

Appendix B

Marin Stream Maintenance Program Manual and Appendices

- The Marin Stream Maintenance Program Manual and Appendices is part of this Order but is not physically attached due to volume. It is available on the [Regional Board's Website](#).

Marin County Flood
Control and Water
Conservation District

Marin County Stream Maintenance Manual



MARIN COUNTY STREAM MAINTENANCE MANUAL

Developed by the:

Marin County Flood Control and
Water Conservation District

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MCFCWCD is a Special District administered by the
County of Marin Public Works Department
3501 Civic Center Drive, Rm 304
San Rafael, CA 94913
(415) 473-6501

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ACRONYMS

| | |
|-----------|--|
| AMM | Avoidance and Minimization Measure |
| BASMAA | Bay Area Stormwater Management Agencies Association |
| BMP | Best Management Practice |
| CEQA | California Environmental Quality Act |
| CCNB | Conservation Corps of the North Bay |
| CDFW | California Department of Fish and Wildlife |
| CNDDDB | Californian Natural Diversity Database (CDFW) |
| CWA | Clean Water Act |
| dbh | diameter at breast height |
| DPW | County of Marin Department of Public Works |
| ECC | Environmental Compliance Coordinator |
| ESA | Endangered Species Act |
| FCZ | Flood Control Zone |
| FEMA | Federal Emergency Management Agency |
| FishNet4C | Fishery Network of the Central California Coastal Counties |
| LOP | Limited Operating Period |
| LWD | Large Woody Debris |
| MBTA | Migratory Bird Treaty Act |
| MCSTOPPP | Marin County Stormwater Pollution Prevention Program |
| MHHW | Mean Higher High Water |
| MOU | Memorandum of Understanding |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Association |
| OHWM | Ordinary High Water Mark |
| OPC | Operational Permits Committee |
| PRBO | Point Reyes Bird Observatory |
| RTE | Right to Enter |
| RWQCB | Regional Water Quality Control Board |
| SMHM | Salt marsh harvest mouse |
| SMP | Stream Maintenance Program |
| STRAW | Students and Teachers Restoring a Watershed |
| USACE | U. S. Army Corps of Engineers |
| USFWS | U. S. Fish and Wildlife Service |
| WDR | Waste Discharge requirement |

GLOSSARY

| | |
|--|---|
| Biologist | A biologist is a person who has a combination of academic training and professional experience in the biological sciences. |
| Bioengineering | Bio-engineering is the application of principles of engineering and natural sciences to flood control maintenance. Applications from both fields, such as installation of willow walls and/or brush mattresses, may be used in the field of flood control engineering to reduce the impacts on the natural and urban environment. |
| District environmental staff | Refers to the Marin County personnel who will oversee the implementation of the SMP, including preparation of pre-notification lists, scheduling pre-construction surveys, conducting trainings, and writing annual reports. |
| Emergency Project | As defined in the State Fish and Game 1600 code. |
| Environmental Compliance Coordinator (ECC) | Refers to the Marin County personnel who will ensure the implementation of general conditions and prohibitions, AMMs, and BMPs associated with all maintenance activities. |
| Flood Control Channel | Engineered channels that have been designed or constructed for drainage or flood control purposes. |
| Flood Control Structure | Levee, dams, and artificially constricted channels for flood control purposes. |
| Maintenance Supervisor | Refers to the lead supervisor, crew chief, foreman, or other lead personnel of the District, County Roads crews, CCNB, STRAW, and/or private contractors. |
| Natural Channel | Streams or watercourses that have not been engineered for drainage or flood control purposes; may include creeks with erosion control structures, such as riprap, on their banks. |
| Pond | Includes any natural or man-made stock pond, detention basin, or sediment basin. |

| | |
|-----------------|---|
| Project | Each <i>project</i> is defined as the maintenance activities completed within an individual Flood Control Zone or County Service Area. For the purposes of this SMP, there are six projects (Flood Control Zones 1, 3, 4, 7 and 9, and County Service Area 13). |
| Riparian Area | The area located along the edge of a channel, generally on the floodplain, characterized by access to and influence of the channel, but not in it. A riparian zone or riparian area is the interface between land and a river or stream. |
| Site Fact Sheet | A one-page sheet prepared for each of the distinct sites; the fact sheet will contain the site ID and location, the habitats and land uses on site, special status species that may occur at the site, and AMMs and BMPs to employ at the site to avoid and minimize environmental impacts. |
| Structure | Storm drain outfalls, tide gates, slide gates, culverts, revetments, bank protection, energy dissipaters, grade control structures, sediment basins, weirs, diversion structures, trash racks, stream gauge structures, fish ladders, fish screens, utility lines, crossings, bridge piers and pump stations. |
| Upland Areas | Areas above the normal reach of streams or rivers and characterized by non-wetland vegetation. |

1.0 PROGRAM OVERVIEW

1.1 Introduction

The Marin County Flood Control and Water Conservation District (District) was formed in 1955 by an act of the California State Legislature with the primary purpose of controlling flood and storm waters of streams which flow within and into the county. The Marin County Board of Supervisors sits as its board and the District is staffed by the County of Marin Department of Public Works (DPW). The boundaries of the District are contiguous with those of the county, and eight flood control zones have been established to address specific issues related to flooding within individual watersheds.

The District holds legal title to thousands of acres of flood control lands and holds easements on many additional lands. It maintains 37 miles of stream channels, several basins, and numerous flood control facilities (17 permanent and 3 portable pump stations; 10 miles of levees; tide gates, and other facilities) to ensure flood conveyance, the proper functioning of flood control facilities, and access to streams, channels, and facilities.

1.2 Historical Context of Flood Management in Marin County

The Marin County Flood Control and Water Conservation District has a long history of being on the cutting edge of environmentally-sensitive flood control work. The District hired its first Creek Naturalist in 1972 to inspect creeks and direct District work within the creeks with habitat preservation and species protection as goals. The District has worked with the Conservation Corps since 1983 to implement creek maintenance projects, and District staff regularly inspects many of our creeks and enforce various local and other regulations which protect them. The District has implemented the Marin County Watershed Program since 2008; the program focuses on watersheds within established County flood zones to integrate flood protection, creek and wetland restoration, fish passage and water quality improvements with public and private partners. In addition, the District works closely with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP), which is a joint effort by the cities and County of Marin to reduce pollutants in stormwater runoff. District staff also implements the County's Fish Passage Program, established by the County Board of Supervisors in 2005, that prioritizes and removes migration barriers to spawning salmon to the upper reaches of Marin's creeks.

As was the norm for 1960's flood control efforts, the U. S. Army Corps of Engineers (USACE) considered three concrete channel flood control projects in Marin County: Coyote Creek from the mouth to Maple Street in Tamalpais Valley; Corte Madera Creek from Larkspur to Fairfax in Ross Valley; and Novato Creek from the mouth to Grant Avenue. Only the first was built in its entirety: the Coyote Creek project was completed in 1967; the Corte Madera Creek channel was stopped at the College of Marin in 1971 (with one more portion in the works to be completed from College of Marin to the Sir Francis Drake Blvd. bridge just before the Ross/San Anselmo line, and with San Anselmo and Fairfax permanently opting out of the project); and the Novato project was not built at all.

Instead, the Novato Flood Control Zone 1 Advisory Board developed an innovative eight-phased program of projects in 1985 following passage of a voter approved bond measure. Projects included raising the Stafford Lake dam, increasing capacities of Novato, Warner and Arroyo Avichi creeks, constructing a bypass at Arroyo Avichi, and constructing a storm water detention pond at Deer Island, stabilizing eroded banks and restoring riparian function.

In many cases, the District maintains storm water pipes and/or flood control facilities that were constructed well before the era of environmental regulation. Nonetheless, it continues to limit its scope of activities to minimize additional impacts to the environment. Within Marin communities, progressive city councils and community members showed an early desire and willingness to acquire lands and prioritize protection of native riparian corridors and wetlands.

While creeks in Marin County have been impacted by development, in general they remain largely above ground and functional. Marin's engaged and environmentally focused community has a long history of supporting stream side protection during development. This stewardship combined with Marin County's commitment to conducting flood control maintenance work in an environmentally sensitive manner has resulted in many of our creeks and adjacent native riparian corridors and lands supporting habitat for endangered species including steelhead, Ridgway's rail, and salt marsh harvest mouse.

We are proud of our communities' history of habitat conservation and continue to balance their flood management needs with the needs of our many creek inhabitants in the most sensitive way possible.

1.3 Manual Organization

This document contains several chapters, tables, figures and maps, and data sheets within the main chapters and appendices.

Chapter 1 introduces the program and describes the program activities, partners and contractors, and foundation documents. Chapter 2 describes the environmental and geomorphic settings of the project works areas. Chapter 3 details the impact avoidance and minimization measures built into the project. Chapter 4 provides an overview of the different maintenance activities, and Chapters 5-9 detail each activity type, listing the program activities, activity-specific maintenance goals, triggers, and conditions, activity scope, timing and frequency, and contractor details. Chapter 10 outlines how the program is managed, describes the annual work cycle, and explains the data collection and management procedures. Finally, Chapter 11 discusses the regulatory framework pertaining to the program.

Appendix A contains the Master List of Project Areas and Sites. Each site is described as to its location, municipal partners, maintenance activities, habitat types, and potentially-occurring special status species. Appendix B lists all of the sediment removal sites with detailed information including work footprints, types of equipment used, equipment

location, and whether U. S. Army Corps of Engineers (USACE) jurisdiction is indicated. Regulatory agencies have requested that Appendices A and B also list larger District projects that, while not included in the SMP, may also be performed within the Project Areas; these projects are listed but are noted as not being included in the SMP. Appendix C contains the maps of site locations and maintenance activities. Appendix D contains Site Fact Sheets for each site, which provides relevant site-specific information including habitats, likely special-status species, and appropriate AMMs, and BMPs. Appendix E contains the Biological Assessment and all its appendices. Appendix F contains the Best Management Practices (BMPs) from BASMAA, CDFW, FishNet4C, and FEMA. Appendix G contains the CEQA documents completed in support of the SMP. Appendix H contains the Biological Survey data sheet; Appendix I contains the Site Report Form; and Appendix J contains the Site Reconnaissance data sheet.

1.4 Program Purpose and Objectives

Since 1972, the District has implemented a prescribed stream maintenance program based on best available science in order to maintain flood conveyance in District-maintained creeks and channels. The program is led by a creek naturalist who directs local conservation crews, road maintenance staff and private contractors to carry out environmentally sensitive vegetation management, sediment removal, and biotechnical slope stabilization activities along with the maintenance of pump stations, levees and other flood control facilities. District staff who implement the maintenance activities have expertise and training in natural resource management, sediment control, and erosion control measures. The Stream Maintenance Program (SMP) includes strong protections for wildlife, habitats, and water quality.

The SMP manual defines the types and scope of the District's common maintenance activities conducted in and around flood control channels and facilities. It establishes programmatic guidance to conduct these activities for flood control purposes while avoiding and minimizing environmental and habitat impacts. The SMP manual provides the organizational framework for flood control staff and managers to oversee maintenance crews and their activities and to ensure that their work complies with the terms and conditions of regional, state, and federal regulations while ensuring the protection of special status species and wetland and riparian habitats.

1.5 Summary of Maintenance Activities

The SMP includes five types of maintenance activities listed below. Detailed descriptions of each of these activities and the environmental protections that are incorporated into the implementation of these activities can be found in Chapters 3-9.

- Vegetation management
- Sediment and debris removal
- Erosion control
- Facilities maintenance and repair of flood control structures
- Levee maintenance

The District's SMP manual has been developed to define the maintenance of streams and flood control facilities, establish programmatic guidance to conduct maintenance activities, and to ensure that the program complies with the terms and conditions of its permits from regional, state, and federal agencies.

To minimize impacts to water quality, wildlife and native habitat, the SMP specifies appropriate general and activity-specific conditions, sensitive species-specific avoidance and minimization measures (AMMs), and best management practices (BMPs) to be employed as part of program implementation (Chapter 3).

The SMP does not include projects requiring individual CWA Section 401 Certification or Waste Discharge Requirements, such as larger capital improvement projects (e.g. building a new pump station), large sediment removal projects (e.g. mainstem of Novato Creek), or new bank stabilization projects using rock rip-rap..

1.6 Program Areas and Sites

The geographic extent of the SMP includes eight project areas: one each for seven flood control zones and one County Service Area (Figure 1-1):

- Flood Control Zone 1 – Novato
- Flood Control Zone 3 – Richardson Bay
- Flood Control Zone 4 – Bel Aire and Strawberry Circle
- Flood Control Zone 5 – Stinson Beach
- Flood Control Zone 6 – San Rafael Meadows
- Flood Control Zone 7 – Santa Venetia
- Flood Control Zone 9 – Ross Valley
- County Service Area 13 – Upper Lucas Valley

Each of the project areas is located in suburban eastern Marin County, except for Flood Control Zone 5 which is located in Stinson Beach in West Marin (Figure 1-1). Each project area includes a number of sites, which are differentiated based on stream reaches and habitat types. Sites were delineated based on locations where work has historically been conducted, but reaches were further broken down by habitat type and likely sensitive species habitats. Each site was classified as being tidally-influenced or not and was furthered classified as to habitat type as identified in the Biological Assessment. The five habitat types are: California annual grassland, northern coastal salt marsh, diked baylands, north coast riparian forest/scrubland, and mixed evergreen forest. The list of sites can be found in Appendix A.

Maintenance work occurs on lands where the County and/or its municipal partners own the land outright in fee title or hold legal easements. In a limited number of sites, vegetation maintenance activities may occur on private parcels for which the District and/or its municipal partners annually receive written landowner rights-to-enter permissions in order to perform maintenance activities (3-REED-1; 3-REED-2; 3-SUT-5; 4-

EAST-2, 5-EAS-1, 5-EAS-2, 5-EAS-3, 7-GAL, 9-LAR-2, 9-Mag-1, 9-MAG-2, and 9-MAG-3). No aspect of the SMP will be implemented in areas where the County or its municipal partners do not have direct legal jurisdiction or landowner permission.

FLOOD CONTROL ZONE 1- NOVATO

Flood Control Zone 1 encompasses the 36,500-acre watershed tributary to Novato and Rush Creeks, which includes the entire city of Novato plus a large part of the unincorporated area around the City. The zone was formed in 1970 to address flooding issues in downtown Novato and surrounding areas. Novato Creek is a substantial perennial stream that extends approximately 17 miles from its mouth at San Pablo Bay to its headwaters above Stafford Lake. Tributaries include Arroyo Avichi, Vineyard Creek, Warner Creek, and Wilson Creek. Ongoing maintenance includes regular servicing of four pump stations, tidegates, levees, and drainages, and an annual vegetation maintenance program.

FLOOD CONTROL ZONE 3 – RICHARDSON BAY

Flood Control Zone 3 encompasses 8,535 acres in Southern Marin draining to Richardson Bay, including the City of Mill Valley and the unincorporated communities of Almonte, Alto, Homestead Valley, Sutton Manor, Tamalpais Valley, and portions of Strawberry Point. The zone was formed in 1956 to address vulnerability to flooding from creek and tidal action within the area adjacent to Richardson Bay. The zone includes Richardson Bay and the many drainage areas tributary to the Bay including Coyote Creek, Arroyo Corte Madera del Presidio, and Warner Canyon Creek. Maintenance activities include regular servicing of five pump stations, tidegates, levees and drainage ditches, and an annual vegetation maintenance program.

FLOOD CONTROL ZONE 4 – BEL AIRE AND STRAWBERRY CIRCLE

Flood Control Zone 4 is located on the Tiburon Peninsula. It encompasses 550 acres and includes portions of the City of Tiburon and the unincorporated communities of Bel Aire and Strawberry. The zone was created in 1957 to alleviate chronic flooding in what was the Bel Aire subdivision and adjacent undeveloped lands. The boundaries of the zone were later amended to include the area of Strawberry Circle. The zone currently maintains existing facilities including three pump stations and performs an annual vegetation maintenance program.

FLOOD CONTROL ZONE 5 – STINSON BEACH

Flood Control Zone 5 encompasses 1,500 acres within the Easkoot Creek watershed. The zone was created in 1961 to address the flooding in Stinson Beach caused by overflows of Easkoot Creek, a small perennial stream that flows through the community into the southeastern arm of Bolinas Lagoon. The creek supports steelhead; coho (likely stragglers) have been documented in the lower reaches (see the Biological Assessment for more information); and red-legged frogs have been documented in a small brackish pond on the east side of Highway 1 at the north end of the Bolinas Lagoon. Common maintenance

activities include removal of sediment and debris jams at bridges and vegetation maintenance along the creek corridor.

FLOOD CONTROL ZONE 6 – SAN RAFAEL MEADOWS

Flood Control Zone 6 is comprised of a 100-acre area that was annexed to the City of San Rafael in 1978. Historically, the main goal was to protect residents against flooding of a local creek. A large portion of the zone was redeveloped in 2005; during construction, the drainage issues were addressed and little flooding risk remains. However, the zone continues to carry out annual vegetation maintenance on the unnamed creeks and ditches in the zone.

FLOOD CONTROL ZONE 7 – SANTA VENETIA

Flood Control Zone 7 extends over approximately 260 acres in the unincorporated community of Santa Venetia, east of Highway 101 along N. San Pedro Road. This community was one of the first developments in Marin County to be constructed on fill over bay mud and was built in an era before the County had the authority to regulate or control development. Due to the low initial elevation of the fill and the compressible nature of the underlying bay mud, the area has subsided and is now below the high tide level. To protect themselves from tidal flooding of Gallinas Creek, the residents of Santa Venetia formed Flood Control Zone 7 in 1962. Maintenance activities include regular servicing of five permanent and three portable pump stations, tide gates, levees and drainage ditches, and an annual vegetation maintenance program.

FLOOD CONTROL ZONE 9 – ROSS VALLEY

This large zone encompasses the 18,600-acre watershed drained by Corte Madera Creek and its tributaries. The towns of Fairfax, San Anselmo, Ross and Larkspur as well as the unincorporated communities of San Anselmo, Fairfax, Kentfield, and Greenbrae are located within this zone. Flood Control Zone 9 was established in 1966 to act as a sponsoring agency for the U.S. Army Corps of Engineers Corte Madera Creek Flood Control Project. In January 2007, the flood zone boundaries were amended to include all territories within the incorporated areas of the towns of San Anselmo and Fairfax. This change was undertaken in response to the flood of December 30, 2005 and the subsequent creation of the Ross Valley Flood Control and Watershed Program. The zone maintains the Corte Madera Creek flood control channel from just downstream of the Ross Post Office to the outfall of the creek in Larkspur. Typical maintenance activities include an annual vegetation and debris cleaning of the creeks.

COUNTY SERVICE AREA 13 - UPPER LUCAS VALLEY County Service Area 13 (Upper Lucas Valley) is located within the 5,950-acre Miller Creek watershed and is managed by Marin County Parks. Parks requested that the District's help in maintaining the flow capacity of the creek. Activities include vegetation maintenance, removal of non-native plant species, and re-vegetation with native species. Students and Teachers Restoring a Watershed (STRAW) is an important partner in this watershed.



Figure 1-1. Project areas covered by the Marin County Flood Control District’s Stream Maintenance Program (SMP).

1.7 Responsible Parties and Program Partners

Marin County Flood Control and Water Conservation District

The District is the primary proponent for the SMP, which utilizes the labor and expertise of the County of Marin Department of Public Works flood control staff and road maintenance crews, Conservation Corps North Bay, STRAW, and private contractors to manage and implement prescribed maintenance activities.

The District will designate environmental staff who will provide day-to-day oversight of the SMP including: 1) project planning; 2) notification to applicable resource agencies; 3)

project implementation including scheduling appropriate site surveys and conducting crew trainings; and 4) annual reporting. The District will also designate Environmental Compliance Coordinators (ECC) to oversee the biological aspects of the SMP. The ECCs shall have an understanding of biological resources, missions of regulatory agencies and regulations as they may affect listed species, and knowledge of the nature of the maintenance activities. The ECCs will coordinate activities with input and review from Public Works biologists.

During project implementation, the ECCs will ensure that all precautions are taken to avoid impacts to the environment including adherence to general conditions and prohibitions as well as activity-specific conditions for each type of activity. The ECCs will also ensure that AMMs are employed as prescribed in Chapter 5, depending on the location and nature of the activity.

Department of Public Works Roads and Building Maintenance

DPW road maintenance crews perform vegetation management, sediment removal, and maintenance of tide gates and other facilities for the District. DPW building maintenance crews undertake pump station maintenance activities.

Conservation Corps North Bay

Conservation Corps North Bay (CCNB) is a non-profit job training and educational organization which has been operating in Marin County since 1982. CCNB will be the primary active partner and contractor with the District for many of the activities included in the SMP. CCNB Maintenance Supervisors and staff will be trained annually by District staff to incorporate the general and activity-specific conditions, AMMs, and BMPs required for each activity at each site in order to protect water quality, habitat and special status species.

Marin County Parks

The District coordinates with Marin County Parks to perform vegetation maintenance activities on lands under their jurisdiction, including County Service Area 13 and the Santa Venetia Marsh Preserve.

Municipal Partners

In addition to the work it oversees directly, the District has formal Memoranda of Understanding with the cities of Larkspur, Mill Valley, and San Rafael and the towns of Fairfax, Ross, and San Anselmo to conduct channel maintenance activities on properties within their jurisdictions. Municipal partners are identified in Appendix A.

Students and Teachers Restoring a Watershed

The District partners with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP) and Point Blue Conservation Science's (formerly the Point Reyes Bird

Observatory) Students and Teachers Restoring a Watershed (STRAW) Project to perform restoration work in eastern Marin County. Activities consist primarily of removal of invasive plants and planting of native species by groups of teachers and students organized by STRAW.

The STRAW Project provides an integrated program of classroom and hands-on watershed restoration education, centered on involving students in professionally designed, creek and wetland restoration to improve creek and wetland habitats. Restoration experiences are complemented with classroom and field studies throughout the school year. These educational activities create a meaningful context for the restoration work and a greater understanding of watershed ecology.

1.8 Foundation Documents for the SMP Manual

The SMP Manual is largely based on work previously performed by the Bay Area Stormwater Management Agencies Association (BASMAA). The District, as a member of MCSTOPPP, has been an active member of BASMAA since 1989. BASMAA is a consortium of 90 Bay Area county and city governments, local water and sanitation districts, and state agencies and was formed in response to the National Pollutant Discharge Elimination System (NPDES) permitting program to promote regional consistency.

In 1998, BASMAA formed an Operational Permit Committee (OPC) which worked for several years to develop a Regional General Permit with the USACE to cover prescribed maintenance activities in flood control channels within BASMAA's jurisdictional areas. Although a Regional General Permit was not obtained, the OPC produced several documents which have been used by several BASMAA members to obtain individual permits. The District is also utilizing these documents to support programmatic permit applications for the SMP program, including:

- Minimal Threat Channel and Basin Maintenance Activities. October 2009. This document describes prescribed flood control maintenance activities.
- Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. October 2006. This document describes the environmental setting, special status species within the BASMAA jurisdictional area, the extent and scope of proposed activities, and a suite of AMMs and BMPs.
- Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities. June 2000. The manual describes BMPs for equipment and vehicles, sediment control, soil stabilization, natural resource protection and restoration, vegetation and debris management, and water diversions.

Additional supporting documents include the Biological Assessment of the proposed SMP (Appendix E) which identified possible sensitive species and habitats that could be impacted by the project and several sources for BMPs (Appendix F).

2.0 ENVIRONMENTAL SETTING AND PROJECT AREAS

2.1 Physical Description

Marin's watersheds share the same general anatomy: the ridge-tops and upper slopes of the watersheds are in generally undisturbed open areas, the valley floors are densely developed, and the lower reaches are tidally-influenced and quite flat.

The uplands encompass the hilly, often steep, terrain from the top of the ridges down to where the valleys flatten out. They are dominated by mixed evergreen forest and oak-bay woodlands, interspersed with open annual grasslands, chaparral, and coastal scrub. Much of the upland habitats in Marin County are protected as public and municipal open space.

The valley floors, where most of the District's SMP sites are located, contain dense residential and commercial developments, often located next to, and sometimes over the creek channels. The road network is also dense, with many bridges and culverts spanning the creeks. In many cases, urbanization has led to channel straightening, building structures that restrict flow and an expansion of invasive plant species.

Creeks on the valley floor are often incised and largely separated from their floodplains by urban land uses. Their channels are often narrower than would be expected given the size of their contributing watersheds. Urbanization has likely increased the timing and magnitude of peak runoff events such that more water flows to the creek at a quicker rate. This can lead to channel down cutting and bank hardening which reduces available riparian habitat.

The lower reaches of creeks have very little topographic relief and are either tidally influenced and support tidal marsh, or are cut off from their surrounding marsh lands by levees. These areas often have altered hydrology and are constrained by roads, levees, and other development. Freshwater seasonal wetlands have become established in areas that were historically baylands and then subsequently diked for agriculture. These seasonal wetlands provide habitat for migratory waterfowl and shorebirds. ,

2.2 Geomorphic Setting

Urbanization has greatly impacted the transport and storage of sediment through Marin's creek systems. Over time, these reaches likely stored sediment in the channel, distributing and depositing it along alluvial fans and or channel floodplain surfaces. The historic geomorphic system was altered by land use practices and the resulting infrastructure developed in the 19th and 20th centuries. Grazing, agriculture, urbanization, road development, flood protection and other land use changes combined to alter the channel system and patterns of sediment deposition.

Many of the streams maintained by the District have been channelized and engineered for flood control purposes. Streams that previously migrated and deposited their sediment

across a broad alluvial fan or floodplain are now constrained to linear channels where sediment accumulates.

Stream channel incision is another geomorphic legacy that affects many of the channels maintained by the District. Incising channels are actively eroding and down-cutting their channel bed and banks. There are several possible causes for channel incision including hydro-modification effects (due to land use changes) whereby runoff and stream flows are more erosive due to higher peak volumes and velocities. Sometimes channels incise because the “base” or “trunk” stream into which they flow has itself “sunk” or incised, and therefore the tributary follows this lead by incising to meet the elevation of the downstream receiving water. Alternatively, sometimes channels incise because there is an active “headward migrating knickpoint” that moves upstream through a system eroding and lowering the channel bed as it moves upstream. Incised channels are typically at greater risk for bank destabilization and in need of repair.

Novato Creek Watershed

The Novato Creek watershed, located at the northwestern extent of San Pablo Bay, is the largest watershed in eastern Marin County. Its creeks flow eastward through oak and bay forests, grasslands, the City of Novato, and into San Pablo Bay near the mouth of the Petaluma River. Novato Creek is joined by six major tributaries along its 17 mile length: Leveroni, Bowman Canyon, Warner, Arroyo Avichi, Arroyo de San Jose, and Simmonds Slough.

The channel network has been altered from its historic natural conditions. Many of the channels are actively in transition to a more stable configuration with the majority of the channels narrower than expected for the watershed size and rainfall. Urbanization has likely increased the timing and magnitude of peak runoff events such that more water flows to the creek at a quicker rate.

Extensive bank erosion indicates that the channels are in a widening phase. Sediment production in the watershed occurs due to upslope processes such as landslides and gully development, as well as channel bed incision and bank erosion. The Novato Creek mainstem of Novato Creek and its major tributaries are all highly entrenched within the city limits and are constrained by development on the banks. Channels in the upper watershed are still incising and are expanding headward into hillside swales.

The stream channels in the lower reaches of the watershed are managed for flood conveyance and navigation and their ability to transport sediment is reduced by levees and urbanization. The levees limit the tidal prism available to scour and move sediment. Sediment accumulates in the lower reaches of the mainstem creek where levees have cut off the channel’s access to the marsh lands.

Richardson Bay Watersheds

The Stream Maintenance Program area in Southern Marin County contains several sub-watersheds that drain into Richardson Bay including Arroyo Corte Madera del Presidio and its tributaries (Cascade, Old Mill, Reed and Warner Creeks), Coyote Creek, Ryan Creek, Marin City and Bel Aire (West and East Creek).

Arroyo Corte Madera del Presidio drains the ridges of the eastern slope of Mount Tamalpais and the Corte Madera Ridge as they flow eastward to Richardson Bay through the Town of Mill Valley. The upper slopes and ridges are largely owned by Marin County Open Space, Marin Municipal Water District, and state and federal park agencies; these lands provide habitat connectivity between adjoining watersheds. The upper channels are steep with boulders and bedrock cascades as they flow through forested v-shaped valleys. Urbanization has altered the form and habitat function of the creeks in the middle and lower reaches of the watershed. Mill Valley land use is mostly medium to low density residential with clusters of commercial areas on the valley floors. Concrete and rock bank stabilization is found throughout much of Arroyo Corte Madera del Presidio and its tributaries; Old Mill Creek, Warner Creek, and Reed Creek. Sections of these creeks have been concrete lined and put into culverts under roads and buildings. Pools are limited to shallow scour pools associated with bank erosion or debris (Rich 1995, and Reedy 2005). Arroyo Corte Madera del Presidio transitions to a tidal slough downstream of La Goma Street.

The Coyote Creek watershed is bounded by Bothin Marsh and Richardson Bay to the east and the Arroyo Corte Madera del Presidio subwatershed to the north. The ridges to the south and west are protected as part of the Golden Gate National Recreation Area. The Coyote Creek subwatershed includes the unincorporated communities of Tamalpais Valley, Tamalpais Valley Junction (Tam Junction), Manzanita, and Almonte. Most of the development is single-family residential, with limited commercial development and services. The upper watershed is mostly rural and semi-rural, while the lower watershed is developed with greater densities near Bothin Marsh. Commercial development is largely concentrated in a small area at the junction of Highway 1 and Almonte Road.

Ryan Creek watershed, only 0.31 square miles lies immediately to the north and east of Arroyo Corte Madera del Presidio watershed. Ryan Creek is ephemeral in nature and water only flows in the creek during and immediately after storm events. Marin City watershed, just to the south of Coyote Creek covers 0.64 square miles and has both have a mix of residential and commercial areas. The upper hillsides are almost entirely residential and there is a substantial houseboat residential area at along the bay front. The Bel Aire, located on the Tiburon Peninsula on the northeastern shores of Richardson Bay, measures 0.78 square miles in area. Three pump stations and annual clearing of vegetation from channels, helps to decrease risk of flooding in this low-lying area of Southern Marin.

Easkoot Creek Watershed

Easkoot Creek originates in the steep, west-facing slopes of Bolinas Ridge. Three tributaries, Fitzhenry, Laurel, and Black Rock Creeks, join to form Easkoot Creek just upstream of Shoreline Highway in Stinson Beach. After exiting the uplands, the creek turns northwest and flows behind the coastal dune until it enters the south arm of Bolinas Lagoon. It has been debated whether or not the creek historically flowed to the Lagoon or went straight out to the ocean. Recent research indicates that the current channel location very closely matches its historic location, and that only during high flow events would the creek change its course and flow directly to the ocean across the beach (Van Kirk 2002, Tetra Tech 2001).

The stretch of Easkoot Creek through the town of Stinson Beach has been hardened with riprap, sacrete, gabions, or retaining walls to stabilize its banks. This reach of creek also exhibited markedly low amounts of large wood and no viable pools.

During medium to large storm events, an active slide on Mt. Tam releases enough hillside material to fill in the creek, even if it has recently been dredged. The essentially flat reach from Arenal to Bolinas Lagoon creates a slower moving creek and a natural area for sediment to settle and deposit. The private bridges along the residential streets known collectively as the “Calles” have limited to no clearance from the creek during storms, which may contribute to flooding. The County and Flood Control Zone 5 has spent significant funds to perform limited sediment removal at the Calle bridges that is typically effective for only one to two seasons and requires dewatering the channel and relocating Steelhead trout.. A sediment basin on Park Service property downstream of Arenal Avenue has been constructed to capture sediment in one location to, reduce the frequency of sediment removal at the Calles bridges, thus reducing impacts to Steelhead and other aquatic life. Constructed in 2013, annual monitoring has shown that it is working well and it’s effectiveness in capturing sediment has allowed for a decrease of sediment removal at the six bridge crossings, thus avoiding impacts in more sensitive creek habitat.

Gallinas Creek Watershed

The Gallinas Creek watershed is located in east Marin between the Miller Creek and San Rafael Creek watersheds. The North Fork is the larger of the two drainages and flows from the Terra Linda/Sleepy Hollow ridgeline through Santa Margarita Valley and the community of Terra Linda to its confluence with South Gallinas Slough near McInnis Park. South Gallinas Slough is fed by several small tributaries that originate in the San Rafael Hills and San Pedro Ridge and flow through the highly urbanized communities of San Rafael Meadows and Santa Venetia.

Prior to urbanization and the tidal wetland reclamation practices of the early 1900s, Gallinas Creek had an extensive tidal slough system fed by intermittent streams originating above Santa Margarita Valley and the headlands surrounding South Gallinas slough. By the 1920s, levees around Santa Venetia had already been constructed, and since the 1940s, the

main tidal sloughs were leveed and the smaller channels and interior tidal marshes drained and filled for agriculture, creating the channel configuration present today.

During the construction of the Terra Linda housing development in the 1950s, upper sections of Gallinas Creek and its tributaries were channelized along Del Ganado Road and Freitas Parkway, following the historic creek alignment. Although the creeks that drain the southern portion of the Gallinas watershed still have natural creek bottoms many have been engineered and realigned and their banks heavily armored.

Corte Madera Creek Watershed/Ross Valley Watershed

The Corte Madera watershed includes 44 miles of stream channels. Ross Creek drains the northern slope of Mt. Tamalpais; San Anselmo Creek and its tributaries drain the northwestern portion of the watershed. The two channels join to form Corte Madera Creek, which continues through more than a mile of concrete-lined channel past the confluences of Larkspur and Tamalpais Creeks and into the salt marsh at the mouth.

Corte Madera Creek and its tributaries responded to the intensive timber harvesting and livestock grazing of the 1800s by incising into the Holocene valley fill. Large trees growing within the channel banks are approximately 50 years old and were likely established immediately after the 1955 flood, which formed high gravel bars. Although the channels are still responding to the 1800s land use and subsequent urbanization, the effects are slowing and less dramatic. As stated by Stetson (2000), ongoing channel responses include headward advance of 1st order tributaries, reduced bed incision and bank erosion in the upper alluvial channel network, and slowing of channel aggradation in the lower reaches of the watershed.

Exposed bedrock outcrops and constructed grade-control structures throughout the channel network have slowed channel incision while accelerating channel widening. Nearly 50% of the banks have been stabilized with rock or concrete to stabilize banks. Geomorphic recovery processes are ongoing, with inset floodplains occurring in areas where the channel was not restricted from widening and pool/riffle sequences forming in the stable bed. Dense urbanization up to the top of streambanks and unnaturally narrow channels restrict instream habitat recovery and limit channel capacity.

The tidal reaches of the system are heavily impacted and have been modified for flood management. In the 1960s, the Army Corps of Engineers designed and constructed an earthen trapezoidal channel on the lower 4.5 miles of creek through the towns of Corte Madera, Larkspur, Kentfield, and Ross. Lower Corte Madera Creek has been widened and straightened. These lower reaches are sediment aggradation and storage zones for upland and tidally-derived sediment.

Sediment is delivered to the channels from upland sources such as gully development, overland flow, and landslides, as well as from channel bed and bank erosion. It is estimated that the latter accounts for only 9% of the annual bedload transported in the system, while the upland sources account for 91% (Stetson 2000). Together the San Anselmo Creek and

Sleepy Hollow Creek subwatersheds generate 55% of the total annual bedload, while Ross Creek and Fairfax Creek subwatersheds only generate about 10% of the bedload each. These differences are due to variations in geology, topography, vegetation types, and land use.

Miller Creek Watershed

Miller Creek and its tributaries drain a 7,440-acre watershed. Historically, the mainstem channel did not extend all the way to San Pablo Bay. It apparently dissipated most years into a willow grove and wetland complex just south of the present location of St. Vincent's School

Miller Creek and its tributaries have been significantly altered by land use practices since Euro-American contact. Heavy cattle grazing, the conversion from native perennial to non-native annual grasslands, urbanization, ditching and the construction of storm drains have all increased the amount and depth of runoff during storms. The increased runoff has caused channels in the upper watershed and in the upstream reaches of the valleys to incise, leading to local bank failure and loss of riparian vegetation. The eroded sediments have accumulated upstream of some bridges and culverts that act like sediment dams, and along the lower limits of the mainstem channel near the baylands. The accumulation of sediment in the mainstem channel has raised its bed and increased the risk of flooding. Flood control levees have been added in some places.

Miller Creek's drainage network consists of a mainstem channel and its tributaries. The lower reaches downstream of Lucas Valley Estates are perennial, while upstream reaches are intermittent or ephemeral. The headwater reaches are largely ephemeral. Mainstem Miller Creek supports a small but viable steelhead fishery.

2.3 Biological Resources

The District prepared a Biological Assessment¹ (BA) of the project area to evaluate the potential for the occurrence of special-status species or sensitive vegetation communities within the project area (See Appendix E). The majority of the vegetation maintenance and sediment removal work occurs in eastern Marin creeks draining from Novato Creek in the north to Coyote Creek in the south. There are only three project sites in western Marin County on Easkoot Creek in Stinson Beach, draining to the Pacific Ocean. Most of the maintenance activities occur within urbanized, residential and commercial land uses. Some of the lower reaches include tidally-influenced land preserved for wildlife and flood control purposes. Most of the land in the upper reaches is largely undeveloped open space or grazing lands.

¹ Marin County Flood Control and Water Conservation District SMP - Biological Assessment, October 2011

Vegetation communities present within and adjacent to the project area include California annual grassland, northern coastal salt marsh, diked baylands, north coast riparian scrub/forest, and mixed evergreen forest.

2.4 Special Status Plant and Wildlife Species

A list of special status plant and wildlife species that could potentially occur at the proposed SMP project sites was created. The list is based on biological resources within five USGS quads (Bolinás, Petaluma Point, Novato, San Rafael, and San Quentin), literature and database reviews, and familiarity with the biological resources within the project region. Altogether, the BA identified 113 species, of which 41 are listed or candidates for listing, and 72 are federal or state species of concern (see Appendix A in the Biological Assessment for the list of Special Status Species Reported or Potentially Occurring at the Project Sites).

For plants, there are 12 listed species in the selected USGS quadrangles and 21 species of concern. Based on the data available, none of the listed species and four of the species of concern is likely or somewhat likely to occur in the project sites.

Similarly, for animals, there are 29 listed species in the selected quads and 46 species of concern. Based on the data available, eight of the listed species and six of the species of concern are likely or somewhat likely to occur in the project sites.

The following special status species may possibly be found at sites where maintenance activities occur: Point Reyes bird's beak, hayfield tarplant, marsh microseris, Marin knotweed, Coho salmon, steelhead trout, California red-legged frog (west Marin), northwestern pond turtle, Ridgway's rail, California black rail, northern spotted owl, salt marsh harvest mouse, and bats.

The BA documented vegetation communities present within or adjacent to work sites include California annual grassland, northern coastal salt marsh, north coast riparian scrub/forest, and mixed evergreen forest.

Stream Maintenance Manual Sections that Address Special Status Species Protection

The BA recommends several actions for avoiding and minimizing impacts on biological resources and special status species and these recommendations have been incorporated into the SMP, including:

- Work within recognized species work windows
- Adhere to a list of species-specific Avoidance and Minimization Measures. Numerous AMMs to protect special status species and their habitat were identified within the Biological Assessment completed for this program. These AMMs have been incorporated into the SMP and can be found in Chapter 3.5 Avoidance and Minimization Measures for Fish.

- Best Management Practices (BMPs) from the FishNet 4C Manual: County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries (2004) were incorporated into the SMP manual and are applied in the field as standard operations. FishNet 4C is a multi-county program on the Central California Coast which helped Coastal Counties implement salmon protection and restoration efforts. The FishNet Roads Manual was developed to assist County maintenance crews conduct their work in the most sensitive manner as possible to protect anadromous salmonid fish.
- Fact sheets for each individual project site were developed for the SMP and can be found in Appendix D. The fact sheets note whether salmonids presence is presumed and list appropriate AMMs and BMPs to be employed at each site to protect and enhance salmonid habitat.
- Designate Environmental Compliance Coordinators (ECCs) to provide natural resource expertise to the SMP
- Training of Conservation Crews and County maintenance workers on AMMs and BMPs to be applied in the field during all operations and during crew training sessions.

2.5 Salmonid Conservation

Within the project areas, steelhead trout (*Oncorhynchus mykiss*) are known to occur in Novato, Vineyard, Miller, Corte Madera, San Anselmo, Fairfax, Sleepy Hollow, Ross, Arroyo Corte Madera del Presidio, Warner Canyon, Old Mill, Reed, and Easkoot Creeks in Marin County, however current abundance is thought to be a small fraction of historical levels. Historically, coho salmon (*Oncorhynchus kisutch*) occupied the Arroyo Corte Madera del Presidio and the Ross Valley Watersheds, but there are no current runs into San Francisco Bay. In the Western Marin project area, coho salmon have been observed in the lower reaches of Easkoot Creek, but those observations were made in 2002 and were likely strays from adjacent coastal watersheds. Easkoot Creek is not known to support a run of coho salmon. Chinook salmon (*Oncorhynchus tshawytscha*) has been observed sporadically in lower Novato Creek watershed.

Marin County Department of Public Works maintains a salmonid presence stream layer in GIS format. The layer has attribute data for stream hydrograph (natural stream, ditch, embankment, artificial path), channel type (natural, engineered, pipeline), and documented presence of steelhead, coho, and Chinook. Because the County has never been exhaustively surveyed for salmonids, data for presence is not complete for the County, nor is there a consistent base year. The data are often used to denote historic presence. The salmonid presence layer is used for development planning countywide however the layer does not contain fine scale data such on spawning areas or migration corridors. Written reports from California Department of Fish and Wildlife habitat surveys

note these types of fine scale habitat features such as pools and riffles, but DFW does not provide these data in GIS formats.

Figure 2-1. Anadromous streams within the project areas (Marin County GIS) and fish passage barriers identified by Ross Taylor and Associates (2003).

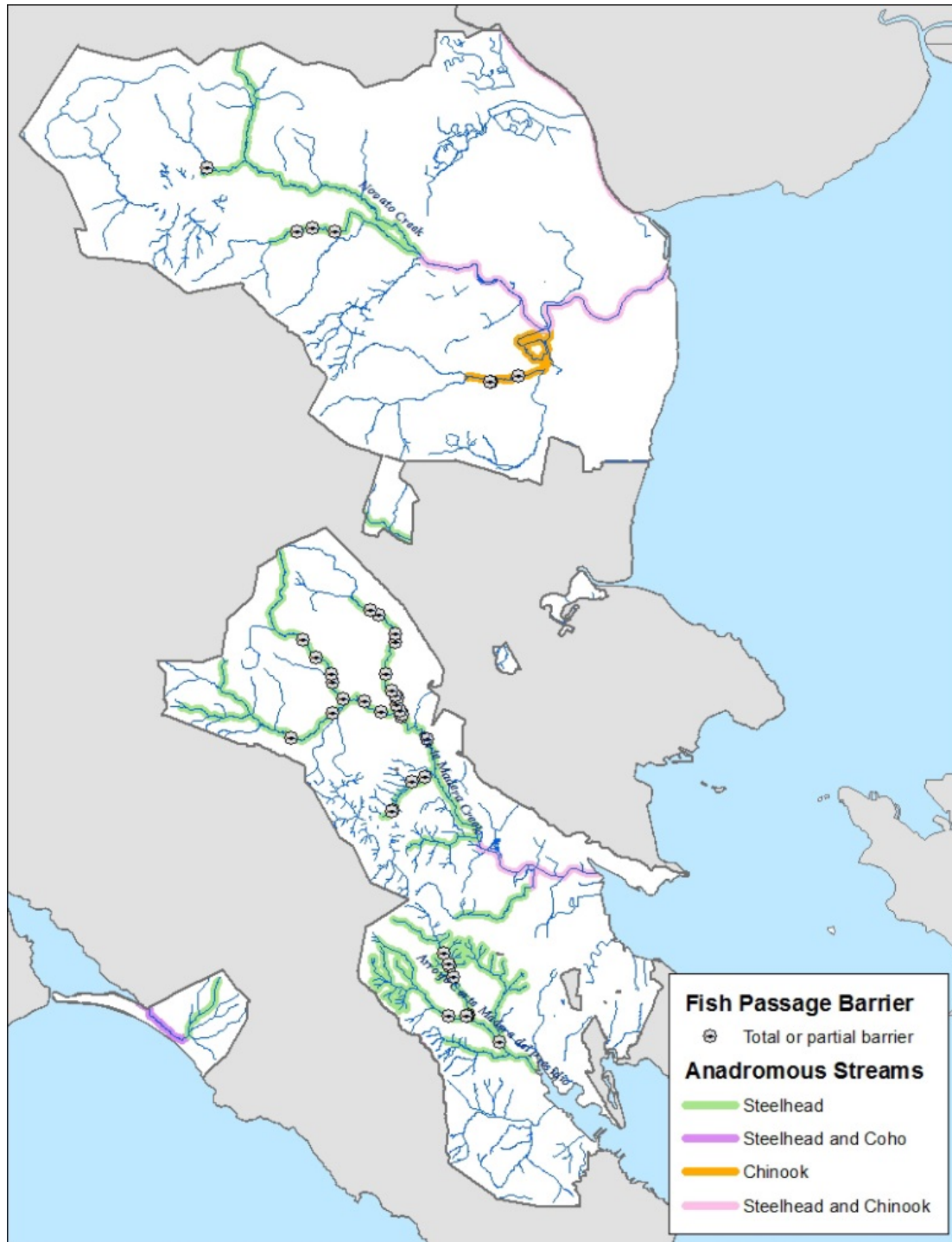


Table 2-1. SMP sites located on or near anadromous streams.

| Site | Creek |
|-------------|----------------------------------|
| 1-NOV-1 | Novato Creek |
| 1-NOV-2 | Novato Creek |
| 1-NOV-3 | Novato Creek |
| 1-VIN | Vineyard Creek |
| 1-WAR-1 | Warner Creek |
| 1-WAR-2 | Warner Creek |
| 3-ACMP-1 | Arroyo Corte Madera del Presidio |
| 3-ACMP-2 | Arroyo Corte Madera del Presidio |
| 3-ACMP-3 | Arroyo Corte Madera del Presidio |
| 3-CAS | Cascade Creek |
| 3-OMC | Old Mill Creek |
| 3-REED-1 | Reed Creek |
| 3-REED-2 | Reed Creek |
| 3-WAR | Warner Canyon Creek |
| 5-EAS-1 | Easkoot Creek |
| 5-EAS-2 | Easkoot Creek |
| 5-EAS-3 | Easkoot Creek |
| 9-CMC-1 | Corte Madera Creek |
| 9-CMC-2 | Corte Madera Creek |
| 9-CMC-2 | Corte Madera Creek |
| 9-CMC-3 | Corte Madera Creek |
| 9-CMC-4 | Corte Madera Creek |
| 9-FAIR | Fairfax Creek |
| 9-LAR-1 | Larkspur Creek |
| 9-LAR-2 | Larkspur Creek |
| 9-ROS | Ross Creek |
| 9-SAC-1 | San Anselmo Creek |
| 9-SAC-2 | San Anselmo Creek |
| 9-SAC-3 | San Anselmo Creek |
| 9-SHC-1 | Sleepy Hollow Creek |
| 9-SHC-2 | Sleepy Hollow Creek |
| 9-SHC-4 | Sleepy Hollow Creek |
| 9-SHC-5 | Sleepy Hollow Creek |
| 9-SHC-6 | Sleepy Hollow Creek |
| CSA-13-MC | Miller Creek |

Over-Archiving Principles for Protecting and Enhancing Salmonid Habitat

Marin County Flood Control District has decades of experience working in or near streams that support populations of threatened or endangered salmonids and their habitat. In 1998, Marin County initiated the FishNet 4 C program, a multi-County program designed to help County governments develop programs and protocols for protection of listed salmonids and their habitat. In 2004 the County adopted the FishNet 4C County Road Maintenance Manual: Guidelines for Protecting Aquatic Habitat and Salmon Fisheries. Since then the County has conducted semi-annual trainings on the content of the manual. Best Management Practices spelled out in the manual are routinely implemented in the field during maintenance activities and are referenced in this manual as well.

When working in or near salmonid streams, the following management strategies will be applied wherever possible:

- 1) **Maintain Low-Flow Channel:** During sediment removal activities the District will provide low flow channels for habitat and fish passage wherever feasible. The District does construct a low flow channel on larger sediment removal projects not included in this manual. On perennial streams, a low flow channel will be established if the County has available the right of way to perform the work.
- 2) **Maintain Vegetation on Lower Streambanks:** Manage stream side vegetation to support aquatic life and salmonids by maintaining overhanging vegetation above and next to the water surface. Vegetation trimming will target mid to upper limbs to allow for debris passage. Thus the roughness is controlled nearer the top of the cross-section rather than at the bottom where the critical functions of the plants, as habitat are, most needed.
- 3) **Maintain and Enhance Instream Habitat Complexity:** A complex instream and channel bed environment provides habitat heterogeneity, cover, and refugia during a range of flow conditions. In coordination with other maintenance activities, District managers will evaluate channels and maintenance sites for opportunities to maintain or enhance complex habitat features. Examples of instream complexity features include:
 - Overhanging vegetation
 - Undercut banks
 - Large Woody Debris (LWD) features that provide cover and refugia during high flow events as well as channel diversity in lower flow events.
 - Deep channel pools that provide rearing habitat and refugia during high flow events as well as habitat during extreme low water times.
 - Cobble/gravel bars and benches that provide spawning and rearing habitats for fish, refugia during higher flow events, and areas suitable for good invertebrate drift.

- Instream geomorphic features that increase channel bedforms, increase the range of channel velocities, and increase the overall range of habitat conditions.

4) **Management of Large Woody Debris (LWD):** Large woody debris is defined as stumps, rootwads and logs having an average diameter greater than 6 " and a length of 10 feet or longer. LWD creates essential habitat for salmonids, including pools and shelter from predators, which are required at specific life stages. Therefore, on salmon streams, when LWD is encountered in the channel during pre-project assessment, the following management practices should be enacted:

- The District should work to preserve and protect LWD on salmon streams to the extent possible.
- All large wood in the channel will be inspected during pre-project surveys and if there is doubt about how to manage the wood, a Department of Fish and Wildlife biologist should be consulted.
- Removal of LWD on salmon streams (as opposed to modification) should only occur where accumulation of woody debris poses a threat to road stability, culverts, bridges or other instream structures and could cause potential flooding due to diminished channel capacity.
- Whenever possible the District will preserve enough roots and branches on the downed wood to provide complexity needed for habitat, or reposition the wood intact.
- When modifying log jams the District will leave logs, rootwads and stumps in the longest lengths and diameters practicable for removal and hauling. Of logs must be cut from fallen trees leave as much as possible on the main trunk, and attached to the rootwad if possible. Only branches obstructing flow should be cut.
- Whenever possible and depending on the species of wood, the District will incorporate LWD removed from channels into stream restoration projects at a nearby location and/or transport any removed LWD to the County Corporation Yard for storage for future restoration projects.

3.0 SELF MITIGATING APPROACH OF PROGRAM

This chapter describes how the implementation of the SMP ensures that maintenance projects are conducted in an environmentally sensitive manner and that impacts are avoided and minimized to the maximum extent possible. Each site has been coded as to the sensitive species potential and sensitive habitats, and for each sensitive species, Avoidance and Minimization Measures (AMMs) have been identified. Further, general conditions and BMPs have been identified for each maintenance activity. Taken together, these efforts assure protections for sensitive species and habitats within the maintenance project sites.

3.1 MITIGATION STRATEGIES

The SMP is structured such that its activities are temporal in nature and would not result in any permanent environmental impacts. An Initial Study pursuant to CEQA was completed February 14, 2012, and a Notice of Determination for a Negative Declaration was filed on June 6, 2012 (State Clearinghouse No. 2012022053). Mitigation measures were outlined in the Initial Study to address the temporary impacts associated with the maintenance activities included in this manual. Maintenance activities that would result in permanent impacts to the creek channel or infrastructure are not included in the SMP program.

The SMP's extensive species-specific Avoidance and Minimization Measures, General and Activity-Specific Conditions, and specified Best Management Practices limit the program's impacts. Temporary impacts from stream maintenance activities are avoided or minimized utilizing the measures described above. In addition, environmental enhancements such as native willow staking, planting of native riparian vegetation, removal of trash and removal of non-native, invasive plant species are carried out as part of the course of work, and temporary impacts are typically self-mitigated by these actions.

Where specific mitigation actions are indicated for temporary impacts, the first course of action should be to attempt to mitigate onsite where impacts occur, with "like for like"; i.e., if riparian vegetation is removed completely, the mitigation would be to plant riparian vegetation locally where applicable. Where onsite mitigation is not available or feasible, the second choice of action should be to mitigate at another County location within the watershed or program area. Where neither of the above two courses of action is available or feasible, mitigation would occur offsite, such as at a STRAW site in the same or adjoining watershed.

3.2 MITIGATION FOR IMPACTS TO ANADROMOUS SALMONIDS

In streams that support salmon or steelhead, impacts to waters of the U.S. or Waters of the State, and/or impacts to riparian habitat, would be mitigated by actions that benefit anadromous salmonids. Mitigation for the loss of instream complexity features will be determined by site assessments conducted prior to project implementation. The site

assessments will also be conducted prior to sediment removal and bank stabilization projects to determine the presence and extent of coarse substrate and instream complexity features. This assessment will inform project and mitigation planning and design.

3.3 PROPOSED MITIGATIONS BY ACTIVITY TYPE

Vegetation Management

Except for the rare event of removing mature trees, vegetation management activities have no permanent impacts and only very minor temporary impacts. The District's methods of limbing and trimming only that which is absolutely necessary to maintain bankfull flow retains intact canopy for shading, roots in banks for stabilization, and understory plants that overhang the creek.

In addition, the related activities of trash removal, non-native plant removal, planting native species, and/or leaving LWD in the creeks will mitigate for any temporary impacts caused by normal vegetation management. If tree removal is indicated, each tree more than 6" dbh will be replaced with at least 3 native trees and monitored for 5 years. If the survival rate is less than 80% after 5 years, replanting and additional monitoring to achieve the survival rate will be required.

Sediment and Debris Removal

The sediment removal projects covered by this SMP are small in scale and do not typically result in permanent impacts. Channel function is often improved after accumulated sediment is removed. Salmonid passage and migratory routes for other aquatic species are often impeded by culverts which become clogged to the point where these species cannot pass up or downstream through the channel. Typically sediment removal from outfalls into tidal areas results in improved tidal flow and action benefitting upstream marsh vegetation. Additionally, sediment removal from clogged culverts will help to keep them in good working order and minimize catastrophic failure, which brings with it far greater environmental impacts.

Trash removal, non-native plant removal, planting native species, and/or modification of LWD instead of removal, serves to mitigate for temporary impacts caused by normal sediment removal activities. The District's first priority in disposing of sediments is to re-use them on other District properties. Often, sediments can be re-used within the same watershed. Uses include adding height to levees to bring levee up to original height and no higher, adding to levee slopes, and road maintenance. Other uses include wetland restoration, mitigation for sea level rise in transition zones and instream gravel use in restoration projects such as fish passage.

Erosion control

Because no specific erosion control projects are identified at this time, mitigation for this activity will be approached on a case by case basis and will be outlined in the project description submitted annually to the agencies for approval.

Facilities Maintenance and Repair of Flood Control Structures

Facilities maintenance activities, conducted using best management practices, will have no permanent and very minor temporary impacts. Trash removal and non-native plant removal next to facilities will mitigate for temporary impacts caused by facilities maintenance activities.

Levee Maintenance

Levee maintenance activities, conducted using best management practices, will have no permanent and very minor temporal impacts. Typical enhancement consists of the removal of non-native plant species which are removed for access and inspection purposes. Trash removal and non-native plant removal will mitigate for temporary impacts caused by these maintenance activities.

3.4 AVOIDANCE AND MINIMZATIONS MEASURES

General Avoidance and Minimization Measures (GAMMs) are included in the manual which apply to all sites. Avoidance and Minimization Measures per species (AMMs) were developed for this program based on the findings and recommendations in the Biological Assessment completed for this program. GAMMS and AMMs are described in detail in the following section.

General AMMs Applied to All Projects

Avoidance and Minimization Measures that apply to all projects at all sites, regardless of maintenance activity type or type of special status species that may be present.

GAMM-1: Environmental Compliance Coordinator, Buffers and Work Stoppages

- Before commencement of a maintenance activity, The District shall designate an Environmental Compliance Coordinator (ECC) who will determine the appropriate AMMs, to implement during operations based on the site fact sheets.
- The ECC shall distribute a work order to maintenance staff and contractors with a list of the AMMs and BMPs applicable to each site. The work order must be completed in a timely manner to allow time for pre-construction surveys.
- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall establish buffers areas, if sufficient, or stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete.

The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USFWS, NMFS, USACE, and/or CDFW). The ECC shall coordinate with Maintenance Supervisors to stop any activity the ECC or agencies deems may cause take of a listed species or their habitat. Work shall not be allowed to resume until appropriate corrective measures have been completed.

- All on-site maintenance activity personnel shall receive instruction regarding the presence of listed species and the importance of avoiding impacts to these species and their habitat before the start of work.

GAMM-2: Site Preparation/Wildlife Reconnaissance

The ECC shall walk the site each day before maintenance activities commence to locate wildlife; if any special status wildlife species are noted, work will not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

When maintenance activities require dewatering, a qualified fisheries biologist with appropriate permits shall be on-site to move fish.

All habitat improvements on salmon and steelhead streams shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (CDFW 2010d).

GAMM-3: Work Windows

To avoid impacts to special status species, the maintenance activities carried out shall typically occur during the summer low flow season. In addition, species-specific work windows shall be followed to avoid impacts. Table below shows the work windows for species that may be impacted by the proposed maintenance activities. Additional information can be found within the species-specific AMMS.

Table 3-1. Work windows.

| | | SMP Work Season | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|--------------------------|-----------------|-------|----------|-------|-------|-------|-------|-------|------|-------|------|-------|------|-------|--------|-------|-----------|-------|---------|-------|----------|-------|----------|-------|
| | | January | | February | | March | | April | | May | | June | | July | | August | | September | | October | | November | | December | |
| Category | Species | 1-15 | 16-31 | 1-15 | 16-28 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 |
| General | In-stream - no salmonids | | | | | | | | | | | | | | | | | | | | | | | | |
| | In-stream - salmonids | | | | | | | | | | | | | | | | | | | | | | | | |
| Vegetation | Planting | | | | | | | | | | | | | | | | | | | | | | | | |
| Invertebrate | Monarch butterfly | | | | | | | | | | | | | | | | | | | | | | | | |
| Fish | Salmonids | | | | | | | | | | | | | | | | | | | | | | | | |
| Amphibian | CA red-legged frog | | | | | | | | | | | | | | | | | | | | | | | | |
| Reptile | Northwestern pond turtle | | | | | | | | | | | | | | | | | | | | | | | | |
| Bird | Black and clapper rails | | | | | | | | | | | | | | | | | | | | | | | | |
| | Northern spotted owl | | | | | | | | | | | | | | | | | | | | | | | | |
| | Raptors and wading birds | | | | | | | | | | | | | | | | | | | | | | | | |
| | Landbirds | | | | | | | | | | | | | | | | | | | | | | | | |
| | Burrowing owl | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammal | Salt marsh harvest mouse | | | | | | | | | | | | | | | | | | | | | | | | |
| | Bats | | | | | | | | | | | | | | | | | | | | | | | | |

Species work window
 SMP work season

GAMM-4: Trash Removal

During all activities at project sites, all construction trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following maintenance activities, all construction trash and maintenance debris shall be removed from work sites and disposed of properly.

GAMM-5: Equipment Staging

Staging/storage areas for equipment, materials, fuels, lubricants, and solvents, shall be located outside of the stream's high water channel and associated riparian area. Stationary equipment such as motors, pumps, generators, compressors, and welders located within the dry portion of the stream channel or adjacent to the stream, shall be positioned over drip-pans. Equipment shall be moved out of the normal high water area of the stream prior to refueling and lubricating. The ECC or Maintenance Supervisor shall ensure that contamination of habitat does not occur during such operations. Best Management Practices covering Chemical Use (Spill Prevention and Control); contained in the BASMAA Flood Control Facility Maintenance Best Management Practices Manual (BAASMA 2000) shall be followed. These BMPs are designed to prevent the discharge of chemicals to flood control channels and storm drain systems and allow prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

The number of access routes, number and size of staging areas, and the total area of the work site activity shall be limited to the minimum necessary to complete the proposed activity.

GAMM-6: Invasive Species

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.

For all activities in creeks and bay, all gear exposed to water shall be allowed to dry for three days before being used again. Some disinfectants are OK to use per DFG and USFWS (users should check with those agencies). As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew will wash and dry them off-site prior to using them in another creek or tributary.

SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES

3.5 Avoidance and Minimization Measures for Special Status Plants

PLA-1: Special status plants

At sites where vegetation may be modified (such as clearing or ground-breaking), and where special status plant species may potentially occur, a qualified biologist shall conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

If suitable habitat is determined to be present within the maintenance site, botanical surveys shall be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, shall be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000).

Surveys shall be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

If listed species are observed or presumed present, then the ECC shall take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project shall be redesigned to avoid listed plant species.

For all observed special status species, the ECC shall complete and submit a California Native Species (or Community) Field Survey Form to the CNDDDB documenting the species and location.

The ECC shall ensure that the Project Foreman is aware of these site-specific conditions, and will inspect the work site before, during, and after completion of the maintenance activities.

3.6 Avoidance and Minimization Measures for Fish

The AMM described below is designed to protect fishery resources. Coho may potentially be found in Easkoot Creek in West Marin, although they aren't known to be breeding there. Steelhead trout are known to occur within Novato Creek, Ross Valley, Miller Creek and Richardson Bay, and these measures will also protect other fish species such as Chinook salmon, sturgeon, lampreys, and Sacramento splittail.

FISH-1: Salmonids

If steelhead and/or coho salmon are known to be absent from the project site based on CEMAR/CDFW surveys and there are long-standing natural or artificial downstream barriers sufficient to prevent upstream migration, then avoidance has been accomplished and no further actions are necessary.

If Coho salmon are observed in the project area during winter months or during pre-construction fish capture and relocation activities, all project activities shall cease and DFW and NMFS shall immediately be notified.

If steelhead are determined or presumed to be present in the project site, then the following Avoidance and Minimization Measures shall be implemented:

- All in-stream maintenance activities will be restricted to the low-flow period of June 15th through October 15th. Work above the top of bank or outside of the channel will not be subject to this modified work period.
- To minimize turbidity and stress to special status species, personnel shall avoid walking through stream pools and the thalweg of the channel, and shall instead walk across riffles or outside of the stream bed to access a project site.
- No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified and permitted biologist.
- If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.
- Captured fish shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year fish from larger age-classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location in which habitat conditions are present to allow for adequate survival of transported fish and fish already present. Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.

- If any salmonids are found dead or injured, the biologist shall contact NMFS biologist Rick Rogers by phone immediately at (707) 578-8552 or the NMFS North Central Coast Office at (707) 575-6050. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length measured, and frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS North Central Coast Office without obtaining prior written approval from the North Central Coast Office, Supervisor of the Protected Resources Division. Any such transfer will be subject to such conditions as NMFS deems appropriate.
- Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.
- If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997: <http://swr.nmfs.noaa.gov/hcd/fishscm.pdf>).
- A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe shall discharge onto the top of bank into a densely vegetated area, which may require extra hose length.
- Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.
- The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.
- For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures will be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream

following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

3.7 Avoidance and Minimization Measures for Invertebrates

INV-1: Monarch butterfly

The three Easkoot Creek project sites, 5-EAS-2, 5-EAS-2, and 5-EAS-3, are adjacent to known overwintering sites for Monarch butterfly.

Avoidance will be accomplished if maintenance activities are scheduled for April 1st through August 31st

If work occurs during the butterfly overwintering season (October through March), the ECC should walk the area of proposed activity each day before maintenance activities begin to determine presence monarchs. If none are observed, avoidance can be assumed and work can proceed. If monarchs are observed within the site, work should not commence until all individuals have left the work site on their own.

3.8 Avoidance and Minimization Measures for Amphibians

AMPH-1: California Red-legged Frog (CRLF)

CRLF absence is presumed for all project sites in eastern Marin. Therefore, impacts are avoided, and no further surveys, studies or CRLF protection measures are required and the maintenance activities can proceed.

For the Easkoot Creek sites, 5-EAS-1, 5-EAS-2 and 5-EAS-3, where there is potential for California red-legged frog to occur, pre-construction aquatic surveys should be conducted by a qualified biologist prior to the onset of any disturbance related activities, following the protocol outlined in the Revised Guidelines on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005):

- At least 15 days prior to the onset of activities, the applicant or project proponent shall submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities shall begin until proponents have received written approval from the Service that the biologist(s) is qualified to conduct the work.
- A Service-approved biologist shall survey the work site two weeks before the onset of activities. If California red-legged frogs, tadpoles, or eggs are found, the approved biologist shall contact the Service to determine if moving any of these life-stages is appropriate. In making this determination the Service shall consider if an

appropriate relocation site exists. If the Service approves moving animals, the approved biologist shall be allowed sufficient time to move California red-legged frogs from the work site before work activities begin. Only Service-approved biologists shall participate in activities associated with the capture, handling, and monitoring of California red-legged frogs.

- Before any construction activities begin on a project, a Service-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the importance of the California red-legged frog and its habitat, the general measures that are being implemented to conserve the California red-legged frog as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session provided that a qualified person is on hand to answer any questions.
- A Service-approved biologist shall be present at the work site until such time as all removal of California red-legged frogs, instruction of workers, and habitat disturbance have been completed. After this time, the contractor or permittee shall designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist shall ensure that this individual receives training outlined above in measure 3 and in the identification of California red-legged frogs. The monitor and the Service-approved biologist shall have the authority to halt any action that might result in impacts that exceed the levels anticipated by the Corps and Service during review of the proposed action. If work is stopped. The Corps and Service shall be notified immediately by the Service-approved biologist or on-site biological monitor.
- Pre-construction surveys should consist of two separate daytime and nighttime surveys extending 300 ft. upstream and downstream (where feasible) of the proposed work sites. If special-status species are found, CDFG and/or USFWS should be contacted to determine what actions are to be taken. The 2005 Guidance recommends a total of up to eight (8) surveys to determine the presence of CRLF at or near a project site. Two (2) day surveys and four (4) night surveys are recommended during the breeding season; one (1) day and one (1) night survey is recommended during the non-breeding season. Each survey must take place at least seven (7) days apart. At least one survey must be conducted prior to August 15th. The survey period must be over a minimum period of 6 weeks (i.e., the time between the first and last survey must be at least 6 weeks). Throughout the species' range, the non-breeding season is defined as between July 1st and September 30th.

- If a maintenance activity site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh no larger than five millimeters to prevent CRLF from entering the pump system.

3.9 Avoidance and Minimization Measures for Reptiles

REP-1: Northwestern pond turtle

Several sites may contain suitable habitat for northwestern pond turtle, and they have been known to occur at sites 1-ASJ-1, 1-LYC, and 1-WAR-2

Pre-construction surveys for northwestern pond turtle shall be conducted by a qualified biologist in accordance with USFWS protocols within 72 hours of the start of maintenance. The creek shall be surveyed for presence of turtles and the creek banks surveyed for presence of burrows; all locations of observed turtles and burrows should be noted.

Each day, before maintenance activities begin, the ECC shall make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, the ECC shall use any means necessary to avoid “take” of these species, including hand removal, installation of fencing, or other measures. The ECC shall assess the likelihood of project impacts to these species and coordinate findings with the USFWS and CDFW to ensure that appropriate protective measures are applied.

At any time during maintenance activities, if a northwestern pond turtle is observed by the ECC, maintenance crew, or other knowledgeable persons, maintenance activities shall stop to avert the avoidable take of these species.

All staging areas for all heavy equipment, storage of materials, and any maintenance/fueling of heavy equipment shall be clearly identified on the grading and building plans in order to minimize impacts to upland habitats outside the project site.

Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of northwestern pond turtles, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

3.10 Avoidance and Minimization Measures for Birds

Following are avoidance and minimization measures for birds. Some of these relate directly to listed species with the potential to occur within one or more project sites (the rails, northern spotted owl); however, others relate more generally to a class of species, such as raptors and wading birds and land birds.

BIRD-1: Ridgway's rail and California black rail

Several of the sites are within (5-10 sites) or immediately adjacent (15-20 sites) to suitable habitat for Ridgway's rail and California black rails. The following measures apply to all sites in or near salt or brackish marshland and will also serve to protect other tidal-marsh dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

When working within 250 ft. of salt or brackish marshland during the period February 1st through August 31st, presence for either rail species shall be assumed.

For all maintenance activities except for mowing of levees:

- Maintenance activities shall be scheduled to occur between September 1st and January 31st to avoid the rail breeding season.
- Work shall be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active.
- Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work shall occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft. above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.
- Activities shall proceed as quickly as possible to reduce disturbance from noise, dust, etc.
- Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If removal is necessary, the work shall be scheduled outside of the breeding season (February 1 – August 31st); all vegetation shall be removed by hand, and shall be salvaged and retained for replacement after work is completed.
- If, for any reason other than fire fuel reduction levee mowing, the District must perform maintenance activities within 250 ft. of salt or brackish marshland during the rail breeding season, the District shall retain a qualified biologist to conduct clapper rail surveys in accordance to most currently available protocols from the Department of Fish and Game and the US Fish and Wildlife Service.

BIRD-2: Northern Spotted Owl

Per the “2011 Protocol for Surveying Proposed Management Activities that May Affect Northern Spotted Owls”, project sites for activities that do not modify spotted owl habitat but may cause disturbance to spotted owls (such as noise from weed-whackers) are defined as 0.25 mi buffers of project footprints. Several of the work sites are within 0.25 mi (1320 ft.) of known locations of northern spotted owl activity centers on Old Mill Creek, Cascade Creek, Warner Canyon Creek, Bothin Creek, Larkspur Creek, and Ross Creek (sites 3-OMC; 3-CAS; 3-WAR; 9-BOTH; 9-LAR-2; and 9-ROS).

To avoid impacts to breeding northern spotted owls, maintenance activities at sites adjacent to habitat for northern spotted owl should follow a limited operating period (LOP) with no vegetation maintenance scheduled from February 1st through July 9th. Disturbance can also be minimized by the use of non-motorized hand tools.

If a biological evaluation determines that vegetation projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location, or where a biological evaluation determines that topographic features may shield nest sites, the LOP may be waived or the buffer distance modified.

BIRD-3: Raptors and Wading Birds

Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them shall be minimized.

Burrowing owls, a federal and state species of special concern, are not known at the sites, and there are no CNDDDB occurrence records for burrowing owls on or near the sites. However, if burrowing owls and/or if signs are found, then guidelines as detailed in the DFG 2012 Staff Report on Burrowing Owl Mitigation shall be followed.

If work is scheduled to occur between August 31 – January 31 after the nesting season, then avoidance has been achieved and work can proceed; however, to protect late- or second-nesters, the ECC shall walk the site before work occurs to check for nests and presence of birds at the work site.

If work in the riparian zone or mowing on levees will occur before July 31st, the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

During nesting season, (February 1st - September 1st), the ECC shall walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

BIRD-4: Landbirds

Many of the project sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. These project sites include: 1-NOV-3, 3-ACMP-3, 3-NYH-2, 5-EAS-2, 9-CMC-4, and many more.

Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests violates the federal Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game (CDFW) Code.

Avoidance will be achieved if maintenance activities are scheduled for August 1st to January 31st to avoid the nesting season (February 1st to July 31st); however, to protect late- or second-nesters, the ECC shall walk the site before work occurs to check for nests and presence of birds at the work site.

If maintenance activities are scheduled during the nesting season, then the following AMMs should be followed:

- The removal of any trees or shrubs shall occur in August, after the nesting season. If removal of trees or shrubs occurs, or maintenance begins between February 1st and July 31st (includes nesting season for passerine or non-passerine birds, and raptors), a nesting bird survey shall be performed within 14 days prior to the removal or disturbance of potential nesting trees or shrubs.
- All trees with active nests shall be flagged and a non-disturbance buffer zone shall be established around the nesting tree, or the site shall be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft. for passerines and non-passerine land birds. Active nests shall be monitored to determine when the young have fledged and are feeding on their own.
- In addition to surveying trees and shrubs for nesting birds, surveys shall be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within 14 days prior to the commencement of project related activities.

- The ECC shall be present at the commencement of maintenance-related activities to ensure that nesting birds and sensitive bird species have not inhabited the project site during the window following pre-construction surveys and commencement of maintenance activities. The ECC shall also review all staging areas to ensure nesting and special status birds are not present.
- Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of sensitive habitat and bird species, and inform them of when work needs to be stopped and appropriate officials informed of species presence. .

3.11 Avoidance and Minimization Measures for Mammals

There is only one listed mammal in the project quad maps; and the mammals on the species of concern list are all bat species. AMMs for mammals are below.

MAMM-1: Salt Marsh Harvest Mouse (SMHM)

The majority of the sites are not in, nor adjacent to, salt marsh harvest mouse habitat; avoidance has been achieved for those sites. Approximately 15-20 sites are adjacent to suitable habitat for salt marsh harvest mouse; and about half of those sites include work which may require impact to salt marsh harvest mouse habitat by removal of pickleweed. For these sites, the following AMMS shall be followed:

- When implementing maintenance activities in uplands adjacent to salt or brackish marshland, vehicles will be confined to existing roads where possible, and disturbed areas shall be re-vegetated with brackish marsh species. Crews shall use matting, pontoon boards or other comparable methods whenever feasible to minimize impacts to the existing vegetation. The placement of mats will be approved by CDFW before their placement. Crews shall work exclusively from mat boards and boardwalks to minimize trampling of vegetation.
- If maintenance activities are conducted outside the breeding season, in coordination with USFWS and CDFW, pre-construction surveys shall be conducted within 5 days of the start of maintenance activities to check for presence of mice within the project sites. In addition, the ECC shall be present during maintenance-related activities along and adjacent to all suitable nesting habitat areas to ensure that salt marsh harvest mice are not present.
- Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for SMHM. Generally, work should not be scheduled to occur between 2 hours before high tide and two hours after high tide.

- Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible.
- Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of the salt marsh harvest mouse and its habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.
- For project sites where work will intrude into tidal marsh habitat, the ECC shall survey the site prior to beginning work in order to determine the presence/absence of SMHM, and the following measures shall be implemented:
 - Under the supervision of the ECC, vegetation shall be removed only with non-mechanized hand tools; no motorized equipment shall be used. Vegetation removal may begin only when no mice are observed, or with CDFW approval, and shall start at the edge farthest from the salt marsh and work its way towards the salt marsh. If a mouse of any species is observed within the areas being removed of vegetation, work shall stop and CDFW shall be notified. Unless otherwise approved by CDFW, the mouse shall be allowed to leave on its own volition. Removal of pickleweed will generally follow Zedler (2001).
 - If trenching takes place within 50 ft. of pickleweed areas, visqueen fencing shall be installed around worksites within pickleweed before excavation activities begin. CDFW will approve the size and placement of fencing. An escape ramp shall be placed in any open trench at the end of the day to allow any entrapped animals to escape.
 - The ECC shall be on-site and shall halt project activities if necessary to comply with these terms.

MAMM-2: Roosting bats

Some of the sites may be within or adjacent to suitable habitat for roosting bats. During pre-project inspection and project implementation the following AMMs will be implemented to protect all bat species:

- Pre-construction surveys for roosting bats shall be conducted concurrent with those for land birds. If surveys occur during the daytime, the biologist shall look for presence of bat droppings at likely roost sites (under bridges and trees (in layers of

bark, woodpecker holes, and hollow branches). The droppings are black and small, about 4 – 8 mm long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software.

- If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed.
- If bats were detected during the pre-construction survey, and removal of trees, shrubs, or dense ivy is scheduled to occur during bat breeding season, a qualified biologist shall conduct a bat presence-absence survey. If bats are detected, work should be re-scheduled to occur within these dates: March 1st – April 15th and/or September 1st – October 15th in order to avoid the breeding season.
- Removal of vegetation where bats have been known to roost shall follow the two-phased removal system: Day 1, in the afternoon, limbs and branches are removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures will be avoided, and only branches or limbs with those features will be removed. Day 2: the entire tree will be removed.
- Training sessions shall be given to all workers during bat breeding season to inform them of protective measures, details about the two-phase tree removal protocol, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

3.12 MITIGATION MONITORING

Monitoring will be used to determine compliance with success criteria and to assist in the evaluation of specific mitigation methods. Monitoring reports will be provided to the resource agencies in the Annual Summary Report (ASR). Changed site conditions that affect the ability to meet monitoring requirements will be described in the monitoring reports. The following process will be implemented to monitor mitigation measures:

- Tree and shrub planting sites will be monitored by a qualified biologist to evaluate the survival and successful establishment of the plantings. Monitoring will be conducted over a 5-year period with assessments performed in Years 1, 3, and 5 following planting. The data collected during monitoring visits will be used to determine if success criteria are met and to recommend management modifications or the implementation of contingency measures, as necessary, to help meet the final success criteria. Site performance and final success will be

evaluated through both quantitative and qualitative monitoring. If the final success criteria are not met by Year 5, remedial measures will be implemented and monitoring will continue annually or as otherwise stipulated in writing until the success criteria are achieved.

- Baseline site conditions at the time of plant installation will be documented in the field. At the time of planting the number, location, and species of trees and shrubs planted and the square footage of the area planted will be recorded. Baseline photographs will be taken at fixed, pre-designated photo points immediately following initial plant installation.
- Planting areas will not be impacted for a minimum of 10 years after planting. If there are impacts to a tree and shrub planting mitigation area, the impacted mitigation area will be replaced in-kind and the monitoring clock will be reset for those areas for another 5 years.

Success Criteria and Remedial Actions

- **Plant Survival:** Plant survival will be monitored in Years 1, 3 and 5. Plant survival will be assessed in upland areas, which are defined by the Stream Maintenance Program as the areas above the normal reach of streams or rivers and characterized by non-wetland vegetation.
- **Percent cover:** Percent cover of all native woody vegetation will be assessed in Years 3 and 5 in riparian areas, which are located along the water's edge. As defined in the Stream Maintenance Program, "riparian" is the area located along the edge of a channel, generally on the floodplain, characterized by access to and influence of the channel, but not in it. A riparian zone or riparian area is the interface between land and a river or stream. The success criterion for percent cover in riparian areas is 30% in Year 3 and 75% in Year 5. There are no percent cover related success criteria in riparian areas for Year 1 as it is assumed the mitigation plantings will be in the early stages of development. Percent cover of all native woody vegetation will be assessed in Year 5 in upland areas. The success criterion for percent cover in upland areas is 30% in Year 5. There are no percent cover related success criteria for upland areas in Years 1 and 3 as it is assumed the mitigation plantings will be in the early stages of development. If the success criterion is not met in Year 5, remedial measures will be discussed with the permitting agencies.

4.0 MAINTENANCE ACTIVITIES

4.1 Overview

The SMP encompasses five types of maintenance activities:

- 1) Vegetation management
- 2) Sediment and debris removal
- 3) Erosion control
- 4) Maintenance and repair of flood control structures
- 5) Levee maintenance

Most maintenance activities occur during the dry season from April 15th to October 15th. However, timing may be affected by weather. In dry years, work may start earlier, and may extend later if there are no significant winter storms. Unless expressly stated in the frequency and timing sections below, if work is scheduled outside the April 15th to October 15th dates, the District will notify CDFW of its intentions.

The following chapters describe the various components, frequency and timing, and contractor details for each type of maintenance activity. At the end of each section is a list of activity-specific conditions that are to be followed when conducting these activities.

In addition to the activity-specific conditions, the SMP is subject to General Conditions for all activities.

4.2 General Conditions for all Activities

GACT-1 The District shall designate an ECC to oversee the implementation of the SMP in the field. Before commencement of a maintenance activity, the ECC shall review the Site Fact Sheet for specific information on the type, location and extent of the activity and associated areas of disturbance and determine the Avoidance and Minimization Measures to implement prior to the maintenance activity for protection of water quality and special status species (*endangered, threatened, rare, and candidate species*) and their habitat. If any changes are observed at the site, the Fact Sheet shall be updated and submitted to CDFW. The ECC shall distribute the Site Fact Sheet to the Maintenance Supervisor five days before beginning the maintenance activity.

- GACT-2** Avoidance and Minimization Measures (AMMs), as prescribed in the Biological Assessment for the SMP Program², shall be implemented during prescribed maintenance activities to ensure that Special Status Species and their habitat are not adversely impacted by maintenance activities.
- GACT-3** Existing stream and riparian habitat conditions such as pools, riffles and wetlands shall be protected to the maximum extent. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations.
- GACT-4** If a maintenance activity may cause the introduction of sediments into the stream, no phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the startup of any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the ECC shall inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.
- GACT-5** Appropriate BMPs shall be incorporated into each project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. BMPs to be implemented for each type of activity are referenced in Appendix F.
- GACT-6** No heavy equipment shall be operated within stream channels where there is flowing or standing water.
- GACT-7** There shall be no permanent loss or significant temporal loss of wetland or riparian habitat in terms of acreage, function, or value.
- GACT-8** No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When

² Marin County Flood Control and Water Conservation District SMP - Biological Assessment, October 2011

operations are completed, any excess material shall be removed from the work area where such material may be washed into waters of the State.

GACT-9

Activities shall not result in any permanent barriers to upstream or downstream migration of anadromous fish.

5.0 VEGETATION MANAGEMENT

Selective vegetation trimming and removal of instream vegetation is the most common maintenance activity and is conducted in order to maintain flow conveyance and to maintain access to District facilities.

5.1 Maintenance Goals and Triggers

Vegetation management activities are implemented to achieve these main goals:

- maintain or improve stream channel flow capacity to reduce risk of flooding
- maintain access to streams, channels, and flood control facilities
- restore creek habitat by removing invasive nonnative plants and encouraging the establishment of native plants particularly in the understory
- remove trees that are hazardous to life and neighboring properties
- maintain stable streambank conditions, and where possible enhance instream ecologic conditions through:
 - reducing and removing exotic and invasive species
 - encouraging the growth and presence of native vegetation
 - developing a mature and complex riparian canopy of native species
 - managing and enhancing bank vegetation to improve streambank stability
 - managing emergent vegetation in the channel

Meeting these goals requires a balance between flood protection needs and habitat stewardship. In general, vegetation maintenance is triggered when one or more of the following conditions occur:

- Vegetation growth is significantly decreasing flood conveyance capacity, especially where infrastructure is at risk
- Vegetation growth impedes access to channels and flood control facilities
- Excessive non-native vegetation at the top of bank or at critical access points growth constitutes a fire hazard to surrounding infrastructure
- Nonnative invasive plant species are reducing the success of native vegetation
- Live trees are creating excessive hydraulic roughness, diverting flow or dead/dying trees are reducing stream capacity and/or creating a safety hazard.

The need for vegetation management activities is unlikely if none of these trigger conditions are present.

5.2 Description of Vegetation Maintenance Activities

Maintaining channel capacity is achieved by selectively limbing and trimming trees that directly block flow, cattail cutting, removing invasive vegetation and clearing trash. These activities may occur from the channel bottom to the top of bank with a focus on retaining over hanging, low lying herbaceous vegetation along the edge of channel for habitat purposes and controlling channel roughness with selective limbing and trimming on the upper banks. The goal is to maintain canopy cover for shade over the water and to shade out invasive non-native plants (Figure 5-1). These activities employ vegetation control methods such as cutting and removing vegetation above the ground by hand or with loppers, hand saws, chainsaws, pole saws, weed eaters and other hand tools. Vegetation management activities do not include ground-disturbing activities. Bladed weed-eaters are used to cut cattails. Entire cattails, including their roots, may be removed as part of sediment removal activities as well. Pesticides and herbicides are not used by the Flood Control District in any form to control vegetation or maintain stream channels.



Figure 5-1. Vegetation management on Warner Creek (Novato) after maintenance was completed. Low lying vegetation along the edge of the channel remains in place for habitat,

while channel conveyance is maintained by selectively trimming vegetation on the upper bank.

Tree removal is a rare event. The decision to remove individual trees will be made in the field by District staff familiar with watershed vegetation and creek ecology. Removal of mature, healthy, native trees is only indicated when pruning is insufficient to reduce the unacceptably high hydraulic roughness in the channel. For example, an arroyo willow growing on a newly established gravel bar may need to be removed if it threatens to block flow through a structure or its establishment could shift flow dynamics forcing erosive flows against an un-protected residential bank. Annual pre-project notification to the RWQCB and DFW will include an inventory of any trees of 6" diameter or greater that need to be removed for flood control purposes.

Removal of sick, dying, or dead trees is indicated when they reduce channel capacity, increase flood hazard, and/or are a safety hazard to adjacent structures. Tree health and hazard potential will be determined by appropriate environmental staff (arborist and/or biologist). Snags will be left in place to provide habitat for birds and small mammals if they do not otherwise pose a flood or safety hazard. Staff will consult with CDFW whenever possible if tree removal is necessary, and retention of large wood debris in the creeks will follow objectives included in Section 2.5 - Salmonid Conservation. If a small native tree requires removal, it will be evaluated for potential use in another location. Alders, red willow, or yellow willow with a single trunk are most desirable for relocating. If it can be used in another location, the tree will be replanted. Large willows that require pruning may be cut into large sprigs and planted on a bare slope or incorporated into a slope stabilization repair.

Invasive Non-Native Plant Removal

Removal of non-native vegetation takes place as part of maintaining channel capacity but also occurs in a more strictly restoration-type activity, as with STRAW projects. Re-vegetation activities under the SMP generally occur after other maintenance work has occurred, such as erosion control or emergency repairs, or in conjunction with STRAW. Pesticides and herbicides are never used by the District to control vegetation in creek channels within Marin County.

5.3 Frequency and Timing

Vegetation management activities are scheduled to occur during the dry season from April 15th to October 15th, weather permitting, and may occur on all sites annually. Within that range, specific types of activity occur as follows:

- Vegetation pruning occurs from June 15th to October 15th

- Cattail removal occurs from August 31st to October 15th, so that cattails do not reestablish before winter storms
- Re-vegetation and tree planting and/or relocating may occur throughout the year and depends on the best timing for successful planting

Generally, channels dominated by fast-growing cattails and/or willows will require annual pruning, while channels with a mature riparian canopy generally require less frequent maintenance to maintain flow capacity. All project sites are inspected annually but not all sites may require maintenance as defined in this manual. Frequency is also affected by weather; wet years may result in more vegetation growth, and years that experience flooding or strong winds may require additional work to clear downed trees or vegetation debris. Annual work plans will reflect current year conditions. The ECC will conduct annual walk-throughs of all sites to determine the upcoming season's list of sites for the notification list.

5.4 Contractor Details

Vegetation maintenance work is performed by a mix of District staff, CCNB, DPW road crews, and/or private contractors. CCNB is contracted to perform the majority of the work, with District staff on site most of the time. District staff may perform tasks of a smaller duration and extent that don't require full CCNB crews. Average work duration depends on the site conditions in any given year. For most sites undergoing vegetation maintenance activities, work is completed within 2-3 days using 1-2 CCNB crews. Private contractors are hired for arborist work and specific tasks requiring advanced skills beyond what District staff and CCNB crews hold.

5.5 Conditions for Vegetation Maintenance

- VEG-1** Generally, vegetation management shall be designed and conducted to meet the objectives of design capacity, channel and basin stability and accessibility while maximizing the shade, erosion control, water quality, and habitat functions of the vegetation.
- VEG-2** Removal of trees in bat habitat should follow the two-phased removal system: Day 1, in the afternoon, limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures would be avoided, and only branches or limbs with those features would be removed. Day 2: the entire tree would be removed.
- VEG-3** Non-native, invasive trees and bushes (e.g., tree of heaven (*Ailanthus* spp.), acacia (*Acacia* spp.), white poplar (*Populus alba*), Lombardy poplar (*Populus nigra 'Italica'*), eucalyptus (*Eucalyptus* spp.), London plane tree (*Platanus* x

hybrid), Indian bean (*Catalpa* sp.), privet, (*Ligustrum* sp), broom (*Genista*, *Spartium*, sp), red clusterberry (*Cotoneaster* sp.), and ivy (*Hedera* sp)), may be cleared from the top-of-bank area or within the channel.

- VEG-5** Vegetation management does not include the use of dozers, loaders, excavators and other heavy tracked or rubber tired equipment, with the exception of mowing equipment.
- VEG-6** Maintaining channel capacity is achieved by selectively limbing and trimming trees that block flow directly, cattail cutting, removing invasive vegetation and clearing trash. These activities may occur from the channel bottom to the top of bank as needed, with a focus on retaining low lying vegetation along the edge of channel for habitat purposes and maintaining canopy cover for shade.
- VEG-7** Typically, mowing occurs from the top of bank all the way to the homeowner's fence line. Brush cutters and weed eaters are used to mow vegetation. Armed mowers may be used in large flat areas such as levees. Riparian and marsh vegetation adjacent to the areas of mowing are protected during mowing activities.
- VEG-8** Areas where non-native vegetation has been removed may be re-vegetated with appropriate California native species and protected using appropriate erosion control methods, to the maximum extent practicable. An erosion control seed mix native to the region shall be used to control erosion where needed and local plant materials and seeds derived from that watershed should be used whenever possible.
- VEG-9** Mulch or tree chips may be used to cover bare soils and if straw is used as mulch it must be seed free straw.

6.0 SEDIMENT AND DEBRIS MANAGEMENT

Sediment management activities are conducted when pipes or other facilities are blocked or interfere with conveyance, and/or sediment is removed from the streambed to maintain capacity at a road crossing or a flood control facility.

6.1 Description of Sediment Removal Activities

Sediment is removed from natural channels and ditches, concrete-lined channels and from engineered sediment basins to maintain flow conveyance and capacity. Sediment removal activities described in this manual are not implemented routinely but as needed to maintain flow conveyance.

Sediment removal is conducted after culverts, channels or other facilities have been inspected by Flood Control Engineers or an Engineering Technician and are found to be blocked by sediment or vegetation to the point of interference with stormwater conveyance that could lead to localized flooding. Each year County Flood Control Engineers review SMP sites within their watershed and use a combination of professional judgment, local knowledge and available data to assess which sites need maintenance in any given year. Sediment removal activities are conducted when pipes or facilities are blocked to the point of interference with stormwater conveyance. At the majority of the sites included in this manual, sediment accumulates at pinch points in the channel such as at culvert inlets or outfalls, typically creating a localized effect. For larger channel dredging projects such as Novato Creek, which is not included in this manual, the District employs hydraulic modeling or other measures to evaluate channel capacity.

The number of sediment removal projects undertaken annually and the quantity of sediment removed in a given year depend on the frequency and extent of past maintenance activities and the weather and hydrologic conditions during recent years. Sediment removal requirements are generally greater following a wet winter with higher than usual runoff, slope erosion, and sediment delivery compared to an average or dry winter when sediment yields are less.

Debris, including tires, shopping carts, trash, furniture and other non-sedimentary deposits, is also removed from creek channels, trash racks and culvert openings. Items are removed from the creek and placed at staging areas by hand and hauled out by dump truck to a certified landfill.

Equipment types, equipment locations, crew sizes, and staging areas vary depending on the need of each site. Appendix B lists each project site; project dimensions, equipment used, location of equipment, and expected duration of work. Equipment includes long-reach excavators, backhoes, haulers, and front loaders. Excavated sediment is placed

directly into dump trucks, or is placed in or pushed to staging areas, then lifted into the dump trucks.

6.2 Maintenance Goals and Triggers

Sediment Removal Goals- Sediment and debris removal activities are implemented to achieve the main goals listed below. Impacts are minimized by implementing the least intensive activities required to meet these goals.

- Maintain stream/channel capacity and/or flood discharge objectives where available
- Maintain or improve unobstructed flow around structures including bridges, storm drain outlets, and pump stations;
- Identify and prioritize stream locations that require sediment and debris removal and maintenance;
- Understand the underlying geomorphic processes at all of the District's maintenance channels to inform and guide appropriate maintenance actions;
- Develop appropriate maintenance target conditions for sites that balances flood protection needs, economizes maintenance activities, and avoids and minimizes environmental impacts;
- Improve water quality conditions through sediment management, including the removal of fine sediments;
- Conduct maintenance that will enhance stream function while minimizing the need for repeat maintenance.
- Provide for the beneficial reuse of sediments where feasible

Sediment Removal Triggers- In general, sediment or debris removal activities are triggered when one or more of the following conditions occur:

- The stream or channel is aggrading such that its capacity is compromised or the flood or discharge objective is compromised (if known).
- Accumulated sediment is covering or blocking culvert outfalls and/or other structures, increasing flooding risk
- Accumulated sediment is allowing for excessive plant growth in the channel flow section, increasing risk of flooding and increasing roughness
- Accumulated sediment is reducing fish passage

At each location where sediment removal is planned, the County will begin with an assessment of the types of sediments, fluvial processes, and habitat in the project area in order to evaluate impacts to bed and bank stability within the site and upstream. Pre-project analysis will include a plan to integrate the excavated reach of creek into the dominant geomorphic conditions in the channel if feasible within the County or municipal

road right-of-way (i.e. drops should not be left in the streambed at the upstream edge of excavation when there is a potential to form headcuts that can migrate upstream). The assessment will also identify sorted sediments, such as gravel bars or fines in tidal areas, and consider them for reuse as spawning gravels or wetland surface material. The assessment will also identify the stream’s fluvial processes so that the appropriate stream cross section can be excavated, leaving behind a stable channel that optimizes sediment transport.

Geomorphic Coding for Sediment Removal Sites

The SMP endeavors to identify causes for chronic sedimentation in order to develop effective long-term solutions for these sites. To facilitate the understanding of geomorphic process at each of the sediment removal sites, geomorphic codes were developed that describe the different underlying causes of sedimentation. (Table 6.1)

Table 6.1- Geomorphic Codes were developed which describe geomorphic processes that lead to sedimentation and often trigger sediment removal activities.

| | |
|----------|---|
| 1 | Urban/Wildland Interface -Transitional area between steeper natural drainage systems to a culverted stormwater drainage system. Deposition occurs at upstream ends of pipes or structures such as trash racks. Typically, these transition areas have been engineered to collect sediment upstream of the storm drain pipe, i.e., bollards installed to capture debris. Sediment removal is required to maintain the effectiveness and connectivity to the downstream drainage system. |
| 2 | Tidal Backwater - Area subject to backwater influence from daily tidal action. |
| 3 | Silt Basin - Engineered silt basin designed to catch sediment. |
| 4 | Road Crossing width < Active Channel Width - Reflects conditions where bridges and/or other road crossings constrict or otherwise affect stream flow and sediment dynamics |
| 5 | Reduction in Channel Gradient - Channel slope flattens, allowing sediment to drop out. |
| 6 | Widening of channel cross section – Decreasing ability of stream flow to move sediment through the system. |
| 7 | Debris or Vegetation Obstruction |
| 8 | Sediment Aggradation at Pipe Outlet -Sediment removal required to maintain hydraulic conveyance and grade line |
| 9 | Bar Grading and Geomorphic Channel Maintenance - Rather than a condition this is an in-stream treatment to realign low flow channel to reduce bank erosion. |

Each sediment removal site was then assigned a Geomorphic Code which describes why sediment is chronically deposited at a specific location in the watershed and associated stream channels (Table 6.2).

Table 6.2 Geomorphic coding per site

| Channel Type | Photo | Site# | 1 Urban/Wildland interface | 2 Tidal backwater | 3 Engineered silt basin | 4 Road crossing width | 5 Reduction in channel gradient | 6 Widened channel cross section | 7 Debris or vegetation obstruction | 8 Sediment aggradation at outlet | 9 Bar grading/low flow channel maintenance |
|---------------|-------|----------|-------------------------------|----------------------|----------------------------|--------------------------|------------------------------------|------------------------------------|---------------------------------------|-------------------------------------|---|
| Natural | | 1-AA-2 | | | | X | | | | | X |
| | | 1-BB-1 | | | | X | | | | | |
| | | 1-NMWD-1 | X | | | | X | | | | |
| | | 1-NMWD-2 | X | | | | X | | | | |
| | | 3-BM | X | | | | | | | | |
| | | 5-EAS-1a | | | | X | | | X | | |
| | | 5-EAS-1b | | | | X | | | X | | |
| | | 5-EAS-1c | | | | X | | | X | | |
| | | 5-EAS-1d | | | | X | | | X | | |
| | | 5-EAS-1e | | | | X | | | X | | |
| Semi-modified | | 9-LAR-2 | | | | X | | | X | X | |
| | | 9-MUR | | | | X | | | | | |
| | | 1-ASJ-2 | | | X | X | | | | | |
| | | 1-VIN | | | | | X | X | X | | |
| | | 3-NYH-1 | | | | | X | X | | | |
| | | 6-EAS-3 | | | | X | | | X | | |
| | | 1-SIMM | | | X | | | | X | | |
| | | 3-COY-2 | X | | | | | | | | X |
| | | 3-COY-3 | | | | | | | | | X |
| | | 3-COY-4 | X | | | | | | | X | |
| Modified | | 3-COY-5 | X | | | | | | X | | |
| | | 3-CRE-1 | | | | | X | X | | X | |
| | | 3-CRE-2 | X | | X | | | | | | |
| | | 3-MIL-1 | | X | | | | | | | |
| | | 3-MIL-2 | | X | | | | | | | |
| | | 3-MIL-3 | | X | | | | | | | |
| | | 3-NYH-2 | | | | | X | | | | |
| | | 3-REED-1 | | X | | | X | | | | |
| | | 3-RYC-1 | | | | | | | | | X |
| | | 3-SUT-1 | | X | | | | | | | |
| | | 3-SUT-2 | | X | | | | | | | |
| | | 3-SUT-3 | | X | | | | | | | |
| | | 3-SUT-4 | | | | | X | | | | |
| | | 3-SUT-5 | | | | | X | | | | X |
| | | 4-EAST-2 | | | | | X | | X | | |
| | | 4-EAST-2 | | | | | X | | | | |
| | | 4-WEST-1 | | X | | | X | | | | |
| | | 4-WEST-2 | | | | | X | | | | X |
| | | 5-EAS-2 | | | | X | | X | | | |
| | | 7-CAS | | | | X | | X | | | |
| 7-EST | | | | | | X | | | | | |
| 7-LAP-1 | | | | | | | | | X | | |
| 7-LAP-2 | X | X | | | | X | | | X | | |
| 7-MAB | | | | | | | | X | | | |
| 7-MEA-1 | | X | | | | | | | | | |
| 7-MEA-2 | X | | | | | X | | | | | |
| 7-PS-2 | | | | X | | | | | | | |
| 7-SOD | | | | | | X | | | | | |
| 9-CCT | | X | | | | | | | | | |
| 9-LAD | X | | | | | | | | | | |
| 9-MAG-1 | | X | | | | | | | X | | |
| 9-MAG-2 | | X | | | | | | | X | | |
| 9-MAG-3 | | X | | | X | | | | X | | |
| 9-SHC-3 | | | | | X | | | | | | |
| 9-SHC-4 | | | | | X | | | | | | |
| 9-SHC-5 | | | | | X | | | | | | |
| 9-SHC-6 | | | | | X | | | | | | |
| 9-SHC-7 | | | | | X | | | | | | |
| 9-VAN-2 | | | | | X | | | | | | |
| 9-VAN-3 | | | | | X | | | | | | |
| 9-VAN-4 | | | | | X | | | | | | |
| 9-VAN-5 | | | | | | | | | | | |
| 9-VAN-6 | X | | | | X | | | | | | |
| 9-WARD | | | | | X | | | X | X | | |

Project Prioritization to Frequency of Sediment Removal

Understanding and incorporating individual site issues and geomorphic conditions for each site into a programmatic work plan provides the County with a better understanding of the factors influencing the need to do work at each of these sites. With comprehensive reconnaissance, monitoring, and site condition documentation, the County may be able to eliminate some sites from maintenance status work or identify a project to address the chronic issues, if feasible.

Several of the sediment removal sites have been identified as chronic, largely due to factors which do not allow for comprehensive solutions, such as tidal backwater and/or flat topography. A few chronic sites have been identified for which a capital improvement project may be possible to reduce or eliminate the need for sediment removal. These sites are described below in Table 6.3 below. As part of this program, the District will continue to identify and prioritize sites where chronic sedimentation issues could be improved through infrastructure improvements. Annually, the flood zone engineer will review and recommend sites to be included in either an individual Flood Zone Work Program or integrated into the larger Marin County Public Works Capital Improvement Program (CIP).

Table 6.3- Opportunities to Eliminate or Reduce Sediment Source Contributions and Decrease the Need for Sediment Removal Activities through implementation of a CIP project.

| |
|---|
| SITE 1-AA/1-BB |
| A creek bank stabilization project at site 1-AA that is scheduled for 2016 work season may reduce the need for sediment removal downstream at site 1-BB. |
| SITE 1-VIN |
| Installation of a metal vane may reduce sediment deposition at the Center road outfall downstream of the Center Road Bridge on Vineyard Creek. The Vineyard Creek project was designed and permitted to facilitate sediment removal which typically occurs annually at this location. |
| SITE 3-NHY-1 |
| Sediment removal at Enterprise Concourse on Nyhan Creek is necessary almost every year to maintain flow conveyance under the existing bridge. Funding would be pursued to investigate alternative bridge designs to improve sediment transport. |

6.3 Sediment and Debris Disposal and Reuse

Instream gravel and coarse sediment along a streambed can be a fundamental habitat element to a healthy functioning stream directly supporting life-cycle needs of fish, amphibians and other aquatic wildlife. When evaluating sites for sediment removal, care is taken to avoid beneficial gravels wherever possible. On Marin County Flood Control

District's larger flood control sediment removal projects such as Novato Creek (not included in this manual), the District prepares a sediment reuse plan for the dredge spoils. On these larger dredge projects sediment samples are collected and analyzed in accordance with the Beneficial Reuse of Dredged Material: Sediment Screening and Resting Guidelines (RWQCB 2000). Before reuse of sediment at an instream or wetland restoration site, the testing results are submitted to the RWQCB for review and approval. The quantities of sediment removed at the majority of the sites included in this manual are much less than the larger dredge projects and the spoils are taken to one of the two Marin County Corporation Yards at Central and West Marin County locations.

Trash debris removed from District channels is taken to one of two places depending if the debris is non-hazardous or hazardous. Non-hazardous material is taken to the Redwood Landfill. If the debris is hazardous in nature, the material is taken to a permitted hazardous waste facility by a permitted and licensed contractor.

6.4 Frequency and Timing

Sediment removal is not a routine activity but rather is implemented solely on an as-needed basis, where determined by annual field evaluation by County Flood Control Engineers. All sediment removal activities are scheduled to occur during the dry season from April 15th to October 15th, weather permitting. In anadromous fish streams all work will occur between June 15-Oct 15th in any given year. At each location where sediment removal is planned, the County will begin with an assessment of the types of sediments, fluvial processes, and habitat in the project area in order to evaluate impacts to bed and bank stability within the site and upstream. Pre-project analysis should include a plan to integrate the excavated reach of creek into the dominant geomorphic conditions in the channel (i.e. drops should not be left in the streambed at the upstream edge of excavation with the potential to become headcuts that can migrate upstream). The assessment will also identify sorted sediments, such as gravel bars or fines in tidal areas, and consider them for reuse as spawning gravels or wetland surface material. The assessment will also identify the stream's fluvial processes so that the appropriate stream cross section can be excavated, leaving behind a stable channel that optimizes sediment transport. Appendix B lists each of the sediment removal sites, along with work duration and interval.

6.5 Contractor Details

Most sediment and debris removal maintenance work is performed by DPW road crews, but some tasks are undertaken by CCNB crews (projects less than 25 yd³), or private contractors. District staff may perform tasks of a smaller duration and extent that don't require full DPW crews. Private contractors are hired for specific tasks requiring skills and/or machinery beyond what District staff and DPW crews possess.

6.6 Conditions for Sediment and Debris Removal

- SED-1** The work area boundaries, including access, shall be the minimum required to complete the project.
- SED-2** Access routes and staging areas shall be chosen such that disturbance or removal of vegetation is minimized. Any sediment removal activity which removes vegetation shall comply with all conditions for vegetation management as described above.
- SED-3** Debris removed from a channel or basin shall be handled, stored and disposed of in accordance with applicable regulatory requirements, and there shall be no discharge of sediment laden water from storage impoundments in violation of applicable water quality standards.
- SED-4** To minimize impacts to natural channels, mechanized equipment (e.g. excavators, backhoes) shall be placed on top of bank whenever possible. Prior to the use of mechanized equipment in natural channels, the ECC shall inform the crew leader of the site access routes and work staging locations for the equipment to ensure the least disturbance practicable. Equipment may only be used within the channel when it is dry naturally or the flow dewatered according to activity-specific conditions for dewatering.
- SED-5** For most sediment removal projects around bridges, culverts, storm drains, diversion inlets, and natural channels, excavators are used from the roadway and/or top-of-bank.
- SED-6** Sediment and debris removal from a lined concrete channel for the purposes of maintaining the channel's design capacity is limited to 3,000 linear ft. of any watercourse, once per year³.
- SED-7** Sediment and debris removal from an engineered basin is limited to basins less than 2 acres in extent as measured by the area within the basin below the top of bank or, in larger basins, no more than 2 acres in extent of sediment removal.⁴
- SED-8** All debris removed shall be taken to a permitted disposal site.

³ BASMAA

⁴ BASMAA

SED-9 For projects around bridges, culverts, storm drains, diversion inlets, and natural channels where the use of excavators from the top-of-bank is not possible, or would cause major vegetation impacts, equipment may be used within the channel when it is dry naturally or the flow dewatered.

SED-10 Gravels, suitable for spawning, will be identified and marked prior to sediment removal. These sediments will be avoided or gathered and set aside to be reapplied at the site after the bulk of sediments have been removed, or removed from the site to be stockpiled at an approved location for beneficial reuse in stream restoration or gravel augmentation projects.

6.7 Conditions for Dewatering and Fish Relocation

When maintenance activities occur in flowing streams or open water, the work site must be dewatered and the following conditions will apply:

DEWAT-1 Any work using equipment within the stream channel shall be performed in isolation from the flowing stream.

DEWAT-2 Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.

DEWAT-3 If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.

DEWAT-4 Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.

DEWAT-5 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997).

DEWAT-6 A filtration/settling system shall be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length.

- DEWAT-7** Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.
- DEWAT-8** The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.
- DEWAT-9** For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials shall be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

7.0 EROSION CONTROL

Erosion control activities are conducted when failing slopes have the potential to interfere with flood control activities and goals.

7.1 Maintenance Goals and Triggers

Erosion control activities are implemented to achieve this goal:

- Stabilizing failing earthen creek banks where biotechnical stabilization techniques are appropriate

Meeting this goal requires a balance between flood control protection needs, water quality, and habitat protection. Impacts are minimized by implementing the least intensive activities required to meet these goals.

In general, bank stabilization activities are triggered by:

- Failing earthen banks that are undermining structures and/or utilities
- Failing earthen banks that are causing increased sediment production and habitat loss.

7.2 Description of Activities

Erosion control activities take place only where the District and/or its partners hold fee title to the land. Most erosion control projects are not prescribed and therefore are not covered under this SMP program. Only those projects where the failing banks are composed of earthen materials and where biotechnical stabilization techniques are used, such as brush mattresses and willow walls, fall under this program.

Erosion control tasks under the permit will generally be completed in 2-4 days. Equipment typically used for erosion control work can include excavators, haulers, front loaders, and bulldozers.

7.3 Frequency and Timing

Like other activities covered under the SMP program, erosion control projects are scheduled for the dry season from April 15th to October 15th, weather permitting. These projects are determined on an as-needed basis; if a project is needed, it will be added to the notification list for the year in which maintenance activities are planned.

7.4 Contractor Details

The District contracts with CCNB to undertake erosion control tasks.

7.5 Conditions for Erosion Control

- EROS-1** Any new erosion control projects must incorporate bioengineering or bio-technical designs and shall be limited to “soft” structures, composed of coir or other biodegradable fabric, and/or willow or other plant materials native to the watershed. Native vegetation shall be incorporated into the design where channel design capacity allows.
- EROS -2** Length of erosion control activities shall not exceed 150 linear feet.
- EROS -3** any new biotechnical erosion repair activity shall be part of a single and discreet project; implementing contiguous projects in series and in a single calendar year is not approvable under this program.

7.6 Conditions for Dewatering

When maintenance activities occur in flowing streams or open water, the work site must be dewatered and the following conditions will apply:

- DEWAT-1** Any work using equipment within the stream channel shall be performed in isolation from the flowing stream.
- DEWAT-2** Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.
- DEWAT-3** If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.
- DEWAT-4** Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.
- DEWAT-5** If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA Fisheries’ criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997).

- DEWAT-6** A filtration/settling system shall be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length.
- DEWAT-7** Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.
- DEWAT-8** The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.
- DEWAT-9** For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

8.0 FACILITIES MAINTENANCE AND REPAIR OF FLOOD CONTROL STRUCTURES

The District needs to maintain its facilities in order to provide flood protection.

8.1 Maintenance Goals and Triggers

Facilities maintenance and repair activities are implemented to achieve this goal:

- Maintain and/or repair flood control facilities to keep them in working order

Meeting this goal requires a balance between flood control needs, water quality, and habitat protection. Impacts are minimized by implementing the least intensive activities required to meet these goals.

In general, facilities maintenance and repair activities are triggered when one or more of the following conditions occur:

- Facilities are deteriorating such that their function is impaired
- Facilities' maintenance intervals have been reached

8.2 Description of Activities

Flood control structures are defined to include all structures built or maintained by the District, including, but not limited to, weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. The maintenance, repair or rehabilitation of flood control structures will not exceed 100 lineal ft. upstream or downstream of each structure.

8.3 Frequency and Timing

Maintenance of flood control structures is scheduled to occur during the dry season from April 15th to October 15th, weather permitting. Some structures, such as tidegates, need annual maintenance; others, such as pump station inlets and outlets, may be maintained on an as-needed basis.

8.4 Contractor Details

Most structure maintenance work is performed by DPW road crews, but some tasks are undertaken by CCNB (such as clearing trash racks) or private contractors. District staff may perform tasks of a smaller duration and extent that don't require full DPW crews. Private contractors are hired for specific tasks requiring advanced skills beyond what District staff and DPW crews hold.

8.5 Conditions for Maintenance of Structures

- MAIN-1** Maintenance activities shall not result in an increase in the facility footprint⁵ unless essential to stabilize the channel.
- MAIN-2** This activity covers in-kind replacement of flood control structures with structures of the same dimension, or with minor deviations in dimension, configuration or alignment⁶. Work is not to exceed 100 lineal ft. upstream or downstream of said structure.
- MAIN-3** When maintaining or repairing an engineered sediment basin, there shall be no discharge of sediment or other pollutants downstream.
- MAIN-4** Maintenance or repair shall only re-establish pre-existing conditions (including as-built conditions); no expansion of capacity is allowed by this program.

When maintenance activities occur in flowing streams or open water, the work site must be dewatered and the following conditions will apply:

- DEWAT-1** Any work using equipment within the stream channel shall be performed in isolation from the flowing stream.
- DEWAT-2** Cofferdams used to divert water shall be constructed with clean river gravel in burlap sacks and sealed with sheet plastic.
- DEWAT-3** If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds.
- DEWAT-4** Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.
- DEWAT-5** If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA

⁵ Facility footprint is defined as the spatial extent of the constructed and artificial elements of the structure and the associated accessway

⁶ Minor deviation is defined as equal to or less than 5% spatial variance from the original structure, e.g. a 500 sq. ft. structure could be replaced by a 525 sq. ft. structure.

Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997).

- DEWAT-6** A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe shall discharge onto the top of bank into a densely vegetated area, which may require extra hose length.
- DEWAT-7** Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.
- DEWAT-8** The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration.
- DEWAT-9** For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

9.0 LEVEE MAINTENANCE AND REPAIR

The District needs to maintain its levees in order to provide flood protection.

9.1 Maintenance Goals and Triggers

Levee maintenance activities are implemented to achieve these main goals:

- Stabilizing levees
- Controlling burrowing rodent populations

Meeting these goals requires a balance between flood control protection needs, water quality, and habitat protection. Impacts to streamside habitat are minimized by implementing the least intensive activities required to meet these goals.

In general, levee maintenance activities are triggered when one or more of the following conditions occur:

- Plant growth on levee roads impedes safe passage to flood control facilities
- Levees are eroding and/or settling, requiring additional fill materials to bring levee up to original height and no higher
- Burrowing mammals are damaging the stability of levees

The need for levee maintenance activities is unlikely if none of these trigger conditions are present.

9.2 Description of Activities

Levee maintenance includes mowing levee tops and banks above the high water line for fuel reduction, stabilizing levees by placing fill on the levee tops, and controlling burrowing rodent populations.

Levee stabilization may occur on any levee maintained by the District; landowner access will be required for activities at site 7-GAL on the Santa Venetia levee, which is private property.

If a gopher infestation occurs, the gophers are trapped and their burrows are filled with an earth/concrete mix or bentonite, following FEMA guidelines⁷. The County of Marin does

⁷ Technical Manual for Dam Owners: Impacts of Animals on Earthen Dams. FEMA 473. September 2005

not use rodenticides or other poisons in rodent control for levee maintenance or in any other SMP activity.

9.3 Frequency and Timing

Levee maintenance activities are scheduled to occur during the dry season from April 15th to October 15th, weather permitting. Sites are treated annually for fuel reduction mowing, and on an as-needed basis for stabilization and rodent control.

9.4 Contractor Details

Most levee maintenance and repair work is performed by DPW road crews, but some tasks are undertaken by CCNB or private contractors. District staff may perform tasks of a smaller duration and extent that don't require full DPW crews. Private contractors may be hired for specific tasks requiring advanced skills beyond what District staff and DPW crews hold.

9.5 Conditions for Levee Maintenance

- LEVVEE-1** Maintenance activities on levees shall not result in disturbance to the subgrade of the levee banks or top. Bottom and surface disturbance shall be kept to the minimum necessary to complete the work and shall not result in erosion of or additional sedimentation into the channel or adjacent wetland or marsh.
- LEVVEE- 2** No pesticides or rodenticides shall be used in the control of rodents on flood control levees within the SMP project area.
- LEVVEE-3** All traps set for rodent control on levees shall be set near the crown of the levee and never in the adjacent marsh or stream channel. No traps shall be set more than two ft. below the crown on the marsh side of a levee.
- LEVVEE-4** After rodents are trapped and removed, burrows will be filled with an earth/concrete mix, bentonite, or other similar fill material to deter re-infestations.
- LEVVEE-5** If the burrow network is extensive, backhoes may be used to uncover the burrows and then repack the earth in order to eliminate the potential for piping of water through the levees through the burrows.

10.0 PROGRAM MANAGEMENT

This chapter describes the components of the annual work cycle and describes how the District will implement the maintenance program in the field. This section also includes a long term monitoring program that will collect data that can be used to inform maintenance priorities over time and direct projects into the County's Capital Improvement program where applicable.

10.1 Annual Work Cycle

The District will implement the SMP in an annual work cycle, to include project planning, pre-project notification, project implementation, and annual reporting. A Watershed Planner, Creek Naturalist, or Operations & Maintenance Engineer will oversee the SMP program, including preparing the documents required by the program

Project Planning, Reconnaissance and Site Selection

Maintenance activities included in this manual are never implemented in a simple routine manner, such as on an annual basis. Instead, creek maintenance activities are conducted only when culverts, channels or facilities have been examined by Flood Control Engineers and are found to be blocked by sediment or vegetation to the point of interference with conveyance of stormwater. The number of maintenance projects undertaken annually and the quantity of sediment and vegetation removed in a given year depend on the frequency and extent of past maintenance activities and the weather and hydrologic conditions during recent years. Channel maintenance requirements are generally greater following a wet winter with higher than usual runoff or at locations where maintenance has not been performed for several years.

In general, vegetation maintenance is triggered when one or more of the conditions listed below occur. The need for vegetation management activities is unlikely if none of these trigger conditions are present.

- Vegetation growth is significantly decreasing flood conveyance capacity
- Vegetation growth impedes access to channels and flood control facilities
- Excessive vegetation growth constitutes a fire hazard to District and private property
- Nonnative invasive plant species are reducing the success of native vegetation
- Live trees are creating excessive hydraulic roughness or dead/dying trees are reducing stream capacity and/or creating a safety hazard.

In general, sediment or debris removal activities are triggered when one or more of the following conditions are observed by the Flood Control Engineer in their annual review of potential maintenance sites:

- Accumulated sediment is covering or blocking culvert outfalls and/or other structures, increasing flooding risk
- The stream or channel is aggrading such that capacity is compromised or the flood or discharge objective is compromised (if known).
- Accumulated sediment is allowing for excessive plant growth in the channel, increasing risk of flooding and possibly causing undue roughness
- Accumulated sediment is reducing fish passage

Each year County Flood Control Engineers review SMP sites within the Flood Control Zones within their jurisdiction and use a combination of professional judgment, local knowledge and available data to assess which sites need maintenance in any given year. Data collection which informs this decision includes annual updating of the site assessment worksheets to document localized sediment conditions at points of aggradation such as culvert outfalls, and flow blockages such as log jams. Sediment accumulation is also tracked through the use of the geomorphic coding system, which explains why sediment accumulates in these locations and helps to guide long term solutions for chronic sediment sources (Table 6-2).

The District's larger flood control channel dredging projects are not included in this manual (i.e. Novato Creek). On these larger projects the District does employ analytical tools to evaluate channel capacity relative to flow using stream flow and discharge data. However, at the majority of the sites included in this manual, sediment accumulates at pinch points in the channel such as at culvert inlets or outfalls, typically creating localized effects that are not reflective of capacity that would be measured by a larger channel modeling exercise using flow and discharge data.

At each location where sediment removal is planned, the County flood control engineers will begin with an assessment of the types of sediments, fluvial processes, and habitat in the project area in order to evaluate impacts to bed and bank stability within the site and upstream. Pre-project analysis will include a plan to integrate the excavated reach of creek into the dominant geomorphic conditions in the channel (i.e. drops should not be left in the streambed at the upstream edge of excavation with the potential to become headcuts that can migrate upstream). The assessment will also identify sorted sediments, such as gravel bars or fines in tidal areas, and consider them for reuse as spawning gravels or wetland surface material. The assessment will also identify the stream's fluvial processes so that the appropriate stream cross section can be excavated, leaving behind a stable channel that optimizes sediment transport.

Several of the sites have been identified as chronic, often due to factors which do not allow for comprehensive solutions, such as tidal backwater and/or flat topography. A few chronic sites have been identified for which permanent solutions may be possible which could reduce or eliminate the need for sediment removal. These sites are described in Table 6.3. As part of this program, the District will continue to identify and prioritize sites where chronic sedimentation issues could be improved through infrastructure improvements. Where feasible, sites will then be included in either an individual Flood Zone Work Program or integrated into the larger Marin County Public Works Capital Improvement Program (CIP).

By May 1st of each year, the District will provide written notification of proposed maintenance activities for the upcoming season to the permitting agencies. The notification will be in the form of a list of each project site and area, and type of activity (vegetation management, sediment removal, erosion control, facilities maintenance, and levee maintenance). Pre-project notification will also include SMP pre-project reconnaissance worksheets for each SMP site along with pre-project photographs.

Additional work may be submitted upon discovery if it meets the criteria established for maintenance as described in Chapter 5, and is not located where conditions affecting fish and wildlife resources on the site have substantially changed, or where such resources would be adversely affected by the proposed maintenance activity.

Project Implementation

The general work window for SMP activities extends from April 15th to October 15th, with the majority of the work being performed between July 1st and October 15th. Exceptions are noted in Chapter 3. Dry years may mean a longer work season; wet weather may halt the work season early.

The SMP is complex; at any one time during the work season, different work activities may be occurring at several sites, with several different contractors. In all cases, all prescribed maintenance activities will be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality.

Work at each site will be scheduled around relevant species' work windows (Table 3-1) whenever possible to avoid impacts, and pre-construction surveys to locate special status species will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of minimization measures. A suite of general and activity-specific conditions and species-specific Avoidance and Minimization Measures (AMMs) apply to the SMP and are described in Chapter 3. In addition, Best Management Practices (BMPs) are prescribed, depending on activity type,

site location, species presumed to be present, work windows, and other conditions. Appendix F contains the BMPs.

Annual Reports

No later than February 15th of each year, the District will provide annual reports to the permitting agencies, describing the work completed during the previous season. The annual reports shall include the project area name, a brief description of project activities, and the appropriate permit implementation fee.

10.2 Data Collection, Management and Program Tracking

Data collection and monitoring efforts are critical to measuring the success of program implementation. The District currently maintains an extensive GIS database from which the maps included in this manual were generated. Both quantitative and observational data is stored in Microsoft Excel and Access tables and databases with links to the GIS database. Data or documentation of the maintenance projects are entered into the database during each cycle of the work plan. The database can be queried to chronicle past maintenance activities or prioritize future actions. The maintenance database is an important tool for the stream maintenance manager and contains technical information to compile the agency notification packages and annual reports. The database will include checklists to ensure all conditions of programmatic permits are met. The regulatory agencies will receive necessary information on maintenance activities based on the permit requirements and the description of activities in this manual. Information saved in the database will also provide insight into future Manual updates.

To properly track the progress of management activities towards achieving the maintenance program's goals and compliance with programmatic permit conditions, these databases will be upgraded and integrated as the stream maintenance program adapts to best meet the stream maintenance goals. The following data are collected for the program:

- GIS reach mapping
- BMP tracking
- Pre- and post-project photos
- Channel geomorphic characterizations
- Annual maintenance notes documenting triggers
- Special status species mapping
- Invasive species locations
- Specific data required by permits
- Pre-project notification packages
- Annual reports

A data sheet used for pre-project site reconnaissance will be employed annually at each site being considered for maintenance (Appendix J). These data sheets will constitute our primary method for gaining additional field data about the SMP sites. Data collected will be used to quantify the need for maintenance, will monitor and document site conditions over time. Over the initial permit period, the District will monitor the data collected via these forms and will make adjustments as necessary to continue to fine tune the District's data collection efforts to support its information needs. Data sheets for pre-construction biological surveys will also be filled out on an annual basis and submitted to resource agencies as required by permit conditions (Appendix I). Site report forms have been developed and are filled out at each site completed on an annual basis. The final report will be developed using a combination of pre-project reconnaissance data, pre-project biological data and implementation data including the photo monitoring and final reports.

10.3 Five-Year Program Review

Every five (5) years, the District and the relevant regulatory agencies will review the stream maintenance program for its overall effectiveness. This review will include an assessment of maintenance activities conducted to date, AMMs and BMPs employed, data management, adequacy of adaptive updates and revisions to the manual, and overall program coordination and communication between the District and the regulatory agencies. The stream maintenance manager will collect and organize the above review information and provide a summary report to the regulatory agencies. These findings will be discussed with regulatory agencies as part of the permit renewal process. As a result of these discussions, potential program changes or updates shall be integrated into the Manual through an addendum or revision process. The updated Manual will be redistributed to regulatory agencies and program partners. Program changes or updates made at the 5-year reviews may require additional California Environmental Quality Act (CEQA) review. Manual revisions may also require an updating of permit terms, which would occur through a collaborative process between the District and the relevant permitting agencies.

10.4 Contractor Training

Proper training of partners and contractors is essential to the success of the SMP in avoiding and minimizing environmental impacts. Training needs vary by contractor and are described below.

DPW Road Crews

- District staff will work with DPW road crews prior to implementing activities covered by the SMP. The ECC will ensure that the Roads Maintenance Supervisors and staff understand their responsibilities for implementing all required general and activity-specific conditions and AMMs. The contractor will be responsible for making sure that the work crews have the materials they need in order to implement all necessary AMMs and BMPs prior to, during and post-construction.
- Maintenance Supervisors and crew members receive periodic training focused on protecting and enhancing aquatic habitats while conducting prescribed road maintenance. Training is based on materials covered in the manual developed by FishNet4C specifically for county road crews, entitled: Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance. Over the past few years, staff have participated in the following FishNet4C workshops:
 - 1) Overview of FishNet4C Roads Manual (2006)
 - 2) Erosion Control & Sediment Management BMPs (2007)
 - 3) Ditch Maintenance/Vegetation Management BMPs (2008)
 - 4) Biotechnical bank stabilization BMPs (2009/10)

CCNB

- District environmental staff will provide an annual training session for all CCNB staff that describes the type and timing of work that will be implemented; potential special status species, their habitats, and associated AMMs, and BMPs to be implemented.
- Prior to commencement of any maintenance activity, District environmental staff will determine the appropriate measures to implement prior to, during and post-activity. The ECC will work regularly with the CCNB Maintenance Supervisor to review work orders to ensure that the Supervisor and their crews implement the prescribed measures needed at each site and for each type of activity.
- Prior to beginning work at each site, the ECC will meet with the CCNB Maintenance Supervisor on site to review the Site Fact Sheet and to ensure that the Maintenance Supervisor understands and is able to comply with the types of AMMs and BMPs prescribed for that site.
- CCNB provides its corps members one day per week of field and classroom instruction on natural resource and science-based topics related to their work, such as watershed ecology, aquatic resources, and identification of local flora and fauna. Corps members may earn credits toward their GED or High School Equivalent diplomas.

STRAW (Students and Teachers Restoring a Watershed)

- Restoration activities are preceded by classroom presentations given by STRAW in partnership with MCSTOPPP. Students learn about the characteristics of the particular watershed in which they will work; the original habitat of the site and how it has been impacted by development, urban runoff, and invasive plant species; and the benefits of restoration.
- On the day of the restoration project, students, teachers, and parent volunteers are trained for the specific activities at the site. Invasive plant removal includes identification of both the invasive weed and other similar native plants. The best techniques are shared, and students focus on small areas to clear the entire site prior to moving to another site. Planting steps are demonstrated and students are encouraged to request a visual check by staff at several key steps to ensure plant survival.
- STRAW restorations are designed for an 80% plant survival rate. Plants are maintained by STRAW staff for a three-year establishment period, and the project team adaptively manages project sites by identifying site specific variables that contribute to plant mortality.

Independent Contactors

- District environmental staff will work with outside contractors prior to implementing activities covered by the SMP. The ECC will ensure that the County Maintenance Supervisors and staff understand their responsibility for implementing all required general and activity-specific conditions and AMMs. The ECC will be responsible for ensuring that the contractors understand what materials they need to have in hand in order to implement all necessary AMM's and BMPs prior to, during and post-construction.
- Companies contracting with the County of Marin for SMP activities will be held to standards described in the Specifications that are included in their County contracts.

Municipal Partners

District environmental staff will work with its municipal partners prior to their implementing activities covered by the SMP. The ECC will ensure that Maintenance Supervisors and municipal staff understand their responsibility for implementing all required general and activity-specific conditions and AMMs. The ECC will be responsible for ensuring that municipal staff understand what materials they need to have in hand in order to implement all necessary AMM's and BMPs prior to, during and post-construction.

11.0 REGULATORY COMPLIANCE

This chapter describes the steps that the District has taken to fulfill all California Environmental Quality Act (CEQA) and environmental permitting requirements. In preparation for the completion of CEQA review of the program and permit applications, the District conducted a Biological Assessment⁸ of SMP activities and their potential to impact sensitive resources within the geographic scope of the project. The Biological Assessment (Appendix E) is the guiding document for the Avoidance and Minimization Measures set forth in order to protect important habitat and special status species during the implementation of stream maintenance activities.

11.1 CEQA Compliance

The District is the lead agency for CEQA review of this program. In 2012, the District prepared an Initial Study, which was circulated according to CEQA guidelines. The District took comments and filed a Mitigated Negative Declaration of Environmental Impact. The Notice of Determination (State Clearinghouse # 2012022053) was filed in June 2012.

In April 2014, the District amended the Mitigated Negative Declaration to add several new sites and change parameters of several other existing sites.

All CEQA documents can be found in Appendix G.

11.2 California Department of Fish and Wildlife

In October 2012, the District entered into a Routine Maintenance Agreement (RMA) (Notification No. 1600-2012-0207-R3) with the California Department of Fish and Wildlife to obtain permitting coverage and terms for the District's most common maintenance needs. The first work season under the permit was 2013 and it will expire December 31, 2016.

In early 2014, the permit was amended to add several new sites and change the parameters of several other existing sites.

Some of the key requirements and restrictions include:

- No native trees with trunk diameter DBH more than 4" may be removed without prior approval from CDFW. Tree replacement will be at a ratio of 3:1,

⁸ Marin County Flood Control and Water Conservation District SMP - Biological Assessment, October 2011

- Notification lists by May 1; daily Site Report Forms; Annual reports and fees due December 31
- Activities will not exceed 7,500 linear feet of creek channel and 11,000 cubic yards of sediment program-wide per year.

11.3 Regional Water Quality Control Board

The Regional Board issues 401 Water Quality Certifications and Waste Discharge Requirements (WDRs) for Marin County's flood control maintenance activities. Under the Clean Water Act (CWA Section 401), applicants for a federal 404 US Army Corps of Engineers (USACE) permit to conduct activities that may result in the discharge of dredged and fill materials into surface waters of the United States (including wetlands) must obtain Section 401 Water Quality Certification from the State so that any such discharge will comply with the applicable provisions of the CWA. For sites located outside ACOE jurisdiction of waters of the U.S. but within waters of the State, the Regional Water Quality Control Board issues Waste Discharge Requirements (WDRs) for activities involving sediment or debris removal, large woody debris management, erosion control, and vegetation management within the channels as part of maintenance activities.

11.4 U.S. Army Corps of Engineers (USACE)

Several of the sediment removal sites are situated below the ordinary high water mark (OHWM) of stream channels that require dewatering for maintenance activities to be implemented or along the SF Bay edge in wetland conditions. These sites fall within the jurisdiction of the U.S. Army Corps of Engineers (USACE) and will require coverage under Clean Water Act 404 Nationwide permits or a Regional General Permit.

The District has contacted USACE about the Stream Maintenance Program and has been advised to approach USACE again once the permitting process with Regional Board has been completed. At that time, based on the nature of the sites within USACE jurisdiction, USACE will suggest the proper course of action for obtaining federal Clean Water Act permits.

11.5 Other Agencies

U.S. Fish and Wildlife Service/NOAA-National Marine Fisheries Service

If USACE determines that maintenance at a project site has the potential to affect a threatened or endangered species or critical habitat under Section 7 of the Endangered Species Act (ESA), the USACE will initiate consultation with the appropriate federal wildlife agency: U.S. Fish and Wildlife Service (USFWS) for terrestrial species and their habitats; or

the National Marine Fisheries Service (NMFS) for protected marine and aquatic fish species and habitats.

The consultation could be formal or informal to address the effects of the project. In some cases, a Biological Opinion with “incidental take” provisions will be distributed from USFWS to USACE for inclusion in the permit.

Bay Conservation and Development Commission (BCDC)

The Bay Conservation and Development Commission (BCDC) regulates placement of fill, dredging activities, and development activities along the bay edge. Some of the sediment removal activities will occur within the jurisdictional areas of BCDC. The District will pursue these permits after the bulk of the sites are covered by CDFW, RWQCB, and USACE.

APPENDIX A

MASTER LIST OF PROJECT AREAS AND SITES

| Marin County Flood Control-Stream Maintenance Program Master Site List | | | | | | | | | | | | |
|---|---|--------------|-----------------------|---|------------------------|-----------------------|-----------------|----------------------|---------------------|-------------------------------|---------------------------------|--|
| April 2017 | Blue = Large dredge projects not included in SMP | | | | | | | | | | | |
| Zone | Site ID | Map # | Creek | Location Description | Tidal Character | Natural Bottom | Concrete | RWQCB WDR/401 | DFW 1600 RMA | Special Status Species | Partner (see list below) | |
| FLOOD CONTROL ZONE 1 - NOVATO | | | | | | | | | | | | |
| 1 | 1-AA-1 | 1 | Arroyo Avichi | Novato Creek to culvert at Novato Blvd | Tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-AA-2 | 1 | Arroyo Avichi | US of bypass to 1575 Indian Valley Rd | Non-tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-ASJ-1 | 3 | Arroyo de San Jose | Pacheco Pond to Hwy 101 | Non-tidal | X | | Yes | Yes | X | MCFCWCD | |
| 1 | 1-ASJ-2 | 3 | Arroyo de San Jose | Hwy 101 to silt basin US of Ignacio Blvd | Non-tidal | | X | Yes | Yes | X | MCFCWCD | |
| 1 | 1-ASJ-3 | 3 | Arroyo de San Jose | Ignacio Blvd to Birdie Dr | Non-tidal | X | | Yes | Yes | X | MCFCWCD | |
| 1 | 1-BB-1 | 1 | Baccaglio Basin | Baccaglio Basin | Non-tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-BB-2 | 1 | Baccaglio Basin | Baccaglio Bypass; Arroyo Avichi trash rack to Basin | Non-tidal | | X | Yes | Yes | | MCFCWCD | |
| 1 | 1-CHE-1 | 1 | Cheda Creek | Pump station | Non-tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-CHE-2 | 1 | Cheda Creek | Novato Blvd to Cowbarn Ln | Non-tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-IGN | 3 | Ignacio Creek | Ignacio Blvd to College of Marin campus | Non-tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-LYC | 1 | Lynwood Creek | Off Rowland Blvd | Non-tidal | X | | Yes | Yes | X | MCFCWCD | |
| 1 | 1-LYS | 1 | Lynwood Slough | Behind Vintage Oaks Shopping Center | Non-tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-NMWD-1 | 2 | Novato Creek | Novato Creek at Jim Grossi Ranch US of Stafford Lake | Non-tidal | X | | Yes | Yes | | NMWD | |
| 1 | 1-NMWD-2 | 2 | Trib to Stafford Lake | Tributary to Stafford Lake near Indian Valley Golf Course | Non-tidal | X | | Yes | Yes | | NMWD | |
| 1 | 1-NOV-1 | 1 | Novato Creek | Mouth to Redwood Blvd | Tidal | X | | Yes | Yes | X | MCFCWCD | |
| 1 | 1-NOV-2 | 1 | Novato Creek | Redwood Blvd to upper tidal extent | Tidal | X | | Yes | Yes | X | MCFCWCD | |
| 1 | 1-NOV-3 | 2 | Novato Creek | Above tidal extent to Thorsen Ct | Non-tidal | X | | Yes | Yes | X | MCFCWCD, STRAW | |
| 1 | 1-NOV-SR | n/a | Novato Creek | Novato Creek Sediment Removal | | | | NO | NO | | | |
| 1 | 1-PAC-1 | 3 | Pacheco Creek | Pacheco Pond to Hwy 101 | Non-tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-PAC-2 | 3 | Pacheco Creek | Hwy 101 to 99 Pacheco Creek Dr. | Non-tidal | X | | Yes | Yes | | MCFCWCD | |
| 1 | 1-PAC-3 | 3 | Pacheco Creek NF | Parallel to Oak Forest Rd | Non-tidal | X | | Yes | Yes | | MCFCWCD | |

| Zone | Site ID | Map # | Creek | Location Description | Tidal Character | Natural Bottom | Concrete | RWQCB WDR/401 | DFW 1600 RMA | Special Status Species | Partner (see list below) |
|--|----------|-------|----------------------------------|---|-----------------|----------------|----------|---------------|--------------|------------------------|--------------------------|
| 1 | 1-RUSH | 1 | Rush Creek | N of Olive/Railroad intersect to Binford Rd(excluding Caltrans ROW) | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 1 | 1-SIMM | 1 | Simmons Slough | Simmons Slough | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 1 | 1-SMC | 2 | San Marin Creek | Between Leese Ln and Driftwood Ave | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 1 | 1-SRC | 2 | San Ramon Creek | Between shopping center and Poplar Dr | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 1 | 1-VIN | 2 | Vineyard Creek | US to 2590 Vineyard Rd | Non-tidal | X | | Yes | Yes | X | MCFCWCD, STRAW |
| 1 | 1-WAR-1 | 1 | Warner Creek | Novato Creek to Diablo Ave | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 1 | 1-WAR-2 | 1 | Warner Creek | Diablo Ave to confluence with Vineyard Creek | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 1 | 1-WIL | 2 | Wilson Creek | Warner Creek confluence to 630 Wilson Ave | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| FLOOD CONTROL ZONE 3 - RICHARDSON BAY | | | | | | | | | | | |
| 3 | 3-ACMP-1 | 4 | Arroyo Corte Madera del Presidio | Camino Alto to La Goma St | Tidal | X | | Yes | Yes | X | City of Mill Valley |
| 3 | 3-ACMP-2 | 4 | Arroyo Corte Madera del Presidio | Warner to Old Mill Cr | Non-tidal | X | | Yes | Yes | X | City of Mill Valley |
| 3 | 3-ACMP-3 | 4 | Arroyo Corte Madera del Presidio | Sunnyside Bridge to 650 W. Blithedale Ave | Non-tidal | X | | Yes | Yes | X | City of Mill Valley |
| 3 | 3-BM | 4 | Bothin Marsh | E. Blithedale Ave at Roque Moraes Dr | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 3 | 3-CAS | 4 | Cascade Creek | From Cascade Dr upstream approximately 600 ft | Non-tidal | X | | Yes | Yes | X | City of Mill Valley |
| 3 | 3-COY-SR | n/a | Coyote Creek | Coyote Creek Sediment Removal Hwy1 to DS end of concrete channel | | | | NO | NO | | |
| 3 | 3-COY-1 | 5 | Coyote Creek | Shoreline Hwy to start of concrete channel | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 3 | 3-COY-2 | 5 | Coyote Creek | Start of concrete channel to Laurel Way | Tidal | | X | Yes | Yes | | MCFCWCD |
| 3 | 3-COY-3 | 5 | Coyote Creek | Laurel Way to US of Ash St | Non-tidal | | X | Yes | Yes | | MCFCWCD |
| 3 | 3-COY-4 | 5 | Coyote Creek | North fork inlet between Ash St and Maple Ave | Non-tidal | | X | Yes | Yes | | MCFCWCD |
| 3 | 3-COY-5 | 5 | Coyote Creek | South fork inlet | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 3 | 3-CRE-1 | 5 | Crest Marin Creek | Flamingo Rd to Ross Dr | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 3 | 3-CRE-2 | 5 | Crest Marin Creek | End of Laurel Way | Non-tidal | X | X | Yes | Yes | | MCFCWCD |

| Zone | Site ID | Map # | Creek | Location Description | Tidal Character | Natural Bottom | Concrete | RWQCB WDR/401 | DFW 1600 RMA | Special Status Species | Partner (see list below) |
|------|----------|-------|--------------------------------|--|-----------------|----------------|----------|---------------|--------------|------------------------|----------------------------|
| 3 | 3-MIL-1 | 5 | Miller Ave drainage | Just S of Miller Ave/Camino Alto intersection | Tidal | X | X | Yes | Yes | X | MCFCWCD |
| 3 | 3-MIL-2 | 5 | Miller Ave drainage | E side of Miller Ave across from Tamalpais HS | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 3 | 3-MIL-3 | 5 | Miller Ave drainage | Across from Tamalpais HS track between Miller Ave and Bothin Marsh multiuse path | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 3 | 3-MRN | 5 | Marin City drainage | Trash racks | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 3 | 3-NYH-1 | 5 | Nyhan Creek | Enterprise Concourse to Headlands Ave | Tidal | X | | Yes | Yes | | MCFCWCD |
| 3 | 3-NYH-2 | 5 | Nyhan Creek WF | Channel behind Tamalpais Valley Elementary School | Non-tidal | | X | Yes | Yes | | MCFCWCD |
| 3 | 3-NYH-3 | 5 | Nyhan Creek tributary | Along Tamalpais Valley Community Center | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 3 | 3-OMC | 4 | Old Mill Creek | Ethel Ave to 550 Cascade Dr | Non-tidal | X | | Yes | Yes | X | City of Mill Valley; STRAW |
| 3 | 3-REED-1 | 4 | Reed Creek | ACMP confluence US approximately 200 ft | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 3 | 3-REED-2 | 4 | Reed Creek | 300 ft US of Miller Ave to Tamalpais Ave | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 3 | 3-RSD | 5 | Robin-Starling Ditch | Approximately 525 ft from Coyote Cr US to just past Robin Rd | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 3 | 3-RYC-1 | 4 | Ryan Creek | ~150 ft upstream of Camino Alto and under road | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 3 | 3-RYC-2 | 4 | Ryan Creek | Ryan Ave circle to Amicita Ave | Non-tidal | X | | Yes | Yes | | City of Mill Valley |
| 3 | 3-SEM | 5 | Pump station at Seminary Drive | Pump station at Seminary Drive | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 3 | 3-SUT-1 | 4 | Sutton Manor | Roque Moraes Dr just S of E. Blithedale Ave | Tidal | X | | Yes | Yes | X | City of Mill Valley |
| 3 | 3-SUT-2 | 4 | Sutton Manor | Roque Moraes Dr to Ashford Ave | Tidal | X | | Yes | Yes | | City of Mill Valley |
| 3 | 3-SUT-3 | 4 | Sutton Manor | Ashford Ave to Dorset Ln | Tidal | | X | Yes | Yes | | City of Mill Valley |
| 3 | 3-SUT-4 | 4 | Sutton Manor | Dorset Ln to Shell Rd ditch | Non-tidal | | X | Yes | Yes | | City of Mill Valley |
| 3 | 3-SUT-5 | 4 | Sutton Manor | Shell Rd ditch parallel to Shell Rd | Non-tidal | X | X | Yes | Yes | | City of Mill Valley |

| Zone | Site ID | Map # | Creek | Location Description | Tidal Character | Natural Bottom | Concrete | RWQCB WDR/401 | DFW 1600 RMA | Special Status Species | Partner (see list below) |
|--|---------------|-------|-----------------------------------|--|-----------------|----------------|----------|---------------|--------------|------------------------|----------------------------|
| 3 | 3-SUT-6 | 4 | Sutton Manor | Trash rack at Vasco Ct | Non-tidal | X | X | Yes | Yes | | City of Mill Valley |
| 3 | 3-WAR | 4 | Warner Canyon Creek | 200 ft DS of Blithedale Bridge to 100 ft DS of Vista Linda Bridge | Non-tidal | X | | Yes | Yes | X | City of Mill Valley; STRAW |
| FLOOD CONTROL ZONE 4 - BEL AIRE AND STRAWBERRY CIRCLE | | | | | | | | | | | |
| 4 | 4-EAST-1 | 6 | East Creek | From Tiburon Blvd US to tidal extent (approx 350 ft) | Tidal | X | | Yes | Yes | X | MCFCWCD |
| | 4-EAST-2 | 6 | East Creek | DS of Cecilia Way; ditch from Cecilia Way upstream to end of Karen Wa | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 4 | 4-SALT | 6 | Salt Works Canal | DS of Tiburon Blvd | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 4 | 4-STR | 6 | Strawberry Circle levee and ditch | On Mill Valley school property | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 4 | 4-WEST-1 | 6 | West Creek | From Tiburon Blvd US to tidal extent (approx 425 ft) | Tidal | X | | Yes | Yes | | MCFCWCD, STRAW |
| 4 | 4-WEST-2 | 6 | West Creek | From tidal extent US to Via Los Altos and a 100 ft section US of Reedlands Woods Way | Non-tidal | X | | Yes | Yes | | MCFCWCD, STRAW |
| FLOOD CONTROL ZONE 5 - STINSON BEACH | | | | | | | | | | | |
| 5 | 5-EAS-1 (a-e) | 10 | Easkoot Creek | Calle del Ribera to Calle de Pinos | Tidal | X | | Yes | No | X | MCFCWCD |
| 5 | 5-EAS-2 | 10 | Easkoot Creek | Sediment trap on NPS land | Non-tidal | | | Yes | No | X | MCFCWCD |
| 5 | 5-EAS-3 | 10 | Easkoot Creek | 250 ft DS of Arenal Ave to 200 ft US of Hwy 1 | Non-tidal | X | | Yes | No | X | MCFCWCD |
| FLOOD CONTROL ZONE 6 - SAN RAFAEL MEADOWS | | | | | | | | | | | |
| 6 | 6-SRM-1 | 6 | Area ditches | SR Meadows by Fwy | Tidal | | | Yes | Yes | X | City of San Rafael |
| 6 | 6-SRM-2 | 6 | Area ditches | San Rafael Meadows | Non-tidal | | | Yes | Yes | | City of San Rafael |
| 6 | 6-SMART | 6 | Area ditches | San Rafael Meadows: SMART | Non-tidal | | | Yes | Yes | | City of San Rafael |
| FLOOD CONTROL - CSA 6- Gallinas Creek | | | | | | | | | | | |
| 7 | CSA-6-SR | n/a | Gallinas Creek | CSA 6 dredge | | | | NO | NO | | |
| FLOOD CONTROL ZONE 7 - SANTA VENETIA | | | | | | | | | | | |
| 7 | 7-CAS | 6 | Castro Ditch | Between Vendola Dr and Mabry Dr | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 7 | 7-EST | 6 | Estancia Ditch | Pump Station 4 to Pump Station 5 | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 7 | 7-GAL | 6 | Gallinas Creek South Fork | South Fork; Behind Vendola Dr from Meadow Way to Pump Station 5 | Tidal | X | | Yes | Yes | X | MCFCWCD |

| Zone | Site ID | Map # | Creek | Location Description | Tidal Character | Natural Bottom | Concrete | RWQCB WDR/401 | DFW 1600 RMA | Special Status Species | Partner (see list below) |
|---|----------|-------|---------------------------|---|-----------------|----------------|----------|---------------|----------------|------------------------|--------------------------|
| 7 | 7-LAP-1 | 6 | | La Pasada Way intersection with Vendola Dr | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 7 | 7-LAP-2 | 6 | Gallinas Creek South Fork | La Pasada Way intersection with N. San Pedro Rd | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 7 | 7-MAB | 6 | Mabry Ditch | Between Mabry Way and Birch Way | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 7 | 7-MCPH | 6 | | McPhail School berm on west side of property N of N. San Pedro Rd | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 7 | 7-MEA-1 | 6 | Gallinas Creek South Fork | Meadow Way Interceptor Outlet; end of Meadow Way at Gallinas Creek | Tidal | X | | Yes | Yes | X | MCFCWCD |
| 7 | 7-MEA-2 | 6 | | Meadow Way Interceptor Inlets; 294 N San Pedro Rd and 308 San Pedro Ct | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 7 | 7-SRAL | 6 | Gallinas Creek South Fork | San Rafael Airport Levee; curves around the NE end of airstrip | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 7 | 7-SOD | 6 | Gallinas Creek South Fork | Sunny Oaks Drain; NW of E. Vendola Dr intersection with N. San Pedro Rd | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 7 | 7-PS-1 | 6 | Gallinas Creek South Fork | Vendola Dr Pump Stations 1-5 and 2 portables | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 7 | 7-PS-2 | 6 | Gallinas Creek South Fork | Pump Station #4 detention basin | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| FLOOD CONTROL ZONE 9 - ROSS VALLEY | | | | | | | | | | | |
| 9 | 9-BOTH | 9 | Bothin Creek | From Fairfax Cr to Bothin Rd | Non-tidal | X | | Yes | Yes | | Town of Fairfax |
| 9 | 9-CCT | 7 | Larkspur Creek | 10-14 College Ave | Tidal | X | | Yes | Yes | | City of Larkspur |
| 9 | 9-CMC-SR | n/a | Corte Madera Creek | Mouth to stilling basin; USACE project | | | | NO | No | | |
| 9 | 9-CMC-1 | 7 | Corte Madera Creek | Bon Air Rd to end of natural channel; beginning of concrete channel | Tidal | X | | Yes | Yes (Veg Only) | X | MCFCWCD |
| 9 | 9-CMC-2 | 7 | Corte Madera Creek | Corte Madera Creek concrete channel outfall US to tidal limit; | Tidal | | X | Yes | Yes (Veg Only) | X | MCFCWCD |
| 9 | 9-CMC-3 | 7 | Corte Madera Creek | Concrete and natural channel from tidal extent at Kentfield Rehab US to Lagunitas Rd Bridge | Non-tidal | X | X | Yes | Yes | X | MCFCWCD |
| 9 | 9-CMC-4 | 7 | Corte Madera Cr | Lagunitas Bridge to Ross Cr | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 9 | 9-FAIR | 9 | Fairfax Creek | From San Anselmo Cr to Sunnyside Nursery | Non-tidal | X | | Yes | Yes | X | Town of Fairfax |

| Zone | Site ID | Map # | Creek | Location Description | Tidal Character | Natural Bottom | Concrete | RWQCB WDR/401 | DFW 1600 RMA | Special Status Species | Partner (see list below) |
|------|---------|-------|--------------------------|--|--------------------|----------------|----------|---------------|--------------|------------------------|---------------------------|
| 9 | 9-LAD | 8 | Laurel Ave ditch | Ditch in residential backyards | Non-tidal | X | | Yes | Yes | | Town of San Anselmo |
| 9 | 9-LAR-1 | 7 | Larkspur Creek | CMC to E of Meadwood (tidal extent) | Tidal | X | | Yes | Yes | X | City of Larkspur |
| 9 | 9-LAR-2 | 7 | Larkspur Creek | Above tidal extent to end of Madrone Ave | Non-tidal | X | | Yes | Yes | X | MCFCWCD, City of Larkspur |
| 9 | 9-MAG-1 | 7 | Larkspur Creek | 1100 Magnolia Ave | Tidal | X | | Yes | Yes | | City of Larkspur |
| 9 | 9-MAG-2 | 7 | Larkspur Creek | 1028 Magnolia Ave | Tidal | X | | Yes | Yes | | City of Larkspur |
| 9 | 9-MAG-3 | 7 | Larkspur Creek | 965 Magnolia Ave | Tidal | X | | Yes | Yes | | City of Larkspur |
| | 9-MAG-4 | 7 | ditch | 600 Magnolia Ave. | Non-tidal | X | | Yes | Yes | | City of Larkspur |
| 9 | 9-MUR | 7 | Murphy Creek | From the Murphy Creek culvert at Kent Ave US to border of the Town of Ross, including culverts and crossings | Tidal 30ft US only | X | | Yes | Yes | | MCFCWCD, DPW, |
| 9 | 9-ROS | 7 | Ross Creek | From mainstem to Glenwood Ave | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 9 | 9-SAC-1 | 8 | San Anselmo Cr | Within Town of Ross (Ross Creek to SA border) | Non-tidal | X | | Yes | Yes | X | Town of San Anselmo |
| 9 | 9-SAC-2 | 8 | San Anselmo Cr | Within Town of San Anselmo | | X | | Yes | Yes | X | Town of Fairfax |
| 9 | 9-SAC-3 | 8 | San Anselmo Cr | Within Town of Fairfax | | X | | Yes | Yes | X | Town of Fairfax |
| 9 | 9-SHC-1 | 9 | Sleepy Hollow Creek | From San Anselmo Cr to town limit | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 9 | 9-SHC-2 | 9 | Sleepy Hollow Creek | From San Anselmo town limit to confluence with Van Winkle Cr | Non-tidal | X | | Yes | Yes | X | MCFCWCD |
| 9 | 9-SHC-3 | 9 | Sleepy Hollow Creek trib | 300 Hidden Valley Ln culvert | Non-tidal | X | | Yes | Yes | | MC Roads |
| 9 | 9-SHC-4 | 9 | Sleepy Hollow Creek | 960 Butterfield Rd/Green Valley Ct | Non-tidal | X | | Yes | Yes | X | MC Roads |
| 9 | 9-SHC-5 | 9 | Sleepy Hollow Creek | Butterfield Rd/Sleepy Hollow Dr bridge | Non-tidal | X | | Yes | Yes | X | MC Roads |
| 9 | 9-SHC-6 | 9 | Sleepy Hollow Creek | Katrina Ln | Non-tidal | X | | Yes | Yes | X | MC Roads |
| 9 | 9-SHC-7 | 9 | Sleepy Hollow Creek | Van Winkle Dr culvert | Non-tidal | X | | Yes | Yes | | MC Roads |
| 9 | 9-SOR | 9 | Sorich Creek | 3500 ft US of San Anselmo Cr confluence | Non-tidal | X | | Yes | Yes | | MCFCWCD |
| 9 | 9-VAN-1 | 9 | Van Winkle Creek | Sleepy Hollow Cr to 275 Van Winkle | Non-tidal | X | | Yes | Yes | | MCFCWCD |

| Zone | Site ID | Map # | Creek | Location Description | Tidal Character | Natural Bottom | Concrete | RWQCB WDR/401 | DFW 1600 RMA | Special Status Species | Partner (see list below) |
|--|-----------|-------|-----------------------------|--|-----------------|----------------|----------|---------------|-----------------|------------------------|--------------------------|
| 9 | 9-VAN-2 | 9 | Van Winkle Creek | Ichabod Ct culvert | Non-tidal | X | | Yes | Yes | | MC Roads |
| 9 | 9-VAN-3 | 9 | Van Winkle Creek | Tappan Rd culvert | Non-tidal | X | | Yes | Yes | | MC Roads |
| 9 | 9-VAN-4 | 9 | Van Winkle Creek | Mather Rd culvert | Non-tidal | X | | Yes | Yes | | MC Roads |
| 9 | 9-VAN-5 | 9 | ditches to Van Winkle Creek | 155 and 201 Van Winkle Drive | Non-tidal | X | | Yes | Yes | | MC Roads |
| 9 | 9-VAN-6 | 9 | Van Winkle Creek | Manitou Dr culvert | Non-tidal | X | | Yes | Yes | | MC Roads |
| 9 | 9-WARD | 7 | Larkspur Creek | Outfall from city parkng lot across from 25 Ward St | Non-tidal | X | | Yes | Yes | | City of Larkspur |
| 9 | 9-WILL | 7 | roadside ditch into marsh | 444 block of Willian Ave. | Partially tidal | X | | Yes | Yes | | City of Larkspur |
| COUNTY SERVICE AREA 13 - UPPER LUCAS VALLEY | | | | | | | | | | | |
| CSA-13 | CSA-13-MC | 6 | Miller Creek | Along Dixie Elementary and Miller Creek Middle schools | Non-tidal | X | | Yes | Yes | X | STRAW |
| | | | | | | | | | PARTNERS | | |
| | | | | | | | | | 1 | MCFCWCD | |
| | | | | | | | | | 2 | City of Mill Valley | |
| | | | | | | | | | 3 | STRAW | |
| | | | | | | | | | 4 | City of Larkspur | |
| | | | | | | | | | 5 | Town of Fairfax | |
| | | | | | | | | | 6 | Town of San Anselmo | |
| | | | | | | | | | 7 | Town of Ross | |
| | | | | | | | | | 8 | City of San Rafael | |
| | | | | | | | | | 9 | NMWD | |
| | | | | | | | | | 10 | MC Roads | |

| | Marin | | | | | | | | | | | | | | | |
|-------------------|-------------------|-------------------------|-------------------|---|--|--|----------------------------|----------------------------|--|---|------------------------|-------------------------|------------------------|---------------------|------------------|--------------------------|
| April 2017 | Blue = Lar | | | | | | | | | | | | | | | |
| Zone | Site ID | Duration of Work | Vegetation | Limb and trim top of bank and side slopes of channel | Remove vegetation within channel bottom | Clear trash and debris from creek | Remove fallen trees | Hazard tree removal | Remove invasive non-native plants | Revegetation with native plant species | Cattail cutting | Sediment removal | Erosion Control | Pump Station | Tide gate | Levee Maintenance |
| FLOOD CO | | | | | | | | | | | | | | | | |
| 1 | 1-AA-1 | 1-2 | X | X | X | X | X | X | X | | | | | | X | |
| 1 | 1-AA-2 | 2-3 | X | X | X | X | X | X | X | | | X | X | | | |
| 1 | 1-ASJ-1 | 2-3 | X | X | X | X | X | X | X | | | | X | | | |
| 1 | 1-ASJ-2 | 2 | X | X | X | X | X | X | X | | | X | X | | | |
| 1 | 1-ASJ-3 | 2 | X | X | X | X | X | X | X | X | | | X | | | |
| 1 | 1-BB-1 | 2 | X | X | X | X | X | X | X | | X | X | X | | | |
| 1 | 1-BB-2 | 2 | X | X | X | X | X | X | X | | | | | | | |
| 1 | 1-CHE-1 | 1-2 | | | | | | | | | | | | X | | |
| 1 | 1-CHE-2 | 1-2 | X | X | X | X | X | X | X | | X | | X | | | |
| 1 | 1-IGN | 2-3 | X | X | X | X | X | X | X | | | | X | | | |
| 1 | 1-LYC | 1-2 | X | X | X | X | X | X | X | | X | | X | | | |
| 1 | 1-LYS | 1-3 | | | | | | | | | | X | | X | | |
| 1 | 1-NMWD-1 | 2-3 | | X | X | X | X | X | X | | | X | | | | |
| 1 | 1-NMWD-2 | 1-2 | | X | X | X | X | X | X | | | X | | | | |
| 1 | 1-NOV-1 | 3-4 | X | X | X | X | X | X | X | | | | X | X | X | X |
| 1 | 1-NOV-2 | 2-3 | X | X | X | X | X | X | X | | | | X | | | |
| 1 | 1-NOV-3 | 3-4 | X | X | X | X | X | X | X | X | | | X | | | |
| 1 | 1-NOV-SR | | | | | | | | | | | | | | | |
| 1 | 1-PAC-1 | 2-3 | X | X | X | X | X | X | X | | | | X | | | |
| 1 | 1-PAC-2 | 2-3 | X | X | X | X | X | X | X | | | | X | | | |
| 1 | 1-PAC-3 | 1 | X | X | X | X | X | X | X | | | | | | | |

| Zone | Site ID | Duration of Work | Vegetation | Limb and trim top of bank and side slopes of channel | Remove vegetation within channel bottom | Clear trash and debris from creek | Remove fallen trees | Hazard tree removal | Remove invasive non-native plants | Revegetation with native plant species | Cattail cutting | Sediment removal | Erosion Control | Pump Station | Tide gate | Levee Maintenance |
|-----------------|----------|------------------|------------|--|---|-----------------------------------|---------------------|---------------------|-----------------------------------|--|-----------------|------------------|-----------------|--------------|-----------|-------------------|
| 1 | 1-RUSH | 1-2 | X | X | X | X | X | X | X | | | X | | | X | |
| 1 | 1-SIMM | 3-4 | X | | X | | | | X | | X | X | | X | X | |
| 1 | 1-SMC | 2-3 | X | X | X | X | X | X | X | | | | | | | |
| 1 | 1-SRC | 2-3 | X | X | X | X | X | X | X | | | | | | | |
| 1 | 1-VIN | 2-3 | X | X | X | X | X | X | X | X | | X | X | | | |
| 1 | 1-WAR-1 | 2 | X | X | X | X | X | X | X | | | | X | | | |
| 1 | 1-WAR-2 | 2-3 | X | X | X | X | X | X | X | X | | | X | | | |
| 1 | 1-WIL | 2-3 | X | X | | X | X | X | X | X | | | X | | | |
| FLOOD CO | | | | | | | | | | | | | | | | |
| 3 | 3-ACMP-1 | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 3 | 3-ACMP-2 | 2 | X | X | X | X | X | X | X | X | | | | | | |
| 3 | 3-ACMP-3 | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 3 | 3-BM | 1-2 | | | | | | | | | | X | | | | |
| 3 | 3-CAS | 1 | X | X | X | X | X | X | X | X | | | | | | |
| 3 | 3-COY-SR | | | | | | | | | | | | | | | |
| 3 | 3-COY-1 | 1-2 | | | | | | | | | | | X | X | X | X |
| 3 | 3-COY-2 | 2 | X | X | | X | X | | X | | | X | X | | X | |
| 3 | 3-COY-3 | 1 | X | X | | X | X | | X | | | X | X | | X | |
| 3 | 3-COY-4 | 1 | X | X | | | | | | | | X | | | | |
| 3 | 3-COY-5 | 1 | X | X | | X | X | | X | | | X | | | | |
| 3 | 3-CRE-1 | 2 | X | | X | | | | | | | X | | X | X | |
| 3 | 3-CRE-2 | 1-2 | | | | | | | | | | X | | | | |

| Zone | Site ID | Duration of Work | Vegetation | Limb and trim top of bank and side slopes of channel | Remove vegetation within channel bottom | Clear trash and debris from creek | Remove fallen trees | Hazard tree removal | Remove invasive non-native plants | Revegetation with native plant species | Cattail cutting | Sediment removal | Erosion Control | Pump Station | Tide gate | Levee Maintenance |
|------|----------|------------------|------------|--|---|-----------------------------------|---------------------|---------------------|-----------------------------------|--|-----------------|------------------|-----------------|--------------|-----------|-------------------|
| 3 | 3-MIL-1 | 2-3 | | | | | | | | | | X | | | | |
| 3 | 3-MIL-2 | 1 | | | | | | | | | | X | | | | |
| 3 | 3-MIL-3 | 2-3 | | | | | | | | | | X | | | | |
| 3 | 3-MRN | 1 | | | | | | | | | | | | | | |
| 3 | 3-NYH-1 | 1-2 | X | X | X | X | X | X | X | | | X | X | | | |
| 3 | 3-NYH-2 | 1 | X | X | X | X | X | X | X | | | X | | | | |
| 3 | 3-NYH-3 | 1 | X | X | X | | | | | | | | | | | |
| 3 | 3-OMC | 3-4 | X | X | X | X | X | X | X | X | | | | | | |
| 3 | 3-REED-1 | 1 | X | X | | X | X | X | X | X | | X | | | | |
| 3 | 3-REED-2 | 2 | X | X | X | X | X | X | X | X | | | | | | |
| 3 | 3-RSD | 1-2 | X | | | | | | | | | | | | | |
| 3 | 3-RYC-1 | 1-2 | | | | | | | | | | X | | X | X | |
| 3 | 3-RYC-2 | 1 | X | X | X | X | X | X | X | X | | | | | | |
| 3 | 3-SEM | 1 | | | | | | | | | | | | X | X | |
| 3 | 3-SUT-1 | 1-2 | | | | | | | | | | X | | | | |
| 3 | 3-SUT-2 | 1 | X | X | X | X | X | X | X | X | | X | | | | |
| 3 | 3-SUT-3 | 1-2 | X | X | X | X | X | X | X | X | | X | | | | |
| 3 | 3-SUT-4 | 1 | X | X | X | X | X | X | X | X | | X | | | | |
| 3 | 3-SUT-5 | 1 | X | X | X | X | X | X | X | | | X | | | | |

| Zone | Site ID | Duration of Work | Vegetation | Limb and trim top of bank and side slopes of channel | Remove vegetation within channel bottom | Clear trash and debris from creek | Remove fallen trees | Hazard tree removal | Remove invasive non-native plants | Revegetation with native plant species | Cattail cutting | Sediment removal | Erosion Control | Pump Station | Tide gate | Levee Maintenance |
|----------|---------------|------------------|------------|--|---|-----------------------------------|---------------------|---------------------|-----------------------------------|--|-----------------|------------------|-----------------|--------------|-----------|-------------------|
| 3 | 3-SUT-6 | 1 | | | | | | | | | | | | | | |
| 3 | 3-WAR | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| FLOOD CO | | | | | | | | | | | | | | | | |
| 4 | 4-EAST-1 | 1 | X | X | X | X | X | X | X | X | | | | X | | |
| | 4-EAST-2 | 1 | X | X | X | X | X | X | X | X | X | | | | | |
| 4 | 4-SALT | 1 | X | | | | | | | | | | X | | | X |
| 4 | 4-STR | 1-2 | | | | | | | | | | | X | X | X | X |
| 4 | 4-WEST-1 | 1 | X | X | X | X | X | X | X | X | | | | X | X | |
| 4 | 4-WEST-2 | 1-2 | X | X | X | X | X | X | X | X | | | | | | |
| FLOOD CO | | | | | | | | | | | | | | | | |
| 5 | 5-EAS-1 (a-e) | 1-2 | X | X | X | X | X | X | X | X | | | | | | |
| 5 | 5-EAS-2 | 1-2 | | X | X | X | X | X | X | X | | | | | | |
| 5 | 5-EAS-3 | 1-2 | X | X | X | X | X | X | X | X | | | | | | |
| FLOOD CO | | | | | | | | | | | | | | | | |
| 6 | 6-SRM-1 | 1-2 | | X | X | X | X | X | X | X | | | | | | |
| 6 | 6-SRM-2 | 1-2 | | X | X | X | X | X | X | X | | | | | | |
| 6 | 6-SMART | 1-2 | | X | X | X | X | X | X | X | | | | | | |
| FLOOD CO | | | | | | | | | | | | | | | | |
| 7 | CSA-6-SR | | | | | | | | | | | | | | | |
| FLOOD CO | | | | | | | | | | | | | | | | |
| 7 | 7-CAS | 1 | X | X | X | X | X | X | X | X | | | | | | |
| 7 | 7-EST | 1-2 | X | | X | X | X | | X | X | | | X | X | X | X |
| 7 | 7-GAL | 2-3 | X | | | | | | X | X | | | X | | | X |

| Zone | Site ID | Duration of Work | Vegetation | Limb and trim top of bank and side slopes of channel | Remove vegetation within channel bottom | Clear trash and debris from creek | Remove fallen trees | Hazard tree removal | Remove invasive non-native plants | Revegetation with native plant species | Cattail cutting | Sediment removal | Erosion Control | Pump Station | Tide gate | Levee Maintenance |
|-----------------|----------|------------------|------------|--|---|-----------------------------------|---------------------|---------------------|-----------------------------------|--|-----------------|------------------|-----------------|--------------|-----------|-------------------|
| 7 | 7-LAP-1 | 5-30 | | | | | | | | | | X | | | X | |
| 7 | 7-LAP-2 | 1 | | | | | | | | | | X | | | | |
| 7 | 7-MAB | 1 | X | X | X | X | X | X | X | X | | X | X | | | |
| 7 | 7-MCPH | 1 | | | | | | | | | | | | | | |
| 7 | 7-MEA-1 | 1 | | | | | | | | | | X | | X | X | |
| 7 | 7-MEA-2 | 1 | X | X | X | X | X | | X | | | X | | | | |
| 7 | 7-SRAL | 1 | X | | | | | | | | | | X | | | X |
| 7 | 7-SOD | 1 | | | | | | | | | X | X | | | | |
| 7 | 7-PS-1 | 1 | | | | | | | | | | | | X | | |
| 7 | 7-PS-2 | 1 | | | | | | | | | X | X | | X | X | |
| FLOOD CO | | | | | | | | | | | | | | | | |
| 9 | 9-BOTH | 1-2 | X | X | | X | X | X | X | X | | | | | | |
| 9 | 9-CCT | 1-2 | | | | | | | | | | X | | | | |
| 9 | 9-CMC-SR | | | | | | | | | | | | | | | |
| 9 | 9-CMC-1 | 2-3 | X | X | | X | X | X | X | X | | X | X | | X | X |
| 9 | 9-CMC-2 | 2 | X | X | | X | X | X | X | | | X | | | X | |
| 9 | 9-CMC-3 | 2 | X | X | | X | X | X | X | X | | X | X | | X | |
| 9 | 9-CMC-4 | 1-2 | X | X | X | X | X | X | X | X | | | X | | | |
| 9 | 9-FAIR | 2-3 | X | X | X | X | X | X | X | X | | | | | | |

| Zone | Site ID | Duration of Work | Vegetation | Limb and trim top of bank and side slopes of channel | Remove vegetation within channel bottom | Clear trash and debris from creek | Remove fallen trees | Hazard tree removal | Remove invasive non-native plants | Revegetation with native plant species | Cattail cutting | Sediment removal | Erosion Control | Pump Station | Tide gate | Levee Maintenance |
|------|---------|------------------|------------|--|---|-----------------------------------|---------------------|---------------------|-----------------------------------|--|-----------------|------------------|-----------------|--------------|-----------|-------------------|
| 9 | 9-LAD | 1-2 | | X | X | X | X | X | X | | | X | | | | |
| 9 | 9-LAR-1 | 2 | X | X | X | X | X | X | X | X | | | | | | |
| 9 | 9-LAR-2 | 3-4 | X | X | X | X | X | X | X | X | | X | | | | |
| 9 | 9-MAG-1 | 1-2 | | | | | | | | | X | X | | | | |
| 9 | 9-MAG-2 | 1-2 | | | | | | | | | X | X | | | | |
| 9 | 9-MAG-3 | 1-2 | | | | | | | | | X | X | | | | |
| | 9-MAG-4 | 1-2 | | | | | | | | | | X | | | | |
| 9 | 9-MUR | 2-3 | X | X | X | X | X | X | X | X | | X | | | | |
| 9 | 9-ROS | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 9 | 9-SAC-1 | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 9 | 9-SAC-2 | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 9 | 9-SAC-3 | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 9 | 9-SHC-1 | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 9 | 9-SHC-2 | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 9 | 9-SHC-3 | 1-2 | | | | | | | | | | X | | | | |
| 9 | 9-SHC-4 | 1-2 | | | | | | | | | | X | | | | |
| 9 | 9-SHC-5 | 1-2 | | | | | | | | | | X | | | | |
| 9 | 9-SHC-6 | 2-3 | X | X | X | X | X | X | X | X | | X | | | | |
| 9 | 9-SHC-7 | 1-2 | | | | | | | | | | X | | | | |
| 9 | 9-SOR | 2-3 | X | X | X | X | X | X | X | X | | | | | | |
| 9 | 9-VAN-1 | 2 | X | X | X | X | X | X | X | X | | | | | | |

| Zone | Site ID | California annual grass-land | Northern coastal salt marsh | Diked Bay-lands | North coast riparian scrub/forest | Mixed evergreen forest | Pt. Reyes bird's beak | Pale yellow tar-plant | Marsh micro-seris | Marin knot-weed | Steel head | Monarch butterfly | CA red-legged frog | NW pond turtle | CA clapper rail | CA black rail | Salt marsh harvest mouse | Bats ssp | Bird's beak | White-rayed pentach aeta | Showy Indian clover |
|------|-----------------|------------------------------|-----------------------------|-----------------|-----------------------------------|------------------------|-----------------------|-----------------------|-------------------|-----------------|------------|-------------------|--------------------|----------------|-----------------|---------------|--------------------------|----------|-------------|--------------------------|---------------------|
| 3 | 3-SUT-6 | X | | | | | | | | | | | | | | | | | | | |
| 3 | 3-WAR | | | | X | | | | | | X | | | | | | | | | | |
| | FLOOD CO | | | | | | | | | | | | | | | | | | | | |
| 4 | 4-EAST-1 | | X | | | | | | | | | | | | X | X | | | | | |
| | 4-EAST-2 | X | | | X | | | | | | | | | | | | | | | | |
| 4 | 4-SALT | | X | | | | | | | | | | | | X | X | X | | | | |
| 4 | 4-STR | | X | | | | | | | | | | | | X | X | X | | | | |
| 4 | 4-WEST-1 | | X | | | | | | | | | | | | | | | | | | |
| 4 | 4-WEST-2 | | | | X | | | | | | | | | | | | | | | | |
| | FLOOD CO | | | | | | | | | | | | | | | | | | | | |
| 5 | 5-EAS-1 (a-e) | | | | X | | X | | | | X | X | X | | X | X | | | | | X |
| 5 | 5-EAS-2 | | | | X | | X | | | | X | X | X | | | | | | | | |
| 5 | 5-EAS-3 | | | | X | | X | | | | X | X | X | | | | | | | | X |
| | FLOOD CO | | | | | | | | | | | | | | | | | | | | |
| 6 | 6-SRM-1 | | X | | | | | | | | | | | | X | X | X | | | | |
| 6 | 6-SRM-2 | | | | X | | | | | | | | | | | | | | | | |
| 6 | 6-SMART | | | | X | | | | | | | | | | | | | | | | |
| | FLOOD CO | | | | | | | | | | | | | | | | | | | | |
| 7 | CSA-6-SR | | | | | | | | | | | | | | | | | | | | |
| | FLOOD CO | | | | | | | | | | | | | | | | | | | | |
| 7 | 7-CAS | X | | | | | | | | | | | | | | | | | | | |
| 7 | 7-EST | | | X | | | | | | | | | | | X | X | X | | | | |
| 7 | 7-GAL | X | | | | | | | | | | | | | X | X | X | | | | |

APPENDIX B

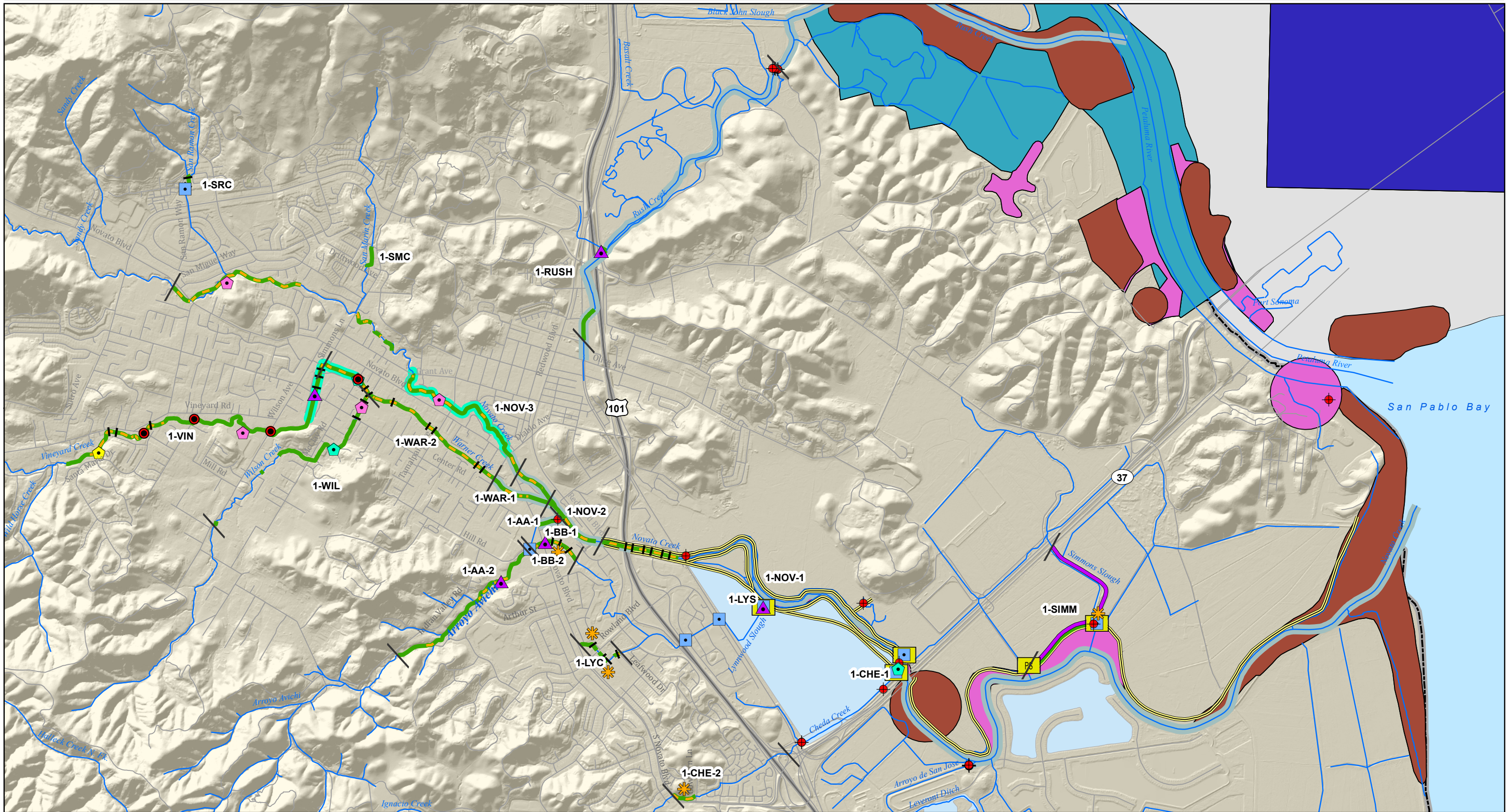
SEDIMENT REMOVAL SITES

APPENDIX C

MAPBOOK

Marin County Flood Control District - Stream Maintenance Program

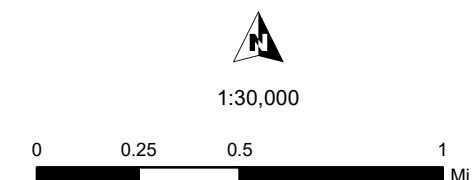
Marin County
Flood Control and
Water Conservation District
April 2017

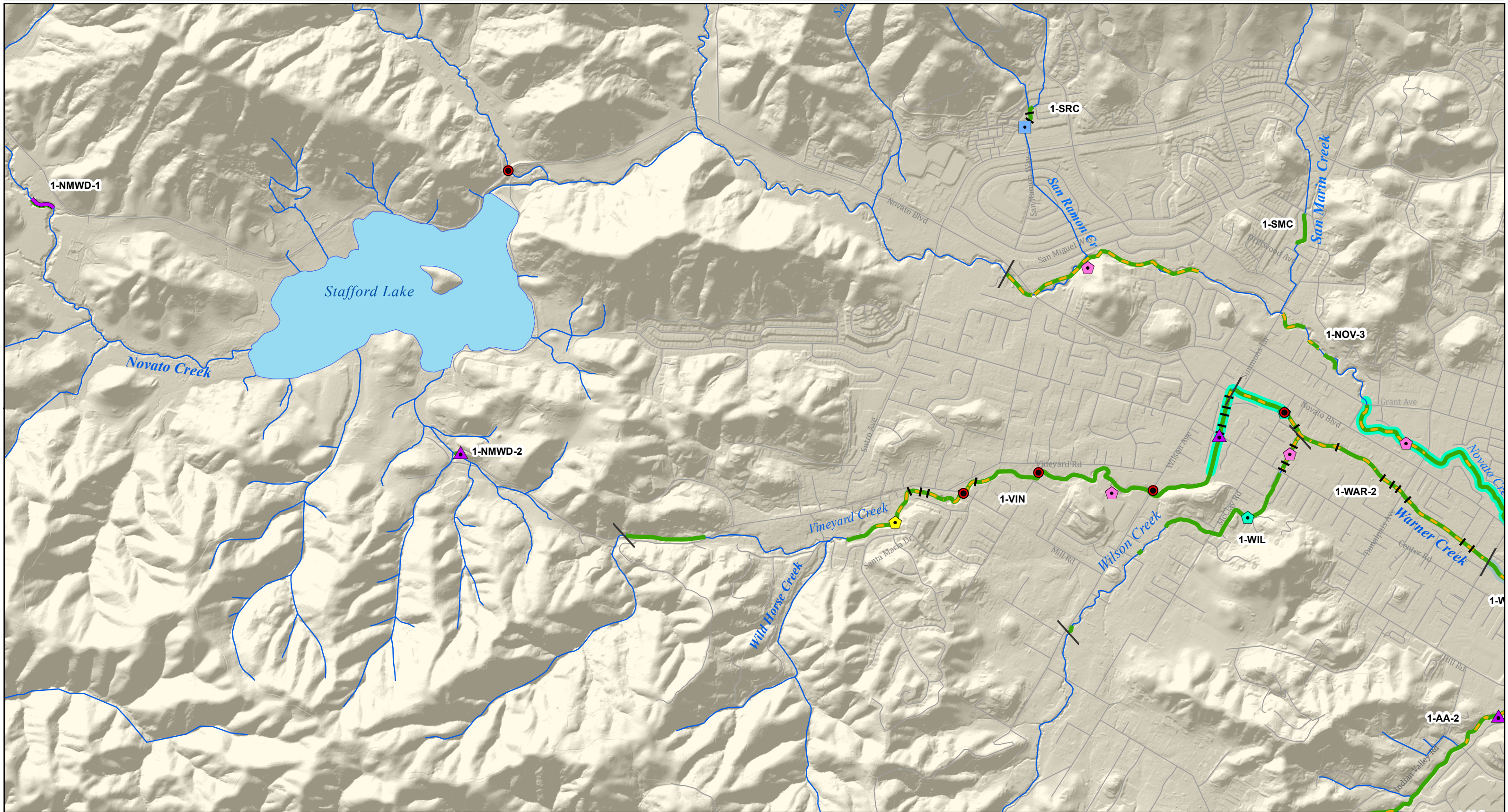


Map
1

**Flood Control Zone 1 - Novato
Lower Novato Creek Watershed**

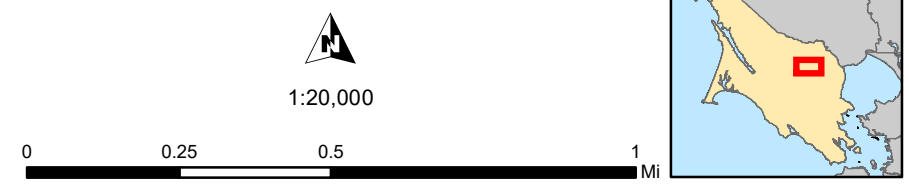
- | | | | | |
|------------------------|------------------|----------------|----------------------------|-------------------------|
| Fish Passage Barrier | Sediment Removal | Tide/Flap Gate | California black rail | Restoration site |
| Vegetation Maintenance | Sediment Removal | Pump Station | California clapper rail | |
| Levee Maintenance | Erosion Control | Trash Rack | California red-legged frog | |
| Tidal Stream | Fuels Reduction | | Salt-marsh harvest mouse | |
| Streams | Cattail cutting | | Complete | |
| | | | Ongoing | |
| | | | Proposed | |
| | | | Complete | |

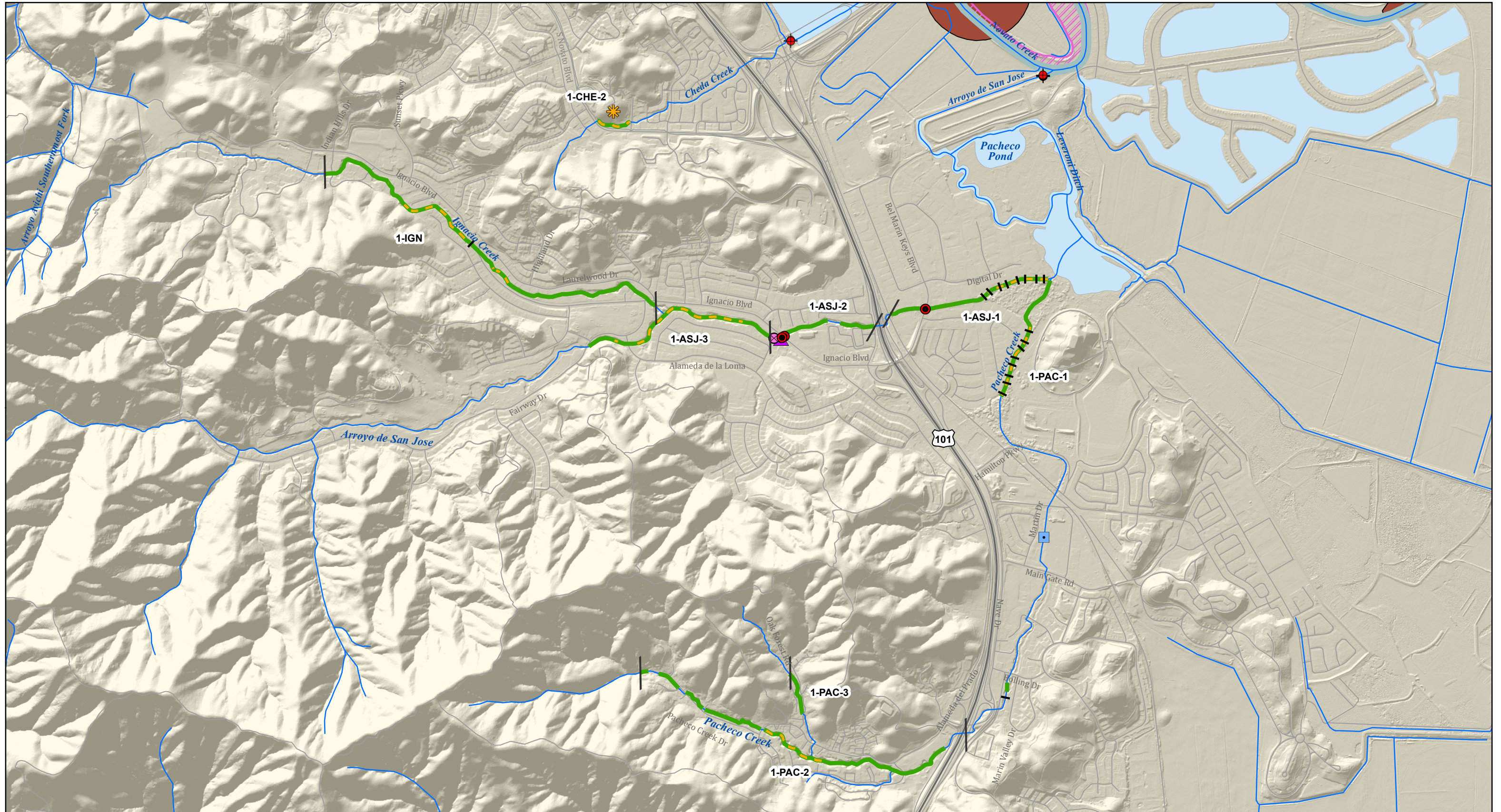




Map 2
Flood Control Zone 1 - Novato Upper Novato Creek Watershed

- | | | | | | |
|------------------------|------------------|----------------|----------------------------|-----------------------|-------------------------|
| Fish Passage Barrier | Sediment Removal | Tide/Flap Gate | Site Limit | California black rail | Restoration site |
| Vegetation Maintenance | Sediment Removal | Pump Station | California clapper rail | Complete | |
| Levee Maintenance | Erosion Control | Trash Rack | California red-legged frog | Ongoing | |
| Streams | Fuels Reduction | | Salt-marsh harvest mouse | Proposed | |
| | | | | Complete | |



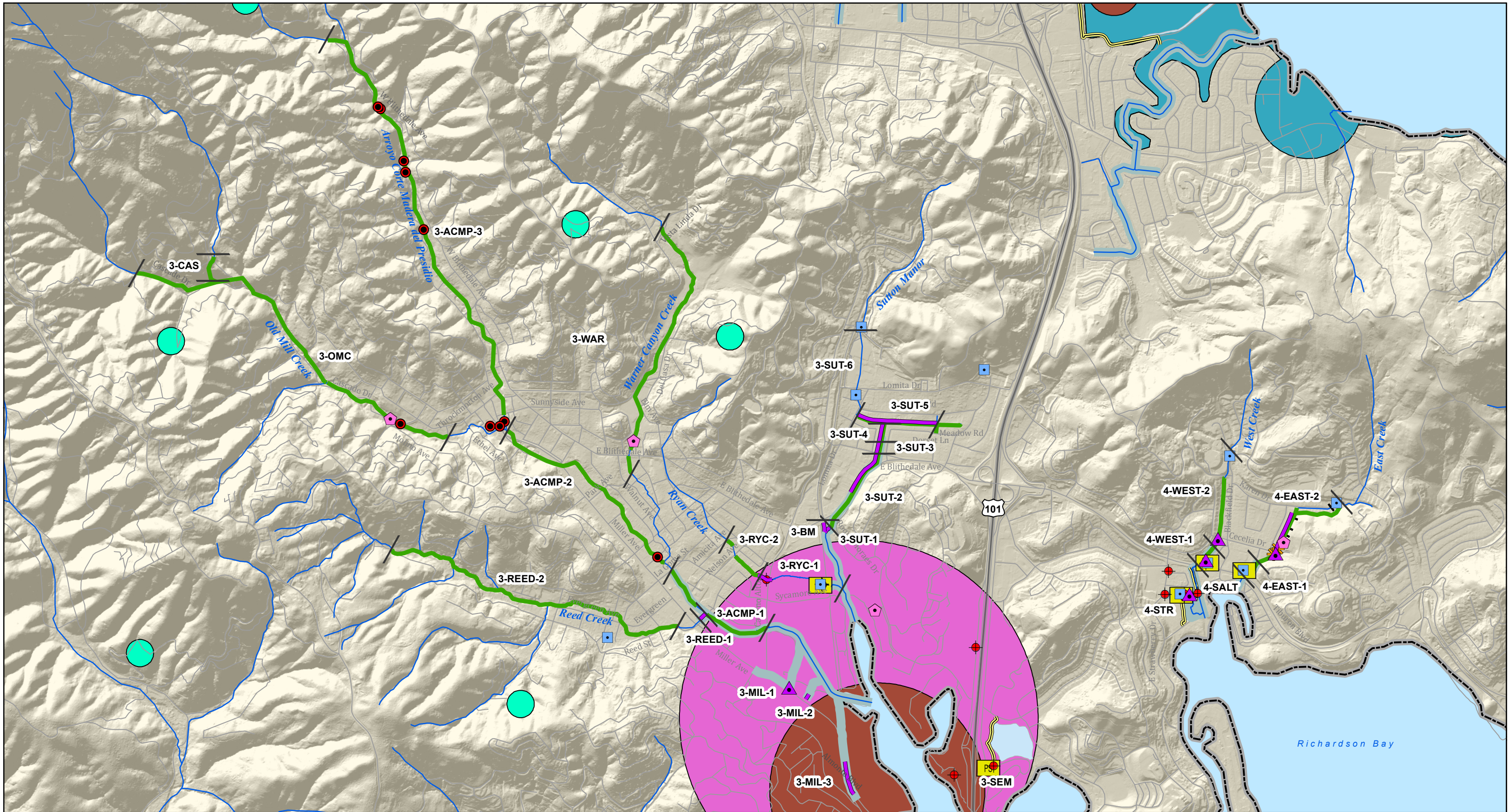


Map 3
Flood Control Zone 1 - Novato
Pacheco Creek and Arroyo San Jose

- | | | | | | |
|------------------------|------------------|----------------|--------------------------|-----------------------|----------|
| Fish Passage Barrier | Sediment Removal | Tide/Flap Gate | Site Limit | California black rail | Complete |
| Vegetation Maintenance | Sediment Removal | Pump Station | salt-marsh harvest mouse | Ongoing | Proposed |
| Tidal Stream | Erosion Control | Trash Rack | Cattail cutting | | |
| Streams | Fuel Reduction | Silt Basin | | | |

0 0.25 0.5 1 Mi

1:20,000

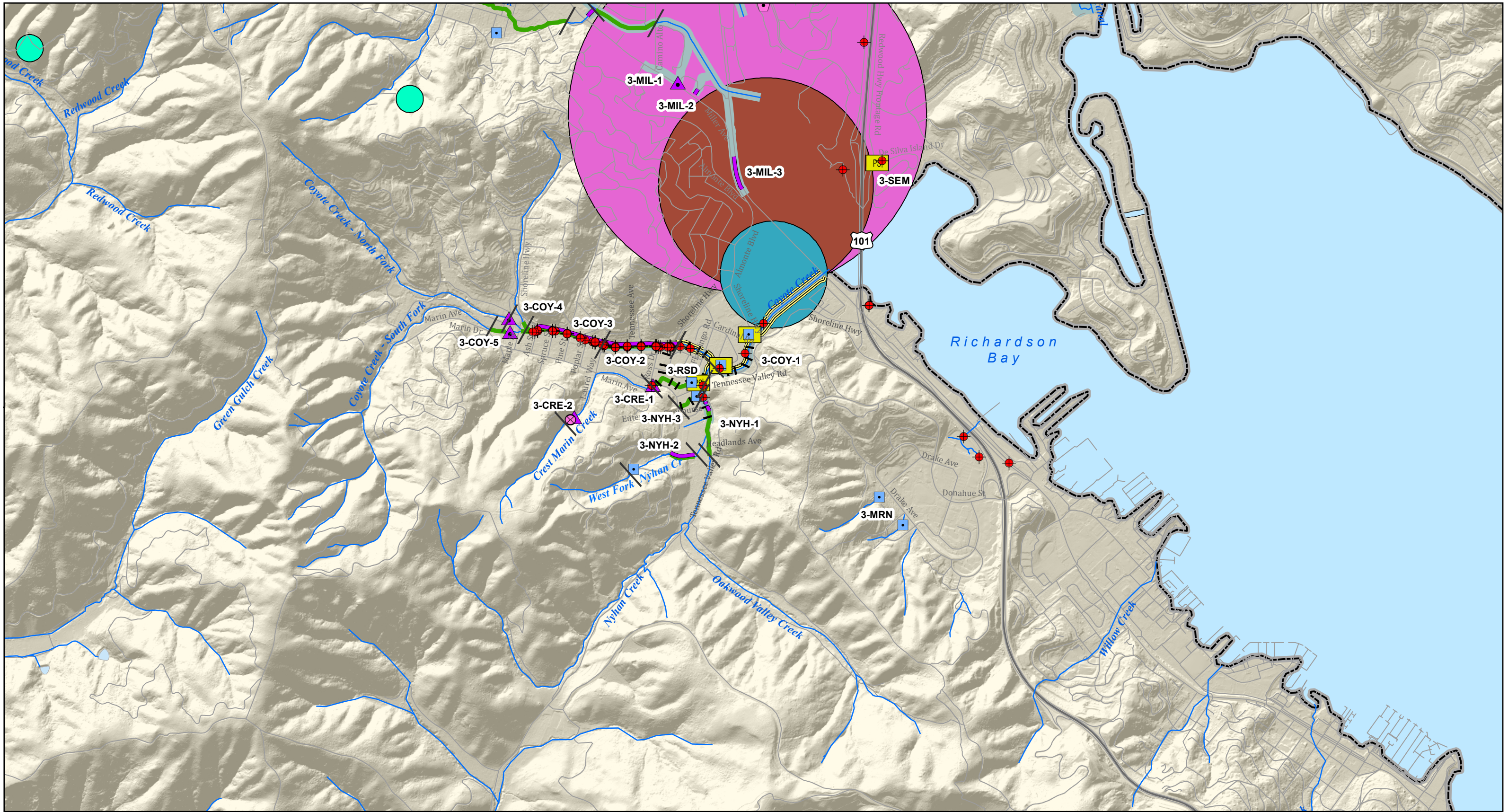


Map 4
Flood Control Zone 3 - Richardson Bay
Arroyo Corte Madera del Presidio
Flood Control Zone 4 - Bel Aire
East and West Creeks

- | | | | | | |
|------------------------|------------------|----------------|------------|--------------------------|----------|
| Fish Passage Barrier | Sediment Removal | Tide/Flap Gate | Site Limit | California black rail | Complete |
| Cattail cutting | Sediment Removal | Pump Station | | California clapper rail | Ongoing |
| Vegetation Maintenance | Fuels Reduction | Trash Rack | | Northern spotted owl | Proposed |
| Tidal Stream | | | | salt-marsh harvest mouse | |
| Streams | | | | | |

Scale: 1:20,000

0 0.25 0.5 1 Mi



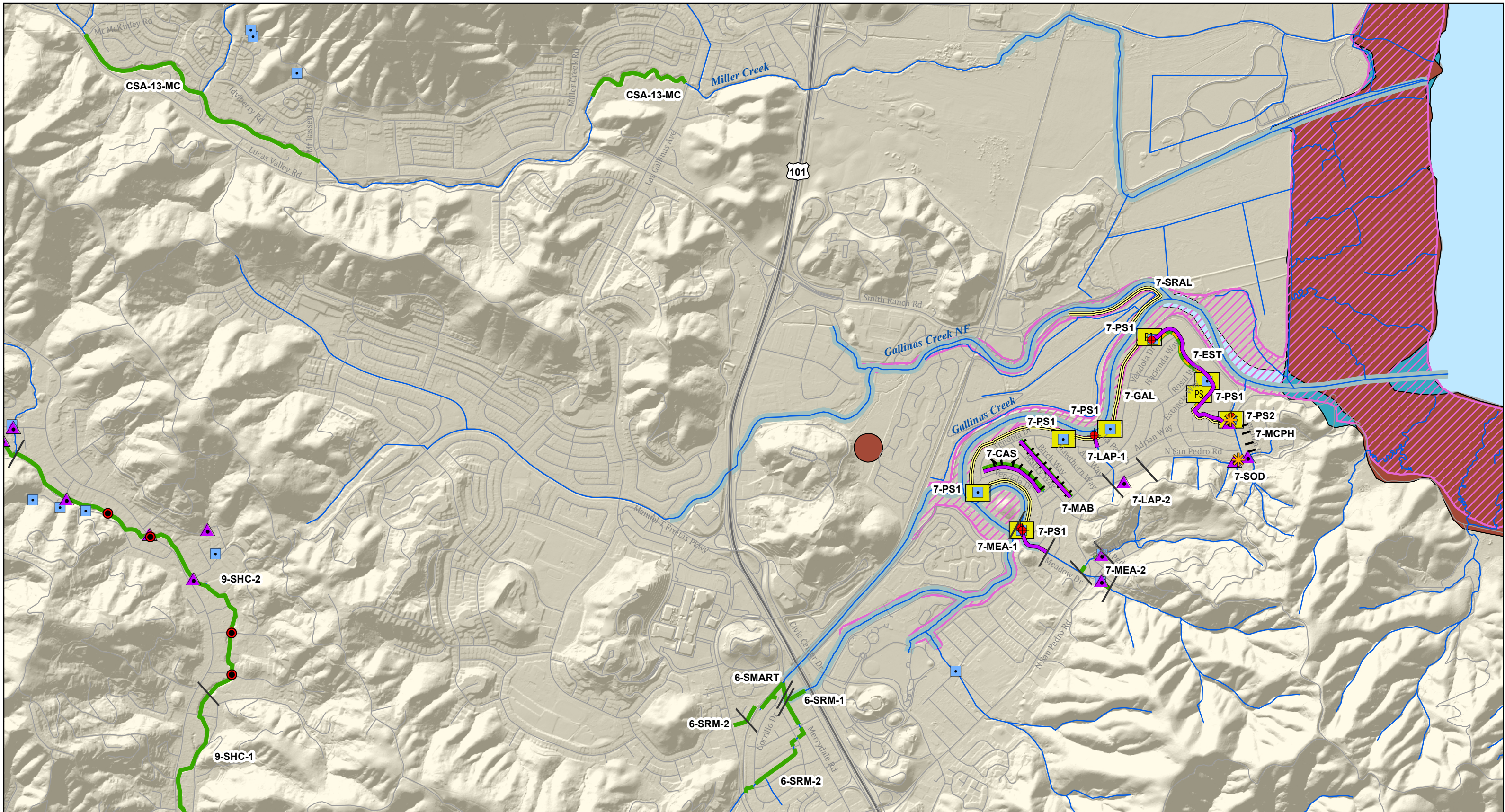
Map 5

**Flood Control Zone 3 - Richardson Bay
Coyote Creek Watershed**

| | | | | |
|------------------------|---------------------|----------------|--------------------------|-------------------------|
| Fish Passage Barrier | Sediment Removal | Tide/Flap Gate | California black rail | Restoration site |
| Vegetation Maintenance | Sediment Removal | Pump Station | California clapper rail | |
| Levee | Erosion Control | Trash Rack | Northern spotted owl | Complete |
| Tidal Stream | Fuels Reduction | Silt Basin | salt-marsh harvest mouse | Ongoing |
| Streams | Site Location Limit | | | Proposed |

Scale: 1:20,000

0 0.25 0.5 1 Mi



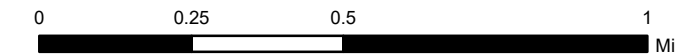
Map 6

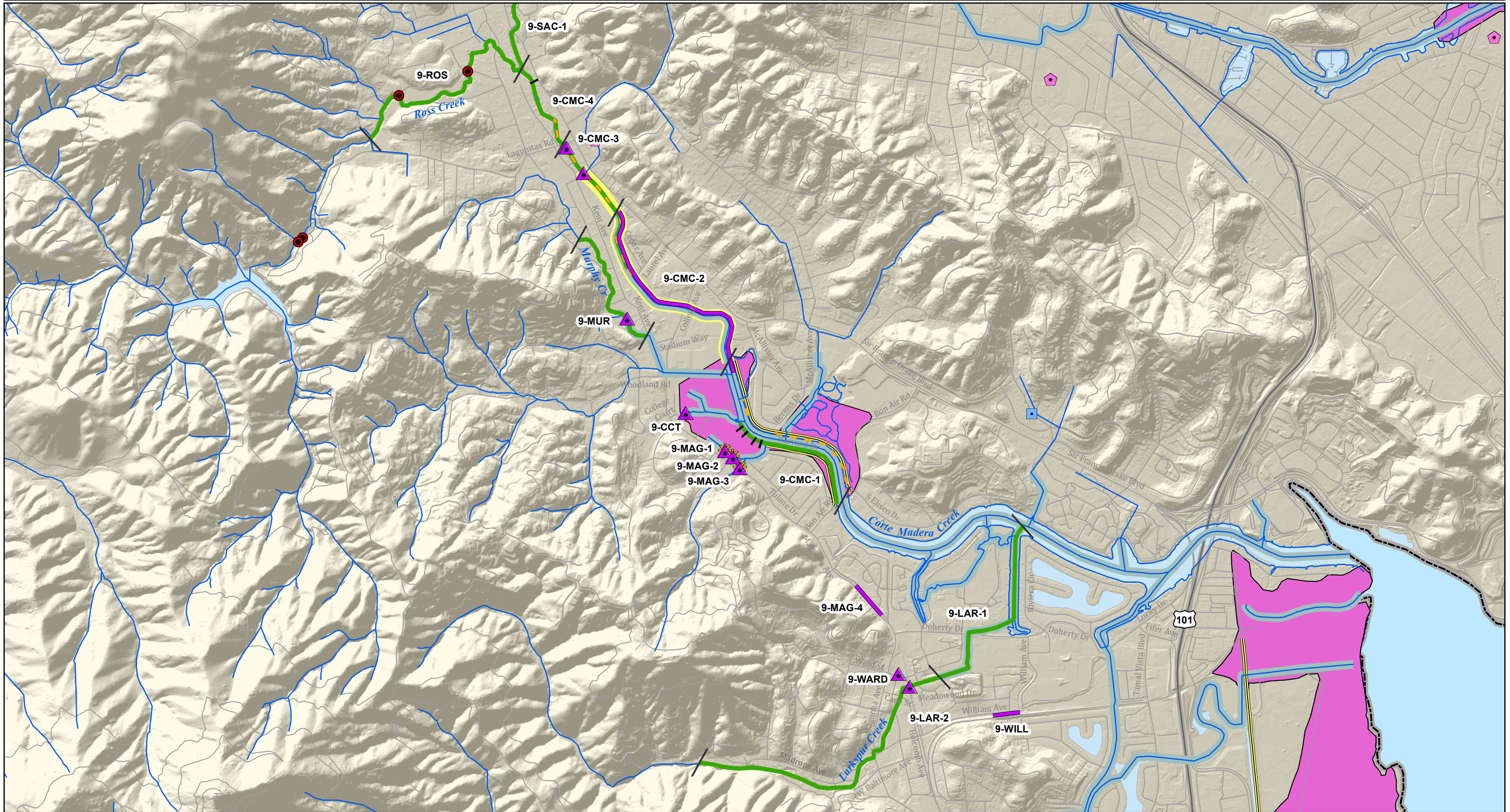
Flood Control Zone 7 - Santa Venetia
Gallinas Creek
CSA 13 - Miller Creek

- | | | | | |
|------------------------|------------------|----------------|--|--------------------------|
| Fish Passage Barrier | Sediment Removal | Tide/Flap Gate | Pump Station def query Owner NOT 'private' | California black rail |
| Vegetation Maintenance | Sediment Removal | Trash Rack | California clapper rail | salt-marsh harvest mouse |
| Levee | Cattail Cutting | | Site Limit | |
| Tidal Stream | Erosion Control | | | |
| Streams | Fuels Reduction | | | |



1:20,000



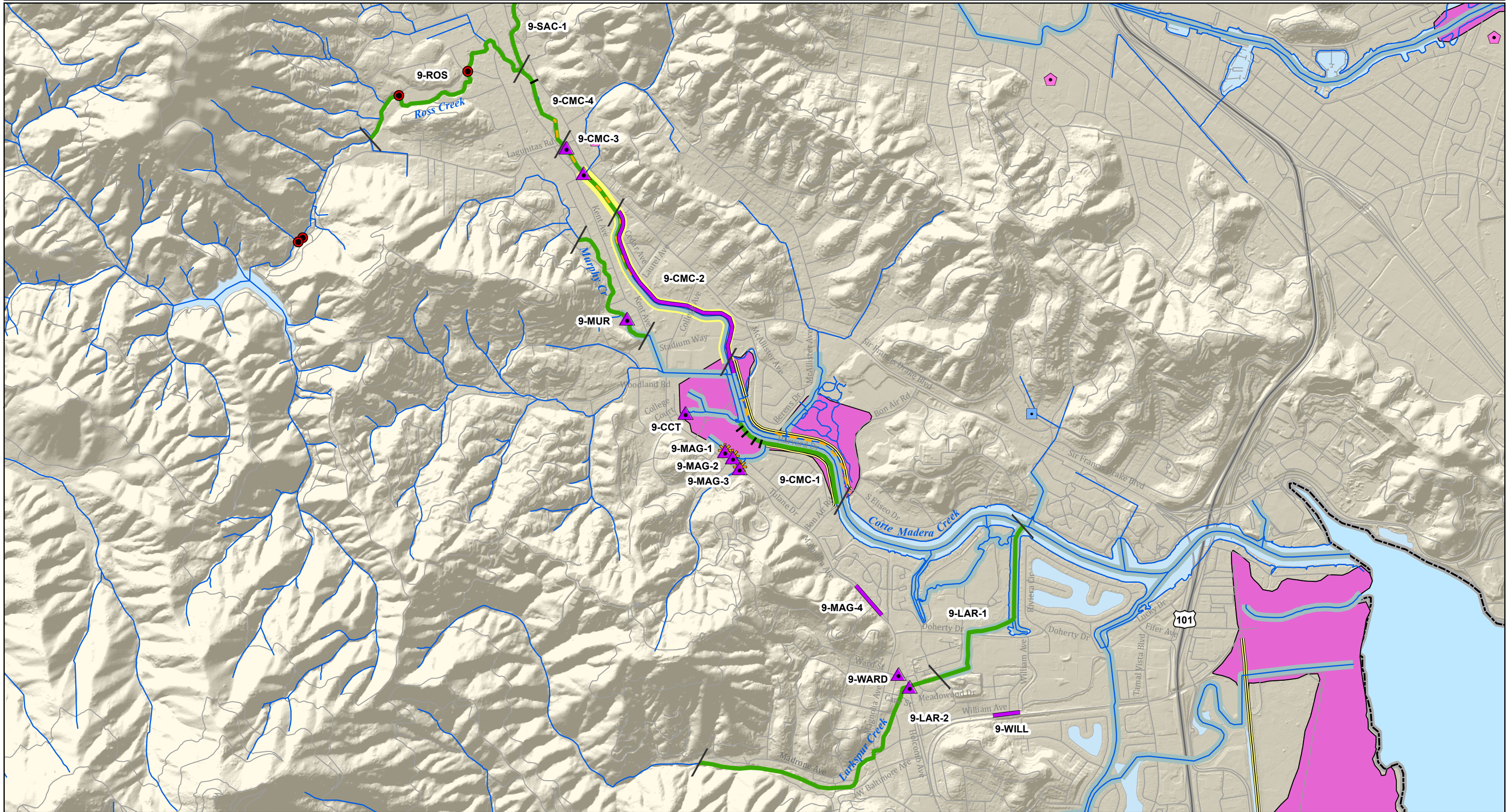


Map 7
Flood Control Zone 9 - Ross Valley
Corte Madera, Larkspur, Murphy, and Ross Creeks

- | | | | |
|------------------------|------------------|-------------------------|-------------------------|
| Fish Passage Barrier | Sediment Removal | California clapper rail | Restoration Site |
| Vegetation Maintenance | Sediment Removal | Northern spotted owl | Complete |
| Levee | Erosion Control | Ongoing | Proposed |
| Tidal Stream | Fuels Reduction | Site Limit | |
| Streams | | | |

Scale: 1:20,000

0 0.25 0.5 1 Mi

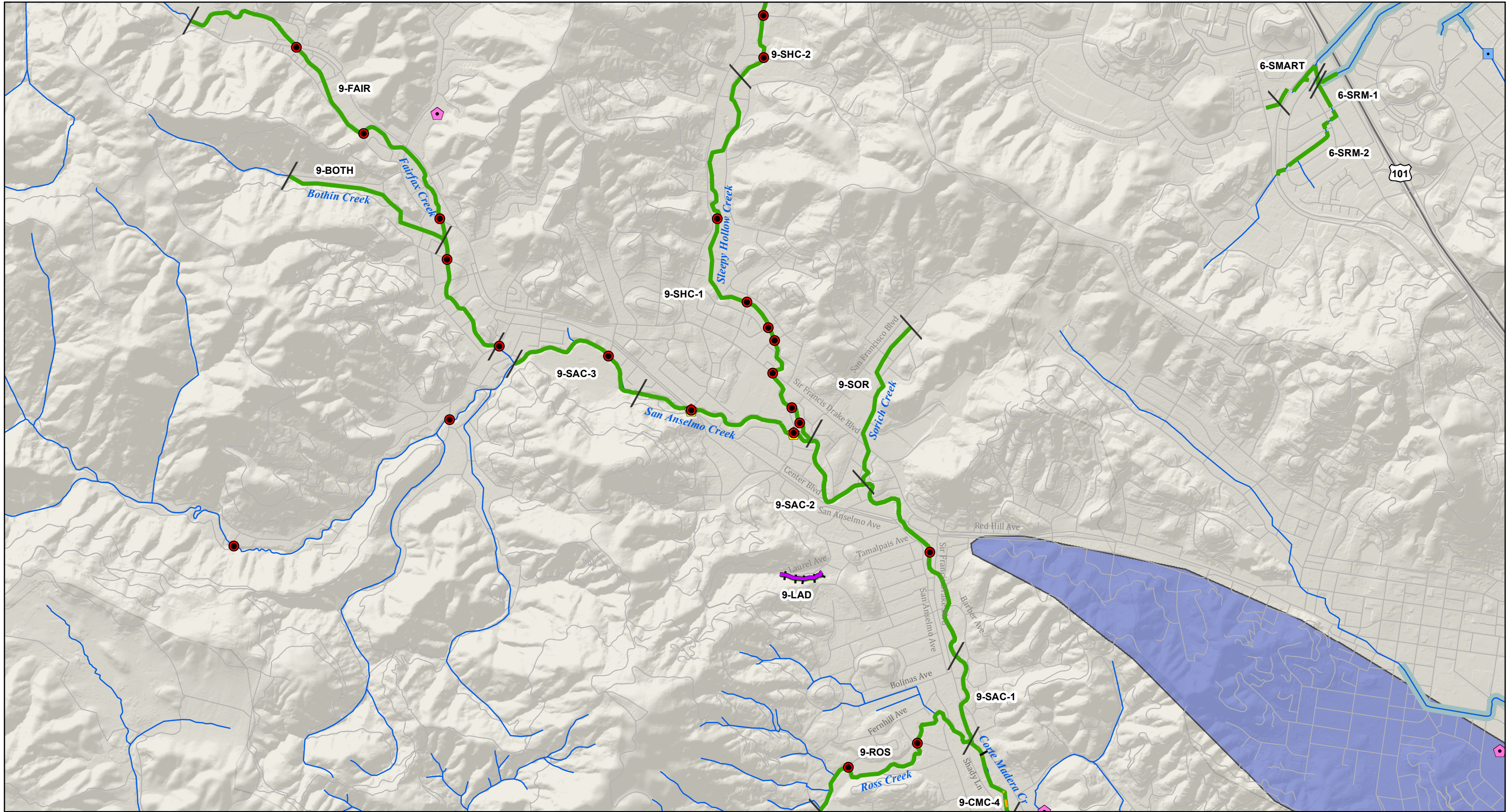


Map 7
Flood Control Zone 9 - Ross Valley
Corte Madera, Larkspur, Murphy, and Ross Creeks

- | | | | |
|------------------------|------------------|---------------------------------------|--|
| Fish Passage Barrier | Sediment Removal | Site Limit | California clapper rail Restoration Site |
| Vegetation Maintenance | Sediment Removal | Northern spotted owl Restoration Site | Complete |
| Levee | Erosion Control | Ongoing | Proposed |
| Tidal Stream | Fuels Reduction | | |
| Streams | | | |

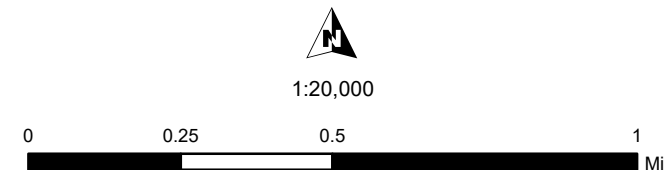
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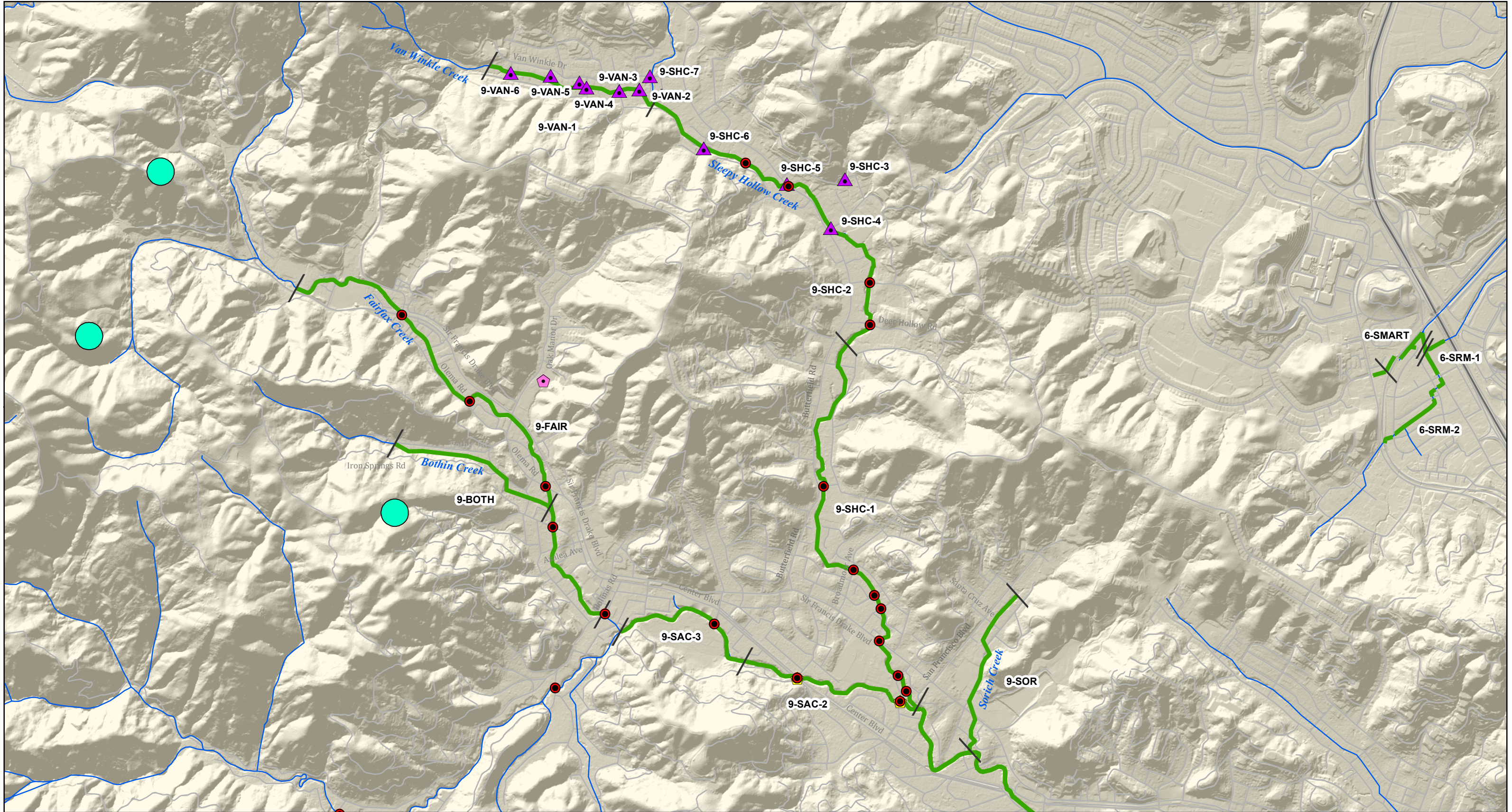
0 0.25 0.5 1 Mi



Map 8
Flood Control Zone 9 - Ross Valley
San Anselmo, Sorch, Fairfax, and Bothin Creeks

- Fish Passage Barrier
- ▲ Sediment Removal
- ▲ Sediment Removal
- Erosion Control
- ||| Fuels Reduction
- Tidal Stream
- ◀ Complete Restoration site
- ◀ Ongoing Restoration site
- ◀ Proposed Restoration site
- / Site Limit
- white-rayed pentachaeta



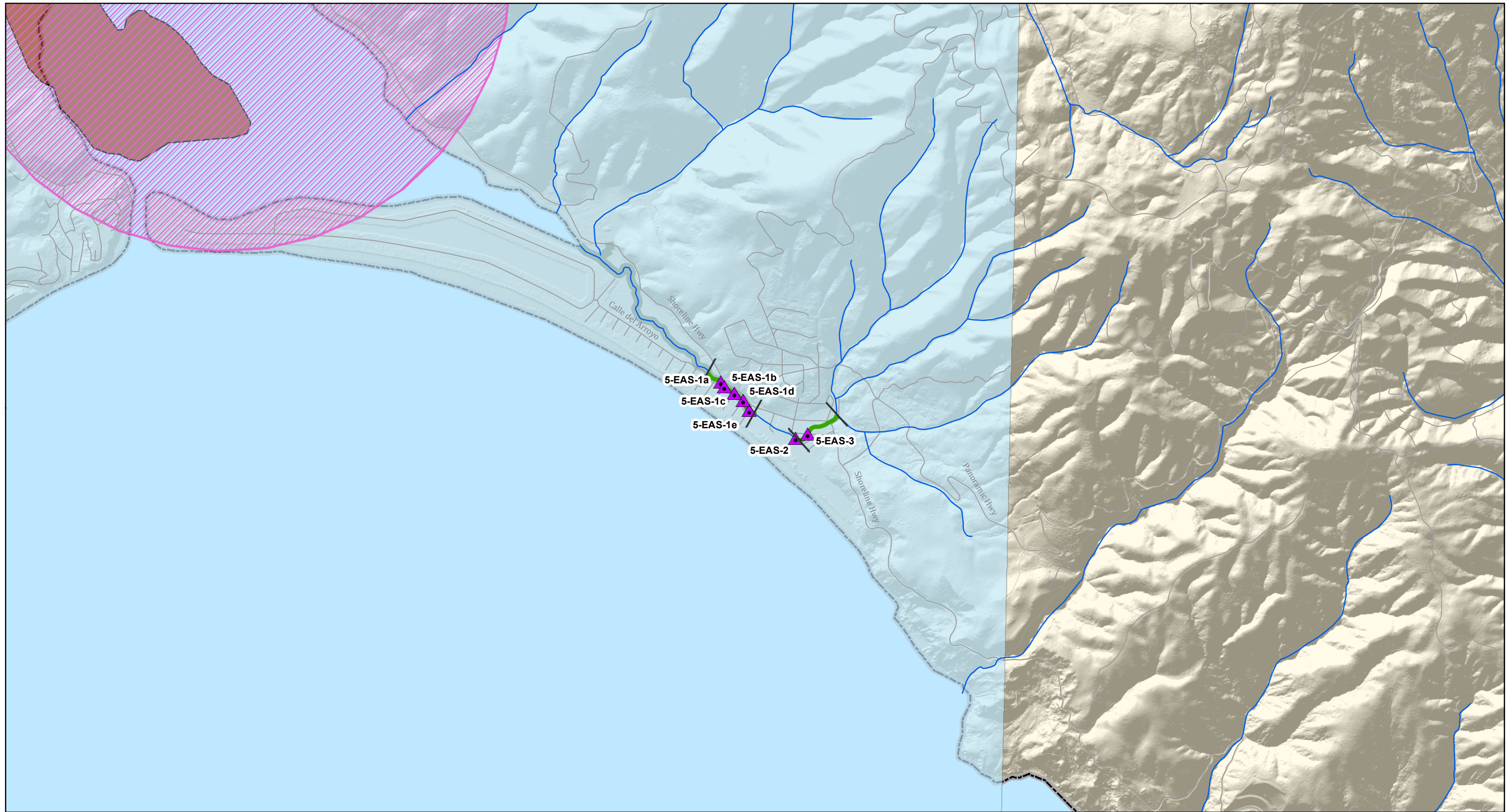


Map 9
Flood Control Zone 9 - Ross Valley
Sleepy Hollow Creek and Van Winkle Creek

- Fish Passage Barrier
- ▲ Sediment Removal
- ▲ Erosion Control
- Northern spotted owl Restoration site
- Vegetation Maintenance
- Streams
- / Site Limit
- Complete
- Ongoing
- Proposed

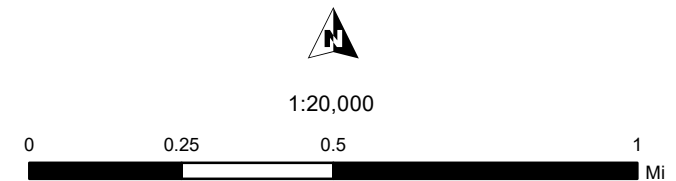
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Map 10
Flood Control Zone 5 - Stinson Beach
Easkoot Creek

- Fish Passage Barrier
- Vegetation Maintenance
- Sediment Removal
- Site Limit
- California black rail
- California clapper rail
- Monarch butterfly
- Tidal Stream
- Streams



APPENDIX D

SITE FACT SHEETS

Flood Control Zone 1 - Novato

Site: 1-AA-1
Arroyo Avichi

Site Description:

This work site is tidal. It stretches between the confluence with Novato Creek upstream to the end of the culvert under S. Novato Boulevard (approximately one city block).

The predominant land use is residential; the creek flows behind backyards on both sides.



Arroyo Avichi downstream of S. Novato Blvd.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.; dominant tree species are bays, oaks, and willows.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and tidegate maintenance.

Best Management Practices:

A-67;A-69; A-73; A-103; A-107; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4; VR-4a; VR-4b; VR-5.

Flood Control Zone 1 - Novato

Site: 1-AA-2
Arroyo Avichi

Site Description:

The work site is non-tidal, and stretches from just upstream of the Arroyo Avichi Bypass structure upstream to 1575 Indian Valley Road.

The predominant land use is residential, with large residential lots on the left bank and more closely hemmed in with houses on the right bank.



Arroyo Avichi at Indian Valley Rd and Arthur St

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest. The predominant tree types are bays, oaks, and willows.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance, sediment removal and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-ASJ-1
Arroyo de San Jose

Site Description:

The work site is non-tidal (behind levees) and stretches from Pacheco Pond upstream to Highway 101.

The predominant land use is commercial.



Arroyo de San Jose
near Pacheco Pond

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest. The predominant tree type is willows.

Potentially-occurring special-status species:

Pale yellow tarplant, northwestern pond turtles have been observed in the creek on the Marin Humane Society property.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; PLA-1, REP-1.

Maintenance Activities:

Fire fuel reduction, and vegetation maintenance, and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-ASJ-2
Arroyo de San Jose

Site Description:

The work site is above tidal influence and has a concrete bottom. It stretches from the west side of Highway 101 to just upstream of the Ignacio Blvd road crossing, including a silt basin.

The predominant land use is residential and commercial.



Arroyo de San Jose just upstream of Ignacio Blvd road crossing, showing area of sediment removal.

Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest. Tree species include oaks, alders, bays, and willows.

Potentially-occurring special-status species:

Pale yellow tarplant.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-ASJ-3
Arroyo de San Jose

Site Description:

This work site is a fairly narrow, non-tidal riparian corridor with a natural bottom. It extends upstream from the silt basin to Birdie Drive.

The predominant land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest. Tree species present include oaks, alders, bays, and willows.

Potentially-occurring special-status species:

Pale yellow tarplant.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6;PLA-1.

Maintenance Activities:

Vegetation maintenance and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-BB-1
Baccaglio Basin

Site Description:

This non-tidal basin collects rainwater, street drainage, and rarely water from the Arroyo Avichi Bypass, and drains to Scottsdale Pond. The basin is hemmed in by residential development, with a small area above the banks of Novato Creek.



Baccaglio Basin near S. Novato Blvd access gates.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is diked baylands. The lower portion is largely marsh dominated by cattails and non-native grasses; the upper portion has willows and oaks.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal; and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-BB-2
Bypass

Site Description:

The work site is above tidal influence and consists of a high-flow, concrete bypass; in high flow events, water will flow into the bypass and through a culvert under S. Novato Blvd to Baccaglio Basin instead flowing directly to Novato Creek.

Surrounding land use is commercial and residential.

Bypass of Arroyo Avichi
to Baccaglio Basin



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

Although the bypass itself is concrete, the north coast riparian scrub/forest vegetation on the banks consists of oaks, bays, willows, Himalayan blackberry and English ivy.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction and vegetation maintenance.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-CHE-1
Cheda Creek

Site Description:

The work site is a small area around the Cheda Pump Station. The work area is above the tide line.



Cheda Creek pump station.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The pump station sits on the levee top in an area of annual grassland. Dominant species are nonnative grasses, with some coyote brush.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Pump station maintenance.

Best Management Practices:

A-229; A-103; A-107; EV-1; EV-2; NR-1; NR-3; VR-4a; VR-4b; VR-5.

Flood Control Zone 1 - Novato

Site: 1-CHE-2
Cheda Creek

Site Description:

The work site is the non-tidal stretch of Cheda Creek between Cowbarn Ln and S. Novato Blvd. The area is generally residential, but upslope and outside of the riparian corridor is an area of non-native annual grassland.



Cheda
Creek

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest; the narrow riparian corridor is dominated by bays and oaks. There are cattails at the upstream culvert outfall, and ornamental fruit trees and palms are present as well.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-IGN
Ignacio Creek

Site Description:

The work site is a fairly narrow, non-tidal riparian corridor constrained by Ignacio Blvd on one side and residential development on the other side.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The dominant vegetation type is north coast riparian scrub/forest; trees present on site include willows, oaks, and bays.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-LYC
Lynwood Creek

Site Description:

The non-tidal work site extends from S. Novato Blvd to Redwood Blvd at Scottsdale Pond. The creek flows through a mix of commercial, residential, and open, marshy areas in the vicinity of the Highway 101/Rowland Blvd interchange.



Lynwood Creek at Rowland Blvd

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation community is north coast riparian scrub/forest dominated by willows; southwest of Rowland Blvd, the canopy is more open, with cattails and largely non-native herbaceous species on the banks.

Potentially-occurring special-status species:

Northwestern pond turtles have been observed in the site vicinity.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; REP-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, and erosion control,

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-LYS
Lynwood Slough

Site Description:

The work site is at the Lynwood Pump Station at Lynwood Slough (behind the Vintage Oaks shopping center). The pump station is located on the slough side of the Novato Creek levee.



Lynwood pump station (looking west over Lynwood Slough).

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The site is located in annual grassland, dominated by non-native grasses, fennel, and bull mallow.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal and pump station maintenance.

Best Management Practices:

A-43; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4a; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-NMWD-1

Site Description:

This site is non-tidal on private property (Grossi Ranch) on Novato Creek upstream of Stafford Lake. Land use is ranch/agriculture.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest along the creek, with oaks and willows the dominant tree species; California annual grassland habitat is immediately adjacent outside the riparian corridor.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal and vegetation maintenance.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-NMWD-2

Site Description:

This site is on North Marin Water District land on a tributary just upstream of Stafford Lake and adjacent to the Indian Valley Golf Course.

Land use is open space and recreation.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest along the creek, with bays the dominant tree species and ferns and Himalayan blackberries in the understory.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal and vegetation maintenance.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-NOV-1

Site Description:

This work site includes the earthen levees on both sides of Novato Creek from the mouth upstream to Redwood Blvd just west of Highway 101. The area is tidally-influenced.

From Redwood Blvd to the SMART railroad tracks, the predominant land use is commercial; downstream of the tracks, the area is open and maintained for flood control and wildlife purposes.



Novato Creek. SMART tracks in foreground, Lynwood Slough and Duckbill Pond in center, Bel Marin Keys community in background. Mouth enters bay off photo to the left.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The dominant vegetation type is California annual grassland. The tops of the levees and the sides of ponds and sloughs are dominated by coyote brush, fennel, acacia, bull mallow, and nonnative grasses; the upper banks on the streamside of the levees are dominated by fennel with pickleweed and saltgrass on the lower banks.

Potentially-occurring special-status species:

Steelhead trout, California clapper rail, California black rail, salt marsh harvest mouse, and raptors and wading birds.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; FISH-1, BIRD-1, BIRD-3, MAMM-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, erosion control, and pump station, tide-gate, and levee maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-NOV-2
Novato Creek

Site Description:

This work site is a tidally-influenced corridor that extends from Redwood Blvd to the upper extent of tidal influence at Novato Fair shopping Center. The right bank of the lower section is concrete-lined.

The general land use is commercial and residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The dominant vegetation type is north coast riparian scrub/forest with willows and heritage oaks.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:

Vegetation maintenance and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-NOV-3
Novato Creek

Site Description:

This site consists of several discontinuous sections of Novato Creek from Novato Fair shopping center upstream to Thorsen Ct; all sections are similar as they are natural, non-tidal, riparian corridors amidst residential and commercial land uses.



Novato Creek at Miwok Park.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest; and the dominant tree species are bays, oaks, willows. The restored Phase 8 portion has been planted with native species including box elders, blue elderberry and coffeeberry.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:

Vegetation maintenance and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-PAC-1
Pacheco Creek

Site Description:

The work site is non-tidal and includes several discontinuous stretches of Pacheco Creek east of Highway 101. The adjacent land uses include residential, commercial, and open areas.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest. The downstream portions are dominated by non-native herbaceous plants, with some shrubs; the upstream portions support oaks, willows, and a few alders.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-PAC-2
Pacheco Creek

Site Description:

The site is above tidal influence and includes several discontinuous sections of Pacheco Creek west of Highway 101. The riparian corridor is constrained on both sides by residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The site consists of north coast riparian scrub/forest. Willows, oaks, and bays are the dominant tree species.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-PAC-3
Pacheco Cr tributary

Site Description:

This non-tidal site is a short section of a tributary to Pacheco Creek that flows between Papermill Creek Ct and Oak Forest Rd amidst residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest, with bays and oaks.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 1 - Novato

Site: 1-RUSH

Site Description:

This work site includes three separate areas of tidally-influenced Rush Creek: 1) tidegates at the downstream end near Cemetery Marsh, 2) sediment and vegetation maintenance at the culvert outlets downstream of Binford Road and 3) vegetation maintenance on a short stretch near Olive Ave between Novato Blvd and Highway 101. The tidegates are in an open salt marsh area.



Rush Creek
near Olive
Ave.

Wetlands and other Waters, including Waters of the State:

USACE jurisdiction.

Vegetation communities:

The site is located in northern coastal salt marsh. The upstream area has cattails and a variety of non-native herbaceous and shrubby species. Downstream Site #2 drains into the marsh and Site #3 is more urbanized.

Potentially-occurring special-status species:

California black rail, California clapper rail, and salt marsh harvest mouse near the downstream tidegate.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; BIRD-1, MAMM-1.

Maintenance Activities:

Vegetation maintenance, sediment removal and tidegate maintenance.

Best Management Practices:

A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-SIMM
Simmons Slough

Site Description:

The work site is at the Simmons Slough pump station (which pumps water from the slough into Novato Ck. The area is tidally-influenced; adjacent land uses include flood control and agriculture. Sediment is removed to promote positive flow to Pump intake from DS HWY 37 to Novato Creek Levee and perpendicular levee screw gate to Sanitary District PS. Very low gradient; water at intake is normal; ag-gradation blocks conveyance to PS



Big Bertha pump station at Simmons Slough.

Wetlands and other Waters, including Waters of the State:

Sediment removal may be under USACE jurisdiction

Vegetation communities:

The vegetation type at the sediment removal site is northern coastal salt marsh with salt grass and pickleweed; the levee tops around the pump station is annual grasslands, with dominant species comprised mainly of nonnative grasses, wild radish, and bull mallow.

Potentially-occurring special-status species:

California black rail, California clapper rail, salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; BIRD-1, MAMM-1.

Maintenance Activities:

Sediment removal and pump station maintenance.

Best Management Practices:

A-43; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4a; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-SMC
San Marin Creek

Site Description:

The site is a narrow block-long stretch of creek between Leese Ln and Driftwood Ave. well above tidal influence. The area is entirely within a residential development.



San Marin
Creek at
Leese Ln

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest. The dominant trees are oak and bays.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 1 - Novato

Site: 1-SRC
San Ramon Creek

Site Description:

The site is a narrow block-long corridor behind the San Ramon shopping center at San Marin Drive and San Ramon Way. The site is well above tidal influence. The land uses are residential and commercial.



San Ramon Creek behind shopping center

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest. The dominant tree species are oaks and bays.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction and vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 1 - Novato

Site: 1-VIN
Vineyard Creek

Site Description:

The work site is a non-tidal, narrow riparian corridor constrained on both sides by residential development. The site includes several discontinuous sections of non-tidally influenced riparian corridor.

Adjacent land uses are primarily residential.



Vineyard Creek at the Sonoma-Marín parcel.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest. Tree species include bays, willows, alders. Understory species include wild grape, blue elderberry, Himalayan blackberry, ivy, and native and non-native grasses.

Potentially-occurring special-status species:

Steelhead trout

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-WAR-1
Warner Creek

Site Description:

The work site is the tidally-influenced downstream portion of Warner Creek from its confluence with Novato Creek upstream to Diablo Ave. The lower portion, below Novato Blvd, has a concrete-lined right bank; the upstream portion is all natural.

Adjacent land uses include residential and commercial development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type east of S. Novato Blvd is northern coastal salt marsh; west of S. Novato Blvd is north coast riparian scrub/forest. The predominant species present are cattails and oaks.

Potentially-occurring special-status species:

Steelhead trout

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:

Vegetation maintenance and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-WAR-2
Warner Creek

Site Description:

The work site is upstream of tidal reach and extends from Diablo Ave upstream to the confluence with Vineyard Creek.

The riparian corridor is constrained by residential development.



Warner Creek near confluence with Wilson Creek

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest. Portions of the area were re-planted in the 1980's as mitigation with native species including willows, bays, alders, blue elderberry and box elder.

Potentially-occurring special-status species:

Steelhead trout and northwestern pond turtle.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; FISH-1, REP-1.

Maintenance Activities:

Fire fuel reduction; vegetation maintenance; and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 1 - Novato

Site: 1-WIL
Wilson Creek

Site Description:

The work site consists of four discontinuous, non-tidal sections of Wilson Creek., extending from the confluence with Warner Creek to near the intersection of Wilson Ave and Hatch Rd. The riparian corridor is constrained by residential development on both sides.



Wilson Creek at
Jennifer Ln

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest, with willows dominating.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-ACMP-1
Arr Corte Madera del Presidio

Site Description:

This site is tidally-influenced and extends from La Goma St to just downstream of the Camino Alto crossing..

The predominant land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh in the downstream section; above the Reed Creek confluence, north coast riparian scrub/forest dominates with oaks, bays, and willows.

Potentially-occurring special-status species:

Point Reyes bird's beak and steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-ACMP-2
Arr Corte Madera del Presidio

Site Description:

This site is above the extent of tidal influence and extends from the confluence of Old Mill Creek downstream to the confluence with Warner Creek.

The predominant land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest, with dominant tree species present being acacia, willows, hazel, alder and box elder.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-ACMP-3
Arr Corte Madera del Presidio

Site Description:

This site is a narrow riparian corridor that extends from 650 W. Blithedale Ave. downstream to the Sunnyside crossing. It is well above tidal influence.

The predominant land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest. Acacia, willows, alder, and box elder make up the majority of tree species in the riparian corridor.

Potentially-occurring special-status species:

Marsh microseris and steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; PLA-1, FISH-1.

Maintenance Activities:

.Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-BM
Bothin Marsh

Site Description:

The site is a tidally-influenced drainage ditch from Sutton Manor upstream to E. Blithedale Ave, between Roque Moraes Dr and the Marin County Multi-Use Path.

Adjacent land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

Point Reyes bird's beak, California black rail and California clapper rail

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, BIRD-1.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-CAS
Cascade Creek

Site Description:

The site extends from the confluence with Old Mill Creek (at Cascade Dr.) approximately 600 ft upstream. The site is well above tidal influence.

Surrounding land use is low-density residential and municipal open space.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Marsh microseris and steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-COY-1
Coyote Creek

Site Description:

The site is tidal with natural bottom, and extends from Shoreline Hwy upstream to the start of the concrete channel.

Surrounding land use includes residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, BIRD-1; MAMM-1.

Maintenance Activities:

Erosion control, pump station, tidegate, and levee maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-COY-2
Coyote Creek

Site Description:

The site is tidal with concrete channel and extends from the start of the concrete bottom upstream to Laurel Way.

Surrounding land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The channel bottom is concrete; predominant vegetation type on the banks is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance, sediment removal, erosion control, and tidegate maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-COY-3
Coyote Creek

Site Description:

The site consists of a non-tidal, concrete channel. It extends from Laurel Way upstream to Ash St.

Surrounding land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The dominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance, sediment removal, erosion control, and tidegate maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-2; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-COY-4
Coyote Creek

Site Description:

The site is non-tidal and includes the reaches between Ash St. and Maple Ave.

Surrounding land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-COY-5
Coyote Creek

Site Description:

The site is non-tidal and has a natural bottom. The site extends for approximately 300 ft, generally parallel to Marin Ave. along the south fork.

Surrounding land use is residential.



Wetlands and other Waters,

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-CRE-1
Crest Marin Creek

Site Description:

This site is non-tidal and extends from Flamingo Rd to Ross Dr.

The predominant land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is California annual grassland.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, and pump station and tidegate maintenance.

Best Management Practices:

A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-CRE-2
Crest Marin Creek

Site Description:

The site extends from just below the driveway crossing upstream approximately 225 ft. and includes the Laurel Way silt basin. The site is well above tidal influence.

Surrounding land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation types are north coast riparian scrub/forest and mixed evergreen forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-MIL-1
Miller Ave

Site Description:

This site is located just south of the Miller Ave/Camino Alto intersection. It is tidally-influenced.

Surrounded land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The dominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, BIRD-1; MAMM-1.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-MIL-2
Miller Ave

Site Description:

This site is tidal and is located across from Tamalpais High School, just east of 625 Miller Ave.

The surrounding land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The dominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

California black rail, California clapper rail, and slat marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, BIRD-1; MAMM-1.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-MIL-3
Miller Ave

Site Description:

This site is located across from the track at Tamalpais High School. It is tidally-influenced.

The surrounding land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

Point Reyes bird's beak, California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, BIRD-1; MAMM-1.

Maintenance Activities:

Sediment removal

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-MRN
Marin City

Site Description:

The site is non-tidal. The south trash rack is located off Pacheco St.; the northern trash rack is located at the end of Dutton Ct.

Surrounding land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

At the northern trash rack, the vegetation type is north coast riparian scrub/forest; at the southern trash rack, the vegetation community is California annual grassland.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Debris removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-NYH-1
Nyhan Creek

Site Description:

The site is non-tidal and extends upstream from Enterprise Concourse to Headlands Ave.

Surrounding land use is low-density residential and institutional.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-NYH-2
Nyhan Creek

Site Description:

This site is a non-tidal channel behind Tamalpais Valley Elementary School.

Surrounding land use is residential and institutional.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

.Fire fuel reduction, vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67;A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-NYH-3
Nyhan Creek

Site Description:

This site is a non-tidal channel, approximately 465 ft long, next to the Tamalpais Valley Community Center.

Surrounding land use is residential and institutional.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-OMC
Old Mill Creek

Site Description:

The site is a riparian corridor extending from Ethel Ave crossing up-stream to 550 Cascade Dr. The site is well above tidal influence.

The predominant land use is residential .



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest.. Redwood, dogwood, ferns, ivy, and vinca are the dominant species present.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-REED-1
Reed Creek

Site Description:

The site is a tidally-influenced open ditch about a block long from the confluence with Arroyo Corte Madera del Presidio to Miller Ave.

The surrounding land use is commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction. No coffer dam needed if done at low tide.

Vegetation communities:

The vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

Steelhead trout possibly during high tide only

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-REED-2
Reed Creek

Site Description:

The site is a non-tidal, riparian corridor that extends from behind 444 Miller Ave upstream to the Tamalpais Dr crossing.

The predominant adjacent land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian. Trees present include willows, bays, oaks, alders, and redwoods; shrub cover is dominated by Himalayan blackberry and ivy.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6. FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-RSD
Robin-Starling Ditch

Site Description:

The site is a non-tidal ditch, approximately 535 ft long, running from just upstream of the Robin Rd crossing and Coyote Creek.

The surrounding land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is California annual grassland.

Potentially-occurring special-status species:

None

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-RYC-1
Ryan Creek

Site Description:

The site is non-tidal and extends from the confluence with Sutton Manor approximately 300 ft to just upstream of the Camino Alto crossing.

Adjacent land uses include institutional, open city-owned parcels, and utilities.



Wetlands and other Waters, includ-

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is diked baylands. The area is disturbed, with nonnative grasses, grindelia, and pickleweed present.

Potentially-occurring special-status species:

Point Reyes bird's beak.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:

Sediment removal, vegetation maintenance, and pump station and tidegate maintenance.

Best Management Practices:

A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-RYC-2
Ryan Creek

Site Description:

The site is a block-long stretch of non-tidal creek from Nelson Ave upstream to Amicita Ave; it passes through the yards of residential lots.

The land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 3 - Richardson Bay

Site: 3-SEM
Seminary PS

Site Description:

The site is tidally influenced and is located behind the Shell gas station on Da Silva Island Dr.

Adjacent land uses are commercial and residential (DSI Homeowners Association owns the surrounding open areas).



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The pump station location sits at the junction of commercial land use, mixed evergreen forest, and northern coastal salt marsh.

Potentially-occurring special-status species:

California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6. BIRD-1, MAMM-1.

Maintenance Activities:

.Pump station and tidegate maintenance.

Best Management Practices:

A-229; A-103; A-107; EV-1; EV-2; NR-1; NR-3; VR-4a; VR-4b; VR-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-SUT-1
Sutton Manor

Site Description:

The site is a tidally-influenced section of Sutton Manor upstream to E. Blithedale Ave, between Roque Moraes Dr and the Marin County Multi-Use Path.

Adjacent land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

Point Reyes bird's beak, California black rail and California clapper rail.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, BIRD-1.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-SUT-2
Sutton Manor

Site Description:

The site extends from Roque Moraes Dr to Ashford Ave and is tidally-influenced. The stream corridor is tightly constrained between E. Blithedale Ave and parking lots.

The adjacent land use includes commercial and residential.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The vegetation type is northern coastal salt marsh, with blackberry and nonnative grasses the predominant species present.

Potentially-occurring special-status species:

Point Reyes bird's beak.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-SUT-3
Sutton Manor

Site Description:

The site extends about a block from Ashford Ave upstream to the extent of tidal influence. This section of Sutton Manor is concrete-lined.

Adjacent land use is residential.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The vegetation type on the banks is California annual grassland, with predominantly nonnative species present.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-SUT-4
Sutton Manor

Site Description:

The site extends from about Dorset Ln to the T intersection with Shell Rd ditch. This section of Sutton Manor is non-tidal and concrete-lined, and it flows through residential backyards.

The nearby land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type on the banks is California annual grassland, with predominantly nonnative species present.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-SUT-5
Sutton Manor

Site Description:

The site encompasses non-tidal Shell Rd ditch, between Meadow Rd and Shell Rd. The ditch is mostly concrete-lined, turning to natural bottom at the upstream portion near Lomita Dr.

Adjacent land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is California annual grassland, with predominantly nonnative species present..

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67;A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-SUT-6
Sutton Manor

Site Description:

The site is located at the Vasco Ct crossing of Sutton Manor. The site is well above tidal influence.

Surrounding land uses are residential and institutional.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is California annual grassland, with predominantly nonnative species present.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Debris removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 3 - Richardson Bay

Site: 3-WAR
Warner Canyon Creek

Site Description:

The site is a non-tidal, riparian corridor that extends from just downstream of the E. Blithedale crossing to just upstream of Vista Linda Dr

The predominant land uses are residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation present is north coast riparian scrub/forest; dominant species are oaks, ferns, ivy, broom, coyote brush and dogwood.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: 4-EAST-1
East Creek

Site Description:

This site is a narrow corridor about a block long and is tidally-influenced.

Surrounding land uses are residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

Point Reyes bird's beak, California black rail and California clapper rail.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, BIRD-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, and pump station maintenance.

Best Management Practices:

A-67;A-69; A-73; A-103; A-107; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4; VR-4a; VR-4b; VR-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: 4-EAST-2
East Creek

Site Description:

This site is a non-tidal, narrow corridor between residential subdivisions, generally running behind Leland Way and Karen Way.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is annual grassland behind Leland Way and north coast riparian scrub/forest behind Karen Way.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: 4-SALT
Salt Works Ca-

Site Description:

This site is the continuation of West Creek and is located downstream of the Highway 131/Tiburon Blvd culverts; the area is tidally-influenced.

The predominant adjacent land use is residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh, with saltgrass and pickleweed present.

Potentially-occurring special-status species:

Point Reyes bird's beak, California black rail, California clapper rail, and salt marsh harvest mouse

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, BIRD-1, MAMM-1.

Maintenance Activities:

Fire fuel reduction, erosion control, and levee maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: 4-STR
Strawberry Circle

Site Description:

This site is tidally-influenced and is located on Mill Valley school property off Strawberry Dr.

The predominant land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

Point Reyes bird's beak, California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, BIRD-1, MAMM-1.

Maintenance Activities:

Fire fuel reduction, sediment removal, erosion control, and pump station, tidegate, and levee maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: 4-WEST-1
West Creek

Site Description:

This site extends from upstream of Highway 131/Tiburon Blvd to the extent of tidal influence and runs behind houses in the residential subdivision.

The predominant land use is residential.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

Point Reyes bird's beak.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; PLA-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, and pump station and tidegate maintenance.

Best Management Practices:

A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 4 - Bel Aire and Strawberry Circle

Site: 4-WEST-2
West Creek

Site Description:

The site is above the extent of tidal influence and is a narrow riparian corridor running between residential backyards.

The predominant land use is residential.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest. Many native species have been planted as mitigation, including spicebush, blue elderberry, and redwood trees.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 5 - Stinson Beach

Site: 5-EAS-1 (a-e)
Easkoot Creek

Site Description:

The site is tidally-influenced and generally parallels Highway 1 between Calle del Ribera and Calle de Pinos.

Surrounding land use is residential.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

Even though there is tidal influence, the dominant vegetation type is north coast riparian scrub/forest, with dominant tree species include bays, buckeyes, willows and a few alders. Shrubs include Himalayan blackberry, cape ivy, broom and pampas grass.

Potentially-occurring special-status species:

Point Reyes bird's beak, coho salmon and steelhead trout, California red-legged frog, California black rail, and California clapper rail, and monarch butterfly.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, FISH-1, INV-1, AMPH-1, BIRD-1.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 5 - Stinson Beach

Site: 5-EAS-2
Easkoot Creek

Site Description:

The site is a n off-channel sediment basin which is non-tidal. The site is adjacent to a parking lot on National Park Service land, behind the Parkside Cafe.

Surrounding land use is recreational and commercial.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction ???

Vegetation communities:

The dominant vegetation type is north coast riparian scrub/forest, with dominant tree species include bays, buckeyes, willows and a few alders. Shrubs include Himalayan blackberry, cape ivy, broom and pampas grass.

Potentially-occurring special-status species:

Point Reyes bird's beak, coho salmon and steelhead trout, California red-legged frog, California black rail, California clapper rail, and monarch butterfly.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, FISH-1, INV-1, AMPH-1, BIRD-1.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67;A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 5 - Stinson Beach

Site: 5-EAS-3
Easkoot Creek

Site Description:

The site is a non-tidal, riparian corridor that extends upstream of 5-EAS-2 up to the Stinson Beach Community Center.

Adjacent land uses are residential and commercial.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest, with bays and buckeyes the predominant overstory; shrubs include Himalayan blackberry, cape ivy, and French broom.

Potentially-occurring special-status species:

Point Reyes bird's beak, coho salmon and steelhead trout, California red-legged frog, and monarch butterfly.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, FISH-1, AMPH-1, and INV-1.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-CAS
Castro Ditch

Site Description:

This site consists of a non-tidal concrete v-ditch within a 10-ft wide easement running between backyards and around Castro Park in a residential neighborhood.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is California annual grassland; there are some backyard trees that overhang the ditch.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-EST
Estancia Ditch

Site Description:

Estancia Ditch is non-tidal and runs between Gallinas Creek levees and residential development.



Estancia Ditch (Gallinas Creek is below levee on right).

Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is diked baylands, dominated by non-native species such as European grasses, Bermuda grass, fennel, and English plantain. Because the ditch has a very slow summer inflow from tidal infiltration, there is standing brackish water with pickleweed, saltgrass, and cordgrass.

Potentially-occurring special-status species:

California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, BIRD-1, MAMM-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, erosion control, and pump station, tidegate, and levee maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-GAL
Gallinas Creek SF

Site Description:

The site is atop the Gallinas Creek levees from Pump Station 5 west around Santa Margarita Island.

Gallinas Creek fronts one side of the levee; the other side is residential.



Gallinas Creek levee

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type on the levee tops is California annual grassland. There are northern coastal salt marsh communities on the creek side of the levee, but no work is done in those areas.

Potentially-occurring special-status species:

California black rail, California clapper rail, and salt marsh harvest mouse could potentially inhabit the salt marsh areas (but are unlikely to be affected by levee-top work).

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, BIRD-1, MAMM-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, erosion control, and levee maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-LAP-1
La Pasada outfall

Site Description:

This site is a stormwater outfall to Gallinas Creek. This is the downstream end of the La Pasada Interceptor, and the pipe goes through the Las Gallinas levee and outfalls into Gallinas Creek.

Work at the outfall requires access through the marsh vegetation.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh; pickleweed, saltgrass and cordgrass are present.

Potentially-occurring special-status species:

Point Reyes bird's beak, California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, BIRD-1, MAMM-1.

Maintenance Activities:

Sediment removal and tidegate maintenance.

Best Management Practices:

A-43; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR-4a; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-LAP-2
La Pasada inlet

Site Description:

This site is a stormwater inlet on the side of North San Pedro Rd, just downhill from a slope forested with oaks and bays. The site is non-tidal.



La Pasada inlet and ditch along N. San Pedro Road.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is California annual grassland. Nonnative grasses dominate at the inlet itself.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-MAB
Mabry Ditch

Site Description:

The site is a 15-ft wide ditch running between backyards in a residential neighborhood.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is California annual grassland. The predominant species are nonnative grasses; landscape trees from backyards shade the ditch in some areas.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-MCPH
Berm at Sunny Oaks

Site Description:

The site is located on the west side of the grounds of McPhail School, on N. San Pedro Rd.



Wetlands and other Waters, including Waters of the State:

Vegetation communities:

The predominant vegetation type is California annual grassland, with nonnative species dominating.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 7 - Santa Venetia

Site: 7-MEA-1
Meadow Way outfall

Site Description:

The tidally-influenced site is the outfall of a stormwater pipe; the pipe goes through the Gallinas Creek levee and outfalls into the creek.



Meadow Way outlet maintenance (2010)

Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The dominant vegetation is northern coastal salt marsh; the area is tidally influenced but there is not much pickleweed habitat. Upslope areas are dominated by nonnative grasses.

Potentially-occurring special-status species:

Point Reyes bird's beak, California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, BIRD-1, MAMM-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, and pump station and tidegate maintenance.

Best Management Practices:

A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-MEA-2
Meadow Way inlet

Site Description:

The site consists of several discontinuous areas on and near Meadow Creek and its tributaries near N. San Pedro Rd and Oxford Dr. The site is above tidal influence.

Surrounding land use is residential and commercial.



Trash rack at Meadow Way inlet, near the 7-11.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The dominant vegetation is north coast riparian scrub/forest with mostly oaks present.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-SRAL
S Rafael Airport levee

Site Description:

This site is a levee separating the airport from Gallinas Creek. All of the activities take place on the tops of the levees, not in the creek and marsh.



San Rafael Airport levee with Gallinas Creek on left.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is California annual grassland..

Potentially-occurring special-status species:

California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, BIRD-1, MAMM-1.

Maintenance Activities:

Fire fuel reduction, erosion control, and levee maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-SOD
Sunny Oaks drain

Site Description:

The site is non-tidal (behind levees) and is located at the northwest intersection of N. San Pedro Rd and E. Vendola Dr.



Sunny Oaks drainage

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The dominant vegetation type is California annual grasslands; dominant species are nonnative herbaceous species.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-PS-1
Vendola Dr PS

Site Description:

The sites are Pump Stations #1,2,3, and 5 and immediate surroundings, which lie inside the levee and three portable pumps located at 866 and 882 Estancia Way and at 60 Meadow Way.



Pump station #2 between Vendola Dr and the Gallinas levee.

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The site is California annual grassland; the dominant species are nonnative grasses.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction and pump station maintenance.

Best Management Practices:

A-67;A-69; A-73; A-103; A-107; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4; VR-4a; VR-4b; VR-5.

Flood Control Zone 7 - Santa Venetia

Site: 7-PS-2
PS4 detention basin

Site Description:

The site is a non-tidal, open area behind levees near Pump Station #4

Adjacent land use is residential.



Detention basin at Pump Station #4

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is annual grassland/diked baylands; the dominant species are nonnative grasses.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Fire fuel reduction, sediment removal, and pump station and tidegate maintenance.

Best Management Practices:

A-43; A-67; A-69; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-BOTH
Bothin Creek

Site Description:

This site is a riparian corridor amidst residential development. Bothin Creek is well above the tidal zone.



Wetlands and other Waters, including

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is mixed evergreen forest, with a redwood overstory and English ivy understory.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 - Ross Valley

Site: 9-CCT
College Ct Outfall

Site Description:

The site extends between residential lots at 10 and 14 College Ct in Larkspur.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Not exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-CMC-1
Corte Madera

Site Description:

This site is tidal and is located between the Bon Air Bridge and the end of the natural channel.

The predominant land use is suburban development.

Sediment removal: Concrete channel outfall downstream to Talmalpais Creek outfall. Sediment removal not included in DFW RMA



Wetlands and other Waters, including Waters of the State:

USACE jurisdiction– tidal

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh, with pickleweed and salt grass.

Potentially-occurring special-status species:

Marin knotweed, Point Reyes bird's beak, steelhead trout, California black rail, California clapper rail, and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, FISH-1, BIRD-1, and MAMM-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance, sediment removal, erosion control, and tidegate and levee maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-2; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through
Marin County Flood Control and Water Conservation District – Biological Assessment

Flood Control Zone 9 - Ross Valley

Site: 9-CMC-2
Corte Madera Creek

Site Description:

This site is tidal and includes the concrete channel up to the extent of tidal influence.

The predominant land use is suburban development.



Wetlands and other Waters, including Waters of the State:

Subject to USACE jurisdiction.

Vegetation communities:

The channel is concrete; the predominant vegetation type on the creek banks is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance, sediment removal, erosion control, and tidegate maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-CMC-3
Corte Madera Creek

Site Description:

This site is non-tidal extends from Kentfield Rehab US to Lagunitas Rd Bridge; sediment removal in concrete channel at fish resting pools only, sediment removal 100 ft. downstream from Lagunitas Bridge.

The predominant land use is suburban development. Sediment removal not included in DFW RMA



Wetlands and other Waters, including Waters of the State:

USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance, sediment removal, erosion control, and tidegate maintenance.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-103; A-107; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-CMC-4
Corte Madera

Site Description:

This site is the non-tidal reach located between the confluence with Ross Creek and the Lagunitas Rd Bridge in Ross.

The predominant land use is suburban development.



Wetlands and other Waters, including Waters of the State:

USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Fire fuel reduction, vegetation maintenance , sediment removal and erosion control.

Best Management Practices:

A-43; A-53; A-61; A-63; A-67; A-69; A-71; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-185; A-191; A-193; A-197; A-203; A-211; A-223; A-229; CU-8; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1 through VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-FAIR
Fairfax Creek

Site Description:

This site includes Fairfax Creek from 300 Olema Rd downstream to the box culvert at Bolinas Rd. The site is well above tidal extent.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 - Ross Valley

Site: 9-LAD
Laurel Ave Ditch

Site Description:

The site is a long (850 ft) ditch on private residential parcels.

The surrounding land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-LAR-1
Larkspur

Site Description:

This site includes the tidally-influenced reaches of Larkspur Creek, from the mouth upstream to just east of Meadowood Dr.

Surrounding land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh.

Potentially-occurring special-status species:

Point Reyes bird's beak, steelhead trout, California black rail, California clapper rail, salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, FISH-1; BIRD-1; MAMM-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 - Ross Valley

Site: 9-LAR-2
Larkspur Creek

Site Description:

The site is the non-tidal portion of Larkspur Creek from the end of Madrone Ave (Blithedale Summit Open Space Preserve) downstream to the extent of tidal influence.

Land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is mixed evergreen forest, with redwood and Douglas fir overstory.

Potentially-occurring special-status species:

Marsh microseris and steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, PLA-1, FISH-1.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-MAG-1
1100 Magnolia Ave

Site Description:

The site is located behind the commercial building at 1100 Magnolia Avenue in Larkspur.

The surrounding land use is predominantly commercial development fronting on salt marsh.



Wetlands and other Waters, including Waters of the State:

Not exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh. Predominant species are cattails in the channel and English ivy on the banks.

Potentially-occurring special-status species:

California black rail; California clapper rail; and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; BIRD-1; MAMM-1.

Maintenance Activities:

Vegetation maintenance (cattail removal) and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-MAG-2
1020 Magnolia Ave

Site Description:

The site is located behind the commercial building at 1020 Magnolia Avenue in Larkspur.

The surrounding land use is predominantly commercial development fronting on salt marsh.



Wetlands and other Waters, including Waters of the State:

Not exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh with dense cattails.

Potentially-occurring special-status species:

California black rail; California clapper rail; and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; BIRD-1; MAMM-1.

Maintenance Activities:

Vegetation maintenance (cattail removal) and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-MAG-3
965 Magnolia Ave

Site Description:

The site is located behind the commercial building at 965 Magnolia Avenue in Larkspur.

The surrounding land use is predominantly commercial and residential development.



Wetlands and other Waters, including Waters of the State:

Not exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is northern coastal salt marsh. Dense cattails cover the channel.

Potentially-occurring special-status species:

California black rail; California clapper rail; and salt marsh harvest mouse.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6; BIRD-1; MAMM-1.

Maintenance Activities:

Vegetation maintenance (cattail removal) and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-MAG-4
Magnolia Ave Ditch

Site Description:

The site is located in the 600 Magnolia Ave block.

The surrounding land use is predominantly commercial and residential development. Sediment removal from drainage ditch only in places where needed.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction. Non-tidal.

Vegetation communities:

The predominant vegetation type is median landscape on roadway and non-native, ruderal grasses

Potentially-occurring special-status species:

n/a

Avoidance and Minimization Measures:

Maintenance Activities:

Sediment removal

Best Management Practices:

A-229; A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; EV-1; EV-2; NR-1; NR-3; SC-1; SC-4 through SC-6; SS-1; SS-3; SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-MUR
Murphy Creek

Site Description:

From the Murphy Creek culvert at Kent Ave US to border of the Town of Ross. Tidal for first 30 ft. of reach only. Includes sediment removal at culverts and crossings; vegetation efforts by collaborative community efforts under Calif. Civil Code 830.

Surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67;A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b;
Marin County Flood Control and Water Conservation District – Biological Assessment

Flood Control Zone 9 - Ross Valley

Site: 9-ROS
Ross Creek

Site Description:

The site includes Ross Creek from Glenwood Ave downstream to the confluence with Corte Madera Creek. The site is above tidal influence.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 - Ross Valley

Site: 9-SAC-1
San Anselmo Creek

Site Description:

This site is non-tidal and includes the stream within the Town of Ross.

Predominant land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 - Ross Valley

Site: 9-SAC-2
San Anselmo Creek

Site Description:

This site is non-tidal and includes the stream within the Town of San Anselmo.

Predominant land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 - Ross Valley

Site: 9-SAC-3
San Anselmo Creek

Site Description:

This site is non-tidal and includes the stream length within the Town of Fairfax, from Pastori Avenue downstream to the San Anselmo border.

Predominant land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 - Ross Valley

Site: 9-SHC-1
Sleepy Hollow Creek

Site Description:

The site is not tidally-influenced and includes the stream length within the Town of San Anselmo.

The predominant land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-SHC-2
Sleepy Hollow Creek

Site Description:

The site is not tidally-influenced and includes the area within unincorporated Marin County, from just above the confluence with Van Winkle Creek downstream to the border of Town of San Anselmo.

The predominant land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-SHC-3
Sleepy Hollow Creek

Site Description:

Culvert under road near 300 Hidden Valley Ln. The site is not tidally-influenced.

The predominant land use is residential development.



Wetlands and other Waters, including

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-SHC-4
Sleepy Hollow Creek

Site Description:

Culvert under road near 960 Butterfield Rd at Green Valley Ct. The site is not tidally-influenced.

The predominant land use is residential development.



Wetlands and other Waters, including

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-SHC-5
Sleepy Hollow Creek

Site Description:

Bridge at Butterfield Rd and Sleepy Hollow Dr. The site is not tidally-influenced.

The predominant land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-SHC-6
Sleepy Hollow Creek

Site Description:

Culvert under road at Katrina Ln. The site is not tidally-influenced.

The predominant land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-SHC-7
Sleepy Hollow Creek

Site Description:

Culvert under road at Van Winkle Dr.
The site is not tidally-influenced.

The predominant land use is residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-SOR
Sorich Creek

Site Description:

The site extends from the confluence with San Anselmo Creek upstream approximately 3500 ft. The site is well above tidal influence.

Adjacent land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

Flood Control Zone 9 - Ross Valley

Site: 9-VAN-1
Van Winkle Creek

Site Description:

The site extends from 275 Van Winkle Dr downstream to the confluence with Sleepy Hollow Creek. The site is well above tidal influence.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance..

Best Management Practices:

A-43; A-67;A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-VAN-2
Van Winkle Creek

Site Description:

Culvert under Ichabod Ct. The site is well above tidal influence.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-VAN-3
Van Winkle Creek

Site Description:

Culvert under Tappan Rd. The site is well above tidal influence.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-VAN-4
Van Winkle Creek

Site Description:

Culvert under Mather Rd. The site is well above tidal influence.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-VAN-5
Van Winkle Creek

Site Description:

The site extends from 275 Van Winkle Dr downstream to the confluence with Sleepy Hollow Creek. The site is well above tidal influence.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, in-
Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-VAN-6
Van Winkle Creek

Site Description:

Culvert under Manitou Dr. The site is well above tidal influence.

The surrounding land use is predominantly residential development.



Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is north coast riparian scrub/forest.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Vegetation maintenance and sediment removal.

Best Management Practices:

A-43; A-67; A-69; A-73; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A-163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-WARD
Ward St

Site Description:

The site is located along a drainage ditch off a city-owned parking lot in downtown Larkspur.

The surrounding land use is predominantly commercial and residential development.



Wetlands and other Waters, including Waters of the State:

Not exempt from USACE jurisdiction.

Vegetation communities:

The predominant vegetation type is California annual grassland.

Potentially-occurring special-status species:

None.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

Flood Control Zone 9 - Ross Valley

Site: 9-WILL

Site Description:

444 William Ave. block; drainage ditch into marsh



Wetlands and other Waters, including Wa-
Ditch

Vegetation communities:

Ruderal non-natives

Potentially-occurring special-status species:

none

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6.

Maintenance Activities:

Sediment removal.

Best Management Practices:

A-43; A-109; A-113; A-117; A-141; A-151; A-157; A-161; A163; A-167; A-179; A-229; EV-1; EV-2; NR-1; NR-3; SC-1 through SC-6; SS-1 through SS-4; VDM-1 through VDM-4; VR-1; VR4b; VR-5; WD-4; WD-5.

County Service Area 13 - Upper Lucas Valley

Site: CSA-13-MC
Miller Creek

Site Description:

The site is a riparian corridor amidst residential development and schools. The site is above tidal influence.



Miller Creek

Wetlands and other Waters, including Waters of the State:

Exempt from USACE jurisdiction.

Vegetation communities:

The vegetation type is north coast riparian scrub/forest. Dominant tree species include willows, oaks, and bays. Understory plants include Himalayan blackberry, native blackberry, snowberry, and vinca.

Potentially-occurring special-status species:

Steelhead trout.

Avoidance and Minimization Measures:

GAMM-1 through GAMM-6, FISH-1.

Maintenance Activities:

Vegetation maintenance.

Best Management Practices:

A-67;A-69; A-73; A-229; EV-1; EV-2; NR-1; NR-3; SS-3; VDM-1; VDM-2; VDM-3; VDM-4.

APPENDIX E

BIOLOGICAL ASSESSMENT

**BIOLOGICAL ASSESSMENT FOR ROUTINE
FLOOD CONTROL MAINTENANCE ACTIVITIES
MARIN COUNTY, CALIFORNIA**



June 2012

Prepared by:
County of Marin
Department of Public Works
P.O. Box 4186
San Rafael, CA 94913-4186
(415) 473-4301
lwilliams@marincounty.org

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SUMMARY

The Marin County Flood Control and Water Conservation District (District) is proposing to conduct annual vegetation maintenance, vegetation removal, and sediment removal activities at 96 project sites along several creeks in Eastern Marin County and Stinson Beach area within its jurisdiction. We prepared this biological assessment of the study area to determine the potential for the occurrence of special-status plant or animal species, or sensitive vegetation communities, within the areas to be affected by the project.

The majority of the vegetation maintenance and sediment removal work occurs in eastern county creeks draining into San Pablo Bay, from Novato Creek in the north to Coyote Creek in the south. There are only three project sites in western Marin County on Easkoot Creek in Stinson Beach, draining to the Pacific Ocean. Most of the maintenance activities occur within urbanized, residential and commercial land uses. Some of the lower reaches include tidally-influenced land reserved for wildlife and flood control purposes; these lands, while having been subject to human activity, now represent the more natural areas within the program scope. Most of the land in the upper reaches is largely undeveloped open space or grazing land.

Vegetation communities present within and adjacent to the study area include California annual grassland, northern coastal salt marsh, diked baylands, north coast riparian scrub/forest, and mixed evergreen forest.

We pulled endangered species listings from the USFWS for the following USGS quads: Bolinas, Petaluma Point, Novato, San Rafael, and San Quentin. We also checked the State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFG 2010a), Special Vascular Plants, Bryophytes, and Lichens (CDFG 2010b), State and Federally Listed Endangered and Threatened Animals of California (CDFG 2010c), Special Animals (CDFG 2009) lists and the California Wildlife Habitat Relationship System (CDFG 2008), as well as the online Inventory of Rare and Endangered Plants (CNPS 2010) for Marin County. Based on these searches, a literature and database review and a familiarity with the flora within the project region, we created the list of special status species. Altogether, there are 113 species on the list, of which 41 are listed or candidates for listing, and 72 are federal or state species of concern. Special Status Species Reported or Potentially Occurring at the Project Sites is included in Appendix A.

For plants, there are 12 listed species in the selected USGS quadrangles. From the species of concern lists, which are not linked to quad maps, we pulled the species that occur in Marin County, based on CNPS lists, records in the CNDDDB, and/or range information from CWHR, resulting in 21 species of concern. Based on the data available, none of the listed species and four of the species of concern are likely or somewhat likely to occur in the project sites.

Similarly, for animals, there are 29 listed species in the selected quads, and 46 species of concern. Based on the data available, eight of the listed species and six of the species of concern are likely or somewhat likely to occur in the project sites.

The project sites in West Marin at Easkoot Creek are the only locations where two of the listed species (coho salmon and California red-legged frog) and two species of concern (monarch butterfly and marsh milk-vetch) could potentially occur.

An analysis is presented for each of the work sites and their potential to support special-status species. The potential for special-status plant or wildlife species to occur within or immediately adjacent to each individual project work site is in most cases based on the presence of suitable habitat or the known presence of a species within the vicinity of the work site. Therefore, within the site-specific analysis, unless otherwise noted, those species that are listed for each work site are considered to have at least some potential to occur within the work site.

Based on the actual or potential presence of certain special-status wildlife species within the project site, recommendations are made to either avoid or minimize potential impacts to them. Appropriate site-specific and species-specific recommendations are given for certain species, including work windows, pre-construction surveys, additional focused surveys, avoidance measures, disturbance minimization, exclusionary fencing, and construction monitoring, among others.

Based on our assessment of habitats in the project sites, certain special-status plant and animal species are not expected to occur or can be ruled out. However, focused wildlife surveys or botanical surveys were not conducted as part of this reconnaissance-level site evaluation. The methods employed would not necessarily rule out some special-status species.

We have made a preliminary determination of project sites that we believe to fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE), as well as the identification of potential waters of the State of California, which are anticipated to fall within the jurisdictions of California Department of Fish and Game (CDFG) and/or the Regional Water Quality Control Board (RWQCB). These determinations are listed in Appendix B.

Aquatic resources, including riparian areas, wetlands, and certain aquatic vegetation communities are considered sensitive biological resources and can fall under the jurisdiction of several regulatory agencies. Within or adjacent to the project sites proposed for vegetation maintenance, sediment removal, and levee maintenance there are two sensitive natural communities that have the potential to be affected by project activities. These include northern coastal salt marsh at Almonte Marsh in Tam Valley, Estancia Ditch in Santa Venetia, and lower Novato Creek; and coastal brackish marsh adjacent and downstream of the Coyote Creek project site. Almost all of the work sites are expected to fall under federal and/or state jurisdictions as wetlands or waters of the U.S. or waters of the state, and will thus require permits from various state and federal agencies including the USACE, CDFG, and RWQCB.

A copy of this report should be submitted to the USACE, North Branch, San Francisco District, with a request for field verification of the preliminary wetland delineation.

1.0 INTRODUCTION AND METHODS

The County of Marin Department of Public Works (DPW) in conjunction with the Marin County Flood Control and Water Conservation District (District) is proposing to conduct vegetation maintenance and sediment removal activities along several creeks in Marin County, California in order to clear debris and to maintain flood conveyance and stream flow. The maintenance work primarily occurs on parcels owned in fee title or held as easements by the District, the County, other County agencies, or partnering city jurisdictions; however, there are four project sites where the District has no formal jurisdiction and therefore will secure landowner access agreements before commencing work. These sites are Reed Creek (project site 3-REED-1; 99 landowners), Sutton Manor/Shell Rd (project site 3-SUT-5; 15 landowners), East Creek (project site 4-EAST-2), and Zone 7 Gallinas South Fork levees (project site 7-GAL; total of 110 landowners, but generally only 5-10 parcels per year will need to be accessed). The purpose of the biological assessment is to determine the potential for the occurrence of special-status plant or animal species, or sensitive vegetation communities within the areas affected by the project. This report presents the results of our field investigations.

The study area includes a total of 96 project sites in six Flood Control Zones (zones 1, 3, 4, 5, 7, and 9) and one non-Flood Zone project site in County Service Area 13 Upper Lucas Valley (Figure 1). There are 26 project sites located in Flood Control Zone 1 in the Novato Creek watershed, 33 project sites in Flood Control Zone 3 in Mill Valley, six project sites in Flood Control Zone 4 in Bel Aire/Strawberry, three project sites along Easkoot Creek in Flood Control Zone 5 in Stinson Beach, 13 project sites in Flood Control 7 in Santa Venetia, 14 project sites in Flood Control Zone 9 in the Corte Madera Creek watershed, and one project site falls outside the flood control zones along Miller Creek in the Miller Creek watershed. Aside from the project sites in Stinson Beach, all the other project sites are located in eastern Marin County.

Nomenclature used throughout this report conforms to Hickman (1993) for plants unless otherwise noted. Nomenclature for special-status plant species conforms to CDFG (2010a,b) and CNPS (2010); nomenclature for special-status animals conforms to CDFG (2009 and 2010c); nomenclature for special-status natural communities conforms to CDFG (2011). Nomenclature for wildlife conforms to Sibley (2000) for birds, Stebbins (2003) for reptiles and amphibians, and Jameson Jr. and Peeters (1988) for mammals. Plant community descriptions generally follow Holland (1986).

District biologists performed a reconnaissance-level survey at all project sites. All distinctive plant communities were noted and described, and all plant and wildlife species detected were identified and recorded. Appendix D lists the plant species detected and Appendix E lists the wildlife species detected. See Appendix F for a copy of the site assessment data sheet.

The surveys were intended as an initial evaluation of on-site habitat types at the project sites and an assessment of the potential for occurrence of special-status plant and wildlife species at those project sites. The evaluation did not include focused wildlife surveys or botanical

Figure 1. Project Areas



surveys, and therefore is not considered adequate to report negative findings for some special-status species. However, based on the surveys conducted to date and an assessment of available habitats on site, certain special-status plant and animal species are not expected to occur or can be entirely ruled out.

An inventory of plant species noted within the immediate vicinity of the project sites is presented in Appendix D. Wildlife species noted on site are listed in Appendix E.

Based primarily on visual inspections, a preliminary determination will be made as to the extent of jurisdictional waters or wetlands at project sites that may be subject to Corps jurisdiction. For sites with a well-defined, often unvegetated, stream channel is present, the extent of waters of the U.S. will be estimated based on the apparent limits of “ordinary high water,” as indicated by scour marks on opposite sides of the banks, alluvial deposits, drift lines or debris, or shelving. In other cases, where strongly hydrophytic vegetation is dominant and there is obvious wetland hydrology (e.g. inundation or soils saturated at the surface), it will be reasonable to assume that hydric soils are present, and that the parameters will be met for the classification of the site as a wetland under federal guidelines (Environmental Laboratory 1987).

A formal wetland delineation and preliminary jurisdictional determination has not yet been conducted. When completed, the extent, where applicable, of waters of the U.S. expected to fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE), will be identified within each of the sites. When the wetlands delineation is conducted, potential waters of the State of California, which are anticipated to fall under the jurisdiction of the California Department of Fish and Game (CDFG) and/or the Regional Water Quality Control Board (RWQCB) will also be identified.

A routine wetland delineation and preliminary jurisdictional determination will be performed in accordance with the procedures outlined in the USACE Wetlands Delineation Manual (Environmental Laboratory 1987). Based on topography and the presence or absence of field indicators including vegetation, hydrology, and soils, the limits of potentially jurisdictional waters of the U.S. will be determined.

2.0 EXISTING CONDITIONS

2.1 Setting

The District's flood control routine maintenance activity area covers several creeks draining eastward to San Pablo Bay, extending from the Novato Creek watershed in the north to the Richardson Bay watershed in the south in the largely urbanized eastern portions of the county, and a portion along Easkoot Creek draining into the Pacific Ocean at Stinson Beach.

Development patterns in Marin County are such that much of the valley floors are urbanized, with housing, commercial developments, and roads. Stream corridors sometimes have tree cover, but are sometimes more open through these areas; in almost all cases they are heavily impacted by human use, with concrete channelization, straightening, building piles in the creek, constrained riparian corridors, impacted floodplains, and nonnative invasive species. The upper reaches of creeks extend past the developed areas into woodlands and forests; many creek headwaters begin in Marin County Open Space lands. The lower reaches of creeks are tidally influenced, often with very little topographic relief, and while less developed, are often constrained by roads (such as Highways 101 and 37), levees, and other human-induced development.

The San Andreas Fault, running offshore through Bolinas Lagoon and up Tomales Bay, splits the County into two distinct geologic landscapes: the Pacific Plate lies on the west side of the fault and is comprised of Cretaceous granitic rock of the Monterey formation overlain with Cenozoic marine sedimentary deposits. All of the proposed project sites are located east of the fault on the North American Plate, which is comprised of Cretaceous sedimentary and metamorphic rocks of the Franciscan Complex (Sloan 2006) with Mesozoic marine sandstones and shales, cherts, and serpentines (Shuford & Tomassi 1989).

2.2 Plant Communities and Wildlife Habitats

The work sites proposed as part of this project can be separated into two basic groups: areas that are located within largely urbanized areas (where work may occur on easements adjacent to residential backyards, road rights of way, etc.), and areas in more natural settings, such as lower Novato Creek where we maintain levees surrounded by open water. In both instances, vegetation maintenance activities have been undertaken for a number of years; these work sites have been subjected to limbing and trimming, mowing, and trash clearing. The levees experience infrequent vehicle use from Flood Control, as well as Vector Control, utilities, and city/town jurisdictions to perform their duties. While these sites often support native species, it should be clear that these sites are not pristine and have been heavily impacted by urban development.

The vegetation communities described below are present within or adjacent to work sites. The descriptions generally follow Holland (1986). Diked baylands follow work by the Goals Project (2000) and BAASMA (2006). These communities include annual grassland, northern coastal salt marsh, north coast riparian scrub/forest, and mixed evergreen forest.

California Annual Grassland

Historically, grasslands in California were dominated by perennial bunchgrasses. However, the vast majority of grasslands have converted from native perennial species to Mediterranean annual grass species, resulting in an annual grassland habitat dominated by nonnative *Bromus* and *Erodium* species and others (Bartolome 2007). The low-elevation grasslands are especially prone to host nonnative species, with some 400 nonnative taxa included in grasslands species.

In addition to areas of open grassland, this habitat also describes many of the habitat remnants found in the easements where maintenance activities occur, such as between residential properties, in open disturbed areas on the landside of levees, and in areas where ditches have been constructed to direct water (where water would not have flowed before development).

Nonnative grassland species include wild oats (*Avena sp.*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), filaree (*Erodium sp.*), star thistle (*Centaurea sp.*), bull thistle (*Cirsium vulgare*), Italian thistle (*Carduus pycnocephalus*), rattlesnake grass (*Briza maxima*), little rattlesnake grass (*Briza minor*), foxtail (*Hordeum murinum*), dandelion (*Taraxacum officinale*), Italian ryegrass (*Lolium multiflorum*), and wild mustards (*Brassica spp.* and *Hirschfeldia incana*).

Native grassland species include wild hyacinths, clovers (*Trifolium sp.*), ground iris (*Iris macrosiphon*), owl's clover, goldfields (*Lasthenia sp.*), blue wild-rye (*Elymus glaucus ssp. Glaucus*), purple needlegrass (*Nassella pulchra*), melic grass (*Melica californica*), creeping wildrye (*Leymus triticoides*), and annual fescue (*Vulpia microstachys*).

Project sites in this habitat are generally found in upland areas that are now predominately converted to urban development, such as San Marin and San Ramon creeks in Novato, the Castro and Mabry ditches in Santa Venetia, and the Sutton Manor area of Mill Valley.

Northern Coastal Salt Marsh

Northern coastal salt marsh is defined by fluctuating water and salinity levels. The dominant plants are those that have adapted to tolerate high salt levels. There are three main parts to the salt marsh, with each part containing different mixes of species: low, middle, and high, though these parts intergrade depending on topography.

Few plants can tolerate the salinities present in the low marsh areas, generally defined as the area between mean sea level to mean high water (Baye et al 2000). Native Pacific cordgrass (*Spartina foliosa*), nonnative (and invasive) smooth cordgrass (*Spartina alterniflora*), and annual pickleweed (*Salicornia europaea*) can be found in the low marsh zone where salinities are highest.

Mid-marsh zones are dominated by pickleweed (*Salicornia virginica*) but also include native species such as saltgrass (*Distichlis spicata*), Pacific cordgrass (*Spartina foliosa*), salt marsh

dodder (*Cuscuta salina*), jaumea (*Jaumea carnosa*), spear scale (*Atriplex triangularis*), and alkali-heath (*Frankenia salina*). Nonnative dense-flowered cordgrass (*Spartina densiflora*) is also common to the middle zones.

Natural upper marsh habitats such as upland marsh edges or ecotones are no longer common, with much urban development taking their place. Human-made areas of high marsh include levee banks which often significantly shorten the area available. Characteristic native species in the upper marsh include gumplant (*Grindelia stricta* var. *angustifolia*), sea lavender (*Limonium californicum*), saltgrass (*Distichlis spicata*), spear scale (*Atriplex triangularis*), alkali-heath (*Frankenia salina*), cattails (*Typha spp*), and salt rush (*Juncus lesueurii*). Nonnative species include pepper grass (*Lepidium latifolium*) and fennel (*Foeniculum vulgare*)

Project sites in this habitat are found in the tidal reaches of the following creeks: Rush, Novato, Warner, Gallinas, Corte Madera, East, West, Almont Marsh, Arroyo Corte Madera del Presidio, and Coyote Creeks in East Marin, and in Easkoot Creek at Bolinas Lagoon upstream almost to Calle de Pinos in West Marin.

Diked Baylands

Formerly tidally-influenced salt marsh, some baylands along San Pablo Bay were diked in order to reclaim land for pasture and hayfields in the late 1800's (Baye 2000). Now severed from natural tidal processes by levees and water control structures, these diked baylands constitute a mixed community. The construction of levees and inland ditches, along with the locations of natural tidal creeks, diverse topography, differing quantities of peat, varying amounts of freshwater inputs, and varying amounts of saltwater intrusion result in a patchwork of plants, some more characteristic of salt marsh and others more characteristic of brackish or freshwater marsh (Baye 2000).

Past uses of the diked lands as pasture and nonnative hay fields have resulted in largely nonnative weedy species composition. These areas do not generally support important salt marsh species such as Pacific cordgrass (*Spartina foliosa*), Mason's lilaepsis (*Lilaeopsis masonii*), smooth goldfields (*Lasthenia glabrata*).

In the more saline areas, native species such as saltgrass (*Distichlis spicata*), pickleweed (*Salicornia virginica*), alkali-heath (*Frankenia salina*), spear scale (*Atriplex triangularis*), dodder (*Cuscuta salina*), alkali bulrush (*Scirpus maritimus*) and cattails (*Typha spp*) are common.

Species common to the brackish habitats include Baltic rush (*Juncus balticus*), goosefoot (*Chenopodium berlandieri*), purslane (*Sesuvium verrucosum*), dock (*Rumex crispus*), barley (*Hordeum marinum* var. *gussoneanum*), poison hemlock (*Conium maculatum*), sago pondweed (*Potamogeton pectinatus*), and rabbitfoot grass (*Polypogon monspeliensis*).

Native freshwater species such as popcorn flower (*Plagiobothrys stipitatus*), toad rush (*Juncus bufonius*), flowering quillwort (*Lilaea scilloides*), and nonnative species such as

brass-buttons (*Cotula coronopifolia*), dittrichia (*Dittrichia graveolens*), bird's foot trefoil (*Lotus corniculatus*), oat bent-grass (*Agrostis avenacea*), wild mustards (*Brassica spp. and Hirschfeldia incana*), loosestrife (*Lythrum hyssopifolia*), and sweet fennel (*Foeniculum vulgare*) may be found in areas of diked baylands.

Project sites in this habitat are found in stream reaches and baylands now behind levees and tidegates: Arroyo de San Jose, Baccaglio Basin, Lynwood Slough, Pacheco, Ryan, and various sites within Santa Venetia.

North Coast Riparian Scrub/Forest

Riparian habitats are found on gravelly stream banks. Dominate tree species are willow (*Salix sp.*) and alders (*Alnus sp.*). Other tree and shrub species include western sycamore (*Platanus racemosa*), bigleaf maple (*Acer macrophyllum*), cottonwood (*Populus fremontii*), box elder (*Acer negundo californicum*), elderberry (*Sambucus caerulea*), California bay laurel (*Umbellularia californica*), and valley oak (*Quercus lobata*). Understory species commonly include horsetail (*Equisetum sp.*), lady fern (*Athyrium filix-femina* var. *cyclosum*), California blackberry (*Rubus vitifolius*), creeping snowberry (*Symphoricarpos albus* var. *laevigatus*), and poison oak (*Toxicodendron diversilobum*). Nonnative species such as Himalayan blackberry (*Rubus armeniacus*) and periwinkle (*Vinca minor*) are common understory species.

Most of the project sites included in the Program are in riparian habitat, which is generally found in the non-tidal reaches of creeks: Novato Creek, Arroyo de San Jose, Pacheco Creek, Miller Creek, and Nyhan Creek in East Marin and Easkoot Creek upstream of Highway 1 in West Marin.

Mixed Evergreen Forest

This community is dominated by broadleaved evergreen trees. Coast live oak (*Quercus agrifolia*) and California bay (*Umbellularia californica*) are the dominant canopy species; understory species include madrone (*Arbutus menzeisii*), bigleaf maple (*Acer macrophyllum*), California blackberry (*Rubus vitifolius*), poison oak (*Toxicodendron diversilobum*) and sword fern (*Polystichum munitum*). Black oak (*Quercus kelloggii*), chinquapin (*Chrysolepis chrysophylla*), California huckleberry (*Vaccinium ovatum*) and wild rose (*Rosa gymnocarpa*), and are also common species in this community.

Project sites in this habitat are found in Crest Marin Creek in Mill Valley and at the Thompson trash rack, Meadow Way trash rack, and La Pasada inlet in Santa Venetia.

3.0 SPECIAL-STATUS BIOLOGICAL RESOURCES

Prior to conducting fieldwork, the California Natural Diversity Data Base (CNDDB) (CDFG 2011) was reviewed for the most recent distribution information for special-status plant and animal species within the Petaluma River, Novato, San Rafael, San Quentin, Point Bonita, and Bolinas quadrangles.

Other information on special-status plant species was compiled through a review of the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Plants of California* (CNPS 2010), the California Department of Fish and Game's (CDFG) *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (CDFG 2010a) and *Special Vascular Plants, Bryophytes, and Lichens List* (CDFG 2010b), and the U.S. Fish and Wildlife Service's (USFWS) *Endangered and Threatened Plant and Animal Taxa; Proposed Rule* (USFWS 1996a, 1999b). Also reviewed for special-status plant occurrences was *Marin Flora* (Howell et al. 2007).

Additional information on special-status animal species was compiled through a review of the CNDDB (CDFG 2011), CDFG's *State and Federally Listed Endangered and Threatened Animals of California* (CDFG 2010c), *Special Animals List* (CDFG 2009), and California Wildlife Habitat Relationship System (CDFG 2008), and USFWS's *Endangered and Threatened Wildlife and Plants* (USFWS 1996a, 1999b).

3.1 Special-Status Plants

Special-status plant species include those listed as Endangered, Threatened, Rare or those species proposed for listing by the USFWS (2001b), the CDFG (2010a,b) and the CNPS (2010). The CNPS listing is sanctioned by the CDFG and serves essentially as their list of "candidate" plant species. CNPS List 1B and List 2 species are considered eligible for state listing as endangered or threatened under the CDFG Code. Such species should be fully considered during preparation of environmental documents subject to the California Environmental Quality Act (CEQA). CNPS List 3 and List 4 species are considered to be either plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS and CDFG recommend that these species be evaluated for consideration during the preparation of CEQA documents.

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites (Appendix A). Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed; all are species of concern.

Based on a reconnaissance-level survey and habitat assessment, many of the 33 species with at least some potential to occur within the region can be ruled out from the work sites due to the lack of suitable habitat within the project corridor. Specialized habitats such as playas, coastal dunes, lower montane coniferous forest, vernal pools, coastal bluff scrub, coastal

prairie, and serpentine-derived soils or outcrops are not present within the study area or work sites.

Although location data for several special-status plant species places them within the study corridor, the presence of some of these within the work sites remains highly unlikely. In many cases, the location data from CNDDDB represent historic data from the time period before large-scale development. In other cases, the CNDDDB data represent best guesses as to location, and while shown as covering our project sites, the required habitat may not be present within the work sites.

Nevertheless, certain special-status plant species, have at least some potential to occur within some of the project sites, and cannot be ruled out without appropriately timed, focused botanical surveys, if work is occurring in these specific habitat types.

Special Status Plant Species

The following is a brief discussion of the four special status plant species noted in Appendix A for additional analysis. These species are considered to have some potential to occur within one or more of the work sites, due to the presence of suitable habitat, the plant was detected during the site reconnaissance, and/or the species has been reported within the vicinity of the work sites.

Point Reyes bird's-beak (*Cordylanthus maritimus ssp. palustris*)

STATUS. Point Reyes bird's beak is a federal species of special concern and is listed by the CNPS as 1B.

PROJECT SITE OCCURRENCE. The CNDDDB lists 42 occurrences of Point Reyes bird's beak in Marin County; the majority of these are on the western coast. Sites near CNDDDB occurrences include: 3-BM, 3-MIL-3, 3-RYC-1, 3-SUT-1, 5-EAS-1, 5-EAS-2, 5-EAS-3.

SPECIES ACCOUNT. The species has recently had a name change; CNPS now refers to the Point Reyes bird's beak as *Chloropyron maritimum ssp. palustre*. It is an annual plant that grows in coastal salt marsh from Oregon to California. In Marin, there are populations along the coast and San Pablo Bay. The plant blooms June to October.

POSSIBLE IMPACTS. Point Reyes bird's beak may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and maintenance, and repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing, and temporary loss of habitat which may result in disturbance or mortality.

Pale Yellow/Hayfield tarplant (*Hemizonia congesta ssp. congesta*)

STATUS. The pale yellow tarplant is not listed by the federal or state governments but is listed by the CNPS as 1B.

PROJECT SITE OCCURRENCE. The CNDDDB lists a record in Ignacio near sites 1-ASJ-1, 1-ASJ-2, and 1-ASJ-3.

SPECIES ACCOUNT. An annual herb, the pale yellow tarplant grows in coastal scrub/valley and foothill grassland habitats, and sometimes roadsides. The plant blooms from April to November. The petals are almost white, in contrast to the yellower petals of the closely related, but not listed, *Hemizonia congesta ssp. lutescens*; with which it hybridizes.

POSSIBLE IMPACTS. Pale yellow tarplant may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and maintenance, and repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing, and temporary loss of habitat which may result in disturbance or mortality.

Marsh microseris (*Microseris paludosa*)

STATUS. The marsh microseris is not listed by the federal or state governments but is listed by the CNPS as 1B.

PROJECT SITE OCCURRENCE. The CNDDDB lists occurrences in the vicinity of sites: 3-CAS, 3-ACMP-3, and 9-LAR-2.

SPECIES ACCOUNT. The marsh microseris is a perennial herb that grows in moist grassland or open woods in closed-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland. The plant blooms from April to July. It is endemic to California and ranges from Marin County and San Francisco Bay Area south along the central coast to Santa Barbara.

POSSIBLE IMPACTS. Marsh microseris may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and maintenance, and repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing, and temporary loss of habitat which may result in disturbance or mortality.

Marin knotweed (*Polygonum marinense*)

STATUS. Marin knotweed is a federal species of special concern and is listed by the CNPS as 3 (needing taxonomic review).

PROJECT SITE OCCURRENCE. The CNDDDB contains record for Marin knotweed on Corte Madera Creek, just downstream of site 9-CMC-1 and at the creek mouth.

SPECIES ACCOUNT. The Marin knotweed is an annual herb that grows in coastal salt or brackish marshes and swamps and blooms from April to October. Currently, there are fewer than twenty known occurrences. Its taxonomic status is uncertain; it is possibly a synonym of *P. robertii*, a non-native plant.

POSSIBLE IMPACTS. Marin knotweed may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and

maintenance, and repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing, and temporary loss of habitat which may result in disturbance or mortality.

3.2 Special-Status Wildlife

Special-status animal species include those listed by the USFWS under the federal Endangered Species Act (1996a, 1999b) and by the CDFG under the California Endangered Species Act (2009, 2010c). The USFWS officially lists species as either Threatened, Endangered, or as Candidates for listing. Additional species receive federal protection under the Bald Eagle Protection Act (*e.g.*, bald eagle, golden eagle), the Migratory Bird Treaty Act (MBTA) and state protection under CEQA §15380(d). All birds, except European starlings, English house sparrows, and rock doves (pigeons), are protected under the MBTA. In addition, many other species are considered by the CDFG to be Species of Special Concern; these are listed in Remsen (1978), Williams (1986), and CDFG (2009). Although such species are afforded no official legal status, they may receive special consideration during the CEQA review process. The CDFG further classifies some species under the following categories: "Fully Protected", "Protected birds" (CDFG Code §3511), "Protected mammals" (CDFG Code §4700), "Protected amphibian" (CDFG Code §5050 and Chapter 5, §41), "Protected reptile" (CDFG Code §5050 and Chapter 5, §42), and "Protected fish" (CDFG Code §5515). The designation "Protected" indicates that a species may not be taken or possessed except under special permit from CDFG; "Fully Protected" indicates that a species can be taken for scientific purposes by permit only (CDFG 2009). The Fish and Game Code §§3503, 3505, and 3800 prohibits the take, destruction or possession of any bird, nest or egg of any bird except English house sparrows and European starlings unless express authorization is obtained from CDFG.

Based on quad searches and special status species listings from federal and state agencies searches, 80 animal species have been identified as having some potential of occurring within the project sites (Appendix A). Of these, only 16 species, based on literature and database reviews and familiarity with local fauna, are considered likely to occur within the project sites. Eight of these are listed; eight others are species of concern. Those species with a moderate to high potential to occur, or those species prominent in the regulatory environment are discussed herein.

Special Status Wildlife Species

The following is a brief discussion of the special status wildlife species noted in Appendix A for additional analysis. These species are considered to have some potential to occur within one or more of the work sites, due to the presence of suitable habitat, the species was detected during the site reconnaissance, and/or the species has been reported within the vicinity of the work sites. Section 5.0 includes a discussion of each individual site and the potential to support those species discussed herein.

Invertebrates

Monarch butterfly (*Danaus plexippus*)

STATUS. The monarch butterfly is not federally or state listed; however, its roosting habitat is often reviewed under CEQA.

PROJECT SITE OCCURRENCE. The monarch butterfly is known to utilize the area near the two Easkoot Creek project sites for overwintering habitat from September to March (U.S. Department of the Interior 2002).

SPECIES ACCOUNT. Monarchs range from southern Canada, through North America and far into South America. They rely on the milkweed plant as a primary food source and for caterpillar hosting. The California coast is an important overwintering area for the monarchs west of the Rockies; migration starts in August and the butterflies are usually at the overwintering sites by October. The butterflies roost in trees and can form large aggregations with many individuals. Potentially suitable roosting habitat occurs adjacent to the Easkoot Creek project sites.

POSSIBLE IMPACTS. Proposed activities will not directly affect the butterflies but could produce disturbances and harassment to them. Most of the proposed maintenance activities will occur before the butterflies migrate into the area. Impacts can be avoided by completing work at the Easkoot Creek sites before September 1; otherwise, potential impacts can be mitigated by checking the sites for presence of monarchs, and if detected, allowing them to leave the area.

Fish

Central California Coast ESU Coho (*Oncorhynchus kisutch*)

STATUS. The Central California Coast ESU coho salmon (*Oncorhynchus kisutch*) is a federal and state endangered species. This ESU includes all naturally spawned populations of coho salmon from Punta Gorda in northern California south to the San Lorenzo River in central California (NOAA 2001). Critical habitat has been designated; for Marin County, critical habitat includes all river reaches draining to the Pacific Ocean (or bays) that are accessible to coho, as well as two rivers draining to San Pablo Bay: Arroyo Corte Madera del Presidio and Corte Madera Creek (DFG 2004).

PROJECT SITE OCCURRENCE. The project sites fall within the Central California Coast ESU, in particular the project sites on Easkoot, Arroyo Corte Madera del Presidio, and Corte Madera Creeks. While CNDDDB lists only one record in Marin, on Redwood Creek in the San Rafael quad, coho are known in several additional west-draining creeks in Marin County. In 2002, 82 juvenile coho were observed in Easkoot Creek (NPS 2003). While they were historically known to populate Arroyo Corte Madera del Presidio and Corte Madera Creek, coho have not been observed in those creeks since 1981 (Leidy 2007).

SPECIES ACCOUNT. Coho salmon are anadromous, growing and maturing in the ocean before returning to their natal freshwater streams to spawn. The first heavy rains of the season set off the coho spawning season, generally between November and January but could be as long as September to March (Bettelheim 2002). Suitable nest sites are often located at riffles and have small to medium sized gravel. After coho fry emerge from their eggs, they remain

in the freshwater creeks, feeding and growing until the next spring. The following spring, almost a year after their emergence, juvenile coho make a seaward migration downstream to the ocean, where they will spend approximately 1 ½ years before returning to spawn (Bettelheim 2002).

POSSIBLE IMPACTS. Reduction in water quality, increased water temperatures, degradation or destruction of instream habitat, increased sedimentation, and dewatering could cause direct mortality of adult or juvenile fish or eggs as well as impair reproductive success.

Central California Coast DPS Steelhead (*Oncorhynchus mykiss irideus*)

STATUS. The Central California Coast Distinct Population Segment steelhead is a federal threatened species and a state special animal. Critical habitat has been designated for the following creeks in Marin County: Estero Americano, Easkoot Creek, Corte Madera Creek, Larkspur Creek, Cascade Creek, Old Mill Creek, Ross Creek, San Anselmo Creek, Sleepy Hollow Creek, Tamalpais Creek, Arroyo Corte Madera del Presidio. Novato Creek was proposed for critical habitat designation but was excluded due to an economic analysis by the Fish and Wildlife Service (USFWS 2005).

PROJECT SITE OCCURRENCE. There are no CNDDDB records in the project quads, but Central California Coast steelhead are known to occur in Easkoot Creek (NPS 2002), and Novato Creek, Miller Creek, Gallinas Creek, Corte Madera Creek, Arroyo Corte Madera del Presidio, and Coyote Creek watersheds (Leidy 2007), although current habitat quality, availability, and accessibility, and thus population sizes, have been drastically reduced compared to historic levels.

SPECIES ACCOUNT. Steelhead trout are born in freshwater streams, where they mature and grow for 1-3 years before migrating to the ocean. They spend from 1-4 growing seasons in the ocean, where most of their growth occurs (USFWS 2010a). The fish then return to their natal streams to spawn. Spawning usually occurs from November to February. Steelhead require cool, clean water in streams that contain adequately sized spawning gravels, instream cover, and intact riparian forests for shading. Downed trees, rootwads, and undercut banks provide important habitat elements for steelhead, which must provide cover and low stream velocities as the fish are not strong enough to withstand heavy currents. Water quality and quantity are important habitat requirements for steelhead (Leidy 2000).

POSSIBLE IMPACTS. Reduction in water quality, increased water temperatures, degradation or destruction of instream habitat, increased sedimentation, and dewatering could cause direct mortality of adult or juvenile fish or eggs as well as impair reproductive success.

Amphibians

California red-legged frog (*Rana draytonii*)

STATUS. California red-legged frog is a federal threatened species and a California species of special concern. Critical habitat has been designated; however, no areas within the selected quads are within the critical habitat designation.

PROJECT SITE OCCURRENCE. In Marin County, red-legged frogs are more common in western than eastern Marin. Within the project site, the greatest potential for red-legged frogs is at the Easkoot Creek work sites.

SPECIES ACCOUNT. Optimal habitat includes ponds, stream courses, and permanent pools with largely intact emergent or shoreline vegetation, such as cattails, tules or willows, and absence of competitors/predators such as bullfrogs and largemouth bass. The species breeds in stock ponds, pools, and slow-moving streams with emergent vegetation for cover and egg attachment. Red-legged frogs have been found in less-optimal habitat such as concrete-lined pools, isolated wells, stock ponds absent of shoreline vegetation, and in refuse piles near ponds.

POSSIBLE IMPACTS. This species may be exposed to impacts during project implementation including sediment and debris removal, vegetation management and maintenance, repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing of nests and young, and temporary loss of breeding habitat which may result in disturbance or mortality.

Reptiles

Northwestern pond turtle (*Clemmys (Actinemys) marmorata marmorata*)

STATUS. The northwestern pond turtle is a candidate for federal listing; the state lists it as a species of concern. No critical habitat has been designated.

PROJECT SITE OCCURRENCE. There are seven CNDDDB records in the selected quads, five are north of the Petaluma River, one is well outside our project site in Redwood Creek, and one is at Phoenix Lake. None of the occurrences are located on or near the project sites.

SPECIES ACCOUNT. There are two subspecies of western pond turtle, with a zone of intergradation occurring from the San Joaquin Valley east to the San Francisco Bay Area. The northwestern pond turtle (*C. m. marmorata*) is the subspecies that occurs in Marin County (Michaud 2008). The southwestern pond turtle (*C. m. pallida*) fills out the southern range. Pond turtles have been observed in slow-moving streams, lakes, reservoirs, wetlands, stock ponds, and sewage treatment plant ponds. Their preferred aquatic habitat includes refugia such as undercut banks, submerged vegetation, rocks, logs, and mud banks; turtle densities can be higher with greater availability of basking sites (Jennings and Hayes 1994). Pond turtles are known to utilize upland terrestrial habitats, most often during the summer for mating, egg-laying, and overland dispersal, and in winter for overwintering (Holland 1994).

POSSIBLE IMPACTS. This species may be exposed to impacts during project implementation includes sediment and debris removal, vegetation management and maintenance, repair, rehabilitation, and replacement of structures. Impacts may include habitat degradation, trampling or crushing of nests and young, and temporary loss of breeding habitat which may result in disturbance or mortality.

Birds

California clapper rail (*Rallus longirostris obsoletus*)

STATUS. The California clapper rail is a federal and state listed endangered species. No critical habitat has been designated.

PROJECT SITE OCCURRENCE. Clapper rails have been reported in Bolinas, Petaluma River, Novato, San Rafael, and San Quentin quads. This species nests and forages in tidal wetlands with pickleweed, cordgrass, and bulrush

SPECIES ACCOUNT. California clapper rails occur almost exclusively in tidal salt and brackish marshes dominated by dense stands of cordgrass and pickleweed, with unrestricted daily tidal flows, well developed tidal channel networks, and suitable nesting and escape cover during extreme high tides. They utilize the lower marsh zone, typically consisting of sparse vegetation and tidal sloughs, for foraging, and the upper marsh zone, typically consisting of dense vegetation, for cover, breeding and high tide refugia (Albertson and Evens 2000). Networks of tidal channels are the most important element of foraging habitat, where they feed on invertebrates including mussels, clams, crabs, snails, insects and fish (Albertson and Evens 2000). Nests are constructed about 2 ft above the ground and generally within 10 ft of active channels or open bay water (Shuford 1993). The nests are often accessed through tunnels in the vegetation for additional protection.

The breeding season for California clapper rails extends from February to August, with most nesting activity typically between March and May. The birds are most active at sunrise and sunset.

Based on known occurrences and the presence of suitable habitat within or adjacent to several of the work sites, California clapper rail could potentially occur in certain project sites in the lower creek systems of Novato Creek, South Fork of Gallinas Creek, and Bothin Marsh.

At other project locations, the presence of this species is highly unlikely.

POSSIBLE IMPACTS. The most likely impact to California clapper rail is noise disturbance from maintenance activities. Sediment removal at approximately 15 sites may directly impact pickleweed and other salt marsh vegetation.

California black rail (*Laterallus jamaicensis coturniculus*)

STATUS. The California black rail is a federal species of concern and is listed as state threatened. No critical habitat has been designated.

PROJECT SITE OCCURRENCE. This species nests and forages in tidal emergent marshes with pickleweed and cordgrass. According to CNDDDB records, there are 18 occurrence records within the selected project quads.

SPECIES ACCOUNT. The California black rail is a year-round resident in the greater Bay Area. They are elusive birds and are more likely heard than seen. They are the smallest of the rails, about 5-6 inches in length. The species occurs in the higher elevation zones of tidal

salt marsh heavily vegetated with pickleweed, and freshwater and brackish marshes. These rails are strongly associated with areas of active tidal influence and avoid diked bayland areas that might contain stagnant water (Shuford 1993). Their nests are platforms in grasses or pickleweed that are generally as close to the ground as possible while staying above high tide; the nests are well-concealed from the sides and from above.

The California black rail has been reported throughout eastern Marin County (CDFG 2010c), within the vicinity of several of the work sites. As such, the California black rail is considered to be moderately likely to occur within or adjacent to these work sites.

POSSIBLE IMPACTS. The most likely impact to California black rail is noise disturbance from maintenance activities. Sediment removal at approximately 15 sites may directly impact pickleweed and other salt marsh vegetation.

Northern spotted owl (*Strix occidentalis caurina*)

STATUS. The northern spotted owl is a federal threatened species; critical habitat has been designated, but there is no designated habitat in Marin County.

PROJECT SITE OCCURRENCE. This species prefers to nest in older growth redwood/Douglas fir forests. One project site (9-LAR-2) is within 250 ft of a known (past) territory on Larkspur Creek; 7 other territories are approximately 1/5 to 1/3 of a mile from project sites on Bothin, Ross, Warner Canyon, Arroyo Corte Madera del Presidio, Old Mill, and Reed Creeks. In most cases, the maintenance activities take place amidst residential development; with territories upslope of the creek and residential zone.

SPECIES ACCOUNT. The range of the spotted owl extends from southwest British Columbia through the Cascade Mountains, coastal ranges, and intervening forested lands in Washington, Oregon, and California, as far south as Marin County (USFWS 2010b). Spotted owls generally rely on older forested habitats because these forests contain the structural complexity, presence of deadwood and snags, high canopy closure and density characteristics required for nesting, roosting, and foraging, though foraging habitat may also include areas with less structural diversity and less canopy cover. In Marin County, the owls prefer Douglas-fir, and redwoods, but they also use Bishop pine and mixed evergreen-deciduous hardwood forests.

Local land agencies (MMWD, MCOSSD, NPS) contract with the Point Reyes Bird Observatory to conduct yearly surveys for northern spotted owls; observations are submitted to CNDDDB.

POSSIBLE IMPACTS. The most likely routine maintenance impact during the non-breeding season would be noise-related. To avoid impacts, maintenance activities should be scheduled to avoid the nesting season of February through July, or, if owls are detected during site reconnaissance, handtools should be used rather than power tools.

Raptors and Wading Birds

Special-status raptors that have potential to occur within or adjacent to the project site include northern harrier (*Circus cyaneus*), a state species of concern, and white-tailed kite

(*Elanus caeruleus*), a California Fully Protected Species and federal Special Concern Species. Northern harriers prefer marshy areas and are often seen along San Pablo Bay from Santa Venetia to Novato. They nest in Point Reyes and near the Petaluma River, mostly in grass or cattails in wet meadows, or near lakes and streams. White-tailed kites are tree nesters (nests are approximately 20 ft above the ground); the breeding population in Marin County is very low (Shuford 1993).

Burrowing owls (*Athene cunicularia hypugaea*), a federal and state species of special concern, nest in abandoned rodent burrows in areas of sparse vegetation, often on levees. They are not known at the sites, and there are no CNDDDB occurrence records for burrowing owls on or near the sites.

Special-status water and wading birds that have potential to occur within or adjacent to the project site include the great egret (*Casmerodius albus*), great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and black-crowned night heron (*Nycticorax nycticorax*). The great egret and great blue heron nest in rookeries in tall trees and secluded areas on marshes, such as Audubon Canyon Ranch at Bolinas Lagoon. The snowy egret and black-crowned night heron nest on West Marin Island, in San Pablo Bay offshore from San Rafael. Green herons (*Butorides virescens*) are known to occur within the project site.

POSSIBLE IMPACTS. The most likely routine maintenance impact during the non-breeding season would be noise-related. To avoid impacts, maintenance activities should be scheduled to avoid the nesting season of February through July, or, if owls are detected during site reconnaissance, handtools should be used rather than power tools.

Passerine and Non-passerine Landbirds

Nesting birds, their nests, and eggs are fully protected by the California Fish and Game Code (Sections 3503, 3503.5) and the Migratory Bird Treaty Act of 1918 (MBTA). The MBTA protects over 800 species, including geese, ducks, shorebirds, raptors, songbirds, and many relatively common species. Destruction or disturbance of a nest is a violation of these regulations and is considered a potentially significant impact. Nesting season is typically considered to extend from February 15th through August 31st in a particular year.

Special-status passerines and non-passerine landbirds that have potential to occur within or adjacent to the project site include saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), San Pablo song sparrow (*Melospiza melodia samuelis*), oak titmouse (*Baeolophus inornatus*), and Nuttall's woodpecker (*Picoides nuttallii*).

In California, yellowthroats are found in freshwater marshes, coastal swales, swampy riparian thickets, brackish marshes, salt marshes, and the edges of disturbed weed fields and grasslands that border soggy habitats (Shuford 1993). In the San Francisco Bay region as a whole, about 60% of yellowthroats breed in brackish marsh, 20% in riparian woodland/swamp, 10% in freshwater marsh, 5% in salt marsh, and 5% in upland vegetation (Hobson *et al.* 1986, Shuford 1993). While a year round resident of Marin County, they are not known to breed in or near the project sites.

San Pablo song sparrows prefer tidal salt marshes with pickleweed. They make nest cups either in depressions on the ground or up to 3 ft high in vegetation; these nests may be on

ditch banks. There are several CNDDDB records ranging from Novato Creek to Arroyo Corte Madera del Presidio.

Oak titmouse, a year-long resident of Marin County, prefers dry, open oak woodlands. They are cavity nesters; nests are normally 3-32 ft above the ground.

Nuttall's woodpecker prefers willow riparian and oak woodlands that are generally more open than dense; they nest in tree cavities in dead limbs or trunks, usually 3-45 ft above the ground.

POSSIBLE IMPACTS. The most likely routine maintenance impact during the non-breeding season would be noise-related. To avoid impacts, maintenance activities should be scheduled to avoid the nesting season of February through July, or, if nests are detected during site reconnaissance, handtools should be used rather than power tools.

Mammals

Salt marsh harvest mouse (*Reithrodontomys raviventris*)

STATUS. Salt marsh harvest mouse is a federal and state listed endangered species. Critical habitat has not been designated for this species.

PROJECT SITE OCCURRENCE. This species is found in saline emergent marsh with dense pickleweed. It is reported to occur within the project site in eastern Marin County. Lower reaches of Novato Creek levees, Gallinas Creek South Fork, Bothin Marsh sites. CNDDDB contains 12 records in Petaluma River, San Rafael, and San Quentin quads.

SPECIES ACCOUNT. The harvest mouse is a rodent endemic to the salt and brackish marshes of the San Francisco Bay Estuary and adjacent tidally influenced areas. The harvest mouse typically weighs about 0.35 ounce with body length ranging from 2.7-2.9 inches. They depend mainly on dense pickleweed (*Sarcocornia pacifica*) as their primary cover and food source. However, harvest mice may utilize a broader source of food and cover which includes saltgrass (*Distichlis spicata*) and other vegetation typically found in the salt and brackish marshes of this region. In natural systems, harvest mice can be found in the middle tidal marsh and upland transition zones. Upland refugia is an essential habitat component during high tide events. The split of the northern (*R. raviventris halicoetes*) and southern (*R. raviventris raviventris*) subspecies occurs in Marin County around Point Pedro, with the northern subspecies in Novato and Santa Venetia, and the southern subspecies in Corte Madera and Richardson Bay marshes.

POSSIBLE IMPACTS. The most likely impact to salt marsh harvest mouse is noise disturbance from maintenance activities. Sediment removal at approximately 15 sites may directly impact pickleweed and other salt marsh vegetation.

Special-Status Bats

There are 24 known species of bats in California, all of which are protected under CDFG Code 4150 as indigenous, non-game mammal species. Each of these species use mature trees, snags, crevices and/or man-made structures such as buildings or bridges for roosting. Bats are site faithful and will not abandon an established roosting area unless disturbed.

Hibernation and roosting areas depend on the location of the roost and the species; potential roosting areas in the vicinity of project components include mature trees, snags and crevices within rock faces. Most of these species are ubiquitous in a variety of habitats, although not in large numbers. However, they often require species-specific roost requirements in terms of temperature, humidity, access, dimensions and height of the roosting area from the ground.

The pallid bat (*Antrozous pallidus*), a California Species of Special Concern, is a bridge-roosting bat species that is considered to have some potential to occur within the project site, due to the presence of bridges at several of the work sites. The species ranges from British Columbia and Montana to central Mexico, and east to Texas, Oklahoma and Kansas in habitats ranging from rocky arid deserts to grasslands into higher elevation coniferous forests. Pallid bats are gregarious, and often roost in colonies up to several hundred individuals. Pregnant females gather in summer maternity colonies within warm rock crevices, abandoned mines, caves, hollow trees and in cavern-like building features (e.g. attics). Females give birth between May and July. Young are generally weaned in mid to late August. Maternity colonies disband between August and October. The bats are relatively inactive during the winter and are not known to migrate. Pallid bats roost in rock crevices, tree hollows, mines, caves, and a variety of anthropogenic structures, including vacant and occupied buildings. Tree roosting has been documented in large conifer snags (e.g. ponderosa pine), inside basal hollows of redwoods and giant sequoias, and bole cavities in oaks. They are primarily insectivorous, feeding on large prey taken on the ground, or sometimes in flight.

Townsend's western big-eared bat (*Plecotus townsendii townsendii*) is a federal and state Species of Special Concern. The species occurs in humid habitats throughout the west, and is distributed from British Columbia south along the Pacific coast to central Mexico and east into the Great Plains. It has been reported in a wide variety of habitat types including mixed forests, riparian communities, agricultural areas, and coastal habitats. Distribution is strongly correlated with the availability of caves and cave-like roosting habitat, with population centers occurring in areas dominated by exposed, cavity forming rock and/or historic mining districts. Summer maternity colonies range in size from a few dozen to several hundred individuals. Maternity colonies form between March and June (based on local climatic factors), with a single pup born between May and July. Males remain solitary during the maternity period. Winter hibernating colonies are composed of mixed-sexed groups which can range in size from a single individual to colonies of several hundred animals. Mating generally takes place between October and February in both migratory sites and hibernacula. Its habit of roosting on open surfaces makes it readily detectable, and it is often the species most frequently observed (commonly in low numbers) in caves and abandoned mines throughout its range. It has also been reported to utilize buildings, bridges, rock crevices and hollow trees as roost sites. Foraging associations include: edge habitats along streams and areas adjacent to and within a variety of wooded habitats. It often travels large distances while foraging, including movements of over 10 miles during a single evening. It is a moth specialist with over 90% of its diet composed of lepidopterans.

Additionally, four tree-roosting myotis bat species are also considered to have some potential to occur within the project site due the presence of suitable tree and riparian

habitat. These species include long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), and Yuma myotis (*Myotis yumanensis*), all Federal Species of Concern. Most of these species utilizes tree cavities, hollows in tree snags, and exfoliating bark. The long-eared myotis will also roost under bridges. Fringed, long-eared, and long-legged myotis bats are less likely to be present in marsh/riparian vegetation (such as that which occurs in the proposed project site) and more likely to be found in mixed hardwood conifer/conifer habitat at higher elevations.

The Western red bat (*Lasiurus blossevillii*), a species of concern by the California Department of Fish and Game, roosts in riparian vegetation in Marin County.

There is potential for the pallid bat, Townsend's western big-eared bat, and Yuma myotis bat to roost in culverts; however, the culverts within the proposed project sites are generally too smooth in texture to be suitable habitat for these bat species.

Pallid bat has been reported near the upper reaches of Lagunitas Creek (CDFG 2011), within one mile of some of the work sites. Given the known presence of these bat species in the region and the presence of suitable habitat at several of the work sites, these and several other bat species are considered to have a moderate potential to occur within or adjacent to these work sites.

POSSIBLE IMPACTS: Bats may be disturbed by noise during vegetation maintenance activities, and their nesting and roosting areas may be destroyed by vegetation removal activities (of standing dead trees and/or invasive species).

3.3 Wildlife Movement Corridors and Habitat Fragmentation

The ability of wildlife to move through the landscape is important for migration (seasonal breeding and feeding), dispersal (new home ranges and long-term genetic exchange), and for daily movement within individual territories.

Habitat fragmentation creates a greater number of habitat patches that are smaller in size than the original contiguous habitat. This, in turn, can hinder regional wildlife movements, put stress on local populations, and increase the probability of extinction for these populations compared to those associated with non-fragmented landscapes. Considering the impacts resulting in potential fragmentation of primary habitat types and loss of valuable dispersal corridors is important when assessing the biological impacts of a project.

Because the activities proposed do not involve the loss of wetland and/or riparian habitat within the work sites, they are not likely to affect wildlife movement corridors or contribute to habitat fragmentation. Given that the proposed work is maintenance-related, the project will likely only result in short-term temporal impacts (1-2 days) to movement for aquatic species dependent the subject habitats. Movement through these areas will be restored as soon as maintenance activities are completed.

3.4 Sensitive Natural Communities

Sensitive natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection (*i.e.*, §404 of the Clean Water Act and/or the §§1600 *et seq.* of the California Fish and Game Code).

Within the project sites, two sensitive natural communities have the potential to be affected by project activities: northern coastal salt marsh and coastal brackish marsh (CDFG 2011). These communities are found within or adjacent to some of the project sites and are expected to fall under federal and/or state jurisdictions as wetlands or waters of the U.S. or waters of the state.

3.5 Wetlands and Other Waters of the U.S.

Wetlands and other aquatic resources such as riparian areas and certain aquatic vegetation communities are considered sensitive biological resources and can fall under the jurisdiction of several regulatory agencies. For a longer discussion of jurisdictional waters, please see Section 6.0

Wetlands are generally defined by the USACE as “those areas that are inundated or saturated by surface or ground water... that under normal circumstances support a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3 [b]). Indicators of three wetland parameters determined by field investigation must be present for a site to be classified as a wetland by the USACE; these are hydric soils, hydrophytic vegetation, and wetlands hydrology.

Approximately 17 sites have been initially identified as possibly meeting the USACE definition of wetlands. A formal wetlands delineation for those sites will be completed in before seeking USACE permits. The following paragraphs set out the process which will be used to make the determinations.

Hydrophytic Vegetation

Hydrophytic vegetation includes those plant species that possess physiological features or reproductive adaptations that allow them to persist in soils subject to prolonged inundation and anaerobic soil conditions. Plant species are classified by their probability of being associated with wetlands or uplands. Obligate (OBL) species almost always (>99% of the time) occur in wetlands. Facultative Wetland (FACW) species occur in wetlands 67-99% of the time. Facultative (FAC) species have an equal probability 33-66% to occur in wetlands. Facultative Upland (FACU) and Obligate Upland (UPL) species occur in wetlands 1-33% and <1% of the time, respectively. A project site will meet this criterion if more than 50 percent of the dominant plant species in each of the strata are OBL, FACW, or FAC indicator species. Table 1 lists common wetland plant species and their indicator status.

Table 1.
Wetland Indicator Status of Common Plant Species
Detected Within and Adjacent to Potential Wetlands

| <i>Scientific Name</i> | <i>Common Name</i> | <i>Indicator Status</i> |
|---|----------------------------|-------------------------|
| <i>Alnus rubra</i> | red alder | FACW |
| <i>Athyrium felix-femina</i> var. <i>cyclosorum</i> | lady fern | FAC |
| <i>Atriplex patula</i> | spearscale | FACW |
| <i>Baccharis douglasii</i> | herb | OBL |
| <i>Cotula coronopifolia</i> ¹ | African brass-buttons | FACW+ |
| <i>Distichlis spicata</i> | saltgrass | FACW |
| <i>Epilobium ciliatum</i> ssp. <i>ciliatum</i> | northern willow herb | FACW |
| <i>Frankenia salina</i> | alkali heath | FACW- |
| <i>Grindelia stricta</i> | marsh gum-plant | FACW |
| <i>Holcus lanatus</i> ¹ | velvet grass | FAC |
| <i>Jaumea carnosa</i> | jaumea | OBL |
| <i>Juncus balticus</i> | wire rush | OBL |
| <i>Juncus effusus</i> | common rush | OBL |
| <i>Juncus xiphioides</i> | iris-leaf rush | OBL |
| <i>Mentha piperata</i> ¹ | peppermint | OBL |
| <i>Mentha pulegium</i> ¹ | pennyroyal | OBL |
| <i>Mimulus guttatus</i> | common large monkey-flower | OBL |
| <i>Picris echioides</i> ¹ | bristly ox-tongue | FAC* |
| <i>Polygonum punctatum</i> | water smartweed | OBL |
| <i>Polypogon monspeliensis</i> ¹ | rabbitfoot grass | FACW+ |
| <i>Potentilla anserina</i> ssp. <i>pacifica</i> | silverweed | OBL |
| <i>Rubus discolor</i> ¹ | Himalayan blackberry | FACW* |
| <i>Rubus parviflorus</i> | thimbleberry | FAC+ |
| <i>Rubus ursinus</i> | California blackberry | FACW* |
| <i>Rumex crispus</i> ¹ | curly dock | FACW- |
| <i>Rorippa nasturtium-aquaticum</i> | watercress | OBL |
| <i>Salicornia virginica</i> | pickleweed | OBL |
| <i>Salix lasiolepis</i> | arroyo willow | FACW |
| <i>Salix lucida</i> var. <i>lasiandra</i> | lance-leaf willow | OBL |
| <i>Scirpus microcarpus</i> | small-headed rush | OBL |
| <i>Scirpus robustus</i> | prairie bulrush | OBL |
| <i>Stachys chamissonis</i> | coast hedge-nettle | OBL |
| <i>Typha angustifolia</i> | narrow-leaf cattail | OBL |
| <i>Typha latifolia</i> | broad-leaf cattail | OBL |
| <i>Urtica dioica</i> ssp. <i>holosericea</i> | hoary nettle | FACW |
| <i>Veronica anagallis-aquatica</i> ¹ | water speedwell | OBL |

¹ indicates non-native species

Soils

A list of soil units mapped within the work sites and supporting potentially jurisdictional wetlands or other waters is presented in Table 2. Soils are indicated where listed as hydric in Marin County (USDA 1985).

Table 2. Soils Mapped at the Work Sites

| Map Series Name | Unit and Phase | Hydric |
|---|-----------------|--------------------|
| Ballard-Urban Land Complex | 0 - 9% slopes | Yes, drainageways |
| Blucher-Cole Complex | 2 - 5% slopes | Yes, alluvial fans |
| Bressa Variant-Mcmullin Variant Complex | 30 - 50% slopes | No |
| Cortina Gravelly Sandy Loam | 0 - 5% slopes | Yes, depressions |
| Cronkhite-Barnabe Complex | 15 - 30% slopes | No |
| Cronkhite-Barnabe Complex | 30 - 50% slopes | No |
| Cronkhite-Barnabe Complex | 50 - 75% slopes | No |
| Dipsea-Barnabe Very Gravelly Loams | 50 - 75% slopes | No |
| Dipsea-Urban Land-Barnabe Complex | 30 - 50% slopes | No |
| Dune Land | Dune land | Yes, basin floors |
| Los Osos-Bonnydoon Complex | 30 - 50% slopes | No |
| Los Osos-Urban Land-Bonnydoon Complex | 15 - 30% slopes | No |
| Maymen-Maymen Variant Gravelly Loams | 30 - 75% slopes | No |
| Novato Clay | Novato clay | Yes, tidal marshes |
| Pits, Quarries | Pits, quarries | Yes, flood plains |
| Reyes Clay | Reyes clay | Yes, drainageways |
| Rock Outcrop-Xerorthents Complex | 50 - 75% slopes | No |
| Saurin-Bonnydoon Complex | 30 - 50% slopes | No |
| Saurin-Bonnydoon Complex | 50 - 75% slopes | No |
| Saurin-Urban Land-Bonnydoon Complex | 15 - 30% slopes | No |
| Saurin-Urban Land-Bonnydoon Complex | 30 - 50% slopes | No |
| Tocaloma-Mcmullin Complex | 15 - 30% slopes | No |
| Tocaloma-Mcmullin Complex | 30 - 50% slopes | No |
| Tocaloma-Mcmullin Complex | 50 - 75% slopes | No |
| Tocaloma-Mcmullin-Urban Land Complex | 15 - 30% slopes | No |
| Tocaloma-Mcmullin-Urban Land Complex | 30 - 50% slopes | No |
| Tocaloma-Saurin Association | Extremely steep | Yes, depressions |
| Tocaloma-Saurin Association | Steep | No |
| Tocaloma-Saurin Association | Very steep | Yes, depressions |
| Urban Land-Ballard Complex | 0 - 9% slopes | Yes, tidal flats |
| Urban Land-Xerorthents Complex | 0 - 9% slopes | Yes, tidal flats |
| Water | Water | No |
| Xerorthents, Fill | | No |
| Xerorthents-Urban Land Complex | 0 - 9% slopes | Yes, tidal flats |

Hydrology

Surface hydrology within the study corridor is influenced by direct precipitation, headwater flows, backwater flooding, sheet flow, surface seepage due to a high water table, the presence of poorly drained soils, tidal fluctuation, and surface runoff from surrounding areas. Runoff from adjacent roadways also contributes to on-site hydrology.

Portions of the Eastern Marin project sites are immediately adjacent to San Pablo Bay. Several perennial streams, including Novato Creek, Corte Madera Creek, Coyote Creek, and Arroyo Corte Madera del Presidio flow into San Pablo Bay. In Western Marin, Easkoot Creek flows directly into the Pacific Ocean. Numerous unnamed intermittent tributaries flowing mostly eastward from their origins on Inverness Ridge are also present within many of the work sites.

Jurisdictional Determination

The CDFG exercises jurisdiction over wetland and riparian resources associated with rivers, streams, and lakes under California Fish and Game Code Sections 1600 to 1607. The CDFG has the authority to regulate work that will substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed. The CDFG's jurisdiction along a river, stream, creek, or other water body is usually bounded by the top-of-bank or the outermost edges of riparian vegetation.

Because all of the project sites are part of aquatic systems that ultimately flow into the Pacific Ocean, all of them are expected to fall under regulation of the CDFG and RWQCB as waters of the State.

4.0 AVOIDANCE AND MINIMIZATION MEASURES

4.1 General Measures

General avoidance and minimization measures apply to each site, regardless of maintenance activity type or special status species that may be present.

GEN-1: Designation of Environmental Compliance Coordinator

An Environmental Compliance Coordinator (ECC) will be designated. The ECC shall have an understanding of biological resources, missions of regulatory agencies and regulations as they may affect listed species, and the nature of the maintenance activities.

Before commencement of a maintenance activity, the ECC will review project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he will determine appropriate measures to implement, based on the type of activity, and will prescribe appropriate avoidance and minimization measures and general and activity-specific conditions and prohibitions.

GEN-2: Assessment, Buffers, and Stop Work Orders

The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC will coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work should not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

GEN-3: Contractor Crew Training

The ECC will ensure that before work starts, all on-site maintenance activity personnel and contractors will receive instruction regarding the presence and description of listed species at each project site and the details of appropriate avoidance and minimization measures.

GEN-4: Site Preparation/Wildlife Reconnaissance

The ECC shall walk the site each day before maintenance activities commence to locate wildlife; if any special status wildlife species are noted, work will not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

All habitat improvements on salmon and steelhead streams shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (CDFG 2010d).

GEN-5: Monitoring and Reporting Program

The ECC will implement a monitoring and reporting program that shall include, but not be limited to: preparing each year's project list, scheduling pre-construction surveys, overseeing project activity during maintenance, preparing photo documentation, and evaluating post-maintenance restoration/revegetation, if necessary. Reporting regarding project impacts to California red-legged frogs will be performed in accordance with the terms and conditions issued by the USFWS.

GEN-6: Work Windows

To avoid impacts to special status species, the maintenance activities carried out should typically occur during the summer low flow season. In addition, species-specific work windows should be followed to avoid impacts. Table 3 shows the work windows for species that may be impacted by the proposed maintenance activities. Additional information can be found within the species-specific AMMS.

Monarch butterfly

Monarch butterflies are known to overwinter in areas adjacent to the Easkoot Creek project area. The work window is April 1st through August 31st; work after September 1st requires more vigilance.

Salmon and steelhead

Work in and around salmon and steelhead streams is restricted to the period of June 15th to October 15th or the first rains. This is to take advantage of low stream flow and avoid the spawning and egg/alevin incubation period in the fall and the outmigration period in spring. Work in non-salmonid streams may be conducted between April 15th and October 15th in each calendar year.

Upslope work generally occurs during the same period as stream work. Sediment reduction activities are dependent on soil moisture content and, in some areas, equipment access and effectiveness are constrained by wet conditions. .

The permissible work window for individual work sites will be further constrained as necessary to avoid adverse impacts to special-status species and the nesting or breeding seasons for native fish, birds, amphibians and terrestrial mammals. (see mitigation measures for specific timing of maintenance activities, by species)

California Red-legged frog, northwestern pond turtle, and salt marsh harvest mouse

There are no work windows for these species; surveys may be required if species may be impacted. See species-specific AMMs for survey requirements.

California clapper and black rails

The work window for activities within rail habitat is September 1st through January 31st.

Table 3. Work Windows

| | | RMA Work Season | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|--------------------------|-----------------|-------|----------|-------|-------|-------|-------|-------|------|-------|------|-------|------|-------|--------|-------|-----------|-------|---------|-------|----------|-------|----------|-------|--|
| Category | Species | January | | February | | March | | April | | May | | June | | July | | August | | September | | October | | November | | December | | |
| | | 1-15 | 16-31 | 1-15 | 16-28 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | 1-15 | 16-30 | 1-15 | 16-31 | |
| General | In-stream - no salmonids | | | | | | | | | | | | | | | | | | | | | | | | | |
| | In-stream - salmonids | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vegetation | Planting | | | | | | | | | | | | | | | | | | | | | | | | | |
| Invertebrate | Monarch butterfly | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fish | Salmonids | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amphibian | CA red-legged frog | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reptile | Northwestern pond turtle | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bird | Black and clapper rails | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Northern spotted owl | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Raptors and wading birds | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Landbirds | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Burrowing owl | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammal | Salt marsh harvest mouse | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Bats | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Species work window
 RMA work season

Raptors, wading birds, and migratory birds

The work window for sites with potential for raptor and migratory bird nesting is August 1st through November 30th; therefore, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. However, if work in the riparian zone or mowing of levees will occur between before July 31st the ECC will conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC should postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

Because the culverts in the proposed project sites are fairly small, there is minimal likelihood that they would provide suitable habitat for swallows. However, if any culverts show evidence of past or current swallow nesting, the ECC will identify them and maintenance activities will occur after August 31st or after all swallows have fledged to avoid impacts.

Roosting bats

The work window for activities at sites where bats are determined to be present is from March 1st through April 15th and September 1st through October 15th.

GEN-7: Trash Removal

During all activities at project sites, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following maintenance activities, all trash and maintenance debris shall be removed from work sites and disposed of properly.

GEN-8: Equipment Staging

Staging/storage areas for equipment, materials, fuels, lubricants, and solvents, will be located outside of the stream's high water channel and associated riparian area. Stationary equipment such as motors, pumps, generators, compressors, and welders located within the dry portion of the stream channel or adjacent to the stream, will be positioned over drip-pans. Equipment will be moved out of the normal high water area of the stream prior to refueling and lubricating. The ECC or crew supervisor shall ensure that contamination of habitat does not occur during such operations. Best Management Practices covering Chemical Use (Spill Prevention and Control), contained in the BASMAA Flood Control Facility Maintenance Best Management Practices Manual (BAASMA 2000) will be followed. These BMPs are designed to prevent the discharge of chemicals to flood control channels and storm drain systems and allow prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

The number of access routes, number and size of staging areas, and the total area of the work site activity shall be limited to the minimum necessary to complete the proposed activity.

GEN-9: Invasive Species

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.

For all activities in creeks and bay, all gear exposed to water should be allowed to dry for three days before being used again. Some disinfectants are OK to use per DFG and USFWS (users should check with those agencies). As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew will wash and dry them off-site prior to using them in another creek or tributary.

GEN-10: Water Quality

Any work using equipment within the stream channel shall be performed in isolation from the flowing stream. If there is any flow when the work is done, cofferdams should be constructed upstream and downstream of the excavation site to divert all flow from upstream of the upstream dam to downstream of the downstream dam. The cofferdams will be constructed with clean river gravel or sand bags and sealed with sheet plastic. Sand bags and any sheet plastic will be removed from the stream upon project completion. Clean river gravel may be left in the stream, but the cofferdams must be breached to return the stream flow to its natural channel.

For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures will be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a filter berm of clean river gravel, coir logs or their equivalent. Silt fences and other non-native materials will be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow.

Water quality will be protected through the use of sediment/erosion control measures, including sediment traps, turbidity curtains, silt fences, hay bales, hydro-seeding using a native mix, and use of seed-free straw mulch, as appropriate. These measures will be appropriately located to prevent transporting and depositing sediment disturbed during maintenance activities outside of the maintenance activity zone.

If it is necessary to divert flow around the work site, either by pump or by gravity flow, the suction end of the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997).

During dewatering, intakes and outlets of pumps should be designed to minimize turbidity and the potential to wash contaminants into the stream.

Any turbid water pumped from the work site itself to maintain it in a dewatered state shall be discharged in an upland location (e.g., vegetated upland area via flexible pipe) where it will be filtered before returning to the stream channel.

4.2 Avoidance and Minimization Measures for Plants

One avoidance and minimization measure covers listed and special status plants.

PLA-1: Special status plants

At sites where vegetation may be modified (such as mowing, clearing, or ground-breaking), and where special status plant species may potentially occur, a qualified biologist should conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000).

Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDDB documenting the species and location.

The ECC shall ensure that the Project Foreman is aware of these site-specific conditions, and will inspect the work site before, during, and after completion of the maintenance activities.

4.3 Avoidance and Minimization Measures for Invertebrates

INV-1: Monarch butterfly

The three Easkoot Creek project sites are adjacent to known overwintering sites for Monarch butterfly.

Avoidance will be accomplished if maintenance activities are scheduled for April 1st through August 31st

If work occurs during the butterfly overwintering season (October through March), the ECC should walk the area of proposed activity each day before maintenance activities begin to determine presence monarchs. If none are observed, avoidance can be assumed and work can proceed. If monarchs are observed within the site, work should not commence until all individuals have left the work site on their own.

4.4 Avoidance and Minimization Measures for Fish

The AMMs described below is designed specifically for coho salmon and steelhead trout, as these species are known to occur within some of the project sites, but the measures will also protect other fish species such as Chinook salmon, sturgeon, lampreys, and Sacramento splittail. There are two project sites at Easkoot Creek that may have coho salmon and several project sites in Easkoot Creek and creeks within the Novato Creek and Richardson Bay watersheds with steelhead trout.

FISH-1: Salmonids

If coho or steelhead are known to be absent from the project site based on CEMAR/DFG survey and there are long-standing natural or artificial downstream barriers sufficient to prevent upstream migration, then avoidance has been accomplished and no further actions are necessary.

If coho or steelhead are determined or presumed to be present in the project site, then the following Avoidance and Minimization Measures shall be implemented:

- All in-stream maintenance activities will be restricted to the low-flow period of June 15th through October 15th. Work above the top of bank or outside of the channel will not be subject to this modified work period.
- No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified biologist.
- To minimize turbidity and stress to special status species, personnel will avoid walking through stream pools and thalwegs, and will instead walk across riffles or outside of the stream bed to access a project site.
- To minimize disturbance during sediment removal activities, if there is flow or seepage in a work site, a reach of creek may have to be de-watered. Before construction of the de-watering system, a qualified biologist with appropriate permit(s) will conduct fish relocation activities, and immediately release captured fish to a suitable habitat near the project site.
- Screens shall be placed on all pumps used for dewatering the work site in accordance with NOAA Fisheries' Fish Screening Criteria for Anadromous Salmonids (NMFS, 1997).

- If used, coffer dams should be constructed upstream of the entire work site within the stream banks, and should be constructed with clean river gravel or sand bags and sealed with sheet plastic.
- Intakes and outlets should be designed to minimize turbidity and the potential to wash contaminants into streams.
- Pump discharge must be directed into a settling basin to allow silt removal. Once the project work is complete, water should slowly released back into the creek to prevent erosion and limit turbidity.

4.5 Avoidance and Minimization Measures for Amphibians

AMPH-1: California red-legged frog (CRLF)

CRLF absence is presumed for all project sites in eastern Marin. Therefore, impacts are avoided, and no further surveys, studies or CRLF protection measures are required and the maintenance activities can proceed.

For the Easkoot Creek sites, 5-EAS-1, 5-EAS-2 and 5-EAS-3, where there is potential for California red-legged frog to occur, pre-construction aquatic surveys should be conducted by a qualified biologist prior to the onset of any disturbance related activities, following the protocol outlined in the Revised Guidelines on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005):

- Pre-construction surveys should consist of two separate daytime and nighttime surveys extending 300 ft upstream and downstream (where feasible) of the proposed work sites. If special-status species are found, CDFG and/or USFWS should be contacted to determine what actions are to be taken. The 2005 Guidance recommends a total of up to eight (8) surveys to determine the presence of CRLF at or near a project site. Two (2) day surveys and four (4) night surveys are recommended during the breeding season; one (1) day and one (1) night survey is recommended during the non-breeding season. Each survey must take place at least seven (7) days apart. At least one survey must be conducted prior to August 15th. The survey period must be over a minimum period of 6 weeks (i.e., the time between the first and last survey must be at least 6 weeks). Throughout the species' range, the non-breeding season is defined as between July 1st and September 30th.
- If California red-legged frogs, tadpoles, or eggs are found, the appropriate state and federal agencies will be contacted to determine what actions should be taken. If the USFWS approves the moving of animals, the ECC shall be allowed sufficient time to move CRLF from the work site before maintenance activities begin. The USFWS should be contacted during the permitting phase to determine if additional measures would be required.
- The project sponsor shall designate a person, which may or may not be the ECC, to monitor on-site compliance as long as that individual has undergone training in CRLF identification. The monitor shall coordinate with the contractor to halt any action that

might result in more than incidental take of CRLF. If work is stopped, the Corps and USFWS shall be notified immediately by the ECC.

- If a maintenance activity site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh no larger than five millimeters to prevent CRLF from entering the pump system.
- A biological monitor should on site to oversee aspects of the project that disturbs CRLF habitat, e.g. disturbance of aquatic vegetation.
- Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of red-legged frogs, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

4.6 Avoidance and Minimization Measures for Reptiles

REP-1: Northwestern pond turtle

Several sites may contain suitable habitat for northwestern pond turtle, and they have been known to occur at sites 1-ASJ-1, 1-LYC, and 1-WAR-2

Pre-construction surveys for northwestern pond turtle should be conducted by a qualified biologist in accordance with USFWS protocols within 72 hours of the start of maintenance. The creek should be surveyed for presence of turtles and the creek banks surveyed for presence of burrows; all locations of observed turtles and burrows should be noted.

Each day, before maintenance activities begin, the ECC should make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, the ECC should use any means necessary to avoid “take” of these species, including hand removal, installation of fencing, or other measures. The ECC should assess the likelihood of project impacts to these species and coordinate findings with the USFWS and CDFG to ensure that appropriate protective measures are applied.

At any time during maintenance activities, if a northwestern pond turtle is observed by the ECC, maintenance crew, or other knowledgeable persons, maintenance activities should stop to avert the avoidable take of these species.

All staging areas for all heavy equipment, storage of materials, and any maintenance/fueling of heavy equipment should be clearly identified on the grading and building plans in order to minimize impacts to upland habitats outside the project site.

Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of northwestern pond turtles, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

4.7 Avoidance and Minimization Measures for Birds

Following are avoidance and minimization measures for birds. Some of these relate directly to listed species with the potential to occur within one or more project sites (the rails, northern spotted owl); however, others relate more generally to a class of species, such as raptors and wading birds and land birds.

BIRD-1: California clapper rail and California black rail

Several of the sites are within (5-10 sites) or immediately adjacent (15-20 sites) to suitable habitat for California clapper rail and California black rails. The following measures apply to all sites in or near salt or brackish marshland and will also serve to protect other tidal-marsh dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

When working within 250 ft of salt or brackish marshland during the period February 1st through August 31st, presence for either rail species should be assumed.

For all maintenance activities except for mowing of levees:

Maintenance activities should be scheduled to occur between September 1st and January 31st to avoid the rail breeding season.

Work should be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active.

Work should be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work should occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.

Activities should proceed as quickly as possible to reduce disturbance from noise, dust, etc.

Removal or disturbance of emergent tidal marsh vegetation should be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface should be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If removal is necessary, the work should be scheduled outside of the breeding season (February 1 – August 31st); all vegetation should be removed by hand, and should be salvaged and retained for replacement after work is completed.

If, for any reason other than fire fuel reduction levee mowing, the District must perform maintenance activities within 250 ft of salt or brackish marshland during the rail breeding season, the District will retain a qualified biologist to conduct clapper rail surveys in accordance to most currently available protocols from the Department of Fish and Game and the US Fish and Wildlife Service.

For fire fuel reduction mowing on levee crowns

Mowing of levees for fire fuel reduction and access to facilities normally occurs during the rail breeding season (usually before July 1st). For all mowing activities, a biological monitor should first walk the entire site to determine presence of any rails and/or rail nests. If rails and/or nests are observed, work should not be allowed to proceed until the following steps are followed: if nests are observed, work should not proceed and should be rescheduled for after young have fledged; if rails are observed but not nests, the birds should be allowed to leave the area on their own before work begins.

If no rails or nests are detected, the biological monitor should walk in front of the mower as work proceeds and ensure that all Avoidance and Minimization Measures are implemented and documented.

When mowing on levees within 250 ft of salt or brackish tidal marshlands, work should be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active. Mowing activities should proceed quickly within an area to reduce disturbance from noise, dust, etc. Mowing of levees within 250 ft of salt or brackish tidal marsh habitat will only occur on the tops of the levees and not on the side-slopes down into the marsh.

In addition, work should be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work should occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.

BIRD-2: Northern Spotted Owl

Per the “2011 Protocol for Surveying Proposed Management Activities that May Affect Northern Spotted Owls”, project sites for activities that do not modify spotted owl habitat but may cause disturbance to spotted owls (such as noise from weed-whackers) are defined as 0.25 mi buffers of project footprints. Several of the work sites are within 0.25 mi (1320 ft) of known locations of northern spotted owl activity centers on Old Mill Creek, Cascade Creek, Warner Canyon Creek, Bothin Creek, Larkspur Creek, and Ross Creek (sites 3-OMC; 3-CAS; 3-WAR; 9-BOTH; 9-LAR-2; and 9-ROS).

To avoid impacts to breeding northern spotted owls, maintenance activities at sites adjacent to habitat for northern spotted owl should follow a limited operating period (LOP) with no vegetation maintenance scheduled from February 1st through July 9th. Disturbance can also be minimized by the use of non-motorized hand tools.

If a biological evaluation determines that vegetation projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location, or where a biological evaluation determines that topographic features may shield nest sites, the LOP may be waived or the buffer distance modified.

BIRD-3: Raptors and wading birds

Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them should be minimized.

Burrowing owls, a federal and state species of special concern, are not known at the sites, and there are no CNDDDB occurrence records for burrowing owls on or near the sites. However, if burrowing owls and/or if signs are found, then guidelines as detailed in the DFG 2012 Staff Report on Burrowing Owl Mitigation should be followed.

If work is scheduled to occur between August 31 – January 31 after the nesting season, then avoidance has been achieved and work can proceed; however, to protect late- or second-nesters, the ECC should walk the site before work occurs to check for nests and presence of birds at the work site.

If work in the riparian zone or mowing on levees will occur before July 31st, the ECC should conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

During nesting season, (February 1st - September 1st), the ECC should walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

BIRD-4: Landbirds

Many of the project sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. These project sites include: 1-NOV-3, 3-ACMP-3, 3-NYH-2, 5-EAS-1, 5-EAS-2, 9-CMC-4, and many more.

Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would violate the federal Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game (CDFG) Code.

Avoidance will be achieved if maintenance activities are scheduled for August 1st to January 31st to avoid the nesting season (February 1st - July 31st).

If maintenance activities are scheduled during the nesting season, then the following AMMs should be followed:

- The removal of any trees or shrubs should occur in August, after the nesting season. If removal of trees or shrubs occurs, or maintenance begins between February 1st and July 31st (includes nesting season for passerine or non-passerine birds, and raptors), a nesting bird survey should be performed by a qualified biologist within 14 days prior to the removal or disturbance of potential nesting trees or shrubs.
- If work in the riparian zone or mowing on levees will occur before July 31st, the ECC should conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.
- All trees with active nests should be flagged and a non-disturbance buffer zone should be established around the nesting tree, or the site should be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft for passerines and non-passerine land birds. Active nests should be monitored by a qualified biologist to determine when the young have fledged and are feeding on their own.
- In addition to surveying trees and shrubs for nesting birds, surveys should be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within 14 days prior to the commencement of project related activities by a qualified biologist.
- The ECC should be present at the commencement of maintenance-related activities to ensure that nesting birds and sensitive bird species have not inhabited the project site during the window following pre-construction surveys and commencement of maintenance activities. The ECC should also review all staging areas to ensure nesting and special status birds are not present.
- Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of sensitive habitat and bird species, and inform them of when work needs to be stopped and appropriate officials informed of species presence. .

4.8 Avoidance and Minimization Measures for Mammals

There is only one listed mammal in the project quad maps; and the mammals on the species of concern list are all bat species. AMMs for mammals are below.

MAMM-1: Salt Marsh Harvest Mouse (SMHM)

The majority of the sites are not in, nor adjacent to, salt marsh harvest mouse habitat; avoidance has been achieved for those sites.

For sites where work includes removal of pickleweed or may otherwise impact salt marsh harvest mouse habitat, the following AMMS should be followed:

- When implementing maintenance activities in uplands adjacent to salt or brackish marshland, vehicles will be confined to existing roads where possible, and disturbed areas should be revegetated with brackish marsh species. Crews will use matting, pontoon boards or other comparable methods whenever feasible to minimize impacts to the existing vegetation. The placement of mats will be verified by a qualified biologist before their placement to minimize habitat impacts. Crews will work exclusively from mat boards and boardwalks to minimize trampling of vegetation. A qualified biologist will be available during the course of the maintenance work.
- If maintenance activities are conducted outside the breeding season, in coordination with USFWS and CDFG, a qualified biologist should conduct a pre-construction survey within 5 days of the start of maintenance activities to check for presence of mice within the project sites. In addition, a biological monitor should be present during maintenance-related activities along and adjacent to all suitable nesting habitat areas to ensure that salt marsh harvest mice are not present.
- Work should be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for SMHM.
- Removal or disturbance of emergent tidal marsh vegetation should be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface should be avoided to provide a buffer of refugial habitat within as wide a swath as possible.
- Training sessions should be given to all workers to inform them of protective measures, instruct them in identification of the salt marsh harvest mouse and its habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.
- For project sites where work will intrude into tidal marsh habitat, a qualified biologist should survey the site prior to beginning work in order to determine the presence/absence of SMHM, and the following measures should be implemented:
 - Under the supervision of the qualified biologist, vegetation should be removed only with non-mechanized hand tools; no motorized equipment should be used. Vegetation removal may begin only when no mice are observed, or with DFG approval, and shall start at the edge farthest from the salt marsh and work its way towards the salt marsh. If a mouse of any species is observed within the areas being removed of vegetation, work should stop and DFG should be notified. Unless otherwise approved by DFG, the mouse shall be allowed to leave on its own volition. Removal of pickleweed will generally follow Zedler (2001).
- If trenching takes place within 50 ft of pickleweed areas, visqueen fencing should be installed around worksites within pickleweed before excavation activities begin.

DFG will approve the size and placement of fencing. An escape ramp should be placed in any open trench at the end of the day to allow any entrapped animals to escape.

- A biological monitor should be on-site who will have the authority to halt project activities in order to comply with these terms.

MAMM-2: Roosting bats

Some of the sites may be within or adjacent to suitable habitat for roosting bats.

Pre-construction surveys for roosting bats should be conducted concurrent with those for land birds. If surveys occur during the daytime, the biologist should look for presence of bat droppings at likely roost sites (under bridges and trees (in layers of bark, woodpecker holes, and hollow branches). The droppings are black and small, about 4 – 8 mm long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software.

If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed.

If bats were detected during the pre-construction survey, and removal of trees, shrubs, or dense ivy is scheduled to occur during bat breeding season, a qualified biologist should conduct a bat presence-absence survey. If bats are detected, work should be re-scheduled to occur within these dates: March 1st – April 15th and/or September 1st – October 15th in order to avoid the breeding season. Removal of vegetation should follow the two-phased removal system: Day 1, in the afternoon, limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures would be avoided, and only branches or limbs with those features would be removed. Day 2: the entire tree would be removed.

Training sessions should be given to all workers during bat breeding season to inform them of protective measures, details about the two-phase tree removal protocol, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

5.0 SITE-SPECIFIC ANALYSIS

Following is an analysis for each of the 95 project sites describing the site, listing the existing vegetation communities and wildlife habitats, noting the potential extent of jurisdictional wetlands or waters, listing potentially occurring special status species, and referencing appropriate avoidance and minimization measures (AMMs) and best management practices (BMPs).

The potential for special-status wildlife species to occur within or immediately adjacent to each individual project site is in most cases based on the presence of suitable habitat or the known presence of a species within the vicinity of the work site. Therefore, within the following site-specific analysis, unless otherwise noted, those species that are listed for each work site are considered to have at least some potential to occur within the work site.

See Appendix D in Programmatic Approach to Routine Flood Control Maintenance Activities document for the Site Fact Sheets.

6.0 PERMITTING IMPLICATIONS

Several state and federal regulatory agencies have jurisdiction over sensitive biological resources such as riparian areas, wetlands, waters of the United States, waters of the State, and special-status species and natural communities. Depending on the extent and type of impacts, project activities often require federal, state, and/or local permits. However, at the discretion of the lead agency in the CEQA review process, prior to the issuance of any permit for actions that would result in impacts to wetlands, waters, special-status species, or sensitive vegetation communities, notification to all or some of the following agencies is likely to be required:

Federal Jurisdiction – United States Army Corps of Engineers (USACE)

The USACE has primary federal responsibility for administering regulations that concern "waters of the U.S." within the project sites. Waters of the United States include: 1) all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide; 2) all interstate waters including interstate wetlands; 3) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, wetlands, sloughs, vernal pools, wet meadows, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; 4) tributaries of the above; and 5) territorial seas.

The USACE acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in "Navigable Waters of the U.S.;" and the Clean Water Act Section 404, which governs specified activities in "other waters of the United States" including wetlands. The USACE requires that a permit be obtained if a project proposes placing structures within, over, or under navigable waters and/or discharging dredged or fill material into "waters of the U.S." below the ordinary high-water mark in non-tidal waters. The Environmental Protection Agency (EPA), United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Services (NMFS), and several other agencies provide comment on USACE permit applications.

For jurisdictional purposes, Section 404 defines wetlands as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support (and do support, under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 Code of Federal Regulations [CFR] 328.3[b] and 40 CFR 230.3). The federal definition of wetlands requires three wetland identification parameters to be present: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands include freshwater marsh, seasonal wetlands, and vernal pool complexes that have a hydrologic link to "other waters of the U.S."

"Other waters of the U.S." refers to hydric features that are regulated by the Clean Water Act but are not wetlands (33 CFR 328.4). To be considered jurisdictional, these features must exhibit a defined bed and bank and an ordinary high-water mark. Examples include rivers, creeks, intermittent and ephemeral channels, ponds, and lakes. Wet areas that are *not*

regulated under the Clean Water Act would include stock watering ponds, agricultural ditches created in upland areas, and isolated wetlands that do not have a hydrologic link to other waters of the U.S.

While the USACE is the responsible agency for regulating wetlands under Section 404 of the Clean Water Act, the EPA has overall responsibility for the Act. The USACE has the option to issue a permit on a case-by-case basis (individual permit) or at a program level (general permit). Nationwide permits (NWP) are an example of general permits; they cover specific activities that generally have minimal environmental effects. Activities covered under a particular NWP must fulfill several general and specific conditions, as defined by the NWP. If a proposed Project cannot meet these conditions, an individual permit may be required.

For residential, commercial, and institutional development projects a standard Individual Permit is required if there are discharges that will result in the fill of any tidal waters or wetlands; or impacts to more than one-half acre of non-tidal waters or wetlands, and/or impacts to greater than 300 linear ft of non-tidal waters or wetlands, including creeks (either perennial intermittent or ephemeral), arroyos or vegetated and unvegetated tributaries.

In contrast, projects that result in impacts of less than one-half acre and/or less than 300 linear ft may be authorized under one of the existing NWPs if they meet all of the NWP General Conditions.

Regardless of the permits required, careful project design and efforts to avoid and minimize impacts to special-status species and wetland resources will streamline the permitting process and significantly improve the likelihood of rapid project approval.

Federal Jurisdiction - United States Fish and Wildlife Service (USFWS)

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior and the Secretary of Commerce jointly have the authority to list a species as threatened or endangered (16 USC 1533[c]). Pursuant to the requirements of FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species could be present in the project site and determine whether the proposed project would have a potentially significant impact on such species. FESA prohibits “take” of federally-listed Threatened or Endangered wildlife species. The FESA defines “take” to mean “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or attempt to engage in any such conduct” 16 U.S.C. §1532(19). The FESA requires that actions authorized, funded or carried out by federal agencies do not jeopardize the continued existence of a federally-listed species or adversely modify designated Critical Habitat for such species. If a federal agency determines that a proposed federal action (i.e., issuance of a Clean Water Act Section 404 permit for wetland fill) “may affect” a listed species and/or designated Critical Habitat, the agency must consult with the USFWS and/or NMFS for protected marine and anadromous fish species in accordance with Section 7 of the FESA. If take of a federally-listed species may occur, the applicant may be required to obtain an Incidental Take Permit from the USFWS. Such take authorization is available through the Section 7 consultation process for projects involving a federal action, or through the Section

10 process (requiring development of a Habitat Conservation Plan) for other projects. The Incidental Take Permit allows taking of federally-listed species if the take is “incidental to and not the purpose of, the carrying out of an otherwise lawful activity” 16 U.S.C. §1539(a)(1)(B).

The USWFS also affords protection to migratory birds through the Migratory Bird Treaty Act (MBTA). The MBTA protects all resident and migratory wild birds found in the United States, except the house sparrow, starling, feral pigeon, and resident game birds. Resident game birds are managed separately by each state. The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import or export any migratory bird including feathers, parts, nests or eggs.

State Jurisdiction - California Department of Fish and Game (CDFG)

CDFG is authorized under the California Fish and Game Code, Sections 1600-1607 to develop mitigation measures and enter into Streambed Alteration Agreements with applicants who propose projects that would obstruct the flow of, or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. The CDFG has the authority to regulate work that will divert, obstruct, or change the natural flow of a river, stream, or lake; change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed. Typical activities regulated by CDFG under Sections 1600-1607 authority include implementing flood control projects, stabilizing banks, creek restoration, constructing river and stream crossings, diverting water, damming streams, and jack-and-boring.

Streams are defined by the presence of a channel bed and bank, and at least an intermittent flow of water. CDFG extends the limits of its jurisdiction either from top-of-bank or to the outermost edges of riparian vegetation. CDFG regulates wetland areas only to the extent that those wetlands are a part of a river, stream, or lake as defined by CDFG. While seasonal ponds are within the CDFG definition of wetlands, they are not part of a river, stream, or lake, and may, or may not, be subject to the jurisdiction of the CDFG under Sections 1601-1603 of the Fish and Game Code.

The California Department of Fish and Game (CDFG) administers the California Endangered Species Act (CESA). The State of California considers an endangered species one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is likely to become an endangered species in the near future in the absence of special protection or management, and a rare species is one that may become endangered if its present environment worsens. Rare species applies to California native plants. Species that are fully protected by California include those protected by special legislation for various reasons, such as the California condor. There is no incidental take allowed for fully protected species. Species of Special Concern is an informal designation used by CDFG for some declining wildlife species that are not proposed for listing as threatened or endangered, such as the burrowing owl. This designation does not provide legal protection, but signifies that these species are recognized as sensitive by CDFG.

In coordination with the USFWS the CDFG also administers the MBTA which provides protections for nesting birds that are both residents and migrants, whether or not they are considered sensitive by resource agencies. The CDFG code 3503 makes it illegal to destroy any birds' nest or any birds' eggs. Code 3503.5 further protects all birds in the orders Falconiformes and Strigiformes (Birds of Prey, such as hawks and owls) and their eggs and nests from any form of take.

State Jurisdiction - Regional Water Quality Control Board (RWQCB)

The RWQCB's regulatory jurisdiction is pursuant to Section 401 of the Federal CWA. The RWQCB typically regulates discharges of dredged or fill material into waters of the U.S., however they also have regulatory authority over waste discharges into Waters of the State, which may be isolated, under the Porter-Cologne Water Quality Control Act issued by the State Water Resources Board. In the absence of a nexus with the Corps, the Regional Board requires the submittal of a Waste Discharge Requirement (WDR) application, which must include a copy of the project Stormwater Pollution Prevention Plan (SWPPP) and a copy of the project Water Quality Management Plan (WQMP), otherwise called a Standard Urban Stormwater Management Plan (SUSMP). The Regional Board's role is to ensure that disturbances in the stream channel do not cause water quality degradation.

7.0 CONCLUSION

The proposed routine maintenance activities cover 96 sites in Marin County. Although the proposed work program is temporary and designed to work around seasonal presence and nesting periods, activities may still result in impacts to sensitive habitat and special status species. There are current records of coho, steelhead, California red-legged frog, salt marsh harvest mouse, California clapper rail and California black rail in or near some of the project sites.

To avoid and minimize impacts to sensitive species and habitats, classroom and field training of contractor staff, protocols for surveying species, and continual site monitoring are recommended.

An appropriate staff member of the Marin County Flood Control and Water Conservation District should be designated as the Environmental Compliance Coordinator (ECC). The ECC will be knowledgeable about and qualified to determine habitat types, identify the special status plant and wildlife species, and follow appropriate protocols. The ECC will conduct pre-construction surveys; conduct trainings for the contractors' supervisors and crew members on special status species, habitat types, and work processes; and direct the implementation of avoidance and minimization measures.

Each Spring, before the work season begins, the ECC should walk each project site segment and note where work needs to occur that year, and what kinds of maintenance activities need to be conducted. At this time, any species present should be noted (see Appendix F for the site assessment data sheet), as well as presence of tree or ground nests, signs of bats, pond turtle burrows, etc.

Each year, the ECC should meet with the contractor foreman and crew supervisors to discuss the proposed maintenance activities and schedule. At this time, the ECC should communicate which special status species may be present at the project sites, what impacts the maintenance activities may have on those special status species, and the avoidance and minimization measures to implement if necessary.

Each year before maintenance activities begin, the ECC should conduct trainings for the contracted personnel. The trainings should include information about the habitat types in which they will be working, the special status species that may be present, how to identify those special status species, and which avoidance and minimization measures to implement in case any special status species are present when maintenance activities are scheduled to begin.

A few days before work is scheduled for a particular project site, the ECC should walk the project site length and search for special status species, ground and tree nests, signs of bats, and active burrows. If necessary, avoidance and minimization measures should be implemented to fence off plants, trees with nests, etc, in order to protect sensitive resources.

Each day before maintenance activities begin, the ECC should walk the project site with the crew supervisors to check for presence of special status species; the appropriate avoidance

and minimization measures should be implemented as necessary to protect sensitive resources.

As the work proceeds, the ECC and crew should take note of any issues that arise and should implement avoidance and minimization measures as required.

Sensitive Vegetation Communities

Impacts to sensitive vegetation communities, including wetlands or other waters of the U.S., or waters of the state, might require mitigation for temporal losses of wetland functions such as wildlife habitat value, water filtration, or groundwater recharge. However, many of the sites are anticipated to be self-mitigating, as wetland vegetation is expected to become re-established following completion of maintenance activities.

Potentially Occurring Special-Status Plant Species

Based on background research, a reconnaissance-level survey, and the presence of suitable habitat, a total of four special-status plant species are considered to have at least some potential to occur within the vicinity of the study area, including within the limits of some of the work sites. These species cannot be ruled out without focused surveys conducted during the appropriate blooming seasons when these species can be readily recognized and identified in the field.

In order to avoid impacts to special-status plant species, botanical surveys are recommended to be conducted in April, May, June, and July for those project sites with the potential for these species, in order to ensure that the potentially occurring special-status plant species, if present, will not be overlooked.

Potentially Occurring Special-Status Wildlife Species

Based on background research, a reconnaissance-level survey, and the presence of suitable habitat, a total of fourteen special-status wildlife species are considered to have at least some potential to occur within the limits of some of the work sites. Two of these species, including California red-legged frog and western pond turtle were detected within the study area. Based on the actual or potential presence, the following recommendations are made to either avoid or minimize potential impacts to special-status wildlife species.

Pre-construction Survey Recommendations

Given the temporary nature of the proposed maintenance activities, specifically those sites where maintenance will be concluded in a very short time period (*i.e.* less than two days), it is recommended that a biological monitor be present on site, prior to the commencement of and during maintenance activities, in lieu of pre-construction surveys. The USFWS, NOAA Fisheries and CDFG should be consulted to approve any of the recommended avoidance recommendations.

8.0 REFERENCES

- Albertson, J.D. and J.G. Evans. 2000. California Clapper Rail. In Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, California.
- Fishnet 4C. 2007. *County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries*. Petaluma, California.
- Bay Area Stormwater Management Agencies Association, Operational Permits Committee. 2000. *Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities*. Prepared by EOA, Inc. Oakland, California.
- Bay Area Stormwater Management Agencies Association, Operational Permits Committee. 2006. *Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment*. Prepared by ESA. San Francisco, California.
- Baye, P. R. 2000. Plants and Environments of Diked Baylands. In Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, California.
- Baye, P. R., P.M. Faber, and B. Grewell. 2000. Tidal Marsh Plants of the San Francisco Estuary. In Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, California.
- Baye, P. and D. Wright. 2004. *Biogeographic Assessment of Tomales Dunes, Marin County, California: Vegetation, Flora, and Invertebrates*. Prepared for Environmental Action Committee of West Marin. Point Reyes Station, CA.
- Bettelheim, M. 2002. *A Review of the History, Natural History, and Status of Coho Salmon (Oncorhynchus kistuch) in California: A Literature Review*. California Department of Fish and Game, Central Valley Bay-Delta Branch. 17 pp.
- Barbour, M. G., T. Keeler-Wolf, and A. A. Schoenherr, editors. *Terrestrial Vegetation of California*, Third edition. 2007. University of California Press. 712 pp.
- Bartolome, J.W., W.J. Barry, T. Griggs, and P. Hopkinson. 2007. Valley Grassland. Pp. 367–393 In: Barbour, M.G, T. Keeler-Wolf, and A.A. Schoenherr. (eds) *Terrestrial Vegetation of California*, 3d Ed. University of California Press.
- California Department of Fish and Game (CDFG). 2011. *California Natural Diversity Database Biogeographic Data Branch, Natural Diversity Data Base*. October.

- California Department of Fish and Game (CDFG). 2010a. *State and Federally Listed Endangered, Threatened, and Rare Plants of California*. Biogeographic Data Branch, Natural Diversity Data Base. Sacramento, California.
- California Department of Fish and Game (CDFG). 2010b. *Special Vascular Plants, Bryophytes, and Lichens List*. Natural Diversity Data Base. Sacramento, California.
- California Department of Fish and Game (CDFG). 2010c. *State and Federally Listed Endangered and Threatened Animals of California*. Biogeographic Data Branch, Natural Diversity Data Base. Sacramento, California.
- California Department of Fish and Game (CDFG). 2010d. *California Salmonid Stream Habitat Restoration Manual*. Fourth Edition. Sacramento, California.
- California Department of Fish and Game (CDFG). 2009. *Special Animals*. Biogeographic Data Branch, Natural Diversity Data Base. Sacramento, California.
- California Department of Fish and Game (CDFG). 2009b. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*. Sacramento, California.
- California Department of Fish and Game (CDFG). California Interagency Wildlife Task Group. 2008. *California Wildlife Habitat Relationship System (CWHR) version 8.2* personal computer program. Sacramento, California.
- California Native Plant Society (CNPS). 2010. *Inventory of Rare and Endangered Plants* (online edition, v7-10dec). California Native Plant Society. Sacramento, California. Accessed on Fri, Dec. 3, 2010 from <http://www.cnps.org/inventory>
- California Department of Fish and Game. 2004. Recovery strategy for California coho salmon. Report to the California Fish and Game Commission. 594 pp.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 131 pp.
- Fellers, G. M., and E. D. Pierson. 2002. *Habitat Use and Foraging Behavior of Townsend's Big-eared Bat (Corynorhinus Townsendii) in Coastal California*. Journal of Mammalogy, 83 (1): 167-177.
- Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, California.
- Good, T.P., R.S. Waples, and P. Adams (editors). 2005. *Updated status of federally listed ESUs of West Coast salmon and steelhead*. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-66, 598 pp.
- Grijalva, E. K. and J. D. Albertson. 2005. *Non-Native Spartina Control Impact Evaluation Matrix (SCIE-M): Estimating the impact of Spartina control on the California clapper rail carrying capacity of San Francisco Bay tidal marshes*. Attachment B to letter to US FWS

- Hickman, J.C. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley, California. 1400 pp.
- Holland, R. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, The Resources Agency. Sacramento, California. 156 pp.
- Holland, R. via web CNPS <http://davisherb.ucdavis.edu/cnpsActiveServer/hollandlist.aspx>
- Holland, D. C. 1994. *The Western Pond Turtle: Habitat and History*. Final Report. U.S. Department of Energy, Bonneville Power Administration. Portland, Oregon
- Howell, J.T., F. Almeda, W. Follette, and C. Best. 2007. *Marin Flora: an illustrated manual of the flowering plants, ferns, and conifers of Marin County, California*. California Academy of Sciences and the California Native Plant Society, San Francisco, California. 510 pp.
- Jennings, M. R. and M. P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game Contract # 8023. Inland Fisheries Division, Rancho Cordova, California.
- Leidy, R. A. 2007. *Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California*. SFEI Contribution #530. San Francisco Estuary Institute. Oakland, California.
- Leidy, R. A. 2000. Steelhead (*Oncorhynchus mykiss irideus*). In Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, California.
- Maragni, D. B. 2000. Chinook Salmon (*Oncorhynchus tshawytscha*). In Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, California.
- National Oceanic and Atmospheric Administration (NOAA). 2001. *Coho Salmon (Oncorhynchus kisutch): Central California Coast ESU Listed Threatened* (Website). <http://www.nwr.noaa.gov/1salmon/salmesa/cohocca.htm>
- National Park Service, Point Reyes National Seashore (NPS). 2003. *2002 Coho Salmon Section 10 Permit Report: Permit #1046 PORE-NR-WR-03/02 A report from the Coho and Steelhead Restoration Project*. Point Reyes Station, California.
- National Park Service (NPS). 2002. *Environmental Assessment: Easkoot Creek Restoration at Stinson Beach*. San Francisco, California.
- Rathbun, G. B., N. Siepel and D. Holland. 1992. *Nesting Behavior and Movements of Western Pond Turtles, Clemmys marmorata*. The Southwestern Naturalist. 37(3): pp 319-324.
- Sawyer, J.O., T. Keeler-Wolf, and J. M. Evans. 2009. *A Manual of California Vegetation: Second edition*. California Native Plant Society, Sacramento, California. 1300 pp.

- Shapiro, A.M. and T. D. Manolis. 2007. *Field Guide to Butterflies of the San Francisco Bay and Sacramento Valley Regions*. University of California Press. Berkeley and Los Angeles, California. 345 pp.
- Shellhammer, H. S. 2000. Salt Marsh Harvest Mouse (*Sorex vagrans haliocoetes*). In Goals Project. 2000. *Baylands Ecosystem Species and Community Profiles: Life histories and Environmental Requirements of Key Plants, Fish and Wildlife*. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, editor. San Francisco Bay Regional Water Quality Control Board, Oakland, California.
- Shuford, W. D. 1993. *The Marin County Breeding Bird Atlas: A Distributional and Natural History of Coastal California Birds*. California Avifauna Series 1. Bushtit Books, Bolinas, California.
- Shuford, W. D. and I. C. Timossi. 1989. *Plant Communities of Marin County*. Special Publication Number 10, California Native Plant Society, Sacramento, California. 32 pp.
- Sibley, D.A. 2000. *The Sibley Guide to Birds*. Alfred A. Knopf. New York, New York. 545 pp.
- Sloan, D. 2006. *Geology of the San Francisco Bay Region*. University of California Press, Berkeley and Los Angeles, California. 360 pp.
- Stebbins, R. C. 2003. *A Field Guide to Western Reptiles and Amphibians*. 3rd Edition. Houghton Mifflin Company. New York, New York. 533 pp.
- Sycamore Associates, LLC. 2004. *Biological Assessment and Wetland Delineation for Forty-nine Road Culvert Locations, West Marin County, California*. Prepared for: Marin County Department of Public Works, San Rafael, California.
- U.S. Department of Agriculture (USDA). 2011. *National List of Hydric Soils*. Natural Resource Conservation Service. Downloaded National_list;_all_states (February 2011) (in XLXS format) from <http://soils.usda.gov/use/hydric/> on February 28, 2011
- U.S. Department of Agriculture (USDA). 1985. *Soil Survey of Marin County, California*. Natural Resource Conservation Service.
- U.S. Fish and Wildlife Service. 2011. *Protocol for surveying proposed management activities that may impact northern spotted owls*. U.S. Fish and Wildlife Service, Sacramento, California.
- U.S. Fish and Wildlife Service (USFWS). 2010a. Species Profile: steelhead. Accessed on December 10, 2010 from: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E08D>
- U.S. Fish and Wildlife Service. 2010b. *Draft revised recovery plan for the northern spotted owl, *Strix occidentalis caurina**. U.S. Fish and Wildlife Service, Portland, Oregon. xii + 163 pp.
- U.S. Fish and Wildlife Service. 2009. *Draft Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California*. Sacramento, California. xviii + 636 pp.
- U.S. Fish and Wildlife Service (USFWS). 2005. *Endangered and Threatened Species: Designation of Critical Habitat for Seven Evolutionarily Significant Units for Pacific Salmon and Steelhead in California: Final Rule*. 50 CFR part 226 Vol. 70(170): 52488-52627. September 2.

- U.S. Fish and Wildlife Service (USFWS). 2002. *Endangered and Threatened Wildlife and Plants: Final Designation of Critical Habitat for Holocarpha macradenia (Santa Cruz tarplant)*. 50 CFR part 17 Vol. 67(200): 63968-64007. October 16.
- U.S. Fish and Wildlife Service. 2002b. Recovery plan for the California red-legged frog (*Rana aurora draytonii*). Portland, Oregon. 173 pp.
- U.S. Fish and Wildlife Service (USFWS). 2001a. *Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for the California Red-legged Frog*. Final Rule. 50 CFR Part 17. Vol. 66 (49): 14625-14671. March 13.
- U.S. Fish and Wildlife Service (USFWS). 2001b. *Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Species that are Candidates or Proposed for Listing as Endangered or Threatened, Annual Notice of Findings on Recycled Petitions, and Annual Description of Progress on Listing Actions; Proposed Rule*. 50 CFR Part 17. Vol. 66(210): pp 54808-54832. October 30.
- U.S. Fish and Wildlife Service (USFWS). 1999a. *Designated Critical Habitat: Central California Coast and Southern Oregon/Northern California Coast Coho Salmon*. 50 CFR Part 226 Vol. 64 (86): 24049-24062. May 5.
- U.S. Fish and Wildlife Service (USFWS). 1999b. *Endangered and Threatened Wildlife and Plants*. 50 CFR Part 17 Vol. 62 (234): 64306-64320. December 31.
- U.S. Fish and Wildlife Service (USFWS). 1998a. *California Freshwater Shrimp (Syncaris pacifica Holmes) Recovery Plan*. U.S. Fish and Wildlife Service, Portland, Oregon. 94 pp.
- U.S. Fish and Wildlife Service. 1998b. *Seven Coastal Plants and the Myrtle's Silverspot Butterfly Recovery Plan*. Portland, Oregon. 141 pp.
- U.S. Fish and Wildlife Service (USFWS). 1997. *Guidance on Site Assessment and Field Surveys for California Red-legged Frogs (Rana aurora draytonii)*. Sacramento Field Office. Sacramento, California.
- U.S. Fish and Wildlife Service (USFWS). 1997. *Fish Screening Criteria for Anadromous Salmonids*. National Marine Fisheries Service, Southwest Regional Office, Long Beach, California.
- U.S. Fish and Wildlife Service (USFWS) 1996a. *Endangered and Threatened Plant and Animal Taxa; Proposed Rule*. 50 CFR part 17. February.
- U.S. Fish and Wildlife Service (USFWS). 1996b. *Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the California Red-legged Frog*. 50 CFR part 17 Vol. 61(101): 25813-25833. May 20.
- U.S. Fish and Wildlife Service (USFWS). 1993. *Endangered and Threatened Wildlife and Plant; Determination of Threatened Status for the Pacific Coast Population of the Western Snowy Plover*. 50 CFR part 17. March.
- U.S. Fish and Wildlife Service. 1985. *Recovery Plan for the California Least Tern, Sterna antillarum brownii*. U.S. Fish and Wildlife Service, Portland, Oregon. 112. pp.
- U.S. Fish and Wildlife Service. 1984. Recovery Plan for the San Bruno Elfin and Mission Blue Butterflies. U.S. Fish and Wildlife Service, Portland, Oregon. 81 pp.

Zedler, J. B., editor. 2001. Handbook for Restoring Tidal Wetlands. Marine Science Series, CRC Press LLC, Boca Raton. Florida.

Zeiner, D.C., W.F. Laudenslayer, Jr., and K.E. Mayer and M. White, eds. 1990. *California's Wildlife - Birds*. Volume II. California Department of Fish and Game, Sacramento, California. 732 pp.

Personal Communications

Herlocker, David. 2010. Interpretive naturalist with Marin County Parks and Open Space. Personal communication with David Herlocker December 7, 2010.

Michaud, Jennifer. 2008. Senior wildlife biologist with Prunuske Chatham, Inc. Personal communication with Jennifer Michaud June 2008.

Smith, Doreen. 2011. Rare plant coordinator with Marin County Chapter of the California Native Plant Society. Personal communication with Doreen Smith March 25, 2011.

APPENDIX A

FEDERAL AND STATE SPECIAL STATUS SPECIES

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|---|--------------------------------|---|--|
| SPECIES LISTED OR PROPOSED FOR LISTING | | | |
| INVERTEBRATES | | | |
| Mission blue butterfly <i>Icaricia icarioides missionensis</i> | FE/-- | Grassland with <i>Lupinus albifrons</i> , <i>L. formosa</i> , and <i>L. varicolor</i> | Low; removed from analysis. No occurrences within the project area (CDFG 2010a). |
| San Bruno elfin butterfly <i>Incalisia mossii bayensis</i> | FE/-- | Steep north facing slopes within the fog belt with grassy ground cover. Larval host plant is <i>Sedum spathulifolium</i> . | Low; removed from analysis. There is one known occurrence in the Bolinas quad, on the upper reaches of Lagunitas Creek, which is not near project areas. |
| Myrtle's silverspot butterfly <i>Speyeria zerene myrtleae</i> Pt. Reyes silverspot butterfly <i>Speyeria zerene puntareyes</i> | FE/-- | Restricted to the foggy coastal dunes/hills of Pt. Reyes Peninsula; Extirpated from coastal San Mateo County. | Low; removed from analysis. No occurrences within the project area (CDFG 2010a) and no suitable habitat. |
| California freshwater shrimp <i>Syncaris pacifica</i> | FE/CE | Permanent streams with fishes. Pool areas of low-elevation, low- gradient streams, among exposed live tree roots of undercut banks, overhanging woody debris, or overhanging vegetation. Found in 17 stream segments within Marin, Napa and Sonoma counties. Many of these stream segments are isolated from the others by barriers, dewatered areas and low quality habitat. | Low; removed from analysis. No occurrences within the project area (CDFG 2010a). |
| FISH | | | |
| Green sturgeon – southern DPS <i>Acipenser medirostros</i> Critical Habitat designated | FT/CSSC | Spawn in the Sacramento River and its tributaries; the San Francisco Bay system provides rearing habitat for juveniles. | Low, removed from analysis. No occurrences in project area (CDFG, 2004); Marin streams too small. |
| Tidewater goby <i>Eucyclogobius newberryi</i> | FE/CSC | Shallow waters of bays and estuaries, in lower, primarily tidal, stream reaches. | Low; removed from analysis. Historical presence in Corte Madera and Novato Creeks, but now extinct in those watersheds (Leidy 2007). |
| Delta smelt <i>Hypomesus transpacificus</i> Critical habitat designated | FT/CT | Restricted to the Sacramento-San Joaquin Delta, including Suisun and San Pablo Bays and the Carquinez Strait. | Low; removed from analysis. Not known to occur in the project area (CDFG 2010a, Leidy 2007). |
| Coho salmon—Central CA coast ESU <i>Oncorhynchus kisutch</i> Critical Habitat designated | FE/CE | Accessible Bay Area and coastal rivers and streams with cover, cool water and sufficient dissolved oxygen. Require beds of loose, silt-free gravel for spawning. | Moderate; retained in analysis. Known and potential occurrences in Easkoot Creek project area only (Bolinás quad). |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|--|--------------------------------|--|--|
| Steelhead – Central CA Coast DPS <i>Oncorhynchus mykiss irideus</i> Critical Habitat designated | FT/CSC | Accessible Bay Area and coastal rivers and streams | High; retained in analysis. Known and potential occurrences project area quads within the project area. |
| Steelhead-Central Valley DPS <i>Oncorhynchus mykiss irideus</i> Critical Habitat designated | FT/-- | Spawn in the Sacramento and San Joaquin Rivers and their tributaries, migrate through San Francisco and Suisun Bays, as well as the Delta region | Low; removed from analysis. Migrators through the bay; management activities that benefit other salmonids will benefit any stragglers. |
| Chinook salmon—Central Valley spring-run <i>Oncorhynchus tshawytscha</i> Critical Habitat designated | FT/CT | Spawning and rearing restricted to Sacramento River basin, migrate through San Francisco Bay and Sacramento-San Joaquin Delta | Low; removed from analysis. Project area does not extend into the range of the ESU. Management activities that benefit other salmonids will benefit any stragglers. |
| Chinook salmon—fall/late fall-run <i>Oncorhynchus tshawytscha</i> | FC/CSC | Spawning and rearing restricted to Sacramento River basin, migrate through San Francisco Bay and Sacramento-SanJoaquin Delta, require clean, cold water and gravel beds | Low; removed from analysis. Chinook are known in the lower reaches of Novato and Corte Madera Creeks. Management activities that benefit other salmonids will benefit them. |
| Chinook salmon—winter run <i>Oncorhynchus tshawytscha</i> Critical Habitat designated | FE/CE | Spawning restricted to the Sacramento River. Requires clean, cold water with gravel beds. | Low; removed from analysis. Project area does not extend into the range of the ESU. Critical Habitat extends from Golden Gate Bridge to Delta. Management activities that benefit other salmonids will benefit any stragglers. |
| Sacramento splittail <i>Pogonichthys macrolepidotus</i> | FT/CSC | Slow moving river sections and dead-end sloughs with flooded vegetation for spawning and foraging for young. | Low; removed from analysis. .Possible in lower reaches of Novato Creek and Simmons Slough; management activities that benefit salmonids will benefit any stragglers. |
| Longfin smelt <i>Spirinchus thaleichthys</i> | FSC/CT | Sacramento-San Joaquin estuary in the salt or brackish water portions of the estuary, require fresh water, sandy-gravel substrates, rocks, and aquatic vegetation for spawning | Low; removed from analysis. No occurrences in the project area (CDFG 2010a; Leidy 2007). |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|--|--------------------------------|--|---|
| AMPHIBIANS | | | |
| California red-legged frog <i>Rana aurora draytonii</i> | FT/CSC | Breed in stock ponds, pools, and slow-moving streams with emergent vegetation for escape cover and egg attachment. Where water is seasonal often utilizes mammal burrows in upland habitat for aestivation | Moderate; retained in analysis. Reported to occur within the project action area (Bolinás quad). |
| REPTILES | | | |
| Northwestern pond turtle <i>Clemmys marmorata marmorata</i> | FC/CSSC | Live in or near ponds or slow-moving creeks and need suitable rocks or logs for basking sites and underwater retreats | Moderate; retained in analysis. Known to occur within the project area. |
| BIRDS | | | |
| Marbled murrelet <i>Brachyramphus marmoratus</i> Critical Habitat designated | FT/CE | Nests in burrows or crevices. Common resident of northwestern coastal forests (temperate rainforest) | Low; removed from analysis. No occurrences within the project area (CDFG 2010a); critical habitat is upland of project area. |
| Swainson's hawk <i>Buteo swainsoni</i> | --/CT | Breeds in riparian areas and oak savannah, requires adjacent foraging habitat such as grasslands or fields supporting rodent populations | Low; removed from analysis. Possible winter resident; no occurrences within the project area; (CDFG 2010a). |
| Western snowy plover <i>Charadrius alexandrinus nivosus</i> | FT/CSC | Nests and forages on sandy beaches on marine and estuarine shores - requires sandy, gravelly, or friable soils for nesting | Low; removed from analysis. Known to occur at Seadrift near Easkoot Creek; no suitable habitat in the project areas. |
| Short-tailed albatross <i>Diomedea albatrus</i> | FE/CSC | | Low; removed from analysis. No occurrences within the project area (CDFG 2010a). |
| Bald eagle <i>Haliaeetus leucocephalus</i> | delisted/CE | Nests and forages on inland lakes, reservoirs, and rivers; winter foraging at lakes and along major rivers | Delisted, removed from analysis. |
| California black rail <i>Laterallus jamaicensis coturniculus</i> | FSC/CT | Nests and forages in tidal emergent wetland with pickleweed and cordgrass | Moderate; retained in analysis. Reported to occur within the project action area in eastern Marin County (San Quentin and San Rafael quads). |
| California brown pelican <i>Pelecanus occidentalis californicus</i> | delisted/3511 | Nests on coastal islands of small to moderate size that afford protection from predators. | Delisted; removed from analysis. |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|---|--------------------------------|--|---|
| California clapper rail <i>Rallus longirostris obsoletus</i> | FE/CE | Nests and forages in emergent wetlands with pickleweed, cordgrass, and bulrush | Moderate; retained in analysis. Reported to occur within the project action area in eastern Marin County (San Quentin, Novato and San Rafael quads). |
| Bank swallow <i>Riparia riparia</i> | --/CT | Nests primarily in riparian and other lowland habitat. Requires vertical banks or cliffs with fine textured or sandy soils near water. | Low; removed from analysis. No occurrences within the project area (CDFG 2010a). |
| California least tern <i>Sterna antillarum browni</i> | FE/CE | Colonial breeder on bare or sparsely vegetated flat substrates including sand beaches, alkali flats, land fills, or paved areas | Low; removed from analysis. No occurrences within the project area (CDFG 2010a). |
| Northern spotted owl <i>Strix occidentalis caurina</i> | FT/-- | Nests in old growth forests | Low; retained in analysis. Known territories within 1/3 mile of eight project areas (CDFG 2010a). |

MAMMALS

| | | | |
|--|-------|---|---|
| Salt marsh harvest mouse <i>Reithrodontomys raviventris</i> | FE/CE | Saline emergent marsh with dense pickleweed | Moderate; retained in analysis. Potentially occurs within the project action area in eastern Marin County (San Quentin, San Rafael quads). |
|--|-------|---|---|

PLANTS

| | | | |
|--|---------------|---|--|
| Sonoma alopecurus <i>Alopecurus aequalis var. sonomensis</i> | FE/--/List 1B | Freshwater marshes and swamps, riparian scrub | Low; removed from analysis. Historically occurred north from Point Reyes Peninsula (Fed. Reg., 1997), outside the project area. |
| Tiburon mariposa lily <i>Calochortus tiburonensis</i> | FT/CT/List 1B | Serpentine grassland | Low; removed from analysis. No occurrences within the project area (CDFG, 2004); project areas not in serpentine areas. |
| Tiburon Indian paintbrush <i>Castilleja affinis ssp. neglecta</i> | FE/CT/List 1B | Open serpentine slopes | Low; removed from analysis. No occurrences within the project area (CDFG, 2004); project areas not in serpentine areas. |
| Sonoma spineflower <i>Chorizanthe valida</i> | FE/CE/List 1B | Sandy soils in coastal grassland | Low; removed from analysis. Known only from occurrences at Pt. Reyes National Seashore (CDFG), outside project action area. |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|---|--------------------------------|--|---|
| Soft bird's beak <i>Cordylanthus mollis</i> ssp. <i>Mollis</i> | FE/CR/List 1B | Coastal salt marsh | Low; removed from analysis. Known in Marin from only two occurrences near San Antonio Creek (CDFG); CNPS presumes extirpated in Marin. |
| Marin dwarf flax <i>Hesperolinon congestum</i> | FT/CT/List 1B | Grasslands and openings in chaparral, often on serpentinite | Low; removed from analysis. 10 occurrences in Marin County, in uplands away from creeks. Project areas not in serpentine. |
| Santa Cruz tarplant <i>Holocarpha macradenia</i> Critical Habitat designated (none in Marin County) | FT/CE/List 1B | Coastal scrub, coastal sand dunes, openings in oak woodlands with sandy or gravelly soil | Low; removed from analysis. Historically occurred near Ross Creek (1883 record). CNPS presumes extirpated in Marin County. |
| Contra Costa goldfields <i>Lasthenia conjugens</i> | FE/--/List 1B | Moist grasslands, vernal pools, cismontane woodlands, alkaline playas | Low; removed from analysis. USFWS lists this species for the project quads, but there are no occurrences within those quads (CDFG; CNPS). |
| Mason's lilaepsis <i>Lilaeopsis masonii</i> | --/CR/List 1B | Brackish or freshwater marshes and swamps, riparian scrub | Low; removed from analysis. No occurrences within the project quads (CDFG; CNPS). |
| White-rayed pentachaeta <i>Pentachaeta bellidiflora</i> | FE/CE/List 1B | Open dry rocky slopes and grassland, often on soils derived from serpentinite. | Low; removed from analysis. Historically occurred from Santa Cruz to Marin counties; currently known only from one occurrence in San Mateo. CNPS presumes extirpated in Marin County. |
| Tiburon jewelflower <i>Streptanthus niger</i> | FE/CE/List 1B | Serpentine outcrops in grasslands | Low; removed from analysis. No occurrences within the project area (CDFG, 2004); project areas not in serpentine areas. |
| Showy indian clover <i>Trifolium amoenum</i> | FE/--/List 1B | Coastal bluff scrub; valley and foothill grasslands | Low; removed from analysis. One record in Stinson Beach area from 1927; CNPS presumes extirpated in Bolinas quad. Habitat at site is not suitable. |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|--|--------------------------------|--|---|
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN | | | |
| INVERTEBRATES | | | |
| Sonoma arctic skipper <i>Carterocephalus palaemon ssp. Magnus</i> | FSC/-- | Prefers shady redwood forest. Inhabits openings in heavily forested woods, moist meadows, and streamsides; larval host plants include purple reedgrass and bromes. | Low. No suitable habitat in the project areas (Baye and Wright 2004). |
| Monarch butterfly <i>Danaus plexippus</i> | --/* | Winter in California. Roost in wind protected eucalyptus, Monterey pine, and cypress groves, with water and nectar sources nearby. | Low. Known to occur near the Easkoot Creek project areas from September to March. Avoid work past September 1st. |
| Marin elfin butterfly <i>Incisalia mossii marinensis</i> | FSC/-- | Rocky outcrops, woody canyons, cliffs; host plant includes stonecrop (<i>Sedum</i> , <i>Sedella</i> , <i>Dudleya</i> , and <i>Parvisedum</i>) species | Low. No habitat in the project areas. |
| San Francisco lacewing <i>Nothochrysa californica</i> | FSC/-- | Inhabits moist woodlands near the coast with coast live oak or pine. | Low. Suitable habitat is not present in the project areas. |
| Mimic tryonia <i>Tryonia imitator</i> | FSC/-- | Coastal lagoons, estuaries, and salt marshes from Sonoma County to San Diego County. | Low. Known in Petaluma River and San Rafael Creek, but not in project areas. |
| FISH | | | |
| Sacramento perch <i>Archoplites interruptus</i> | FSC/CSC | Slow moving sloughs, streams, rivers, and lakes | Low. Native but extinct in Corte Madera Creek (Leidy 2007) |
| River lamprey <i>Lampetra ayresi</i> | FSC/-- | Larger coastal streams in the San Francisco Bay drainage system | Low. Low density in SF Bay. |
| Pacific lamprey <i>Lampetra tridentata</i> | FSC/-- | Pacific Ocean and estuaries; spawning in coastal streams from Alaska to Baja California | Low. Low density in SF Bay. Possibly in Corte Madera Creek (Leidy 2007). |
| AMPHIBIANS | | | |
| Foothill yellow-legged frog <i>Rana boylei</i> | FSC/CSC | Partly shaded streams with riffles and quiet pools absent of predatory fish | Low. Present in Marin, but not known in the project areas; habitat not suitable.. |
| BIRDS | | | |
| Cooper's hawk <i>Accipiter cooperi</i> | --/CSC | Nests in riparian growths of deciduous trees and live oak woodlands | Low. No habitat in project areas. |
| Sharp-shinned hawk <i>Accipiter striatus</i> | --/CSC | Nests in riparian growths of deciduous trees and live oaks | Low. No habitat in project areas. |
| Tricolored blackbird <i>Agelaius tricolor</i> | FSC/CSC | Riparian thickets and emergent vegetation near open water | Low. Winter in Marin, especially in Pt. Reyes, but not in project areas (PRBO). |
| Grasshopper sparrow <i>Ammodramus savannarum</i> | FSC/-- | Favors grasslands and pastures over 100 acres. | Low. No habitat in project areas. |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|--|--------------------------------|--|---|
| Golden eagle <i>Aquila chrysaetos</i> | CSC/3511 | Open hills with grassland, open scrub, adequate prey base, large trees or cliffs for nesting | Low. Not known in project areas. |
| Great egret <i>Ardea alba</i> | --/* | Colonial nesters in large trees near marshes, tidal flats, or irrigated pastures | Low. Nest in Bolinas Lagoon, possibly near Santa Venetia, but not in other project areas. |
| Great blue heron <i>Ardea herodias</i> | --/* | Nests in trees along lakes and estuaries | Low. Nest in Bolinas Lagoon, possibly near Santa Venetia, but not in other project areas. |
| Short-eared owl <i>Asio flammeus</i> | --/CSC | Fresh water and salt marshes and swamps, lowland meadows, irrigated fields | Low. Not known to breed in Marin; no CNDDDB records in Marin. |
| Western burrowing owl <i>Athene cunicularia hypugaea</i> | FSC/CSC | Nests in mammal burrows in open, arid grasslands | Low. Not known to breed in Marin. |
| Oak titmouse <i>Baeolophus inornatus</i> | FSLC/-- | Prefers open woodlands of warm, dry oak and oak-pine. | Moderate. Known to be yearlong resident in Marin |
| Ferruginous hawk <i>Buteo regalis</i> | FSC/CSC | Dry open country with a variety of habitats. | Low. Possible winter resident in Marin County. |
| Lawrence's goldfinch <i>Carduelis lawrencei</i> | FSC/-- | Dry grassy slopes and chaparral; prefers fiddlenecks | Low. Not likely to be found in project areas. |
| Vaux's swift <i>Chaetura vauxi</i> | FSC/-- | Riparian woodlands and woodlands near lakes | Low. Mostly in West Marin; no confirmed breeding records. |
| Northern harrier <i>Circus cyaneus</i> | --/CSC | Mostly nests in emergent vegetation, wet meadows or near rivers and lakes, but may nest in grasslands away from water. | Moderate; known to breed in Pt Reyes; often observed from Santa Venetia to Novato along San Pablo Bay. |
| Black swift <i>Cypseloides niger</i> | FSC/CSC | Colonial breeders using cliffs in deep canyons | Low. Known in Boinas quad, but no suitable habitat at project area. |
| Yellow warbler <i>Dendroica petechia brewsteri</i> | --/CSC | Prefers dense riparian habitat with willows, cottonwoods, or alders for nesting and foraging | Low. Not known to breed in or near the project areas. |
| Snowy egret <i>Egretta thula</i> | --/* | Marshes, tidal flats, lakes, streams | Low. Nest on West Marin Island, but not in project areas. |
| White-tailed kite <i>Elanus leucurus</i> | --/3511 | Found in open grasslands with scattered trees for nesting and perching. | Low. No nesting habitat, could be forager. |
| California horned lark <i>Eremophila alpestris actia</i> | --/CSC | Short grass prairie, fallow grain fields, open areas with short vegetation | Low. No suitable habitat within the project areas. |
| American peregrine falcon <i>Falco peregrinus anatum</i> | Delisted/3511 | Nests near wetlands, lakes, rivers, or other water on cliffs, banks, human structures | Low. No nesting habitat, could be forager. |
| Saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i> | FSC/CSC | Saline and freshwater marshes with adjacent riparian thickets. | Low. Yearlong resident in Marin County, but not known to breed in project areas. |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|--|--------------------------------|--|---|
| Harlequin duck <i>Histrionicus histrionicus</i> | FSC/CSC | Nests along shores of shallow, swift rivers with plentiful aquatic invertebrates. | Low. Possible winter resident only. |
| Loggerhead shrike <i>Lanius ludovicianus</i> | FSC/CSC | Nests in shrublands and forages in open grasslands | Low. Locally present but not abundant. |
| Lewis's woodpecker <i>Melanerpes lewis</i> | FSC/-- | Open woodlands in interior foothills and valleys | Low. Project areas are not in normal range. |
| San Pablo song sparrow <i>Melospiza melodia samuelis</i> | FSC/CSC | Tidal sloughs in salt marshes with pickleweed, restricted to north side of San Francisco Bay and Suisun Bay | Moderate. Known to occur in the Eastern Marin project areas. |
| Long-billed curlew <i>Numenius americanus</i> | FSC/-- | Lake beaches, nests in both dry and wet uplands | Low. Marin is winter range only. |
| Black-crowned night heron <i>Nycticorax nycticorax</i> | --/* | Lake margins, mud bordered bays, marshy areas | Moderate. Known to forage in tidal project areas (breed offshore). |
| Ashy storm petrel <i>Oceanodroma homochroa</i> | FSC/CSC | Coastal/oceanic habitats. Nests on islands with natural cavities or provided burrows | Low. No habitat in project areas. |
| Osprey <i>Pandion haliaetus</i> | --/CSC | Along rivers, lakes, and coasts | Low. Breeds at Kent Lake; not present in project areas. |
| Double-crested cormorant <i>Phalacrocorax auritus</i> | --/CSC | Nests along coast on isolated islands or in trees along lake margins. | Low. Potentially adjacent to tidal project areas. |
| Nuttall's woodpecker <i>Picoides nuttallii</i> | FSLC/-- | Oak woodland, chaparral, riparian (esp-willow-cottonwood) woodland; often foothill canyons. | Moderate. Known to occur in project areas in eastern Marin, especially Novato; breed through June. |
| Allen's hummingbird <i>Selasphorus sasin</i> | FSC/-- | Near the coast in mixed evergreen, riparian woodlands, eucalyptus and cypress groves, oak woodlands, and coastal scrub. | Low. Possible summer resident in Easkoot Creek project areas. |
| Caspian tern <i>Sterna caspia</i> | --/* | Protected coastal waters, lakes, rivers, fresh and salt water wetlands, especially estuaries, coastal bays and beaches. Nest on low sand or gravel with sparse vegetation. | Low. Possible summer resident in Marin; project areas do not have suitable habitat. |
| Elegant tern <i>Sterna elegans</i> | FSC/CSC | Does not nest in northern California, forages in inshore coastal waters, bays, and estuaries | Low. Possible summer resident in Marin; project areas do not have suitable habitat. |
| MAMMALS | | | |
| Pallid bat <i>Antrozous pallidus</i> | --/CSC | Open, dry habitats with rocky outcrops, cliffs, caverns, and crevices for roosting | Moderate. Known in Ross Creek project area; widespread but not abundant. |
| Townsend's western big-eared bat <i>Corynorhinus townsendi townsendii</i> | FSC/CSC | Humid coastal regions, will only roost in the open, extremely sensitive to disturbance | Low. Known well NW of Easkoot Creek project areas. |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|--|--------------------------------|---|---|
| Greater western mastiff bat <i>Eumops perotis californicus</i> | FSC/CSC | Open arid to semi-arid habitats, including woodlands, coastal scrub, chaparral, and grasslands. Roosts in trees, cliffs, dwellings | Low. No records in CNDDB for Marin County. Wide range but not abundant. |
| Small-footed myotis <i>Myotis ciliolabrum</i> | FSC/-- | Open arid habitats. Nursery colonies in caves, crevices, clay banks. Roosts in caves, dwellings, crevices. | Low. No records in CNDDB for Marin County. Wide range but not abundant. |
| Long-eared myotis <i>Myotis evotis</i> | FSC/-- | Brush, woodland, and forest habitats, prefers coniferous habitat types. Nursery colonies in buildings, crevices, spaces under tree bark, and snags. | Low. No records in CNDDB for Marin County. Wide range but not abundant. |
| Fringed myotis <i>Myotis thysanodes</i> | FSC/-- | A wide variety of habitats. Optimal habitats are valley-foothill hardwood and hardwood-conifer types. Uses caves, buildings, or crevices for roosting and nursery colonies. | Low. No records in CNDDB for Marin County. Wide range but not abundant. |
| Long-legged myotis <i>Myotis volans</i> | FSC/-- | Most common in woodland and forest habitats above 4000 feet. Use trees and caves for roosting, hollow trees or spaces under tree bark for nursery colonies. | Low. No records in CNDDB for Marin County. Wide range but not abundant. |
| Yuma myotis <i>Myotis yumanensis</i> | FSC/-- | Optimal habitat is open forests or woodlands with sources of water and flying insects. Nursery colonies in caves, buildings, or crevices. | Low. No records in CNDDB for Marin County. Wide range but not abundant. |
| PLANTS | | | |
| Napa false indigo <i>Amorpha californica var. napensis</i> | --/--List 1B | Dry slopes in yellow pine forest, chaparral, mixed evergreen forest, northern oak woodland | Low. Known in Marin, but no suitable habitat in project areas. |
| Bent-flowered fiddleneck <i>Amsinckia lunaris</i> | --/--List 1B | Coastal bluff scrub, cismontane woodland, valley and foothill grassland | Low. Known in Marin County, but not within project areas. |
| Marsh milk-vetch <i>Astragalus pycnostachyus var. Pycnostachyus</i> | FSLC/--List 1B | Coastal and saltmarsh habitats | Low. Known historically to occur near Easkoot Creek project areas, but CNPS presumes it extirpated in Bolinas quad.. |
| Small groundcone <i>Boschniakia hookeri</i> | --/--List 2 | Redwood forests | Low. Known to occur near Larkspur Cr and Arroyo Corte Madera del Presidio project areas.. |
| Salt marsh owl's clover <i>Castilleja ambigua ssp. ambigua</i> | FSLC/--List 1B | Salt marshes | Low. Known to occur in Marin; no records in CNDDB. |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|---|--------------------------------|--|--|
| Point Reyes bird's beak <i>Cordylanthus maritimus ssp. palustris</i> | FSC/--/List 1B | Coastal salt marsh | Moderate. Known to occur in west and east Marin County project areas. |
| Western leatherwood <i>Dirca occidentalis</i> | --/--/List 1B | Broadleaved upland forests, closed-cone coniferous forests, chaparral, cismontane woodland, North coast coniferous forests, riparian forests, riparian woodland; mesic sites | Low. Known to occur in Bolinas quad, but well upslope of Easkoot Creek project areas. |
| Streamside daisy <i>Erigeron biolettii</i> | --/--/List 3 | Rocky, mesic sites in broadleaved upland forest, cismontane woodland, and North Coast coniferous forest | Low. Known to occur in Marin; no records in CNDDB. No suitable habitat in project areas. |
| Marin checker lily <i>Fritillaria affinis var. tristulis = F. lanceolata</i> | --/--/List 1B | Coastal prairie, northern coastal scrub | Low. Known in Bolinas quad, but no suitable habitat in the Easkoot Creek project areas. |
| Dune gilia <i>Gilia capitata ssp. chamissonis</i> | --/--/List 1B | Coastal dunes and coastal scrub | Low. 1905 occurrence at Easkoot Creek project area, but habitat is not suitable. |
| Diablo helianthella <i>Helianthella castanea</i> | FSC/--/List 1B | Openings in chaparral and broadleaved upland forest | Low. Known in Mill Valley project areas; habitat at project areas is not good for this species. |
| Hayfield tarplant <i>Hemizonia congesta ssp. leucocephala</i> | --/--/List 1B | Coastal scrub, valley and foothill grassland | Moderate. Known near Arroyo San Jose project area. |
| Tiburon tarplant <i>Hemizonia multicaulis ssp. vernalis</i> | FSC/--/-- | Highly restricted distribution in coastal scrub and grassland habitats | Low. No records in CNDDB. |
| Delta mudwort <i>Limosella subulata</i> | --/--/List 2 | On mud banks in freshwater and brackish marshes and swamps, riparian scrub | Low. Known to occur in Marin; no records in CNDDB. |
| Marsh microseris <i>Microseris paludosa</i> | --/--/List 1B | Wet areas in a variety of habitats, including coastal scrub and valley and foothill grassland | Moderate. Known near Larkspur Cr, Arroyo Corte Madera del Presidio, and Cascade Cr project areas. |
| Hairless popcorn-flower <i>Plagiobothrys glaber</i> | --/--/List 1A | Coastal salt-marsh, alkaline flats, meadows, and seeps | Low. Historic record (1924) in Coyote Creek area; presumed extirpated in Marin (CNPS). |
| Marin knotweed <i>Polygonum marinense</i> | FSC/--/List 3 | Marshes and swamps | Moderate. Known in Corte Madera Creek project area. |
| Tamalpais oak <i>Quercus parvula var. tamalpaisensis</i> | --/--/List 1B | Known only from Mt. Tamalpais, lower montane coniferous forest | Low. Known in upland parts of San Rafael quad; no suitable habitat in project areas. |
| Point Reyes checkerbloom <i>Sidalcea calycosa ssp. rhizomata</i> | --/--/List 1B | Coastal freshwater marshes and swamps | Low. Known in upper San Anselmo and Lagunitas Creeks, but no suitable habitat in project areas. |

**SPECIAL STATUS SPECIES REPORTED OR POTENTIALLY OCCURRING
AT THE PROJECT SITES**

| Common Name <i>Scientific Name</i> | Listing Status FWS/DFG/CNPS | Habitat Requirements | Potential Occurrence |
|--|--------------------------------|------------------------------------|--|
| Marin checkerbloom <i>Sidalcea hickmanii ssp. viridis</i> | FSC/--/List 1B | Chaparral, usually on serpentinite | Low. Known to occur near Easkoot Creek, but no suitable habitat in project areas. |
| Pacific cordgrass <i>Spartina foliosa</i> | FSLC/--/-- | Salt marshes | Low. Known near baylands project areas, but outside of project work areas. |

APPENDIX B

PRELIMINARY LIST OF PROJECT SITES WITHIN THE JURISDICTION OF THE U.S. ARMY CORPS OF ENGINEERS

Project Sites within USACE Jurisdiction

| Site ID | Creek | Location Description | Tidal Character | Natural bottom | Concrete bottom |
|--|---------------------------|--|-----------------|----------------|-----------------|
| FLOOD CONTROL ZONE 1 - NOVATO | | | | | |
| 1-ASJ-2 | Arroyo de San Jose | Hwy 101 to silt basin US of Ignacio Blvd | Non-tidal | | X |
| FLOOD CONTROL ZONE 3 - RICHARDSON BAY | | | | | |
| 3-BM | Bothin Marsh | E. Blithedale Ave at Roque Moraes Dr | Tidal | X | |
| 3-COY-2 | Coyote Creek | Start of concrete channel to Laurel Way | Tidal | | X |
| 3-COY-3 | Coyote Creek | Laurel Way to US of Ash St | Non-tidal | | X |
| 3-MIL-1 | Miller Ave drainage | Just S of Miller Ave/Camino Alto intersection | Tidal | X | X |
| 3-MIL-2 | Miller Ave drainage | E side of Miller Ave across from Tamalpais HS | Tidal | X | |
| 3-MIL-3 | Miller Ave drainage | Across from Tamalpais HS track between Miller Ave and Bothin Marsh multiuse path | Tidal | X | |
| 3-REED-1 | Reed Creek | ACMP confluence US approximately 200 ft | Tidal | X | |
| 3-SUT-1 | Sutton Manor | Roque Moraes Dr just S of E. Blithedale Ave | Tidal | X | |
| 3-SUT-2 | Sutton Manor | Roque Moraes Dr to Ashford Ave | Tidal | X | |
| 3-SUT-3 | Sutton Manor | Ashford Ave to Dorset Ln | Tidal | | X |
| FLOOD CONTROL ZONE 4 - BEL AIRE AND STRAWBERRY CIRCLE | | | | | |
| 4-EAST-2 | East Creek | From tidal extent to end of Karen Way | Non-tidal | X | |
| 4-WEST-1 | West Creek | From Tiburon Blvd US to tidal extent (approx 425 ft) | Tidal | X | |
| FLOOD CONTROL ZONE 7 - SANTA VENETIA | | | | | |
| 7-EST | Estancia Ditch | Pump Station 4 to Pump Station 5 | Non-tidal | X | |
| 7-LAP-1 | Gallinas Creek South Fork | La Pasada Way intersection with Vendola Dr | Tidal | X | |
| 7-MEA-1 | Gallinas Creek South Fork | Meadow Way Interceptor Outlet; end of Meadow Way at Gallinas Creek | Tidal | X | |
| FLOOD CONTROL ZONE 9 - ROSS VALLEY | | | | | |
| 9-CMC-2 | Corte Madera Creek | Start of concrete channel to tidal extent | Tidal | | X |

APPENDIX C

PROJECT AREA AND SITE MAPS

Please see Appendix C in Programmatic Approach to Routine Maintenance Activities document for the maps.

APPENDIX D

PLANT SPECIES DETECTED

Plant Species Detected at the RMA Sites

| Family | Scientific Name | Common Name | |
|-------------------------------------|--|----------------------------|---|
| Aceraceae (Maple family) | <i>Acer negundo</i> | box-elder maple | |
| | <i>Acer macrophyllum</i> | big-leaf maple | |
| Anacardiaceae (Sumac Family) | <i>Toxicodendron diversilobum</i> | poison-oak | |
| Apiaceae (Parsley Family) | <i>Conium maculatum</i> | poison hemlock | * |
| | <i>Daucus carota</i> | Queen Anne's lace | * |
| | <i>Foeniculum vulgare</i> | sweet fennel | * |
| | <i>Heracleum maximum</i> | cow parsnip | |
| | <i>Oenanthe sarmentosa</i> | water parsley | |
| | <i>Osmorhiza (berteroi) chilensis</i> | sweet cicely | |
| Apocynaceae (Dogbane Family) | <i>Vinca major</i> | periwinkle | * |
| Aquifoliaceae (Holly Family) | <i>Ilex aquifolium</i> | English holly | * |
| Araliaceae (Aralia Family) | <i>Hedera helix</i> | English ivy | * |
| Aristolochiaceae (Birthwort Family) | <i>Aristolochia californica</i> | California pipe-vine | |
| Asteraceae (Sunflower Family) | <i>Achillea millefolium (A. borealis)</i> | yarrow | |
| | <i>Anaphalis margaritacea</i> | pearly everlasting | |
| | <i>Artemisia californica</i> | California sagebrush | |
| | <i>Baccharis pilularis</i> | coyotebrush | |
| | <i>Carduus pycnocephalus</i> | Italian thistle | * |
| | <i>Centaurea calcitrapa</i> | purple star-thistle | * |
| | <i>Chamomilla suaveolens (Matricaria matricarioides)</i> | pineapple weed | * |
| | <i>Cirsium vulgare</i> | bull thistle | * |
| | <i>Cotula coronopifolia</i> | brass-buttons | * |
| | <i>Delairea odorata</i> | Cape ivy | * |
| | <i>Euthamia occidentalis</i> | Western goldenrod | |
| | <i>Gnaphalium spp</i> | cudweed | |
| | <i>Grindelia stricta var. angustifolia</i> | shrubby saltmarsh gumplant | |

Plant Species Detected at the RMA Sites

| Family | | |
|---|-------------------------|---|
| Scientific Name | Common Name | |
| <i>Jaumea carnosa</i> | jaumea | |
| <i>Lasthenia californica/ L. gracilis</i> | goldfields | |
| <i>Madia sativa</i> | tall tarplant | |
| <i>Microseris sp</i> | dandelion | |
| <i>Picris echioides</i> | bristly ox-tongue | * |
| <i>Senecio vulgaris</i> | common groundsel | * |
| <i>Taraxacum officinale</i> | dandelion | * |
| Betulaceae (Birch Family) | | |
| <i>Alnus rhombifolia</i> | white alder | |
| <i>Alnus rubra</i> | red alder | |
| <i>Corylus cornuta var. californica</i> | California hazelnut | |
| Berberidaceae | | |
| <i>Berberis nervosa</i> | longleaf Oregon grape | |
| <i>Berberis pinnata</i> | shortleaf Oregon grape | |
| Boraginaceae (Borage Family) | | |
| <i>Echium candicans (E. fastuosum)</i> | Pride of Madeira | * |
| Brassicaceae (Mustard Family) | | |
| <i>Brassica nigra</i> | black mustard | * |
| <i>Brassica rapa</i> | field mustard | * |
| <i>Cardamine californica var. californica</i> | woodland milkmaids | |
| <i>Lepidium strictum (L. pubescens)</i> | peppergrass | * |
| <i>Lepidium latifolium</i> | perennial peppergrass | * |
| <i>Raphanus sativus</i> | wild radish | * |
| <i>Rorippa nasturtium-aquaticum</i> | watercress | * |
| Caprifoliaceae (Honeysuckle Family) | | |
| <i>Lonicera hispidula var. vacillans</i> | California honeysuckle | |
| <i>Sambucus nigra var caerulea</i> | blue-berried elderberry | |
| <i>Symphoricarpus albus var. laevigatus</i> | tall snowberry | |
| <i>Symphoricarpos mollis</i> | creeping snowberry | |
| Chenopodiaceae (Goosefoot Family) | | |
| <i>Calystegia purpurata ssp. purpurata</i> | common morning glory | |
| <i>Convolvulus arvensis</i> | field bindweed | * |
| <i>Salicornia virginica</i> | perennial pickleweed | |

Plant Species Detected at the RMA Sites

| Family | | |
|---|-----------------------|---|
| <i>Scientific Name</i> | Common Name | |
| Cornaceae | | |
| <i>Cornus sericea</i> | creek dogwood | |
| Cyperaceae (Sedge Family) | | |
| <i>Carex globosa</i> | round-fruited sedge | |
| <i>Carex gracilior</i> | slender sedge | |
| <i>Carex obnupta</i> | tall sedge | |
| <i>Carex praegracilis</i> | turf sedge | |
| <i>Cyperus eragrostis</i> | umbrella sedge | |
| <i>Scirpus microcarpus</i> | broadleafed bulrush | |
| <i>Scirpus (Schenoplectus) robustus (or S. maritimus)</i> | saltmarsh bulrush | |
| Dennstaedtiaceae (Bracken-Fern Family) | | |
| <i>Pteridium aquilinum var. pubescens</i> | western bracken-fern | |
| Dipsacaceae (Teasel Family) | | |
| <i>Dipsacus sativus</i> | teasel | * |
| Dryopteridaceae (Woodfern Family) | | |
| <i>Polystichum californicum</i> | California sword fern | |
| Ericaceae | | |
| <i>Arbutus menziesii</i> | madrone | |
| <i>Arctostaphylos manzanita</i> | common manzanita | |
| <i>Rhododendron macrophyllum</i> | western rhododendron | |
| <i>Rhododendron occidentale</i> | western azalea | |
| Equisetaceae (Horsetail Family) | | |
| <i>Equisetum arvense</i> | common horsetail | |
| <i>Equisetum telmateia ssp. braunii</i> | giant horsetail | |
| Fabaceae (Pea Family) | | |
| <i>Acacia spp.</i> | acacia spp. | * |
| <i>Cytisus scoparius</i> | Scot's broom | * |
| <i>Genista monspessulana</i> | French broom | * |
| <i>Lotus corniculatus</i> | bird's-foot trefoil | * |
| <i>Lupinus albus</i> | silverleaf lupine | |
| <i>Lupinus formosus</i> | lupine | |
| <i>Medicago polymorpha</i> | bur clover | * |
| <i>Melilotus indica</i> | yellow sweet clover | * |
| <i>Spartium junceum</i> | Spanish broom | * |

Plant Species Detected at the RMA Sites

| Family | | |
|--|----------------------------|---|
| Scientific Name | Common Name | |
| <i>Trifolium albopurpureum</i> var. <i>albopurpureum</i> | Indian clover | |
| <i>Ulex europaeus</i> | gorse | * |
| <i>Vicia sativa</i> ssp. <i>Nigra</i> | narrow-leaved common vetch | * |
| <i>Vicia sativa</i> ssp. <i>Sativa</i> | broad-leaved common vetch | * |
| Fagaceae (Oak Family) | | |
| <i>Chrysopsis chrysophylla</i> | giant chinquapin | |
| <i>Lithocarpus densiflorus</i> | tanbark oak | |
| <i>Quercus agrifolia</i> | coast live oak | |
| <i>Quercus berberidifolia</i> | scrub oak | |
| <i>Quercus chrysolepis</i> | canyon live oak | |
| <i>Quercus douglasii</i> | blue oak | |
| <i>Quercus garryana</i> | Oregon oak | |
| <i>Quercus lobata</i> | valley oak | |
| <i>Quercus kelloggii</i> | black oak | |
| Frankeniaceae (Frankenia Family) | | |
| <i>Frankenia salina</i> | alkali heath | |
| Geraniaceae (Geranium Family) | | |
| <i>Erodium botrys</i> | broad-leaf filaree | * |
| <i>Erodium cicutarium</i> | red-stem filaree | * |
| <i>Geranium dissectum</i> | cut-leaved cranesbill | * |
| Grossulariaceae (Gooseberry Family) | | |
| <i>Ribes californicum</i> | California gooseberry | |
| <i>Ribes sanguineum</i> var. <i>glutinosum</i> | pink flowering currant | |
| Hippocastanaceae | | |
| <i>Aesculus californica</i> | California buckeye | |
| Iridaceae (Iris Family) | | |
| <i>Sisyrinchium bellum</i> | blue-eyed grass | |
| Juncaceae (Rush Family) | | |
| <i>Juncus patens</i> | blue-green rush | |
| <i>Juncus tenuis</i> (was <i>occidentalis</i>) | western rush | |
| <i>Juncus xiphioides</i> | iris-leaved rush | |
| Lamiaceae/Labiatae (Mint Family) | | |
| <i>Mentha pulegium</i> | pennyroyal | * |

Plant Species Detected at the RMA Sites

| Family | | | |
|--------------------------------------|---|-----------------------|---|
| | <i>Scientific Name</i> | Common Name | |
| | <i>Monardella villosa ssp. villosa</i> | coyote mint | |
| | <i>Stachys ajugoides var. rigida</i> | hedge-nettle | |
| Lauraceae | | | |
| | <i>Umbellularia californica</i> | California bay-laurel | |
| Lemnaceae (Duckweed Family) | | | |
| | <i>Lemna minor</i> | duckweed | |
| Liliaceae (Lily Family) | | | |
| | <i>Chlorogalum pomeridianum var. pomeridianum</i> | soap plant | |
| Malvaceae (Mallow Family) | | | |
| | <i>Malva nicaeensis</i> | common mallow | * |
| Myricaceae | | | |
| | <i>Morella californica</i> | California wax myrtle | |
| Myrtaceae | | | |
| | <i>Eucalyptus globulus</i> | blue-gum eucalyptus | * |
| Oleaceae | | | |
| | <i>Fraxinus latifolia</i> | Oregon ash | |
| | <i>Olea europaea</i> | olive | * |
| Onagraceae (Evening Primrose Family) | | | |
| | <i>Camissonia (Oenothera) ovata</i> | sun-cups | |
| | <i>Epilobium canum ssp. canum</i> | California fuchsia | |
| Oxalidaceae (Oxalis Family) | | | |
| | <i>Oxalis albicans ssp. pilosa</i> | Wood-sorrel | |
| Papaveraceae (Poppy Family) | | | |
| | <i>Eschscholzia californica</i> | California poppy | |
| Pinaceae (Pine Family) | | | |
| | <i>Pinus radiata</i> | Monterey pine | * |
| | <i>Pseudotsuga menziesii</i> | Douglas-fir | |
| Plantaginaceae (Plantain Family) | | | |
| | <i>Digitalis purpurea</i> | foxglove | * |

Plant Species Detected at the RMA Sites

| Family | | |
|--|---------------------------|---|
| <i>Scientific Name</i> | Common Name | |
| <i>Plantago erecta</i> | dwarf plantain | |
| <i>Plantago lanceolata</i> | English plantain | * |
| <i>Plantago major</i> | common broadleaf plantain | * |
| Poaceae/Gramineae (Grass Family) | | |
| <i>Agrostis sp.</i> | bentgrass | * |
| <i>Avena barbata</i> | slim oat | * |
| <i>Avena fatua</i> | fat oat | * |
| <i>Briza maxima</i> | rattlesnake grass | * |
| <i>Briza minor</i> | little rattlesnake grass | * |
| <i>Bromus diandrus</i> | ripgut brome | * |
| <i>Bromus hordeaceus</i> | soft brome, chess | * |
| <i>Bromus rubens</i> | foxtail chess | * |
| <i>Cortaderia sp</i> | pampas grass | * |
| <i>Cynodon dactylon</i> | Bermuda grass | * |
| <i>Cynosurus echinatus</i> | dogtail grass | * |
| <i>Dactylis glomerata</i> | orchard grass | * |
| <i>Distichlis spicata</i> | saltgrass | |
| <i>Elymus glaucus ssp. glaucus</i> | blue wild-rye | |
| <i>Festuca arundinacea</i> | tall fescue | * |
| <i>Holcus lanatus</i> | velvet grass | * |
| <i>Hordeum marinum ssp. Gussoneanum</i> | Mediterranean barley | * |
| <i>Hordeum murinum ssp. Leporinum</i> | farmers' foxtail | * |
| <i>Leymus triticoides</i> | wheatgrass leymus | |
| <i>Lolium multiflorum</i> | Italian annual ryegrass | * |
| <i>Lolium perenne</i> | perennial ryegrass | * |
| <i>Melica californica</i> | grassland melicgrass | |
| <i>Melica torreyana</i> | slender melicgrass | |
| <i>Nassella lepida</i> | slender needlegrass | |
| <i>Nassella (Stipa) pulchra</i> | purple needlegrass | |
| <i>Phalaris aquatica (P. tuberosa var. stenoptera)</i> | Harding grass | * |
| <i>Spartina foliosa</i> | Pacific cordgrass | |
| <i>Vulpia bromoides</i> | brome-like annual fescue | * |
| Polygonaceae (Buckwheat Family) | | |
| <i>Eriogonum fasciculatum</i> | bush buckwheat | |
| <i>Eriogonum nudum var. nudum</i> | nude buckwheat | |
| <i>Rumex conglomeratus</i> | clusterd dock | * |
| <i>Rumex crispus</i> | curly dock | * |

Plant Species Detected at the RMA Sites

| Family | Scientific Name | Common Name | |
|---|---|----------------------------|---|
| Polemoniaceae (Gilia/Phlox Family) | <i>Gilia clivorum</i> | small gilia | |
| | <i>Navarretia squarrosa</i> | skunkweed | |
| | | | |
| Polypodiaceae | <i>Polypodium californicum</i> | California polypody | |
| | | | |
| Portulacaceae (Purslane Family) | <i>Claytonia perfoliata</i> | miners' lettuce | |
| | | | |
| Primulaceae (Primrose Family) | <i>Anagallis arvensis</i> | scarlet pimpernel | * |
| | <i>Dodecatheon hendersonii</i> | shooting star | |
| | | | |
| Pteridaceae | <i>Adiantum jordanii</i> | California maidenhair | |
| | | | |
| Ranunculaceae (Buttercup/Crowfoot Family) | <i>Ranunculus californicus</i> | California buttercup | |
| | | | |
| Rhamnaceae | <i>Ceanothus foliosus var. foliosus</i> | indigo bush | |
| | <i>Ceanothus thyrsiflorus</i> | blueblossom | |
| | <i>Rhamnus (Frangula) californica</i> | coffee-berry | |
| | | | |
| Rosaceae (Rose Family) | <i>Adenostoma fasciculatum</i> | chamise | |
| | <i>Amelanthier utahensis</i> | service berry | |
| | <i>Heteromeles arbutifolia</i> | toyon | |
| | <i>Pyracantha spp.</i> | firethorn | * |
| | <i>Rosa californica</i> | California wild rose | |
| | <i>Rubus armeniacus</i> | Himalaya blackberry | * |
| | <i>Rubus ursinus</i> | California wild blackberry | |
| Rubiaceae | <i>Galium trifidum</i> | marsh bedstraw | |
| | | | |
| Salicaceae Willow Family) | <i>Salix exigua</i> | narrow-leaved willow | |
| | <i>Salix laevigata</i> | red willow | |
| | <i>Salix lasiolepis</i> | arroyo willow | |
| | | | |

Plant Species Detected at the RMA Sites

| Family | Scientific Name | Common Name |
|-----------------------------------|---|---------------------|
| | <i>Salix lucida lasiandra</i> | yellow willow |
| | <i>Salix scouleriana</i> | Scouler's willow |
| | <i>Salix sitchensis</i> | Sitka willow |
| Scrophulariaceae (Figwort Family) | | |
| | <i>Castilleja densiflora</i> var. <i>densiflora</i> | common owl's clover |
| | <i>Mimulus aurantiacus</i> | sticky monkeyflower |
| | <i>Mimulus guttatus</i> | common monkeyflower |
| | <i>Scrophularia californica</i> ssp. <i>californica</i> | bee-plant |
| Taxodiaceae | | |
| | <i>Sequoia sempervirens</i> | coast redwood |
| Taxaceae | | |
| | <i>Torreya californica</i> | California nutmeg |
| Typhaceae (Cattail Family) | | |
| | <i>Typha angustifolia</i> | narrow-leaf cattail |
| | <i>Typha latifolia</i> | broad-leaf cattail |

Notes

* denotes non-native plants or natives planted out of natural native location.

APPENDIX E

WILDLIFE SPECIES DETECTED

Wildlife Species Detected at the RMA Sites

| CLASS | | |
|--------------|--|----------------------------|
| Family | Scientific Name | Common Name |
| INSECTA | | |
| Vespidae | <i>Vespula sp.</i> | Yellowjacket |
| OSTEICHTHYES | | |
| Salmonidae | <i>Oncorhynchus mykiss irideus</i> | Steelhead |
| AMPHIBIA | | |
| Ranidae | <i>Rana draytonii</i> | California red-legged frog |
| | <i>Rana catesbeiana</i> | Bullfrog |
| Hylidae | <i>Pseudacris regilla</i> | Pacific chorus frog |
| REPTILIA | | |
| Emydidae | <i>Clemmys marmorata marmorata</i> | Northwestern pond turtle |
| AVES | | |
| Anatidae | <i>Anas platyrhynchos</i> | Mallard |
| Ardeidae | <i>Egretta thula</i> | Snowy egret |
| Cathartidae | <i>Cathartes aura</i> | Turkey vulture |
| Accipitridae | <i>Accipiter striatus</i> | Sharp-shinned hawk |
| | <i>Buteo jamaicensis</i> | Red-tailed hawk |
| Rallidae | <i>Laterallus jamaicensis coturniculus</i> | California black rail |
| | <i>Rallus longirostris obsoletus</i> | California clapper rail |
| Columbidae | <i>Zenaidura macroura</i> | Mourning dove |
| Trochilidae | <i>Calypte anna</i> | Anna's hummingbird |
| Picidae | <i>Picoides nuttalli</i> | Nuttall's woodpecker |
| | <i>Melanerpes formicivorus</i> | Acorn woodpecker |

Wildlife Species Detected at the RMA Sites

| CLASS | | |
|--------------|--------------------------------|---------------------------|
| Family | Scientific Name | Common Name |
| Corvidae | | |
| | <i>Aphelocoma coerulescens</i> | Westren scrub jay |
| | <i>Cyanocitta stelleri</i> | Steller's jay |
| | <i>Corvus brachyrhynchos</i> | American crow |
| Paridae | | |
| | <i>Parus rufescens</i> | Chestnut-backed chickadee |
| Mimidae | | |
| | <i>Mimus polyglottos</i> | Northern mockingbird |
| Parulidae | | |
| | <i>Dendroica coronata</i> | Yellow-rumped warbler |
| Emberizidae | | |
| | <i>Junco hyemalis</i> | Dark-eyed junco |
| | <i>Pipilo crissalis</i> | California towhee |
| Regulidae | | |
| | <i>Regulus calendula</i> | Ruby-crowned kinglet |
| Icteridae | | |
| | <i>Euphagus cyanocephalus</i> | Brewer's blackbird |
| Fringillidae | | |
| | <i>Carpodacus mexicanus</i> | House finch |
| MAMMALIA | | |
| Cervidae | | |
| | <i>Odocoileus hemionus</i> | Mule deee |
| Sciuridae | | |
| | <i>Sciurus carolinensis</i> | Gray squirrel |

APPENDIX F

SITE ASSESSMENT DATA SHEET

**Marin County / Department of Public Works / Flood Control and Water Conservation District
Routine Maintenance Agreement Site Assessment Data Sheet**

Site ID: _____ Date: _____

Staff Name: _____ Photo#: _____

Site Notes: _____

Wetlands / US: _____

VEGETATION

Shading of stream: None Low Moderate High

Riparian Vegetation Trees > 10m Present Absent

| | | |
|-------------------------|---------|-------------------|
| Percentage Cover: | | Dominant species: |
| Trees | _____ % | _____ |
| Shrubs / vines / rushes | _____ % | _____ |
| Grasses / herbs / ferns | _____ % | _____ |
| Barren | _____ % | |

Weeds observed _____

Special status species observed: _____

ANIMALS

| | | | |
|------------------|----------------|--------------|----------------------|
| Habitat present: | Coho / SH / CH | Rails / SMHM | Birds (tree-nesting) |
| | NWPT | Bats | BUOW |

Species observed:

Birds _____

Amph / Reptiles _____

Mammals _____

Other _____

APPENDIX F

BMP REFERENCES

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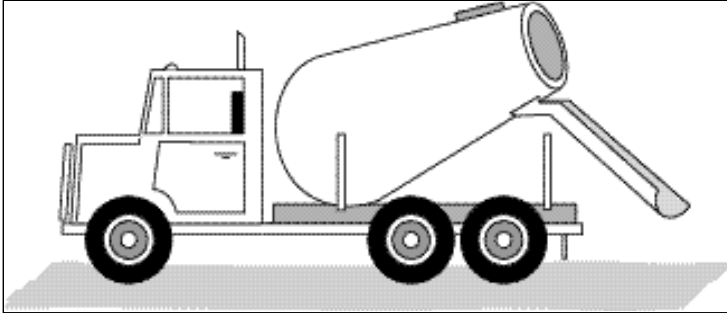
| Page Numbers | Activity Type | BMP Initials | BMP Title | Source |
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| 4-6 | Equip/Vehicles | EV-1 | Equipment and Vehicle Maintenance | BAASMA |
| 7-10 | Equip/Vehicles | EV-2 | Equipment and Vehicle Cleaning | BAASMA |
| 11-13 | Resource Protection | NR-1 | Channel Protection and Restoration | BAASMA |
| 14-15 | Resource Protection | NR-2 | Biotechnical Bank Stabilization | BAASMA |
| 16-18 | Resource Protection | NR-3 | Project Planning/Scheduling | BAASMA |
| 19-23 | Resource Protection | A-229 | Seasonal Planning | FishNet4C |
| 24-26 | Sediment Control | SC-1 | Stockpiles and Sediment Disposal | BAASMA |
| 27-28 | Sediment Control | SC-2 | Dredging | BAASMA |
| 29-35 | Sediment Control | SC-3 | Sediment Basins | BAASMA |
| 36-43 | Sediment Control | SC-4 | Straw or Sandbag Barriers | BAASMA |
| 44-49 | Sediment Control | SC-5 | Sediment Traps | BAASMA |
| 50-53 | Sediment Control | SC-6 | Silt Fence | BAASMA |
| 54-55 | Sediment Control | A-101 | Check Dam - Straw Bale | FishNet4C |
| 56-58 | Sediment Control | A-103 | Concrete Washout | FishNet4C |
| 59-60 | Sediment Control | A-107 | Containment of Concrete Pours | FishNet4C |
| 61-63 | Sediment Control | A-109 | Silt Mat Inlet | FishNet4C |
| 64-66 | Sediment Control | A-113 | Silt Mat/Vegetated Grassy Swale | FishNet4C |
| 67-74 | Sediment Control | A-117 | Silt Fence | FishNet4C |
| 75-78 | Sediment Control | A-141 | Turbidity Curtain | FishNet4C |
| 79-87 | Sediment Control | SS-1 | Erosion Control Blankets, Mats | BAASMA |
| 88-91 | Sediment Control | SS-2 | Dust Control | BAASMA |
| 92-95 | Sediment Control | SS-4 | Construction Road Entrance Stabilization | BAASMA |
| 96-103 | Sediment Control | A-53 | Blankets/Geotextile Fabric | FishNet4C |
| 104-105 | Sediment Control | A-61 | Coir Fabric-Netting | FishNet4C |
| 106-109 | Sediment Control | A-63 | Coir Logs/Straw Rolls | FishNet4C |
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| 112-116 | Erosion Control | A-185 | Brush Mattress | FishNet4C |
| 117-118 | Erosion Control | A-191 | Harvesting and Handling Woody Cuttings | FishNet4C |
| 119-122 | Erosion Control | A-193 | Large Woody Debris Revetment | FishNet4C |
| 123-125 | Erosion Control | A-197 | Willow Wall Revetment | FishNet4C |
| 126-129 | Erosion Control | A-203 | Live Stakes | FishNet4C |
| 130-134 | Erosion Control | A-211 | Wattles/Fascines | FishNet4C |
| 135 | Erosion Control | A-223 | Streambed Gravel | FishNet4C |
| 136-139 | Vegetation Maintenance | VDM-1 | Preservation of Existing Vegetation | BAASMA |
| 140-142 | Vegetation Maintenance | VDM-2 | Removal of Existing Vegetation | BAASMA |
| 143-145 | Vegetation Maintenance | VDM-3 | Revegetation After Soil Disturbance | BAASMA |
| 146-147 | Vegetation Maintenance | A-67 | Broadcast Seeding | FishNet4C |
| 148-149 | Vegetation Maintenance | A-69 | Hydroseeding | FishNet4C |
| 150-153 | Vegetation Maintenance | A-73 | Planting | FishNet4C |
| 154-156 | Vegetation Maintenance | VDM-4 | Debris Removal | BAASMA |
| 157-163 | Velocity Reduction | VR-4a | Permanent Outlet Protection | BAASMA |
| 164-166 | Velocity Reduction | VR-4b | Temporary Outlet Protection | BAASMA |
| 167-173 | Velocity Reduction | VR-5 | Storm Drain Inlet Protection | BAASMA |
| 174-175 | Velocity Reduction | A-43 | Energy Dissipater | FishNet4C |
| 176-182 | Water Diversion | WD-5 | In Channel Flow Diversion Systems | BAASMA |
| 183-188 | Water Diversion | A-151 | Cofferdam | FishNet4C |
| 189-190 | Water Diversion | A-157 | Dewatering | FishNet4C |
| 191-192 | Water Diversion | A-161 | Fish Exclusion | FishNet4C |
| 193-195 | Water Diversion | A-163 | Level Spreader | FishNet4C |
| 196 | Water Diversion | A-167 | Sandbag | FishNet4C |
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**Chemical
Use**

**Concrete Use
and Disposal**



- Pollution Prevention
- Wildlife Protection
- Habitat Protection

Description

Implement use, washout, and disposal practices for concrete activities that prevent concrete leaching discharge to flood control channels, waterways, and storm drain systems.

Applicability

- Replacement or construction of concrete piers or pilings.
- Construction or maintenance projects where concrete is used and where concrete dust and debris result from demolition activities.
- Any time concrete may contact water. Before cured, concrete can leach into the water and affect the pH of water.

Approach and Standards

General

- To the degree possible, avoid mixing extra concrete on site.
- When washing concrete to remove fine particles and expose the aggregate, do not wash the fines into the channel, street, or storm drain. Collect and return the fines to the aggregate base stockpile or dispose of properly.
- Minimize water use by having a positive shutoff on the washout hose.
- Designate concrete disposal areas.
- Store dry bulk and bagged cement, mortar, sand, and concrete materials under cover, away from the channel and the storm drains.

Chemical Use

Concrete Use and Disposal

Washouts

- Designate areas to be used for washout of transit mix trucks and other vehicles and equipment used to transport, r move, and/or work concrete.
- Locate on site washout areas at least 50 feet from any storm drain inlets, drainage facilities, or channels. Contain runoff from this area by constructing a temporary pit or bermed area large enough to contain the liquid and solid waste generated during washout procedures.
- Washout locations may be flagged with lath or surveyors tape or designated as necessary to insure that truck drivers utilize proper areas.
- Perform washout of concrete trucks in designated areas only. Do not allow excess concrete to be dumped on site, except in designated areas.
- Wash wastes into a temporary pit where the concrete can set, be broken up, and then disposed of properly. Dispose of hardened concrete on a regular basis.

Concrete Use In and Near Waterways

- When sawcutting or sanding, ensure concrete dust does not enter waterway.
- Use sheeting or otherwise isolate concrete that is used in channels (e.g., for piers, etc.) for generally 2.5 weeks to one month to allow time for curing. Concrete has a cure time of approximately one month. Concrete that has not been cured can increase the pH of the water. Concrete should be isolated until it no longer poses a threat to the pH levels.

Limitations

- Space and staff time is needed to designate and set up a washout area.
- The replacement of structures that are made of concrete and are in contact with stream water would violate California Department of Fish and Game Code § 5650 without proper BMPs.
- Requires planning.

Requirements

Maintenance

- Monitor weather and wind direction to ensure concrete dust is not entering storm drains or channels.

Chemical Use

Concrete Use and Disposal

- Where appropriate, construct sediment traps or other types of sediment detention devices downstream of demolition activities.
- Monitor on-site concrete waste storage and disposal procedures at least weekly.
- Regularly monitor materials used to isolate concrete located in inundated channels or waterways. Once the concrete cures, promptly remove the sheeting or other isolation materials.

Costs

- Material costs for sheeting or isolation materials, and staff time costs for monitoring can incur.

Training

- Instruct drivers and equipment operators on proper concrete disposal and equipment washout practices.
- Educate employees, subcontractors, and suppliers on concrete waste storage and disposal procedures.
- Designate a staff member, aware of the potential environmental consequences of improperly handled concrete and concrete wastes, to oversee and enforce concrete management procedures.
- If using a temporary pit, dispose of hardened concrete on a regular basis.
- Instruct staff on California Department of Fish and Game statutes, and on proper installation, monitoring, and removal of isolation materials for protection during curing of concrete placed in waterways.

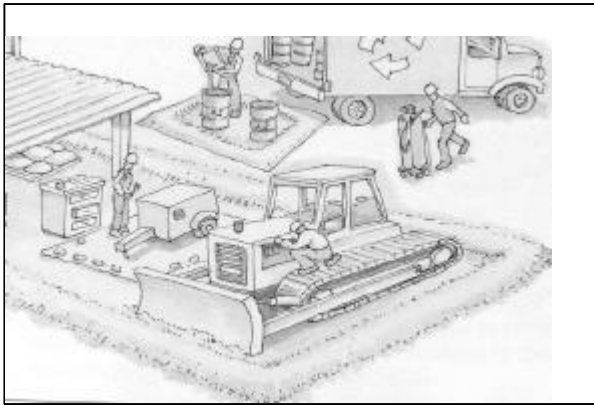
References

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, CA 23, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD 16(2), April 1997.

Rugg, Mike, California Department of Fish and Game, personal communication, BASMAA OPC meeting, September 14, 1999.

Santa Clara Valley Water District, "BMP/PMM List," February, 1999.



Source: BASMAA

- Pollution Prevention
- Pollution Control

Description

Methods to prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment maintenance by conducting these activities off-site or in a designated area designed to contain spills and prevent runoff or runoff.

Applicability

- This applies to all equipment and vehicle maintenance activities associated with flood control maintenance.
- Refer to BMP CU-4 (spill prevention and control) for more information related to this BMP.

Approach and Standards

- Keep vehicles and equipment clean. Do not allow excessive build-up of oil or grease.
- Maintain vehicles and equipment, and conduct fueling off-site or in a designated, protected area where vehicle fluids and spills can be handled more easily.
- If maintenance must occur on-site, use designated areas located away from drainage courses to prevent the run-on of stormwater and the runoff of spills. Clearly designate the service area with berms, sandbags, or other barriers.
- For vehicles that use hydraulic equipment (e.g., excavators, loaders), consider using vegetable-based hydraulic oil, which is biodegradable.
- Quantities of equipment fluids greater than 55 gallons should be provided with secondary containment that is capable of containing 110% of the primary container(s).
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids. Store fluids in appropriate containers with covers, and properly recycle or dispose of them off-site.

**Equipment &
Vehicles**

- For long-term projects, use portable tents or covers over maintenance areas during the rainy season, October to April. Make sure fluid containers are properly stored in covered areas.
- Store cracked batteries in a non-leaking secondary container and remove from the site.
- Place a stockpile of spill clean-up materials where it will be readily accessible.
- Use absorbent materials on small spills located on impervious surface rather than hosing down the spill. On pervious surfaces such as soils, dig up wet spills and properly dispose of the material rather than burying it. Collect and dispose of the absorbent materials properly and promptly.
- Regularly inspect on-site vehicles and equipment for leaking oil and fluids.
- Check incoming vehicles and equipment for leaking oil and fluids (including delivery trucks, and employee and subcontractor vehicles). Do not allow leaking vehicles or equipment on-site.
- As appropriate, properly label containers with a “Hazardous Waste” label and properly recycle or dispose of hazardous waste off-site.

Limitations

Not allowing leaking vehicles or equipment on-site may cause delays in construction.

Requirements

Maintenance

- Maintain waste fluid containers in leak-proof condition.
- Keep ample supplies of spill cleanup materials on-site.
- Inspect on-site and off-site vehicle and equipment maintenance areas regularly.

Costs

- Costs associated with this BMP will depend on the age, use, and amount of preventative maintenance of the equipment and vehicles used.
- Cleaning equipment at a commercial business can be economical by eliminating the need for a separate operation at your site.
- Lower hazardous waste management costs by eliminating or reducing the amount of hazardous wastes.
- Separate wastes for easier recycling and lower disposal costs.

Training

- Train employees in proper maintenance techniques that promote pollution prevention.

- Train employees in spill clean up procedures.

References

California Code of Regulations, 1999.

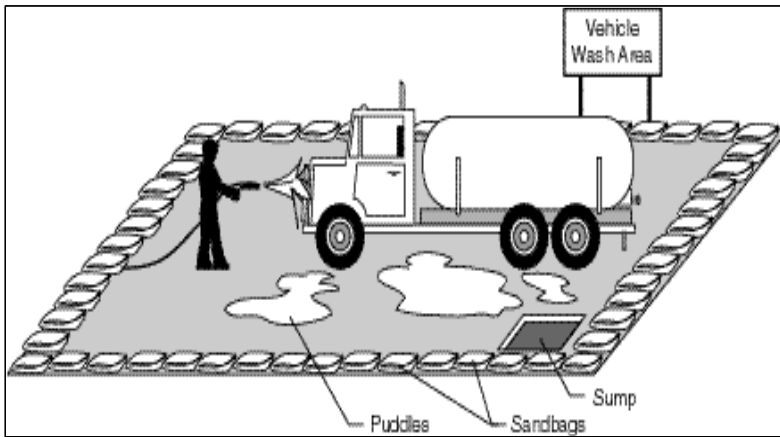
California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, CA 32, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD 19 (2), April 1997.

Frame, Robert (San Mateo County Public Works), personal communication to Billi Romain (BASMAA), June 7, 2000.

Santa Clara Valley Water District, *Final Best Management Practices Plan for the 1998 Sediment Removal Project*, September 18, 1998.

**Equipment &
 Vehicles**



- Pollution Prevention
- Pollution Control

Description

Practices to prevent or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning by using off-site facilities whenever possible, or by conducting these operations in designated, protected areas.

Applicability

- This applies to all equipment and vehicles that are used for flood control activities and that require cleaning.

Approach and Standards

- Whenever possible, wash vehicles and equipment off-site where wash waters may be disposed of properly.
- When vehicle and equipment cleaning must occur on-site, and the operation cannot be located with treatment facilities and discharge to a sanitary sewer, the outside cleaning area should have the following characteristics:
 - ✓ Located away from storm drain inlets, drainage facilities, or channels.
 - ✓ Bermed to contain wash waters and to prevent runoff and runoff.
 - ✓ Configured wash area with a sump to allow collection and disposal of wash water.
 - ✓ Discharge water as dust control or to a pervious surface.
 - ✓ Wash waters shall not be discharged or allowed to flow to storm drains or channels.
 - ✓ Use the on-site cleaning area only when necessary.
- Refer to CU-8 for concrete or cement washout.

**Equipment &
Vehicles**

- Use as little water as possible to avoid having to install erosion and sediment controls for the wash area.
- Use phosphate-free, biodegradable soaps and then use the least amount necessary.
- Do not permit steam cleaning, unless the area is equipped with filtering devices. Do not permit the use of soap, solvents, or degreasers on-site. These particular items generate significant pollutant concentrations.

Limitations

- Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades.
- Some municipalities may require pretreatment and monitoring of wash water discharges to the sanitary sewer. Contact the local wastewater authority for permission and direction prior to initiating cleaning activities.

Requirements

Maintenance

- Inspect regularly for erosion and sedimentation of the wash areas.
- Regularly service sumps associated with wash areas.

Costs

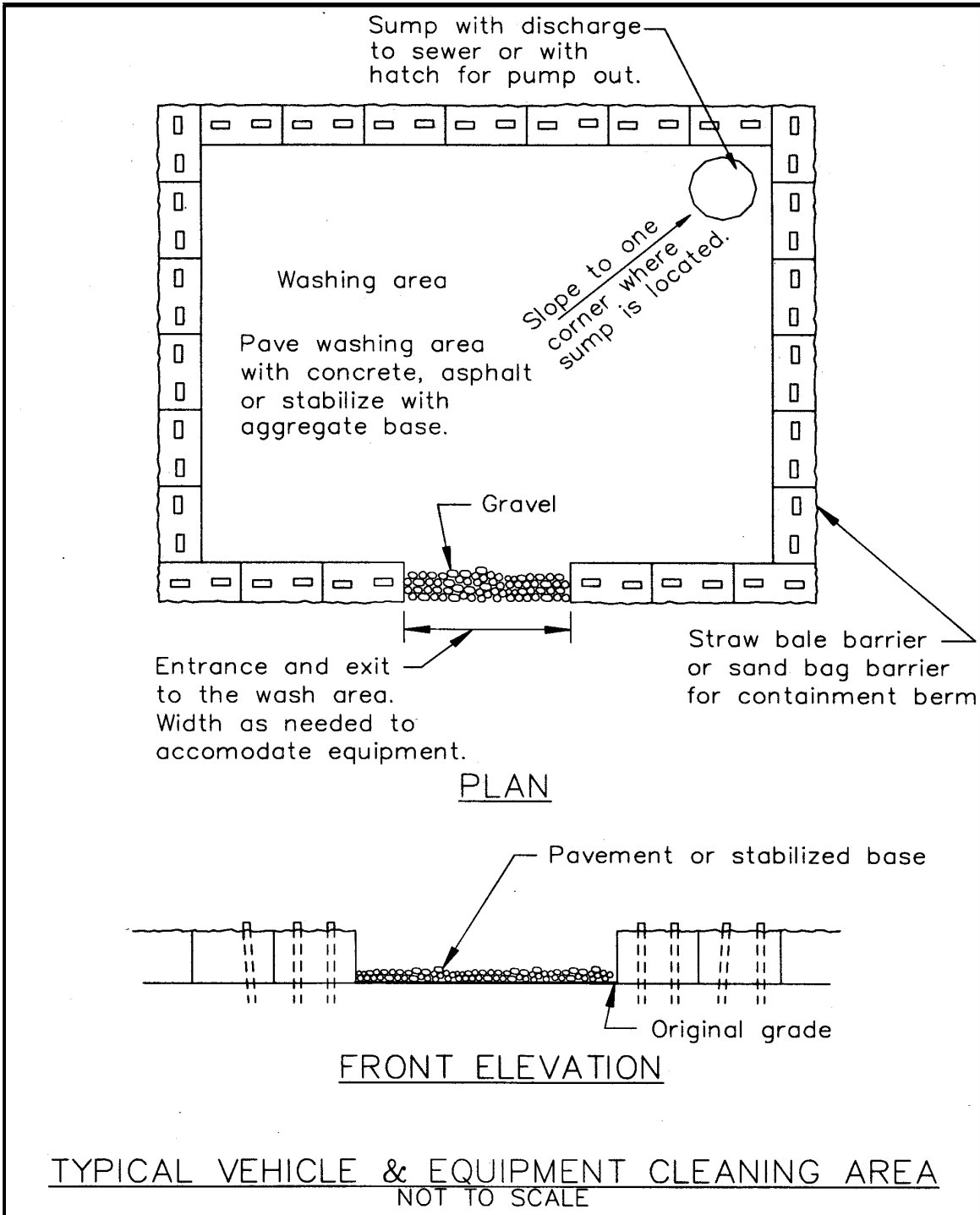
- Cleaning equipment at a commercial business can be economical by eliminating the need for a separate operation at your site.
- Staff time to create vehicle wash area, maintain sump, contact proper authorities.
- Material costs for berms, sumps, biodegradable soap, and aggregate, concrete or asphalt base.

Training

- Train employees on the proper disposal of wash waters.
- Educate employees and subcontractors on pollution prevention measures.

Equipment & Vehicles

Equipment & Vehicle Cleaning



Source: Caltrans, 1997.

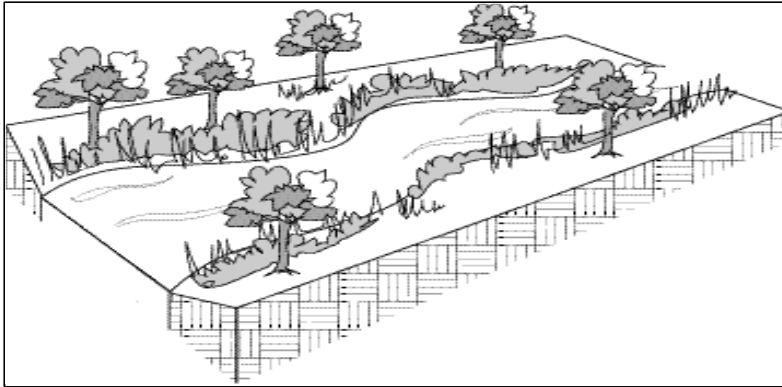
References

California Code of Regulations, 1999.

California Storm Water Quality Task Force, *California Storm Water Best Management Practices Handbook Construction Activity*, CA 30, 1992.

Santa Clara Valley Water District, "BMP/PMM List," February, 1999.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD 18 (2), April 1997.

Natural Resources Channel Protection & Restoration

- Erosion Control
- Wildlife Protection
- Habitat Protection
- Slope and Channel Protection

Description

Practices to protect or provide suitable habitat for fish, amphibians, and wildlife dependent on the riparian area.

Applicability

- Channels and stream work.

Channel restoration is likely to have a strong, positive effect on wildlife protection.

Approach and Standards**All Channels.**

- Schedule work to avoid wildlife breeding or nesting seasons (see BMP NR-3).
- Regrade the channel bottom at the end of work to as close to original conditions as possible in order to restore the riffle and pool configuration of the channel bottom.
- Release flow after work is completed at a reduced velocity to minimize erosion or the washing of fish or amphibians downstream. Consult with a creek naturalist, hydrologist or appropriately trained personnel prior to release to determine appropriate flow velocity if substantial quantities of water have been impounded.
- As appropriate, spawning gravel should be carefully removed and stored in areas where maintenance activities will not impact the gravel. The gravel should be replaced as close to original conditions as possible upon completion of the maintenance activities.
- Off-site gravel should not be used to create spawning areas without approval by appropriate regulatory agencies and biologists.
- Perform bank repairs in the dry season (see BMP NR-3).
- Keep site and channel disturbance to the minimum necessary to accomplish the repairs.

Natural Resources Channel Protection & Restoration

- Perform work from the top of the bank whenever possible. The operation of equipment in the channel should be kept to a minimum.
- Keep disturbance to any existing setback areas to the minimum necessary to accomplish the repair.

Natural Channels.

- Where feasible, leave wood in place to provide habitat.
- As long as they remain stable, allow undercut banks to remain in place for fish habitat.

Limitations

- Appropriate repairs may need to be performed during wet or breeding seasons.
- Practices need to allow for sufficient channel capacity to meet flood control requirements.

Requirements

Maintenance

- In natural channels, periodically inspect the stability of undercut banks. Undercut banks on engineered channels are considered unstable.
- Secure storage areas and care of spawning gravel during maintenance activities.

Costs

- Staff time for monitoring stability of undercut banks
- Potential additional staff time for performing work from the top of bank, regrading channel bottom to natural state upon disturbance, and protecting and returning spawning gravel.

Training

- Training needs are minimal. Staff should be trained in the reasons for and using the practices that minimize impacts.
- A trained biologist / creek naturalist / hydrologist / environmental planner or other appropriate personnel is recommended to conduct staff training on channel protection and restoration techniques.

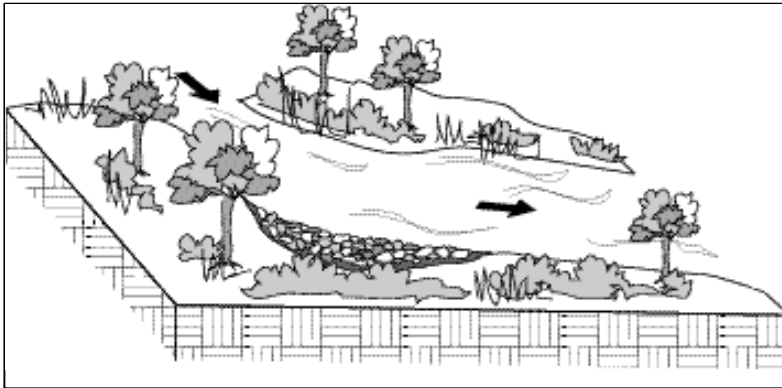
References

Contra Costa County Flood Control District, personal communication, Cece Sellgren, March 2000.

Natural Resources Channel Protection & Restoration

Marin County Flood Control District, written communication, March 2000.

Santa Clara Valley Water District, "BMP/PMM List," February, 1999.



- Wildlife Protection
- Habitat Protection
- Erosion Control
- Slope and Channel Protection

Description

Practices to protect or provide suitable habitat for fish, amphibians, and wildlife dependent on the riparian area. This measure provides a soft bank repair technique immediately adjacent to the flood control channel or work areas when possible for wildlife use and erosion control. A “soft” repair is a type of bank protection structure incorporating biological materials like seeds, plants, plant parts such as root wads, or a combination of vegetation and inert materials such as brush mats or sills, wattles, fascines, or branch packing or layering.

Applicability

- Channels and streams requiring bank repairs.

Approach and Standards

- Incorporate the services of qualified staff (e.g., engineer, planner, revegetation specialist) or a biotechnical consultant to create a plan to use soft bank repair techniques for the early stages of erosion under proper hydraulic conditions.
- If hydraulic conditions allow, retain a natural bank or use a biotechnical repair rather than or along with a hard-scape repair..
- In-kind repairs should be performed where possible and feasible, or biotechnical repairs should be considered and implemented if feasible.
- See also vegetation BMPs (VDM-1 through VDM-3).

Limitations

- Hydraulic conditions must be appropriate to allow for biotechnical repairs.
- Proper training in biotechnical repairs is necessary.
- Requires monitoring until vegetation is well established.

Requirements

Maintenance

- Vegetation maintenance, possibly including irrigation, until established.
- Regular monitoring required.
- In long term, biotechnical bank stabilization may require less overall maintenance by flood control personnel.

Costs

- Costs in staff time for planning, installation, monitoring, and if vegetation restoration is required.
- Regular monitoring and maintenance of vegetation until established.

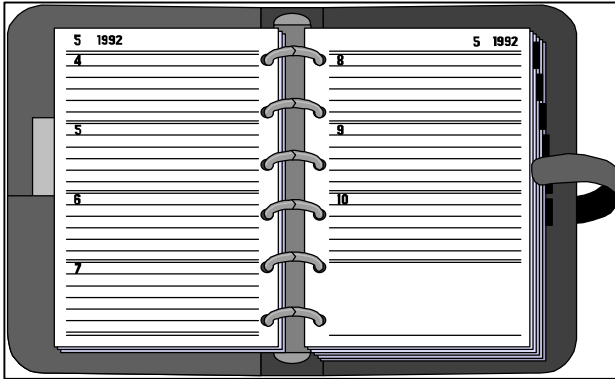
Training

- Requires staff adequately trained in biotechnical bank stabilization to create repair plan.
- Training needs regarding biotechnical repairs including suitable locations, types of appropriate repairs, installation, monitoring, and maintenance

References

Santa Clara Valley Water District, "BMP/PMM List," February, 1999.

California Regional Water Quality Control Board, San Francisco Bay Region, "General Permit for Maintenance Activities Which Pose a Threat to Water Quality," 4th draft, 1999.



- Erosion Control
- Sediment Control
- Habitat Protection
- Wildlife Protection

Description

Plan channel maintenance projects to minimize potential for erosion and to protect special status species.

Applicability

- All flood control maintenance activities.

Approach and Standards

- Avoid disturbance to habitat during the nesting and/or breeding seasons.. Wildlife surveys should be performed in areas where work is to be performed to confirm the absence of listed species or species of concern.. Alert maintenance staff to the presence of any sensitive species in the area.
- Avoid or minimize soil or sediment disturbing activities during the rainy season between October 15 and April 15 unless approval to work within this period is received from regulatory agencies.
- Schedule major land disturbing activities during the dry season between April 15 and October 15. Work in channels during the dry season or in dewatered conditions if flowing water is present (see WD-5).
- Monitor the weather forecasts for rainfall and prepare the site if significant rain is imminent. If rain is forecast, have all materials that are needed to prepare the site for rain be readily available on site.
- When rainfall is predicted, adjust the schedule to allow for the implementation of erosion and sediment controls, such as vegetation or physical controls, on all disturbed areas prior to the onset of rain.
- Erosion may be caused during the dry season, by unseasonal rainfall, wind, and vehicle tracking. Maintain site stabilization year round and keep sediment trapping devices in operational condition.

Natural Resources

Project Planning / Scheduling

- Schedule work to minimize the extent of site disturbance at any one time.
- Incorporate staged seeding and revegetation of channel banks as work progresses.
- Install and maintain sanitary facilities on jobs that last multiple days.

Limitations

- Emergency work may require repairs during rain events.
- If the project is large and causes a significant impact to neighborhoods, it may be necessary to coordinate efforts between local governments and citizens. Work hours may be restricted to between 8 a.m. to 5 p.m.
- Tidal activities may restrict work hours. Consult a tide table applicable to the project site area to schedule work at low tide.

Requirements

Maintenance

- Routinely verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- When changes are warranted, amend the sequence in advance to anticipate problems and maintain control.

Costs

- No additional costs are necessary for materials.
- Costs due to staff time delays can be minimized with proper planning.
- Additional staff time may be necessary to coordinate with neighborhoods, agencies, and stakeholders.
- Additional mobilization costs for staged seeding and revegetation may be incurred.

Training

- Design staff and maintenance staff should be trained in planning and scheduling.
- Personnel with a background in biology may be necessary to determine typical nesting and breeding times and locations of sensitive species.
- All employees should receive annual pollution prevention training and contractors should receive training before the job is started.
- The construction crew should be trained in the requirements of all permits obtained for the project.
- Educate employees, subcontractors, and suppliers on sanitary/septic waste storage and disposal procedures.

References

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC1, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CA 22, April 1997.

Santa Clara Valley Water District, "BMP/PMM List," February, 1999.

BMP – SEASONAL PLANNING

DESCRIPTION

The purpose is to protect aquatic resources and fisheries to the greatest extent possible through scheduling and sequencing of construction activities with the implementation of erosion and sediment control measures. Minimize the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

APPLICATIONS

All projects involving land-disturbing activities. Sequencing to minimize land disturbance during the rainy season.

CONSTRUCTION GUIDELINES

- 1) Obtain all required permits well before beginning of construction as unforeseen permitting delays and requirements may require drastic delays in scheduling.
- 2) Create a timetable incorporating water quality and erosion control measures into construction plans.
- 3) Avoid working between October 15 and April 1st to limit impacts during critical periods for aquatic species during the wet season.
- 4) Schedule work to minimize the extent of site disturbance at any one time. Where appropriate, incorporate staged revegetation of graded slopes as work progresses.
- 5) Schedule establishment of permanent vegetation including appropriate planting time and maintenance.
- 6) Maintain year-round sediment control practices even during dry months when unexpected changes in weather could cause a discharge into waterways.
- 7) Plan enough time before rainfall to allow for effective use of vegetation or other soil stabilization methods.

BMP MAINTENANCE

- ✓ During construction, check the schedule frequently and change the schedule to accommodate changes to the work plan.
- ✓ Monitor the weather forecast for rainfall and adjust the construction schedule to allow the implementation of soil stabilization and sediment controls prior to the onset of rain.
- ✓ Be prepared year-round to deploy soil stabilization and sediment control practices. Keep the site stabilized year-round, retain and maintain rainy season sediment trapping devices in operational condition.

SEASONAL RESTRICTIONS BY SPECIES Taken from Mitigation Measures, Monitoring and Reporting Program for the 2005 Fisheries Restoration Grant Program –Appendix B; Dept. of Fish and Game Regional General Permit/Neg. Dec. for Fisheries Restoration Grant projects.

- 1) To avoid impacts to aquatic habitat the activities carried out in the restoration program typically occur during the summer dry season.
 - a) Work around streams is restricted to the period of June 15 through November 1 or the first rainfall. This is to take advantage of low stream flow and avoid the spawning and egg/alevin incubation period of salmon and steelhead.
 - b) Upslope work generally occurs during the same period as stream work. Road decommissioning and other sediment reduction activities are dependent on soil moisture content. Upslope projects do not have seasonal restrictions in the Incidental Take Statement but work may be restricted at some sites to allow soils to dry out adequately. In some areas equipment access and effectiveness is constrained by wet conditions.
 - c) The permissible work window for individual work sites will be further constrained as necessary to avoid the nesting or breeding seasons of birds and terrestrial animals. At most sites with potential for raptor (including northern spotted owls) and migratory bird nesting, if work is conditioned to start after July 31, potential impacts will be avoided and no surveys will be required. For work sites that might contain nesting marbled murrelets, the starting date will be September 15 in the absence of surveys. The work window at individual work sites could be advanced if surveys determine that nesting birds will not be impacted.
 - d) For restoration work that could affect swallow nesting habitat (such as removal of culverts showing evidence of past swallow nesting), construction will occur after August 31 to avoid the swallow nesting period. Alternatively, the suitable bridge nesting habitat will be netted before initiation of the breeding season to prevent nesting. Netting must be installed before any nesting activity begins, generally prior to March 1. Swallows must be excluded from areas where construction activities cause nest damage or abandonment.
 - e) Planting of seedlings shall begin after December 1, or when sufficient rainfall has occurred to ensure the best chance of survival of the seedlings, but in no case after April 1.

Coho Salmon (*Oncorhynchus kisutch*), Chinook Salmon (*Oncorhynchus tshawytscha*), Steelhead (*Oncorhynchus mykiss*), and Coast Cutthroat Trout (*Oncorhynchus clarki clarki*)

- 1) Project work within the wetted stream shall be limited to the period between June 15 and November 1, or the first significant fall rainfall. This is to take advantage of low stream flows and to avoid the spawning and egg/alevin incubation period of salmon and steelhead. Whenever possible, the work period at individual sites shall be further limited to entirely avoid periods when salmonids are present (for example, in a seasonal creek, work will be confined to the period when the stream is dry).

California Red-Legged Frog (*Rana aurora draytonii*)

- 1) Ground disturbing activities in potential red-legged frog habitat will be restricted to the period between July 1 and October 15.

California Freshwater Shrimp (*Syncaris pacifica*)

- 1) Ground disturbing activities in potential shrimp habitat shall be restricted to the period between July 1 and November 1.

Least Bell's Vireo (*Vireo bellii pusillus*)

The potential exists for the noise from heavy equipment work and the harvesting of willow branches for revegetation at these sites to disrupt vireo nesting. To avoid this potential impact, the following mitigation measures will be implemented:

- 1) Work shall not begin within one quarter mile of any site with known or potential habitat for the Least Bell's Vireo until after September 15.
- 2) Harvest of willow branches at any site with potential habitat for the Least Bell's Vireo will not occur between March 1 and September 15.
- 3) The work window at individual work sites may be modified, if protocol surveys determine that nesting birds do not occur within 0.25 miles of the site during the breeding season.

Marbled Murrelet (*Brachyramphus marmoratus*)

The marbled murrelet is listed as endangered under CESA and threatened under ESA. Activities to protect and restore habitat will not remove or degrade suitable habitat for marbled murrelets, however nesting birds could be disturbed by the noise from heavy equipment required for projects such as culvert removal or placement of large woody debris.

- 1) Adverse effects can be avoided by limiting heavy equipment work within 0.25 mile of marbled murrelet habitat to the period between September 16 and March 23.
- 2) Work shall not begin within 0.25 mile of any site with occupied or un-surveyed suitable marbled murrelet habitat between March 24 and September 15.
- 3) The work window at individual work sites near suitable habitat may be modified, if protocol surveys determine that habitat quality is low and occupancy is very unlikely.

Northern Spotted Owl (*Strix occidentalis caurina*)

The northern spotted owl is listed as threatened under ESA. Restoration activities should not alter habitat for northern spotted owls, however nesting birds could be disturbed by the noise from heavy equipment during projects such as culvert removal or placement of large woody debris. Direct injury or mortality of owls is not an issue. The potential exists for heavy equipment work at these sites to disturb spotted owl nesting. To avoid this potential effect, the following mitigation measures will be implemented:

- 1) Disturbance can be avoided by limiting heavy equipment work within 0.25 miles of suitable spotted owl habitat to the period between August 1 and January 31.
- 2) Work at any site within 0.25 miles of suitable habitat for the northern spotted owl will not occur from February 1 to July 31.
- 3) The work window at individual work sites may be advanced prior to July 31, if protocol surveys determine that suitable habitat is unoccupied.

Willow Flycatcher (*Empidonax traillii*)

The potential exists to affect suitable habitat for the willow flycatcher by the harvesting of willow branches for riparian planting and construction of live willow mattresses and live willow walls. The potential also exists for the noise from heavy equipment work or harvesting of revegetation material at project sites to disrupt willow flycatcher nesting. To avoid this potential impact, the following mitigation measures will be implemented:

- 1) Heavy equipment work shall not begin within one quarter mile of any site with known or potential habitat for the *willow flycatcher* until after August 31. Heavy equipment work shall not begin within one quarter mile of any site with known or potential habitat for the *southwestern willow flycatcher* until after September 15.
- 2) Harvest of willow branches at any site with potential habitat for the willow flycatcher will not occur between May 1 and August 31. Harvest of willow branches at any site with potential habitat for the *southwestern willow flycatcher* will not occur between May 1 and September 15.
- 3) The work window at individual work sites may be modified, if protocol surveys determine that nesting birds do not occur within 0.25 miles of the site during the breeding season.

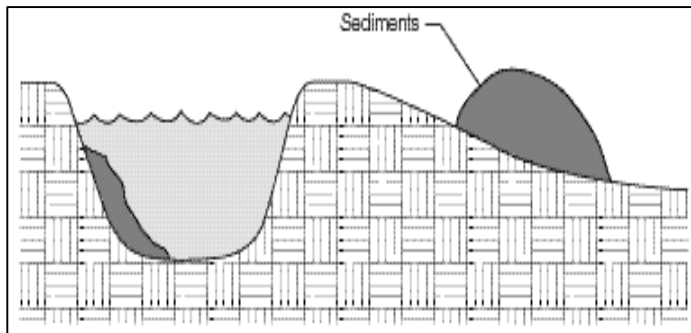
Least Bell's Vireo (*Vireo bellii pusillus*)

The potential exists for the noise from heavy equipment work and the harvesting of willow branches for revegetation at these sites to disrupt vireo nesting. To avoid this potential impact, the following mitigation measures will be implemented:

- 1) Work shall not begin within one quarter mile of any site with known or potential habitat for the Least Bell's Vireo until after September 15.
- 2) Harvest of willow branches at any site with potential habitat for the Least Bell's Vireo will not occur between March 1 and September 15.
- 3) The work window at individual work sites may be modified, if protocol surveys determine that nesting birds do not occur within 0.25 miles of the site during the breeding season.

Point Arena Mountain Beaver (*Aplodontia rufa nigra*)

- 1) No operation of noise generating equipment (e.g. chainsaws) within 100 feet of active burrows during the breeding season (December 15 – June 30).
- 2) No operation of mechanical equipment (e.g. backhoes, excavators) within 100 feet of active burrows during the breeding season (December 15 – June 30), and within 50 feet the remainder of the year.
- 3) No ground disturbance (e.g. dumping of boulders) within 500 feet of active burrows during breeding season, and within 100 feet the remainder of the year. No severe ground disturbance (e.g. driving of bridge piles, blasting) within 500 feet of active burrows at any time.



- Sediment Control
- Wildlife Protection
- Habitat Protection

Description

Practices to protect channel water from re-deposition of removed sediments or from erosion of material stockpiles such as soil, sand, waste concrete, waste asphalt, or materials smaller in diameter than 4.75 mm.

Applicability

- Channels and streams requiring sedimentation removal.
- Stockpiles of soil, sand, or materials smaller than 4.75 mm in diameter.
- Stockpiles of waste concrete or asphalt.

Approach and Standards

- For removing sediment, use a hydraulic or barge-mounted dredge to reduce the impacts to vegetation and wildlife on channel banks.
- Remove sediment to an upland site or landfill. If the stockpiled material is appropriate, it can be used to repair levee or maintenance roads, as road base material, or other reuse needs. Sediment should not be used to fill waters of the United States unless the responsible party that uses the material has all of the appropriate permits and approvals.
- Sediment should not be removed outside of the San Francisco Bay watershed to prevent the further spread of exotic species such as mitten crabs. Trucks should be cleaned before leaving the job site (see BMP EV-2).
- Create a stockpile for wet sediments at or nearby the removal site to allow for drying before disposal.
- Temporary storage stockpiles should be located so that runoff will not discharge to surface water outside of the active work area. The stockpiles could be located so that runoff is directed towards sediment traps in the active work area.

Sediment Control

Stockpiles and Sediment Disposal

- In wet areas where a stockpile is not feasible, trucks may be lined with an impervious material such as plastic. Alternatively, the trucks could drain excess water by slightly tilting their loads and allowing the water to drain out to a sediment basin. Water should not drain directly to channels or city streets without proper water quality control measures in effect.
- Do not stock pile dredged sediments or silt removed from sediment basins in an area where runoff can redeposit sediment in the channel.
- At the off-site disposal area, all drainage outlets at the site should be protected from sediment laden runoff from the stockpiles by using one or some combination of the following BMPs:
 - ➔ Cover stockpiles with plastic sheeting in a manner to prevent rainfall from having contact with the stockpiled materials. Securely attach the plastic sheeting to the stockpile.
 - ➔ Cover the entire stockpile with an erosion control blanket(s). The erosion control blanket(s) should be installed as per the manufacturer's directions (see BMP SS-1).
 - ➔ Surround the downslope/downstream area of the stockpile with silt fences or hay bales (see BMP SC-7 or SC-5, respectively) as needed to reduce turbidity.
 - ➔ Divert all storm water runoff from the stockpile to a sediment trap or sediment basin (see BMP SC-6).
 - ➔ Remnants of any stockpiles should be swept up using dry sweeping methods, rather than hosed away.
- Individual site characteristics may require different combinations of the best management practices described above.

Limitations

- None.

Requirements

Maintenance

- Stockpiles should be located so as not to flow to channels or storm drain inlets without being treated first. Regularly inspect and maintain plastic or blanket coverings, sediment traps, silt fences, and hay bale dikes, as necessary.

Costs

- Costs in staff time for inspection and maintenance.

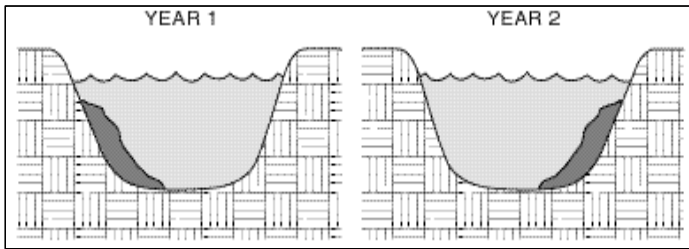
- Costs for materials (blankets, plastic, fencing, hay bales, etc.).

Training

- Train employees on correct placement of stockpiles, exotic species threats, and correct placement of and maintenance of erosion control blankets, hay bale barriers, sediment traps, silt fences, and plastic coverings.

References

Santa Clara Valley Water District, “Storm Water Pollution Prevention Best Management Practices for Construction and Maintenance Activities: Soil and Material Stockpiles, BMP No.: 106, July 16, 1996,” *Final Best Management Practices Plan for the 1998 Sediment Removal Project*, September 18, 1998.

Sediment Removal**Dredging**

- Sediment Control
- Wildlife/Habitat Protection
- Habitat Protection

Description

Practices to protect water quality from channel dredging.

Applicability

- Channels and streams requiring sediment removal.

Approach and Standards

- For removing sediment, use a hydraulic or barge-mounted dredge to reduce the impacts to vegetation and wildlife on channel banks.
- Perform wildlife and vegetation surveys prior to dredging to determine that the project area is free from sensitive species.
- Desilt culverts in later summer after birds have finished nesting, or as recommended by a qualified biologist who has performed a survey for nesting birds and amphibians (see also BMP NR-3).
- Monitor water quality upstream and downstream of the dredging site to check that sedimentation downstream is minimized and to meet the standards of the municipal NPDES storm water, waste discharge requirements, or other appropriate permits.
- Dredge small channels with an excavator from the access road on one side of the channel.
- Remove sediment in large channels from one side only in alternate years to minimize impacts on vegetation and wildlife.
- Dredge larger projects in a checkerboard pattern to reduce impacts on the vegetation and wildlife.

Limitations

- Some channels may be too small to incorporate all of the practices described.
- Planning is necessary to avoid nesting and breeding times.

Sediment Removal

Dredging

Requirements

Maintenance

- Conduct monitoring and adjust procedures as necessary.

Costs

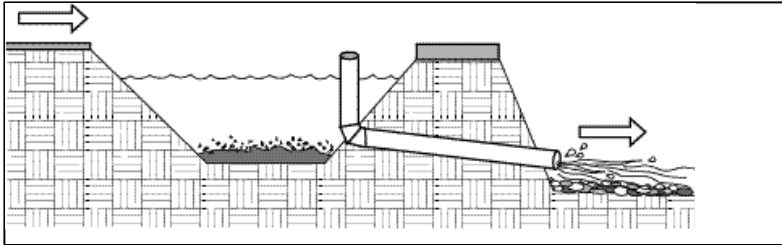
- Costs in staff time for monitoring.

Training

- Minimal training necessary. A trained biologist may be necessary to perform wildlife surveys.

References

Santa Clara Valley Water District, *Final Best Management Practices Plan for the 1998 Sediment Removal Project*, September 18, 1998.

Sediment Removal**Sediment Basins**

- Sediment Control
- Heavy Metals
- Pathogens
- Pollution Control

Description

Practices to protect water quality by controlling sediments through the use and proper operation and maintenance of sediment basins. Sediment basins are designed to slow velocity and temporarily retain water to allow sediments to settle out. The basin is created by excavation or by constructing an embankment across a waterway or low drainage area. The basin allows storm water runoff to collect, and detain that water to allow sediments to settle out before being discharged. Sediment basins are temporary structures.

Applicability

- Use in association with dikes, temporary channels, and/or pipes being used to divert storm water from disturbed areas into the basin and from undisturbed areas around the basin.
- Outlets of disturbed watersheds 10 acres or greater.
- As necessary, outlets within smaller disturbed watersheds with concentrated flow or in areas with erosive soils.
- Any maintenance project that disturbs areas during the rainy season.
- Areas where a basin could prevent sediment-containing runoff from entering drainage ways or channels.
- Locations where permanent detention basins will be located.

This measure will likely have a significant impact reducing sediment; and may have a significant impact, depending on specific site characteristics in reducing heavy metals, oxygen demanding substances, and pathogens.

Approach and Standards**Installation**

- Locate basins:
 - ➔ Where a low embankment can be built across a swale or excavation
 - ➔ Where failure would not cause loss of life or property;
 - ➔ In locations that allow for maintenance access and include room for protected sediment removal and stockpiling areas.

Sediment Removal

Sediment Basins

- Size sediment basins using the following recommendations provided by the San Francisco Bay Regional Water Quality Control Board (1998):

1) $Q = CIA$

Where,

Q = Flow expected from the site in cubic feet per second

C = Coefficient of runoff (typically between 0.4 to 0.7), depending on the imperviousness of the contributing area

I = Expected rainfall, in inches per hour

A = Contributing area in acres

2) $A_s = 1.2Q/V_s$

Where,

A_s = Surface area of settling basin with 2-feet of minimum depth

Q = Flow as calculated above

V_s = Settling velocity of particles, in feet per second

A = Contributing area in acres

| Particle Size (mm) | Particle Description | Settling Velocity V_s , (fps) |
|--------------------|----------------------|---------------------------------|
| 0.5 | Coarse sand | 0.19 |
| 0.2 | Medium sand | 0.067 |
| 0.1 | Fine sand | 0.023 |
| 0.05 | Coarse silt | 0.0062 |
| 0.02 | Medium silt | 0.00096 |
| 0.01 | Fine silt | 0.00024 |
| 0.005 | Clay | 0.00006 |

- Build the sediment basin before the wet season and construction activities begin. In the Bay Area, the wet season is generally defined as October 15 through April 15.
- Clear areas under embankments, structural works, and sediment basins. Strip the areas of vegetation (see BMPs VDM-2 and VDM-4).
- Ensure the basin length to width ratio is greater than 3:1 (L:W).
- Provide baffles to prevent the short-circuiting of inlet flows that would reduce residence time.
- Place the basin inlet to maximize the distance from the basin outlet.
- Use rock or vegetation to protect the inlet and slopes from erosion.
- Consider using a forebay built upstream of the basin to remove debris and larger particles.
- Use corrugated metal or reinforced concrete riser pipe with dewatering holes and an anti-vortex device and trash rack attached to the top of the riser for the principal outlet. This will prevent floating debris from flowing out of the basin or from clogging the system. Make sure the principal outlet is designed to handle the inflow design storm.

Sediment Removal

Sediment Basins

- Locate the outlet structure on a firm and smooth foundation. The base should be anchored securely with concrete, etc. to prevent the base from floating.
- Connect the riser pipe using a watertight connection, to the horizontal pipe (barrel) that extends through the embankment to the toe of the fill. Provide anti-seep collars on the horizontal barrel.
- Clearly mark the basin's cleanout level on the riser pipe.
- Include an emergency spillway to handle flows that are not contained by the principal spillway. The spillway should be comprised of an open earthen or vegetated channel on top of undisturbed material (not fill), or constructed of non-erodible riprap.
- Place outlet protection at the pipe outlet (see BMP VR-4).
- Install a safety fence around the basin suitable for keeping children out of the basin.
- For removing sediment, use a hydraulic or barge-mounted dredge to reduce the impacts to vegetation and wildlife on channel banks.
- If any contaminated material or hazardous material is excavated, or needs to be transported or disposed of, follow the regulations of the following agencies: United States Department of Transportation, United States Environmental Protection Agency; California Environmental Protection Agency; Department of Toxic Substances Control; and California Division of Occupational Safety and Health Administration.

Limitations

- Some sites may not be situated in areas that allow for easy removal of sediments from the top of the banks.
- Erosion controls should be considered before sediment controls.
- Sediment and detention basins require a large enough surface area to allow for sediment settling. The basins need to be designed with enough length to prevent reduced residency time from short-circuiting.
- Multiple basins should be used for drainage areas greater than 100 acres (40 ha).
- Basin design should be created by a registered professional civil engineer and approved by the overseeing regulatory agency.
- Requires fencing to protect children.
- Do not locate sediment basins in streams.
- Standing water could provide suitable habitat for mosquitoes or other pests to breed.
- Frequent sediment removal can be labor-intensive and costly.

Sediment Removal

Sediment Basins

Requirements

Maintenance

- Conduct routine inspections of sediment and detention basins; make corrective repairs and perform maintenance including desilting as necessary. Inspect the basins before and after rain storms, and weekly through the wet season. Inspect sediment traps at least every 24 hours during extended storms.
- Dewater sediment basins or plug the outlet before beginning desilting operations.
- Work from the top of the banks when possible. Off-haul all materials once removed
- Do not stockpile silt from sediment basins onsite where they can drain to the waterway.
- Require siltation removal on both a routine and corrective basis to promote effective stormwater pollutant removal efficiencies for wet or dry detention ponds, infiltration devices, and sediment basins.
- Observe or sample inlets and outlets frequently for total suspended solids to make sure the erosion control measures and sediment basins are working correctly.
- Examine the banks of the basin for structural soundness and any seepage.
- Examine the outlet structure and spillway for obstructions or damage, and repair as necessary.
- Check the outlet area for erosion and repair and stabilize as necessary.
- When the storage areas are one-third full, remove the sediment. Protect the sediment removed from the basin and stockpiled appropriately (see BMP SC-1).
- For most dry sediment basins, rakes, shovels, sickles and machetes may be all that is necessary for maintenance. Basins should be designed to allow access from heavy equipment as well, however. For wet basins, necessary maintenance equipment may include access vehicles, dump trucks, bulldozers, and dredging / excavation equipment.
- Necessary staffing includes a minimum of two people per crew for health and safety reasons, and a program manager who should be easily assessable to provide necessary direction.

Costs

- Frequent sediment removal can be costly and require intensive labor requirements. These costs can be reduced if ponds are properly designed so that accumulated sediments are easily removed.
- Costs for waste material removal, transport, and disposal.
- Material costs may be incurred for the following equipment: vehicles, dump trucks, bulldozers, trackhoes, excavators, mowers, weed trimmers, sickles, machetes, shovels, rakes, personal protective equipment including goggles, dust masks, coveralls, boots, and gloves.

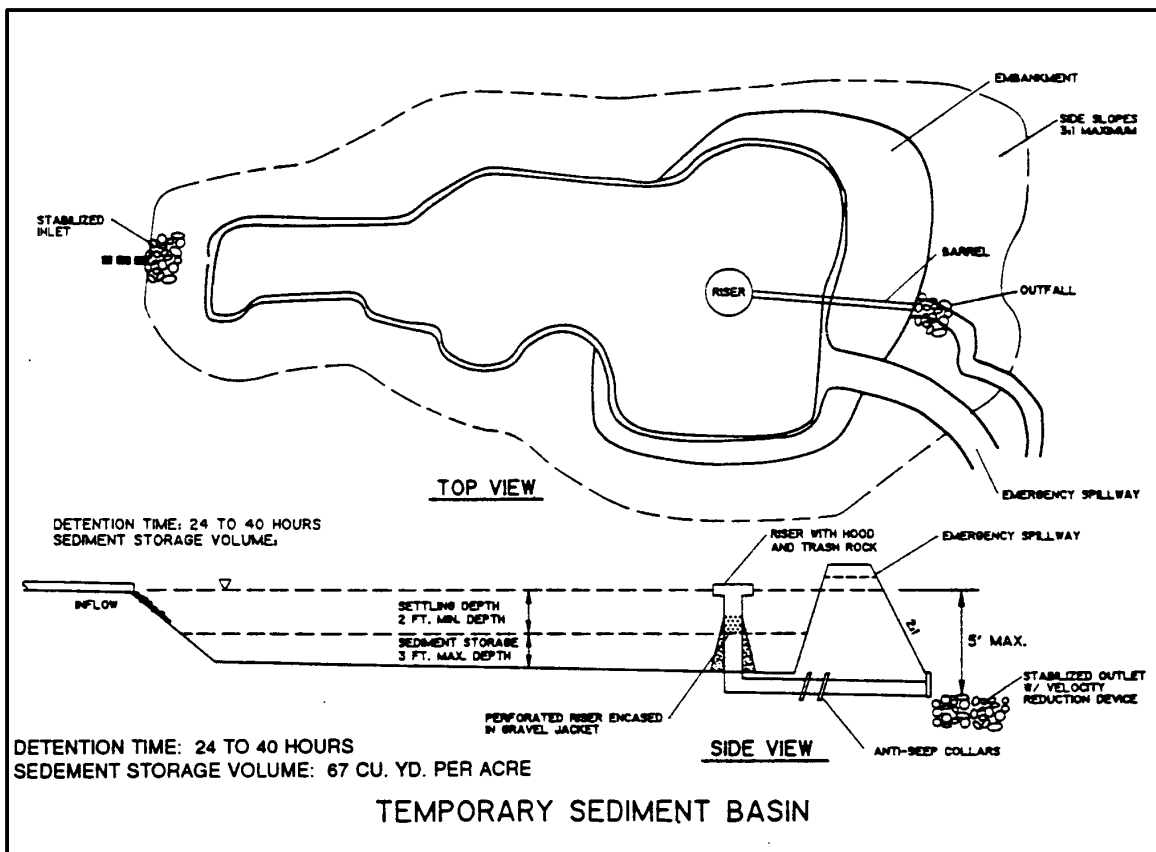
Sediment Removal

Sediment Basins

- In 1992, the USEPA estimated that the average annual cost for installation and maintenance of a sediment basin sized less than 50,000 cubic feet and designed to be used for 2 years was \$0.40 per cubic foot, or \$700 per drainage acre. For basins sized greater than 50,000 cubic feet, the USEPA estimated a cost of \$0.20 per cubic foot, or \$350 per drainage acre (SWQTF, Construction BMP Handbook, March 1993).

Training

- Necessary training includes proper excavation and maintenance procedures, and proper waste disposal procedures.
- Registered Professional Civil Engineer necessary for design.

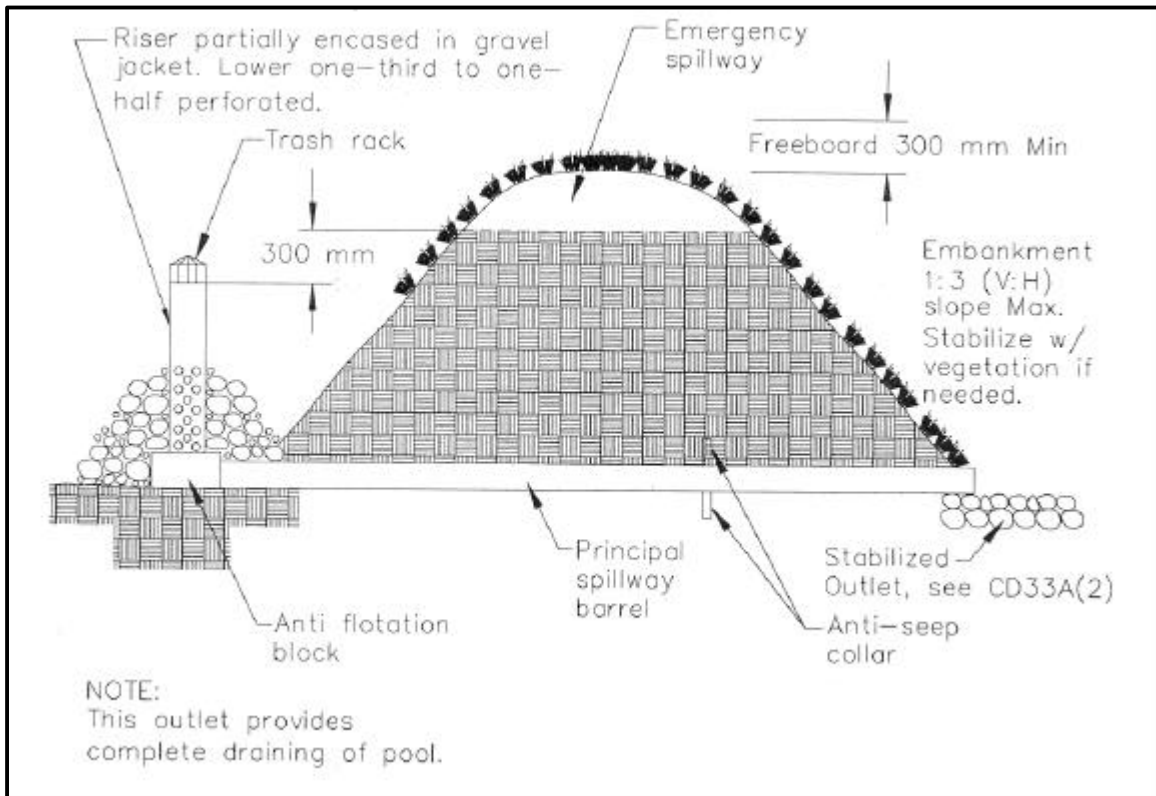


Source: California Storm Water Quality Task Force, "Construction..." 1993.

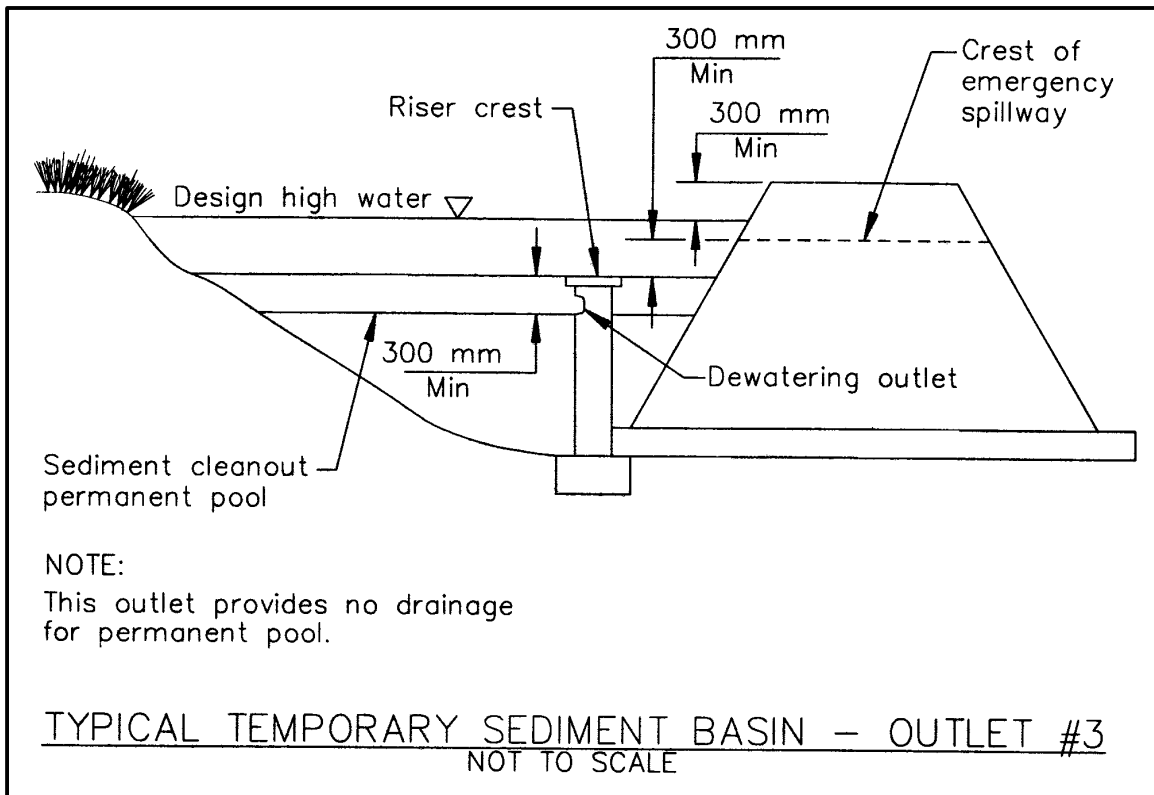
Sediment Removal

Sediment Basins

Sediment Basin Outlets:



Source: Caltrans, 1997.

Sediment Removal**Sediment Basins**

Source: Caltrans, 1997.

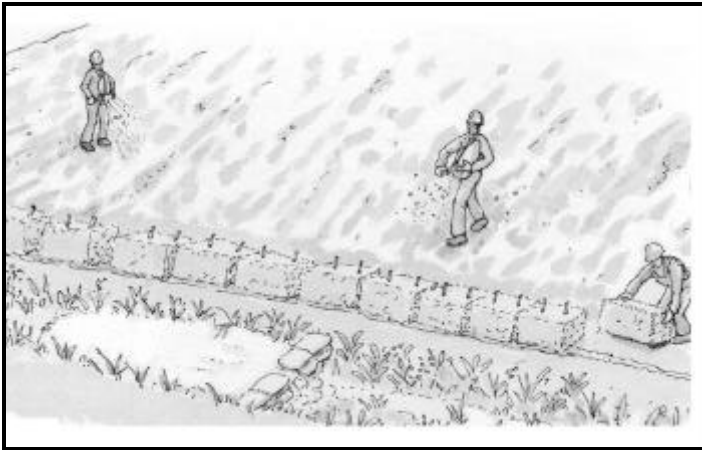
References

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Municipal Handbook*, SC75 "Detention/Infiltration Device Maintenance," March, 1993.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC56 "Sediment Basin," March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD41(2), April 1997.



Source: BASMAA

- Sediment Control
- Erosion Control

Description

Temporary devices consisting of straw, bio-degradable fiber, or sandbags that are placed to direct flow as to intercept sheet flow runoff and settle sediment behind the barriers while slowly allowing water through.

- Straw bale dikes are temporary barriers that are entrenched and anchored end to end across the toe of a slope.
- Fiber rolls are porous rolls (or rolled blankets (see BMP SS-2)) comprised of bio-degradable fibers that are stuffed in photodegradable open weave netting. They allow water to filter through while trapping sediment, slowing runoff, and reducing sheet erosion.
- Sand or gravel bags also detain sediment-laden runoff from disturbed areas, and releases the water as sheet flow while retaining the sediment. In addition, sand bags can also be used as check dams in small ditches (see BMP VR-2).

Applicability

All

- Along the perimeter of a site.
- In flood control channels where a sediment removal project is in progress, barriers may be used in conjunction with other BMPs.

Straw Bale Dikes

- Beneath flat, disturbed areas that are likely to be subject to sheet and rill erosion.

Fiber Rolls

-
- Along the face of exposed and erodible slopes to shorten the length of the slope.
 - At the grade breaks where slopes become steeper.
 - In drainage swales to slow flows.
 - Along streambanks to help with stabilization and revegetation (see BMPs VDM-3, NR-1, and NR-2).

Sand or Gravel Bags

- Across channels as a barrier to protect maintenance trenches or to provide temporary crossings for construction equipment.
- Parallel to roads to keep sediment off paved areas.
- For diverting or directing flow to, or for constructing a sediment basin (see BMP SC-3).
- When extended construction timelines limits the use of silt fences (BMP SC-6) or straw bale barriers.
- When construction/maintenance site conditions or scheduling requires relocation of barriers to meet changing field conditions and priorities.
- Upflow of storm drain inlets along roads at a 45 degree angle from the sidewalk curb to divert flow, slow flow velocity, and pond and filter runoff. Gravel preferred.

Approach and Standards

Straw Bale Dikes

- Place on 2% (50:1) or flatter slopes preferably. If the slope exceeds 10% (10:1), then the length of the slope upstream of the barrier should be less than 50 feet (15 m).
- Keep the drainage area upstream of the straw bale barriers to 0.25 ac/ 100 ft (0.3 ha/100 m).
- Keep the slope length that drains to the barrier to 100 ft or less (30 m).
- Do not place hay bales directly at the toe of the slope; allow between six inches and five feet of space for water to pool and sediment to accumulate.
- Make sure the straw bales are properly entrenched at least four inches into the soil and staked. Otherwise they will shift, become ineffective, and could cause undercutting and gully formation.

Fiber Rolls

- Follow the manufacturer's recommendations for installation.
- Fine grade the subgrade by hand-removing large stones or other debris or soil chunks that would inhibit direct contact of the soil with the fiber roll.
- Contour a concave key trench 2 to 4 inches (50 to 100 mm) deep along the installation route.

-
- Place soil excavated in the trenching uphill or flow side of the roll to prevent undercutting of the roll by runoff or flow.
 - Install the fiber rolls into the key trench and stake both sides of the roll within 6 feet of each end and every six inches. Use 1 inch by 2 inch by 23 inch stakes.
 - Drive stakes in on alternating sides of the roll for flat areas. In sloped area, stakes can be driven directly through the center of the roll.
 - If more than one fiber roll is placed in a roll, place securely next to one another to provide a tight joint. Do not overlap.
 - For a temporary, steeply-sloped access road that will no longer be used, install fiber rolls across the road. Curve the very ends of the fiber roll uphill slightly to avoid erosion runoff around the ends.

Sand or Gravel Bags

- Use sand bags of geotextile fabric, not burlap.
- Fill sand bags with $\frac{3}{4}$ inch rock or $\frac{1}{4}$ inch pea gravel.
- Place several layers of sand bags, over-lapping the bags and packing them together tightly.

Limitations

Straw Bale Dikes

- Must be properly entrenched or can cause undercutting and gully erosion.
- Use should be limited to construction or maintenance activities that can be completed in less than three months.
- Should not be used in paved areas; areas subject to concentrated flow or channel flow; or in live streams.
- Can be used as inlet protection only if it is staked-in behind the curbs.

Fiber Rolls

- Do not use for long or medium slopes, or for slopes that are steeper than 3:1 (horizontal to vertical).
- Do not use in areas where flow is concentrated more than 1 cfs.
- Primary purpose is not sediment control.

Sand or Gravel Bags

- Limit the upstream drainage area to 5 acres (2 ha.)
- Labor-intensive installation necessary.
- Do not use to detain concentrated flows.
- Use gravel bags rather than sand bags near inlets.

Requirements

Maintenance

All

- Repair or replace any split, torn, unraveling, or slumping materials.
- Inspect prior to and after rain events.
- Maintain as necessary.

Straw Bale Dikes

- Inspect daily during rain events.
- Remove sediment when it reaches one-third of the barrier height.
- Remove the dikes when no longer necessary.

Fiber Rolls

- Typically can be left in place; no need to remove. If not badly worn, rolls can be removed and reused.
- Inspect at least daily during prolonged rain events.

Sand or Gravel Bags

- Remove sediment when it is one-third of the height of the barrier.
- Repair as necessary.
- Remove the barrier when no longer needed.

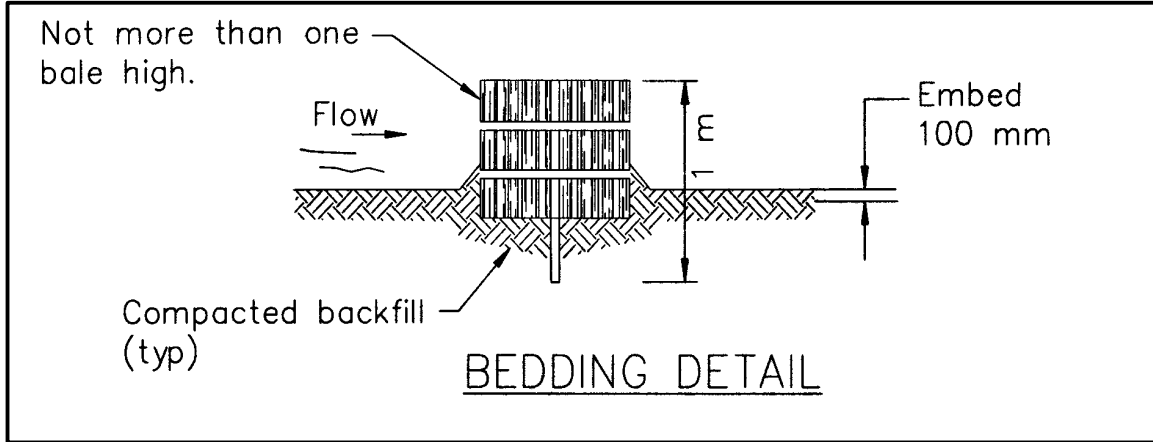
Costs

- Costs in staff time for construction, monitoring, and repairs.
- Sediment and device removal and disposal costs. Fiber rolls have no device removal costs.
- Material costs for sand or gravel and burlap, bale bales, or fiber rolls.

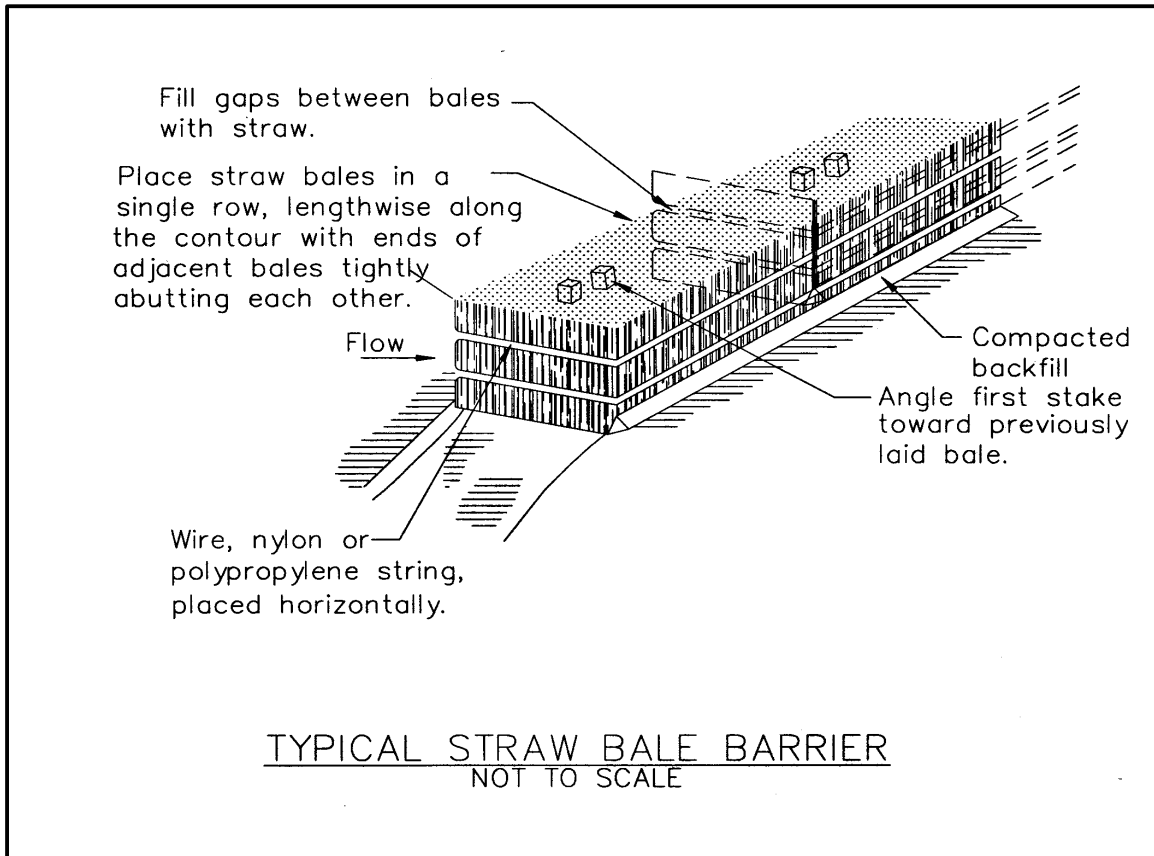
Training

- Minimal training necessary but important for proper installation and maintenance.

Straw Bale Barriers:

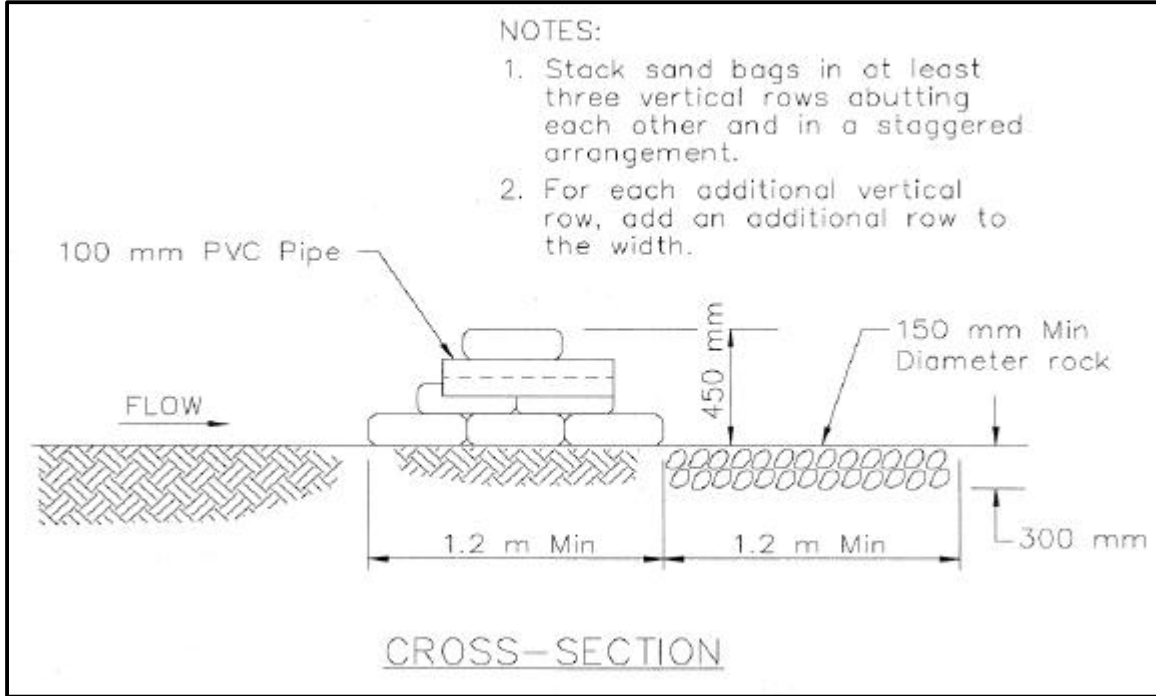


Source: Caltrans, 1997.

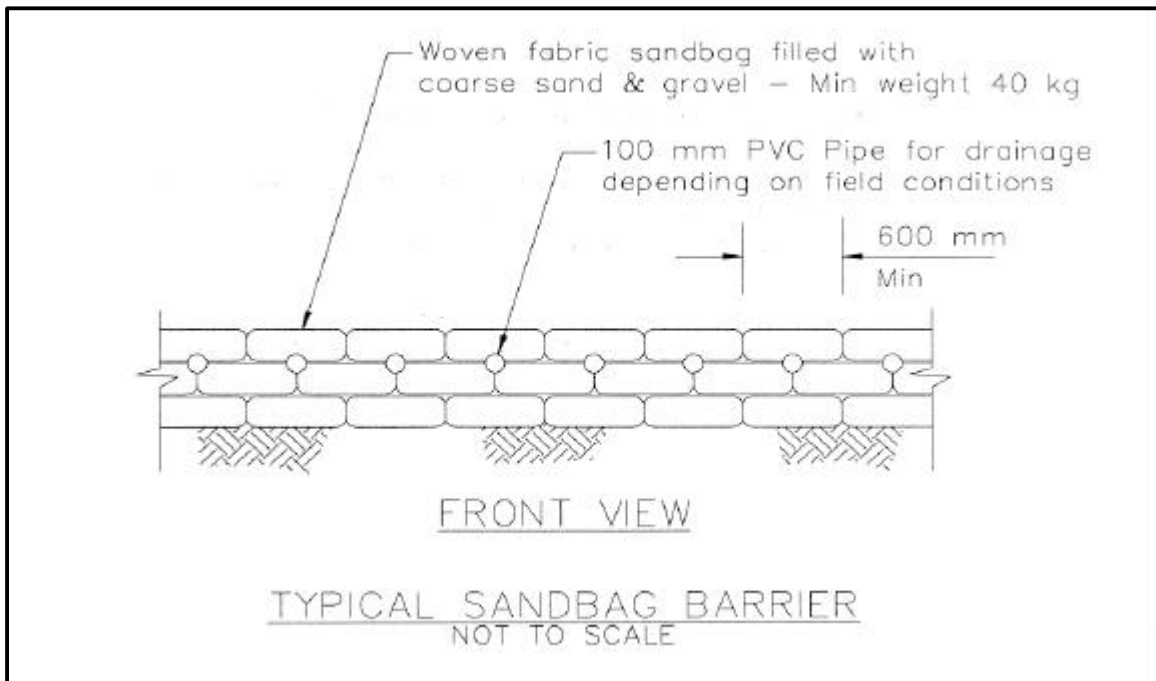


Source: Caltrans, 1997.

Sand Bag Barriers:

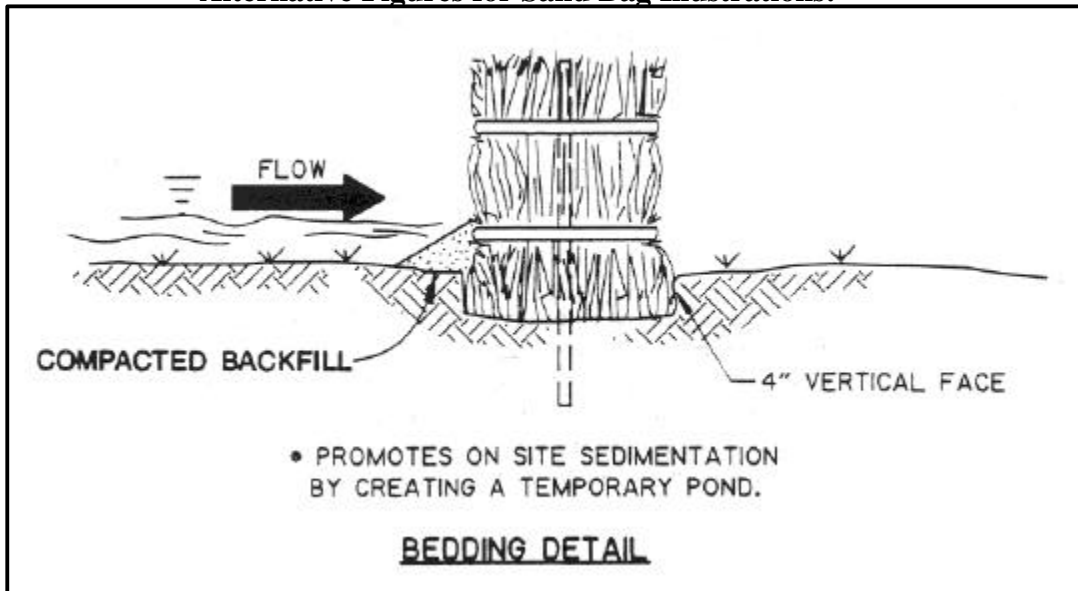


Source: Caltrans, 1997.

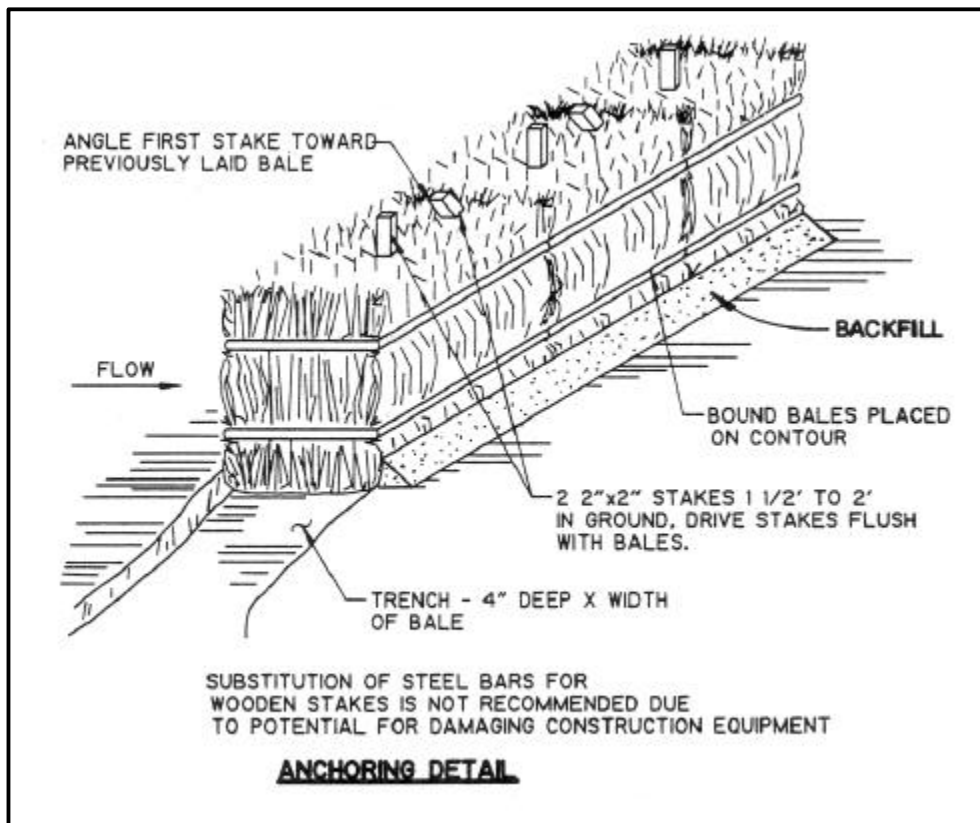


Source: Caltrans, 1997.

Alternative Figures for Sand Bag Illustrations:



Source: California Storm Water Quality Task Force, 1993.



Source: California Storm Water Quality Task Force, 1993.

References

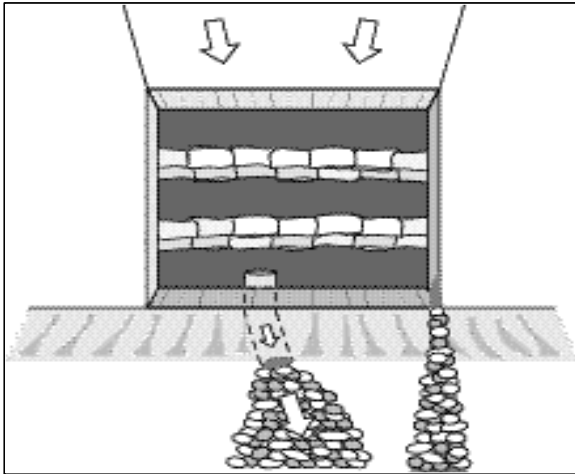
Bay Area Stormwater Management Agencies Association, *Blueprint for a Clean Bay*, 1995.

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, April 1997.

Contra Costa County Public Works Department, personal communication with Cece Sellgren, March 16, 2000.

Sediment Removal**Sediment Trap**

- Sediment Control

Description

A device consisting of a small basin that has a controlled release structure to retain larger size sediment. The trap is created by excavating, or by building an earthen embankment, straw bale check dam, or gravel bag barrier across the drainage path. The trap can be used as a complement device for upstream erosion control measures and down stream sediment basins (see BMPs SS-1 through SS-4; VR-1 through VR-5; and WD-1 through WD-4).

Applicability

- Construction or maintenance projects involving disturbed areas during the wet season (typically October 15 through April 15).
- Areas where sediment-laden runoff may enter a watercourse or storm drain system.
- For small drainage areas ((less than 5 acres (2 ha)).
- As a complement device for initial treatment before entering a sediment basin.
- For nuisance groundwater (see also WD-4).

Approach and Standards

Sediment Removal

Sediment Trap

- Size sediment traps using the following recommendations provided by the San Francisco Regional Water Quality Control Board (1998):

1) $Q = CIA$

Where,

Q = Flow expected from the site in cubic feet per second

C = Coefficient of runoff (typically between 0.4 to 0.7), depending on the imperviousness of the contributing area

I = Expected rainfall, in inches per hour

A = Contributing area in acres

2) $A_s = 1.2Q/V_s$

Where,

A_s = Surface area of settling basin with 2-feet of minimum depth

Q = Flow as calculated above

V_s = Settling velocity of particles, in feet per second

A = Contributing area in acres

| Particle Size (mm) | Particle Description | Settling Velocity V_s , (fps) |
|--------------------|----------------------|---------------------------------|
| 0.5 | Coarse sand | 0.19 |
| 0.2 | Medium sand | 0.067 |
| 0.1 | Fine sand | 0.023 |
| 0.05 | Coarse silt | 0.0062 |
| 0.02 | Medium silt | 0.00096 |
| 0.01 | Fine silt | 0.00024 |
| 0.005 | Clay | 0.00006 |

- Construct the traps before the wet season and construction activities begin.
- Locate basins:
 - ➔ Where a low embankment can be built across a swale or excavation
 - ➔ Where failure would not cause loss of life or property;
 - ➔ In locations that allow for maintenance access and include room for protected sediment removal and stockpiling areas.
- Design trap with a length to width ratio greater than 3:1 (L:W), or include baffles to prevent short circuiting of the inlet flow.
- Locate trap inlets to maximize the travel distance to the outlet.
- Protect trap outlet from erosion by using rocks or vegetation.
- Construct the outlet in one of the following ways to allow for easier dewatering of the trap:
 - ➔ Use corrugated metal or reinforced concrete riser pipe with dewatering holes that are encased in gravel to prevent floatables (debris) from flowing out or clogging the system.
 - ➔ Build a crushed stone outlet section of the embankment at the trap's low point. The crushed stone section should serve as a spillway outlet for flood flows without

Sediment Removal

Sediment Trap

the danger of erosion. The bottom section should allow a method to dewater the trap between rain events.

Limitations

- Larger surface areas needed to allow for sediment settling.
- Not appropriate for drainage areas larger than 5 acres (2 ha).
- Only large and medium sized particles can be removed by sediment traps.
- Upstream erosion control is necessary in conjunction with the sediment traps.
- Do not located in live streams.
- Requires protective fencing to prevent access by children.

Requirements

Maintenance

- Throughout the wet season, inspect the traps at least weekly. Inspect the traps before, after, and at least every 24 hours during rainfall events.
- Inspect the banks for seepage and structural soundness.
- Examine the outlet structure and spillway for damage or obstructions and repair as necessary.
- Check the outlet area for erosion and repair if necessary.
- Remove sediment that has accumulated when the volume has reached one-third the original trap volume.
- Properly stockpile and/or dispose of sediment and debris collected from the trap (see also BMP SC-1, VDM-4).

Costs

- Costs in staff time for construction, monitoring, and repairs.
- Removal and disposal costs.
- Material costs for rocks or vegetation.

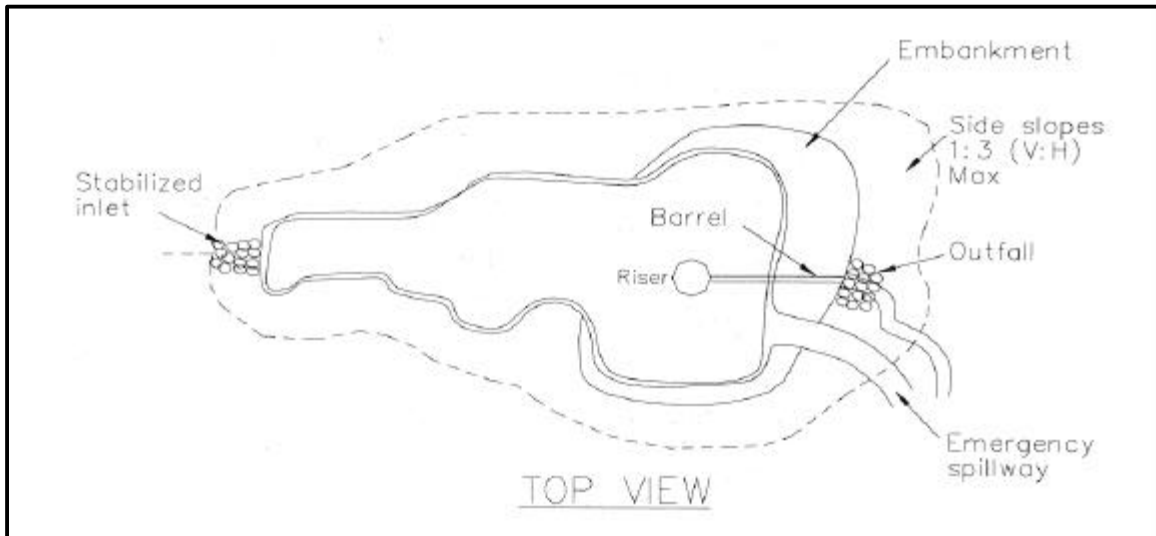
Training

- Minimal training necessary.

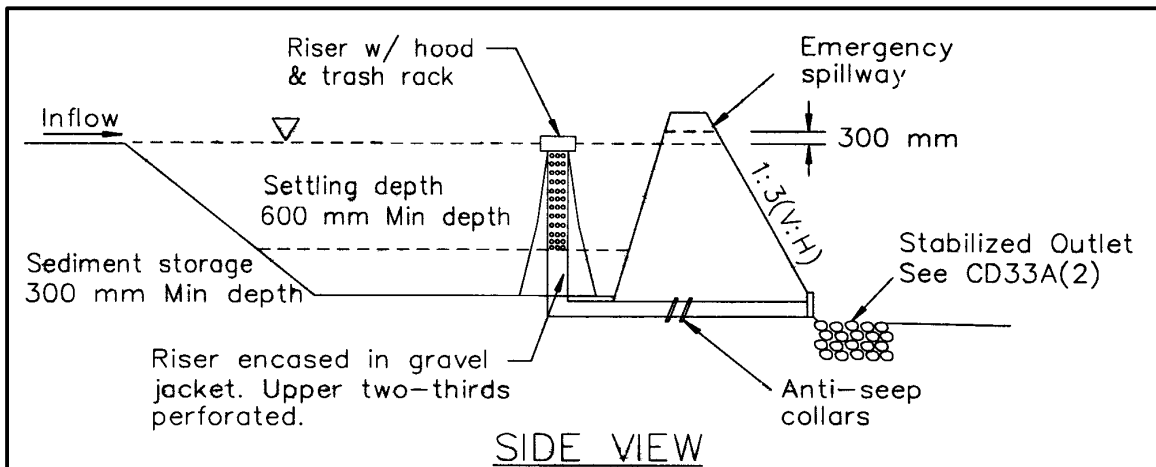
Sediment Traps:

Sediment Removal

Sediment Trap



Source: Caltrans, 1997.



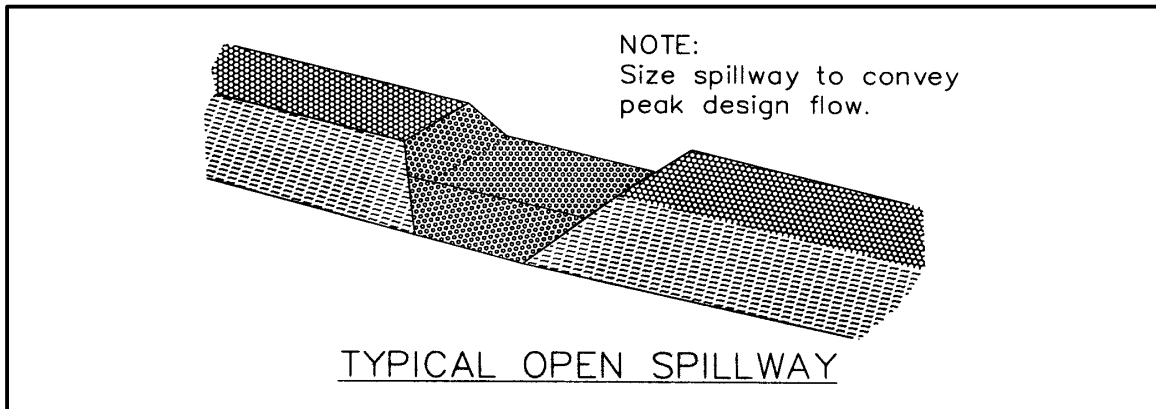
NOTES:

1. Typical trap design shown will handle 12.7 mm of runoff over a 24 hour period.
2. Settling volume: 130 m³ per hectare of drainage area.
3. Sediment storage volume: 65 m³ per hectare of drainage area.

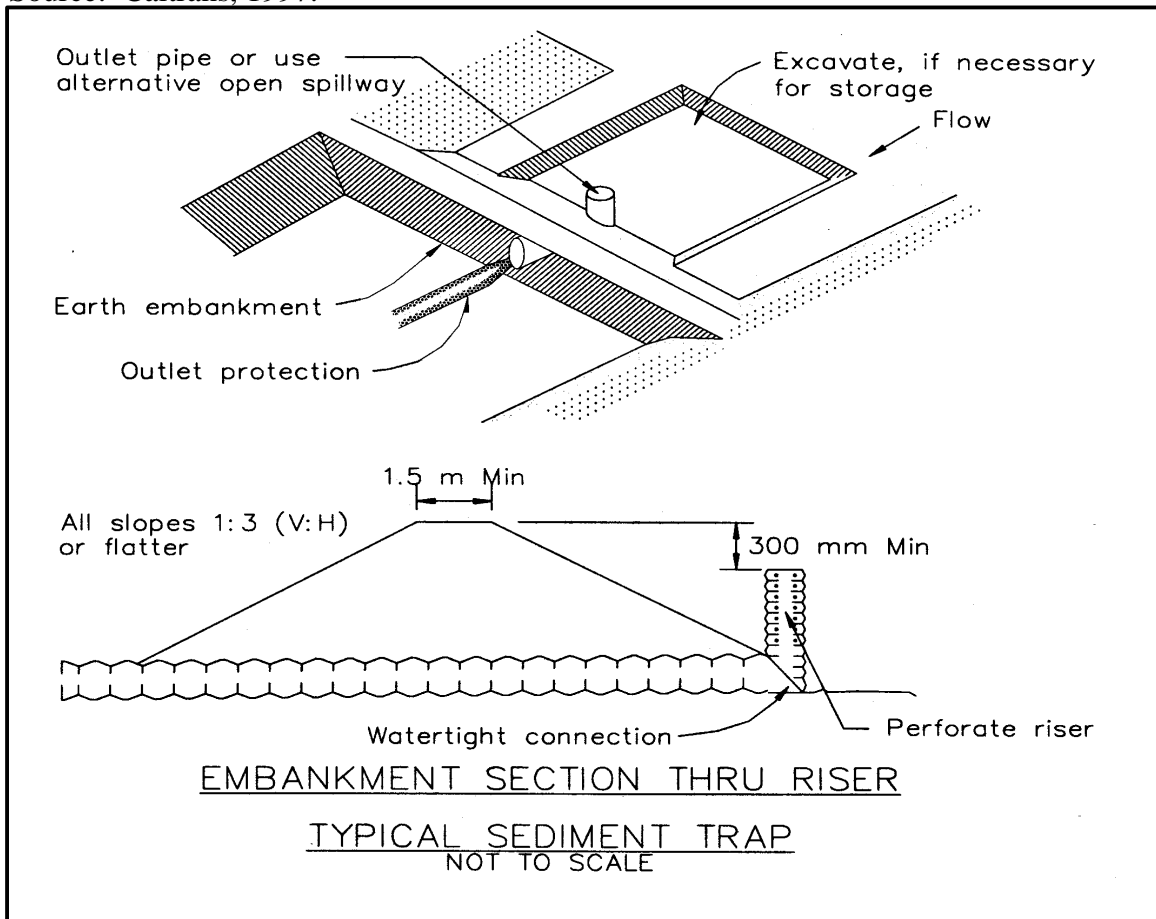
Source: Caltrans, 1997.

Sediment Removal

Sediment Trap



Source: Caltrans, 1997.

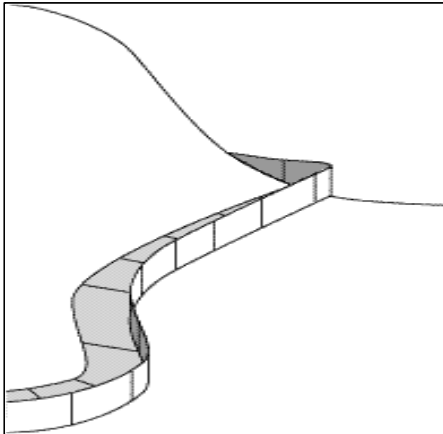


Source: Caltrans, 1997.

References

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, April 1997.



- Sediment Control

Description

A temporary device consisting of permeable fabric that is placed to intercept sheet flow runoff. The silt fencing slows and ponds the runoff, which allows the sediments to settle. The water is then released slowly through the permeable fabric.

Applicability

- Along (not across) streams and channels.
- Along the perimeter of a site.
- Below the toe of exposed or erodible slopes.
- Downslope of exposed soils.
- Around soil stockpiles (see BMP SC-1).

Approach and Standards

- Construct each fence along a level contour to prevent failure via the creation of rills and gullies.
- Keep drainage area upstream of the silt fence to less than 0.25 ac./100 ft (0.3 ha/100m) of fence.
- Keep the length of slope that drains to any point along the fence to 100 feet (30 m) or less.
- Limit the length of any single fence to 500 ft. (150 m.).
- Turn the last 6 feet of the face up slope in a “J” or “L” shape so that ponding can occur.
- Do not connect fence segments, but overlap segments of the fence by at least one foot to ensure complete coverage

Sediment Removal

Silt Fence

- Do not place silt fences in areas that are not suitable for temporary ponding or sediment deposition.
- Do not place silt fences across streams or other drainages that have concentrated flows, as it will lead to undercutting, gully formation and fence failure.
- To strengthen the fence, add gravel backfill on the up-slope side, making sure that the filter fabric is buried deeper than the gravel back fill. In addition, hay bales can be placed behind the filter fabric on the downslope side to strengthen the fence. Up to three hay bales can be placed atop of one another as long as they are properly staked to the ground.
- To anchor the fence, rope can be attached to the fence stakes and anchored into the up-slope soil with another stake.

Installation of Fence

- Bury, or key in, filter fabric at least 6 inches below the ground surface and 6 inches across, and then back fill with dirt or gravel.
- Allow 2 to 5 feet at the toe of the slope for sediment to accumulate.
- Make sure that the silt fence is aligned along natural contours to prevent flow diversion.

Limitations

- Do not use for flow diversion.
- Do not use in areas (streams, channels, etc.) where flow is concentrated.
- Requires frequent maintenance.

Requirements

Maintenance

- Inspect prior to and after rain events.
- Remove sediment when accumulations have covered one-third of the fence height.
- Repair any portions of the fence that have been undercut.
- Repair or replace any split, torn, slumping or weathered filter fabric.
- Properly remove and dispose of the silt fence when no longer needed.

Costs

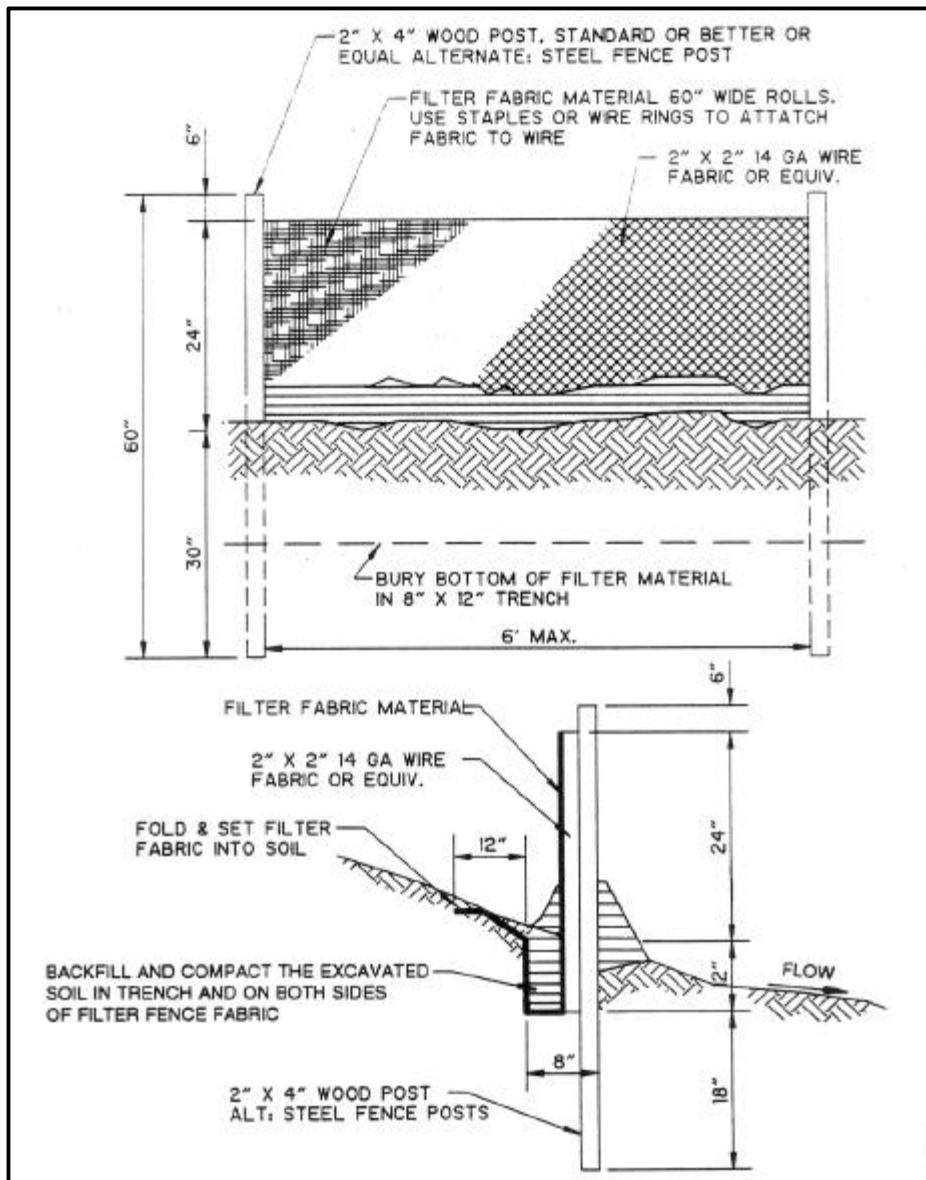
- Costs in staff time for construction, monitoring, and repairs.
- Sediment and device removal and disposal costs.
- Material costs for rocks, filter fabric, and stakes.

Sediment Removal

Silt Fence

Training

- Minimal training necessary but important for proper installation and maintenance.



Source: California Storm Water Quality Task Force, 1993.

References

Sediment Removal

Silt Fence

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, March, 1993.

BMP – CHECK DAM: STRAW BALE

DESCRIPTION

Temporary sediment catchments constructed of straw bales. Also used as grade control structures to facilitate vegetation establishment.

APPLICATIONS

Use in small upland drainages and gullies only. Used to trap sediment from dewatering operations. (See BMP: Dewatering – Pumping or Draining). May also be used to allow for revegetation in eroded swales.

LIMITATIONS

- ✓ When used as sediment catchments, must be inspected and cleaned out regularly.
- ✓ Temporary structures. Rely on vegetation to stabilize over the long run.
- ✓ Check dams tend to flatten channel grade causing upstream bank-full meandering which may erode stream banks.
- ✓ Adequate cutoff trench into competent native ground is essential. Incorrect installation may cause increased erosion.

CONSTRUCTION GUIDELINES

- 7) Never use metal stakes or rebar to anchor bales unless a provision is included to remove these materials. Metal stakes pose a serious safety hazard.
- 8) Key bales 4 inches into the ground and side banks. Compact moist soil around side banks.
- 9) Center must be lower than sides to act as a spillway. Add rock downstream of center weir bale.
- 10) Secure with a minimum of two wooden stakes per bale.

BMP MAINTENANCE

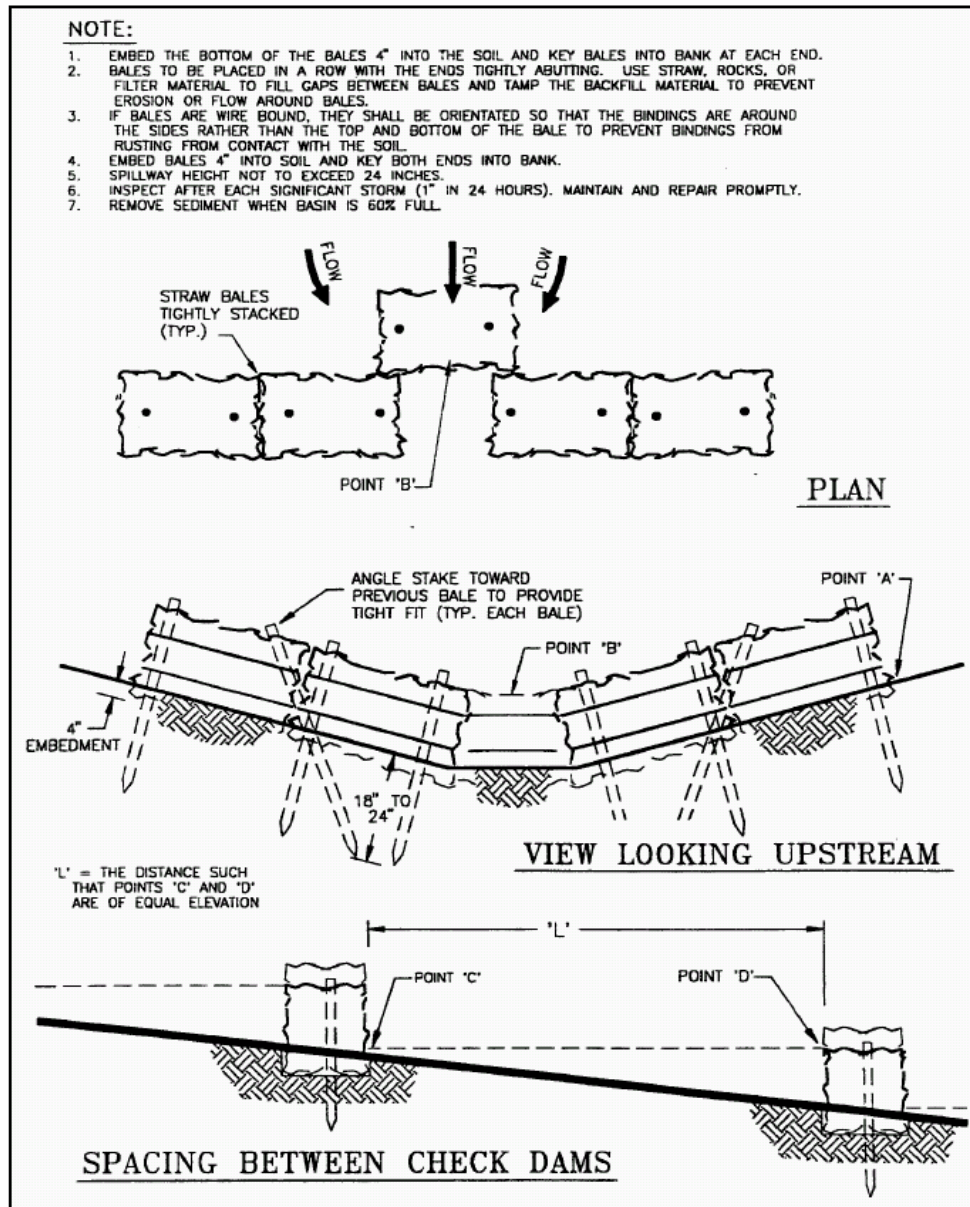
- ✓ When used as sediment catchments, must be inspected and cleaned out when basin is 60% full.
- ✓ Inspect sediment catchments after each significant storm (1 inch in 24 hours).

BMP REMOVAL

- ✓ Straw bales and stakes used as a catchment basin are removed after the project has stabilized. The area is then smoothed, reseeded and mulched (see Seeding BMP and Mulching BMP).

- ✓ When used as grade control to facilitate vegetation establishment, removal is not required.

CHECK DAM – STRAW BALE



Source: McCullah, J. 1992. Erosion and Sediment Control Standards Design Manual – County of Shasta. Prepared for the Western Shasta RCD. Redding CA. 187 p.

BMP - CONCRETE WASHOUT

DESCRIPTION

Concrete washout areas prevent concrete waste discharges to waterways and storm drains. Concrete and cement-related mortars are toxic to fish and the aquatic environment.

APPLICATIONS

Concrete washouts are applicable for projects that require;

- on-site preparation and use of Portland cement concrete, asphalt concrete, or cement mortar
- equipment washouts

LIMITATIONS

- 4) An appropriate area for the washout must be identified at least 50 feet away from watercourses and storm drains in case of accidental breaching.
- 5) The storage capacity of the basin must be sized correctly for the job.

CONSTRUCTION GUIDELINES

- 1) The location of the concrete washout should be clearly labeled and all employees should be educated about proper concrete disposal.
- 2) Avoid mixing excess amounts of fresh concrete or cement mortar on-site.
- 3) Wash out concrete mixers only in designated washout areas where the water will flow into temporary sealed basins or onto stockpiles of aggregate base or sand. Use as little water as possible to reduce hardening and evaporation time of waste products.
- 4) Construct a basin large enough to contain all liquid and waste concrete materials generated during washout procedures. A minimum basin size is 9 feet x 9 feet and 2 feet deep. Plastic liner materials shall be a minimum of 60-mil polyethylene sheeting free of holes and defects.
- 5) Recycle washout by pumping back into mixers for reuse when possible.

BMP MAINTENANCE

- ✓ The concrete washout should be checked frequently to ensure proper use and effectiveness.
- ✓ At 75% capacity, the washout must be cleaned or new facilities must be constructed and ready for use.

BMP REMOVAL

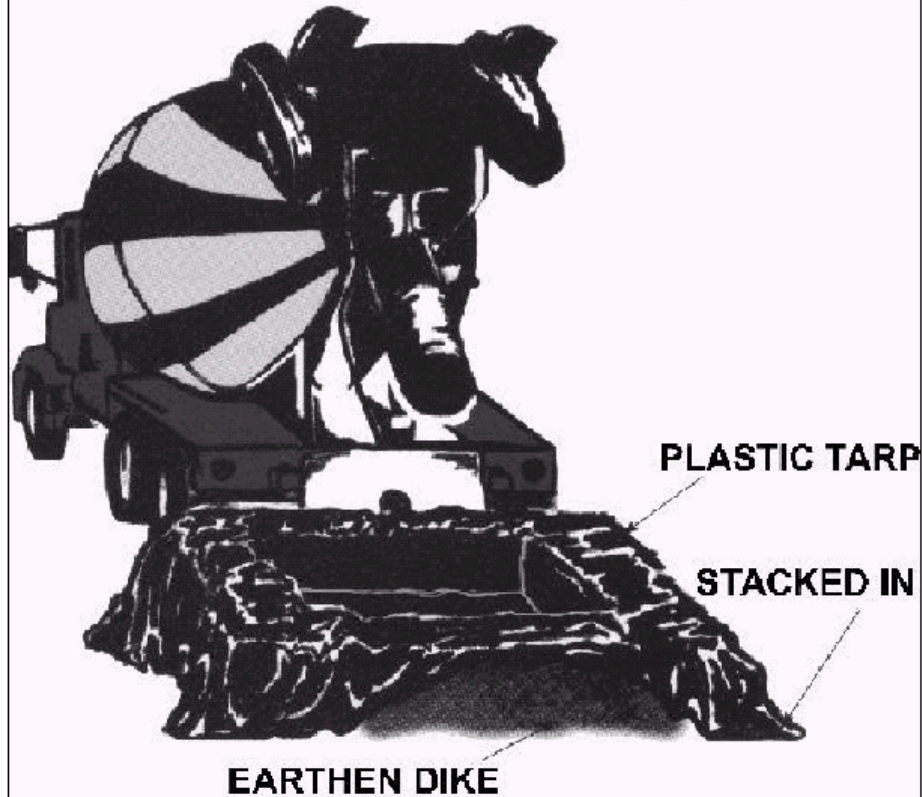
- ✓ The hardened concrete and materials related to the washout must be broken up, removed, and disposed of in accordance to local regulations.
- ✓ Area disturbed by the concrete washout must be repaired.

REFERENCES AND ADDITIONAL INFORMATION

California Regional Water Quality Control Board. *Erosion and Sediment Control Field Manual*, page 108, Third Edition, July 1999.

Caltrans. *Storm Water Quality Handbooks: Construction Site Best Management Practices Manual*, November 2000.

CONCRETE WASHOUT AREA



Source:
California Regional Water Quality Control
Board. Erosion and Sediment Control Field
Manual, Third Edition, July 1999.

**CONCRETE
WASHOUT**

BMP- CONTAINMENT OF CONCRETE POURS

DESCRIPTION

Proper management and techniques of pavement construction materials will greatly reduce or eliminate discharge into waterways resulting from paving, surfacing and the materials related to the removal of paving waste. Concrete and cement-related materials are toxic to fish and the aquatic environment.

APPLICATIONS

Containment of concrete will be necessary when forming, cutting, surfacing, paving, cleaning, or removal activities occur.

LIMITATIONS

- 6) Fine particulate matter may not be removed by the filtering methods.
- 7) Some containment controls become ineffective during wet weather.

CONSTRUCTION GUIDELINES

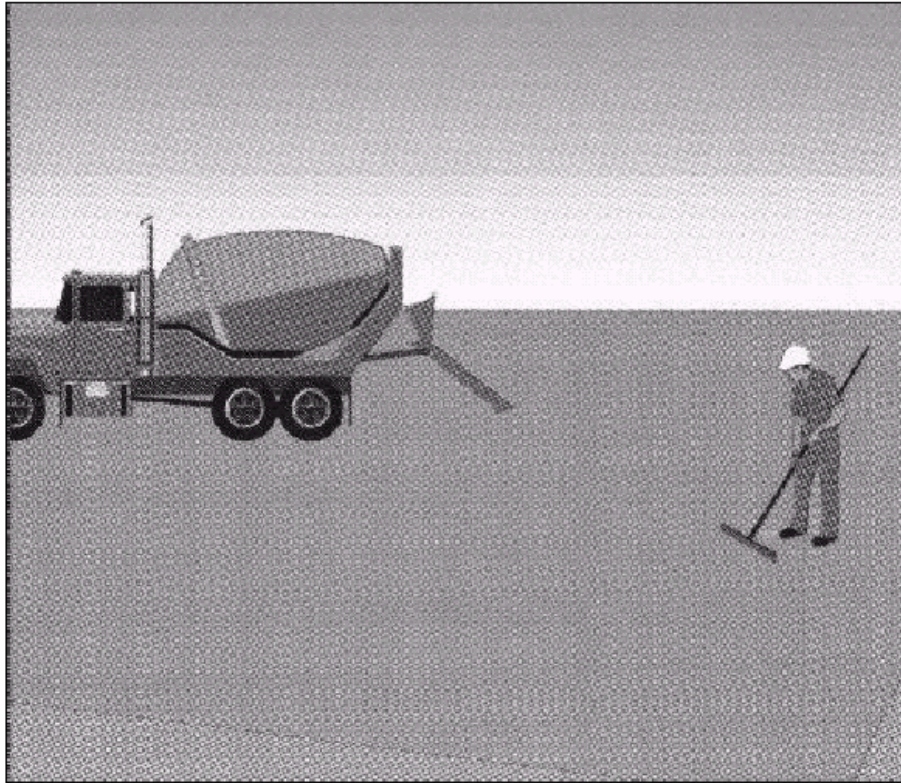
- 1) Apply concrete in dry weather to prevent runoff.
- 2) Drip pans or absorbent materials should be placed under paving machines when parked or stored on site.
- 3) Straw bales, sand bags, silt mats, or other controls should be used in drainage areas to filter runoff.
- 4) Use as little water as possible to reduce runoff.
- 5) Sweepings should be returned to the stockpile or disposed of in the trash, not washed into the street or a waterway.
- 6) Recycle broken concrete and asphalt.

BMP MAINTENANCE

- ✓ Check filter areas to ensure effective control of concrete waste. Remove waste build-up before filters are filled to capacity.
- ✓ Inspect and maintain machinery to minimize leaks and drips.
- ✓ Check with employees and subcontractors to ensure that measures are being followed.

BMP REMOVAL

- ✓ Drip pans, absorbent materials, wash water, and solids must be disposed of at approved facilities.



Source:
California Regional Water Quality Control
Board. Erosion and Sediment Control Field
Manual, Third Edition, July 1999.

CONTAINMENT, CONCRETE POUR

BMP – SILT MAT INLET

DESCRIPTION

A silt mat inlet protector is a filter fabric with an erosion control blanket and riser placed over a storm drain drop inlet to help reduce the introduction of sediment into the watercourse during construction.

APPLICATIONS

During construction, silt mats are the last line of defense to trap sediment before runoff enters the storm drain.

LIMITATIONS

- ✓ The silt mat inlet protection is only effective at low flows.
- ✓ Only effective for drop inlets which have been designed in a concave area – not for use on street side curb gutters.
- ✓ Inlet filters may cause stormwater to by-pass the inlet only to re-enter the watercourse at an unprotected location.
- ✓ Silt mat inlet protection must be monitored and maintained frequently.

CONSTRUCTION GUIDELINES

- 1) All upstream erosion control measures must be in place prior to installation of silt mat.
- 2) Clear and smooth the area to be covered by the erosion control blanket.
- 3) Roll out the blanket over the cleared area. Secure the edges of the blanket with staples or washed angular gravel.
- 4) Install the inlet protection device to the blanket as shown in the attached manufacturer's details.

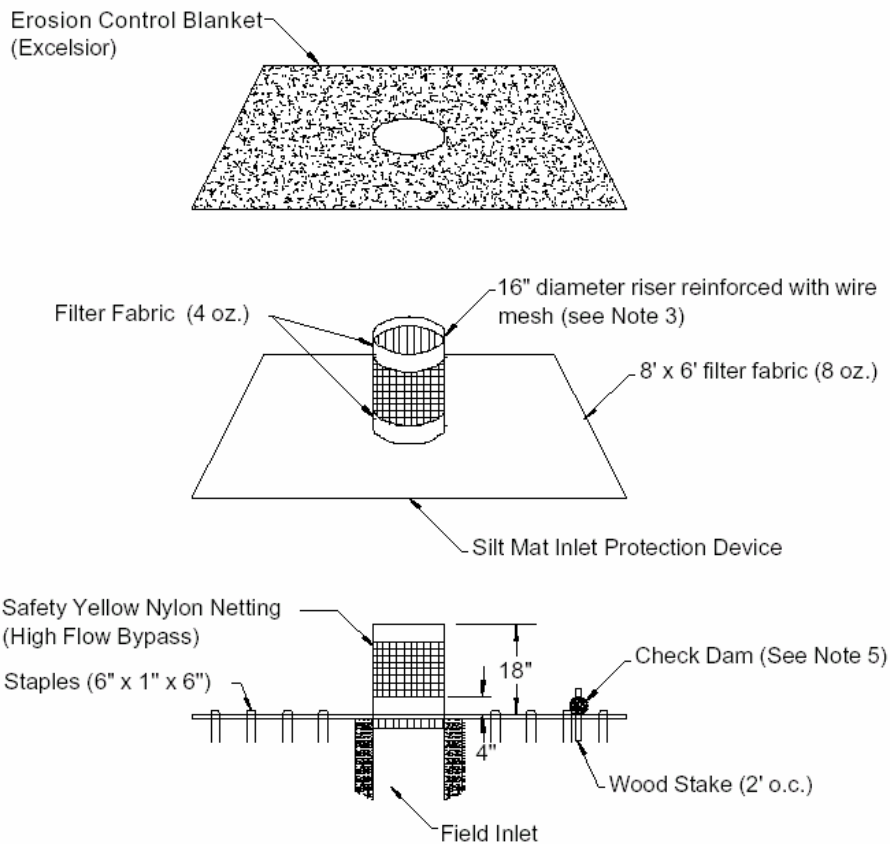
BMP MAINTENANCE

- ✓ Filter maintenance requirements vary with the application. Silt mats should be inspected before and after every rain event.
- ✓ During extended periods of rainfall, inspection should be at least every 24 hours.
- ✓ Silt and debris should be removed when the depth exceeds three inches (3") and disposed of in accordance with local agency requirements.

- ✓ The silt mat should be replaced when ripped or damaged.

BMP REMOVAL

- ✓ Silt mat can be removed when no longer necessary for inlet protection. All materials should be disposed of properly.



NOTES:

1. Clear and level area (6'-0" x 8'-0" min.) surrounding field inlet.
2. Roll out mat and center riser over inlet grate.
3. Install wire mesh frame into riser.
4. Secure mat in place using staples (6" x 1" x 6" min.) at approximately 1'-0" o.c.e.w. On hard surfaces, anchor with washed angular gravel or rock.
5. Side(s) of erosion control blanket may be rolled to form check (silt) dam to further slow or direct flows. Stake in place as shown.
6. Inspect inlet protection device before and after rain events, and weekly throughout the rainy season. During extended rain events, inspect at least once every 24 hours.
7. Remove and properly dispose of accumulated silt and debris to allow for proper function of device.

Source:
www.kristar.com/media/pdf/siltmat.pdf
 KriStar Enterprises, Inc., Santa Rosa, CA
 (800) 579-8819

SILT MAT - INLET

BMP – SILT MAT/VEGETATED GRASSY SWALE

DESCRIPTION

An erosion control blanket installed in a swale or drainage ditches and outlets at construction sites, functioning to both prevent erosion and collect water-borne sediments. The mat maybe seeded to establish vegetation which aides in sediment entrapment.

APPLICATIONS

A last line of defense to trap sediments before construction site waters enter the natural watercourse.

LIMITATIONS

- ✓ Not for large volumes or high flows – swale slope must be low gradient.
- ✓ Plastic netted erosion control blankets may entrap wildlife. Use plastic-netted erosion control blankets only when the design shear stress exceeds the manufacturer's recommendations for non-plastic products and wildlife entrapment will not be an issue.

CONSTRUCTION GUIDELINES

- 5) All upstream erosion control measures must be in place prior to installation of silt mat.
- 6) Where installation is downstream of a discharge point such as a culvert or discharge hose, a rock energy dissipater will be required over a portion of the silt mat.
- 7) There are many types and grades of erosion control blanket. The blanket chosen should be non-plastic, consisting of natural fibers such as coir or excelsior. The blanket must meet the manufacturer's design specifications for the flow rates, velocities, and shear stresses anticipated.
- 8) Install as per manufacturer's instructions. See accompanying details. It is essential that pre-installation soil surfaces are smooth to provide good soil to silt mat contact without tenting.
- 9) If used with an appropriate perennial seed mix, the effectiveness of the silt mat may increase as the grass grows. (see Broadcast Seeding BMP)
- 10) Do not use fertilizers in conjunction with the silt mat and seeding, as the fertilizer may mobilize and contaminate downstream waters.

BMP MAINTENANCE

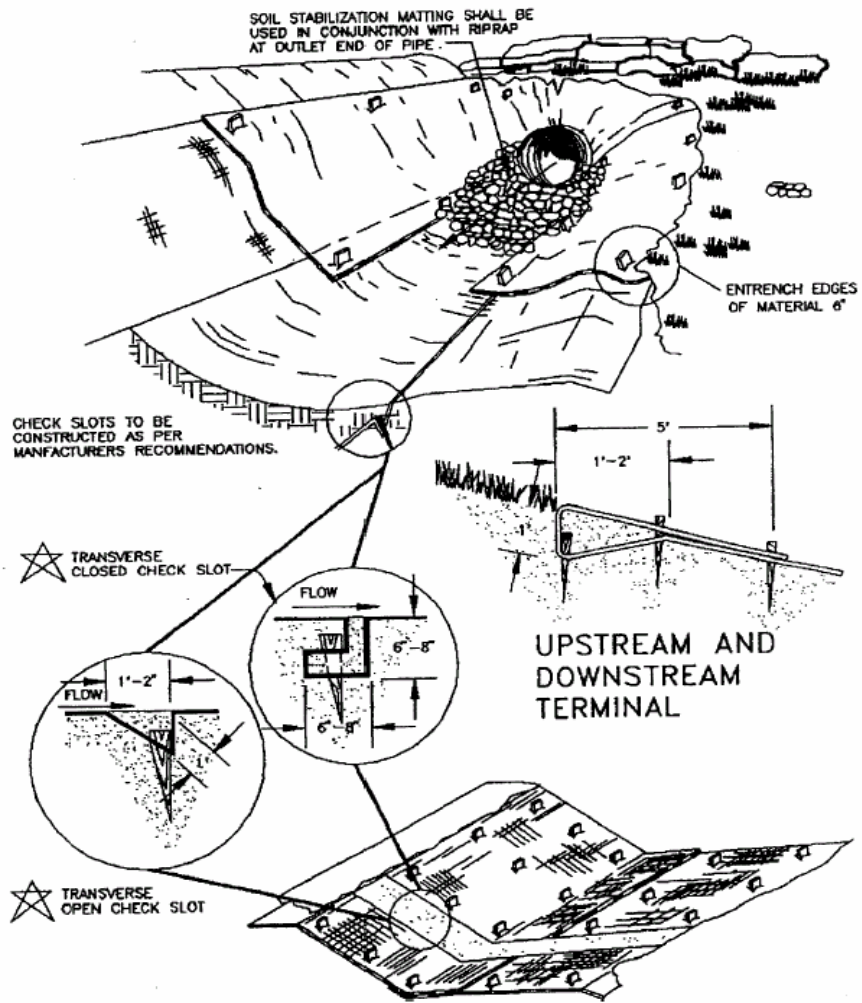
- ✓ Inspect silt mat during and after flow events. Re-fasten any loose areas, or replace damaged sections.

BMP REMOVAL

- ✓ Removal may not be required as the natural materials decompose on site.

SILT MAT- SWALE

Purpose: To capture sediment and prevent erosion at culvert discharge points where there are no high flow rates.



Source: King County. 2000. Regional Road Maintenance Endangered Species Act Program Guidelines.

BMP- SILT FENCE

DESCRIPTION

A silt fence is a temporary sediment barrier consisting of filter fabric entrenched into the soil and attached to supporting posts. Silt fence installed with a trencher or by slicing is the most effective installation method to ensure against common silt fence failures.

The slicing method for silt fence installation utilizes an implement towed behind a tractor to “plow” or slice the silt fence material into the soil. The slicing method requires the “Tommy” silt fence machine or equivalent. Silt fence machines install the silt fence by slicing through the soil, rather than excavating it. Slicing minimally disrupts the soil upward and slightly displaces the soil, maintaining the soil’s profile and creating an optimal condition for future mechanical compaction. Compacted soil resists water infiltration and moisture saturation, thus nearly eliminating washouts.

APPLICATIONS

Silt fence is a sediment control practice. Silt fence is intended to be installed where sediment-laden water can pond, thus allowing the sediment to fall out of suspension and separate from the runoff. It is not intended to be an erosion control practice. Improperly applied or installed silt fence will increase erosion. Only install silt fence where water can pond. Silt fence placed off contour will effectively divert runoff if that is desired.

Silt fence can be used where:

- ✓ sheet and rill erosion would occur;
- ✓ protection of adjacent property or areas beyond the limits of grading is needed (perimeter control);
- ✓ the size of the drainage area is no more than 1/4 acre per 100 linear feet of silt fence;
- ✓ the maximum flow path length above the barrier is 100 feet (30.5 m);
- ✓ the maximum slope gradient above the barrier is 2:1;
- ✓ small swales are carrying silt, the slope is less than 2%, and the drainage area is less than 2 acres (0.8 ha);
- ✓ silt fence is the only feasible option.

LIMITATIONS

The high failure rate of silt fences is often due to:

- ✓ Improper placement on the site
- ✓ Inadequate quantities relative to the area contained
- ✓ Shallow trenches with little or no soil compaction.
- ✓ Inadequate attachment to posts
- ✓ Failure to maintain the silt fence after installation.

When installing, remember these important facts:

- ✓ No formal design is required. Silt fences have a useful life of one season. Their principal mode of action is to slow and pond the water and allow soil particles to settle. Silt fences are not designed to withstand high heads of water, and therefore should be located where only shallow pools can form. Their use is limited to situations in which sheet or overland flows are expected.
- ✓ Silt fences should be placed on contour to be most effective. Site perimeters and property boundaries rarely follow slope contour. If silt fences are placed along property boundaries, water may be diverted to the low point and failure may occur.
- ✓ The slicing method has the capability to turn in a short distance, thus properly installing silt fence where needed. Turning enables upturns on the ends of silt fence runs, maneuvering around obstacles on construction sites, protection along property lines, and following contours as prescribed in Best Management Practices.
- ✓ Silt fences normally cannot filter the volumes generated by channel flows. When installed across a concentrated flow path, undercutting of the fence often occurs. Silt fences should not be designed to impound sediment or water more than 18 inches (0.5 m) high. Sediment shall be cleaned from behind the fence when it reaches 50% of the designed impoundment height (9 inch (0.2 m)).

CONSTRUCTION GUIDELINES

Some design considerations include:

- 1) Determine what kind of runoff, and how much, is coming onto the site; too much volume of water per silt fence area means failure will happen;
- 11) Determine where and how the total volume is going to exit; total drainage area is the prime consideration of silt fence quantity, not necessarily slope;

- 12) Soil type can play a role in the placement and quantity requirements; sandy soils might require more silt fence per area to contain the volume of potential sediment; clay soils might need fewer fences because the volume of potential sediment loss is less, although the volume of water might be greater because clay soils allow less rainfall infiltration;
- 13) Type, size and spacing of fence posts; wood posts are inadequate and should not be used; steel t-posts weighing at least 1.25 lbs per ft. are required, as they can be driven 24 inches into compacted soil, which is necessary to hold a horizontal load 18 inches high, and they can also be recycled and used repetitively; improper spacing of posts causes failures;
- 14) Type of filter cloth; if all the elements of the silt fence installation are properly adhered to, the fabric does not make much difference; even lightweight non-woven fabric will hold 18 inches of sediment; wire supported fence is costly and ineffective.
- 15) Typical silt fence specifications were written 25 years ago and have changed little since. Some states have recognized some of the inherent problems, such as inadequate trench depth, and implemented minor changes to improve efficacy. The 25 year-old specifications, referred to as the trenching method, have never been tested for efficacy and proven worthwhile. A trencher was simply the only piece of equipment available at the time capable of securing the fabric into the soil, regardless of efficacy. Today, many contractors just open a furrow with a blade and backfill onto the fabric with the crumbs. Loose soil, both from the trencher or the blade, absorbs water quickly and becomes saturated easily, washing out under the fabric.
- 16) The soil should be sliced and the fabric mechanically installed into the soil
- 17) The height of a silt fence shall not exceed 36 inches (0.9 m). Storage height and ponding height shall never exceed 18 inches (0.5 m).
- 18) To minimize erosion, install silt fence at the head of a slope to slow velocity and to create a large storage area.
- 19) The fence line shall follow the contour as closely as possible.
- 20) The ends of the fence should be turned uphill.
- 21) Steel support posts should be utilized, properly spaced and driven into compacted soil
- 22) Post spacing shall not exceed 6 feet (1.8 m).
- 23) The filter fabric is stapled or wired directly to the posts. Filter fabric shall not be stapled to existing trees.

- 24) Fabric should be attached to the posts with three diagonal ties
- 25) Set any silt fence placed at the toe of a slope at least 6 feet (1.8 m) from the toe in order to increase ponding volume.

BMP MAINTENANCE

- ✓ Inspect silt fences and filter barriers weekly after each significant storm, i.e. 1 inch (25.4 mm) in 24 hours. Make any required repairs immediately.
- ✓ Remove sediment when it reaches 1/3 height of the fence or 9 inches (0.3 m) maximum.
- ✓ The removed sediment shall conform to the existing grade and be vegetated or otherwise stabilized.

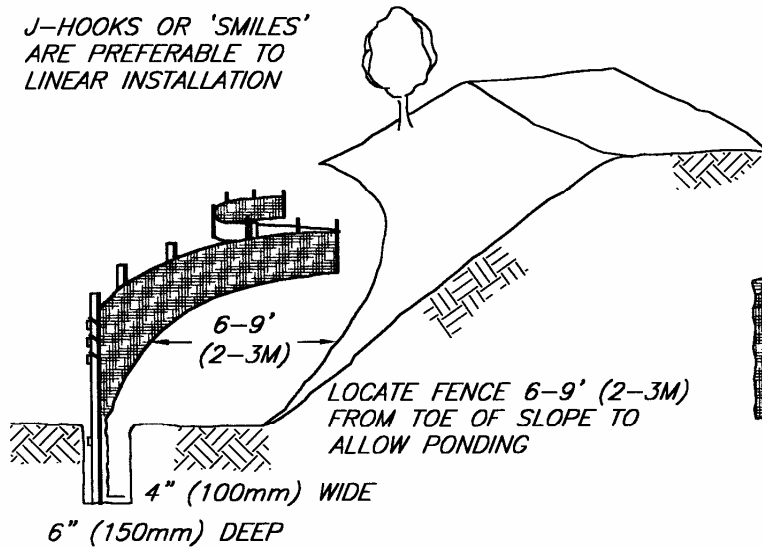
BMP REMOVAL

- ✓ Once a silt fence has served its purpose, make sure you permanently stabilize the upslope area and remove any sediment stored behind the silt fence *before* removing it.

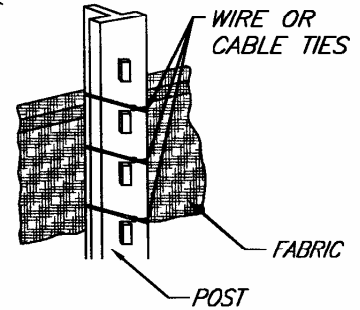
ADDITIONAL RESOURCES

Silt Fence That Works, Thomas Carpenter, CPESC, 2000. Tommy Silt Fence Machine, 3718 S.W. Court Ave., Ankeny, Iowa, 50021 (800) 965-4665 www.tommy-sfm.com
Installation of Silt Fence Using the Tommy® Static Slicing Method, Environmental Technology Verification Report, Washington, DC, 2000

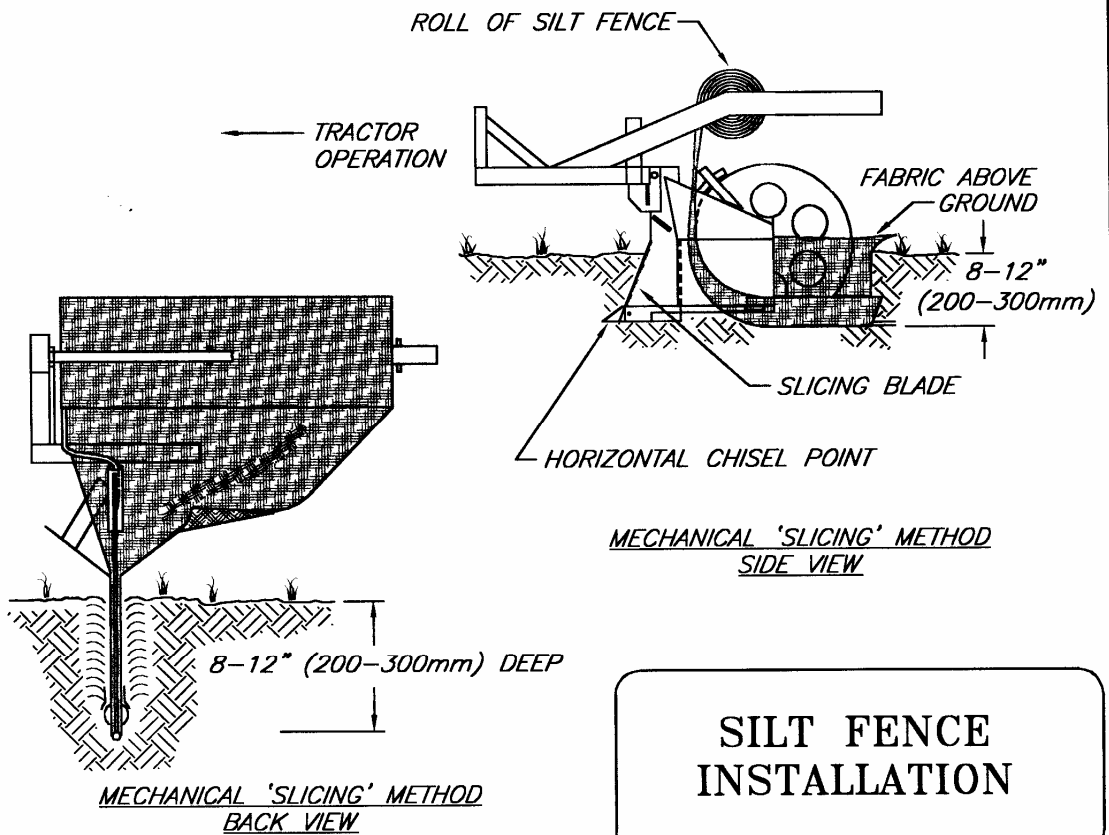
J-HOOKS OR 'SMILES' ARE PREFERABLE TO LINEAR INSTALLATION



'BEST' TRENCHING METHOD

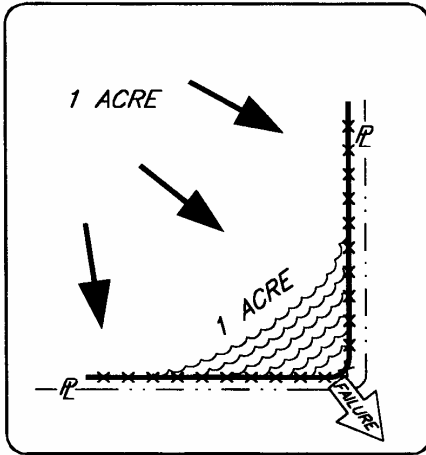


'BEST' T-POST WITH ATTACHMENT TO POST

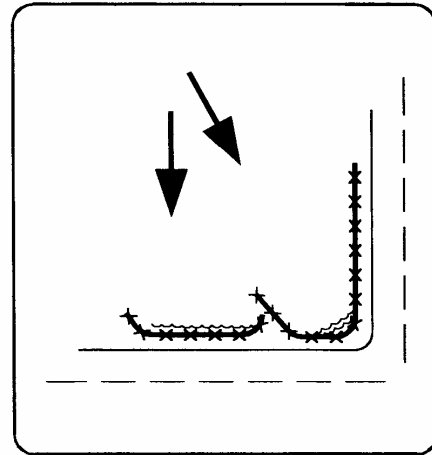


SILT FENCE INSTALLATION

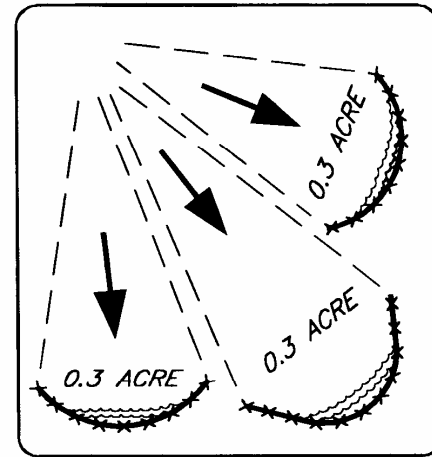
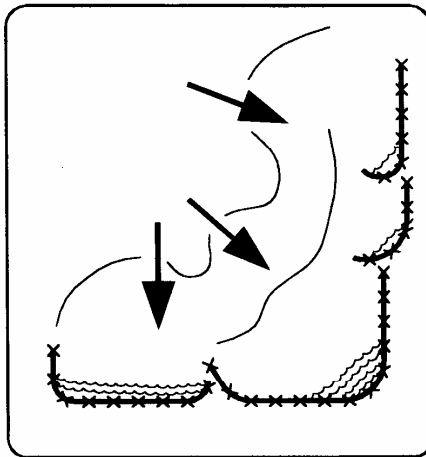
FILE: SF-Methods



Incorrect – Do Not layout "perimeter control" silt fences along property lines. All sediment laden runoff will concentrate and overwhelm the system.



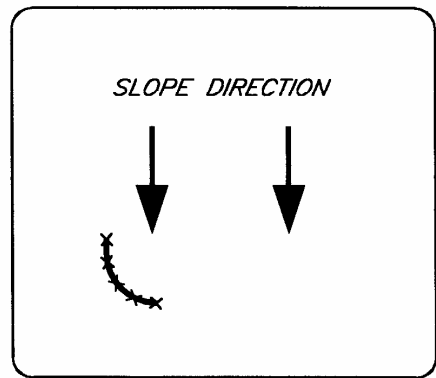
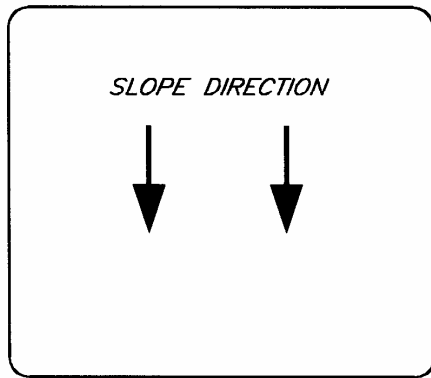
Correct – Install J-hooks



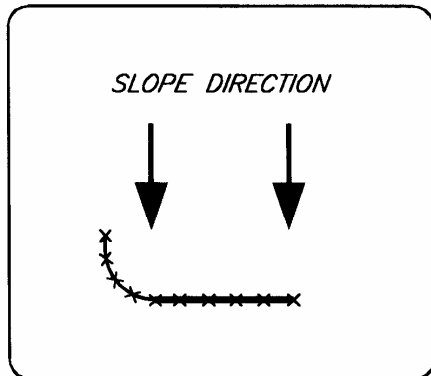
Discreet segments of silt fence, installed with J-hooks or 'smiles' will be much more effective.

SILT FENCE PLACEMENT FOR PERIMETER CONTROL

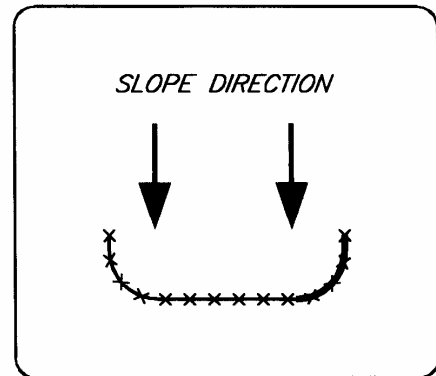
FILE: SF--Perimeter Control



STEP 1 – CONSTRUCT LEG



STEP 2 – CONSTRUCT DAM

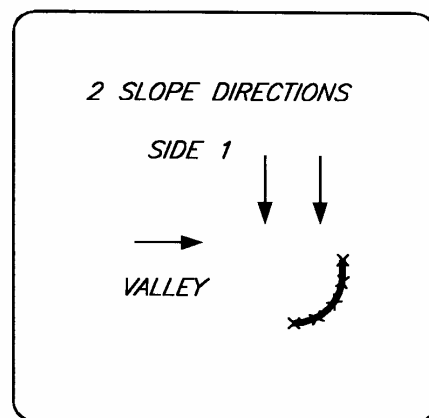
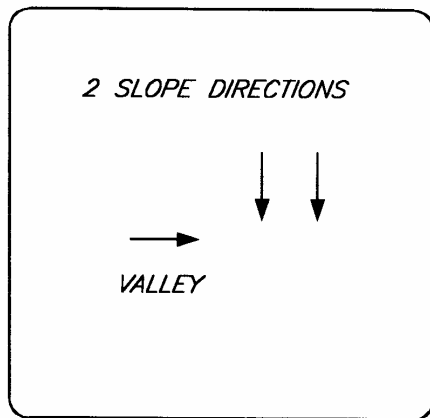


STEP 3 – CONSTRUCT LEG 2

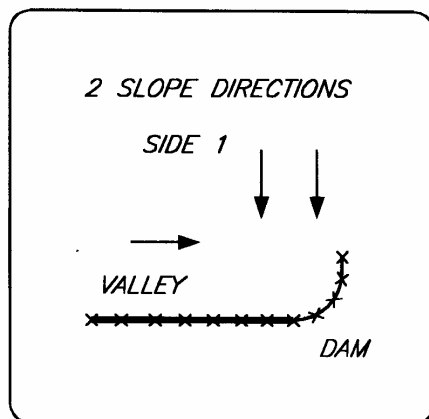
INSTALLATION WITH J-HOOKS OR 'SMILES' INCREASE SILT FENCE EFFICIENCY.

**SILT FENCE
TYPICAL PLACEMENT—ONE SLOPE**

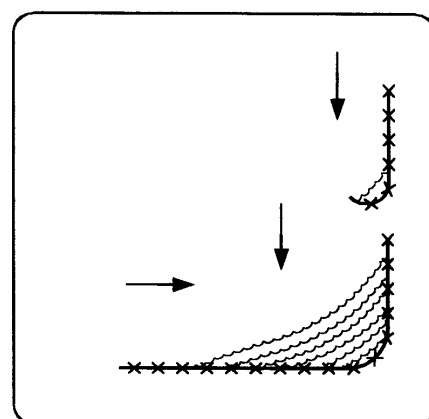
FILE: SF—One Slope



STEP 1 - CONSTRUCT A DAM



STEP 2 - CONSTRUCT SIDE 2



STEP 3 - CONSTRUCT J-HOOKS AS NEEDED

INSTALLATION WITH J-HOOKS WILL INCREASE SILT FENCE EFFICIENCY AND REDUCE EROSION-CAUSING FAILURES.

**SILT FENCE
TYPICAL PLACEMENT-TWO SLOPES**

FILE: SF-Two Slopes

BMP – TURBIDITY CURTAIN

DESCRIPTION

A turbidity curtain is a temporary floating geotextile structure used to contain the flow of silt and debris in a waterway during construction. The curtain functions by limiting the flow of water to allow the sediments to settle out. **Other names:** floating boom, turbidity barrier, silt curtain, stillwater screen.

APPLICATIONS

Silt and debris must be contained by law to protect aquatic resources. The turbidity curtain can be ordered to specification depending on flow, depth, length, filtering properties, and the desired length of deployment.

LIMITATIONS

- ✓ Use of a turbidity curtain in a waterway is subject to federal, state, and local permits.
- ✓ The curtain is intended to be used as an enclosure, not a dam for turbid waters to settle out.
- ✓ Custom curtains are available.
- ✓ A site survey is required to assess the velocity, depth, and sediment type to select the proper curtain.

CONSTRUCTION GUIDELINES

- 1) Construction of the turbidity curtain varies with vendor: see manufacturer's specifications.
- 2) Choose the appropriate height and length of turbidity curtain.
- 3) Add a suitable weight or anchoring system to the bottom of the curtain
- 4) Ensure that water discharged from turbidity curtain meets permit requirements at point of discharge.

BMP MAINTENANCE

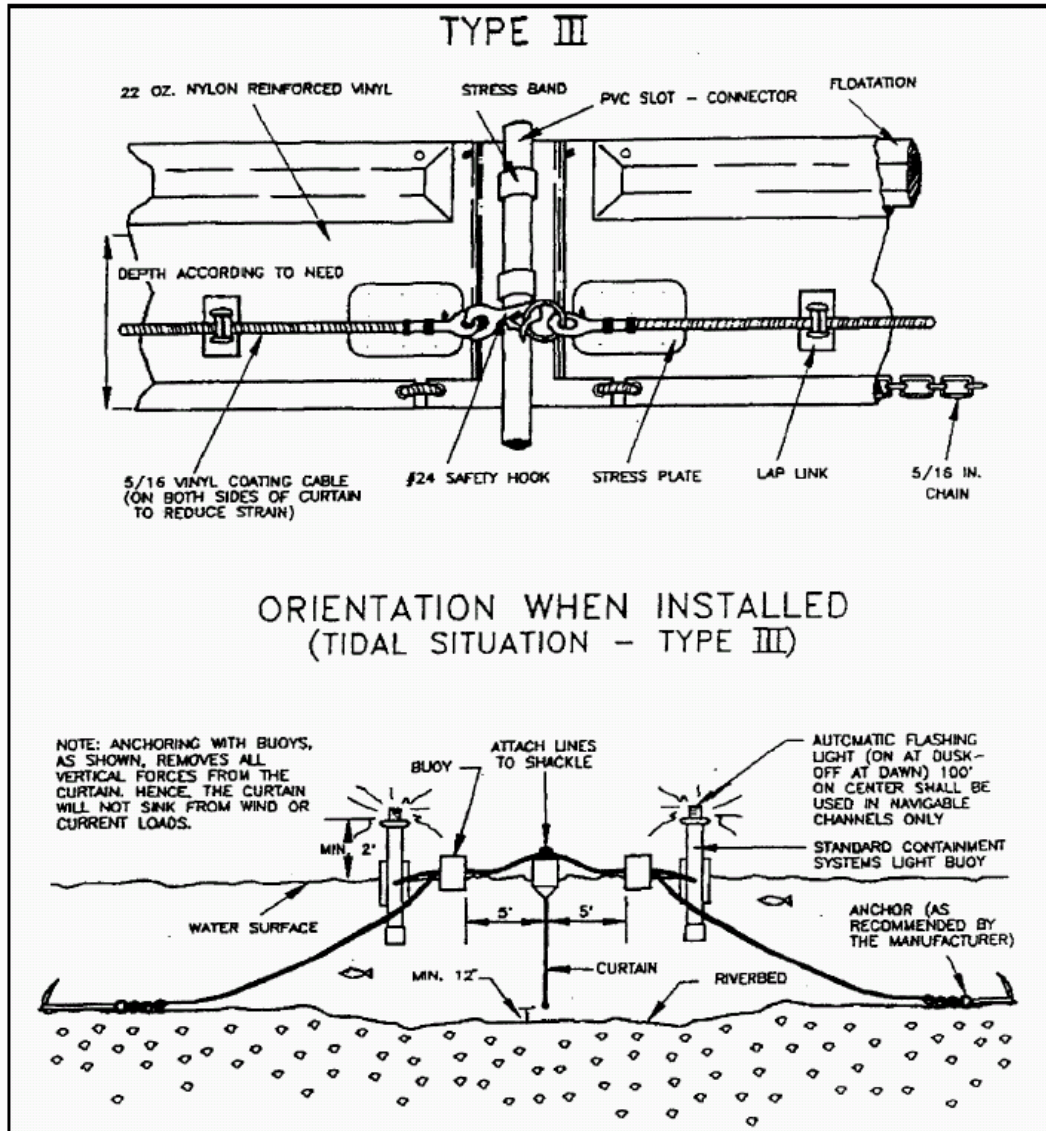
- ✓ Careful monitoring of the mud levels will be required to conform to the curtain's capability to hold the material.
- ✓ Anchor lines must be checked and replaced with any signs of wear.
- ✓ Tears and leaking connections must be checked and repaired.

BMP REMOVAL

- ✓ Remove curtain in such a manner as to minimize turbidity. Remaining soil particles shall be sufficiently settled before removing the curtain.
- ✓ Discharge of turbid water will be subject to discharge requirements in waterways.

TURBIDITY CURTAIN

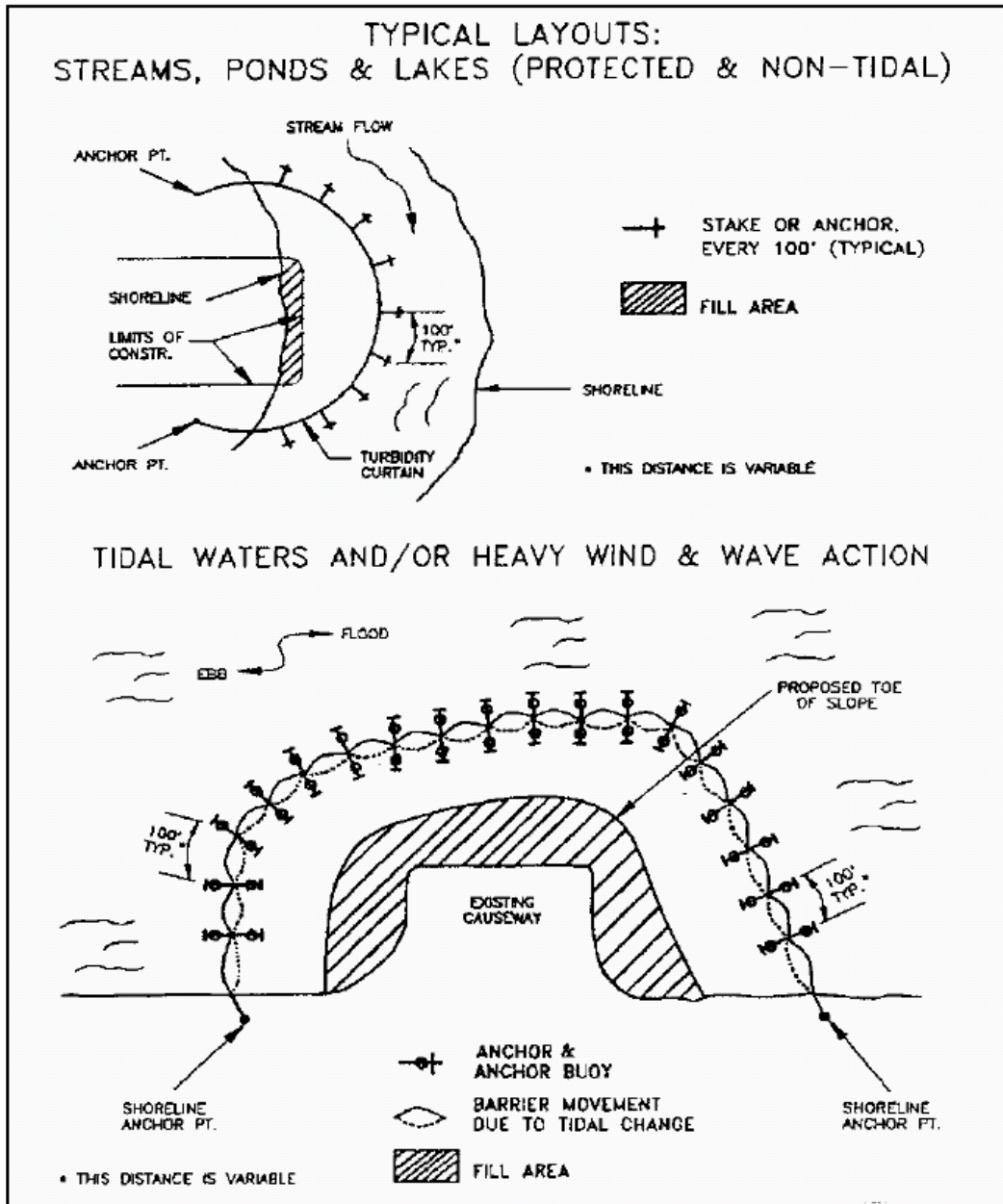
Figure 1. Turbidity Curtain – Type III, including tidal situation.



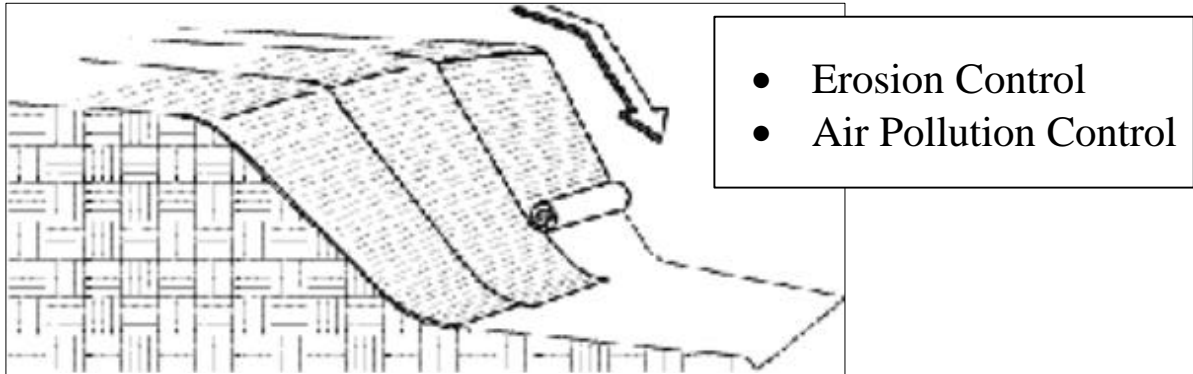
Source: King County. 2000. Regional Road Maintenance Endangered Species Act Program Guidelines.

TURBIDITY CURTAIN

Figure 2. Two typical layouts of a turbidity curtain.



Source: King County, 2000. [Regional Road Maintenance Endangered Species Act Program Guidelines](#).



Description

Erosion control blankets are biodegradable or synthetic blankets that are used to stabilize disturbed soils, especially on slopes. Erosion control blankets and mats protect the soil from rain, surface runoff, and wind caused erosion, and can enhance infiltration, decrease soil compaction, and increase protection of seeds from predators.

Applicability

- Channels with flows from 2-feet per second to 4-feet per second (0.6 m/s to 1.2 m/s).
- Channels which will be vegetated and for which the flow velocity is greater than appropriate for the channel.
- Disturbed areas and slopes where mulch needs to be anchored. Blankets or mats can work in areas where crimping or tackifying are not adequate. Steep slopes, steeper than or equal to 1:2 (Vertical/Horizontal).
- Areas and slopes where the danger of erosion is high.
- Slopes adjacent to sensitive areas like streams, wetlands, channels.
- Disturbed areas where plants are slow to mature and provide protection.

Biodegradable and easy-to-install, erosion control blankets are effective measures to reduce erosion and to encourage vegetation growth.

Approach and Standards

- When choosing the materials consider cost, effectiveness, acceptability (i.e., environmental compatibility, regulatory acceptability, and visual impact), vegetation enhancement, installation, and operation and maintenance requirements. Considerations of vegetation enhancement should include native plant compatibility, germination and growth rates, moisture retention, temperature modification, open space or coverage, and nutrient uptake.

- Properly prepare the site to make sure the blanket/mat has complete contact with the soil. Sites can be prepared by grading and shaping the installation area; removing all rocks, dirt clods, vegetation, etc.; preparing the seedbed by loosening the top 2- to 3-inches (50-75 mm) of soil; and applying soil amendments as directed by soil tests, the seeding plan, and manufacturer's recommendations.
- Before installing the blanket, seed the area. All areas disturbed during installation will need to be re-seeded. For turf-reinforcement application, seeding is often performed after mat installation.
- Anchors can include U-shaped wire staples, metal geotextile stake pins or triangular wooden stakes. Wire staples should be at least 11 gauge; metal stake pins should be at least 0.188 in. (5 mm) diameter steel with a 1.5 in. (40 mm) steel washer at the pin head. Drive wire staples and metal stakes flush to soil surface. All anchors should be at least 6- to 18-inches (150-450 mm) long, longer for loose soils, and should resist pull-out.
- Follow the manufacturer's installation recommendations.

Channel Installations:

- Dig initial anchor trench 1-foot deep by 6 inches wide (300 mm by 150 mm) across the channel at the downslope end of the project area.
- Dig intermittent check slots 6-inches deep and 6-inches wide (150 mm by 150 mm) across the channel at 25- to 30-foot intervals (8- to 10-m) along the channel.
- Cut longitudinal channel anchor slots 4-inches deep and 4-inches wide (100 mm by 100 mm) along each side of the installation to bury edges of matting. When possible, extend the matting/blanket 2-to 3-inches (50 mm to 75 mm) above the crest of the channel side slopes.
- Begin at downstream end and in the center of the channel. Place the starting end of the first roll in the anchor trench and secure at 12-inch (300 mm) intervals. The matting/blanket should be initially upside down in the anchor trench.
- As with the first roll, position the next rolls in the anchor trench so that they overlap the preceding roll by at least 3 inches (75 mm).
- Anchor the initial ends of the mats at 2-inch intervals (50 mm) and backfill with soil. Compact the soil.
- Unroll the center strip of matting/blanket upstream. Stop at the next check slot or terminal anchor trench. Unroll adjacent mats/blankets upstream as was done with the center strip. Maintain a 3-inch (75 mm) overlap.
- Fold and secure all rolls and matting so they are snug in all the transverse check slots. Lay the mat/blanket in the bottom of the slot and fold it back against itself. Anchor the two layers of the mat/blanket at 12-inch (300 mm) intervals. Backfill and compact the soil.
- Continue rolling the other mat/blanket widths upstream to the next check lot or anchor trench.

- For non-critical installations, an alternative method is to place two rows of anchors on 6-inch (100 mm) centers at 25-30 foot (8-10 meters) intervals instead of the excavated check slots.
- If necessary, splice the blanket/mat ends to overlap like shingles, by a minimum of 12 inches (300 mm) apart on 12-inch intervals.
- Place the edges of the outside mats/blankets in the longitudinal slots, anchor with staples, backfill and compact the soil.
- Anchor, backfill and compact the upstream end of the mat/blanket in a 12 by 6-inch (300 by 150 mm) terminal trench.
- Secure the mat to the ground using U-shaped wire staples, geotextile pins, or wooden stakes.
- Seed and fill the turf reinforcement matting with soil if needed.

Slope Installations:

- At the top of the slope, anchor the blanket in a 6-inch deep by 6-inch wide trench. Backfill the trench and tamp dirt over the blanket.
- Unroll the blanket down the slope in the same direction that water would flow down the slope. Do not place the blanket horizontally across the slope.
- Overlap the edges of the rolls by 2 to 3 inches (50 mm to 75 mm). Staple the blanket down every 3 feet (1-meter).
- When splicing blankets, place blankets end over end in shingle style with 6 inches (150 mm) overlapping. Staple down the overlapped area about 1-foot (300 mm) apart.
- Blankets should be placed loosely, not stretched, and be stapled down enough to best keep direct soil contact.

Limitations

- High material and labor costs.
- Requires proper site preparation (e.g. smooth grading) to make sure the blanket or matting has enough contact with the soil. Rocky areas are not suitable for rolled blankets.
- Areas where final vegetation will be mowed are not suitable for rolled blankets because the staples can get caught in the mower.
- The use of non-biodegradable plastic sheeting should be kept to covering stock piles, or for temporarily covering small graded areas, because it is easily torn and vandalized and needs to be removed and properly disposed. Plastic sheeting does not allow for any infiltration, which heightens the probability for increased flows and erosion problems downhill and downstream.

Requirements

Maintenance

- Inspect after installation, before and after significant rain, and periodically throughout construction.
- Inspect for erosion and undermining. Perform immediate repairs as necessary.
- For washouts or breakage, repair the damage to the channel or slope (e.g., rills, gullies), before re-installing the blanket.
- When choosing materials, consider the differences in requirements for maintenance frequency, and need for fertilization, and irrigation. Also, consider the durability, longevity, ease of installation and safety as these will contribute to maintenance requirements.

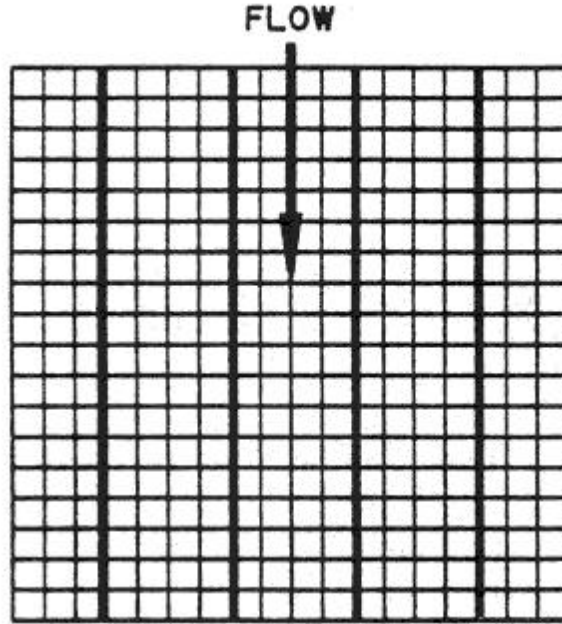
Costs

- Erosion control blankets are more expensive than other forms of erosion control as they have high material and labor costs.
- When choosing the material consider material costs, preparation costs, installation costs, and any add-on costs. Also consider the maintenance frequency and needs for fertilization and irrigation as these contribute costs as well.

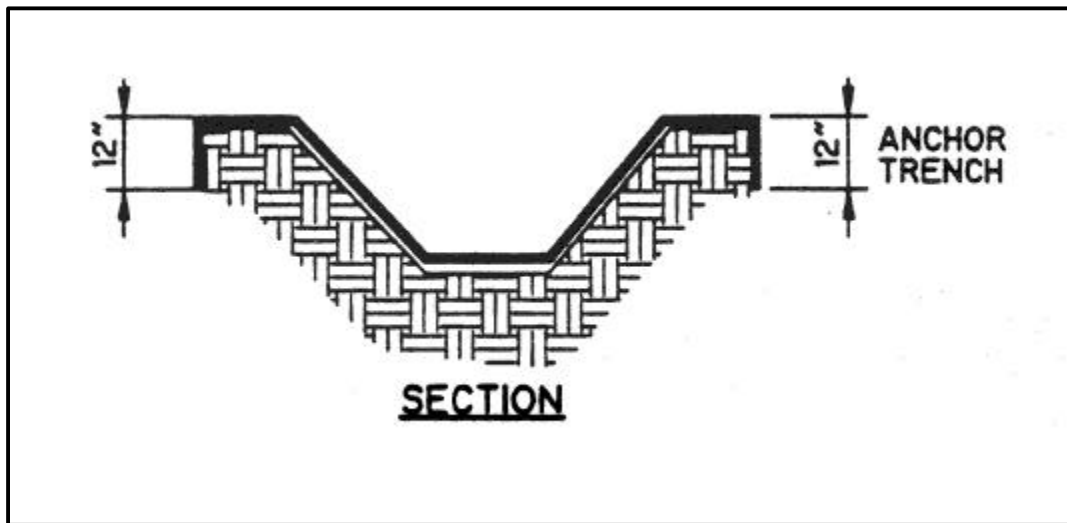
Training

- Minor training on appropriate installation and inspection is needed.

Placement of Erosion Control Blankets In Channels:



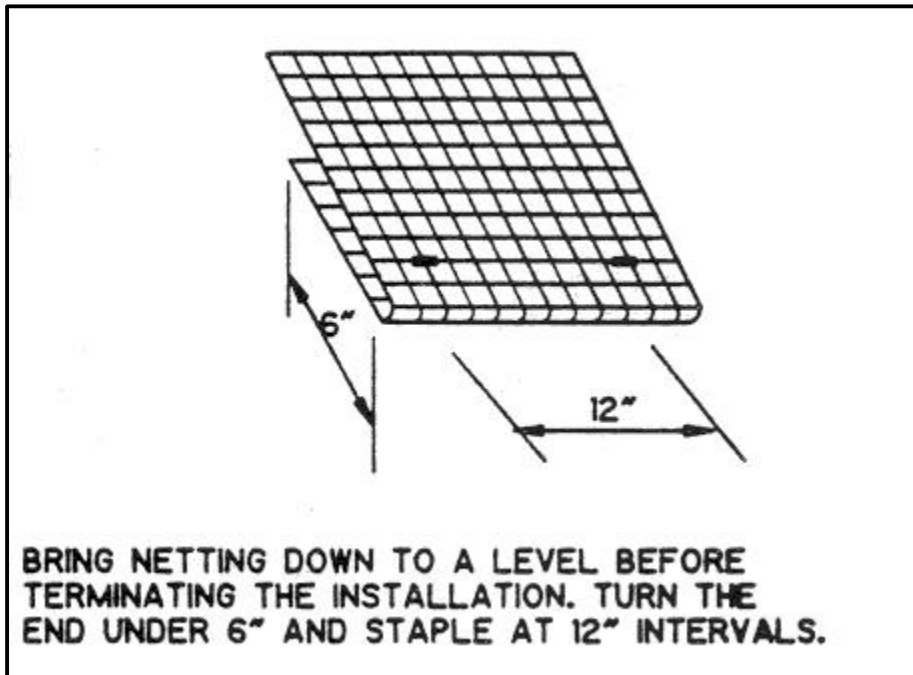
Source: California Storm Water Quality Task Force, 1993.



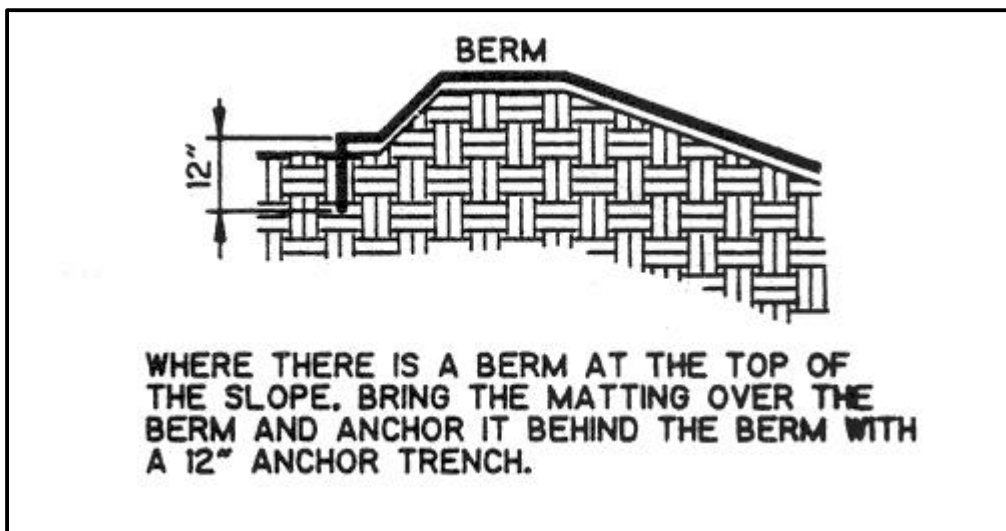
Source: California Storm Water Quality Task Force, 1993.

Note: These techniques work for small channels with low velocities only.

Anchoring Blankets and Mats:



Source: California Storm Water Quality Task Force, 1993.

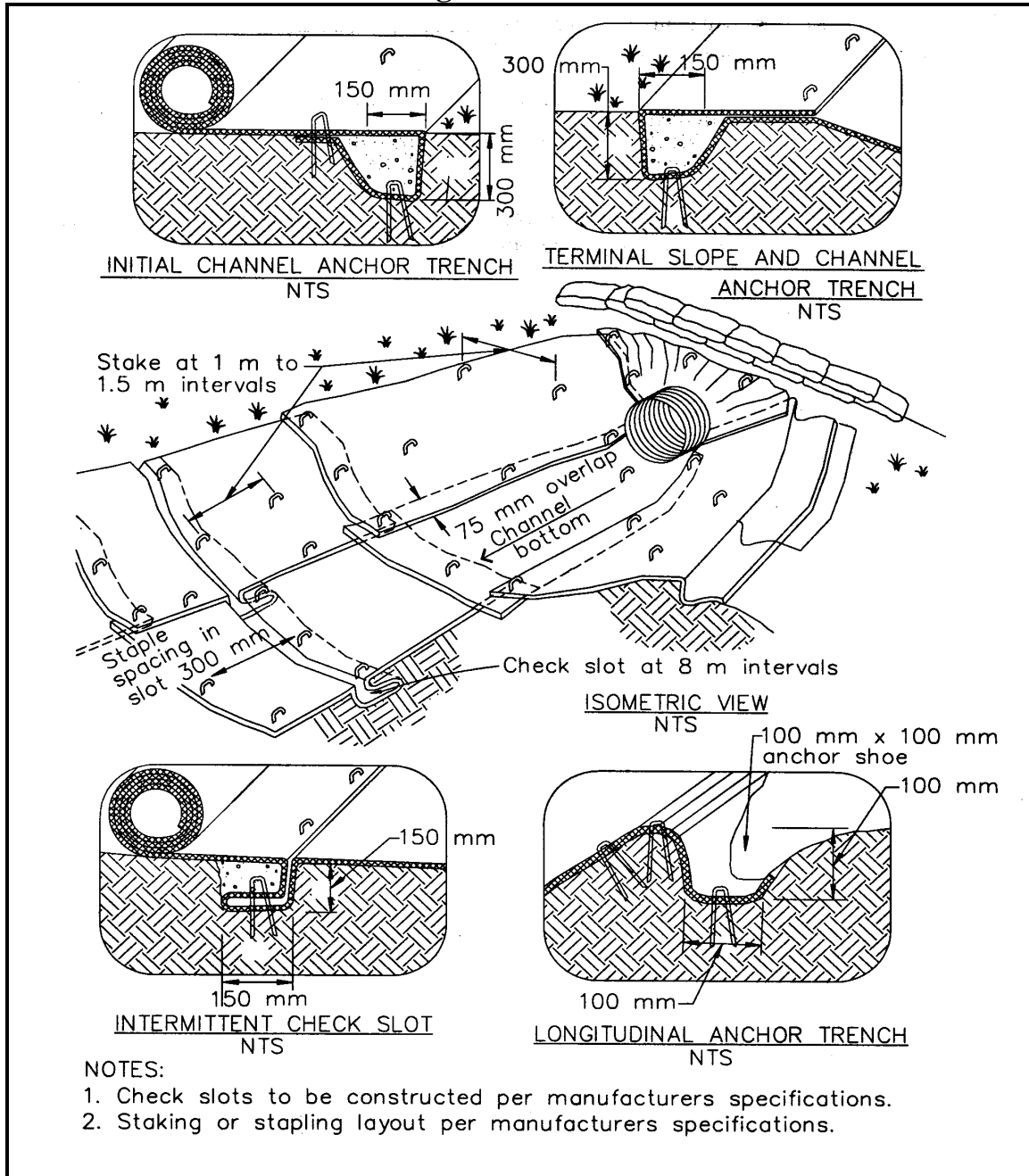


Source: California Storm Water Quality Task Force, 1993.

Soil Stabilization

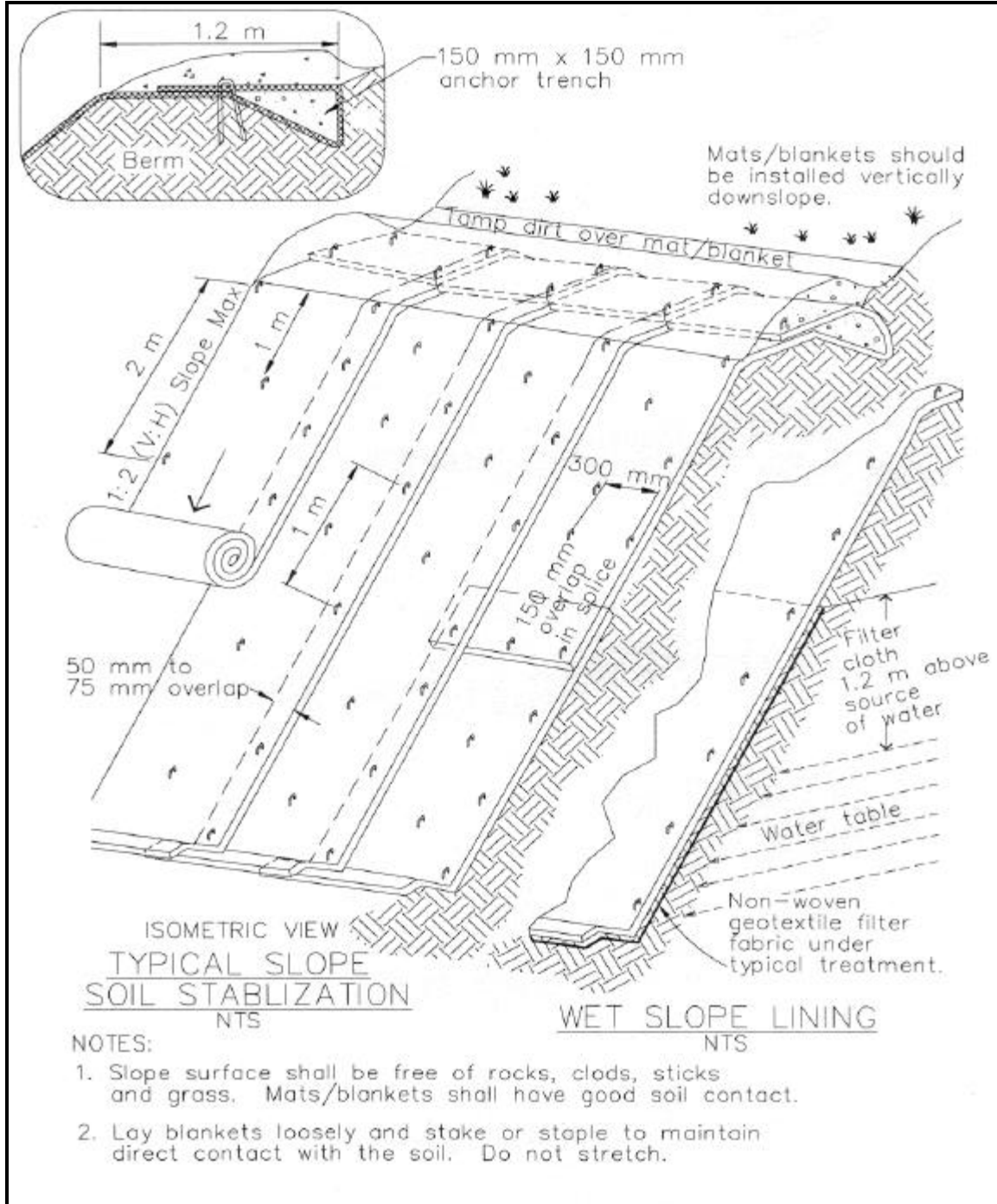
**Erosion Control Blankets,
Mats, and Geotextiles**

Anchoring Blankets and Mats:



Source: Caltrans, 1997.

Installation of Blankets and Mats:



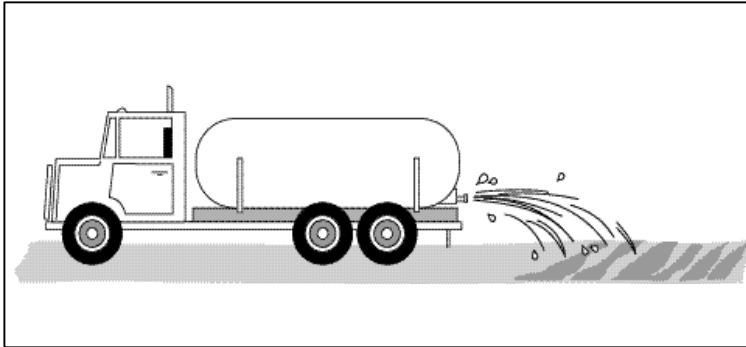
Source: Caltrans, 1997.

References

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC20, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD26B(2), April 1997.



- Erosion Control
- Sediment Control
- Air Pollution Control

Description

Dust control measures are used to keep the amount of airborne dust particles to a minimum to reduce erosion and airborne pollutants during the time between site disturbance and paving or revegetation. Dust control measures may include chemical or other measures (e.g. vegetation, mulch, stone, gravel).

Applicability

- To control dust from construction and maintenance vehicles and equipment at a work site.
- All construction and maintenance sites with exposed soils, as needed.
- Windy or wind-prone areas.
- Sites with silt and clay soils, which are prone to dust.
- Material stockpiles.
- Disturbed areas with or without traffic.
- Demolition areas.
- Unpaved roads.

Approach and Standards

- Schedule the maintenance activities to minimize the amount and time an area is exposed.
- Exposed soils can be quickly stabilized by using vegetation, mulch, spray-on adhesives (see also discussions of chemical measures, below), sprinkling water, or covering the area with stone or gravel (see also Limitations, below).
- Create and stabilize entry and exit points before starting construction or maintenance work (See BMP SS-4).
- Direct most maintenance traffic to stabilized roadways as possible (see BMP SS-4).
- Levee traffic should not exceed 10 mph.

Soil Stabilization**Dust Control**

- Identify the direction of prevailing winds, and adjust the project as possible to minimize the generation of dust.
- Use street sweepers to keep dust down on paved roadways that are used by maintenance trucks, especially those that transport silt from dredging sites.
- Cover trucks that haul soils to prevent the generation of dust during transportation.
- All soil transportation should be conducted in accordance with the California Vehicle Code.
- Water is the most commonly used inorganic chemical applied to reduce the dust level. The recommended application rate is generally 0.125 gal/yd² (0.6 L/m²) every 20 to 30 minutes as necessary. Recycled water can be used as appropriate.
- Other inorganic chemicals used for dust control include salts, silicates, and surfactants. Organic chemicals used for dust control include copolymers, petroleum products, lignin sulfonate, vegetable oils, and spray-on adhesives. See the Regional Board's *Erosion and Sediment Control Field Guide* (1998) for complete selection information and recommended application rates for each of the various methods.
- Quickly clean sediments on paved roads by sweeping (not washing).
- Stabilize unpaved roads, parking, and staging areas and reduce the speed and number of trips on unpaved roads (see also, BMP SS-4).
- Revegetate and mulch (see also, BMP VDM-3).
- Sweep off trucks before they enter the street.
- In dump trucks, lightly wet down the soil before transport.

Site Preparation for Chemical Dust Control Measures:

- Use a blade to smooth soil surface; crown or slope surface to avoid creation of ponds.
- Compact soils, if necessary.
- Pre-wet the soil evenly at 0.03- to 0.3 gal/yd² (0.14-1.4 L/m²).
- Apply chemical solutions under pressure, and overlap the solution 6-12 inches (100-300 mm).
- Curing will occur immediately to four hours after application. After the chemical has cured, compact the area.
- Future treatments should be applied at a 50% application rate before the last treatment becomes inactive.
- If the humidity is low, chemicals can be reactivated by rewetting using 0.1- to 0.2 gal/yd² (0.5- to 0.9L/m²).

Limitations

- The type and amount of stone and gravel application, and chemical application may be limited in stream channel areas—check with appropriate regulatory agencies first.
- Most dust control measures are temporary and require reapplication. (Spray-on adhesives have the longest life-span—they can perform for three to four years; while copolymers can last 1 to 2 years. Both form a crust.)

Soil Stabilization

Dust Control

- Some dust control measures (e.g., petroleum products) may cause environmental harm.
- Water generally lasts less than one day because it evaporates quickly. Overwatering could cause erosion.
- Salts such as calcium chloride (CaCl) or sodium chloride (NaCl) can be corrosive and are not very effective when the humidity is low. Another salt, magnesium chloride (MgCl) works at higher temperatures and lower humidity than CaCl, but it can be more costly. Salts can leach in heavy rains.
- Lignin Sulfonate can be slippery.
- Petroleum and vegetable oils should not be used as they can seep into the soil or move into the drainage. In addition, vegetable oils have limited availability, may become brittle, and may limit the binding ability of soil grains as the oils coat the grains.
- Chemical treatments that make the soil water repellent will increase runoff (e.g. vegetable oils, copolymers, petroleum products, spray-on adhesives).
- Certain chemicals may contain solvents that require proper handling.
- Limit the application of asphalt as a mulch tack or chemical mulch as it could migrate to the drainage.

Requirements

Maintenance

- Inspect wind-prone areas, and areas exposed to vehicle traffic daily.
- When soil stabilizers are used, inspect after rain events as well, and reapply soil stabilizers as needed.

Costs

Material costs for soil stabilizers and application vehicles vary. Staff time for application and inspection also depends on the chemical stabilizer used. Silicates and petroleum products appear to be the most expensive.

Training

- A full understanding of the chemicals chosen, and their potential impacts and reapplication requirements are important.

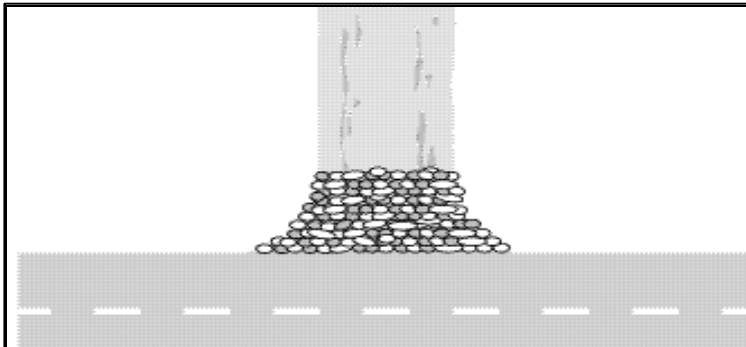
References

Soil Stabilization

Dust Control

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

Santa Clara Valley Water District, "BMP/PMM List," February, 1999.



- Erosion Control
- Sediment Control
- Air Pollution Control
- Slope and Channel Protection

Description

Measures to prevent construction equipment or vehicles from tracking sediments out of a work site onto paved roadways. Measures for the entrance include placement of a stabilized pad of gravel aggregate over a filter cloth at locations where vehicle traffic exits a construction site onto a paved area. The stabilization noticeably reduces the amount of sediment (dust, mud) tracked off-site. A washrack can be used as well to remove caked-on sediment.

Applicability

- All areas where equipment or vehicles exit from a construction or unpaved maintenance road onto a paved road (public right-of-way, street, alley, sidewalk, or parking area).

Construction entrance stabilization measures have a moderate effect on reducing the amount of sediment tracking. The measure will also likely reduce the amount of nutrients, toxic materials, and oil and grease tracked from the road entrance onto paved roads, thus minimizing the runoff of these materials to the storm drain system.

Approach and Standards

- Construct site entrances and exits on level ground if possible.
- Use washed, well-graded gravel or crushed-rock from 1-3 inches in size, for the entrance/exit aggregate to prevent tracking of rocks onto the roadway. Smaller stones could be tracked onto the paved roadway.

- Alternately, Class II aggregate base (maximum 1.5-inch rock) can be used if a street sweeper is available to periodically remove the material tracked onto the paved street. Track walk the aggregate base to minimize the amount of material that will be tracked.
- The stones should be 6-inches deep or the depth recommended by a soils engineer.
- Minimum length should be 50-feet; minimum width should be 30-feet. For smaller maintenance roads on local creeks, width can be reduced to 20-feet.
- Provide enough turning radii, or driveway return, at the entrance (see also BMPs VDM-2, VDM-4).
- Properly grade entrance to prevent runoff from leaving unpaved site.
- Unpaved road access measures should be combined with street sweeping on the public, paved right-of-way.
- If necessary, adjust gates to allow for increased road height.

Limitations

- Requires maintenance throughout the life of the site entrance.
- Can be expensive to construct.
- Street sweepers cannot move 2-3 inch rock. Therefore, if rocks greater than 2 inches are used at access points and get tracked onto the street, manual cleanup is necessary.

Requirements

Maintenance

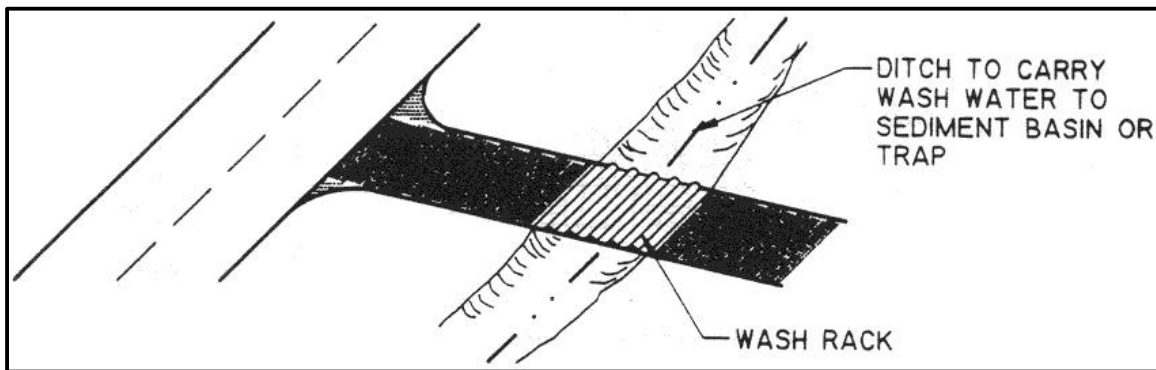
- The stabilized construction exit should be inspected after each rainfall, and at least monthly.
- Gravel should be replaced when voids in the surface area are noticeable.
- Any sediment deposited on the paved roadways should be removed using dry cleaning methods, such as sweeping, as soon as possible but at least at the end of each working day.
- Upon completion of construction or infrequent maintenance, gravel and filter fabric should be removed.

Costs

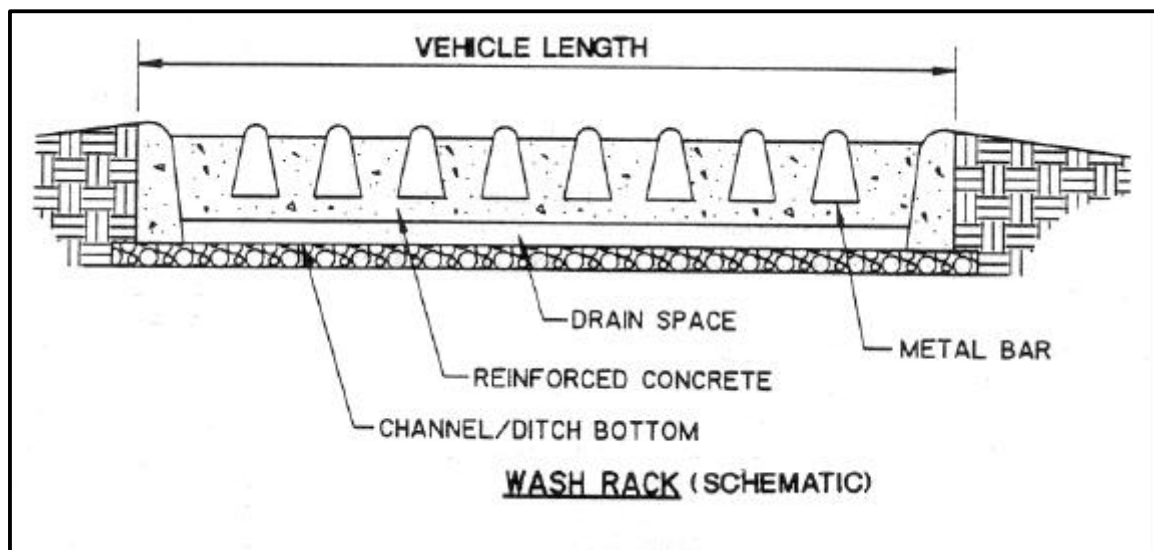
- According to the US EPA (1992), the average annual cost for installation and maintenance of the stabilized construction entrance is \$1,500 an entrance without wash rock; and \$2,200 an entrance with wash rock.
- Cost to adjust gates to allow for increased road height, if necessary.

Training

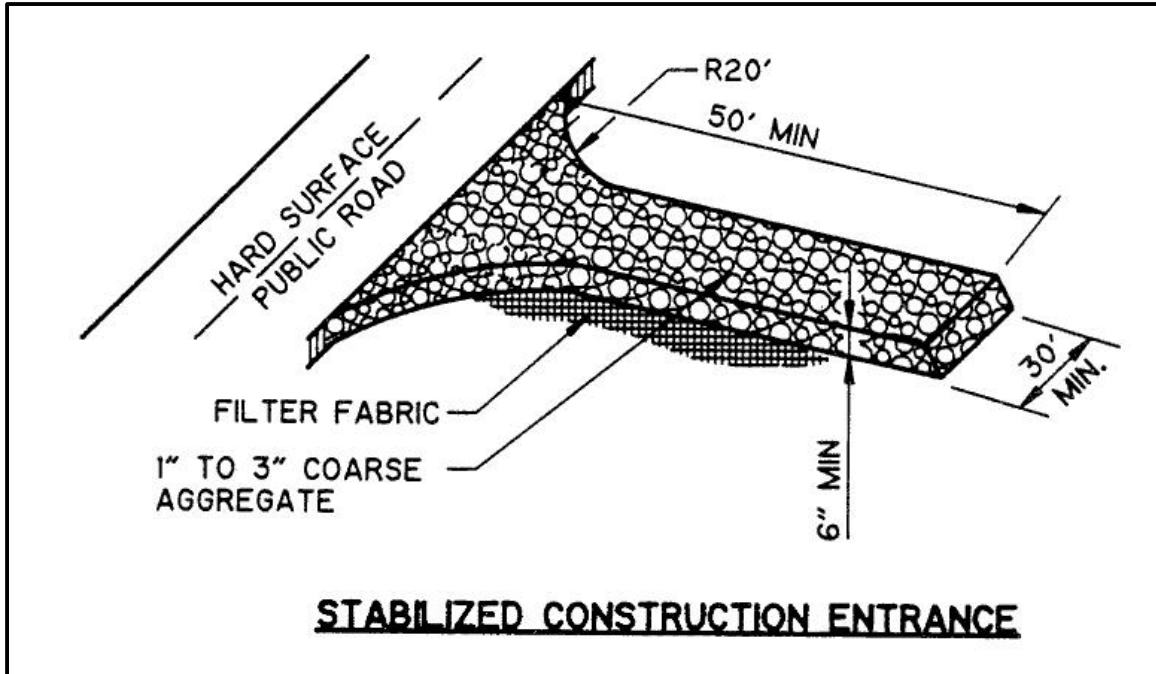
- Training needs are minimal. Staff should be trained to reduce speeds on unpaved maintenance roads, and to use washrack if necessary. As appropriate, staff should be trained to properly design and construct stabilized site entrances and exits, and unpaved roads.



Source: California Storm Water Quality Task Force, 1993.



Source: California Storm Water Quality Task Force, 1993.



Source: California Storm Water Quality Task Force, 1993.

References

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC24, March, 1993.

Santa Clara Valley Water District, personal communication, "Comments on the BASMAA OPC BMP Guidance Manual," February 2, 2000.

BMP – BLANKETS/GEOTEXTILE FABRICS

DESCRIPTION

Erosion control blankets and mats are installed to protect the prepared soil surface of a steep slope.

APPLICATIONS

Erosion control blankets are used on steep slopes to temporarily stabilize and protect disturbed soil from raindrop impact and surface erosion, to increase infiltration, decrease compaction and soil crusting, and to conserve soil moisture. Erosion control blankets also protect seeds from predators, reduce desiccation and evaporation by insulating the soil and seed environment. Some types of erosion control blankets and turf reinforcement mats are specifically designed to stabilize channelized flow areas.

LIMITATIONS

- ✓ This BMP should not be used in areas subject to scour from high flows (e.g. streambanks) unless designed by an engineer. Permits shall be obtained prior to any streambank or shoreline installation.
- ✓ Blankets and mats manufactured with plastic netting shall be avoided.

CONSTRUCTION GUIDELINES

- 1) Proper site preparation is essential to ensure complete contact of the protection matting with the soil.
- 2) Grade and shape area of installation.
- 3) Remove all rocks, clods, and vegetative or other obstructions so that the installed blankets, or mats will have direct contact with the soil.
- 4) Prepare seedbed by loosening 2-3 inches (50-75 mm) of topsoil above final grade.
- 5) Seed area before blanket installation for erosion control and re-vegetation. (Seeding after mat installation is often specified for turf reinforcement application.)
- 6) U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats to the ground surface. Wire staples should be a minimum of 11 gauge. Metal stake pins should be 3/16-inch diameter steel with a

1 1/2 inch steel washer at the head of the pin. Wire staples and metal stakes should be driven flush to the soil surface. All anchors should be 6-8 inches long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils.

Installation on Slopes:

- 1) Begin at the top of the slope and anchor its blanket in a 6 inch deep x 6-inch wide trench. Backfill trench and tamp earth firmly.
- 2) Unroll blanket downslope in the direction of the water flow.
- 3) The edges of adjacent parallel rolls must be overlapped 2-3 inches and be stapled every 3 feet.
- 4) When blankets must be spliced, place blankets end over end (shingle style) with 6-inch overlap. Staple through overlapped area, approximately 12 inches apart.
- 5) Lay blankets loosely and maintain direct contact with the soil - do not stretch.
- 6) Blankets shall be stapled sufficiently to anchor blanket and maintain contact with the soil. Staples shall be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 to 2:1, require 2 staples per square yard. Moderate slopes, 2:1 to 3:1, require 1-2 staples per square yard (1 staple 3' on center). Gentle slopes require 1 staple per square yard.

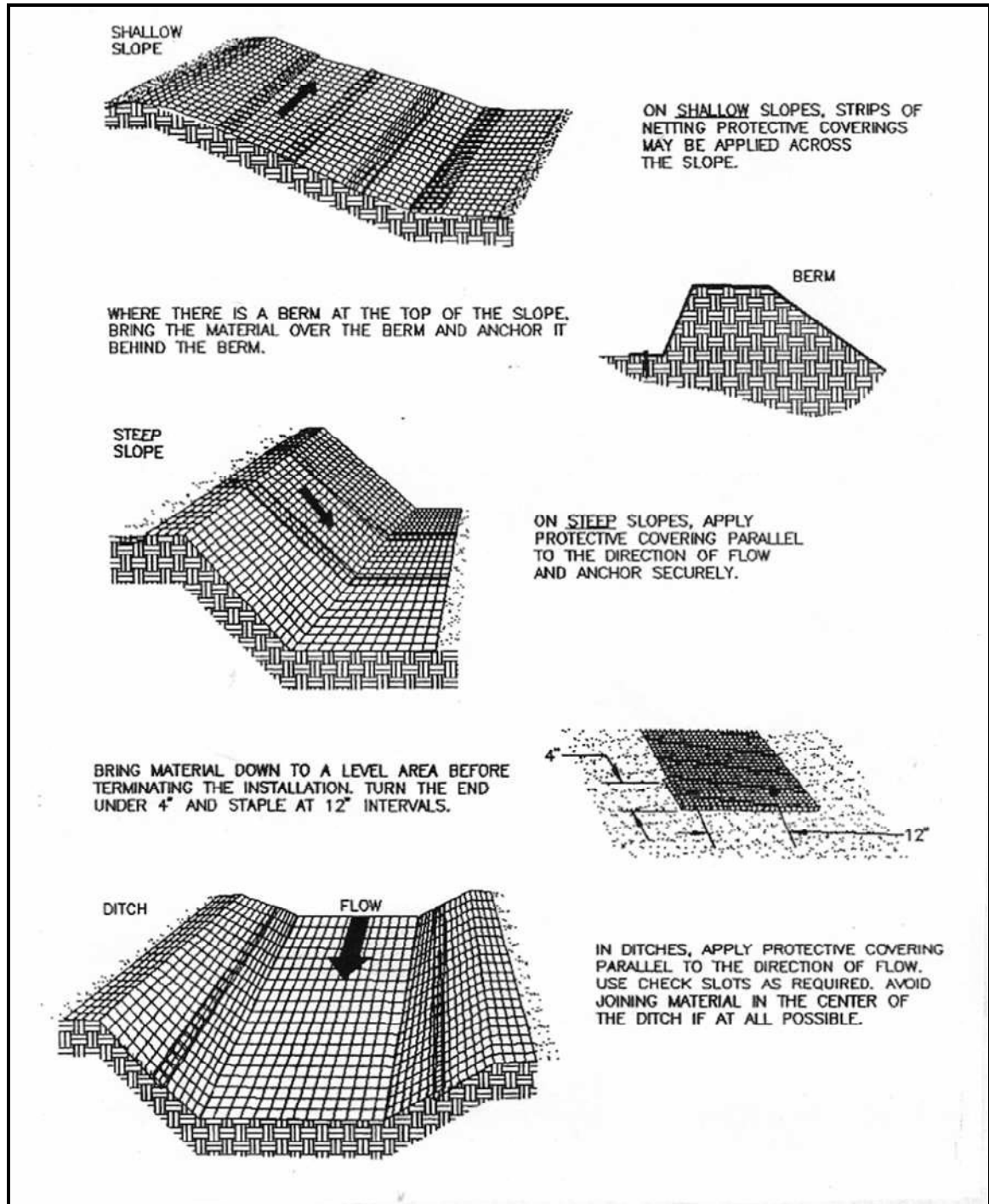
BMP MAINTENANCE

- ✓ All blankets and mats should be inspected periodically following installation.
- ✓ Inspect installation after significant rainstorms to check for erosion and undermining. Any failure should be repaired immediately.
- ✓ If washout or breakage occurs, re-install the material after repairing the damage to the slope or drainage way.

BMP REMOVAL

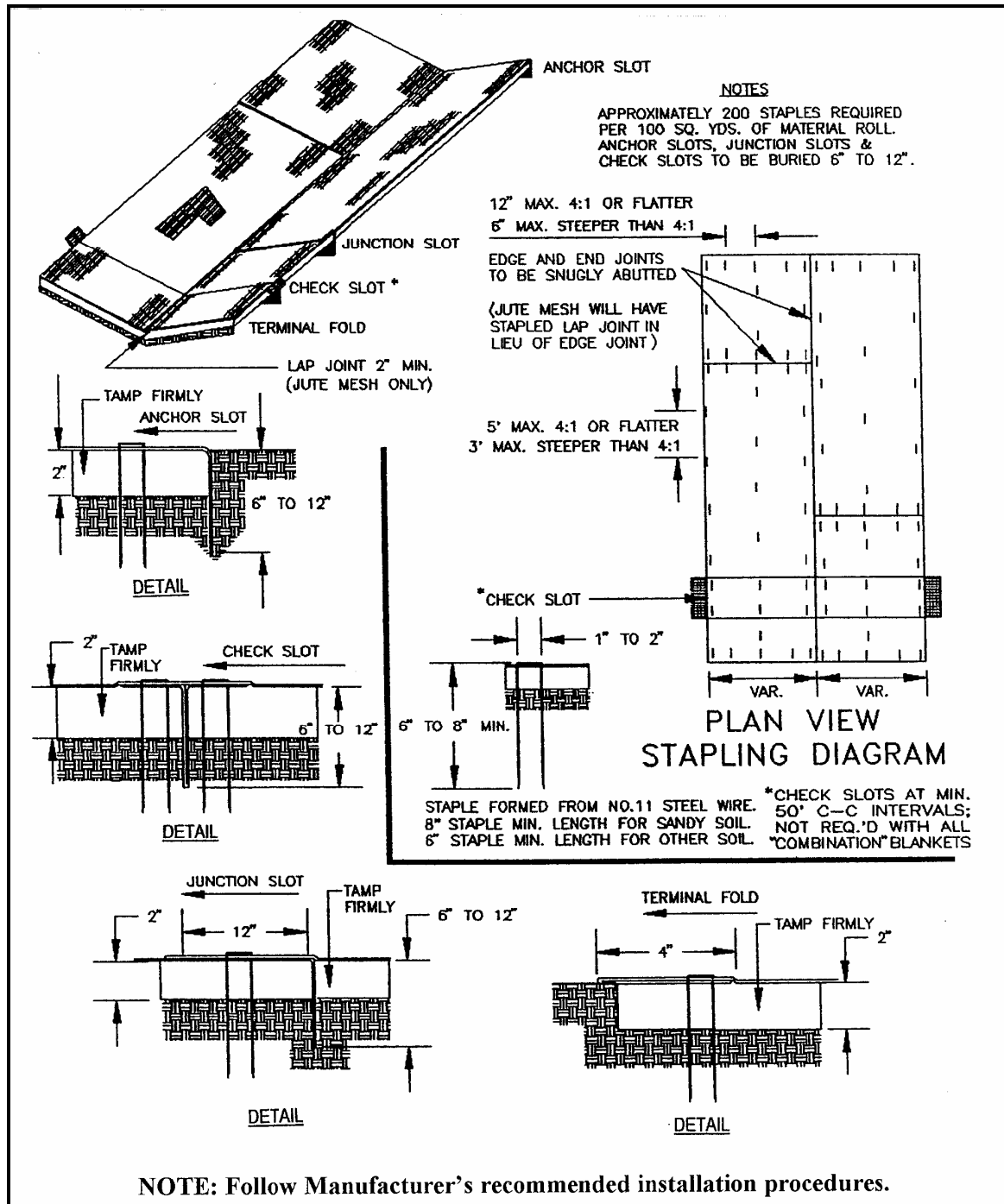
- ✓ BMP removal should not be necessary.

Placement of Biodegradable Blankets



(Source: ABAG. 1995. Manual of Standards for Erosion & Sediment Control Measures. Oakland CA.)

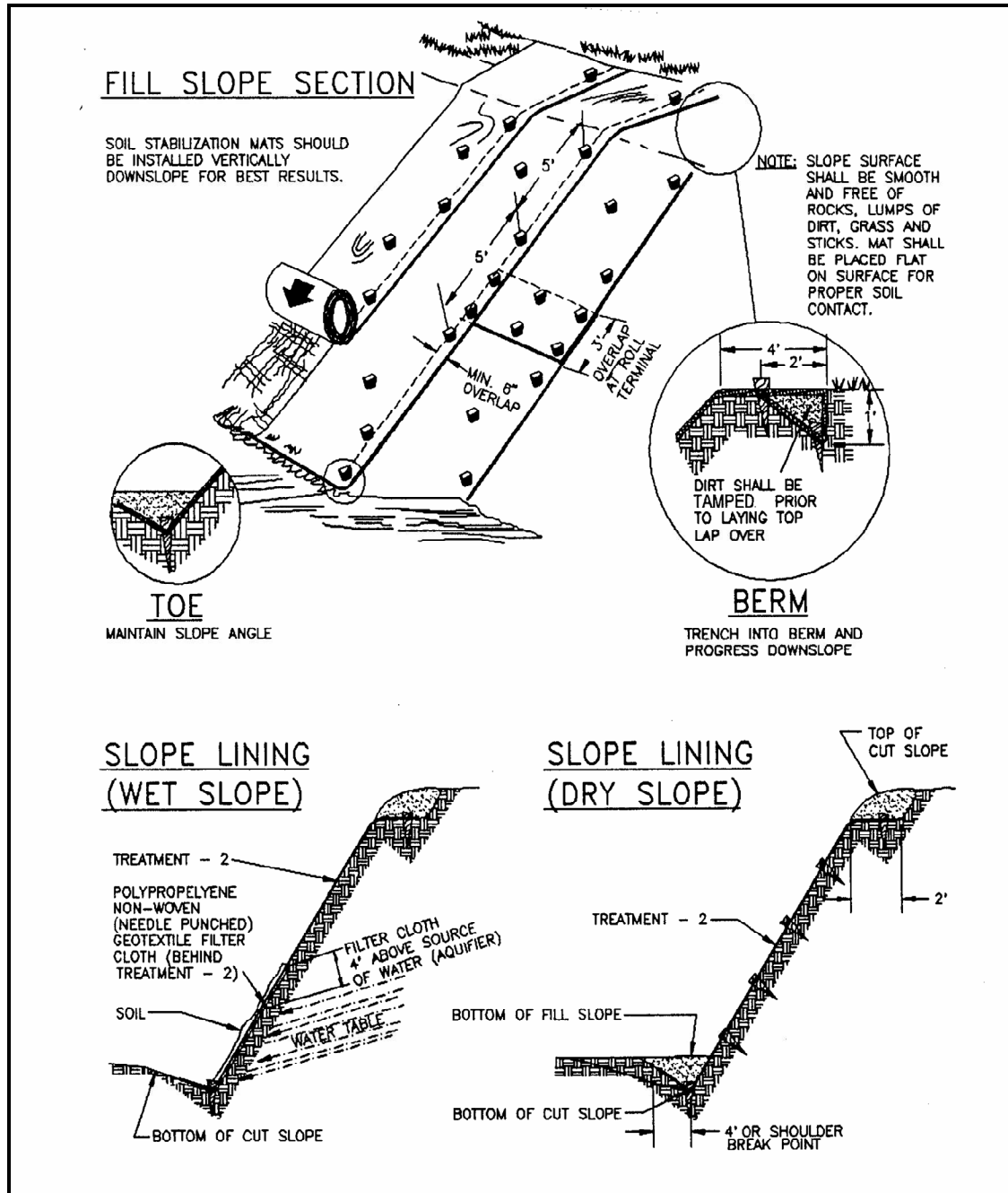
Installation of Biodegradable Blankets



Source: ABAG. 1995. Manual of Standards for Erosion & Sediment Control Measures. Oakland CA.

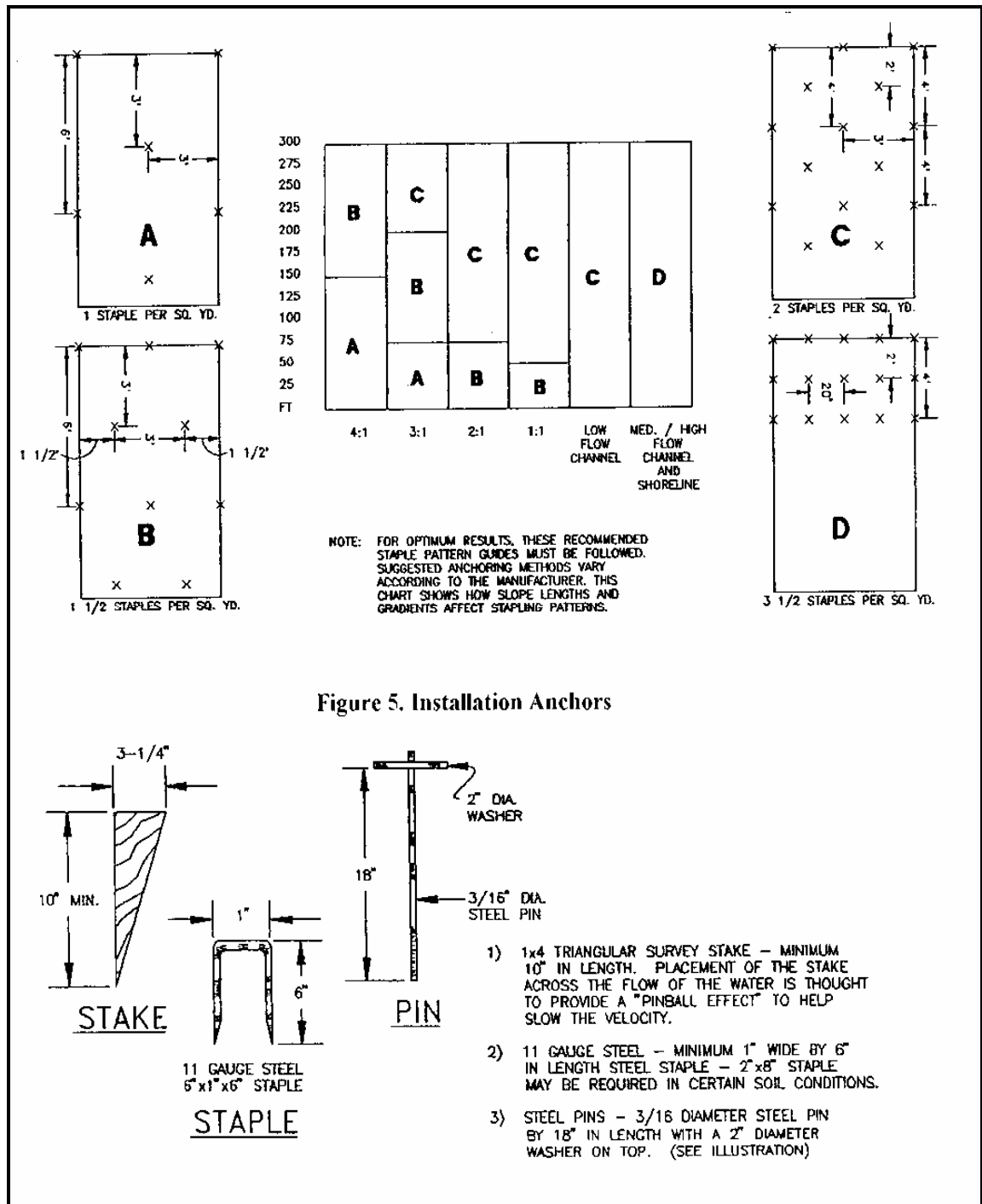
Placement of Non-biodegradable Blankets

*** Important Note:** Non-biodegradable blankets should not be used in fish bearing streams and US Fish and Wildlife Service prohibits their use on stream crossings in the bankful channel.



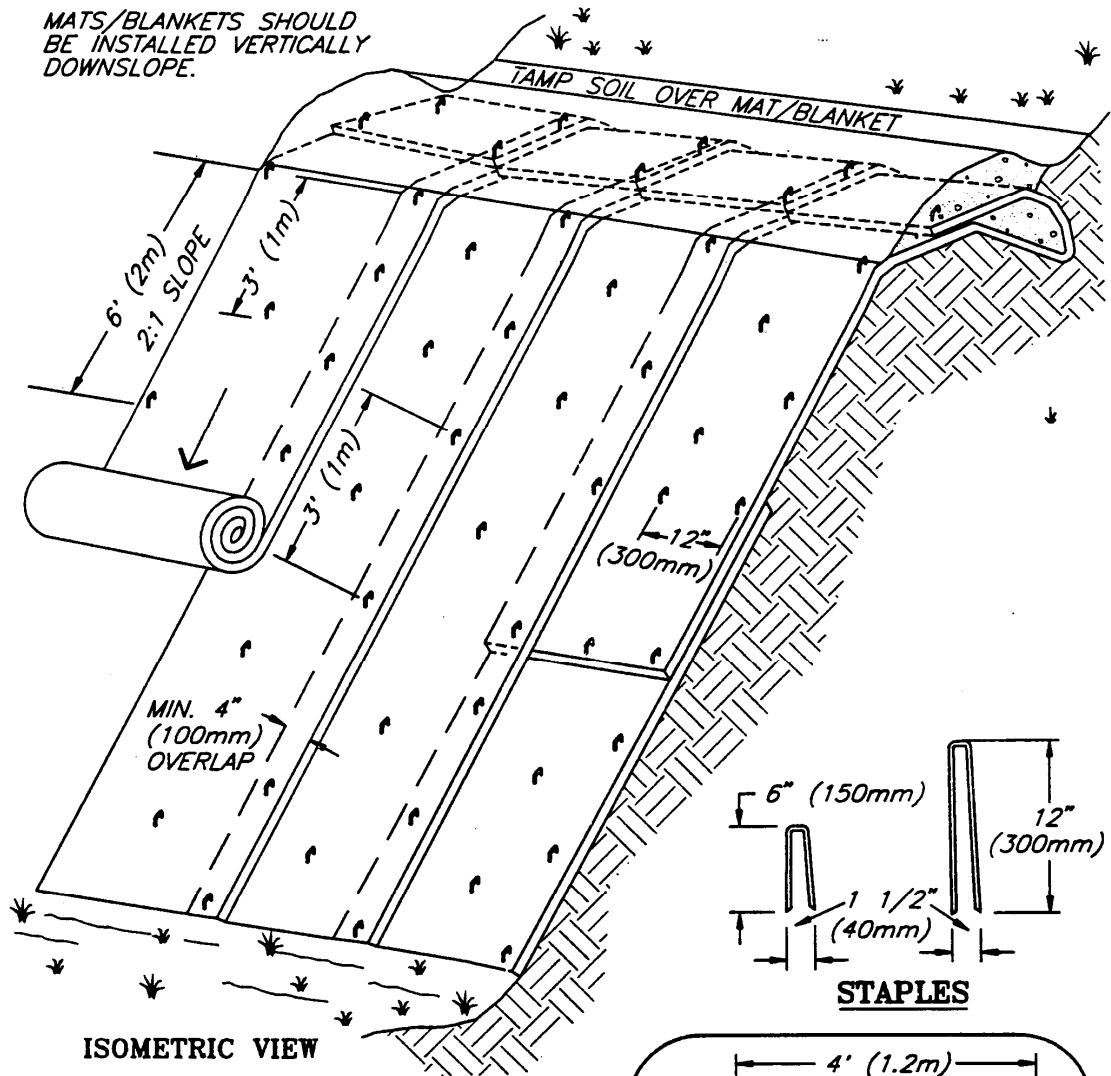
(Source: ABAG. 1995. Manual of Standards for Erosion & Sediment Control Measures. Oakland CA.)

Anchoring of Blankets



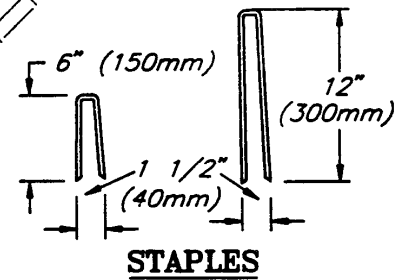
(Source: ABAG. 1995. Manual of Standards for Erosion & Sediment Control Measures. Oakland CA.)

MATS/BLANKETS SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.

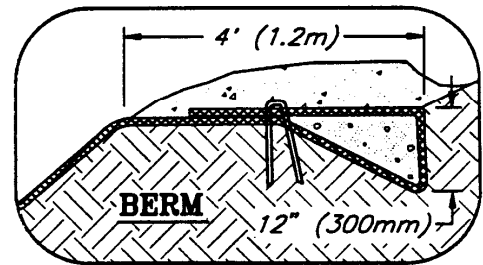


ISOMETRIC VIEW

**TYPICAL SLOPE
SOIL STABILIZATION**



STAPLES



NOT TO SCALE

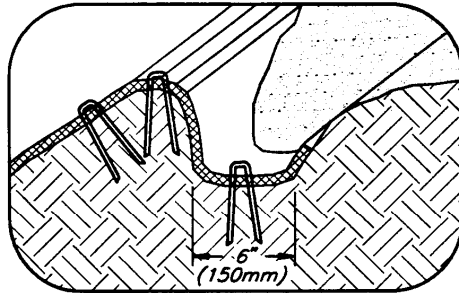
NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

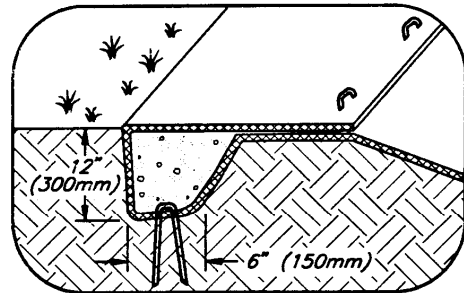
**EROSION BLANKETS &
TURF REINFORCEMENT MATS
SLOPE INSTALLATION**

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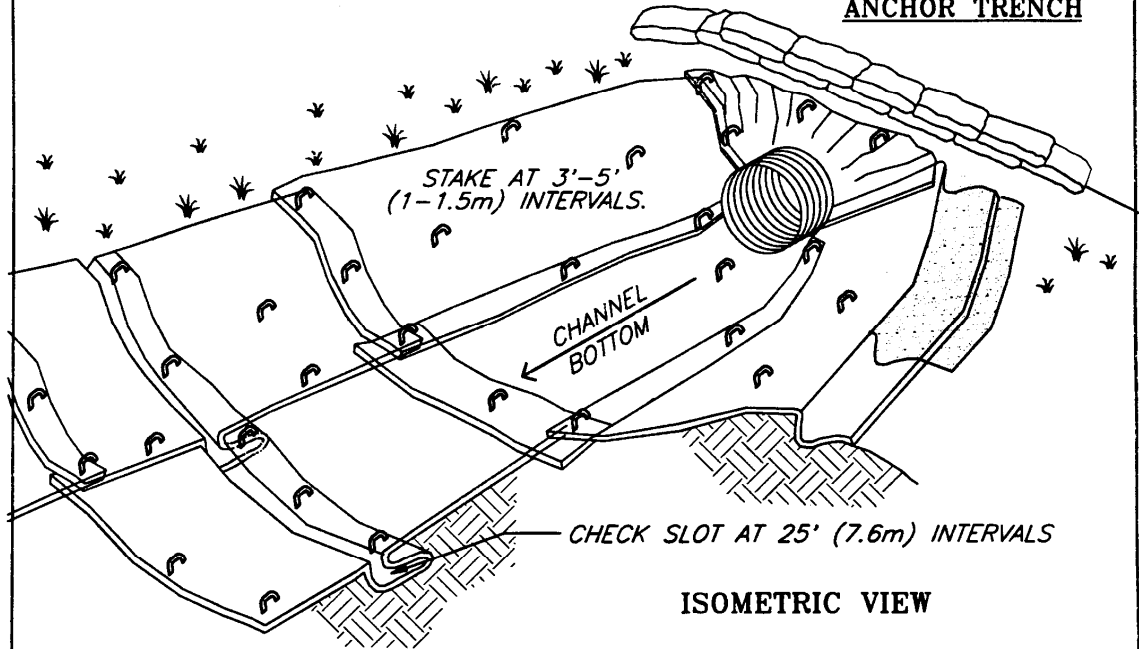
FILE: BLNKTSLP



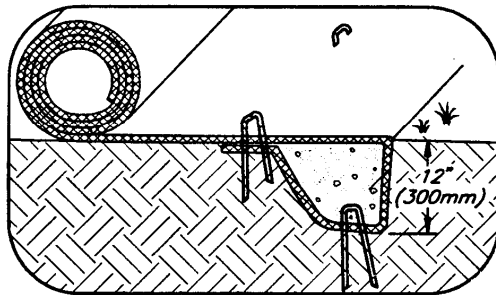
LONGITUDINAL ANCHOR TRENCH



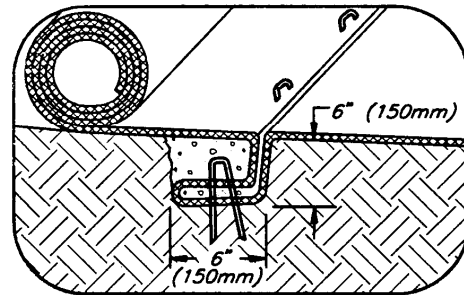
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH



ISOMETRIC VIEW



INITIAL CHANNEL ANCHOR TRENCH



INTERMITTENT CHECK SLOT

NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURERS SPECIFICATIONS.
2. STAKING OR STAPLING LAYOUT PER MANUFACTURERS SPECIFICATIONS.

EROSION BLANKETS & TURF REINFORCEMENT MATS CHANNEL INSTALLATION

FILE: BLNKTCHA

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BMP - COIR FABRIC/NETTING

DESCRIPTION

Coir fabric/netting is a geo-textile product made from coconut fibers loosely woven into a fabric usually packaged in roll form. This fabric can be used to provide a reduction in water velocity/erosive forces and/or habitat protection and topsoil stabilization.

APPLICATIONS

This BMP may be used in areas to provide stabilization/protection to the soil surface of steep slopes or stream banks. It can be used in combination with vegetation and/or seeding to reinforce soil in high flow/high velocity waters and on slopes as steep as 1:1. It may be used as bank stabilization before vegetation efforts have occurred. Coir fabric or netting is preferred to jute. Jute fabrics are often treated with preservatives that will discourage the growth of vegetation. Jute will also degrade much more quickly than coir.

LIMITATIONS

This BMP should *not* be used:

- ✓ In the streambed.
- ✓ When short-term biodegradability is desired.

CONSTRUCTION GUIDELINES

- 1) When used near watercourses or streams, coir fabrics/nettings must be used in accordance with permit requirements.
- 2) Fabric may be laid out horizontally or vertically on slope.
- 3) Stakes or staples must be used to anchor fabric to ground.
- 4) Lay loosely on the surface so fabric makes contact with the ground (do not stretch for extra coverage).
- 5) Overlap fabric edges at least 12 inches.
- 6) The fabric should be trenched in at least 12 inches deep at the top and bottom ends of the installation to prevent undercutting.

- 7) If used in conjunction with hand seeding or hydroseeding, place seeding first and cover with fabric.
- 8) Live staking may be done after the fabric is placed by piercing the fabric.

BMP MAINTENANCE

- ✓ During construction, inspect daily during the workweek.
- ✓ Schedule additional inspections during storm events.
- ✓ Make any required repairs immediately.

BMP - COIR LOGS AND STRAW ROLLS

DESCRIPTION

Straw rolls are manufactured from straw wrapped in netting. Coir logs are similar, but are filled with coconut fiber rather than straw. The logs are placed and staked in shallow trenches along the contour of newly constructed or disturbed slopes. They can be used to provide perimeter protection, settling, reduction in water velocity/erosive forces and habitat protection.

APPLICATIONS

The BMP may be used for temporary soil stockpile protection, drop inlet protection, temporary check dams, bank or slope stabilization, and streambank toe protection. This BMP may be used for perimeter sediment control, and is preferred over silt fencing and straw bales. It may also be used to replace missing sections of earthen berms (example: above new ditch relief culverts). Straw rolls should be manufactured of rice straw or a sterile (non-seed bearing) straw to prevent the introduction of non-native grasses. Polypropylene or coir netting is preferred over plastic netting.

LIMITATIONS

This BMP should *not* be used:

- ✓ where flow volume or water velocity inhibit its usefulness.

CONSTRUCTION GUIDELINES

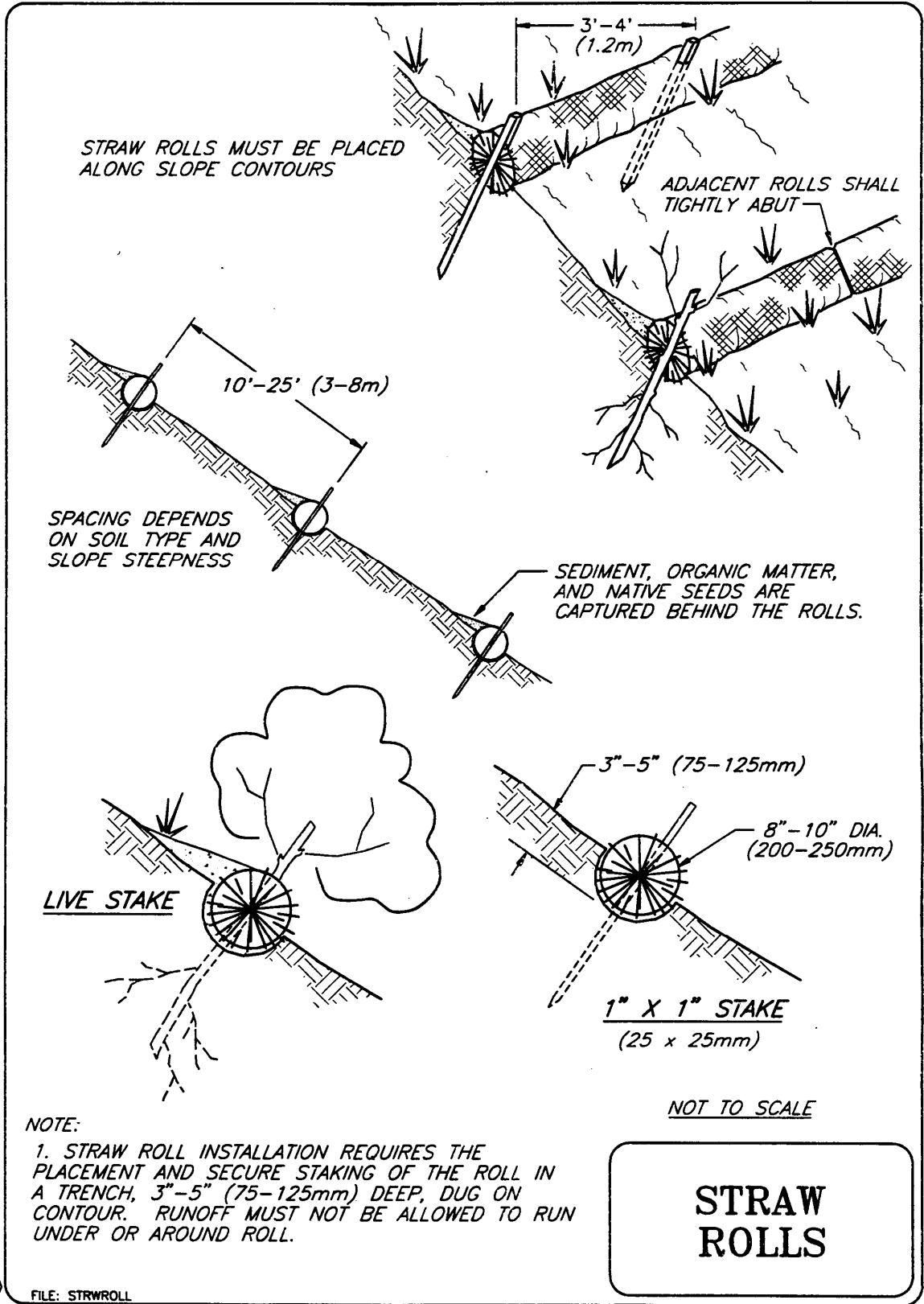
- 1) Logs are placed in 2 to 3 inch deep trenches and staked along the contours of newly constructed or disturbed slopes.
- 2) Log spacing depends on soil type and slope steepness.
- 3) Adjacent logs shall be tightly abutted to prevent water flow and gully formation between logs.
- 4) Ensure that logs are in contact with the ground in the trenches to prevent water flow under logs.
- 5) Live staking may be used in conjunction with logs.

BMP MAINTENANCE

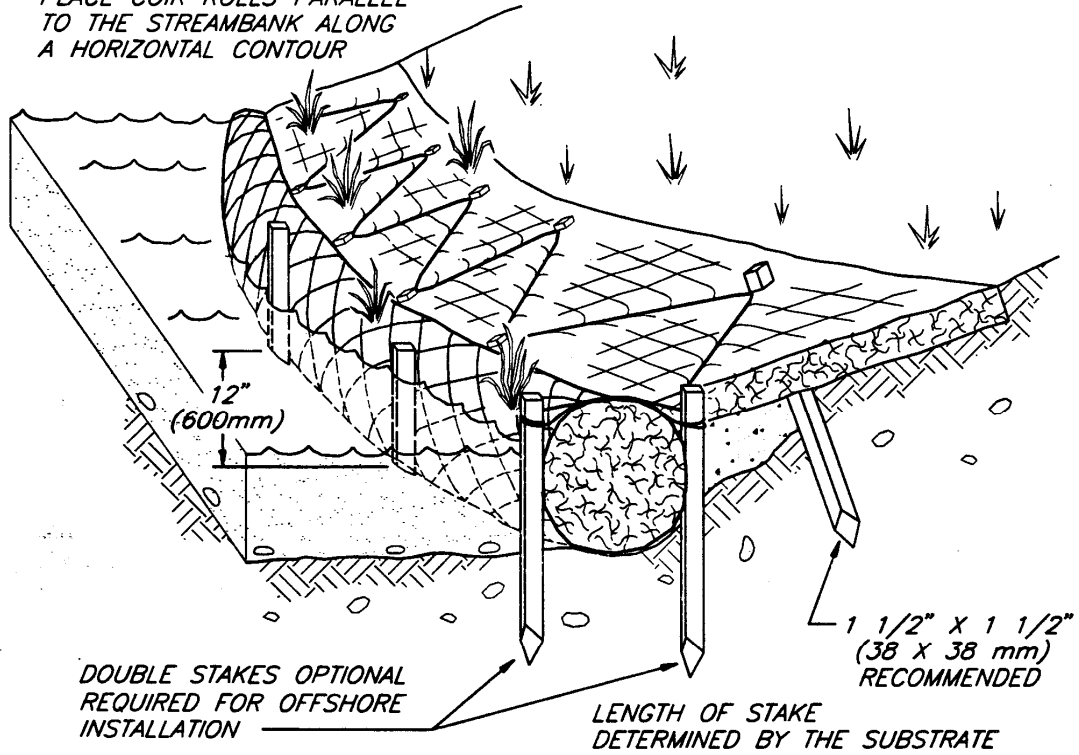
- ✓ During construction, inspect daily during the workweek.
- ✓ Schedule additional inspections during storm events.
- ✓ Make any required repairs immediately.
- ✓ For perimeter control installations (securing spoils, etc.), remove sediment deposits when they reach ½ the height of the log/roll.

BMP REMOVAL

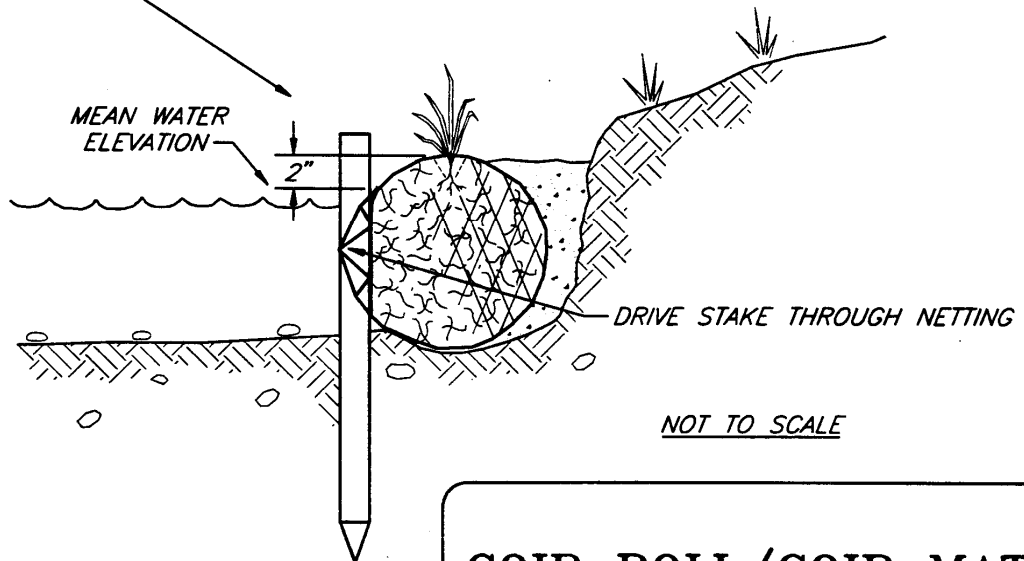
- ✓ Remove sediment buildup in front of BMP.
- ✓ Revegetation of the site may be necessary.
- ✓ Dispose of netting properly. Straw or coir filling may be used as mulch.
- ✓ BMP removal may not be necessary.



PLACE COIR ROLLS PARALLEL TO THE STREAMBANK ALONG A HORIZONTAL CONTOUR



PLACE COIR ROLL SUCH THAT THE ROLL EXTENDS 2" (50 mm) ABOVE MEAN WATER ELEVATION



COIR ROLL/COIR MATS

© 1996 JOHN McCULLAH

FILE: COIRRM

BMP – MULCHING

DESCRIPTION

Mulching is the application of sterile *weed-free* straw, wood fiber (*as in hydromulch*), local leaf litter, mature screened compost or other suitable materials to the soil surface. This BMP is used to reduce the potential for soil becoming water or air borne, and to encourage vegetation establishment.

Typically, apply an erosion control seed mix to scarified bare ground and cover bare areas where surface erosion and sediment delivery could occur. Rates of about 4,000 pounds/acre, or approximately 50 bales/acre of straw, meet this standard. Use mulch to cover seed to improve microclimatic conditions for germination and seedling survival. Seeding and mulching rates are highly variable, depending on the seed mix used. Consult your local extension office or seed supplier for recommended rates of application and local site conditions.

APPLICATIONS

This BMP may be used to provide protection to the soil surface and to protect newly seeded areas. This BMP may be used in combination with plantings.

LIMITATIONS

- ✓ Mulch may not adhere well to slopes steeper than 2:1.
- ✓ Mulch should not be placed in water bodies or in ditches where water flow is continuous.

CONSTRUCTION GUIDELINES

- 1) Mulch should be applied so that the soil is covered enough to allow seeds to protect against erosion, but still allow seeds to germinate.
- 2) Select the appropriate mulch for the site. Local leaf litter or on-site grass mowings may be preferred if available. Rice straw is relatively weed free in upland areas but not necessarily the best choice for wetlands. Irrigated cereal grains and sterile wheat straw may be appropriate, but residual germination may compete with target revegetation species. Wood fiber mulch provided by hydromulchers is the most sterile medium. Mature screened compost is effective both for erosion control and as a soil builder.”

- 3) In areas subject to runoff or wind erosion, mulch shall be secured to the soil by mechanical or manual crimping, anchoring with branches, plant-derived tackifiers, or other appropriate methods.

BMP MAINTENANCE

- ✓ Conduct periodic inspections and reapply mulch where missing.

BMP REMOVAL

- ✓ BMP removal is not necessary.
- ✓

BMP – BRUSH MATTRESS

DESCRIPTION

A brush mattress or brush mat is a revegetation technique that provides a protective covering to a slope or streambank as soon as it is installed. A brush mattress is typically constructed using live willow branches or other species that root easily from cuttings, but can also be constructed with any brushy, woody branches in order to provide immediate and effective slope protection.

Brush mattresses quickly stabilize a slope or streambank by providing a dense network of branches, which prevent superficial erosion, while also collecting soil and native seeds. The overlapping branches provide an ideal environment for native seeds to germinate and establish. As the live branches root and grow, the soil is reinforced with an underground matrix of spreading roots. If used on streambanks, a brush mat traps sediments during high water, and eventually the plant growth on the stabilized streambank provides aquatic habitat. Brush mattresses work well for stabilizing reconstructed stream channels, as they provide immediate cover for fish and instant bank protection, even before they become established and grow.

Of all the streambank biotechnical practices, brush mattresses can withstand the highest velocities. Studies conducted by Christoph Gerstgraser, (Universitat fur Bodenkultur, Vienna, Austria), demonstrated that brush mattresses stabilized the bank in a test flume against velocities exceeding 7 mps (20 f/s), while other techniques, even rock riprap, failed.

APPLICATIONS

Brush mattresses are ideal for eroding streambank slopes where immediate protection is needed. Installing a brush mattress along an eroding reach can rapidly stabilize streambanks in danger of being scoured due to high erosive forces. The mattress's dense layer of brush helps deflect water from the bank and protect it from scouring, while also providing habitat directly along the water's edge. Brush mattresses also work well for shoreline protection. The mat's density breaks the impact of waves and instantly provides a thick protective layer of brush along the shoreline.

If the desire is to stabilize and revegetate an eroding streambank or shoreline and discourage foot trails along sensitive areas, brush mats work well as impenetrable barriers, giving time for vegetation to become established. On slopes, brush mattsing provides rapid protection against superficial erosion. Brush mats are often combined with other soil stabilization techniques such as vegetated riprap, wattles, live facines, root wads, live siltation, or coir logs, which may be needed to secure the toe of the slope. The brush mattress technique is usually most effective on slopes no steeper than 2H:1V.

For gully repair on steeper slopes, see *Sediment Control- Brush Packing*.

LIMITATIONS

- ✓ A brush mattress requires large numbers of cuttings, probably more than any other biotechnical method. Carefully evaluate availability of plant material before including this technique in a revegetation design.
- ✓ Brush mat installation is a labor-intensive construction method.
- ✓ In areas with little rainfall, brush mattresses installed on dry slopes may not survive long, as this technique does not entrench the branches deeply into the soil.
- ✓ If constructing a brush mattress on a streambank, do not leave loose overhanging branches. They may catch on material floating down the stream channel and the mattress may be ripped from the streambank.
- ✓

CONSTRUCTION GUIDELINES

- 1) Use wooden construction stakes and/or live stakes (such as willow). The length of stakes will vary based on soil conditions. Biodegradable natural fiber rope is usually preferable to wire.
- 2) Prepare the slope or streambank by clearing away large debris, and grading the slope so that branches will lie flat on the bank. Do not disturb the slope or bank any more than necessary.
- 3) Excavate a horizontal trench, 8 to 12 inches deep, at the toe of the streambank or at the base of applicable area on the slope. The basal ends of the branches should extend into moist soil.
- 4) Lay the cuttings flat against the graded slope, slightly crisscrossed, with the basal ends placed as deeply into the trench as possible. Continue to lay the cuttings along the face of the bank or slope until about 80% groundcover is achieved (about 6-12 inches thick).
- 5) If the cuttings are shorter than the slope or bank,, stagger and overlap the cuttings so the entire area has adequate coverage.
- 6) You may plant rooted plants within the brush mattress, before the branches are laid. It is too difficult to plant through the mattress afterward.
- 7) Pound in a grid of 24 to 36 inch long stakes into the mattress at 3 to 4 foot centers (see typical drawing: Brush Mattress). Do not pound the stakes completely in, as this will be done after tying. Use longer stakes in less cohesive (sandy) soil.

- 8) Secure the brush mattress by using cord, rope, or 10-12 gauge-galvanized wire tied in a diamond pattern between each row of stakes. (Tie the cord or wire to the stakes in such a manner that if it breaks, the integrity of the remaining cord or wire is still maintained). Notching or drilling stakes may make securing cord or wire to stakes easier, but is not necessary.
- 9) After networking the mattress with cord or wire, drive the stakes in further to compress the mattress tightly against the slope.
- 10) Secure the toe of the mattress using the technique best suitable for the site conditions. To secure the toe of the mattress using a willow wattle, first construct a wattle the length of the area to be treated (see wattle technique). Make sure the wattle is tied together tightly. Place the wattle in the trench over the cut ends of the brush mattress. Secure the wattle with 18 to 48 inch long wedge-shaped wooden stakes every 3-4 feet. In some cases, such as small streams or gentle slopes, simply placing large locally collected rocks around and on top of the basal ends of the cuttings is enough to secure the toe of the mattress. Other techniques that may be used include vegetated riprap, wattles, live facines, rootwad revetments, live siltation, or coir logs.
- 11) Backfill around and in between the branches of the mattress by using material excavated from the trench, working the soil in well. Buckets of water will help to wash the soil down into the stems. It is most important for the thicker, basal ends of the mattress to get good soil cover for rooting, but generally cover at least 1/4 of the depth of the mattress with soil. If installed along a stream, make sure the upstream end of the mattress and wattle is keyed into the streambank to prevent high flows from scouring behind the mattress. It is also a good idea to protect this area with some revetment, large rocks, or tree trunks. If possible, tie the mattress to existing vegetation or roots on the bank for extra security.
- 12) Cover entire mattress with a thin layer (1 to 1.5 inches) of fine dirt.

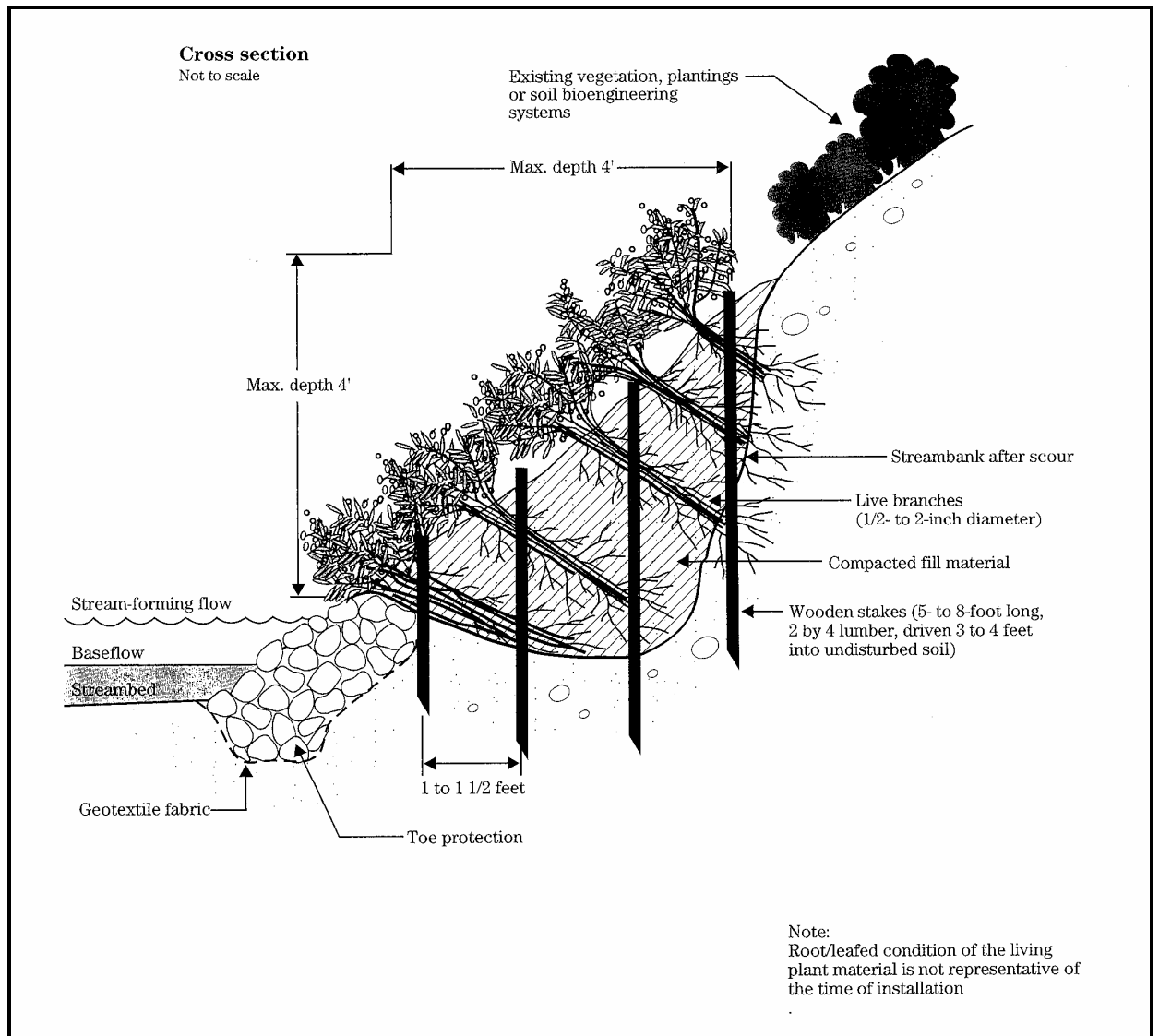
BMP MAINTENANCE

- ✓ Make sure you periodically monitor the brush mattress after it has been installed. This will provide valuable insight into the stabilization process and for future biotechnical projects. If the willow does not grow, the mattress will still provide stability, especially if it is backfilled and seeded with native grasses, sedges, or rushes.
- ✓ Periodic maintenance includes making sure the stakes and cord/wire are still securing the mattress to the streambank. Carefully check the upstream end to make sure flows are not getting behind the mattress.
- ✓ Irrigate through first two growing seasons.

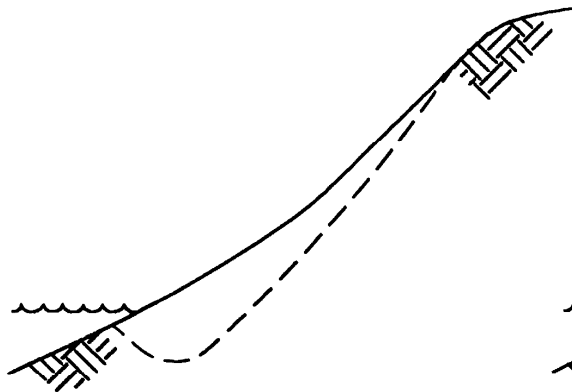
BMP REMOVAL

✓ BMP removal is not necessary.

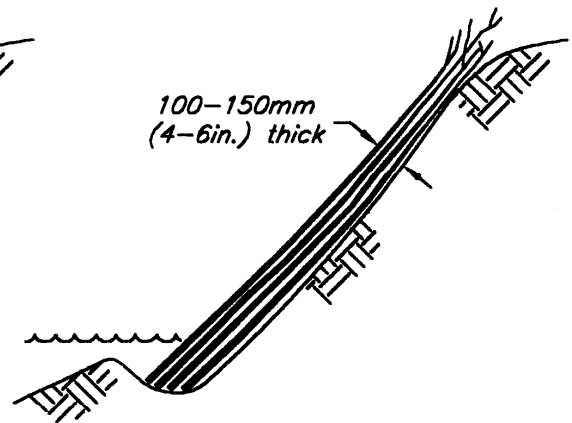
✓



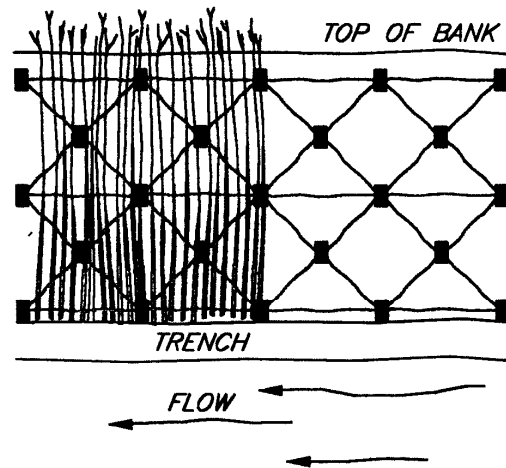
Note: CDFG encourages planting to below bankfull elevation and the addition of large woody debris (see B-7.4). Source: USDA Natural Resources Conservation Service. 1996. Engineering Field Handbook – Streambank and Shoreline Protection. Part 650, Chapter 16.



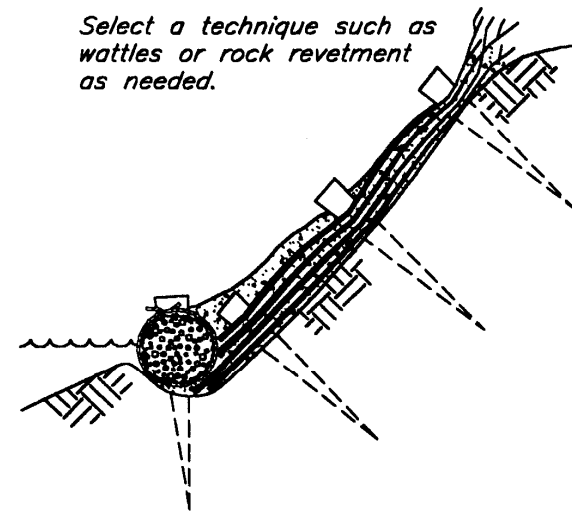
Step 1: Excavate trench and grade bank.



Step 2: Place willow branches making sure that the butt ends reach the bottom.



Step 3: Place stake (notched) on 1.0m (3ft.) centers and secure the mattress with twine, rope or wire.



Select a technique such as wattles or rock revetment as needed.

Step 4: Drive the stakes deeply into the bank to tightly compress the branches against the soil. Cover and partially bury the mattress to encourage rooting.

BRUSH MATTRESS

© 2000 JOHN McCULLAH

FILE: BRSHMATT

BMP - HARVESTING AND HANDLING OF WOODY CUTTINGS

DESCRIPTION

Proper harvesting and handling of live woody cuttings is essential to plant growth establishment. Cuttings must be harvested at optimum times of the year and safely transported without drying out. Willow and cottonwood species are typically used. See also BMP – Planting; BMP – Fabric Reinforced Earth Fill with Brush Layering (Vegetated Geodrid).

APPLICATIONS

Live woody cuttings are used in riparian plantings for habitat enhancement and streambank stabilization projects using soil bioengineering.

LIMITATIONS

- ✓ There may be limited quantities of harvestable cutting within a reasonable distance from the project site. Native cutting should ideally be from the watershed in which the project is implemented.
- ✓ There is a limited period during which cuttings can be collected and planted. The ideal time in Northern coastal California is October through January, although cuttings may be taken as early as August if the planting site is properly irrigated.
- ✓ Planting woody cuttings in the spring is not recommended as the plant's energy goes primarily to leaf production with an accompanying high evapo-transpiration demand at that time, especially on south facing slopes with coarse textured soils.
- ✓ Site conditions must be conducive to growth of the selected species: soil texture, moisture, and site aspect must be considered.
- ✓

CONSTRUCTION GUIDELINES

- 1) Choose the right species from either the *Salix* (willow) or *Populus* (cottonwood) genus, depending upon what is growing naturally in the area. Plant form or structure (tree or shrub) may be an important criteria depending on the project goals (e.g., willowfly catcher habitat = shrubby vs. flood conveyance = tall, over-arching, shading). The willow genus includes low-growing, multiple stem shrubby species (arroyo, sandbar willow) and taller single stem forms (red, black, and yellow).

- 2) Hardwood cuttings are generally divided into three categories: Sprigs (or stakes) that are 0.75 to 1.5 inches in diameter and 36 to 48 inches long; Poles that are 1.5 to 3 inches in diameter and 5 to 8 feet long; and Branch Cuttings or Weavers which are no thinner than 1/2 inch and 6 to 12 feet long depending on the application (wattles, layering, willow wall revetments).
- 3) A good source of willow is along road right-of-ways. Another possible source is along drainage or irrigation canals. Donor trees or areas of trees from which cuttings are taken shall be pre-approved by project manager or biologist. No more than 50% of an existing cottonwood or willow clump shall be removed, unless the clump is scheduled to be removed by grading. Try to remove cuttings from inside the crown of the existing plant and spread the harvesting activity throughout the stand to minimize visual impact. No cuttings shall be taken from within 40 feet of a willow or cottonwood with an active bird nest in it.
- 4) Cuttings shall be cut clean with sharp hand saws or loppers. Branches of sprigs and poles shall be pruned off with sharp shears close to the main stem but just outside the branch collar. Some side branches may be left on the branch cuttings intended for brush layering and fascines. Trim the terminal bud (the bud at the growing tip) so the plant energy will be rerouted to the lateral buds and adventitious tissue. Cuttings with swelling, scar tissue, boring insects, or disease shall be rejected. Cuttings shall be cut from live healthy materials. The bottom end of the pole shall be cut at a 45° angle (approximately) and the top shall be cut flat, straight across (90° to the length of the pole).
- 5) Transportation: During cutting and transportation, keep cutting moist and in the shade by using wet burlap or wet sawdust and tarps. Never let the cuttings dry out or be exposed to sunlight until planted.!
- 6) Storage: Ideally, cuttings should be planted within 48 hours of harvest. Between time of harvest and planting, the bottom ends of the cuttings must be submerged and the tops kept moist. They should be soaked in a pond or river backwater and kept in the shade.
- 7) Installation: In most cases, a 1.5 foot radius area around the planting spot should be bare mineral soil. A planting hole may be prepared using an auger, water-jet, or by pounding a foundation stake into the ground (depending on planting depth). When the stake is pounded, the top should be protected with a cap or wire wraps, and any splits should be cut off. Ideally, the cutting should be long enough to extend into the capillary fringe of the water table. A minimum of two-thirds of the cutting should be below the ground surface.

BMP - LARGE WOODY DEBRIS REVETMENT

DESCRIPTION

Large woody debris (LWD) is any large piece of woody material generally defined as 6 inches and larger in diameter and at least 10 feet long, including the trunk and root mass, including stumps or rootwads.

APPLICATIONS

When incorporating woody material into projects, it is necessary to identify the desired performance and habitat benefits. Each project must be specifically tailored to meet the objectives identified for the habitat and any structures to be protected. It can be used in combination with other BMPs.

LWD in coastal streams creates exceptional habitat for salmonids and should be properly sized at 1.5 times channel width.

LIMITATIONS

Do *not* use this BMP:

- ✓ without identifying potential impacts to upstream and downstream banks, structures and facilities.
- ✓ when specific design requirements and desired habitat benefits have not been identified.
- ✓ in or adjacent to water bodies until all necessary permits have been obtained.

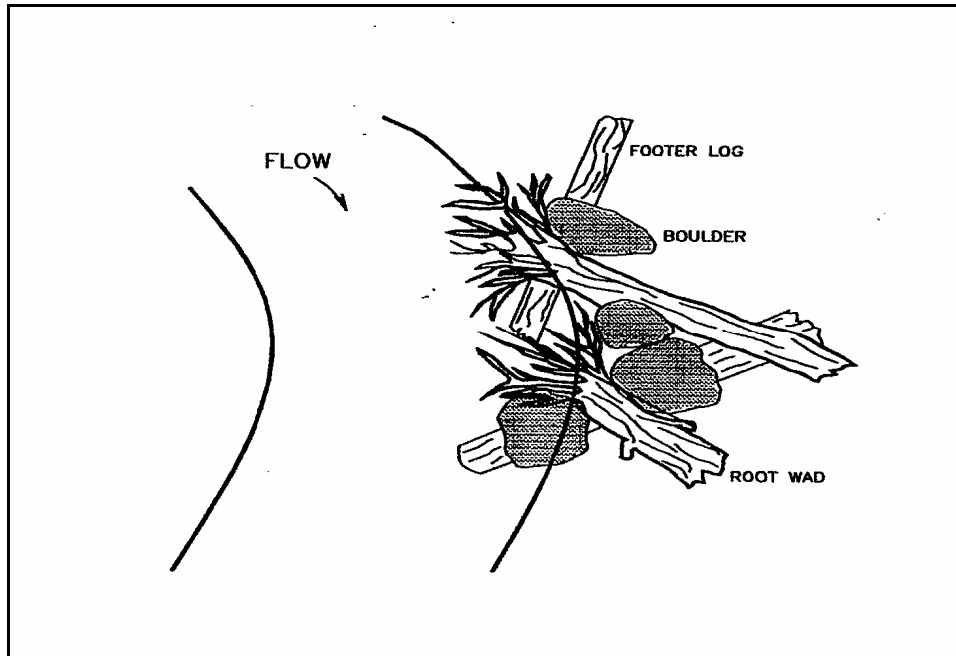
CONSTRUCTION GUIDELINES

- 1) Guidelines will vary based on existing site conditions, size and shape of the wood, forces exerted by moving water, etc.
- 2) Construct in accordance with design and permit conditions.

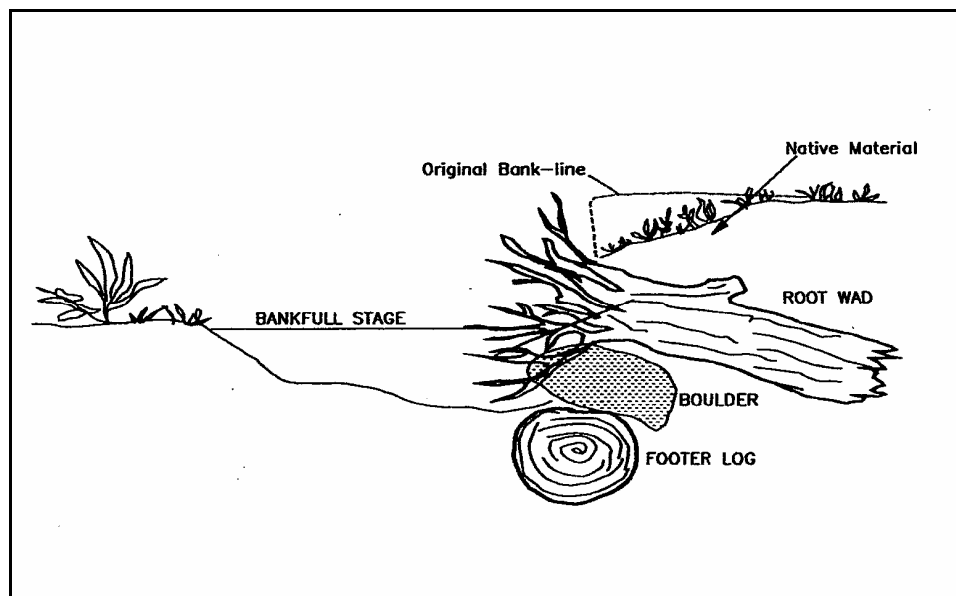
BMP MAINTENANCE

- ✓ Monitor large woody debris installed to ensure it remains as built. Consult as necessary for adjustments and/or modifications to large woody debris installations.

Large Woody Debris Revetment

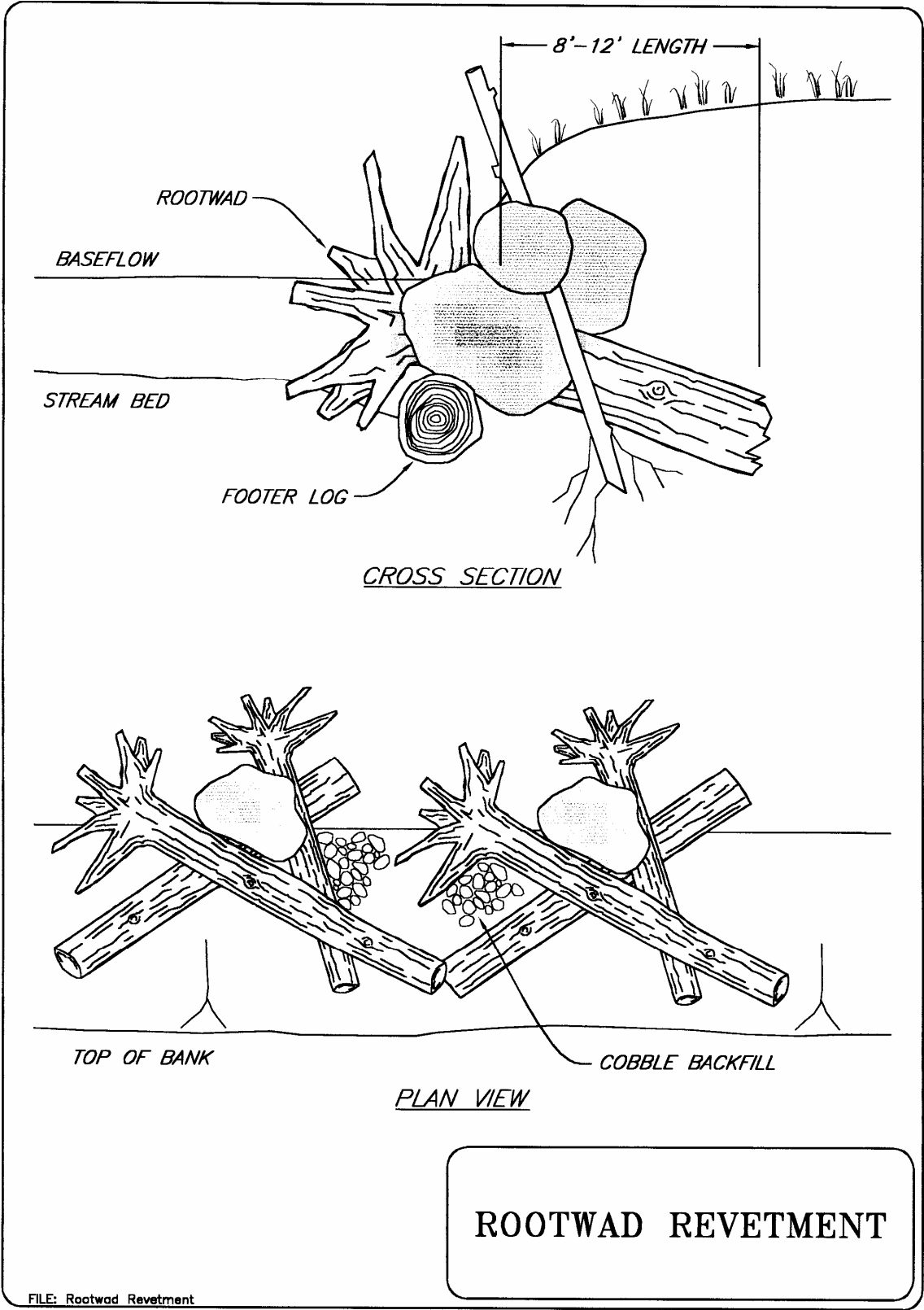


Native material revetment – Plan View. (After Rosgen, 1993)



Native material revetment – Side View. (After Rosgen, 1993).

Source: California Dept. of Fish and Game (CDFG). 1998. California Salmonid Stream Habitat Restoration Manual. By Gary Flosi, et al. 3rd edition. Sacramento, CA.



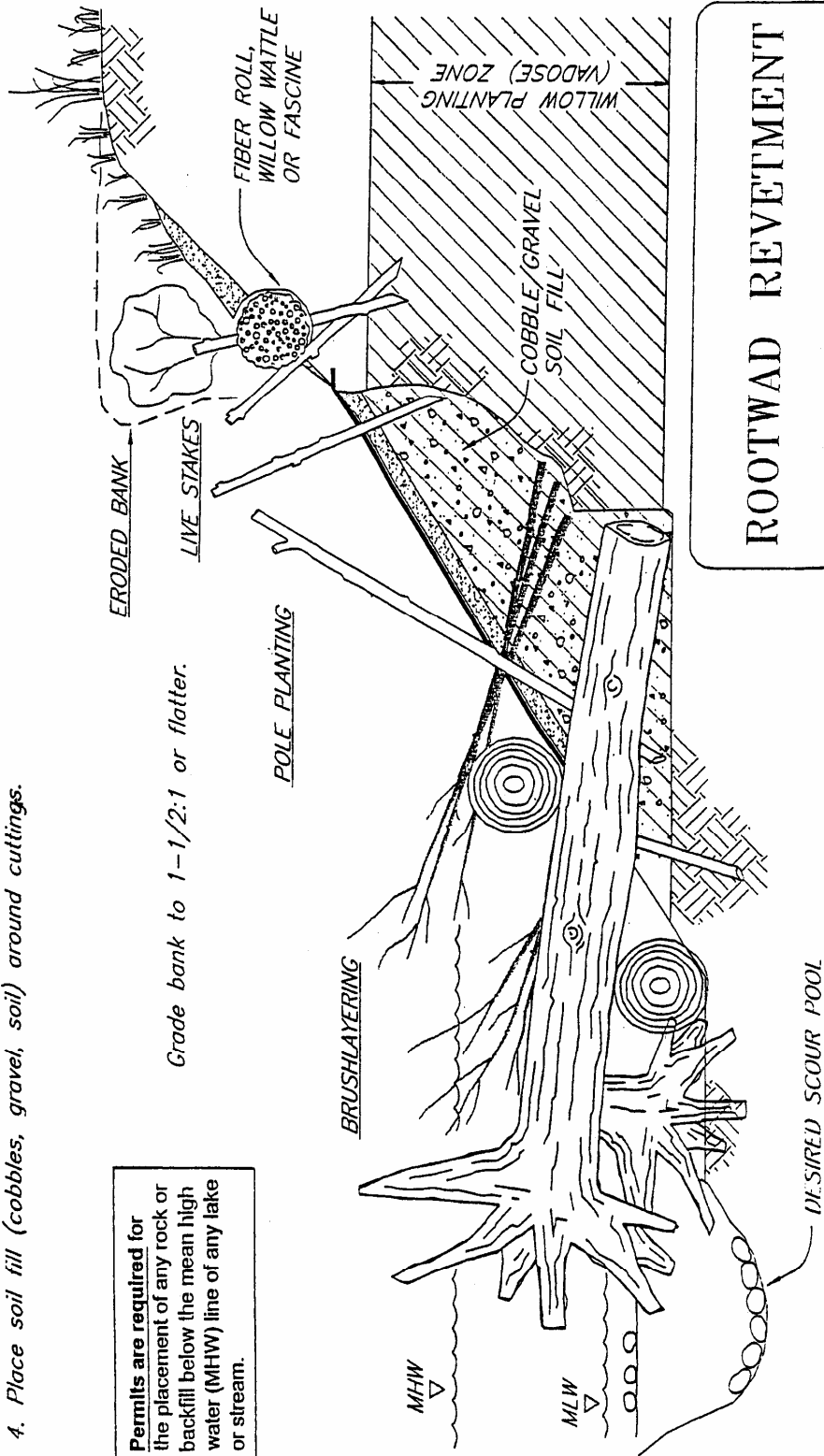
ROOTWAD REVETMENT

FILE: Rootwad Revetment

NOTES:

1. Willow pole planting and brushlayering shall be installed during bank grading and riprap placement to ensure good contact with 'native ground' and soil fill.
2. Willow poles and brush layers shall extend down into expected soil moisture zones (vadose).
3. Cut small holes or slits in filter fabric as necessary.
4. Place soil fill (cobbles, gravel, soil) around cuttings.

Permits are required for the placement of any rock or backfill below the mean high water (MHW) line of any lake or stream.



ROOTWAD REVETMENT

BMP – WILLOW WALL REVETMENT

DESCRIPTION

A living revetment built along an eroding stream bank to rebuild the bank and protect it from further erosion.

APPLICATIONS

Useful for stream bank protection and re-construction in small to medium river systems. As a living system, the roots grow into the fill soil forming a flexible, porous structure. Provides valuable stream bank habitat for aquatic and terrestrial species.

LIMITATIONS

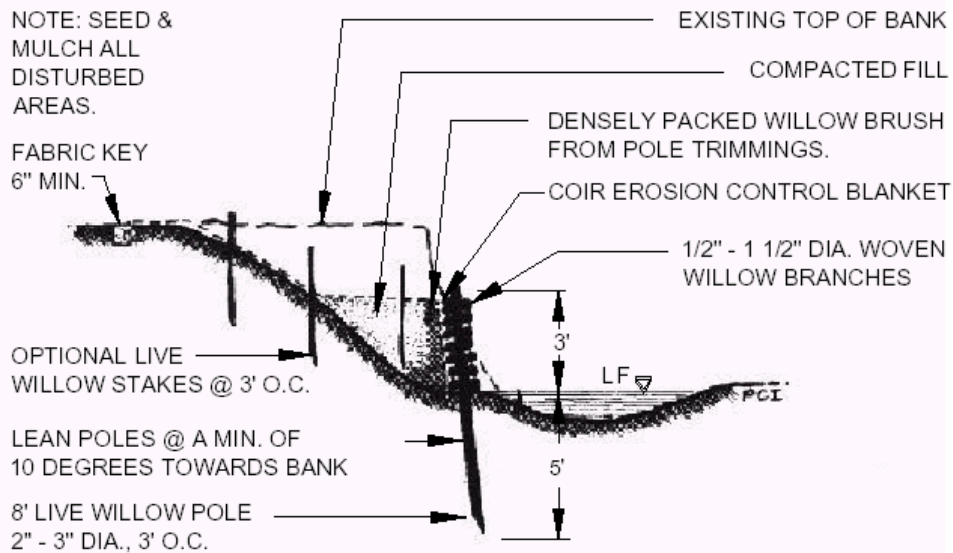
- ✓ Not suitable for deeply slumped, landslide areas.
- ✓ Drainage areas should be relatively small (generally less than 2,000 acres) with stable streambeds.
- ✓ The system must be built during low flow conditions. May need to divert water around the site and/or dewater.
- ✓ Live cuttings should be taken no earlier than the end of August and kept moist until the rainy season.
- ✓ Willows require nearly full sun conditions to be vigorous. Not to be used in heavy shade. Check to see if willows are growing in the area to confirm if this technique can be used.
- ✓ Maximum height of revetment is three feet, but can be constructed in multiple stair-step under the right moisture regime.
- ✓ Not to be used in a down-cutting stream.

CONSTRUCTION GUIDELINES

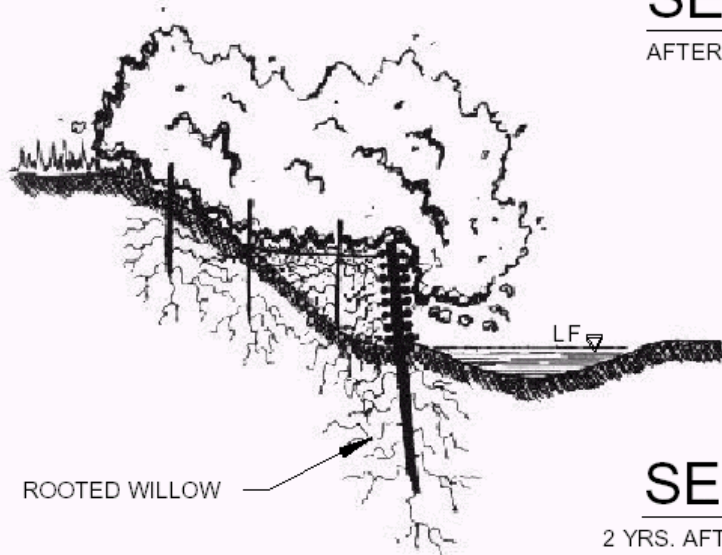
- 1) See drawing for details.
- 2) Toe of wall starts between the low flow and bank full level. Lay out post positions at 3-foot intervals to conform to bank. Upstream and downstream ends must be tucked into a stable bank feature or keyed with rock.
- 3) If toe scour is an issue, a boulder toe may be required.

BMP MAINTENANCE

- ✓ Keep soil and live cuttings moist by overhead irrigation until the rainy season begins.
- ✓ Keep livestock away from the live cuttings. If possible protect from deer for the first year.



SECTION
AFTER INSTALLATION



SECTION
2 YRS. AFTER INSTALLATION

CONCEPTUAL DRAWING
NOT FOR CONSTRUCTION

Source:
©Prunuske Chatham, Inc.
Occidental, CA

**WILLOW WALL
REVETMENT**

BMP - LIVE STAKES

DESCRIPTION

Live staking involves the insertion of live, vegetative cuttings into the ground in a manner that allows the cutting (stake) to take root and grow. This BMP is used to reduce the potential for soil to become water borne, to reduce water velocity and erosive forces, and to aid in habitat protection. Poles used in willow walls and through rip rap may be a structural application. Sprigs may be used in individual planting spots along a streambank. See *BMP- Harvesting and Handling of Woody Cuttings*.

APPLICATIONS

This BMP may be used to repair small slips and slumps, to reinforce or enhance stream banks, and to anchor and enhance the effectiveness of wattles, fascines, straw logs and other erosion control materials. It may also be used in conjunction with approved rip rap installations (vegetated rip rap).

LIMITATIONS

Do *not* use this BMP:

- ✓ where vegetation growth will interfere with maintenance or facility access.
- ✓ where vegetation growth will create safety issues.
- ✓ for immediate soil stabilization results.

CONSTRUCTION GUIDELINES

- 1) Before cutting and gathering materials, see *BMP Harvesting and Handling of Woody Cuttings* to ensure greatest success for plant material to sprout and grow.
- 2) Live staking must be implemented during the dormancy period of chosen plant species, late fall to winter (October through January is ideal in Northern Coastal California). If native willows or cottonwood are not found in the vicinity, live staking may not be a good option.
- 3) Hardwood cuttings are generally divided into three categories: Sprigs (or stakes) that are 0.75 to 1.5 inches in diameter and 36 to 48 inches long; Poles that are 1.5 to 3 inches in diameter and 5 to 8 feet long; and Branch Cuttings or Weavers which are no thinner than 1/2 inch and 6 to 12 feet long depending on the application (wattles, layering, willow wall revetments).
- 4) Don't allow stakes to dry out. Soak all cuttings in water for a minimum of 24 hours. Soaking significantly increases the survival rate of the cuttings; however, they must be planted the same day they are removed from water.

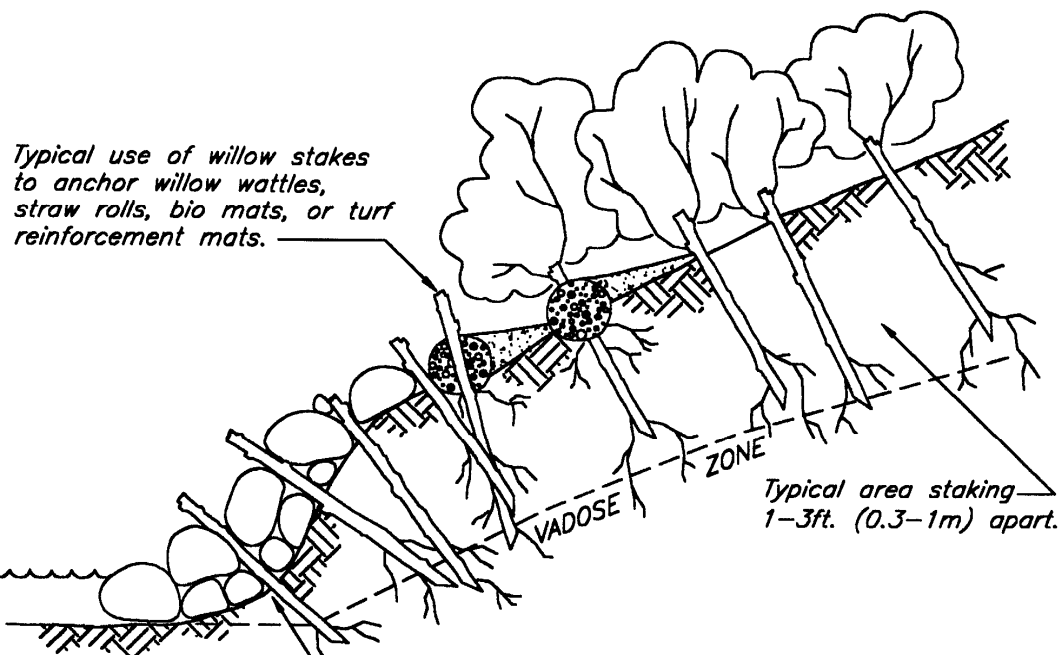
- 5) Use an iron stake or bar to make a pilot hole in firm soil. Plant the stakes butt-ends into the ground, with the leaf bud scars or emerging buds always pointing up. Be careful not to damage the buds, strip the bark or split the stake during installation. Plant stakes at random in the most suitable places at a rate of 2-5 cuttings/square yard. Do not plant the stakes in rows or at regular intervals.
- 6) Set the stake as deep as possible into the soil, preferably with 80 percent of its length into the soil and in contact with mid-summer moist soils. The stake should protrude only to a maximum of one-quarter its length above the ground level to prevent it from drying. Stakes should be cut so that cutting extends above competing herbaceous vegetation. At least 2 buds and/or bud scars shall be above the ground after planting. It is essential to have good contact between the stake and soil for roots to sprout. Tamp the soil around the cutting. Do not fertilize.

BMP MAINTENANCE

- ✓ Periodic inspection, repair and maintenance will be done in accordance with permit requirements. If no permits are required, vegetation will be monitored for the first two years or until the vegetation is established.
- ✓ Staked area may need to be watered during summer months.

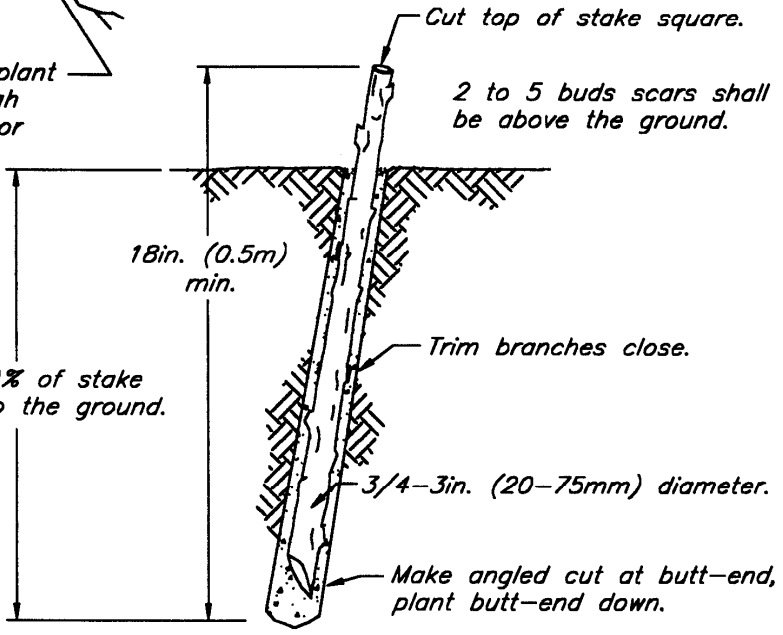
BMP REMOVAL

- ✓ BMP removal is not necessary.



Typical area staking
1-3ft. (0.3-1m) apart.

Typical - drive or plant willow stakes through openings in riprap or gabions.



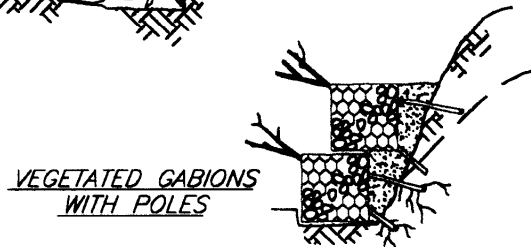
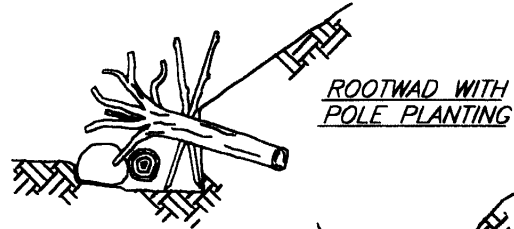
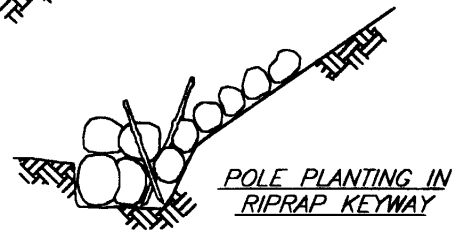
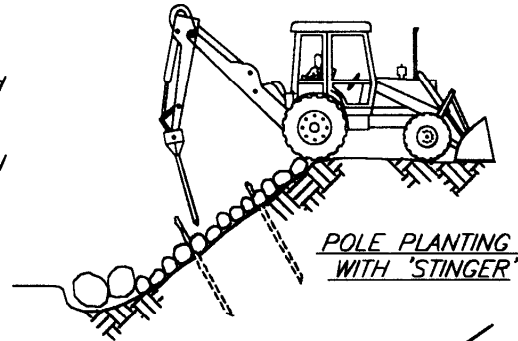
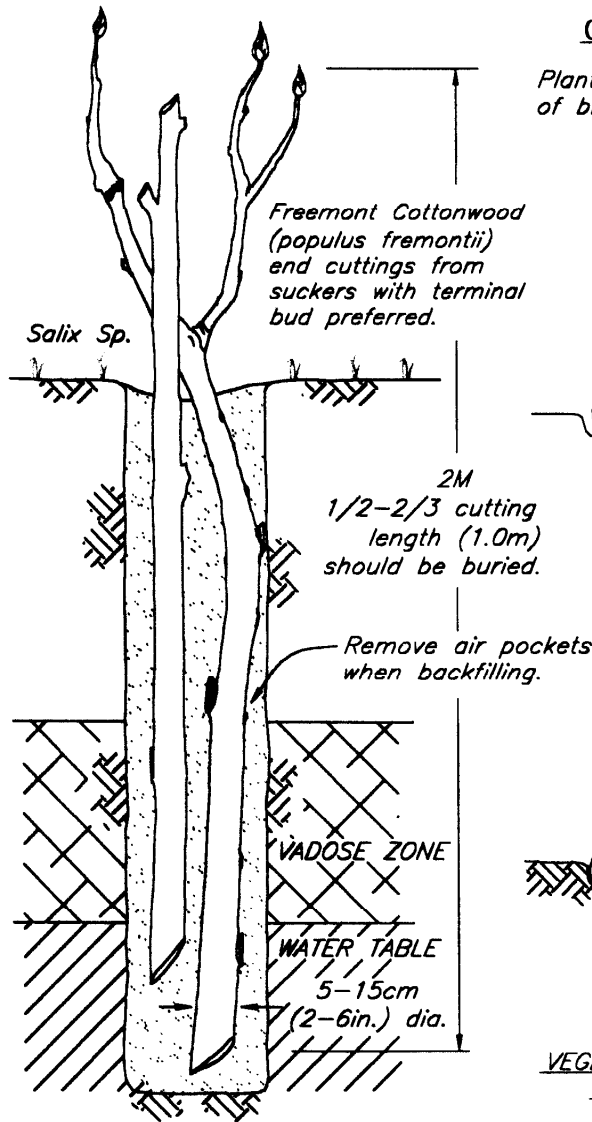
- NOTES:**
1. Harvest and plant stakes during the dormant season.
 2. Use healthy, straight and live wood at least 1 year old.
 3. Make clean cuts and do not damage stakes or split ends during installation, use a pilot bar in firm soils.
 4. Soak cuttings for 24 hours (min.) prior to installation.
 5. Tamp the soil around the stake.

LIVE STAKING AND JOINT PLANTING

© 2000 JOHN McCULLAH
FILE: LVSTJTPL

CONSTRUCTION TECHNIQUES

Plant poles deeply *during* construction of biotechnical streambank work.



NOTES:

1. Pole cuttings of willow or cottonwood are longer and have a larger diameter than branch cuttings or live stakes.
2. Larger diameter cuttings have a greater supply of stored energy (stored photosynthesis) than smaller diameter cuttings.
3. Pole cuttings are better suited for highly erodible areas and sites with fluctuating water levels.
4. The pole cuttings should extend through the vadose zone and into the permanent water table. At least 1/2 to 2/3 of the pole should be below the ground, at least 1.0m (3 ft.), and long enough to emerge above adjacent vegetation.
5. "Muddying" - filling the hole with water and then soil to make a mud slurry can remove air pockets.

POLE PLANTING

BMP - WATTLES/FASCINES

DESCRIPTION

Wattles and fascines are live branch cuttings, usually willows, bound together into long, tubular bundles used to stabilize slopes and stream banks. Both wattles and live fascines are true biotechnical practices. The live branches and live stakes provide the biological element while the stems, rope ties and wedge shaped wooden stakes all combine to provide the structural elements. Fascines differ from wattles in that the branch cuttings all point in the same direction in fascines, where they may point in either direction in wattles. Wattles are typically aligned on contour, where fascines are angled slightly upslope and thus tend to produce more vigorous growth.

APPLICATIONS

Wattles/fascines may be used for long slopes, road fills, road cuts, gullies or slumped areas, eroded slopes or eroding stream banks. May be used to repair small earth slips and slumps or to protect slopes from shallow slides 1-2 feet deep. Wattles/fascines may be used to stabilize entire cut or fill slopes or localized gully areas of slopes, or may be installed on newly built slopes or as a remedial action on existing slopes. This technique is useful on slopes requiring other planting materials such as woody vegetation, transplants and grasses. Wattles/fascines enhance conditions for natural invasion and the establishment of other plants from the surrounding plant community.

LIMITATIONS

- ✓ Always perform plant material harvest and installation during the dormant season, late fall through early spring.
- ✓ Where increased infiltration may cause slope failures, use fascines instead of wattles to ensure positive drainage.

CONSTRUCTION GUIDELINES

- 1) Pre-soak wattles/fascines for 24 hours, or install on the same day they are harvested and prepared. Wattles/fascines must be stored in the shade and under cover, preferably in water. Use site reconnaissance to identify species and site conditions on adjacent sites and compare their conditions to the construction site.

Planting will be more successful as the soil, site conditions, and species selected match stable and vegetated nearby sites.

- 2) Tie cuttings together to form bundles, tapered at each end, 6-30 feet in length, depending on site conditions or limitations in handling. The completed bundles should be 6-12 inches in diameter. Stagger the cuttings in the bundles so that the tips are evenly distributed throughout the length of the bundle.
- 3) Compress and tightly tie wattle/fascine bundles with rope or twine of sufficient strength and durability. Bundles shall be tied 12-15 inches apart.

4) General Installation Guidelines

| <i>Slope (H:V)</i> | <i>Slope Length Between Wattles/Fascin es (feet)</i> |
|---------------------|--|
| <i>1:1 to 1.5:1</i> | <i>3-4</i> |
| <i>1.5:1 to 2:1</i> | <i>4-5</i> |
| <i>2:1 to 2.5:1</i> | <i>5-6</i> |
| <i>2.5:1 to 4:1</i> | <i>6-8</i> |
| <i>3.5:1 to 4:1</i> | <i>8-12</i> |
| <i>4.5:1 to 5:1</i> | <i>10-20</i> |

- 5) Perform any slope repairs prior to wattle/fascine installation.
- 6) Beginning at the base of the slope, dig a trench on contour. The trench shall be shallow, about ½ : what fraction? Check printout] the diameter of the wattle. The trench width will vary from 12-18 inches depending on the slope angle. Place the wattles immediately after trenching to reduce desiccation of the exposed soil. Wattles shall be staked firmly in place with one row of construction stakes on the downhill side of the wattling, not more than 3 feet apart. second row of stakes shall be placed through the wattles, near the ties, at not more than 5 feet apart. Overlap the tapered ends of adjacent wattles so the overall wattle thickness of the wattle is uniform. Two stakes shall be used at each bundle overlap such that a stake may be driven between the last two ties of each wattle.

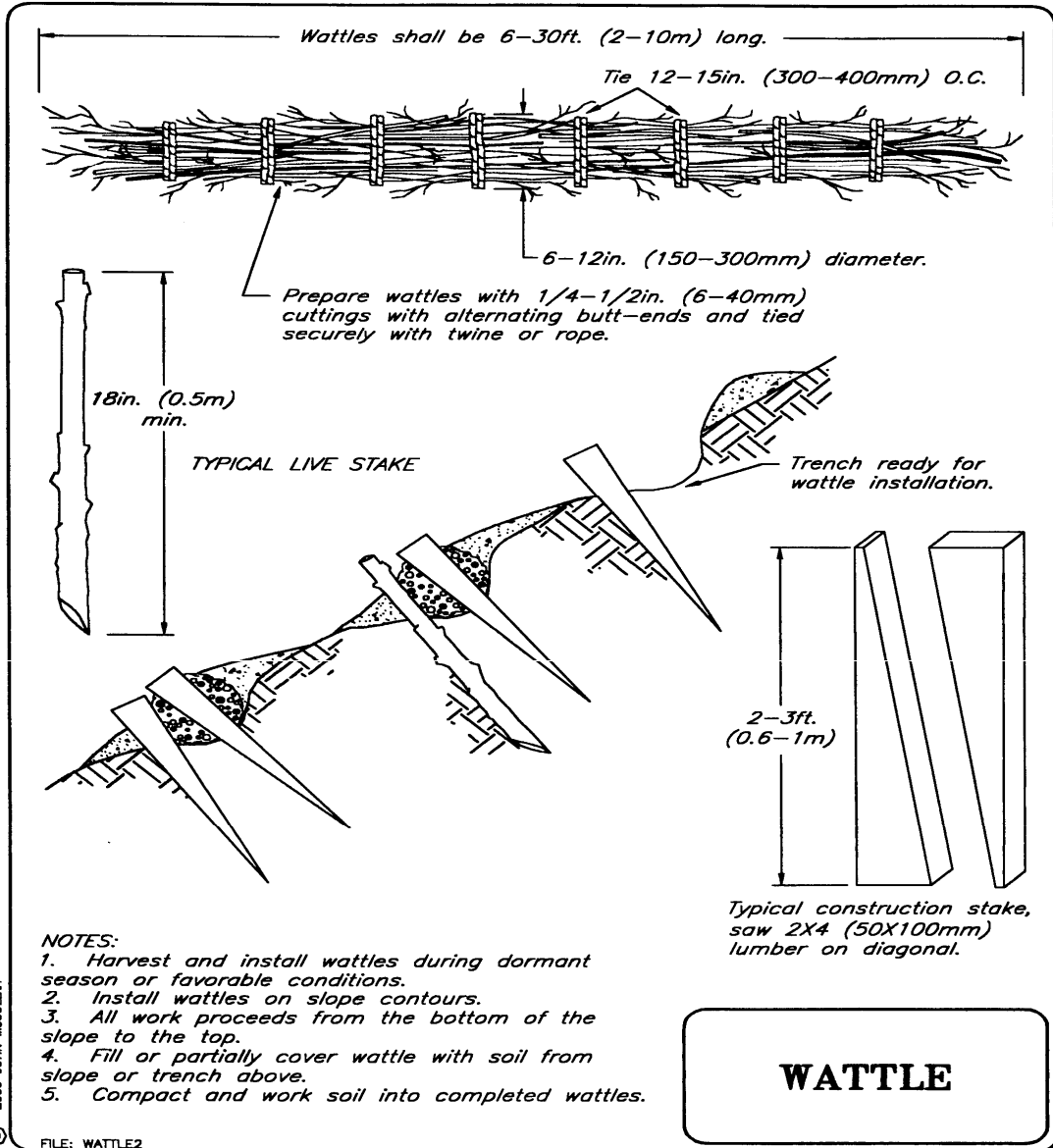
- 7) Live stakes, if specified, are generally installed on the downslope side of the bundle. Drive the live stakes below and against the bundle between the previously installed construction stakes. Proper backfilling is essential to the successful rooting of the wattles. Backfill wattles with soil from the slope or trench above. The backfill shall be worked into the wattle interstices and compacted behind and below the bundle by walking on and working from its wattling terrace.
- 8) Repeat the preceding steps to the top of the slope. Place moist soil along the sides of the live bundle. The top of the bundle should be slightly visible when the installation is completed. Plant the slope as specified.
- 9) Seed and mulch slope, if specified. Shallow slopes, generally 3:1 or flatter may be seeded and mulched by hand. Steeper slopes can have seed applied hydraulically and the mulch should be anchored with tackifier or other approved methods.

BMP MAINTENANCE

- ✓ Conduct regular inspections and maintenance of wattle installations, particularly during the first year.
- ✓ Staked area may need to be watered during summer months.
- ✓ Immediately repair rills and gullies around or under wattles.

BMP REMOVAL

- ✓ BMP removal is not necessary.
- ✓

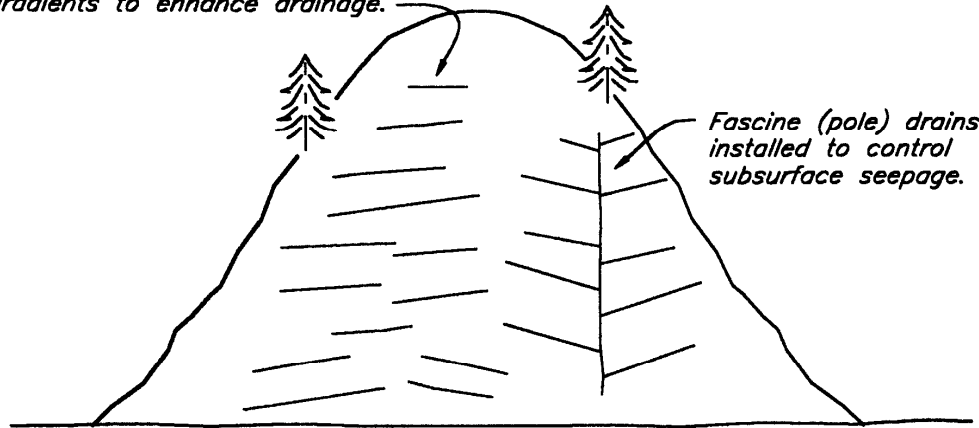


- NOTES:**
1. Harvest and install wattles during dormant season or favorable conditions.
 2. Install wattles on slope contours.
 3. All work proceeds from the bottom of the slope to the top.
 4. Fill or partially cover wattle with soil from slope or trench above.
 5. Compact and work soil into completed wattles.

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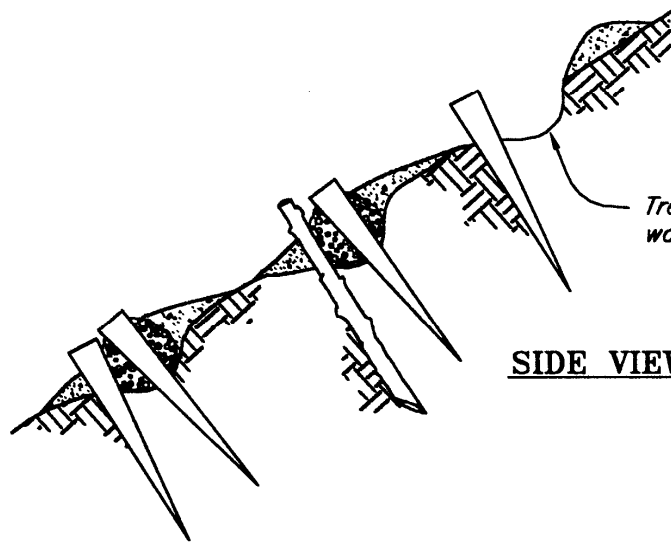
FILE: WATTLE2

Fascines placed in trenches on slope face along shallow gradients to enhance drainage.



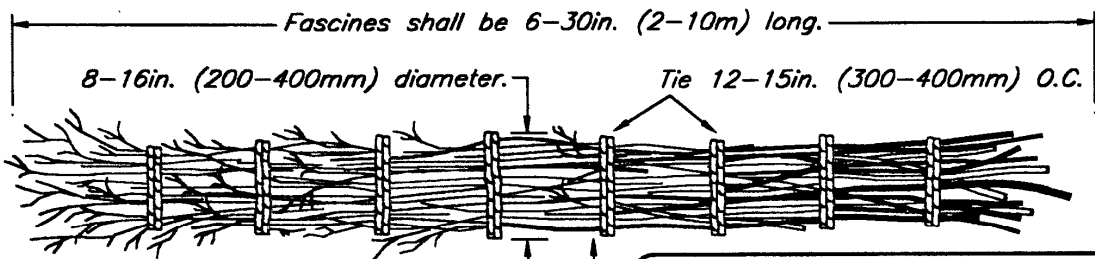
Fascine (pole) drains installed to control subsurface seepage.

FRONT VIEW OF SLOPE



Trench ready for wattle installation.

SIDE VIEW OF SLOPE



Fascines shall be 6-30in. (2-10m) long.

8-16in. (200-400mm) diameter.

Tie 12-15in. (300-400mm) O.C.

Prepare fascines with 1/4-1/2in. (6-40mm) cuttings, with all bud ends facing the same way.

LIVE FASCINE

NOT TO SCALE

© 1999 JOHN McCULLAH

FILE: LIVEFASC

BMP – STREAMBED GRAVEL

DESCRIPTION

Streambed gravel is clean, alluvial river-run, non-angular (smooth) gravel of variable sizes used for in-stream habitat protection and maintenance, or sometimes in a culvert.

APPLICATIONS

Streambed gravel can be used to provide a natural substrate for fish and for minimizing siltation in ditches and/or stormwater facilities.

LIMITATIONS

- ✓ Placing gravel in streams constitutes fill and must be permitted by the appropriate agencies.
- ✓ Gravel tends to move from the site, downstream, during winter storm run-off.
- ✓ When used as a bedding underneath a culvert, gravel may allow piping of water under the culvert.
- ✓ In some regions, river-run alluvial gravel can be difficult to acquire.

CONSTRUCTION GUIDELINES

- 1) Place gravel in accordance with applicable design and permit conditions.
- 2) Check gravel gradation to ensure it meets design specifications.
- 3) If gravel has excessive fines, wash gravel off-site (at a location where washed water cannot enter watercourses, streams or wetlands) until it runs clear.
- 4) Haul material in clean truck bed.
- 5) Dump cleaned rock onto tarped area on-site.
- 6) Place a cover and berm around clean rock stockpiles. Re-wash rock before using if it becomes dirty.

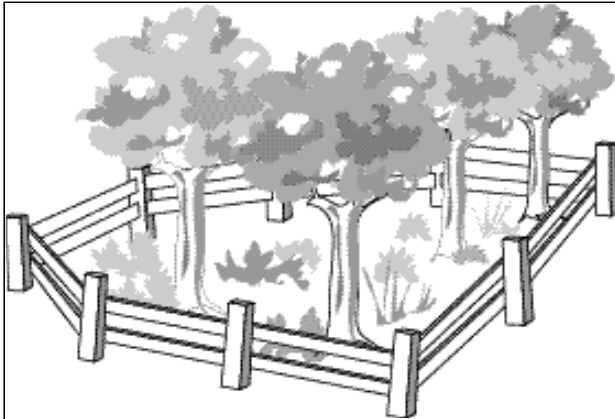
BMP MAINTENANCE

- ✓ Replace as needed

BMP REMOVAL N/A

Vegetation and Debris Management

Preservation of Existing Vegetation



- Erosion Control
- Sediment Control
- Habitat/Wildlife Protection

Description

Methods to minimize soil erosion in and near flood control channels by preserving existing vegetation.

Applicability

- Areas within a maintenance site where no construction activity occurs, or where construction activity is phased to occur at a later date.
- Sensitive areas where natural vegetation exists and should be preserved, such as: steep slopes and watercourses.
- Areas where local, state, or federal government require vegetation preservation.
- Areas where preserving vegetation can be particularly beneficial. These areas include flood plains, stream banks, steep slopes, and other areas where erosion control would be difficult to establish, install, and maintain, or areas where there are critical resources downstream.

Approach and Standards

Planning

- Make efforts to preserve existing vegetation during project planning, and before site disturbance begins.
- Decide which vegetation will remain on the site based on the following criteria: compatibility with the proposed project, aesthetic value, susceptibility to disease or rot, environmental value, wildlife benefits, whether vegetation is or is not native, relationship to other vegetation, erosion control capabilities, and space needed.
- In natural channels with adequate channel capacity, leave overhanging vegetation and emergent wetland vegetation that colonizes deposition bars in order to maintain

Vegetation and Debris Management

Preservation of Existing Vegetation

healthy creek life. This technique reduces channel capacity and should be used only as appropriate.

- Preserve low growing vegetation that will not cause major resistance to storm flows.
- Prepare landscaping plans, which retain as much existing vegetation as possible and describe proper care of this vegetation before, during, and after construction. Propose landscaping plans which do not include plant species that compete with the existing vegetation.

On-Site Activities

- Existing vegetation to be preserved on the site should be protected from mechanical and other injury while the maintenance project occurs. Define a setback area from vegetation to be preserved and protect the area with berms, fencing, signs, etc. The setback area size should be based on the location, species, size, age and potential impact of adjacent maintenance and construction activities or permanent improvements.
- Flag or mark trees to remain in place. Stake off root system limits (drip lines of trees). Some counties limit construction within 5 feet of the tree drip line. Fence off the area to be preserved.
- Where grading under trees is necessary, excavation and fill should be limited to one foot within the drip lines.
- In natural channels, create tree wells and retaining walls (permanent), which help preserve existing vegetation, large enough to protect the root system.
- For the native oak trees, allow no trenching or irrigation within the drip lines of the tree, since both these activities are detrimental to tree preservation.
- Temporary roadways should be located to minimize damage to shrub and tree stands, and should follow natural contours to reduce cutting and filling.
- Do not locate construction traffic routes, spoil piles, etc., where significant adverse impacts on existing vegetation may occur.
- If any damage is done unintentionally to the area of existing vegetation, repair the damage immediately.

Limitations

- Requires planning.
- May limit area available for construction activities.
- Would not apply to areas of flood control channels where U.S. Army Corps of Engineers or the Natural Resources Conservation Service requires that channels be kept clear of most vegetation to provide for designated flood flows.
- For sites with diverse topography, it may be difficult or expensive to save existing trees.

Vegetation and Debris Management

Preservation of Existing Vegetation

Requirements

Maintenance

- Inspection and maintenance requirements for protection of vegetation are low.
- During construction, maintain the limits of grading or disturbance at all times.
- Ensure that irrigation and maintenance of native trees or vegetation conforms to specifications on the landscape plan.
- Maintain the existing grade around vegetation. Raising the grade can suffocate the roots, and lowering the grade may expose roots.
- Ensure that site-specific vegetation management plans or habitat conservation plans clearly specify maintenance activities that will facilitate or preserve a targeted vegetation cover type or a succession of cover types over time.

Costs

- In general, there is little cost associated with preserving existing vegetation if properly planned during the project design. Maintaining existing vegetation may yield aesthetic wildlife and water quality benefits.
- In general, costs are limited to staff time and materials for cordoning off vegetation to be preserved. Additional costs required if tree wells and retaining walls are created.

Training

- Train appropriate staff to minimize disturbance to vegetation that is to remain in place.
- Train staff on how to identify target and non-target, native and non-native species, and desirable riparian and terrestrial plants, at the start of a job.
- Train appropriate staff to understand where and how to preserve existing vegetation. Vegetation management planning for the preservation of existing vegetation requires planning, which involves design staff and maintenance staff.

References

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC2, March, 1993.

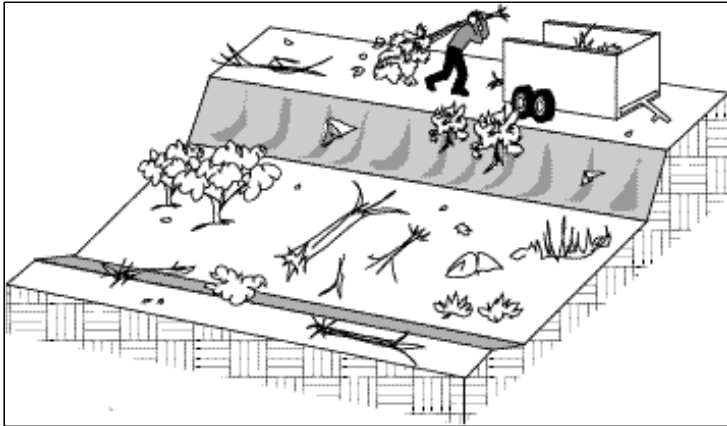
**Vegetation and Debris
Management**

**Preservation of
Existing Vegetation**

Marin County Flood Control District, Draft "Environmentally Sensitive Stream Management Strategies," February 16, 1998.

Vegetation and Debris Management

Removal of Existing Vegetation



- Erosion Control
- Public Safety
- Habitat/Wildlife Protection

Description

Vegetation removal techniques to preserve the channel's flood control functions; create a stable channel environment, where the need to perform vegetation removal is minimal; and provide safe access for maintenance equipment, fire protection vehicles and pedestrians.

Applicability

- Areas where construction will occur and could be damaging to existing vegetation, structures, or equipment.
- Areas where flow is obstructed or is diverted against a bank.
- Where necessary for public safety.
- Refer to BMP NR-3 for more information related to this BMP.

Approach and Standards

- As appropriate, use small, motorized rubber-tracked vehicles with hydraulic lift mounted platforms to aid in cutting and removing vegetation from flood control channels.
- Use hand operated equipment (e.g. loppers, hand saws, chain saws, weed eaters, and other tools) to remove or trim vegetation where it is feasible.
- Have a vegetation specialist available for maintenance crews to consult with when removing or trimming vegetation on flood control district property.
- Where applicable, consider using mowers operated from the access road to cut vegetation on channel banks instead of spraying with herbicides.
- If herbicides are used, use herbicides that are approved for water use, and only in the lowest amounts that are effective. Consider minimizing the effects on aquatic life when deciding whether to remove treated vegetation or mowing it to decompose in place.

Vegetation and Debris Management

Removal of Existing Vegetation

- If possible, save removed native vegetation to replant after construction or to plant immediately in other areas.
- Keep equipment away from trees to be preserved to avoid trunk damage caused by equipment scarring the trunk, and to prevent soil compaction near roots (see also VDM-1).
- Consider potential wind damage to adjacent vegetation from exposure to increased wind velocities, as appropriate, before removing vegetation,
- Only vegetation that is noxious, or that could obstruct channel flows, should be removed. Herbacious layers are components of riparian habitat and provide erosion protection. If noxious vegetation is removed, replant the area with native vegetation. Do not remove stumps.
- Willows require the following treatment:
 - ✓ Never top live willows. This encourages shrubby growth.
 - ✓ Only remove willows from a channel bed if they are obstructing flow or diverting water against a bank.
- Remove non-native vines or plants that inhibit the growth of native riparian trees.
- To favor stream shading, retain large trees on the east side of north-south flowing streams and on the south side of east-west flowing streams.
- Recycle useful vegetation, (i.e., cut willows can be used to revegetate an eroding bank).

Limitations

- Requires planning.

Requirements

Maintenance

- Monitoring and progress evaluations are essential components of vegetation management programs.
- During construction, the limits of grading or disturbance should be clearly marked at all times.
- Removal of trees or vegetation should conform to the vegetation plan.

Costs

- The cost of using mowers opposed to herbicides is in dispute. Some sources indicate that using mowers to control excess growth, instead of herbicides, could potentially reduce costs, while other sources state that mower use is extremely expensive. The Santa Clara Valley Water District (February 2000) indicates that mechanical

Vegetation and Debris Management

Removal of Existing Vegetation

vegetation removal (mowing, discharge, etc.) costs five times more than herbicide controls, in part because it must be performed more often.

- Purchase or upkeep of additional hand-operated equipment and rubber-tracked vehicles with hydraulic lift mounted platform, may be required.
- Costs would increase with the hiring of a vegetation specialist.
- If a lot of vegetation is removed, costs for vegetation disposal and for replanting useful vegetation would increase.
- Extra costs are incurred for vegetation that is removed, saved, and replanted.

Training

- Train vegetation removal crews in the correct methods for pruning and vegetation removal.
- Staff should be trained to remove vegetation with the least amount of impact to existing vegetation that is to be preserved. Vegetation management planning for the removal of vegetation requires planning, which involves the design staff as well as the maintenance staff.
- A vegetation expert may be required for some projects.

References

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC2, March, 1993.

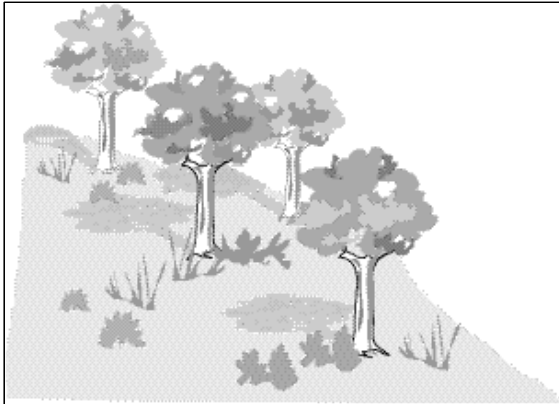
Marin County Flood Control District, Draft “Environmentally Sensitive Stream Management Strategies,” February 16, 1998.

Santa Clara Valley Water District, “BMP/PMM List,” February, 1999.

Santa Clara Valley Water District, personal written communication, “Comments on the BASMAA OPC BMP Guidance Manual.” February 2, 2000.

Vegetation and Debris Management

Revegetation After Soil Disturbance



- Erosion Control
- Sediment Control
- Habitat/Wildlife Protection

Description

Methods to properly revegetate sites after site disturbance to reduce bank erosion potential.

Applicability

- Areas within a site where no further construction or maintenance activities will occur.
- Sensitive areas where natural vegetation existed prior to disturbance (especially steep slopes, watercourses, and building sites in wooded areas).
- Areas where local, state, or federal government requires preservation or mitigation.

Approach and Standards

Vegetation

- The project site should be revegetated as soon as feasible after construction.
- Use native Bay Area plants and grasses in revegetation projects.
- Revegetation should be regularly monitored for survival for at least three years.
- Take cuttings and seeds from existing native vegetation before disturbance and cultivate. Use to replant so plants are genetically similar and acclimated to the specific area.
- Revegetate at ratio of at least 1½:1. Overplanting is recommended because some initial mortality is expected.
- If soil moisture is deficient, new vegetation should be supplied with supplemental water until firmly established.
- Cut or mow grasses to encourage the establishment and spread of grass.

Mulch

Vegetation and Debris Management

Revegetation After Soil Disturbance

- Use mulch, composed of bark, other wood products, straw, or erosion-control blankets, to form a protective blanket over the seeds and hold them in place and retain soil moisture. Erosion control blankets must be applied to planting areas where slopes are 2:1 or steeper.
- The choice of mulch should be based on the size of the area, site slopes, surface conditions such as hardness and moisture, weed growth, and availability of mulch materials.
- Type of mulch, binders, and application rates should be as recommended by the manufacturer.

Limitations

- Requires planning, and long-term monitoring.
- For sites with diverse topography, satisfactory revegetation can be difficult and expensive.
- May need area to cultivate cuttings and seeds to be used for revegetation efforts.
- Mulches tend to lower soil surface temperature, and may delay germination of some seeds.
- May require additional plantings or seeding if monitoring shows that revegetation efforts are not successful.

Requirements

Maintenance

- Cultivate cuttings and seeds.
- During construction, clearly mark the limits of grading or disturbance at all times.
- Ensure that irrigation or maintenance of native trees or vegetation conforms to specifications on the landscape plan.
- Perform monitoring for three to five years, as specified in the landscape or project mitigation plan.
- Inspect all seeded areas periodically for failures. If failures are found, reseed, fertilize, and mulch the areas within the planting season, using half of the original application rates.
- Inspect the mulch periodically and after rain for damage and deterioration.
- Maintain the longevity and integrity of the mulch until vegetation is established.

Vegetation and Debris Management

Revegetation After Soil Disturbance

Costs

- Costs would result from hiring a vegetation specialist, and for performing ongoing monitoring.
- There could be an extra cost to cultivate cuttings and seeds and to irrigate and for additional planting or seeding.

Training

- A vegetation specialist may be necessary.
- Train vegetation crews in the correct methods for collecting cuttings and seeds, and for removing and replanting vegetation.
- Training should be provided on the use and maintenance of native Bay Area plants and grasses for revegetation projects.
- Train design and maintenance staff on planning for revegetation after construction.

References

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC2, ESC 10, ESC 11, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD 24B(2), 25(2), April 1997.

Caltrans, *Caltrans Storm Water Quality Handbooks, Planning and Design Staff Guide*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD 24A(1), 25(1), April 1997.

BMP – BROADCAST SEEDING

DESCRIPTION

Hand seeding is broadcasting grass seed on disturbed or bare soil areas by hand or a hand seeding device. This BMP reduces the potential for soil to become water or air borne, reduces erosion after vegetation establishment, provides for vegetative buffers and aids in habitat protection. Seeding with appropriate seed mixes also helps discourage colonization by non-native and invasive plant species.

APPLICATIONS

We encourage hand seeding whenever possible to aid in controlling erosion on construction sites. Seed only areas intended to be left dormant for a year or more, such as soil berms.

LIMITATIONS

- ✓ After broadcast seeding, mulch the area and/or install erosion control blankets or mats.
- ✓ Schedule seeding to fit the germination timing for the specific grasses to be used. Typically this is October and November for cool season California grasses. If seed is applied earlier, increase the seed and mulch quantities.
- ✓

CONSTRUCTION GUIDELINES

- 1) Select seed mixes appropriate to the season and site conditions. Permit conditions and/or sensitive locations may require special seed mixes. Avoid the use of tall growing flashy fuel types or types with known allelopathy such as annual rye grass. Consider native perennials whenever possible.
- 2) Grade as needed and feasible to permit the use of equipment for seedbed preparation.
- 3) Grade and scarify the site as needed and feasible to permit good seed to soil contact. See BMP Surface Roughening and Soil Tracking. Commercial fertilizers are seldom recommended as they can leach into the stream and the high nitrogen promotes broadleaf weed growth over native perennial growth. In areas where there is no longer topsoil, consider amending the soil with mycorrhizal inoculants and/or mature screened compost.

- 4) Install needed erosion control practices, such as sediment basins, diversion dikes and channels, prior to seeding. Divert concentrated flows away from seeded areas.
- 5) Surface roughening: If the area has been recently loosened or disturbed, no further roughening is required. When the area is compacted, crusted or hardened the soil shall be loosened with disking, raking or harrowing.
- 6) Spread seed uniformly and according to manufacturer's recommendations.
- 7) Straw mulch, erosion control blankets or mulch and tackifiers/soil binders should be applied over the seeded areas.

BMP MAINTENANCE

- ✓ Inspect during seed establishment period. Re-seed, due to mortality, as necessary. Areas that fail to establish cover adequate to prevent sheet and rill erosion will be reseeded as soon as such areas are identified. Spot seeding can be done on small areas to fill in bare spots where grass did not grow properly.

BMP REMOVAL

- ✓ BMP removal should not be necessary.

BMP – HYDROSEEDING

DESCRIPTION

Hydroseeding is broadcasting grass seed, tackifier, wood fiber mulch and water on disturbed areas using a hydroseeding machine. This BMP is used to reduce the potential for soil becoming water or air borne, to reduce erosion after vegetation is established, provide vegetative buffers and to aid in habitat protection. Seeding with appropriate seed mixes will also help discourage colonization by non-native and invasive plant species.

APPLICATIONS

Hydroseeding may be used after soil disturbance is completed at construction sites and/or on bare slopes.

LIMITATIONS

- ✓ Hydroseeding should not be used on streambanks or in areas subject to scour.
- ✓ Schedule seeding to fit the germination timing for the specific grasses to be used. Typically this is October and November for cool season California grasses. If seed is applied earlier, increase the seed and mulch quantities

CONSTRUCTION GUIDELINES

- 1) Select seed mixes appropriate to the season and site conditions. Permit conditions and/or sensitive locations may require special seed mixes. Avoid the use of tall growing flashy fuel types or types with known allelopathy ¹such as annual rye grass. Consider native perennials whenever possible. Commercial fertilizers are seldom recommended as they can leach into the stream and the high nitrogen promotes broadleaf weed growth over native perennial growth. In areas where there is no longer topsoil, consider amending the soil with mycorrhizal inoculants and/or mature screened compost
- 2) Install needed erosion control practices, such as sediment basins, diversion dikes and channels, prior to hydroseeding. Divert concentrated flows away from hydroseeded areas.

¹ If a plant type is allelopathic, it exudes chemicals into the surrounding soil that discourage or inhibit other plant types from growing. Eucalyptus is a commonly known allelopathic species.

- 3) Surface roughening: If the area has been recently loosened or disturbed, no further roughening is required. When the area is compacted, crusted or hardened the soil shall be loosened with discing, raking or harrowing.
- 4) Spread hydroseed mix uniformly and according to manufacturer's recommendations.
- 5) Cover hydroseeded areas with other methods as needed.

BMP MAINTENANCE

- ✓ Inspect during seed establishment period. Re-seed, due to mortality, as necessary. Areas that fail to establish cover adequate to prevent sheet and rill erosion will be reseeded as soon as such areas are identified. Spot seeding can be done on small areas to fill in bare spots where grass did not grow properly.

BMP REMOVAL

- ✓ BMP removal should not be necessary.
- ✓

BMP – PLANTING

DESCRIPTION

Planting, as outlined in this BMP, involves the establishment of native woody perennial species for the purpose of erosion control and/or habitat enhancement. See also Hand Seeding, Hydroseeding, and Mulching BMPs.

APPLICATIONS

Wherever riparian or upland woody vegetation is required and it is determined that natural recruitment will not be sufficient.

LIMITATIONS

- ✓ Sources of good quality locally native plant materials may be limited.
- ✓ An extended establishment period may require years of maintenance.
- ✓ Sources of water for irrigation may be limited.
- ✓ Permit requirements may guide design and maintenance planning.

CONSTRUCTION GUIDELINES

- 1) Choose the appropriate species for the site as determined by what is growing in the surrounding areas, soil type, water requirements, exposure, wildlife species requirements and permit requirements. Spacing and structure must also be considered.
- 2) Schedule the planting time as appropriate for the species and project maintenance capabilities. Riparian and upland species should be planted in November and December. The planting window for willow sprigs may be extended into the late summer (but not spring) if irrigation is provided. Emergent species may be planted after high flows if sufficient water will be available.
- 3) Order plant materials from a reputable native plant nursery well in advance to allow the nursery time to collect and propagate local species. Nine months to two years lead time may be required.

- 4) Inspect nursery-grown plant materials prior to accepting. Avoid tree species grown in one gallon flat bottom pots which promote root girdling. Revegetation plans typically specify tree size – for example:
- Tree Species: Trees, with the exception of cottonwood, willows, and dogwood, shall be grown from locally collected seed. Tree species shall be grown in 14-inch deep Treepots™ for at least 9 months and shall have root systems that fill the containers but are not root bound; roots shall show active growing tips. The minimum stem caliper of the main trunk shall be 0.2 inches at 1 inch above the root crown. Tops shall be at least 6 inches tall and have healthy, live buds and/or leaves, with no broken leaders.
 - Shrub and Vine Species: Shrubs and vines shall be grown from seeds or cuttings, except elderberry, which shall be grown from seed. Shrubs and *vines* shall be grown in 10-inch deep Deepots™ or one gallon pots for at least 9 months and shall have root systems that fill the containers but are not root bound; roots shall show active growing tips. The minimum stem caliper of the main trunk of elderberries shall be 0.2 inches at 1 inch above the root crown. All other species shall either have a similar caliper or have sufficient number of stems of a sufficient size to be equivalent to a 0.2-caliper single stem. Tops shall have healthy, live buds and/or leaves.
 - Plants shall show no signs of deleterious infection from bacteria, fungus, or insects. Reject plants with open wounds or unusual swelling of stems or branches.
 - Willow sprigs shall be 0.75 inch to 1.5 inches in diameter at the base and 3 feet long. Sprigs shall be cut clean with sharp hand saws. Branches shall be pruned off with sharp shears close to the main stem but just outside the branch collar. Sprigs with swelling, scar tissue, boring insects, or disease shall be rejected. Sprigs shall be cut from live healthy materials. Donor trees or areas of trees from which sprigs are cut shall be pre-approved by the owner. No more than 50% of an existing cottonwood or willow clump shall be removed for sprigs, unless the clump is scheduled to be destroyed by grading. No sprigs shall be taken from within 20 feet of a willow or cottonwood with an active bird nest in it.
- ✓ Site preparation includes the removal of all vegetation in the planting area. Scalp a 3 foot by 3 foot area free of vegetation and debris down to bare mineral soil.
- 5) Install plants according to attached drawings. If significant rain is not forecast, water-in the plants.
- 6) Where deer or rabbit browse is anticipated, it may be necessary to install browse protectors. If the riparian zone has high velocity floods, wait until early spring to

install protectors. Welded wire cages around cottonwoods may be required if beavers are in the area.

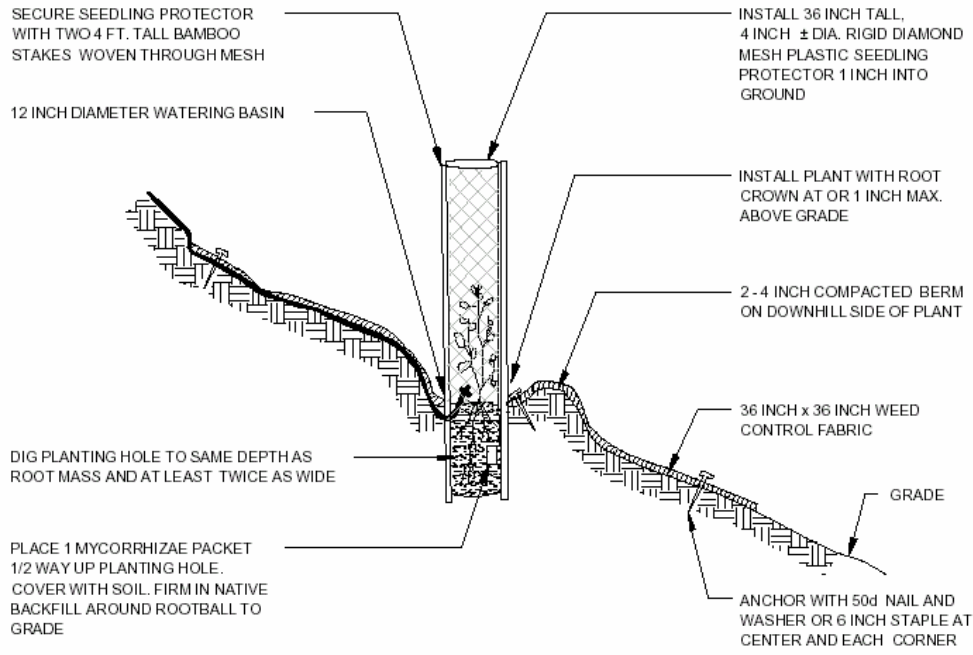
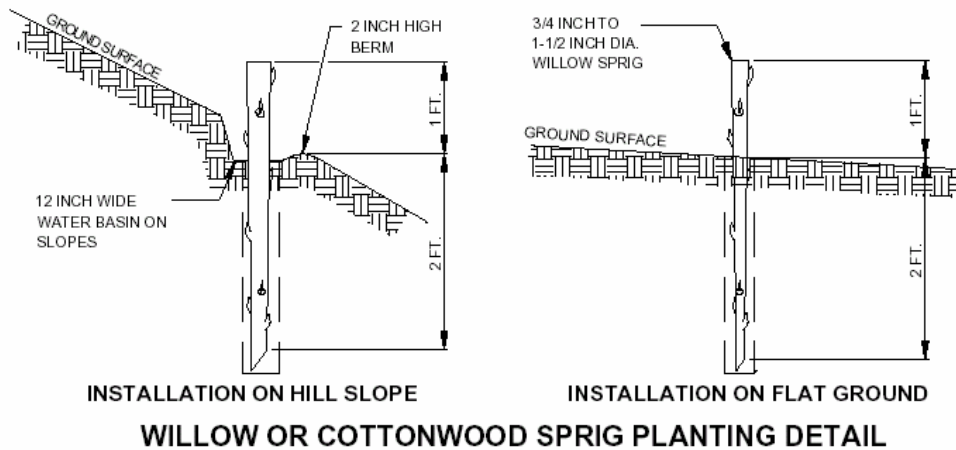
- 7) Schedule irrigation and maintenance requirements according to the needs of the plants and conditions. Maintenance may be required for one to three years. If watering is required, supplemental watering must begin in early spring (March) or as soon as the surface soil begins to dry.

BMP MAINTENANCE

- ✓ Regular inspection of plantings should be anticipated. As often as once per week, but no less than once per month for the first year.
- ✓ Maintenance includes weeding, watering, repair to browse protectors at a minimum.
- ✓ Where irrigation is required, it is essential to begin irrigation in the spring (March or April) before the soil begins to dry. This is the time when the plant and nearby weedy species put on the most growth and have the highest water demand. Transplants are most susceptible to drought in the spring and early summer. At the same time, it is important not to waterlog native species. Allow the soil surface (top ½ inch) to dry between waterings.
- ✓ Monitor plant survival in October to anticipate plant replacement that may be required by permit.
- ✓ Trimming lower branches of willows to allow for unrestricted stream flow may be desirable.

BMP REMOVAL

- ✓ It may be necessary to remove irrigation lines, browse protectors, and other materials at the end of the establishment period.

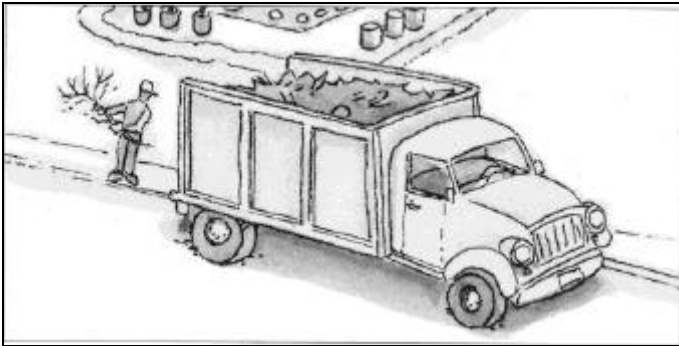


Source:
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 Occidental, CA

PLANTING

Vegetation and Debris Management

Debris Removal



Source: BASMAA

- Pollution Prevention
- Pollution Control
- Habitat & Wildlife Protection
- Erosion Control
- Public Safety

Description

Methods for removing debris from channels to minimize pollution, protect habitat/wildlife, provide for public safety, and minimize erosion.

Applicability

- This applies to any flood control channel activity that generates by-products, residuals, or wastes.
- Refer to BMPs EV-1, EV-2, NR-3, and VDM-2 for more information related to this BMP.

Approach and Standards

- As appropriate, use small rubber tracked vehicles in the channel bottom to carry debris to the designated collection point. Avoid using heavy equipment in the channel bottom for debris removal as much as possible.
- When possible, pick up debris with equipment operated from the top of the bank or access road.
- Deposit woody debris or vegetation collected from the channel in areas that will not cause storm-related problems (e.g., away from storm drain inlets, drainage facilities, and other watercourses).
- When necessary divert runoff that comes into contact with solid waste into appropriate control measures such as trash racks in order to remove waste and debris. (See BMPs WD-1, WD-2, WD-3).
- Manage construction by-products, residuals, and other wastes by stockpiling and properly removing (see BMP SC-1). Leave the site cleaner than before the work started by removing all litter, construction containers, and other work related materials.

Vegetation and Debris Management

Debris Removal

- Consider leaving stumps in place after trees are cut to create essential creek habitat. If leaving the stump in place, position and anchor the stump into the bank to minimize movement. For fallen trees, stumps can be left if the bark is stabilized (when trees fall, their root structure tears out of the bank and can contribute to bank stabilization).
- Only remove from creeks or channels downed wood that is loose and can be washed downstream or that obstructs flow or diverts flow into a bank. Downed wood could potentially protect tree roots from being undermined.
- Salvage or recycle useful vegetation debris, packaging, and surplus building materials when practical. For example, native trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas (see BMPs VR-1, and VDM-3). Wood pallets, cardboard boxes, and construction scraps can also be recycled.
- Collect trash and rubbish regularly around the project site, daily during rainy and windy conditions.

Limitations

- Temporary stockpiling of certain construction wastes may necessitate extra drainage-related controls during the wet season (see BMP SC-1).

Requirements

Maintenance

- Maintenance workers should perform daily good housekeeping at work site.
- Replace or exchange leaking dumpsters.
- Properly cover stockpiled material to avoid erosion of the stockpile.
- As appropriate, properly cover sediment trapping devices like the berm of a silt fence, to avoid sediment transport.
- Arrange for adequate debris disposal schedules to ensure that dumpsters or drop boxes do not overflow.
- Securely cover dumpsters or drop boxes used to collect debris at night and during rainy weather.

Costs

Additional staff time and disposal costs may be necessary depending on the site. Actual additional costs are not known.

Vegetation and Debris Management

Debris Removal

Training

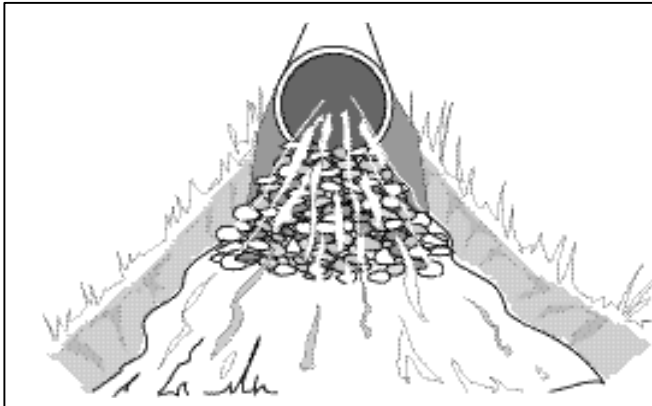
- Instruct employees on identification of solid waste and hazardous waste.
- Train employees on how to respond to hazardous waste found at work sites.
- Educate employees on solid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures.
- Train communities on the detrimental effects of dumping debris and garbage in creeks and urban flood control channels.

References

Santa Clara Valley Water District, "BMP/PMM List," February, 1999.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD 13(2), April 1997.

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.



- Erosion Control

Description

This measure provides a device made of rock, grouted riprap, or concrete rubble that is placed at outlets to channels and pipes to reduce the velocity of water exiting, and to retain the embankment near the inlets and outlets to pipe conveyances as a way to control erosion and scour. This practice protects inlets or outlets from developing plunge pools (small, eroded pools), and protects against scour and the resulting gully erosion at a culvert outlet. Erosion control fabric and hay waddes/coconut rolls can be installed in front of an outlet to provide additional velocity reduction and a softer appearance. (See BMPs, SS-1 and SC-5).

Applicability

This measure is intended to describe permanent outlet protection. Outlet protection for temporary dewatering activities need not be as detailed (see VR-4b).

Outlet Protection

- Outlets of pipes, drains, conduits or channels.
- Outlets at the bottom of mild to steep slopes.
- Outlets of channels that carry continuous water flows.
- Outlets that must handle short, intense water flows (e.g., flash floods).
- Areas where lined conveyances discharge to unlined conveyances.

Outlet Protection with Flared Culvert End Sections

- Outlets of slope drains and culverts, pipes, drains, and conduits.

Inlet Protection

- Inlets of slope drains and culverts can also use the flared culvert end section.

Velocity Reduction

Permanent Outlet Protection

Approach and Standards

Outlet Protection

- Rock outlet protection is effective at limiting erosion when the rock is sized and placed appropriately. Increase rock size for high velocity flows. Use sound, durable, angular rock.
- Construct rock apron on zero grade.
- Align apron with the receiving stream and keep it straight throughout its length. If a curve is needed to fit the site conditions, place the curve in the upper section of the apron.
- When designing the outlet project, consider flow depth, roughness, gradient, side slopes, discharge rate and velocity. The discharge pipe size governs the rock depth and outlet protection length. Hydraulic calculations and velocities should be used to determine the total length of the device.
- Specifications based on USDA Soil Conservation Service (now Resource Conservation Service) are listed in the table below. For larger or higher flows, consult a registered civil engineer.
- Provide cutoff walls.

| Pipe Diameter | | Discharge | | Apron Length | | Rip Rap D ₅₀ Minimum Diameter | |
|---------------|-------|-------------------|-------|--------------|----------|--|----------|
| mm | in | m ³ /s | cfs | m | ft | mm | in |
| 300 | 11.81 | 0.14 | 4.94 | 3 | 9.8413.1 | 100 | 3.945.91 |
| | | 0.28 | 9.89 | 4 | 2 | 150 | |
| 450 | 17.72 | 0.28 | 9.89 | 3 | 9.84 | 150 | 5.91 |
| | | 0.57 | 20.13 | 5 | 16.40 | 200 | 7.87 |
| | | 0.85 | 30.02 | 7 | 22.97 | 300 | 11.81 |
| | | 1.13 | 39.91 | 8 | 26.25 | 400 | 15.75 |
| 600 | 23.62 | 0.85 | 30.02 | 5 | 16.40 | 200 | 7.87 |
| | | 1.13 | 39.91 | 8 | 22.97 | 200 | 7.87 |
| | | 1.42 | 50.15 | 8 | 22.97 | 300 | 11.81 |
| | | 1.70 | 60.13 | 9 | 29.53 | 400 | 15.75 |

Source: USDA

Flared Culvert End Section

- Construct at zero grade if possible.
- Ensure that pipe connections are water tight.

Limitations

Velocity Reduction

Permanent Outlet Protection

Outlet Protection

- During high flows, loose rock may wash away.
- Outlet protection may have negative impacts on channel habitat. These impacts generally will be less than the impacts from erosion if no protection is provided, however.
- Sediments caught in the rock outlet protection device may be difficult to remove without removing the rocks.
- Grouted riprap can break apart in areas with freeze and thaw, or from hydrostatic pressure if there is not adequate drainage.
- Riprap aprons are best used as a temporary measure during construction.
- High inspection requirements during the rainy season.

Flared Culvert End Sections

- Flared culvert end sections are mostly used for hydraulic efficiency, but have some limited erosion control benefits.
- Make sure the device complies with local and state regulations.

Requirements

Maintenance

A fair amount of maintenance is necessary to ensure outlet protection devices and flared culvert end sections work properly.

Outlet Protection

- Inspect prior to the start of the rainy season, after rain events, and periodically during the rainy season.
- Inspect apron for displacement of the riprap and/or damage to the underlying fabric. Repair and replace as necessary.
- Inspect for scour beneath the riprap and around the outlet, and repair any damage immediately.
- Remove temporary devices as soon as the drainage area has been stabilized or at the end of construction.

Flared Culvert End Sections

- Inspect for debris and sediment build up; clean as necessary.
- Inspect for scour beneath and around the flared end, and repair as necessary.

Costs

Velocity Reduction

Permanent Outlet Protection

Moderate capital expenditures required, while operation and maintenance costs are lower. Rock outlet protection is generally less expensive and easier to install than concrete aprons or energy dissipaters.

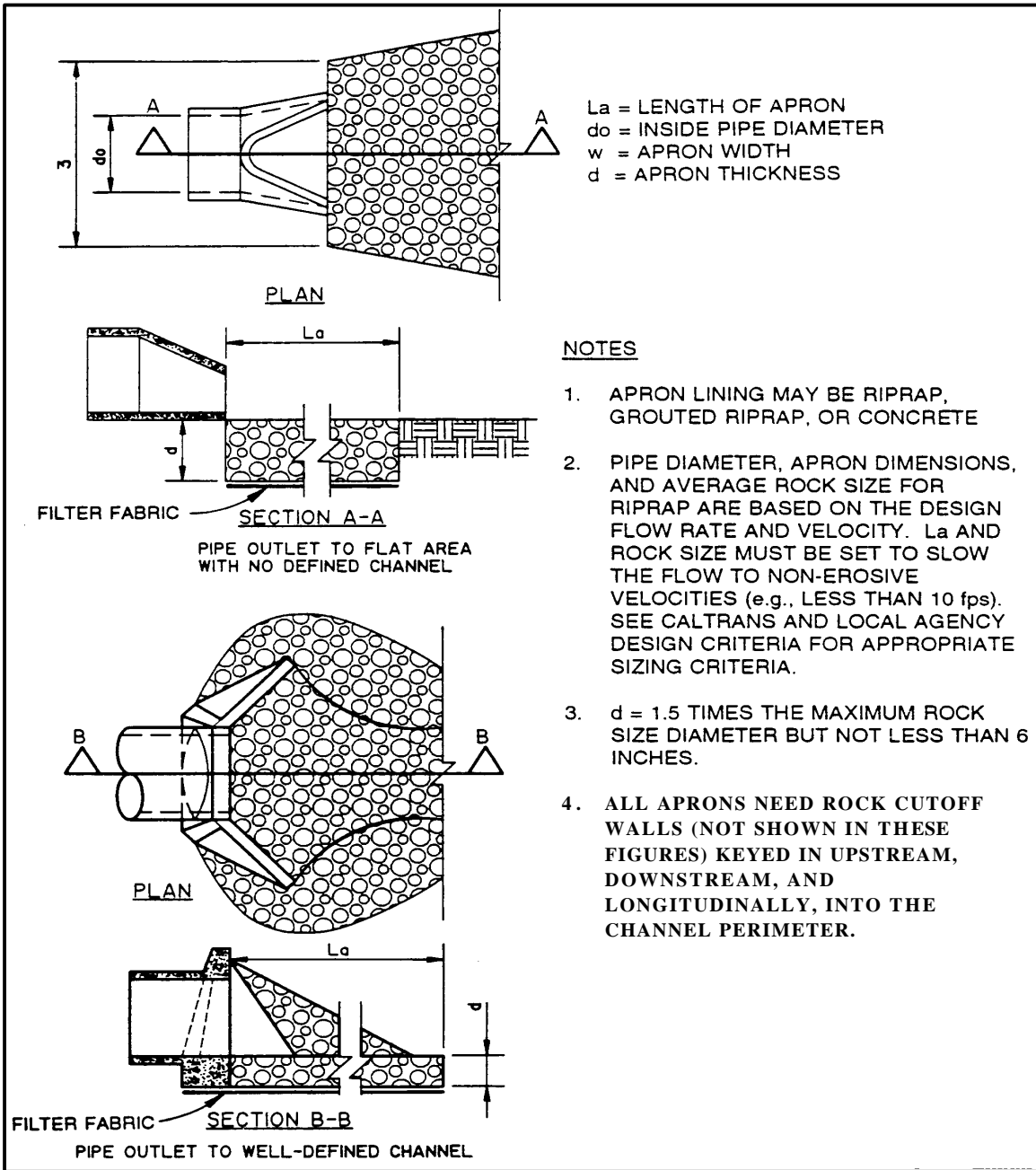
- Installation costs. Material costs for filter fabric, riprap, and flared culvert end sections, including materials necessary for repairs.
- Costs due to staff time for inspection and repairs.

Training

- A registered civil engineer is needed to design outlet protection for flows greater than 1.70 cubic meters per second .

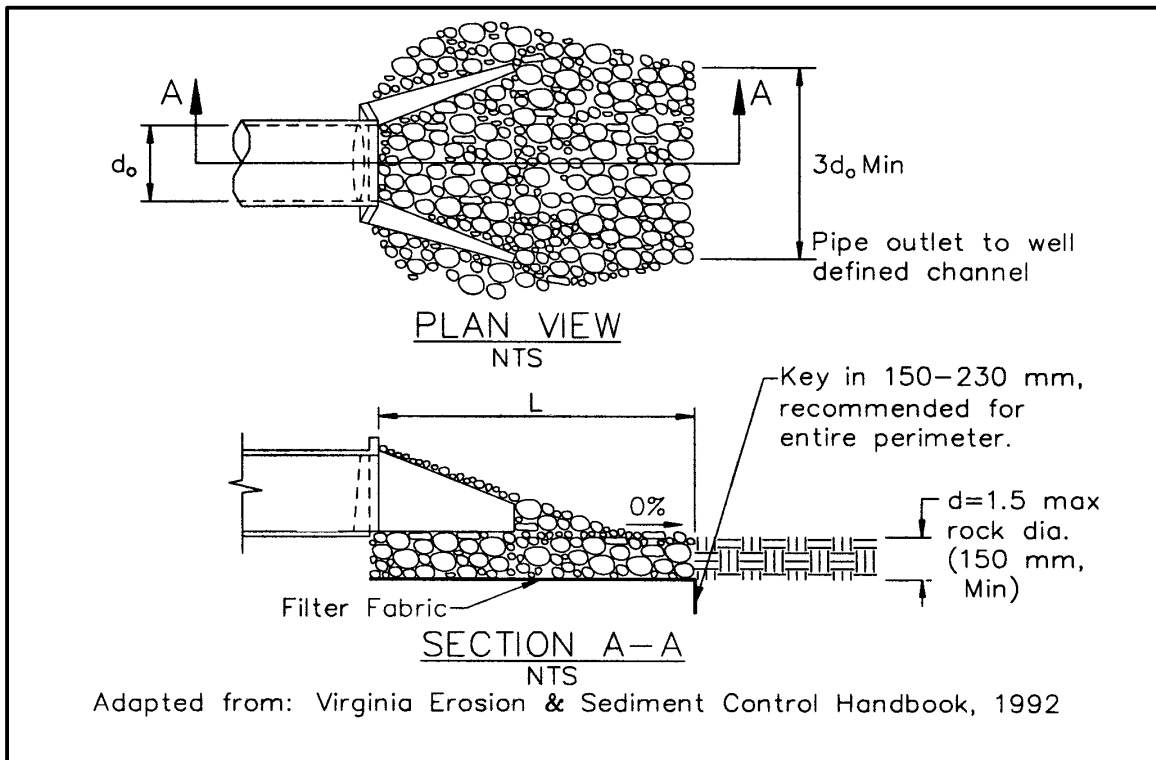
Velocity Reduction

Permanent Outlet Protection



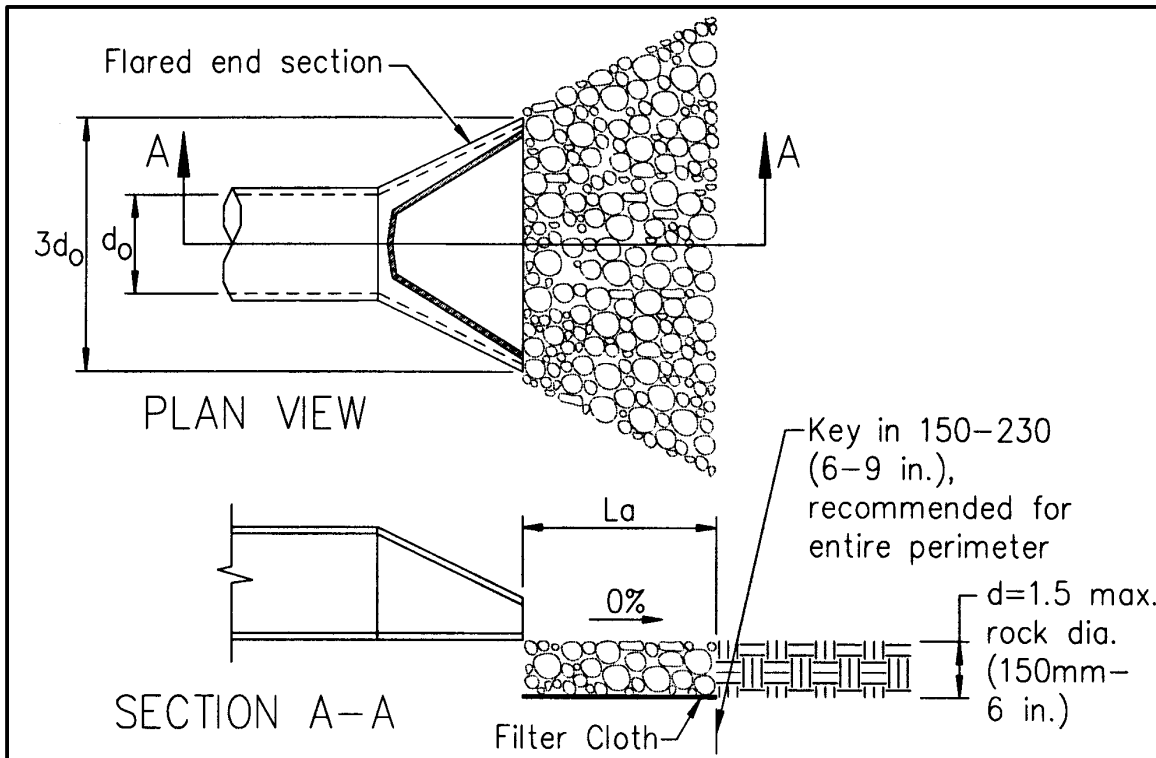
Source: California Storm Water Quality Task Force, 1993.

(Note: Note 4 was not included in the original source.)



Source: Caltrans, 1997.

Note: All aprons need rock cutoff walls (not shown in these figures), keyed in upstream, downstream and longitudinally, into the channel perimeter.



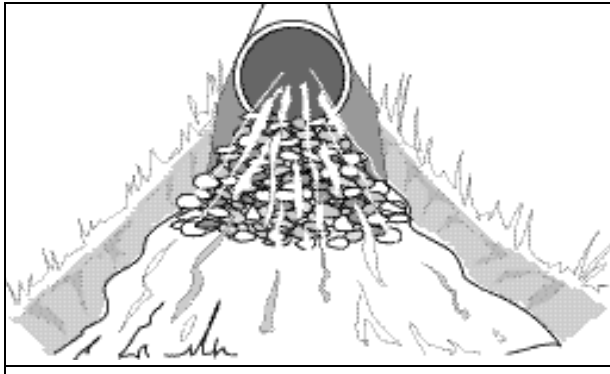
Source: Caltrans, 1997.

Note: All aprons need rock cutoff walls (not shown in these figures), keyed in upstream, downstream and longitudinally, into the channel perimeter.

References

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC40, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD33A(2), CD33B(2), April 1997.



- Erosion Control

Description

This measure provides information on temporary devices made of rock that is placed at outlets to temporary channels and pipes to reduce the velocity of water exiting, and to control erosion and scour. This practice protects inlets or outlets from developing plunge pools (small, eroded pools), and protects against scour and the resulting gully erosion at a culvert outlet. Erosion control fabric and hay waddles/coconut rolls can be installed in front of an outlet to provide additional velocity reduction and a softer appearance. (See BMPs SS-1 and SC-5).

Applicability

This measure is intended to describe temporary outlet protection, such as for a sediment basin (BMP SC-3) or dewatering/diversion system (BMPs WD-4, WD-5). See VR-4a for detailed information on permanent outlet protection .

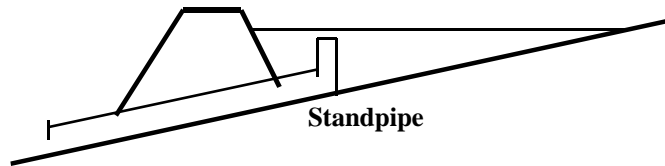
Approach and Standards

Inlet Protection

- Where the bottom is vegetated and the amount of water being conveyed is relatively small, inlet protection may not be necessary.
- If considerable turbulence may be generated around the intake which can cause sediment to be suspended in the discharge water, then the inlet must be protected.
- One technique to protect inlets involves ponding water behind the cofferdam or in an excavated sump. The intake pipe end should be substantially above the bottom of the pond or sump unless a container is used for the sump or the pond bottom is lined with impervious material.
- For gravity systems, a standpipe arrangement is very effective (see figure below). An intake filter can also be used to screen out sediment. However it may not be effective

Velocity Reduction**Temporary Outlet Protection**

against fine-grained material such as clay and it is easily clogged by debris, so it is not recommended if the pump must run unattended (e.g., nights or weekends).

**Outlet Protection**

- For very low flow rates, a sheet of plastic or plywood may be enough to spread the flow and reduce the velocity of the water. However, the most common temporary outlet protect is a rock apron on filter fabric.
- Rock outlet protection is effective at limiting erosion when the rock is sized and placed appropriately. Increase rock size for high velocity flows. Use sound, durable, angular rock.
- Construct rock apron on zero grade.
- Align apron with the receiving stream and keep it straight throughout its length. If a curve is needed to fit the site conditions, place the curve in the upper section of the apron.
- When designing the outlet project, consider flow depth, roughness, gradient, side slopes, discharge rate and velocity. The discharge pipe size governs the rock depth and outlet protection length. Consider hydraulic calculations and velocities to determine the total length of the device.
- For outlets carrying larger or higher flows, consult a registered civil engineer.
- All aprons need rock cutoff walls, keyed in upstream, downstream, and longitudinally into the channel perimeter.
- If discharge is to a tidal area, the discharge pipe may need to be equipped with a flap gate to prevent tidal flows from backing up the outlet.

Limitations**Outlet Protection**

- During high flows, loose rock may wash away.
- Outlet protection may have negative impacts on channel habitat. These impacts generally will be less than the impacts from erosion if no protection is provided, however.
- Riprap aprons are best used as a temporary measure during construction.
- High inspection requirements during the rainy season.

Requirements

Maintenance

A fair amount of maintenance is necessary to ensure that temporary outlet protection work properly, especially when used during the rainy season.

Outlet Protection

- Inspect temporary outlets periodically, especially before predicted storms.
- Inspect apron for displacement of the riprap and/or damage to the underlying fabric. Repair and replace as necessary.
- Inspect for scour beneath the riprap and around the outlet, and repair any damage immediately.
- Remove temporary devices as soon as the drainage area has been stabilized or at the end of construction.

Costs

- Moderate capital expenditures required, while operation and maintenance costs are lower. Rock outlet protection is generally less expensive and easier to install than permanent protection.
- Installation costs. Material costs for filter fabric, and rock, including materials necessary for repairs.
- Costs due to staff time for inspection and repairs.

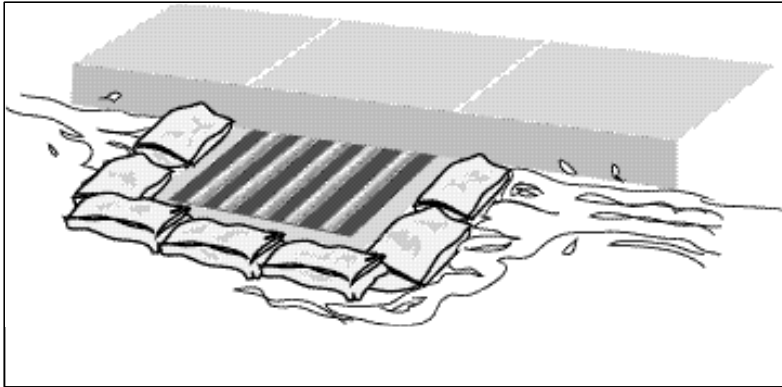
Training

- A registered civil engineer is needed to design outlet protection for flows greater than 1.70 cubic meters per second.

References

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC40, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD33A(2), CD33B(2), April 1997.

Velocity Reduction**Storm Drain
Inlet Protection**

- Pollution Control
- Sediment Control

Description

Devices temporarily constructed around storm drains to pond sediment-laden runoff allow sedimentation to occur, and to filter the water before it enters the storm drain system.

Applicability

- When sediments may enter an inlet via surface runoff.
- In areas that have not been permanently stabilized.
- For use during the wet season (October 15 through April 15, typically).
- Locations where the drainage area is 1 acre (0.4 ha) or less.
- Open areas that have sheet flow, or flow not exceeding 0.5 cfs (0.014 cubic meters/second). If flows exceed this rate or if localized flooding must be prevented, block and gravel bag barriers can be used.
- Excavated drop inlet sediment traps can be used with relatively heavy flows and overflow alternatives are required.

This measure is likely to have a significant impact to reduce sedimentation downstream of the storm drain inlet.

Approach and Standards

- Do not use filter fabric to cover the inlet grate, as it can clog and cause localized flooding.
- Bring the disturbed area to the grade of the drop inlet and smooth and compact the disturbed area. Stabilize all bare areas around the inlet properly.
- If the inlet is on a slope, the down-slope side of the inlet does not need to be protected as long as the slope is steep enough that runoff will not enter the storm drain from that side.

Velocity Reduction

Storm Drain Inlet Protection

Filter Fabric Fence

- Can be used for drainage basins less than one acre and less than a 5 percent slope.
- Place wooden stakes, sized 2 inches by 2 inches and at least 3 feet long, around the inlet perimeter at a maximum of 3 feet apart. Drive them at least 8 inches into the ground.
- Excavate a trench about 8 inches wide and 1 foot deep around the outside perimeter of the stakes.
- Using at least one-inch wire staples, staple the filter fabric to the stakes so that 32 inches of fabric extends and can be formed into the trench.
- Backfill the trench with $\frac{3}{4}$ -inch or less washed gravel along the entire perimeter.

Block and Gravel Filter

- Can be used in areas with flows greater than 0.5 cfs.
- Place hardware cloth or wire mesh that has one-half inch openings over the drop storm drain inlet so that the wire extends at least one foot beyond the sides of the inlet structure. Overlap the strips if necessary.
- Place a single row of concrete blocks lengthwise on their sides around the inlet so that the open ends face out not up. The ends of the concrete blocks should abut one another. Blocks can be stacked to adjust the height of the filter.
- Put hardware cloth or wire mesh with one-half inch openings over the outside vertical face (open end) of the concrete blocks to keep stone from being washed through the blocks.
- Pile $\frac{3}{4}$ to 3 inch washed stone against the mesh to the top of the blocks.

Gravel and Mesh Filter

- Can be used on curb or drop inlets where construction equipment may drive over the inlet.
- Place hardware cloth or wire mesh that has one-half inch openings over the drop storm drain inlet so that the wire extends at least one foot beyond the sides of the inlet structure. Overlap the strips if necessary. Put filter fabric over the wire mesh.
- Put $\frac{3}{4}$ to 3-inch gravel over the filter fabric/wire mesh to a depth of at least 12 inches over the entire inlet opening.

Sand Bag Barrier

- Can be used to create small sediment traps upstream of the inlets on sloped, paved streets.
- Use sand bags of geotextile fabric, not burlap.
- Fill sand bags with $\frac{3}{4}$ inch rock or $\frac{1}{4}$ inch pea gravel.
- Construct on gently sloping, paved streets.
- Locate so there is room upstream of the barrier for the water to pond and sediment to settle.

Velocity Reduction

Storm Drain Inlet Protection

-
- Place several layers of sand bags, overlapping the bags and packing them together tightly.
 - Leave a gap of one bag on the top row to act as a spillway. Do not allow flow from a 10-year-average-sized storm to overflow the curb.

Limitations

- Protection may cause localized flooding. Devices should be used only when the ponding will not encroach into heavy traffic areas or onto surfaces and slopes that could erode.
- Use other on-site sediment trapping techniques together with inlet protection during high flow conditions or for drainage areas larger than 1 acre (0.4 ha).
- Frequent maintenance is needed to minimize short-circuiting and to remove sediments and buildup that have collected.

Requirements

Maintenance

- Properly collect and dispose of accumulated sediment.
- Inspect all devices before and after rain events, and at least weekly throughout the rainy season. During extended storms, inspect the devices at least once every 24 hours.
- Remove all devices within 30 days of site stabilization, or when the protection is no longer needed.

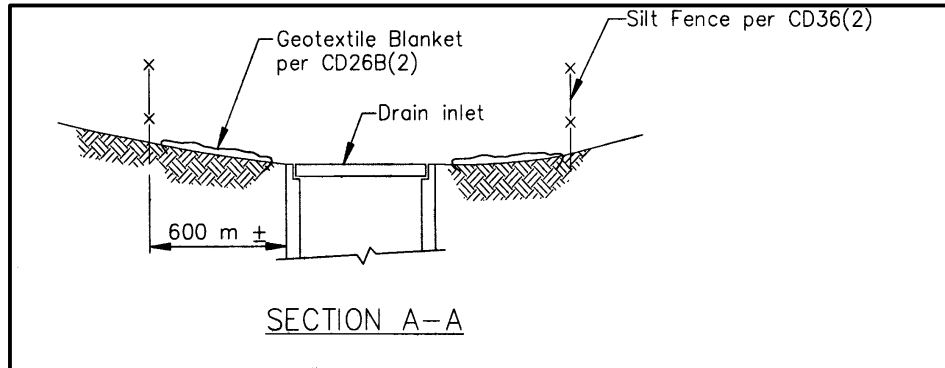
Costs

Cost for materials (aggregate, concrete blocks, burlap, filter fabric). Staff time necessary for monitoring and repairs. Disposal costs.

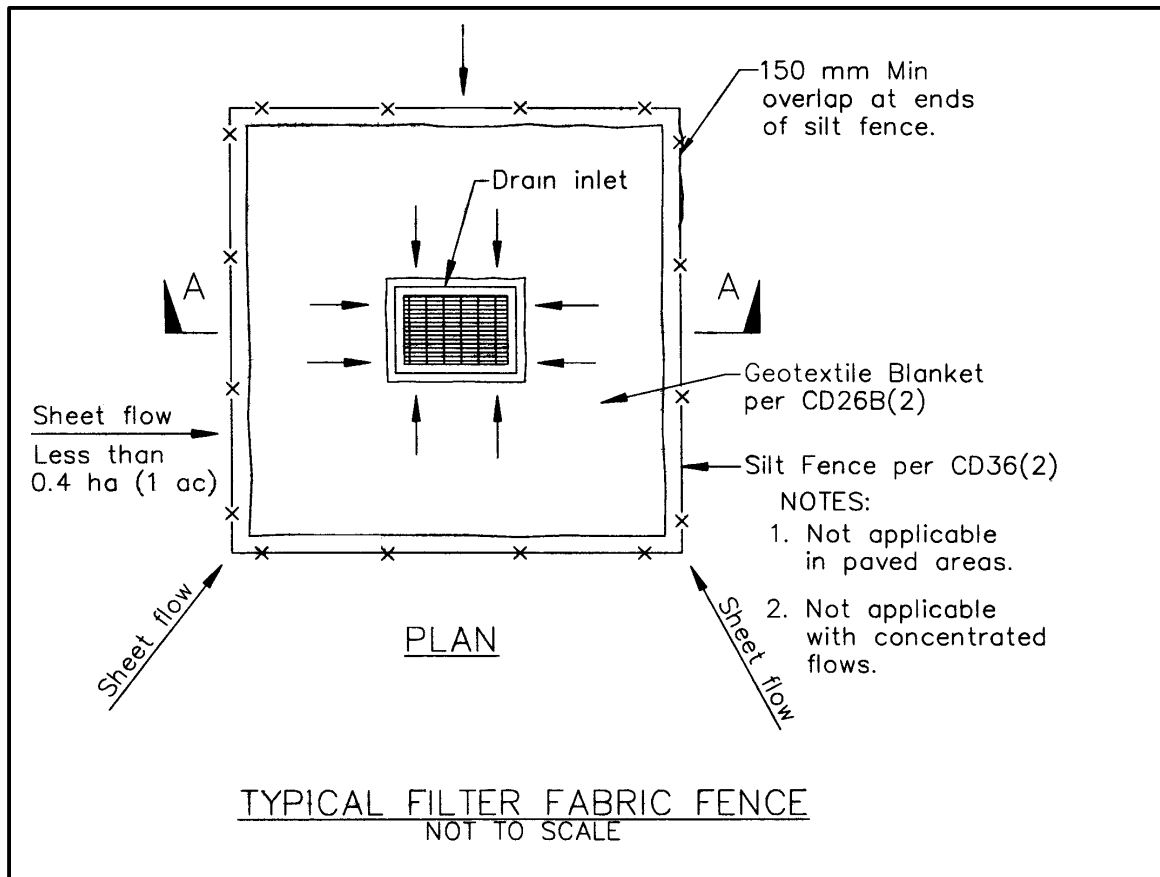
Training

- A full understanding of the techniques and proper inspection and maintenance methods are necessary.

Storm Drain Inlet Protection Strategies:



Source: Caltrans, 1997.

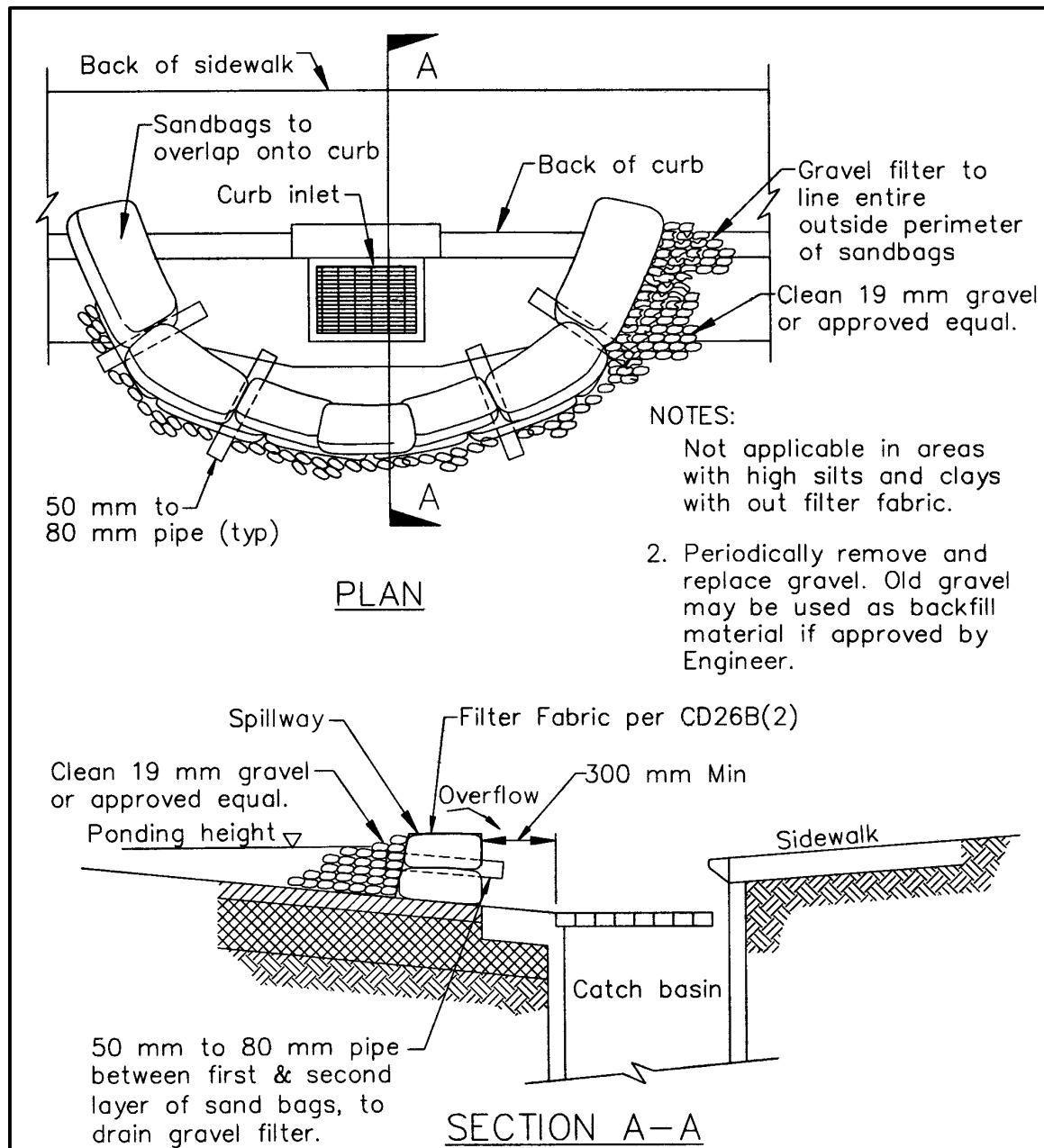


Source: Caltrans, 1997.

Note: See Appendix B for metric to English conversions

Velocity Reduction

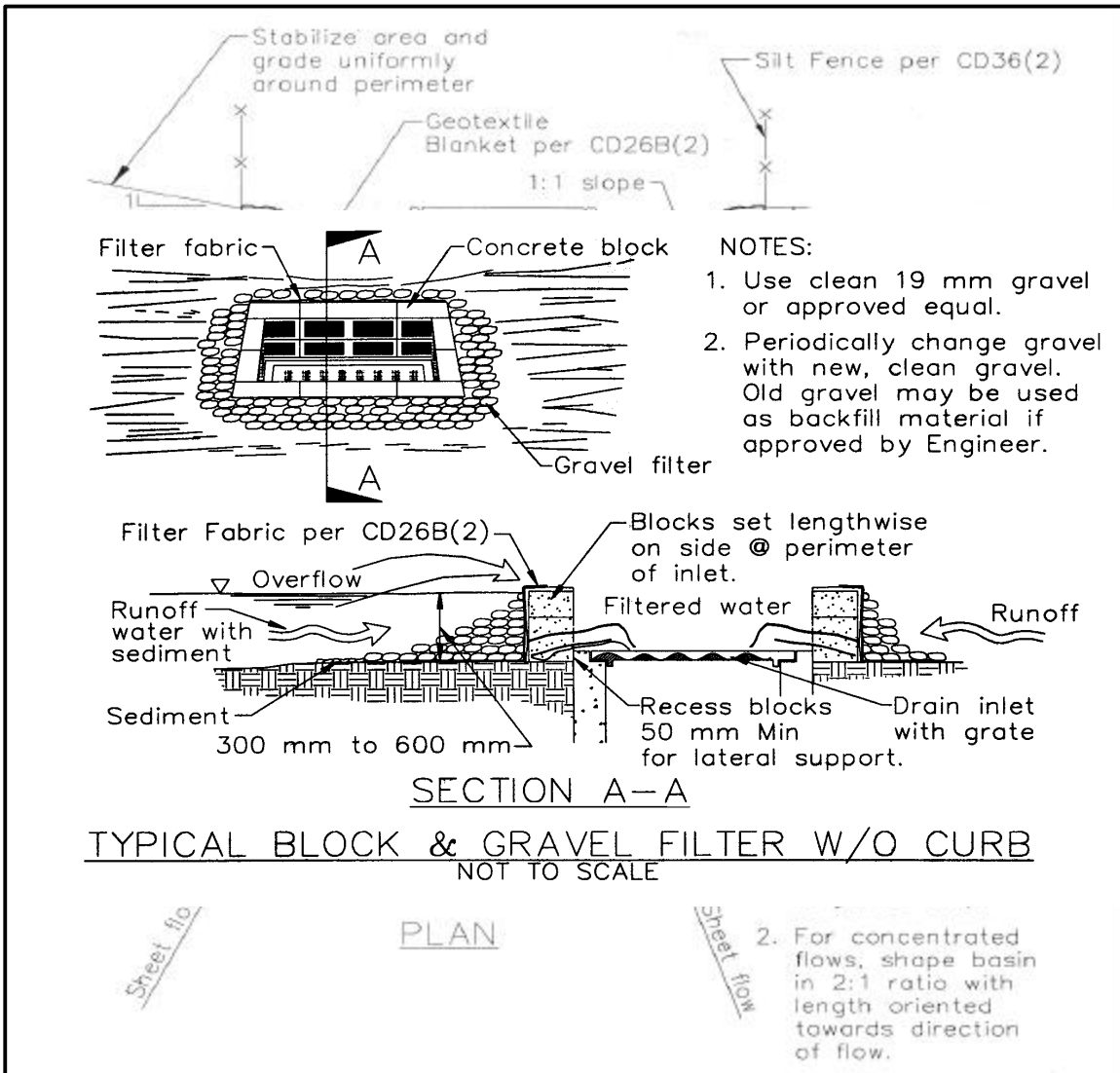
**Storm Drain
Inlet Protection**



Source: Caltrans, 1997.

Velocity Reduction

**Storm Drain
Inlet Protection**



Source: Caltrans, 1997.

Velocity Reduction

**Storm Drain
Inlet Protection**

References

California Regional Water Quality Control Board, San Francisco Bay Region, *Erosion and Sediment Control Field Manual*, 1998.

California Storm Water Quality Task Force, *Stormwater Best Management Practices Construction Handbook*, ESC54, March, 1993.

Caltrans, *Caltrans Storm Water Quality Handbooks, Construction Contractor's Guide and Specifications*, prepared by Camp Dresser & McKee, Woodward-Clyde, Aguilar Engineering, Psomas & Associates, MK Centennial, CD40(2), April 1997.

BMP - ENERGY DISSIPATER

DESCRIPTION

An energy dissipater is a structure designed to control erosion at the outlet of a culvert or conduit by reducing the velocity of flow and dissipating the energy.

APPLICATIONS

This BMP is required at the outlet of any new or replacement drainage culvert. The outlets of channels, conduits, and other structures are points of high erosion potential. To prevent scour and undermining, an outlet stabilization structure is needed to absorb the impact of the flow and reduce the velocity to non-erosive levels. Evaluate existing culverts and schedule upgrades of energy dissipater installations as appropriate.

A riprap-lined apron is a commonly used practice for this purpose because of its relatively low cost and ease of installation. Extend the riprap apron downstream until stable conditions are reached, even though this may exceed the length calculated for design velocity control. Down drains may also be used as energy dissipaters. Rock aprons may also be required below down drains depending on slope steepness and soil conditions.

LIMITATIONS

- ✓ Do not use this BMP below the mean high water line of any water body before obtaining appropriate permits. Due to issues relative to Corps 404 jurisdiction sometimes energy dissipaters are not placed below the ordinary high water mark which results in increased erosion
- ✓ Consider other energy dissipaters such as concrete impact basins, paved outlet structures, or a half culvert where site conditions warrant.
- ✓ Rock/riprap dissipaters may require containment in mattresses to maintain their effectiveness.

CONSTRUCTION GUIDELINES

- 1) Adequately compact berm material to prevent failure.
- 2) Apply temporary seeding and mulch to all surfaces of a soil diversion berm according to the BMP-Seasonal Planning.

BMP MAINTENANCE

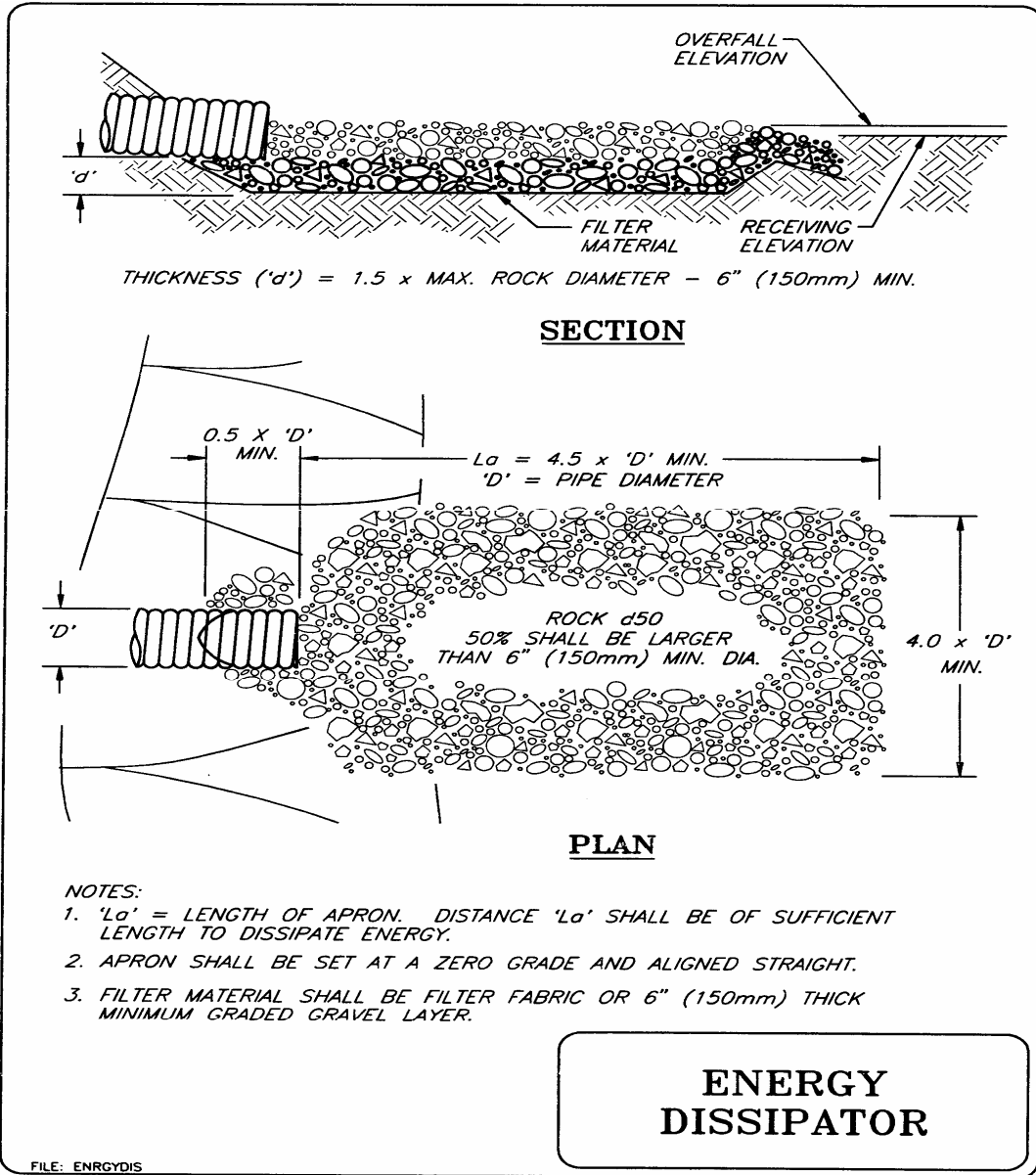
- ✓ After heavy rains, inspect outlet structures for erosion or dislodged stones. Immediately make all needed repairs to prevent further damage.

✓

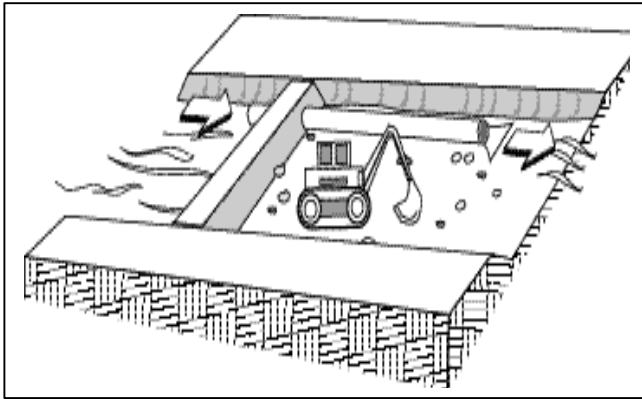
BMP REMOVAL

✓ BMP removal should not be necessary.

✓



Water Diversion



- Sediment Control
- Erosion Control
- Pollution Prevention

Description

Practices and methods to prevent flowing or tidal waters in a watercourse or channel from entering a work area. The purposes are twofold: to prevent flowing or tidal water from interfering with the work (e.g., excavation, concrete work, etc.) and to prevent contaminants such as suspended sediment, cement, and other work materials from being discharged downstream. This BMP does not cover discharges from the protected work area. See BMPs for Sediment Control (SC), and Water Diversion (WD) for more information.

Applicability

- These methods are applicable during the dry season when work must be conducted in watercourses or channels where there is a residual base flow but little likelihood of storm flow.

Approach and Standards

- Dewatering system should be in place and functioning before in-channel work is started.
- Intakes and outlets should be designed and maintained so as not to add contaminants to the stream flow.
- If water is discharged from the disturbed and isolated work area, then filtration devices or settling basins must be provided as necessary to insure that its turbidity (suspended sediment content) does not significantly exceed that of the channel flow to which it is discharged.
- Depending on the rate of discharge, filtration/settling may involve sophisticated systems such as shown in WD-4, SC-3, or SC-5 or simple filter fabric or hay bale barriers as shown in SC-4 and SC-6. Such filtration/settling systems are not designed

Water Diversion

for any purpose other than turbidity reduction. Other measures may be necessary to prevent and control discharges of other pollutants. Some of these are discussed in other sections of this manual.

- Following construction work, it is important to remove all system components and to restore disturbed areas at the intake, cofferdam, and discharge sites to preconstruction grades.
- Once the project work is complete and as system components are being removed, release water slowly back into the work area. Water released at higher velocities can cause erosion and increased turbidity.

Limitations

- These are considered temporary systems and are not generally designed to accommodate winter storm flows. They should not be relied upon when there is substantial risk of storm flow in the channel.
- These systems will have the effect of blocking fish passage. If the stream or channel supports a steelhead or salmon fishery these diversions should not be used between November 1st and May 31st. For other fisheries, consult the California Department of Fish and Game. See also, BMP NR-3.

Requirements

Maintenance

- **Maintenance of these systems is critical.** In general, diversion systems must be operational 24 hours per day during the period when construction in the channel is in progress. Failure could result in flooding of the work area and the overwhelming of work area discharge filtration or settling systems by the full stream flow. All system components should be inspected at least twice per day.
- If pumps are used, they must be serviced (fuel, oil, running condition) regularly and a standby pump of equivalent capacity should be available on site. If pumps are electric (e.g., submersible pumps) and a generator is used to supply power, it also must be serviced. Appropriate BMP's should be used (see CU-4 and EV-1).
- Both intake and discharge components are capable of generating suspended sediment and should be inspected and repaired or modified if there is any sign of increased turbidity in the discharge.

Water Diversion

Costs

- Moderate costs for purchasing and servicing equipment and materials.
- Costs for staff time to inspect and maintain to ensure system is operational 24 hours per day.

Training

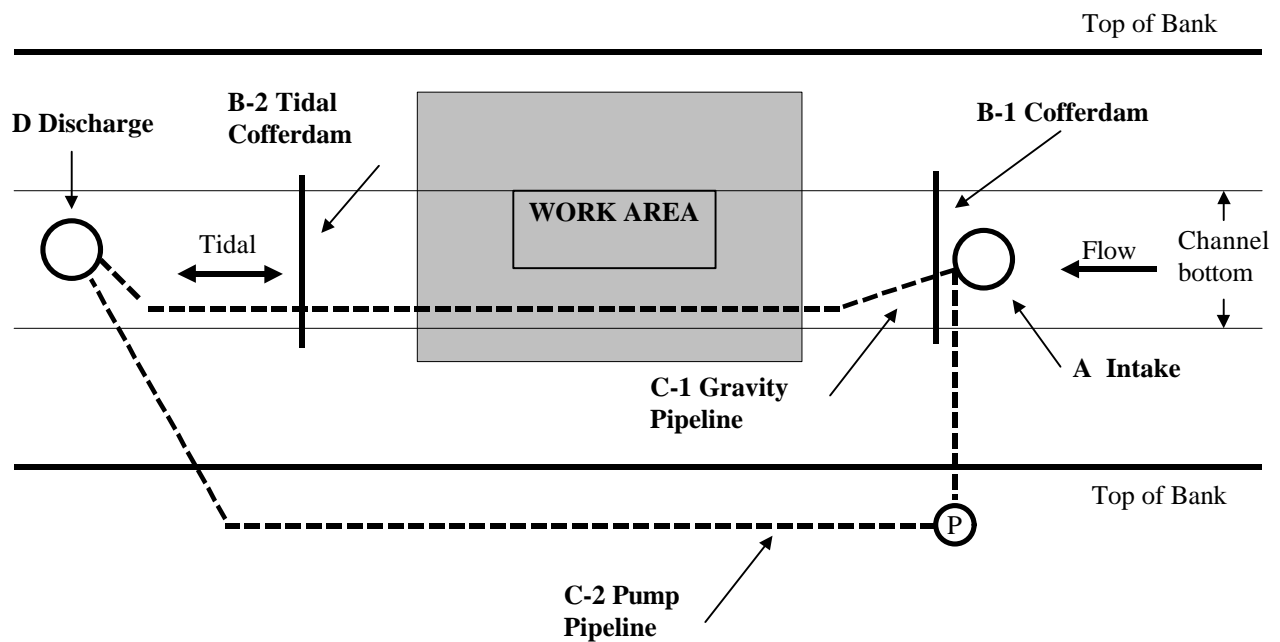
- Staff should be trained in correct implementation and monitoring of they system.
- Need trained personnel to maintain and service equipment as necessary.
- Staff should be aware of which waterbodies contain sensitive fish populations and other habitat considerations.

Water Diversion

GENERALIZED SCHEMATICS

TRANSVERSE COFFERDAM

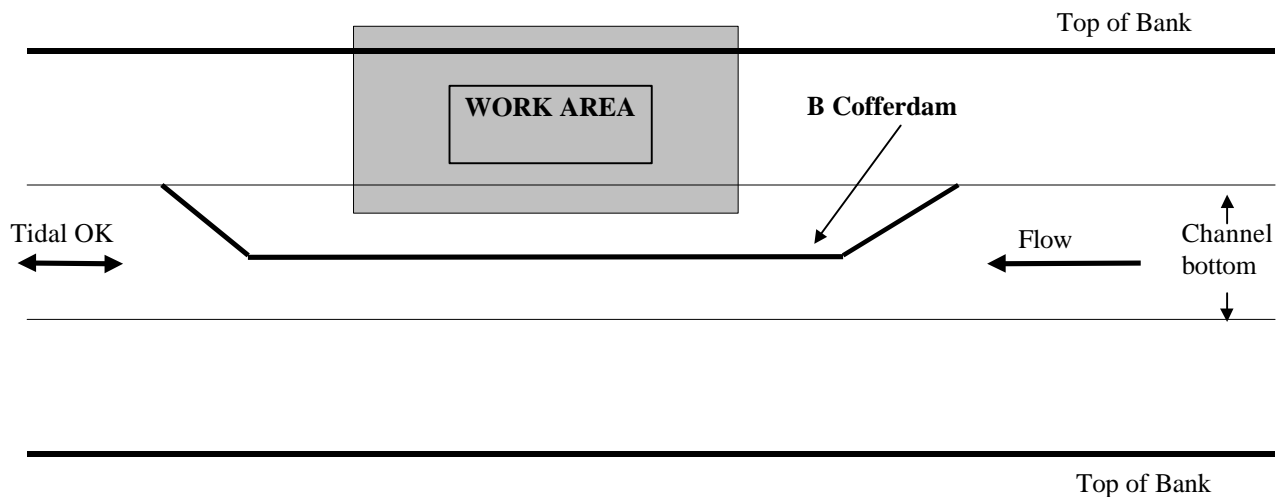
For situations where equipment must be operated from the channel bottom or the work extends across the bottom. Flow from upstream must be captured and conveyed to a point downstream of the work.



Water Diversion

LONGITUDINAL COFFERDAM

For situations where equipment will be operated from the top of bank and the work does not extend completely across the channel bottom. The channel bottom outside the cofferdam remains undisturbed.

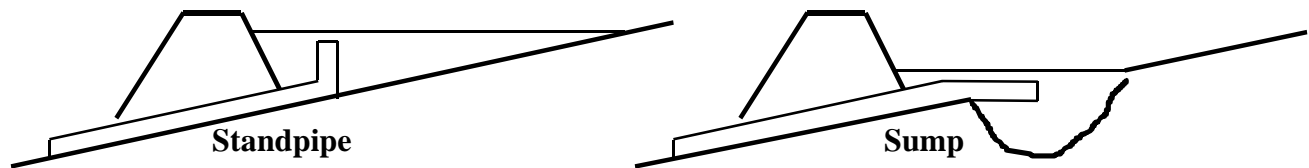


Water Diversion

COMPONENT DESIGN

All materials used in these systems - cofferdams, intake and discharge protection, and mechanical components - should be completely removed after construction and the areas restored to grade.

A. Intake: Where the bottom is vegetated and the amount of water being conveyed is relatively small, inlet protection may not be necessary. However, considerable turbulence may be generated around the intake which can cause sediment to be suspended in the discharge water and this should be avoided. A variety of techniques can be used for this purpose, including ponding of water behind the cofferdam or in an excavated sump. The intake pipe end should be substantially above the bottom of the pond or sump unless a container is used for the sump or unless the pond bottom is lined with impervious material. For gravity systems, a standpipe arrangement is very effective. An intake filter can also be used to screen out sediment, but it may not be effective against fine-grained material such as clay and it is easily clogged by debris. Therefore, an intake filter is not recommended if the pump must run unattended (e.g., nights or weekends).



B-1 Cofferddam: The cofferdam is an impervious structure designed to prevent surface flows from passing into the work area. It can be constructed of fill materials such as bottom sediments (usually reserved for sediment removal operations where the material is being moved around anyway), of sandbags filled with soil, sand, or gravel, or of structural materials such as driven sheet piles, timber and plywood, water dams (large water filled tubes), K-rails, or, for small scale applications, even hay bales. Many of these structures will require sealing with plastic sheeting to become impervious.

B-2 Cofferdam: When the construction site is in a tidal channel or otherwise subject to backflow from downstream, it will be necessary to construct a cofferdam downstream of the site to exclude these flows. Construction is similar to the upstream cofferdam (B-1, above) except that it must be high enough and strong enough to withstand the highest tide expected during the construction period. The longitudinal cofferdam will perform both B-1 and B-2 functions. (Note that tidal action will also impose design challenges for any discharges from the work area.)

C-1 Gravity Pipeline: A gravity flow system is preferable from the standpoint of reliability because it does not depend on a pump. Water flows continuously from the

Water Diversion

intake. The disadvantage is that the pipeline must slope continuously downgrade and therefore may have to pass through or near the work area. In some circumstances, the flow can be contained by a ditch or berm rather than a pipeline. Such systems must not be erosive. In all likelihood they will have to be lined with fabric, plastic, or other protective materials. If a ditch is excavated into native bottom material (as opposed to deposited sediment) it should be backfilled and compacted after completion of the work. Otherwise, it could lead to downcutting on site and/or headcutting upstream.

C-2 Pump Pipeline: A pumped system is necessary where there is no available discharge point continuously downgrade of the intake, for example, where the work area spans the channel bottom and the pipeline cannot be routed through it. The pump, itself, can be located at the intake (e.g., submersible pump) or elsewhere depending on the situation. It should be automatically actuated by water levels at the intake and of sufficient size to accommodate the maximum expected flows. The disadvantage is that the system is dependent on pump reliability. Any malfunction or vandalism can result in flooding of the construction site and carry pollutants downstream, especially if it occurs outside of working hours (see Maintenance). It is sometimes preferable to divert the flows to a point outside the channel such as a storm drain. If this is contemplated, however, it should be recognized that downstream aquatic plants and animals would be adversely affected by the loss of flow and this should be carefully considered and addressed before implementing such a system.

D. Discharge: The discharge point is another location where unnecessary turbidity can be generated. It may not be necessary to provide energy dissipation or other protection if the discharge is to an existing hardened structure (such as a culvert or a riprap or concrete apron), to deep water, or even to a vegetated area if the discharge rates are low enough. However, if the discharge may cause erosion or scour it should be protected. For low flow rates this may be as simple as a sheet of plastic or plywood to spread the flow. For higher flows, a riprap apron (see WD-2 and VR-4) or other, more resistant means may be necessary. Note that if the discharge is to a tidal area it may be necessary to equip the discharge pipe with a flap gate to prevent tidal flows from backing up to the intake.

References

Baker, Patrick E., CEP, Alameda County Public Works Agency, April 2000.

BMP- COFFERDAM

DESCRIPTION

A cofferdam is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in or adjacent to water. Cofferdams may be made of rock, sand bags, wood or aqua barriers.

APPLICATIONS

This BMP may be used in construction activities such as streambank stabilization, culvert installation, bridges, piers or abutments. It may be used in combination with other methods such as clean water bypasses and/or pumps.

LIMITATIONS

A cofferdam is a potentially serious “taking” issue (could cause harm to listed species) and is not a routine road maintenance BMP. For information on incidental take permits for fish habitats, see Chapter 2-Permits. Consultation with a fisheries biologist and agency biologists is imperative if there are salmonids present in the stream system. A Streambed Alteration Agreement (1600permit) is needed from DFG which will outline the terms and conditions to protect aquatic habitat and species.

Do *not* use this BMP:

- ✓ if there is insufficient stream flow to support aquatic species.
- ✓ in deep water unless designed or reviewed by an engineer.
- ✓ to completely dam stream flows.

CONSTRUCTION GUIDELINES

- 1) When used in watercourses or streams, cofferdams must be used in accordance with permit requirements. Materials for cofferdams should be selected based on ease of maintenance and complete removal following construction activities.
- 2) Construct cofferdams of sandbags, placed by hand. Sandbags should be filled with clean river run gravels.
- 3) Cover dam covered in visqueen to minimize water infiltration

BMP MAINTENANCE

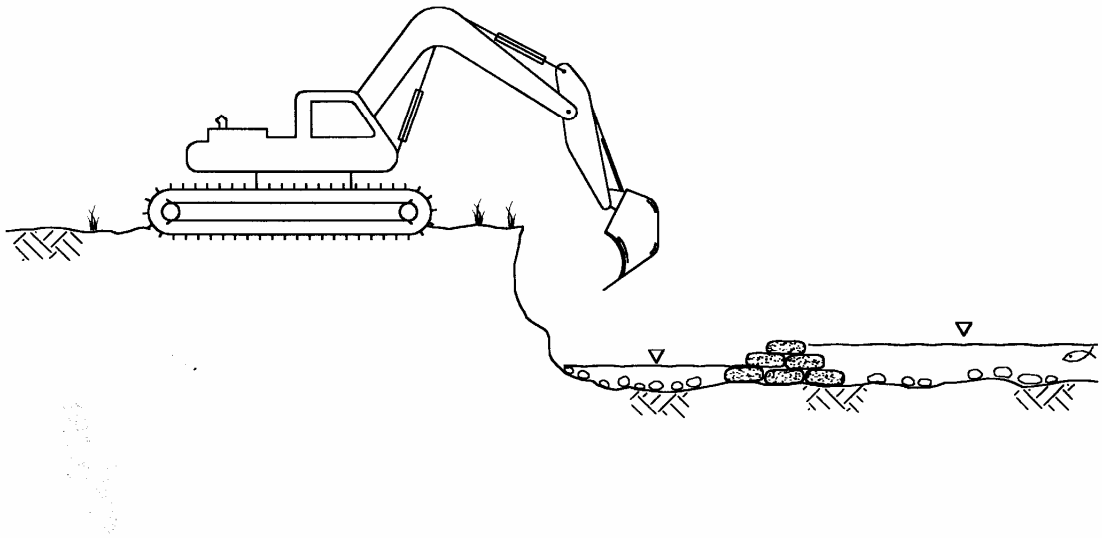
- ✓ During construction, inspect daily during the work week.
- ✓ Schedule additional inspections during storm events.
- ✓ Immediately repair any gaps, holes or scour.

BMP REMOVAL

- ✓ Remove sediment buildup.
- ✓ Remove BMP. Recycle or re-use if applicable.
- ✓ Revegetate areas disturbed by BMP removal if applicable.

BENEFITS/LIMITATIONS

- Difficult to dewater*
- Inexpensive*
- Labor intensive to install and remove*
- Sand may be deposited in stream if bags break, better to use clean gravel*



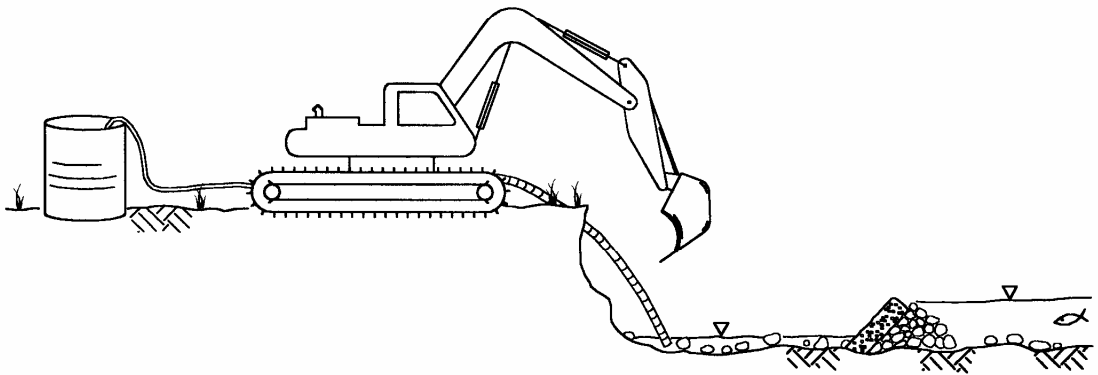
SAND BAG/GRAVEL BAG TECHNIQUE

**INSTREAM EROSION AND SEDIMENT
CONTROL ISOLATION TECHNIQUES**

FILE: Instream Techniques3

BENEFITS/LIMITATIONS

- Allows partial dewatering*
- Relatively inexpensive*
- Useful for small streams*
- Minimal TSS when removed*



NOTES:

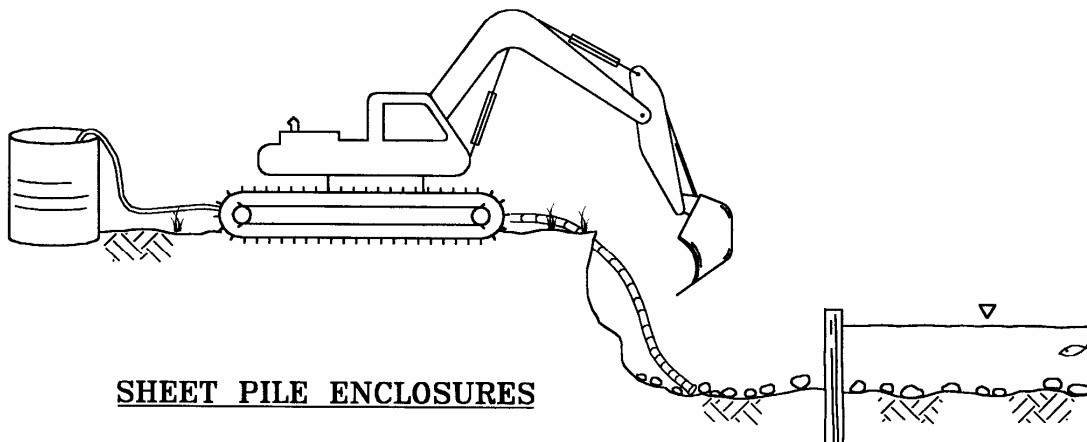
- Step 1. Install clean gravel*
- Step 2. Place impermeable soil*
- Step 3. Do work*
- Step 4. Decommission berm by removing soil layer first*
- Step 5. Pump work area. Head differential will cause turbo water to flow into work area*
- Step 6. Remove or spread gravel*

**GRAVEL/SOIL BERM INSTREAM
ISOLATION TECHNIQUE**

FILE: Berm Instream Techniques

BENEFITS/LIMITATIONS

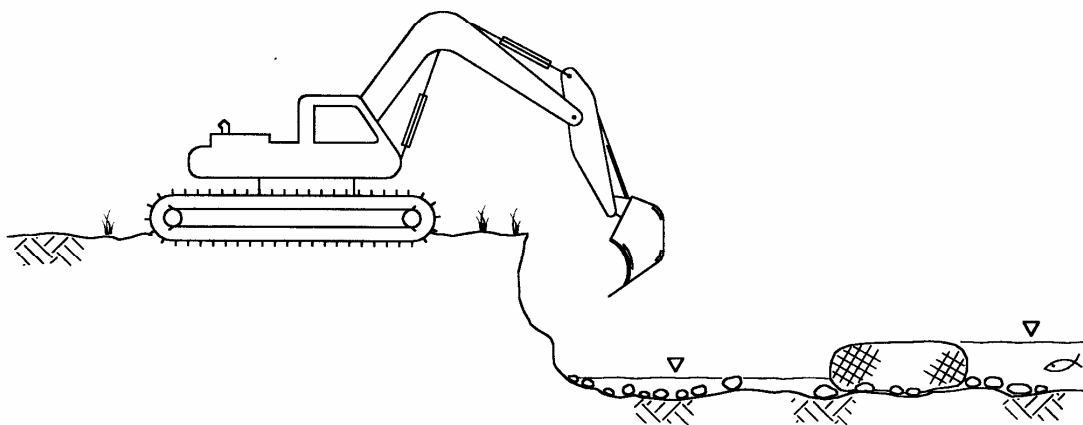
- Allows full dewatering*
- Relatively expensive*
- Useful in large rivers, lakes, high velocity*
- Not really appropriate for small streams*
- Requires staging and heavy equipment access areas*



SHEET PILE ENCLOSURES

BENEFITS/LIMITATIONS

- Allows partial dewatering*
- Moderately expensive*
- Ease of installation and removal unknown*
- Can be designed for small streams to large rivers*



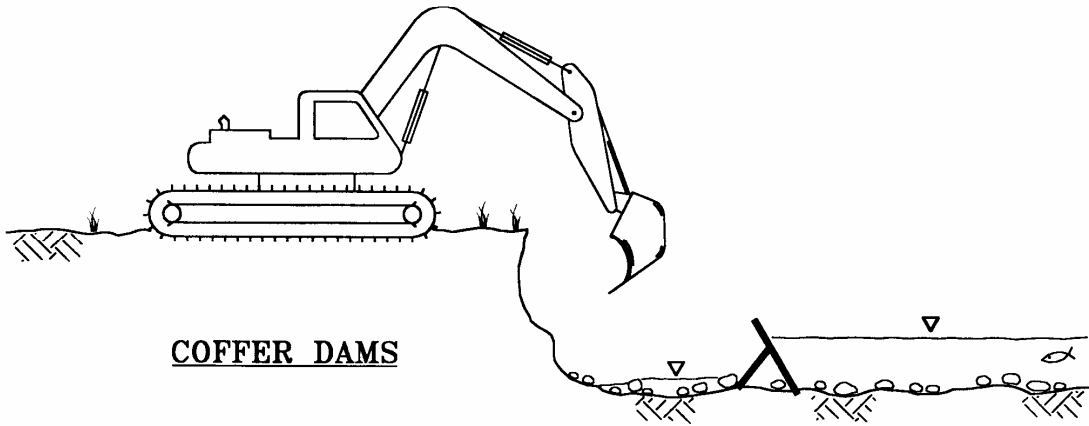
WATER-FILLED GEOTEXTILE (AQUA DAM)

INSTREAM EROSION AND SEDIMENT CONTROL ISOLATION TECHNIQUES

FILE: Instream Techniques2

BENEFITS/LIMITATIONS

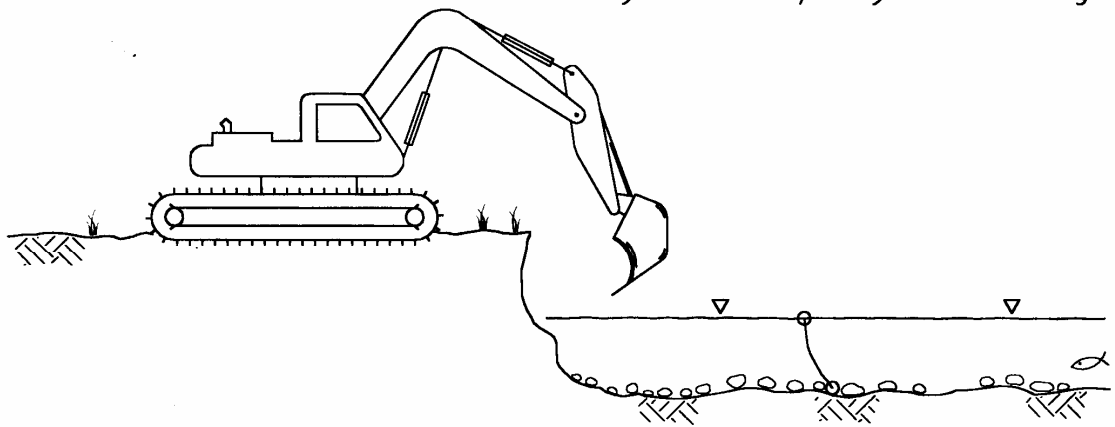
- Allows partial dewatering*
- Many different types available*
- Relatively expensive*
- Can be designed for large and small streams*
- Ease of installation and removal unknown*



COFFER DAMS

BENEFITS/LIMITATIONS

- Does not allow dewatering*
- Inexpensive*
- Used in slow water lakes only*
- Not very effective especially when removing*



GEOTEXTILES, SILT BARRIERS, CURTAINS

INSTREAM EROSION AND SEDIMENT CONTROL ISOLATION TECHNIQUES

FILE: Instream Techniques1

BMP – DEWATERING

DESCRIPTION

A temporary method to remove and filter water from excavated areas on construction sites prior to discharge to the storm drain or surface waters. See also Aqua Barrier, Cofferdam, and Stream Bypass BMPs.

APPLICATIONS

Used for draining creeks, lakes, ponds, sediment traps, basins, or excavations on construction sites. Also used wherever sediment-laden water must be removed from the construction site using a dewatering pump.

LIMITATIONS

- ✓ Conditions at individual sites will determine the scope and applicability of dewatering.
- ✓ Dewatering is subject to federal, state, and local permits.
- ✓ The discharge of sediment-laden water from a dewatering site into any water of the State without filtration is prohibited.
- ✓ A fish or aquatic wildlife rescue plan may be required.

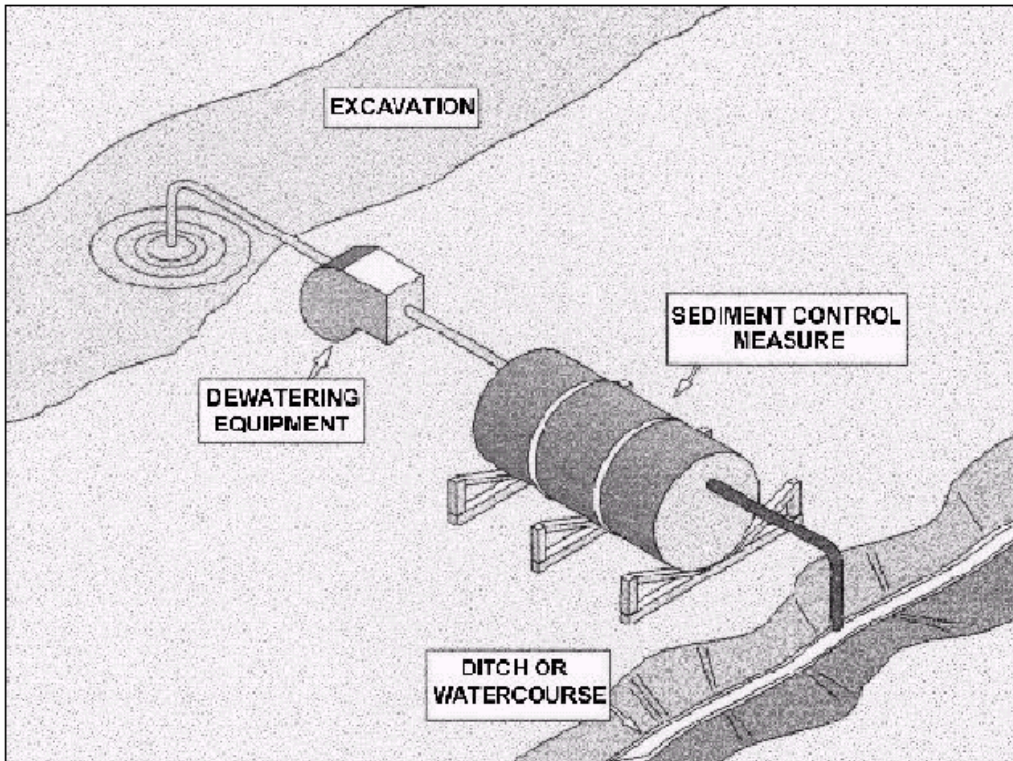
CONSTRUCTION GUIDELINES-

See Chapter 6.5- Dewatering for detailed Best Management Practices to minimize impact on fish and other aquatic organisms when dewatering a project site.

- 1) A dewatering structure should be sized to allow water to flow through any filtering media without overflowing the structure.
- 2) Adequate erosion and sediment control measures are to be considered first. Dewatering practices should be considered as a last-resort control measure.
- 3) Check water for odors, discoloration, or an oily sheen. If present, have the water tested by a certified lab. Discuss test results with Regional Water Quality Control Board Staff to determine how and where to discharge.
- 4) An energy dissipater may be needed to prevent erosion at the outlet.

BMP MAINTENANCE

- ✓ Inspect and clean sediment control devices frequently to prevent build-up or blockage of the sediment filters.
- ✓ Monitor effluent to ensure that no sediment is discharged into a storm drain or water of the State.



SEE ALSO;
 AQUA BARRIER
 STREAM BYPASS (WATER DIVERSION)
 COFFER DAM

Source:
 Caltrans. Storm Water Quality Handbooks:
 Construction Site Best Management Practices
 Manual, November 2000.

**DEWATERING
 & FILTERING
 (PUMPING OR DRAINING)**

BMP – FISH EXCLUSION

DESCRIPTION

Road maintenance activities may require work within streams that contain fish and other aquatic resources. Some of these activities require water to be diverted around the work site (see BMP – Stream Bypass) with the fish removed, relocated upstream of the work area, and excluded from the work site until work is completed.

APPLICATIONS

Fish exclusion may be necessary when work is done in watercourses and streams (slope stabilization, sediment removal, vegetation or habitat management, debris removal) and for repair, replacement, maintenance, or installation of stream crossings (pipes, culverts, fish ladders) and bridges.

LIMITATIONS

- ✓ Fish exclusion from the work site prior to dewatering must be with authorization from the National Marine Fisheries Service and the California Department of Fish and Game. Fish exclusion is done only under the supervision of a qualified fisheries biologist with the appropriate State and Federal permits.

CONSTRUCTION GUIDELINES

- 1) Isolate the work area (block nets).
- 2) Remove as many fish as possible using seines and relocate upstream or downstream in pools of adequate size.
- 3) Gradually dewater work area.
- 4) Remove as many remaining fish as possible using seines and dip nets, and relocate.
- 5) Electroshock, if required by permit, to avoid any strandings in pools where other methods are ineffective.

BMP MAINTENANCE

- ✓ Keep records of fish exclusion activities.
- ✓ Obtain any needed training from the qualified fishery biologist.
- ✓ Only assist the supervising fisheries biologist in accordance with State and Federal procedures when requested.

- ✓ Help clean fish screens of leaves and debris as necessary, and report any mortality to the supervising biologist.

BMP REMOVAL

- ✓ Once work is completed, gradually return the stream to its original condition so as not to cause a surge downstream or strand fish upstream.

SOURCES

Five Counties Salmonid Conservation Program. 2002. A Water Quality and Stream Habitat Protection Manual for County Road Maintenance in Northwestern California Watersheds. [<http://www.5counties.org/>]

BMP - LEVEL SPREADERS

DESCRIPTION

A non-erosive outlet for concentrated runoff constructed to disperse flow uniformly across a slope.

APPLICATIONS

Use to convert concentrated flow to sheet flow and release it uniformly over a stabilized area. The level spreader is most often used as an outlet for temporary or permanent diversions and diversion dikes. Runoff water containing high sediment loads must be treated in a sediment-trapping device before release in a level spreader.

LIMITATIONS

Use this BMP if:

- ✓ sediment-free storm runoff can be released in sheet flow down a stabilized slope without causing erosion.
- ✓ a level lip can be constructed without filling.
- ✓ the area below the spreader lip is uniform with the slope of 10% or less and is stable for anticipated flow conditions, preferably well vegetated.
- ✓ the runoff water will not re-concentrate after release.
- ✓ there will be no traffic over the spreader.

CONSTRUCTION GUIDELINES

- 1) The level spreader is a relatively low-cost structure to release small volumes of concentrated flow where site conditions are suitable. The outlet area must be uniform and well vegetated with slopes of 10% or less. Take particular care to construct the outlet lip completely level in a stable, undisturbed soil. Any depressions in the lip will concentrate the flow, resulting in erosion.
- 2) Determine the capacity of the spreader by estimating peak flow from the 10-year storm. Restrict the drainage area so that maximum flows into the spreader will not exceed 30 cfs.
- 3) When water enters the spreader from one end, as from a diversion, select the appropriate length, width, and depth of the spreader from the table below:

| Design Flow (cfs) | Entrance Width (ft) | Depth (ft) | End Width (ft) | Length (ft) |
|--------------------------|----------------------------|-------------------|-----------------------|--------------------|
| 0-10 | 10 | 0.5 | 3 | 10 |
| 10-20 | 16 | 0.6 | 3 | 20 |
| 20-30 | 24 | 0.7 | 3 | 30 |

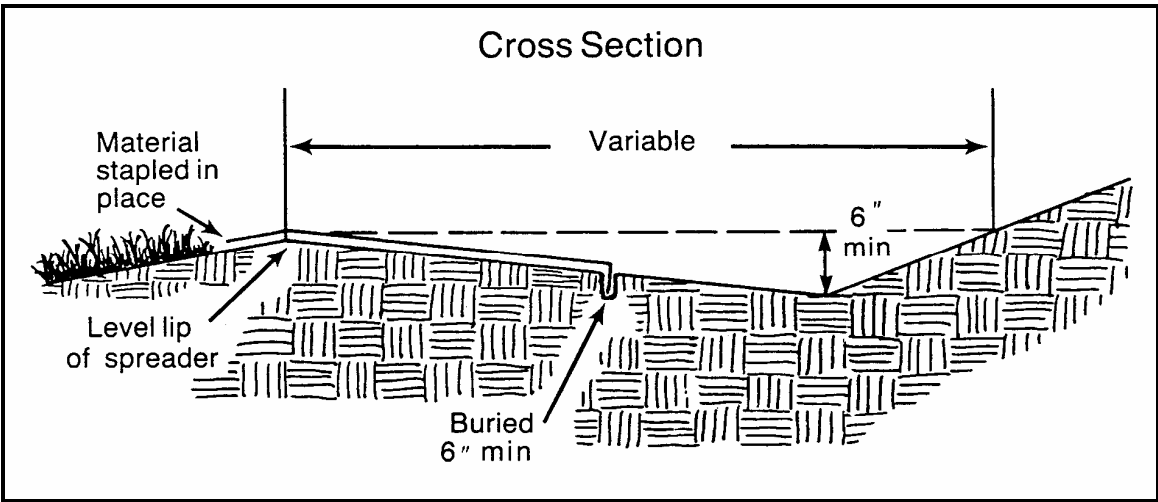
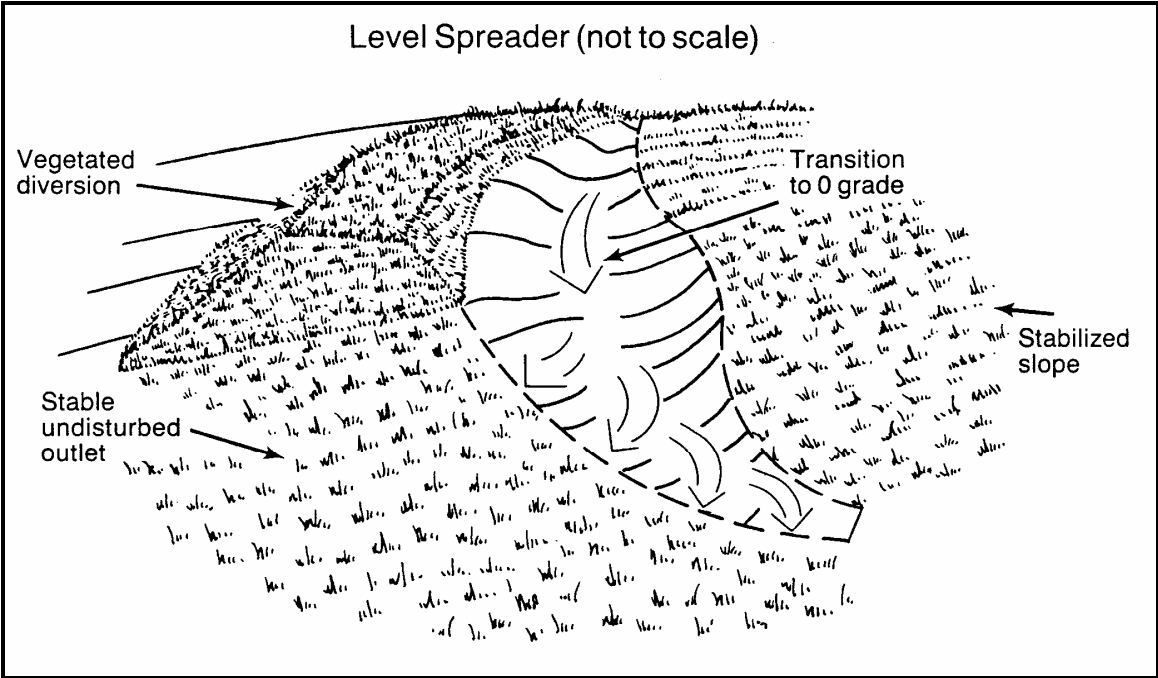
- 26) Construct the level lip on undisturbed soil to uniform height and zero grade over the length of the spreader. (However, aprons frequently cannot be set at zero grade due to slope.) Protect it with an erosion-resistant material, such as erosion control blankets or mats, to prevent erosion and allow vegetation to become established.
- 27) The blankets or matting should be a minimum of 4 ft wide extending 6 inches over the lip and buried 6 inches deep in a vertical trench on the lower edge. The upper edge should butt against smoothly cut sod and be securely held in place with closely spaced heavy-duty wire staples at least 12 inches long.
- 28) Ensure that the spreader lip is level for uniform spreading of storm runoff.
- 29) Construct the level spreader on undisturbed soil (not on fill).
- 30) Construct a 20-ft transition section from the diversion channel to blend smoothly to the width and depth of the spreader.
- 31) Disperse runoff from the spreader across a properly stabilized slope not to exceed 10%. Make sure the slope is sufficiently smooth to keep flow from concentrating.
- 32) Immediately after its construction, appropriately seed the disturbed area with native grasses and mulch.

BMP MAINTENANCE

- ✓ Inspect level spreaders after every rainfall until vegetation is established, and promptly make needed repairs. After the area has been stabilized, make periodic inspections and keep vegetation in a healthy, vigorous condition.

BMP REMOVAL

- ✓ Removal is not necessary.



BMP – SANDBAG

DESCRIPTION

A sandbag is a pre-manufactured cloth or plastic bag filled with sand or gravel. Sandbags can be used to keep water away from work areas and unstable slopes, and to construct curb inlet sediment barriers. Sandbags are also used as protection against flooding, as ballast, and in the construction of cofferdams and clean water bypasses.

APPLICATIONS

This BMP may be used during emergencies to control the flow and level of water. It may be used during construction to form dewatered areas such as cofferdams and clean water bypasses.

LIMITATIONS

Do *not* use this BMP where prohibited by permit conditions or as a permanent structure.

CONSTRUCTION GUIDELINES

- 1) When using this BMP in water bodies, fulfill appropriate permit conditions.
- 2) Secure ends of sandbags to ensure material does not scatter.
- 3) When used as a barrier, stack bags tightly together and in alternative (bricklayer) fashion.
- 4) Fill bags with clean sand or gravel.

BMP MAINTENANCE

- ✓ During construction, inspect daily with additional inspections during storm s.
- ✓ Replace damaged sandbags.
- ✓ Remove sediment when deposits reach the height of the sandbag barrier.

BMP REMOVAL

- ✓ Evaluate site to determine when BMP is no longer needed.
- ✓ Remove sediment buildup in front of BMP.
- ✓ Remove BMP, recycle and/or re-use if applicable.
- ✓ Revegetate area disturbed by BMP removal and spread material in sandbags on slopes and stable areas where allowed by permit conditions.

BMP - STREAM BYPASS (WATER DIVERSION)

DESCRIPTION

A stream diversion is a temporary bypass through a pipe, flume, or excavated channel that carries water flow around work areas.

APPLICATIONS

Commonly used for culvert installation or replacement. Where possible, a stream diversion should be the first choice to control erosion and sediment during the construction of culverts or other instream structures.

Maintaining a live channel is always the utmost priority. Therefore, we recommend a partial bypass. [BL: New NOAA comment. Also, NOAA says “Pumps should not be used” and “Stream diversions should not be used”. I’m obviously missing something - They’re not asking to remove this entire BMP, are they?]

LIMITATIONS

The stream diversion technique you use depends upon the type of work involved, physical characteristics of the site, and the volume of water flowing through the project.

Advantages of a pumped diversion include:

- ✓ Downstream sediment transport can almost be eliminated.
- ✓ De-watering of the work area is possible.
- ✓ Pipes can be moved about to allow construction operations.
- ✓ The dams can serve as temporary access.
- ✓ Increased flows can be managed by adding more pumping capacity.

Some disadvantages of a pumped diversion are:

- ✓ Flow volume is limited by pump capacity.
- ✓ Requires 24-hour monitoring of pumps.
- ✓ Sudden rain could overtop dams
- ✓ Creates in-stream disturbance to install and remove dams.
- ✓

Advantages of excavated channels and flumes are:

- ✓ Isolates work from water flow and allows dewatering
- ✓ Can handle larger flows than pumps.

Disadvantages of excavated channels and flumes are:

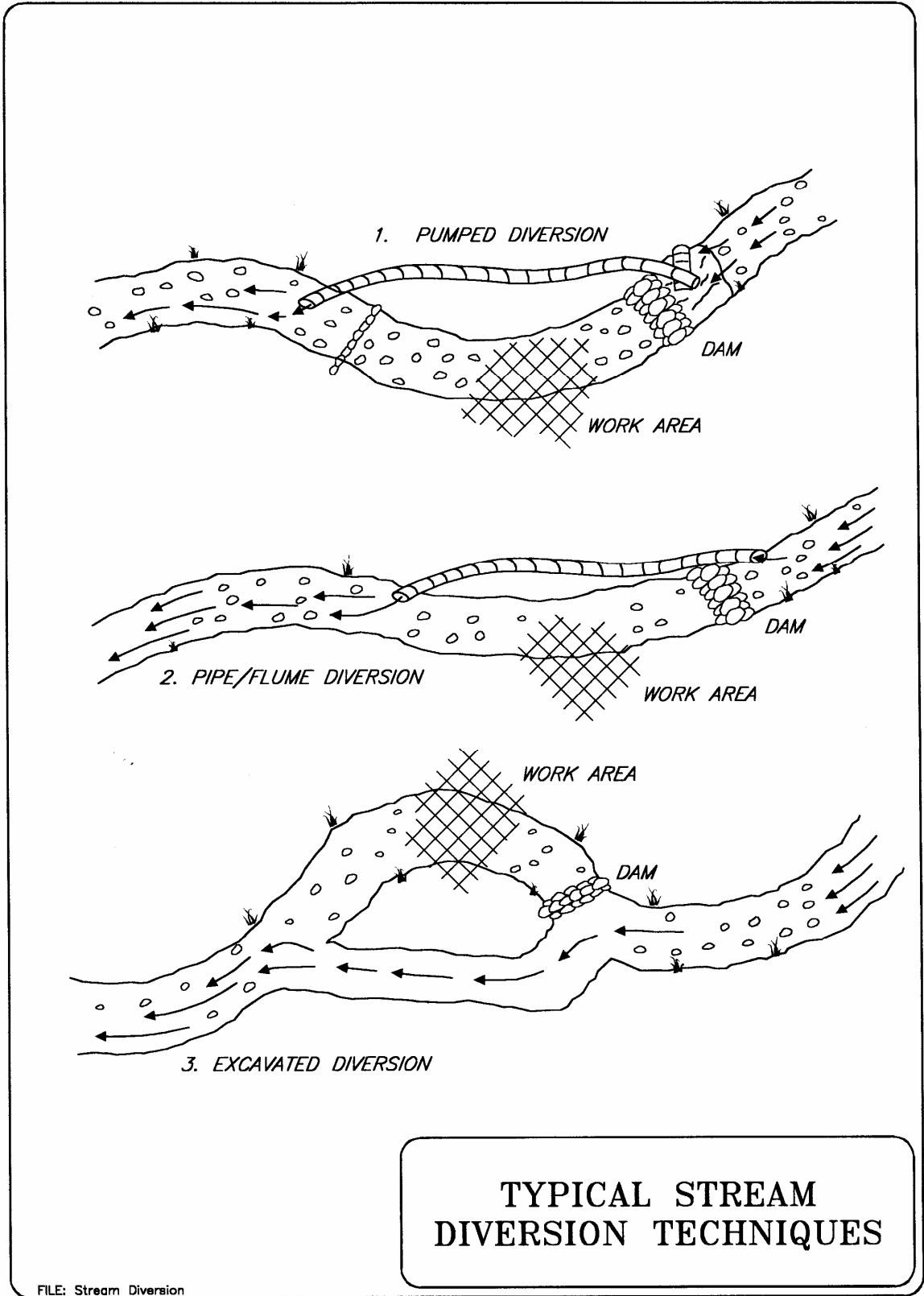
- ✓ Bypass channel or flume must be sized to handle flows, including possible floods.
- ✓ Channels must be protected from erosion.
- ✓ Flow diversion and then re-direction with small dams causes in-stream disturbance and sediment.
- ✓
- ✓ Do *not* use stream diversions;
- ✓ without identifying potential impacts to the stream channel.
- ✓ until all necessary permits have been obtained. A stream bypass is a potentially serious “taking” issue and is not a routine road maintenance BMP (for information on incidental take permits for fish habitats, see Chapter 2-Permits).
- ✓
- ✓ **CONSTRUCTION GUIDELINES**
 - 1) Guidelines vary based on existing site conditions.
 - 2) The preferred option is a partial bypass, which maintains a live stream channel.
 - 3) Size pipes adequately to allow fish passage.

BMP MAINTENANCE

- ✓ Closely monitor and maintain all stream diversions
- ✓ Pumped diversions require 24-hour monitoring of pumps

BMP REMOVAL

- ✓ Once the work is completed, remove the stream diversion and redirect the flow through the new culvert or back into the original stream channel.



APPENDIX G

CEQA DOCUMENTS

416402

NOTICE OF DETERMINATION
Marin County Environmental Coordination and Review

FILED

JUN 06 2012

RICHARD N. BENSON
MARIN COUNTY CLERK
BY: J. Whitney, Deputy

TO: Office of Planning and Research
 County Clerk, County of Marin

FROM: Marin County Flood Control and Water Conservation District
(Lead Agency)

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title: Marin County Flood Control Routine Maintenance Activities Program

State Clearinghouse #: 2012022053 (if submitted to State Clearinghouse)

Contact Person: Kallie Kull, Senior Planner

Assessor's Parcel: N/A

Application: Routine Flood Control Maintenance Activities

Project Location: East Marin County (Zones 1,3,4,7,9), and County Service Area 13 in Upper Lucas Valley

Project Description: The Marin County Flood Control and Water Conservation District's (MCFCWCD) Routine Maintenance Activities (RMA) program defines the scope and timing of the maintenance activities conducted annually in and around flood control channels and facilities in East Marin County. The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Levee maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program establishes programmatic guidance to conduct these maintenance activities for flood control purposes while avoiding and minimizing environmental impacts.

This is to advise that the Marin County Flood Control and Water Conservation District Director approved the above-described project on February 16, 2012, and has made the following determinations regarding the above described project:

1. The project in its approved form will not have a significant effect on the environment.
2. A Mitigated Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures were made a condition of the approval of the project.
4. Findings were made pursuant to the provisions of CEQA.

I certify that a copy of the Negative Declaration of Environmental Impact and record of project approval is on file and may be examined at:

Agency: Marin County Department of Public Works

Address: 3501 Civic Center Drive, Room 304, San Rafael, CA 94903

POSTED 6/6/12 7/5/12

By: [Signature]
Robert Beaumont, Director,
Marin County Flood Control and Water Conservation District

Date: 6/4/12

The filing of this Notice of Determination starts a 30 day statute of limitations on court challenges to the approval under CEQA.

N-12-06

NLE-12-124

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NEGATIVE DECLARATION

Marin County
Environmental Coordination and Review

Pursuant to Section 21000 et. seq. of the Public Resources Code and the Marin County Environmental Impact Review Guidelines and Procedures, a Negative Declaration is hereby granted for the following project.

1. **Project Name:** **Marin County Flood Control Routine Maintenance Activities Program**
2. **Location and Description:** **Eastern Marin County Flood Control Zones 1, 3, 4, 7, 9, and Community Service Area 13 in Upper Lucas Valley**

The Marin County Flood Control and Water Conservation District's (MCFCWCD) Routine Maintenance Activities (RMA) program defines the scope and timing of the maintenance activities conducted annually in and around flood control channels and facilities in East Marin County. The MCFCWCD is responsible for maintenance of 37 miles of stream channels, two sediment basins, and numerous flood control facilities throughout East Marin County (e.g. weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drains and pump station inlet/outlet structures). The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Levee maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program does not include projects requiring individual agency permits, such as larger capital improvement projects (e.g. building a new pump station), large dredging projects (e.g. dredging the mainstem of Novato Creek), or new bank stabilization projects using only hardened materials such as rock rip rap. The RMA program establishes programmatic guidance to conduct these maintenance activities for flood control purposes while avoiding and minimizing environmental impacts. The program provides the organizational framework to ensure that routine maintenance work complies with the terms of State and Federal regulations and permit conditions to protect water quality, wetlands and riparian habitats.

3. **Project Sponsor:** **Marin County Flood Control and Water Conservation District**
4. **Finding:** **Based on the attached Initial Study and without a public hearing, it is my judgment that:**


- The project will not have a significant effect on the environment.
- The significant effects of the project noted in the Initial Study attached have been mitigated by modifications to the project so that the potential adverse effects are reduced to a point where no significant effects would occur.



Marin County Environmental Coordinator

Date: 2/14/12

Based on the attached Initial Study and the comments received during the public review period, the Marin County Department of Public Works grants a Negative Declaration.



Robert Beaumont, Director
Marin County Flood Control and Water Conservation District

Date: 6/4/12

5. Mitigation Measures:

(Select one of the following statements)

- The Initial Study did not identify any potential adverse impacts and, therefore, the project does not require mitigation measures.
- Please refer to mitigation measures in the attached Initial Study.
- The Initial Study concludes that the Department can modify the project's potential adverse impacts, as noted under the following factors in the attached Initial Study.

The Department of Public Works has incorporated into the project all of the mitigation measures described in the attached Initial Study.

6. Preparation:

The Marin County Flood Control and Water Conservation District prepared this Negative Declaration and interested parties may obtain copies at the address listed below.

Kallie Kull, Senior Planner
Marin County Department of Public Works
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Monday through Friday
8:30 a.m. to 4:30 p.m.
Telephone (415) 473-6528

**MARIN COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT**

DRAFT INITIAL STUDY

*Marin County Flood Control District
Routine Maintenance Activities Program*

I. BACKGROUND

- A. Project Sponsor's Name and Address: Marin County Flood Control District
3501 Civic Center Drive, Room 304
San Rafael, CA 94903
- B. Lead Agency Name and Address: Marin County Flood Control District
3501 Civic Center Drive, Room 304
San Rafael, CA 94913-4186
- C. Contact Person and Phone Number: Kallie Kull; Senior Planner, (415) 499-6532

II. PROJECT DESCRIPTION

- A. Project Title: Marin County Flood Control District: Routine Maintenance Activities Program (RMA)
- B. Type of Application(s): Flood Control Routine Maintenance Projects
- C. Project Location: The geographic extent of the RMA program includes routine maintenance activities carried out in and around creeks, channels, ditches, levees, flood control structures and facilities, located within six project areas: one each for five flood control zones in East Marin County (Zones 1,3,4,7,9), and County Service Area 13 in Upper Lucas Valley (See Figure 1):

Flood Control Zone 1 – Novato
Flood Control Zone 3 – Richardson Bay
Flood Control Zone 4 – Bel Aire and Strawberry Circle
Flood Control Zone 7 – Santa Venetia
Flood Control Zone 9 – Ross Valley
County Service Area 13 – Upper Lucas Valley

Refer to:
Figure 1: Map of County Flood Control Zones and CSA/CSD areas included in the project
Attachment A: Maps 1-12 of Project Areas and Species of Concern
Attachment B: Master list of Project Areas and RMA Activities
Attachment C: Master List of all Sediment Removal Sites

- D. General Plan Designation: The proposed project area is vast in extent and includes creeks which are located within the mapped City Centered and Coastal Baylands Corridors of East Marin (Countywide Plan 2007) and within Streamside Conservation Areas (SCAs).

- E. Zoning: Project areas within the RMA program fall into the land use and zoning categories of Residential, General Commercial/Mixed Use, Office/Commercial Mixed Use, Neighborhood/Commercial Mixed- Use/ Recreational Commercial, Industrial, Agricultural, Public and Open Space Lands.

PROJECT AREA

The Marin County Flood Control District is responsible for maintenance of 37 miles of stream channels, two sediment basins, and numerous flood control facilities (e.g. weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drains and pump station inlet/outlet structures), throughout East Marin County. The geographic extent of the proposed Routine Maintenance Program (RMA) includes six project areas: one each for five flood control zones (Zones 1, 3, 4, 7 and 9), and one project site in County Service Area 13 in Upper Lucas Valley (*Figure 1*). The Flood Control Zones included in this project are located exclusively in Eastern Marin County. Each zone includes a number of project sites, which are differentiated based on stream reaches and habitat types. In all, there are 93 specific sites where the District performs routine maintenance activities. There are 26 project sites located in Flood Control Zone 1 in the Novato Creek watershed, 33 project sites in Flood Control Zone 3 in Mill Valley, six project sites in Flood Control Zone 4 in Bel Aire/Strawberry, 13 project sites in Flood Control 7 in Santa Venetia, 14 project sites in Flood Control Zone 9 in the Corte Madera Creek watershed, and one project site in County Service Area 13 in Upper Lucas Valley.

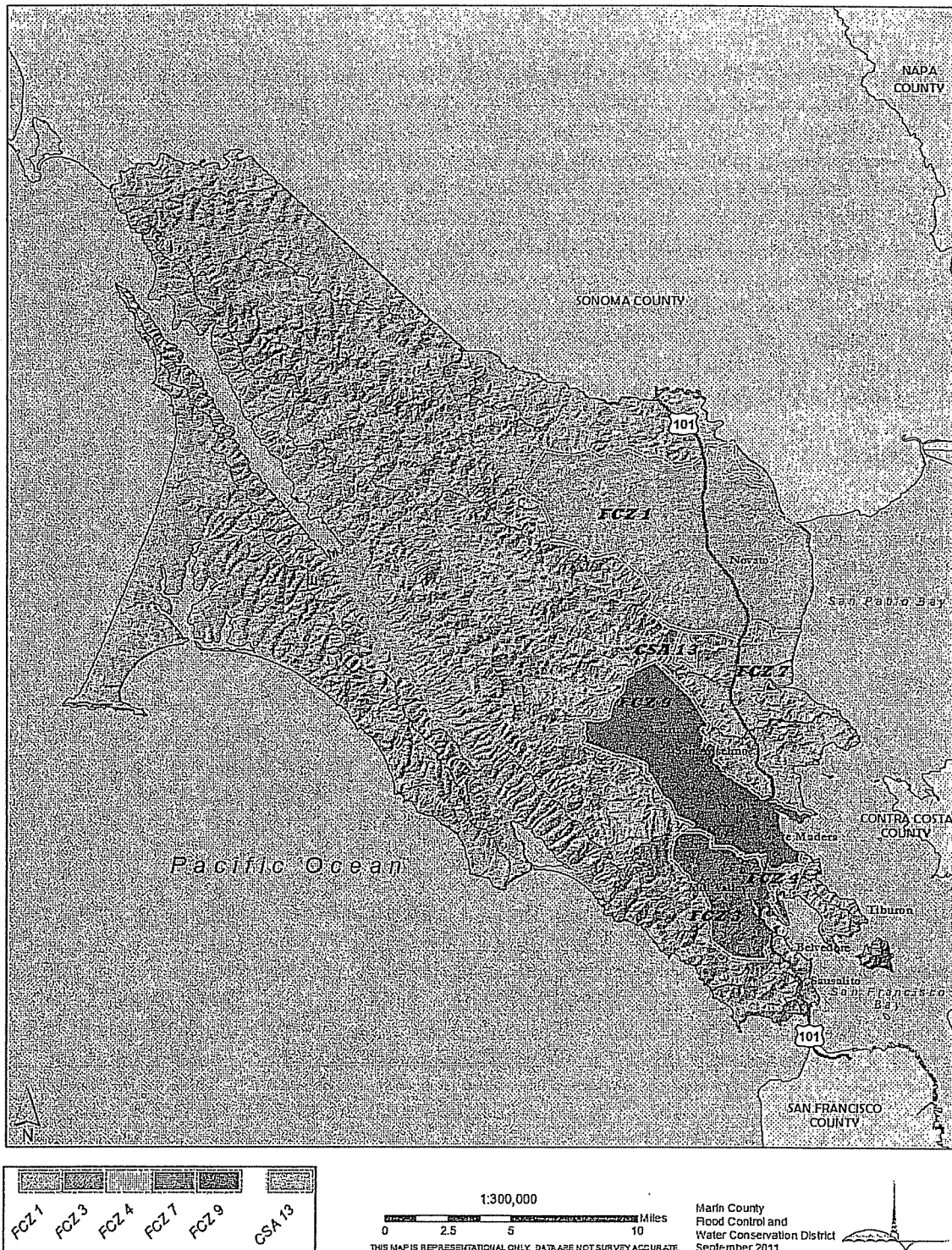


Figure 1. Project areas covered by the Marin County Flood Control District’s Routine Maintenance Activities Program; Flood Control Zones 1, 3, 4, 7, 9, and Community Service Area 13 in Upper Lucas Valley, all in East Marin County.

PROGRAM OVERVIEW

Program Purpose

The Marin County Flood Control District's Routine Maintenance Activities Program (RMA) defines the types and scope of the District's annual routine maintenance activities conducted in and around flood control channels and facilities. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program establishes programmatic guidance to conduct these activities for flood control purposes while avoiding and minimizing environmental impacts. The RMA program provides the organizational framework for flood control staff and managers to oversee maintenance crews and their activities and to ensure that their work complies with the terms of State and Federal regulations and permit conditions to protect water quality, wetlands and riparian habitats. The RMA program does not include projects requiring individual agency permits, such as larger capital improvement projects (e.g. building a new pump station), large dredging projects (e.g. dredging the mainstem of Novato Creek), or new bank stabilization projects using only hardened materials such as rock rip rap. The District will implement the RMA program in a yearly work cycle, to include pre-project notification, project implementation, and annual reporting.

Jurisdictional Boundaries

Maintenance activities are implemented on an annual basis only in locations where the Marin County Flood Control District and/or its municipal partners own the land outright in fee title or holds legal easements; with the exception of four sites on private property, where the District annually receives written landowner permission before performing maintenance activities. No aspect of the RMA program shall be implemented in areas where the County or its municipal partners do not have direct legal jurisdiction or landowner permission.

Environmental Setting

Eastern Marin County watersheds share the same general anatomy: the ridge-tops and upper slopes of the watersheds are in generally protected open space areas, the valley floors are densely developed, and the lower reaches are tidally-influenced and quite flat. The District's 93 RMA sites are located mainly in the valley floors and lower creek reaches. The uplands encompass the hilly, often steep, terrain from the top of the ridges down to where the valleys flatten out. They are dominated by mixed evergreen forest and oak-bay woodlands, interspersed with open annual grasslands, chaparral, and coastal scrub. Much of the upland habitats in Marin County are protected as public and municipal open space. The valley floors are developed with dense residential and commercial developments, often right up to, and sometimes in, the creek channels. The road network can also be quite dense, with many bridges spanning the creeks. In almost all cases, creeks are heavily impacted by historic human use, including concrete channelization and straightening, constrained riparian corridors, impacted floodplains, and non-native invasive species. The lower reaches of creeks have very little topographic relief; they are either tidally influenced and support saltwater or brackish-water marsh, or are protected by levees for agricultural or residential use. While often less developed, these lower marsh areas have altered hydrology and are constrained by roads, levees, and other human-induced development. Freshwater seasonal wetlands have become established in areas that were once historical baylands and which have been diked for agriculture. These seasonal wetlands provide habitat for migratory waterfowl and shorebirds, including California clapper and black rails.

Type of Work

The RMA program covers five categories of routine flood control maintenance activities:

- 1) Vegetation management
- 2) Sediment and debris removal
- 3) Erosion control
- 4) Maintenance and repair of flood control structures
- 5) Levee maintenance

1) Vegetation Management Activities are employed to achieve three main goals:

- maintain channel function
- reduce fire fuels,
- restore creek habitat

These goals are achieved by removing invasive non-native plants and re-vegetating with native plants where necessary to control erosion and maintain riparian habitat. Channel maintenance is achieved by limbing and trimming of riparian trees and shrubs, selective cattail cutting and removing trash. Occasionally trees growing on the channel bed need to be removed because they obstruct flow or divert flow and cause bank erosion. This work is typically limited to the removal of arroyo willow or white alder growing in the center of the channel bed.

Vegetation management activities are performed by crews using hand tools and do not include ground-disturbing activities. Cattails are removed from selected reaches as part of sediment removal activities. All vegetation maintenance is done without the use of herbicides.

Vegetation management takes place from the channel bottom to the top of the high water mark, and includes trimming limbs from trees and shrubs growing over the channel and trimming branches that hang down into the active channel. The goal of vegetation management within natural channels is to establish a canopy cover that will suppress invasive plant growth and maintain cooler stream temperatures.

Fire fuel reduction is achieved by mowing on tops of banks and levees and the thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas.

Tree removal is a rare event with the exception of non-native trees such as acacia. Once or twice a year crews may need to remove a tree that has died and poses a hazard to adjacent structures or could pose a flood hazard if it falls into the channel. Removal of these trees is conducted in consultation with the Department of Fish and Game.

Removal of non-native vegetation takes place as part of maintaining channel function but also occurs in a more strictly restoration-type activity led by Point Reyes Bird Observatory's STRAW Program (Students and Teachers Restoring a Watershed) in partnership with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP). Students working in the STRAW Program remove invasive non-natives and replant sites with native vegetation. The program has worked at creek sites near schools where access and proximity allow for the removal of all traces of the non-native vegetation and the return to sites to continue maintenance and restoration of the creek corridor. These restoration activities have been ongoing for over 10 years. The partnership with the STRAW Program demonstrates the County's efforts to manage creeks through stewardship of the land. Native plant restoration reduces the maintenance needs in the creeks and allows for better habitat to be established in the urban creek corridors. The students, teachers and parents working in their local creeks increases the community awareness of the habitat and supports the County's watershed-based approach to caring for our creeks.

2) Sediment and Debris Removal

Sediment and debris removal from channels, sediment basins and around flood control facilities (e.g. trash racks) is completed on a routine basis in order to maintain channel function and facilitate unobstructed flow around structures including bridges, storm drain outlets, and pump stations. Excavated sediment is hauled away to a permitted spoils disposal site. Debris items found in the channels and around flood control facilities (e.g. tires, shopping carts, trash, furniture), are typically removed by hand and hauled to a certified disposal site, such as a landfill. Attachment B lists all sediment removal sites included in the RMA program with specific information regarding dimensions of work area, equipment used, location of equipment, and expected duration of work at each site.

3) Erosion Control

Erosion control activities take place only where the District and/or its partners hold fee title to the land. Most large erosion control and large bank stabilization projects are not routine and therefore are not included in the RMA program. The only erosion control projects included in the RMA program are those where a failing streambank is composed of earthen materials and biotechnical engineering techniques are used to stabilize the bank and prevent further erosion (e.g. brush mattresses and willow walls). Erosion control activities will generally be minor in nature and completed in 2-4 days.

4) Maintenance and Repair of Flood Control Structures

Annual routine maintenance and repair of Marin County flood control structures is a key objective of the RMA program. Flood control structures are defined to include all structures built or maintained by the District, including, but not limited to, weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drain or pump station inlet/outlet structures and similar structures. The maintenance, repair or rehabilitation of flood control structures does not exceed 100 linear feet upstream or downstream of each structure and does not include increasing the footprint of any structure.

5) Levee Maintenance and Repair

Levee maintenance includes mowing levee tops and banks above the high water line for fire fuel reduction, stabilizing levees by placing fill on the levee tops, and controlling burrowing rodent populations. Levee stabilization may occur on any levee maintained by the District; a landowner access agreement is required for activities at site 7-GAL on the Santa Venetia levee, which is private property. If a gopher infestation occurs, the gophers are trapped and their burrows are filled with an earth/concrete mix or bentonite, following FEMA guidelines. The County of Marin does not use rodenticides or other poisons in rodent control for levee maintenance or in any other RMA program activity.

PROGRAM IMPLEMENTATION

Environmental Staff and Oversight

The Marin County Flood Control District will designate environmental staff who will provide day-to-day oversight of the RMA program including: 1) pre-project planning and notification to applicable resource agencies, 2) pre-project surveys for special status wildlife and plant species depending on site location and designated work windows, 3) project implementation including site surveys, conducting crew trainings, and coordinating with crews in the field, and 4) annual reporting to permitting resource agencies. The District will designate Environmental Compliance Coordinators (ECCs) to specifically oversee the biological aspects of the RMA program. The ECCs shall have an understanding of biological resources, permit regulations that may affect listed species and/or water quality, familiarity with the maintenance activities, and how to implement Avoidance and Minimization Measures and BMPs in the field. The ECCs will

ordinate activities with input and review from County of Marin Public Works' staff biologists.

A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the project's potential impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Avoidance and Minimization Measures (AMMs) to be employed at each project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

General and activity-specific conditions, AMMs and BMPs are incorporated into the overall project description and spelled out in the individual project fact sheets for each site. The job of the ECCs is to ensure that all measures are employed as prescribed in the field, depending on the location and nature of the activity.

Schedule and Timing of Maintenance Activities

The Routine Maintenance Activities Program is implemented annually throughout the project area in East Marin County. The general work window for RMA activities is the dry season, from April 15th to October 15th, depending on weather. Dry years may mean a longer work season; wet weather may halt the work season early. Table 1 below shows the Special Status Species potentially found within the project area and the established work windows for each species relative to the proposed work periods. As a general rule, work at each site will be scheduled around relevant work windows to avoid impacts. In instances where work needs to be scheduled outside of an established work window for a particular species in a specific location, species-specific pre-construction surveys will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of Avoidance and Minimization Measures before proceeding. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality.

Responsible Parties and Program Partners

Marin County Flood Control and Water Conservation District (District)- The Marin County Flood Control and Water Conservation District is the primary proponent for the RMA program, which utilizes the labor and expertise of the County of Marin Department of Public Works (DPW), County road maintenance crews, Conservation Corps North Bay crews (CCNB), and private contractors to manage and implement routine maintenance activities. The Marin County Flood Control and Water Conservation District (District) was formed in 1955 by an act of the California State Legislature with the primary purpose of controlling flood and storm waters of streams which flow within and into the county. The Marin County Board of Supervisors sits as its board and the District is staffed by the County of Marin Department of Public Works (DPW). The boundaries of the District are contiguous with those of the county and eight flood control zones have been established to address specific issues related to flooding within individual watersheds.

County of Marin Department of Public Works Road Crew (DPW)- DPW road maintenance crews perform a portion of the vegetation management, sediment removal, erosion control, and facility maintenance activities.

Marin County Parks - The District coordinates with Marin County Parks to perform vegetation maintenance activities on certain lands under their jurisdiction.

Conservation Corps North Bay (CCNB)- Conservation Corps North Bay is a non-profit job training and educational organization which has been operating in Marin County since 1982. CCNB will be the primary active partner and contractor with the District for many of the activities included in the RMA program. CCNB Maintenance Supervisors and staff will be trained annually by the District staff to incorporate the general and activity-specific conditions, AMMs, and BMPs required for each activity at each site in order to protect water quality, habitat and special status species.

Municipal Partners- Cities of Mill Valley, Novato, Larkspur, Ross, Fairfax, and San Anselmo- In addition to the work it oversees directly on County unincorporated lands, the District has a formal agreement with the City of Mill Valley that enables the City of Mill Valley to perform routine flood control maintenance activities on an annual basis on properties that fall within the District's flood control easements. In Novato, the District performs flood control maintenance activities in areas within the City of Novato's jurisdiction. The District is currently negotiating similar agreements for the District to conduct maintenance activities on a routine basis within the smaller municipalities of the Ross Valley (Cities of Larkspur, Ross, San Anselmo and Fairfax).

MCSTOPPP and STRAW- The District partners with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP) and the Point Reyes Bird Observatory's (PRBO) Students and Teachers Restoring a Watershed (STRAW) to perform restoration work in eastern Marin County. Activities consist primarily of removal of invasive plants and planting of native species by groups of teachers and students organized by STRAW.

Private Contractors - District environmental staff will work with outside contractors prior to implementing activities covered by the RMA. The ECC will be responsible for making sure that hired contractors understand what materials they need to have in hand and what methods to employ when implementing prescribed AMM's and BMPs during and post-construction. Companies contracting with the County of Marin for RMA program activities will be held to standards described in the Specifications that are included in their County contracts.

Foundation Documents for the RMA

The RMA program is largely based on program documents and studies previously developed by the Bay Area Stormwater Management Agencies Association (BASMAA). The District, as a member of MCSTOPPP, has been an active member of BASMAA since 1989. BASMAA is a consortium of 90 Bay Area county and city governments, local water and sanitation districts, and state agencies and was formed in response to the National Pollutant Discharge Elimination System (NPDES) permitting program to promote regional consistency. In 1998, BASMAA formed an Operational Permit Committee (OPC) which worked for several years to develop a Regional General Permit with the USACE to cover routine maintenance activities in flood control channels within BASMAA's jurisdictional areas. Although a Regional General Permit was not obtained, the OPC produced several documents which have been used by several BASMAA members to obtain individual permits. In addition to previous documents developed for BASMAA, the District commissioned a Biologic Assessment for the RMA program. *Biological Assessment for Routine Flood Control Maintenance Activities; Marin County, California* (July 2011).

The District is utilizing the information in these documents to support programmatic permit applications to the Department of Fish and Game, the Army Corps of Engineers, and the Regional Water Quality Control Board for the RMA program.

- *Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works*. July 2011.
- *Minimal Threat Channel and Basin Maintenance Activities*. October 2009. This document describes routine flood control maintenance activities.
- *Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment*. October 2006. This document describes the environmental setting, special status species within the BASMAA jurisdictional area, the extent and scope of proposed activities, and a suite of AMMs and BMPs.
- *Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities*. June 2000. The manual describes BMPs for equipment and vehicles, sediment control, soil stabilization, natural resource protection and restoration, vegetation and debris management, and water diversions.

III. CIRCULATION AND REVIEW

A. Responsible Agencies: *(agencies whose approval is required and permits needed)*

- U.S. Army Corps of Engineers – Section 404 permit under the Clean Water Act with consultation from the U.S. Fish and Wildlife Service (Endangered Species Act of 1973, as amended) and NOAA Fisheries (Endangered Species Act of 1973, as amended);
- San Francisco Bay Regional Water Quality Control Board – Section 401 Water Quality Certification; and
- California Department of Fish and Game - 1600 Streambed Alteration Agreement Programmatic Routine Maintenance Agreement.

DOCUMENTS INCORPORATED BY REFERENCE

The following is a list of relevant information sources, which have been incorporated by reference into the foregoing Initial Study pursuant to Section 15150 of the State CEQA Guidelines. The number assigned to each information source corresponds to the number listed in parenthesis following the incorporating topical question of the Initial Study checklist. These documents are both a matter of public record and available for public inspection at the County of Marin. Copies of Documents (1-2) below are available for public review at the County of Marin Planning Department (Room 308), 3501 Civic Center Drive, San Rafael, California, Monday through Friday between the hours of 8:00 a.m. to 4:00 p.m. Copies of documents (3-8) are available for public review at the Marin County Public Works Department (Room 304) or at the Marin County website www.marinwatersheds.org. Copies of Documents (9 – 10)) can be found on-line at the individual municipal websites.

- 1) Marin Countywide Plan, Marin County Community Development Agency, Planning Division (2007).
- 2) Marin County Code; Supp. No. 6-11, Update 1; (June 7, 2011).
- 3) A Programmatic Approach to Routine Flood Control Maintenance Activities; County of Marin (October 2011).
- 4) Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works. (October 2011).
- 5) Minimal Threat Channel and Basin Maintenance Activities. BASMAA OPC (October 2009).
- 6) Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. BASMAA OPC October 2006.
- 7) Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities. BASMAA OPC, (June 2000).
- 8) County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries; FishNet 4C; Dec 2004; updated 2007)
- 9) City of Mill Valley General Plan (1989).
- 10) City of Novato General Plan (1996).

IV. EVALUATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to Section 15063 of the State CEQA Guidelines, and the County EIR Guidelines, Marin County will prepare an Initial Study for all projects not categorically exempt from the requirements of CEQA. The Initial Study evaluation is a preliminary analysis of a project which provides the County with information to use as the basis for deciding whether to prepare an Environmental Impact Report (EIR) or Negative Declaration. The points enumerated below describe the primary procedural steps undertaken by the County in completing an Initial Study checklist evaluation and, in particular, the manner in which significant environmental effects of the project are made and recorded.

- A. The determination of significant environmental effect is to be based on substantial evidence contained in the administrative record and the County's environmental database consisting of factual information regarding environmental resources and environmental goals and policies relevant to Marin County. As a procedural device for reducing the size of the Initial Study document, relevant information sources cited and discussed in topical sections of the checklist evaluation are incorporated by reference into the checklist (e.g. general plans, zoning ordinances). Each of these information sources has been assigned a number which is shown in parenthesis following each topical question and which corresponds to a number on the data base source list provided herein as Attachment A. See the sample question below. Other sources used or individuals contacted may also be cited in the discussion of topical issues where appropriate.
- B. In general, a Negative Declaration shall be prepared for a project subject to CEQA when either the Initial Study demonstrates that there is no substantial evidence that the project may have one or more significant effects on the environment. A Negative Declaration shall also be prepared if the Initial Study identifies potentially significant effects, but revisions to the project made by or agreed to by the applicant prior to release of the Negative Declaration for public review would avoid or reduce such effects to a level of less than significance, and there is no substantial evidence before the Lead County Department that the project as revised will have a significant effect on the environment. A signature block is provided in Section VII of this Initial Study to verify that the project sponsor has agreed to incorporate mitigation measures into the project in conformance with this requirement.
- C. All answers to the topical questions must take into account the whole of the action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts. Significant unavoidable cumulative impacts shall be identified in Section VI of this Initial Study (Mandatory Findings of Significance).
- D. A brief explanation shall be given for all answers except "Not Applicable" answers that are adequately supported by the information sources the Lead County Department cites in the parenthesis following each question. A "Not Applicable" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "Not Applicable" answer shall be discussed where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- E. "Less-than-significant Impact" is appropriate if an effect is found to be less-than-significant based on the project as proposed and without the incorporation of mitigation measures recommended in the Initial Study.
- F. "Potentially Significant Unless Mitigated" applies where the incorporation of recommended mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less-than-significant Impact." The Lead County Department must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from Section V, "Earlier Analyses", may be cross-referenced).
- F. "Significant Impact" is appropriate if an effect is significant or potentially significant, or if the Lead County Department lacks information to make a finding that the effect is less-than-significant. If there are one or more effects which have been determined to be significant and unavoidable, an EIR shall be required for the project.
- G. The answers in this checklist have also considered the current California Environmental Quality Act Guidelines and the Initial Study Checklist contained in those Guidelines.
- H. This Initial Study checklist was prepared consistent with current California Environmental Quality Act Guidelines and the Initial Study checklist contained in those Guidelines.

V. ISSUES (for source #(s) see: Documents Included by Reference; Page 13)

1. LAND USE AND PLANNING. *Would the proposal:*

| | | | | |
|--|--------------------|--|------------------------------|----------------|
| a) Conflict with applicable Countywide Plan designation or zoning standards? (source #(s): 1, 2) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The determinations of policy consistency as discussed in this Initial Study section represent County staff interpretation of policies. However, this Initial Study does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

Section 15358(b) of the CEQA Guidelines states that “effects analyzed under CEQA must be related to a physical change in the environment”, however policy inconsistencies may not necessarily indicate significant environmental effects. Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environment are considered significant impacts pursuant to CEQA. Where potentially significant environmental impacts are raised in the discussion below, they have been mitigated to a less-than-significant impact and, therefore, project activities are determined to be consistent with the relevant policies cited. Mitigations are addressed further in the topical impact sections following the plan, policies and regulations analyses.

LOCAL PLANS, POLICIES, AND REGULATIONS

Land use designations and development of the project sites are governed by the objectives and policies of the 2007 Marin Countywide Plan (CWP), sections of the Marin County Code, including Title 22 (Zoning) and Title 23 (Natural Resources) and Title 24 (Development Standards). And General Plans for local municipal program partners including; City of Novato, City of Mill Valley, Town of Ross, City of Larkspur, Town of San Anselmo and the Town of Fairfax.

MARIN COUNTY CODE

TITLE 22- DEVELOPMENT CODE; Chapter 22.27- Native Tree Protection and Preservation

Section 22.27.040 (k)- Exemption to the Prohibition of Removal of a Protected Tree states that the project proponent must demonstrate that the tree removal is by a public agency to provide for the routine management and maintenance of public land.

Consistent- The project is consistent with the Marin County Code (Title 22) which requires projects to minimize tree removal and grading, as well as to maintain adequate site features that establish the visual character of the site. Marin County Flood Control District during RMA Program implementation, will minimize any riparian tree removal unless absolutely necessary to achieve the goals of the program, which are to protect the public and public facilities from flooding, while protecting water quality and sensitive habitats. To protect sites that are environmentally sensitive, the District will employ a suite of Avoidance and Minimization

Measures and Best Management Practices to protect existing habitats and species of concern. Therefore, the project is consistent with the development standards set forth in Title 22.

TITLE 23- NATURAL RESOURCES;

The provisions of Title 23 are enacted to protect and promote the public health, safety and general welfare, to preserve environmental qualities, and to protect the value, worth and enjoyment of the use of real property to the fullest extent possible, through the regulation of the uses or activities of the property in a manner which will prevent serious public injury.

Chapter 23.08 Excavating, Grading, and Filling

Chapter 23.08 establishes regulations for excavation, grading and filling in order to:

- (1) Preserve and enhance the natural beauties of the land, streams, bays and shorelines;
- (2) Reduce or eliminate the hazards of earth slides, mudflows, rock falls, undue settlement, erosion, siltation, sedimentation and flooding;
- (3) Protect and enhance the water quality of watercourses, water bodies and wetlands and vegetation for wildlife habitat;
- (4) Regulate de facto development caused by uncontrolled grading.

Activities of this nature which are considered exempt from the provisions of this chapter include:

- (a) Grading done by or on behalf of a public agency that assumes full responsibility for the work.

Consistent: The project as described will be implemented by the County of Marin Flood Control District, local municipalities or private contractors under contract with the District. The District is a public agency and assumes full responsibility for the work conducted under the RMA program, therefore the program is exempt from the terms of Chapter 23.08, and consistent with the requirements of this section of County code.

Chapter 23.09 Floodplain Management

It is the purpose of Chapter 23.09 to promote the public health, safety and general welfare and to minimize the losses described in this section by provisions designed to:

- (A) Protect human life and health;
- (B) Minimize expenditure of public money for flood control projects;
- (C) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- (D) Minimize prolonged business interruptions;
- (E) Minimize damage to public facilities and utilities, such as water located in areas of special flood hazard;
- (F) Help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
- (G) Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- (H) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

(2) In order to accomplish its purposes, Chapter 23.09 includes methods and provisions for:

- (A) Restricting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- (B) Requiring that uses vulnerable to flood, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- (C) Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- (D) Controlling filling, grading, dredging and other development which may increase flood damage; and
- (E) Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Consistent- The project is consistent with the Marin County Code Title 23 which was enacted to protect and promote the public health, safety and general welfare, and to preserve environmental qualities in a manner which would prevent serious public injury. The objective of the project is to promote flood control and minimize risk to public health, safety and welfare. The program as designed will minimize potential impacts to sensitive habitats and will be designed to blend into the surrounding natural environment to the greatest extent feasible. The proposed flood control project incorporates practices which enhance the biological and visual character of the creek corridor. Although some trimming of riparian trees will occur to prevent flooding, the project will not alter the riparian character of the project sites. The implementation of the proposed program will respect the surrounding natural environment and return channel elevations to their previous condition prior to sedimentation.

In summary, the proposed project is maintenance in nature, and will not change the Land Use Designations at the project sites or conflict with zoning standards or the objectives of the above-mentioned code in any way; therefore, the project will be consistent with applicable Marin County Code.

| | | | | |
|---|---------------------------|---|-------------------------------------|-----------------------|
| <p>b) Conflict with applicable environmental plans or policies adopted by Marin County? (source #(s): 1)</p> | <p>Significant Impact</p> | <p>Potentially Significant Unless Mitigated</p> | <p>Less Than Significant Impact</p> | <p>Not Applicable</p> |
| | [] | [X] | [] | [] |

MARIN COUNTYWIDE PLAN (2007)

Specific Countywide Plan policies which pertain to the proposed project are associated with the following subjects:

- (1) Include Resource Preservation in Environmental Review;
 - BIO- 2.1 Include Resources Protection in Environmental Review
- (2) Coordinate with Trustee Agencies and Promote Early Consultation with Agencies;
 - BIO-2.8 Coordinate with Trustee Agencies during environmental review when special-status species, sensitive natural communities, or wetlands may be affected.
 - BIO-2.9 Promote early consultation with other agencies.

(3) Protection of Riparian Systems

- BIO-1.5 Promote Use of Native Plant Species
- BIO-1.7 Remove Invasive Exotic Plants
- BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials
- BIO-4.6 Control Exotic Vegetation
- BIO-4.7 Protect Riparian Vegetation

(4) Protection of Stream Conservation Areas

- BIO-4.4 Promote Natural Stream Channel Function
- BIO-4.5 Restore and Stabilize Stream Channels
- BIO-4.10 Promote Interagency Cooperation
- BIO-4.19 Maintain Channel Stability

(5) Species and Habitat Preservation

- BIO-1.1 Protect Wetlands, Habitat for Special -Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors.
- BIO-1.3 Protect Woodlands, Forests, and Tree Resources
- BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors.
- BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season
- BIO-2.7 Protect Sensitive Coastal Habitat.
- BIO-5.3 Leave Tidelands in the Natural State
- BIO-5.5 Protect Freshwater Habitats
- BIO-5.6 Use Flood Basins for Seasonal Habitat

(6) Protection of Watersheds and Water Quality

- WR-1.1 Protect Watersheds and Aquifer Recharge
- WR-2.3 Avoid Erosion and Sedimentation
- WR-2.4 Design County Facilities to Minimize Pollutant Input

(7) Avoidance of Environmental Hazards

- EH-2.1. Avoid Hazard Areas
- EH-3.2. Retain Natural Conditions
- EH-4.1. Limit Risks to Structures
- EH-4.2 Remove Hazardous Vegetation

(8) Protection of Air Quality

- AIR-2.0 Protection from Emissions
- AIR-5.0 Adaptation to Climate Change

(9) Minimize Noise Impacts;

- NO-1.3 Regulate Noise Generating Activities

(10) Protection of Visual Resources

- DES-4.1. Preserve Visual Quality

(11) Avoid Impacts to Historical Resources;

- HAR-1.3. Avoid Impacts to Historical Resources

CONSISTENCY OF PROJECT WITH EXISTING MARIN COUNTYWIDE PLAN POLICIES

(1) Include Resource Preservation in Environmental Review

BIO-2.1 Include Resource Preservation in Environmental Review to assess the impact of proposed development on native species and habitat diversity, particularly special-status species, sensitive natural communities, wetlands, and important wildlife nursery areas and movement corridors. Require adequate mitigation measures for ensuring the protection of any sensitive resources and achieving “no net loss” of sensitive habitat acreage, values, and functions.

Consistent: The Marin County Department of Public Works (DPW) developed a biological assessment for the RMA program which evaluated potential impacts to native species, habitat diversity and special-status species and natural communities (Biological Assessment for Routine Flood Control Maintenance Activities; July 2011). The objective of the biological assessment was to identify adequate measures to protect any sensitive resources and achieve “no net loss” of sensitive habitat acreage, values, and functions. Prescriptions contained in the Biological Assessment include species related Avoidance and Minimization Measures as well as Special Conditions and Best Management Practices to be employed during project implementation. The project is guided by these prescriptions from the Biological Assessment so therefore, the project will be consistent with Policy BIO-2.1.

(2) Coordinate with Trustee Agencies and Promote Early Consultation with Other Agencies

BIO-2.8 Coordinate with Trustee Agencies. Consult with trustee agencies (the California Department of Fish and Game, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration (NOAA) Fisheries, U.S. Army Corps of Engineers, Environmental Protection Agency, Regional Water Quality Control Board, and Bay Conservation and Development Commission) during environmental review when special-status species, sensitive natural communities, or wetlands may be adversely affected.

BIO-2.9 Promote Early Consultation with Other Agencies. Require applicants to consult with all agencies with review authority for projects in areas supporting wetlands and special-status species at the outset of project planning.

Consistent: DPW has coordinated the development and review of this project and its associated environmental documents with natural resource trustee agencies who require permits for the proposed work. Permitting agencies include the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), the California Department of Fish and Game for all sites. A select number of sites will need permits from the U.S. Army Corps of Engineers with consultation with U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. Regulatory permit applications have been submitted to all these agencies. Project coordination with these regulatory agencies and notification to all interested parties and the general public will continue throughout the public review process. Therefore, the project is consistent with Policies BIO-2.8 and BIO-2.9.

(3) Protection of Riparian Systems

BIO-1.5 Promote Use of Native Plant Species. Encourage use of a variety of native or compatible non-native, non-invasive plant species indigenous to the site vicinity as part of project landscaping to improve wildlife habitat values.

BIO-1.7 Remove Invasive Exotic Plants. Require the removal of invasive exotic specie, to the extent feasible, when considering applicable measures in discretionary permit approvals for development projects unrelated to agriculture, and include monitoring to prevent re-establishment in managed areas.

BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials. Encourage the use of integrated pest management and organic practices to manage pest with the least possible hazard to the environment. Restrict the use of insecticide, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared; the habitat itself is threatened; a substantial risk to public health and safety exists, including maintenance for flood control; or such use is authorized pursuant to a permit issues by the agricultural commissioner. Encourage non-toxic strategies for pest control, such as habitat management using physical and biological control, as an alternative to chemical treatment, and allow use of toxic substances only after approaches have been tried and determines unsuccessful. Continue to implement the Integrated Pest Management ordinance for county-related operations.

BIO- 4.6 Control Exotic Vegetation. Remove and replace invasive exotic plants with native plants as part of stream restoration projects and as a condition of site-specific development approval in than SCA and include monitoring to prevent reestablishment.

BIO-4.7 Protect Riparian Vegetation. Retain riparian vegetation for stabilization of stream banks and floodplains, moderating water temperatures, trapping and filtering sediments and other water pollutants, providing wildlife habitat, and aesthetic reasons.

Consistent: Vegetation management activities are employed to achieve three main goals: maintain channels, reduce fire fuels, and restore creek habitat by removing invasive non-native plants and re-vegetating with native plants. Maintaining channel function is achieved by limbing and trimming, cattail cutting, removing vegetation from channel bottoms, and clearing trash. These activities occur from the channel bottom to the top of the high water mark, and include trimming tree limbs from trees and shrubs growing in the channel and trimming branches that hang down into the active channel. These activities employ vegetation control methods such as cutting and removing vegetation above the ground by hand or with loppers, hand saws, chainsaws, pole saws, weed eaters and other hand tools. Bladed weed-eaters are used to cut cattails. Fire fuel reduction is achieved by mowing on tops of banks and levees, removal of fallen trees, removal of standing dead trees, and thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas. Tree removal and thinning employ a mix of tools including chainsaws, loppers, hand saws, pole saws, hedge trimmers, and other hand tools.

Tree removal is a rare event. Program BIO-4f of the Countywide Plan recognizes that tree growth may be cleared from the stream channel where removal is essential to protect against property damage or prevent safety hazards Removal of mature, healthy, native trees is only indicated when pruning is insufficient to reduce unacceptably high hydraulic roughness in the channel. For

example, an arroyo willow growing on a newly established gravel bar may need to be removed if it threatens to block flow through a structure. Removal of sick, dying, or dead trees is indicated when they reduce channel capacity, increase flood hazard, and/or are a safety hazard to adjacent structures. Tree health and hazard potential will be determined by appropriate environmental staff (arborist or biologist). Snags shall be left in place to provide habitat for birds and small mammals if they do not otherwise pose a flood or safety hazard. Staff will consult with CDFG whenever possible if tree removal is necessary, and retention of large wood debris in the creeks will follow CDFG protocols.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program. Since 1999 STRAW has restored 7,159 linear feet (5.9 acres) of riparian corridor along east Marin creeks, removing invasive non-native plants and revegetating with natives to restore streamside habitat. The STRAW Program is included as a partner in the Marin County Flood Control District's Routine Maintenance Program (RMA).

Overall, the vegetation removal within flood control creeks and drainages will be the minimum amount necessary to clear these areas of obstructions. As discussed in detail in Sections V. 7, the proposed project will adhere to the mitigation measures outlined in that section, ensuring that the project would have less-than-significant impacts on riparian systems or the plants and animals that inhabit the riparian zone. Therefore, the project has been mitigated to consistency with Policies BIO-1.5, BIO-1.7, BIO-1.8, BIO-4.6 and BIO-4.7.

(4) Protection of Stream Conservation Areas

BIO-4.1 Restrict Land Use in Stream Conservation Areas. *A Stream Conservation Area (SCA) is established to protect the active channel, water quality and flood control functions, and associated fish and wildlife habitat values along streams. Development shall be set back to protect the stream and provide an upland buffer, which is important to protect significant resources that may be present and provide a transitional protection zone. Best management practices shall be adhered to in all designated SCAs. Best management practices are also strongly encouraged in ephemeral streams not defined as SCAs.*

Allowable uses in SCAs in any corridor consist of the following, provided they conform to zoning and all relevant criteria and standards for SCAs, as follows:

- Existing permitted or legal nonconforming structures or improvements, their repair, and their retrofit within the existing footprint;
- Projects to improve fish and wildlife habitat;
- Driveway, road and utility crossings, if no other location is feasible;
- Water monitoring installations;
- Passive recreation that does not significantly disturb native species;
- Necessary water supply and flood control projects that minimize impacts to stream function and to fish and wildlife habitat;
- Agricultural uses that do not result in any of the following:
 - a. The removal of woody riparian vegetation;

- b. The installation of fencing within the SCA that prevents wildlife access to the riparian habitat within the SCA;
- c. Animal confinement within the SCA; and
- d. A substantial increase in sedimentation.

BIO-4.4 Promote Natural Stream Channel Function. *Retain and, where possible, restore the hydraulic capacity and natural functions of stream channels in SCAs. Discourage alteration of the bed or banks of the stream, including filling, grading, excavating, and installation of storm drains and culverts. When feasible replace impervious surfaces with pervious surfaces. Protect and enhance fish habitat, including through retention of large woody debris, except in cases where removal is essential to protect against property damage or prevent safety hazards. In no case shall alterations that create barriers to fish migration be allowed on streams mapped as historically supporting salmonids. Alteration of natural channels within SCAs for flood control shall be designed and constructed in a manner that retains and protects the riparian vegetation, allows for sufficient capacity and natural channel migration, and allows for reestablishment of woody trees and shrubs without compromising the flood flow capacity where avoidance of existing riparian vegetation is not possible.*

BIO- 4.5 Restore and Stabilize Stream Channels. *Pursue stream restoration and appropriate channel redesign where sufficient right-of-way exists that includes the following: a hydraulic design, a channel plan form, a composite channel cross-section that incorporates low flow and bankfull channels, removal and control of invasive exotic plant species, and bio-technical bank stabilization methods to promote quick reestablishment of riparian trees and other native vegetation.*

BIO-4.10 Promote Interagency Cooperation. *Work in close cooperation with flood control districts, water districts, and wildlife agencies in the design and choice of materials for construction and alterations within SCAs.*

Consistent: Many of the channels included in the project areas are subject to protection under the Stream Conservation Area protection policies as set forth in the Countywide Plan. As discussed in Section V. 3. (c) And V. 11. (d, e), the proposed project is a flood control project that will maintain functioning channels for conveyance of water flow, minimize impacts to fish and wildlife habitat and reduce risk of fire and flooding. Thus, it is a permitted activity within the SCA, as set forth in the Countywide Plan Policy BIO-4.1 Excavation of accumulated sediment, selective vegetation removal within the creeks, channels and drainage ditches at the project sites, and minimal streambank stabilization where needed will work to restore the hydraulic and natural functions of project drainages to reduce the risk of flooding, thus the project is consistent with Policies BIO-4.4 and 4.5. The project promote interagency cooperation in that it will be implemented by the Marin County Flood Control District in collaboration with local municipalities including the Cities of Mill Valley, Larkspur, Ross, San Anselmo, Fairfax and Novato. Permits for the project will be issued by the trustee agencies including the Department of Fish and Game, the US Army Corps of Engineers, the Regional Water Quality Control Board, the US Fish and Wildlife Service and the National Marine Fisheries Service.

(5) Species and Habitat Preservation

BIO-1.1 Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors. *Protect sensitive biological resources, wetlands, migratory species of the Pacific Flyway, and wildlife movement corridors through careful environmental review of proposed development applications, including consideration of cumulative impacts, participation in comprehensive habitat management programs with other local and resource agencies, and continue acquisition and management of open space lands that provide for permanent protection of important natural habitats.*

BIO-1.3 Protect Woodlands, Forests, and Tree Resources. *Protect large native trees, trees with historical importance; oak woodlands; healthy and safe eucalyptus groves that support colonies of monarch butterflies, colonial nesting birds, or known raptor sites; and forest habitats. Prevent the untimely removal of trees through the implementation of standards in the Development Code and Native Tree Preservation and Protection Ordinance. Encourage other local agencies to adopt tree preservation ordinances to protect native trees and woodlands, regardless of whether they are located in urban or undeveloped areas*

BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors. *Ensure that important corridors for wildlife movement and dispersal are protected as a condition of discretionary permits, including consideration of cumulative impacts. Features of particular importance to wildlife for movement may include riparian corridors, shorelines of the coast and bay, and ridgelines. Linkages and corridors shall be provided that connect sensitive habitat areas such as woodlands, forests, wetlands, and essential habitat for special-status species, including an assessment of cumulative impacts.*

BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season. *Limit construction and other sources of potential disturbance in sensitive riparian corridors, wetlands, and baylands to protect bird nesting activities. Disturbance should generally be set back from sensitive habitat during the nesting season from March 1 through August 1 to protect bird nesting, rearing, and fledging activities. Pre-construction surveys should be conducted by a qualified professional where development is proposed in sensitive habitat areas during the nesting season, and appropriate restrictions should be defined to protect nests in active use and ensure that any young have fledged before construction proceeds.*

BIO-2.7 Protect Sensitive Coastal Habitat. *Protect coastal dunes, streams, and wetlands, and sensitive wildlife habitat from development in accordance with coastal resource management standards in the development code.*

BIO-5.1 Protect the Baylands Corridor. *Ensure that baylands and large, adjacent essential uplands are protected, and encourage enhancement efforts for baylands, including those in the baylands corridor.*

BIO-5.3 Leave Tidelands in Their Natural State. *Require that all tidelands be left in their natural state to respect their biological importance to the estuarine ecosystem. Any modifications should be limited to habitat restoration or enhancement plans approved by regulatory agencies.*

BIO-5.5 Protect Freshwater Habitats. *Preserve and where possible expand habitats associated with freshwater streams, seasonal wetlands, and small former marshes to facilitate the circulation, distribution, and flow of fresh water, and to enhance associated habitat values.*

BIO-5.6 Use Flood Basins for Seasonal Habitat. *Utilize natural or manage man-made flood basins to provide seasonal habitat for waterfowl and shorebirds and prohibit development in these basins to protect habitat values.*

Consistent: A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the project's potential impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Avoidance and Minimization Measures (AMMs) to be employed at each project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

General and activity-specific conditions, AMMs and BMPs are incorporated into the overall RMA project description and spelled out in the individual project fact sheets for each site. An Environmental Compliance Coordinator (ECC) will work with the project on a daily basis to ensure that all AMMs and BMPs are implemented as prescribed in the field, depending on the location and nature of the activity. The ECC will be on-site to monitor the outcome of all conservation measures to assure protection of all fish and wildlife species and their habitats

As prescribed in the Biological Assessment, pre-construction surveys for special-status animal and plant species will be completed at individual sites as necessary depending on work windows and seasonal conditions. If surveys confirm species occurrence at a project site, a biologist will oversee all construction work and implement appropriate conservation measures to protect these species. If necessary, avoidance of work areas and stop work orders will be employed if impacts to sensitive species and their habitat cannot be mitigated to a less-than-significant level or avoided completely. As discussed in detail in Sections V. 7. (a, b, c), the proposed project, will adhere to the mitigation measures outlined in those sections, ensuring that the project would have less-than-significant impacts on all special-status species, wildlife and habitat diversity. Therefore, the project has been mitigated to consistency with Policies BIO-1.1, BIO-1.3, BIO-2.4, BIO-2.5, BIO-2.7.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program. Since 1999 STRAW has restored 7,159 linear feet (5.9 acres) of riparian corridor along east Marin creeks, removing invasive non-native plants and revegetating with natives to restore streamside habitat. The STRAW Program is included as a partner in the Marin County Flood Control District's Routine Maintenance Program (RMA).

Sensitive natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection (i.e., §404 of the Clean Water Act and/or the §§1600 et seq. of the California Fish and Game Code). Within the project sites, two

sensitive natural communities have the potential to be affected by project activities: northern coastal salt marsh and coastal brackish marsh (CDFG 2011). These communities are found within or adjacent to some of the project sites and are expected to fall under federal and/or state jurisdictions as wetlands or waters of the U.S. or waters of the state. Wetlands and Other Waters of the U.S. Wetlands and other aquatic resources such as riparian areas and certain aquatic vegetation communities are considered sensitive biological resources and can fall under the jurisdiction of several regulatory agencies. Wetlands are generally defined by the USACE as “those areas that are inundated or saturated by surface or ground water... that under normal circumstances support a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3 [b]). Indicators of three wetland parameters determined by field investigation must be present for a site to be classified as a wetland by the USACE; these are hydric soils, hydrophytic vegetation, and wetlands hydrology. Approximately one third of the sites have been initially identified as possibly meeting the USACE definition of wetlands. A formal wetlands delineation for those 38 sites will be completed in Spring or Summer 2012. Mitigation measures to protect these sites are outlined in Section 7 below. In tideland areas maintenance work will be limited to that which is absolutely necessary to restore flow through to the tidelands from upland drainage areas (e.g. clearing sediment from culvert outfalls). The minimal amount of work proposed in the tidelands area will be conditioned by permits issued by the Department of Fish and Game (1600 Streambed Alteration Agreement) and the Army Corps of Engineers (404 permit), with consultation from US Fish and Wildlife Service the National Marine Fisheries Service, and the Regional Water Quality Control Board (401 Certification). General and activity-specific conditions, AMMs and BMPs prescribed for all project sites located in tideland areas will mitigate the project’s impacts to less-than-significant, therefore, the project will be consistent with Policies BIO-5.1, BIO-5.3, BIO-5.5, and BIO-5.6.

(6) Protection of Watersheds and Water Quality

WR-1.1. Protect Watersheds and Aquifer Recharge. Give high priority to the protection of watersheds, aquifer-recharge areas, and natural drainage systems in any consideration of land use.

WR-2.3. Avoid Erosion and Sedimentation. Minimize soil erosion and discharge of sediments into surface runoff, drainage systems, and water bodies. Continue to require grading plans that address avoidance of soil erosion and on-site sediment retention. Require developments to include on-site facilities for the retention of sediments, and, if necessary, require continued monitoring and maintenance of these facilities upon project completion.

WR-2.4 Design County Facilities to Minimize Pollutant Input. Design, construct, and maintain County building, landscaped areas, roads, bridges, drainages, and other facilities to minimize the volume of toxic, nutrients, sediment, and other pollutants in stormwater flows, and continue to improve road maintenance methods to reduce erosion and sedimentation potential.

Consistent: Implementation of this project will help to restore the normal drainage patterns within the project area by removing accumulated sediment from the creeks, channels and drainage ditches at selected sites. There will be a temporary increase in turbidity in these drainages as sediment is disturbed from the dredging process. These impacts will be short-term and localized over the 1-7 day sediment removal project period. DPW will use Best Management Practices (BMPs) outlined in the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance. These BMPs include minimizing loss of

native vegetation, conducting the work from the road whenever possible, timing the work prior to the rainy season; minimizing sediment disturbance and suspension within the water, taking all excavated material to an upland disposal site, and sediment/erosion controls to keep excess soil from washing or blowing away during removal, transport and storage (including sediment traps, silt fences, coir logs and wattles containing weed-free rice straw, as necessary). Dewatering will be conducted in a manner to reduce turbidity downstream of the project area. To prevent streambed erosion from the use of cofferdams, pipes and pumps used to de-water the creek, diversion pipe outlets shall be placed on hard surfaces or temporary outfall dissipation structures shall be installed (i.e. rock piles). No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start-up of any phase of the project that may result in sediment run-off to the stream. If rainfall is predicted, erosion control measures must be kept on-site and be in place prior to the onset of precipitation. As discussed in detail in Sections V. 3. (b) and V. 4. (c), the proposed project will adhere to the mitigation measures outlined in those sections, ensuring that the project would have less-than-significant impacts on water quality and watersheds. Therefore, the project has been mitigated to consistency with Policies WR-1.1, 2.3 and 2.4.

(7) Avoidance of Environmental Hazards

EH-2.1. Avoid Hazard Areas. *Require development to avoid or minimize potential hazards from earthquakes and unstable ground conditions.*

EH-3.2. Retain Natural Conditions. *Ensure that flow capacity is maintained in stream channels and floodplains, and achieve flood control using biotechnical techniques instead of storm drains, culverts, riprap, and other forms of structural stabilization.*

EH-4.2 Remove Hazardous Vegetation. *Abate the build-up of vegetation around existing structures or on vacant properties that could help fuel fires.*

Consistent: The RMA project is maintenance in nature and no new development or increases of footprint of existing development is proposed; therefore no increase in impacts from an earthquakes on structures is predicted for the project. This project will restore the channel function of these drainages by removing obstructing vegetation and accumulated sediment, which should reduce the potential for flooding of adjacent roadways and promote public safety of people and property from the risks associated with flooding. The proposed bank stabilization associated with the RMA uses biotechnical designs and does not include installation of rip rap or other forms of structural stabilization. Bank stabilization and channel clearing activities will be implemented in a way that maintains natural channel features and watershed functions. Mowing of levees and along top of bank in selected channel reaches is done before the July 4th holiday in order to reduce fire fuel loading and to minimize the risk of grass fires, therefore, the project will be consistent with Policies EH-2.1, 3.2 and 4.2.

(8) Protection of Air Quality

AIR-2.0. Protection from Emissions. *Minimize the potential impacts from land uses that may emit pollution and/or odors on residential and other land uses sensitive to such emissions in unincorporated Marin County.*

AIR-5.0 Adaptation to Climate Change- Adopt policies and programs that promote resilient human and natural systems in order to ease the impacts of climate change.

Consistent: The effects on air quality are from exhaust coming from heavy equipment during dredging. These impacts are short-term and temporal, occurring incrementally over the 1-7 day work periods. As discussed in Section V. 5.(a), the project would contribute minimally to air impacts; no significant negative impacts related to air quality are identified. The re-vegetation of stream banks by the STRAW program serves to sequester carbon and thus reduce the impacts of climate change. Consequently, the proposed project will be consistent with Policy AIR-2.1.

(9) Protection of Open Space and Trails

Policy TRL-1.1. Protect the Existing Countywide Trail System. Maintain the existing countywide trail system and protect the public's right to access it.

Consistent: The project will not impede access to the Countywide Trail System in any way nor will it create any impacts that will decrease the public's enjoyment of the trail system or open space areas in any way, therefore it is consistent with the Countywide Plan Policies to protect open space and trails.

(10) Minimize Noise Impacts

NO-1.3. Regulate Noise Generating Activities. Require measures to minimize noise exposure to neighboring properties, open space, and wildlife habitat from construction-related activities, yard maintenance equipment, and other noise sources, such as amplified music.

Consistent: As discussed in Section V. 10. (a, b), the noise associated with sediment removal activities is limited to the sound of heavy equipment operating during normal daytime working hours (approximately 8:00 a.m. to 4:00 p.m.). The project is short-term (approximately 1-7 days, depending on site), most of the work is not near residences and for those that are, private landowners have concurred with implementation of this flood control maintenance project on their lands and project dates will be coordinated with these landowners in advance of project commencement. Noise impacts could cause temporary disturbance to wildlife species such as songbirds that use the riparian zone. Any disturbed or flushed resident wildlife are expected to return to the project area after completion of daily construction activities. The project would contribute minimally to noise impacts; no significant impacts related to noise pollution are identified. Therefore, the project will be consistent with Policy NO-1.3.

(11) Protection of Visual Resources

DES-4.1. Preserve Visual Quality Protect scenic quality and views of the natural environment – including ridgelines and upland greenbelts, hillsides, water, and trees – from adverse impacts related to development.

Consistent: The visual resources of the project sites would not be adversely impacted by maintenance activities because the overall project is designed to respect the surrounding natural environment and return it to its previous condition (i.e., by removing aggraded sediment, fallen

trees or overgrown weeds). Some trimming of riparian trees will occur, but the maintenance project would not result in visual impacts to public or scenic views and vistas from adjacent roadways, therefore, the project will be consistent with Policy DES-4.1.

(12) Avoid Impacts to Historical Resources

HAR-1.3. Avoid Impacts to Historical Resources. Ensure that human activity avoids damaging cultural resources.

Consistent: As discussed in Sections V. 14. (a, b), the proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and some sites to be dredged have previously been dredged multiple times in the same locations. Should any cultural resources be discovered during sediment removal activities, all work shall immediately be stopped and the services of a qualified archaeologist from Sonoma State University's Cultural Resources Department shall be engaged to assess the value of the resource and to develop appropriate mitigation measures. As discussed in detail in Sections V. 14. (a), the proposed project will adhere to the mitigation measures outlined in that section, ensuring that the project would have less-than-significant impacts on historical resources. Therefore, the project has been mitigated to consistency with Policy HAR-1.3.

CITY OF MILL VALLEY GENERAL PLAN (1989)

Section 5: Public Health and Safety; PH-1: The City shall strive to ensure that all grading, site improvements and structures minimize geotechnical, seismic and flood hazards to people and property.

A large portion of developed and undeveloped Mill Valley lands are subject to flooding due to a combination of factors including periodic heavy winter rainfalls, tidal fluctuations, and potentials for tsunami and dam failure due to seismic activity. Flooding as a result of heavy rainfall can result from either of two phenomena: (1) storm water run-off inundation of lowlands due to an inadequate drainage network, and (2) high Bay tides and winds which force the storm water up stream channels. Mill Valley drains into the Richardson Bay Drainage Basin mainly by way of the Basin's major stream, Arroyo Corte Madera Del Presidio. The creek often overflows its banks in the lower reaches during a period of heavy rainfall. Significant encroachment has occurred along Arroyo Corte Madera by urban development and excessive vegetative growth. Both factors have imposed extreme limitations on channel flow capacities along substantial portions of the stream, resulting in major flood problems. Damaging floods have periodically occurred over this area as a result.

Consistent: The primary objective of the proposed RMA project within the City of Mill Valley's jurisdiction is to reduce the potential risk of flooding by maintaining the channels and removing obstructions from related flood control infrastructure such as tidegates, weirs and trash racks; therefore the RMA program is consistent with the PH-1 Policy of the City of Mill Valley General Plan.

CITY OF NOVATO GENERAL PLAN (1996)

The City of Novato General Plan contains the following policies to protect Watercourses, Wetlands, and Baylands Areas that are applicable to the proposed RMA activities that will be conducted on properties within the City of Novato jurisdiction.

CHAPTER IV- Environment; Watercourses, Wetlands, and Baylands Areas

EN Objective 1– Preserve, protect, and enhance streams and other bodies of water.

EN Policy 1 Ecology of Creeks and Streams. *Preserve and enhance the ecology of creeks and streams.*

EN Policy 2 Vegetation in Watercourse Areas. *Protect vegetation in watercourse areas.*

EN Policy 3 Wildlife Habitat. *Endeavor to preserve and enhance wildlife habitat areas in watercourse areas and control human use of these areas as necessary to protect them.*

EN Policy 4 Erosion Control. *Minimize soil disturbance and surface runoff in the Stream Protection Zones. Pursuant to the City's grading ordinance, work in and adjacent to the zones shall be conducted during the dry season only, at times when the Community Development Department determines that surface runoff will be minimal or containable.*

EN Policy 5 Habitat Restoration. *Restore damaged portions of riparian areas to their natural state, wherever feasible.*

EN Policy 7 Water Quality. *Encourage protection of water resources from pollution and sedimentation, and preserve their environmental and recreation values. Count the project's size and cumulative impacts.*

EN Policy 8 Environmentally Sound Flood Control Measures. *Encourage flood control measures that retain the natural features and conditions of watercourses to the maximum feasible extent.*

EN Objective 2- Preserve, protect, and enhance wetlands.

EN Policy 9 Determination of Wetlands. *Recognize the U.S. Army Corps of Engineers (ACE) as the designated permitting agency that regulates wetlands. In regulating wetland activities, the ACE consults with other agencies and organizations including but not limited to U.S. Fish and Wildlife and State Department of Fish and Game.*

EN Policy 10 Wetlands Ecology. *Preserve and enhance wetlands ecology.*

EN Objective 3- Preserve, protect and enhance historic bayland areas.

EN Policy 12 Bayland Area Protection. *Regulate development in the Bayland Overlay Zone so that it does not encroach into wetlands or sensitive wildlife habitats, provided that this regulation does not prevent all use of a property. Discourage human activity that damages fisheries, or habitat for birds, fish or other wildlife.*

EN Objective 4 - Preserve and protect native plant and animal species and their habitat.

EN Policy 18 Species Diversity and Habitat. Protect biological resources that are necessary to maintain a diversity of plant and animal species.

EN Policy 19 Special Status Species. Cooperate with State and Federal Agencies to ensure that development does not substantially adversely affect special status species appearing on the State or Federal list for any rare, endangered, or threatened species. The environmental documentation will screen for the Federal Candidate Species, plants listed on lists 1A, 1B, or 2 of the California Native Plant Society (CNPS), inventory of rare and endangered vascular plants of California and animals designated by CDFG as species of special concern or their current equivalent.

CHAPTER V- Safety and Noise

SF Objective 3- Reduce flood hazards.

SF Policy 6 Cooperation with Marin County. Continue to work with the Marin County Public Works Department to minimize negative impacts of storm runoff.

SF Policy 8 Reducing Flood Hazards. Reduce flood risk by maintaining effective flood drainage systems and regulating construction.

SF Policy 9 Storm Drainage System. Maintain unobstructed water flow in the storm drainage system.

Consistent: The proposed project is consistent with City of Novato General Plan policies listed above, since the primary objective of the RMA project is to reduce the potential risk and hazards associated with flooding and to maintain unobstructed flow in the storm drainage systems. During all RMA activities Avoidance and Minimization Measures and BMPs will be implemented to protect and enhance the streams and wetlands within the project area and native habitat found within these systems. Therefore the RMA program is consistent with the Policies EN 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 18, and 19 and SF 6, 8 and 9.

LAND USE AND PLANNING Section 1- (continued...)

| c) Affect agricultural resources, operations, or contracts (e.g. impacts to soils or farmlands, impacts from incompatible land uses, or conflicts with Williamson Act contracts)? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
|---|--------------------|--|------------------------------|----------------|
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not change any agricultural resources, operation or contracts; therefore this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| d) Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not divide or affect the physical arrangement of the established communities; therefore this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| e) Result in substantial alteration of the character or functioning of the community, or present or planned use of an area? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not alter the character or function of the community and will actually be a benefit to the community by reducing the potential frequency of flooding; therefore, the project will result in less-than-significant impacts.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| f) Substantially increase the demand for neighborhood or regional parks or other recreational facilities, or affect existing recreational opportunities? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not increase demand for parks or other facilities, therefore this is a less-than-significant impact.

2. **POPULATION AND HOUSING. *Would the proposal:***

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| a) Increase density that would exceed official population projections for the planning area within which the project site is located as set forth in the Countywide Plan and/or community plan? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not have an effect on population nor density of housing; therefore, this is a less-than-significant impact.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| b) Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or extension of major infrastructure)? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not have an effect on growth of an area either directly or indirectly; therefore the project will result in less-than-significant impacts.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| c) Displace existing housing, especially affordable housing? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not displace existing housing of any kind; therefore, the project will result in a less-than-significant impact.

3. **GEOPHYSICAL.** *Would the proposal result in or expose people to potential impacts involving:*

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|--|-----------------------|---|------------------------------------|-------------------|
| a) Location in an area of geologic hazards, including but not necessarily limited to: 1) active or potentially active fault zones; 2) landslides or mudslides; 3) slope instability or ground failure; 4) subsidence; 5) expansive soils; 6) liquefaction; 7) tsunami ; or 8) similar hazards? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

This is a routine flood control maintenance project, which will not result in the building of any structures, not increase the vulnerability of other structures to geologic hazards, nor diminish stability of structures within the project area. Rather, the maintenance activities will add to the protection of the public and public infrastructure from potential geologic hazards by increasing channel function and removing debris from culverts and around flood control infrastructure such as trash racks and pump stations. Therefore the project will result in less-than-significant impacts.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| b) Substantial erosion of soils due to wind or water forces and attendant siltation from excavation, grading, or fill? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

This is a flood control maintenance project with primary objectives to remove vegetation, debris and accumulated sediment to maintain channel function and facilitate unobstructed flow around public infrastructure including bridges, storm drains, trash racks, and pump stations. Another aspect of the project is to prevent bank erosion and sedimentation into adjacent creek channels. The only sediment that will be excavated is below water line in creeks, channels sediment basins and drainage ditches; there will be no excavating or grading of adjacent channel banks, and no permanent fill is involved in the project unless it is related to a bio-engineered streambank stabilization project. Each activity includes prescribed Best Management Practices (BMPs), which are mandated to be employed during and after project implementation. Erosion control BMPs are implemented to keep soil from leaving the work sites. During work activities there may be a temporary increase in turbidity in drainages as sediment is disturbed from the dredging process and potential water quality impacts could have a negative effect

upon aquatic life. Avoidance and minimization measures to protect threatened and endangered species and sensitive habitats are discussed in Section V. 7 (a). Implementation of the following mitigation measures are incorporated into the project description and will decrease the impacts of erosion and sedimentation to a less than significant level.

MITIGATION MEASURES

V.3 (b)-1. The District shall designate an Environmental Compliance Coordinator (ECC) to oversee the implementation of the RMA in the field. Before commencement of a maintenance activity, the ECC shall review Site Fact Sheets for specific information on the type, location and extent of the activity and associated areas of disturbance and determine the Avoidance and Minimization Measures and Best Management Practices (BMPs) to implement prior to the maintenance activity. The ECC shall distribute the Site Fact Sheet to the Maintenance Supervisor five days before beginning the maintenance activity.

V.3 (b)-2. Erosion control BMPs shall be incorporated into each project to minimize the discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. Erosion control measures shall be monitored during and after storm events and modifications shall be made, if needed.

V.3 (b)-3. If a maintenance activity may cause the introduction of sediments into the stream, no phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start up of any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the ECC shall inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

V.3 (b)-4. DPW shall construct the project in a manner that reduces turbidity and protects water quality, resident fish and other aquatic species. To prevent streambed erosion from the use of temporary cofferdams, pipes and pumps used to de-water the creek channel, diversion pipe outlets would be placed on hard surfaces or outfall protection in the form of rock or similar material would be installed. These temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after project completion and the creeks shall be restored to their natural condition.

V.3 (b)-5. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material that may be washed into waters of the State shall be removed from the work area and transported to a legal upland spoils disposal site.

MITIGATION MONITORING MEASURES

V.3(b)-1-5. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| c) Substantial changes in topography from excavation, grading or fill, including but not necessarily limited to: 1) ground surface relief features; 2) geologic substructures or unstable soil conditions; and 3) unique geologic or physical features? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

A long-term objective of this maintenance project is to restore natural channel formation and to decrease the potential risk and frequency of flooding. A localized change in stream channel and sediment basin topography will occur through the removal of sediment within the creek channels and drainages. It shall be the minimum amount needed to restore natural channel function and facilitate unobstructed flow conditions. Given the nature of the project, the changes in channel topography are desired outcomes. Given that the sediment to be removed is caused by deposition of eroded sediment from the upper watershed into the lower flood control drainages, impacts to these channels from excavation should be positive in nature. Consequently, the project will result in less-than-significant impacts.

4. WATER. Would the proposal result in:

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| a) Substantial changes in absorption rates, drainage patterns, or the rate and amount of surface runoff? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Drainage patterns and rate of surface run-off into drainages within the project area from the upper watersheds and adjacent neighborhoods will remain unaltered. The removal of sediment and obstructing vegetation from these channels will increase the channel's ability to carry surface run-off during high flood flows and improve connectivity between downstream and upstream habitats. If the channels have greater functional ability after maintenance has been performed, the potential risk of flooding of adjacent roads and property will be reduced. Consequently, the project will result in less-than-significant impacts.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| b) Exposure of people or property to water related hazards, including, but not necessarily limited to: 1) flooding; 2) debris deposition; or 3) similar hazards ? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

This is a flood control project which will decrease potential for flood hazards caused by vegetation or debris deposition around culverts, trash racks, pump stations, and tide gates during high flows. By removing vegetation and sediment from the channels, ditches and sediment basins identified within the project area, the channels will be altered to improve natural channel function and decrease the threat of potential flooding of adjacent roads and property. The project will have an overall beneficial effect on preventing potential flood hazards and debris deposition; consequently the project will result in less-than-significant impacts.

| | | | | |
|---|--------------------|--|------------------------------|----------------|
| c) Discharge of pollutants into surface or ground waters or other alteration of surface or ground water quality (e.g. temperature, dissolved oxygen or turbidity)? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

This is a routine flood control maintenance project with the primary objective to remove vegetation and accumulated sediment to maintain channel function and unobstructed flow around structures including bridges, storm drain outlets, and pump stations, and to maintain stable stream banks where necessary. The only sediment that will be excavated is below water line in creeks, channels and drainage ditches; there will be no excavating or grading of adjacent channel banks, and no permanent fill is involved in the project. Each activity includes prescribed Best Management Practices (BMPs), which are mandated to be employed during and after project implementation. The BMPs are designed to keep soil from leaving the work sites (erosion control BMPs) and to repair collapsing stream banks which often contribute to siltation of streams (bio-engineered stream bank repair BMPs). During implementation there may be a temporary increase in turbidity as sediment is disturbed by the dredging process. Potential water quality impacts could have a negative effect upon water quality and aquatic life. Potential impacts to threatened and endangered species that are present within or near the project site area are discussed in Section V.7(a). Implementation of the following mitigation measures will decrease the risk of impacts of erosion or siltation to water quality and aquatic resources and will reduce these impacts to less than significant.

MITIGATION MEASURES

V.4(c)-1. The District shall implement maintenance activities in a manner that reduces turbidity and protects water quality, resident fish and other aquatic species. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area and transported to a legal upland spoils disposal site.

V.4(c)-2. Appropriate BMPs shall be incorporated into each project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. BMPs to be implemented for each type of activity are referenced in the program documents and prescribed in the Project Fact Sheets for each site. Erosion control measures shall be monitored during and after storm events and modifications made, if needed. BMPs to be implemented are taken from the the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and the FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance.

V.4(c)-3. To prevent streambed erosion from the use of cofferdams, pipes and pumps used to de-water the creek, diversion pipe outlets shall be placed on hard surfaces or temporary outfall dissipation structures shall be installed (i.e. rock piles). Temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after project completion and the creeks shall be restored to their natural condition.

V.4(c)-4. No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start up of any phase of the project that may result in sediment run-off to the stream. If rainfall is predicted, erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the Environmental Compliance Coordinator shall

inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

MITIGATION MONITORING MEASURES

V.4(c)-1-6. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

| d) Substantial change in the amount of surface water in any water body or ground water either through direct additions or withdrawals, or through intersection of an aquifer by cuts or excavations? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
|---|--------------------|--|------------------------------|----------------|
| | [] | [X] | [] | [] |

A select set of sites within the project will need to be temporarily dewatered for equipment access for sediment removal and bank stabilization aspects of the project and to protect special status species such as steelhead trout. Creek flows will be diverted by the construction of temporary cofferdams around the active construction site and water will be transported from upstream to downstream reaches via pumps and pipes/hoses. The cofferdams will be constructed with native materials, including sand bags, gravel bags or equivalent materials and be sealed and secured with plastic sheeting and anchored in place. There will be temporary impacts on water resources within these creek channels during the dewatering process. This impact will be short-term and localized but has the potential to adversely affect aquatic resources in the project area. Threatened and endangered species that are present or near the project site are discussed in Section V.7.(a) and applicable mitigations are proposed to protect these species during dewatering. Implementation of the following best management practices will decrease the risk of impacts to water resources resulting from the dewatering process and reduce these impacts to less than significant.

MITIGATION MEASURES

V.4(d)-1. The District shall construct the projects in a manner that protects fish and other aquatic resources and avoids loss of their habitat. A biologist shall oversee project work and implement any necessary conservation measures to protect these species, including pre-construction surveys and rescue and relocation to suitable upstream or downstream habitat.

V.4(d)-2. Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic. Intakes and outlets should be designed to minimize turbidity and the potential to wash contaminants into the stream. If a work site is to be temporarily dewatered by pumping, intakes should be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997). A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length. Once the project work is complete, water should be slowly released back into the work area to prevent erosion and decrease turbidity. The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under

this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration. All cofferdams, pumps, pipes, sheet plastic, silt fences or other non-native materials shall be removed from the stream upon project completion.

V.4(d)-3. Sufficient water shall at all times be allowed to pass downstream to maintain aquatic life below the diversion dam.

V.4(d)-4. For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials shall be removed from the stream following completion of the activity.

MITIGATION MONITORING MEASURES

V.4(d)-1-4. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

| | | | | |
|--|---------------------------|---|-------------------------------------|-----------------------|
| e) Substantial changes in the flow of surface or ground waters, including, but not necessarily limited to: 1) currents; 2) rate of flow; or 3) the course or direction of water movements? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The natural direction and rate of flow of groundwater will remain unchanged. The natural direction of flow of the creeks and channels will not change, but the rates of surface flow in some areas may increase with the decreased coefficient of friction resulting from the removal of sediment. As the channel function is increased, there may be a decrease in flood flows coming from the creeks and channels onto adjacent roads and properties, which is the objective of the project. Therefore, this is a less-than-significant impact.

| | | | | |
|--|---------------------------|---|-------------------------------------|-----------------------|
| f) Substantial reduction in the amount of water otherwise available for public water supplies? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not reduce the amount of water supply available to the public; therefore, this is a less-than-significant impact.

5. AIR QUALITY. *Would the proposal:*

| | | | | |
|---|---------------------------|---|-------------------------------------|-----------------------|
| a) Generate substantial air emissions that could violate official air quality standards or contribute substantially to an existing or projected air quality violation? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the maintenance project. Since the work will occur out in the open air and over a short duration in each project area (1-7 days, depending on project site), the impact on air quality will be less-than-significant.

| | | | | |
|---|---------------------------|---|-------------------------------------|-----------------------|
| b) Expose sensitive receptors to pollutants, such as noxious fumes or fugitive dust? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the maintenance project. Since the work will occur out in the open air and over a short duration in each project area (1-7 days, depending on project site), the impact to sensitive receptors will be less-than-significant. The impact from dust will be minimal during sediment removal since the work is being done in the wet environment with very little volatile dust, therefore the impact to sensitive receptors will be less-than-significant.

| | | | | |
|---|---------------------------|---|-------------------------------------|-----------------------|
| c) Alter air movement, moisture, or temperature, or cause any change in climate? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Planting of streamside native vegetation occurs as part of the STRAW Program, serving to decrease stream temperatures, increase carbon sequestration and reduce the impacts of global climate change, therefore, this is a less-than-significant impact.

| | | | | |
|---|---------------------------|---|-------------------------------------|-----------------------|
| d) Create objectionable odors? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The only odors that will be produced will come from the exhaust fumes from the heavy equipment used for the project and potentially smell coming from anaerobic soil conditions in a super saturated environment. The work will occur out in the open air and over a short duration (1-7 days, depending on project site), therefore the impact from objectionable odors will be less-than-significant.

6. **TRANSPORTATION/CIRCULATION. *Would the proposal result in:***

| | | | | |
|--|--------------------|--|------------------------------|----------------|
| a) Substantial increase in vehicle trips or traffic congestion such that existing levels of service on affected roadways will deteriorate below acceptable County standards? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project will deploy vehicles and equipment on a daily basis to the various project sites, where it will remain until the project is completed each day. No substantial increase in vehicular traffic or congestion will occur because of the project. The level of service on affected roadways will not drop below acceptable County standards. These impacts will be minor and are commensurate with currently-occurring traffic impacts associated with routine road maintenance activities along these roads in Marin County. Therefore, this is a less-than-significant impact.

| | | | | |
|--|--------------------|--|------------------------------|----------------|
| b) Traffic hazards related to: 1) safety from design features (e.g. sharp curves or dangerous intersections); 2) barriers to pedestrians or bicyclists; or 3) incompatible uses (e.g. farm equipment)? ((source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

Project implementation will not result in dangerous design features or incompatible uses. Temporary staging of equipment along the road right-of-way could result in the temporary re-direction of vehicle, bicycle and pedestrian traffic. The proposed maintenance project is along County of Marin or local municipality maintained roads and road crews and contractors are experienced at conducting procedures to avoid road traffic hazards. Implementation of the following mitigation measure will decrease the risk of impacts to traffic hazards and reduce these impacts to less than significant.

MITIGATION MEASURES

V.6 (b)-1. The County maintenance crews and any Contractors on the project shall clearly mark alternative routes with traffic control signs during project implementation to ensure public safety.

MITIGATION MONITORING MEASURES

V.6 (b)-1. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

| | | | | |
|--|--------------------|--|------------------------------|----------------|
| c) Inadequate emergency access or access to nearby uses? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Alternative routes shall be clearly marked with County of Marin traffic control signs or communicated on site by County Roads maintenance crews. Emergency vehicles would be given special consideration to provide

unimpeded and continual access to roadways during the maintenance period. Therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| d) Insufficient parking capacity on-site or off-site? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Because equipment will sometimes be staged from the road right-of-way, there could be a temporary loss of pull-out areas used for parking at some sites along project related roads, where staging of County vehicles and equipment could result in the temporary use of part of these pull-out areas. Due to the temporary maintenance nature of the project, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| e) Substantial impacts upon existing transportation systems, including rail, waterborne or air traffic systems? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Due to the temporary maintenance nature of the project, no substantial impacts upon existing transportation systems will occur on or around the project sites. Minor road diversions may be required during project activities, with alternative routes clearly marked with County of Marin traffic control signs or communicated on site by County Roads maintenance crews. Therefore, this is a less-than-significant impact.

7. BIOLOGICAL RESOURCES. *Would the proposal result in:*

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| a) Reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats including, but not necessarily limited to: 1) plants; 2) fish; 3) insects; 4) animals; and 5) birds listed as special-status species by State or Federal Resource Agencies? (source #(s): 3, 4) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

In order to assess and mitigate for potential impacts to special status species and their habitats, a biologic assessment was conducted which looked at potential impacts of all routine maintenance activities on special status species and their habitats; (Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works, California. July 2011). Those species with a moderate to high potential to occur, or those species prominent in the regulatory environment are discussed in detail in the Biological Assessment and actions to avoid impacts to these species and their habitats are summarized in this section.

Based on quad searches and special status species listings from federal and state agencies searches, 80 special status animal species have been identified as having some potential of occurring within the project sites. Of these, only 16 species, based on literature and database reviews and familiarity with local fauna, are considered likely to occur within the project sites and eight of these are listed as threatened or endangered including:

- Central California Coast coho salmon (*Oncorhynchus kisutch*)
- Central California Coast steelhead trout (*Oncorhynchus mykiss irideus*)
- California red-legged frog (*Rana draytonii*)
- Northwestern pond turtle (*Clemmys (Actinemys) marmorata marmorata*)
- California clapper rail (*Rallus longirostris obsoletus*)
- California black rail (*Laterallus jamaicensis coturniculus*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Salt marsh harvest mouse (*Reithrodontomys raviventris*)

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites. Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed as threatened or endangered; all are species of concern.

- Point Reyes bird's-beak (*Cordylanthus maritimus ssp. palustris*)
- Pale Yellow/Hayfield tarplant (*Hemizonia congesta ssp. congesta*)
- Marsh microseris (*Microseris paludosa*)
- Marin knotweed (*Polygonum marinense*)

The RMA program is complex; at any one time during the work season, different work activities may be occurring at several sites, with several different contractors. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality. Pre-construction surveys to locate special status species will be conducted before maintenance activities commence as prescribed and work at each site will be scheduled around relevant work windows where possible to avoid impacts (Table 1; page 7). Work at a site may be re-scheduled based on survey finding if necessary. A suite of General and Activity-Specific Conditions apply to activities implemented as part of the RMA program as well as species-specific Avoidance and Minimization Measures (AMMs).

Best Management Practices (BMPs) have been prescribed for each project site, depending on activity type, site constraints, and species presumed to be present. BMPs to be implemented at each site are referenced from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and FEMA.

General and Activity-Specific Conditions, AMMs and BMPs are incorporated into the RMA project description and included in the individual Project Fact Sheets for each site. The job of the Environmental Compliance Coordinator is to ensure that all measures are employed as prescribed in the field prior to, during and after implementation. The General and Activity-Specific Conditions, AMMs and species-specific AMMs are described in detail below and included in the Project Fact Sheets developed for each site.

MITIGATIONS

The following mitigation measures are proposed to avoid and minimize the reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats and would decrease the risk of impacts to a level of less than significant.

GENERAL CONDITIONS

V.7(a)-1. Designation of Environmental Compliance Coordinator- An Environmental Compliance Coordinator (ECC) shall be designated by the County of Marin Flood Control District. The ECC shall have an understanding of biological resources, missions of regulatory agencies, regulations as they may affect listed species, and the nature of the maintenance activities. In the planning stage, before commencement of a maintenance activity, the ECC shall review project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he shall determine appropriate pre-construction surveys that may be required, depending on the species involved and the type of activity planned for that project site. The ECC shall ensure that the project crews adhere to General and Activity-Specific Conditions and Avoidance and Minimization Measures prescribed for each site and type of activity.

V.7(a)-2. Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

V.7(a)-3. Contractor Crew Training- The ECC shall ensure that before work starts, all on-site maintenance activity personnel and contractors receive instruction regarding the presence and description of listed species at each project site and the details of appropriate avoidance and minimization measures.

V.7(a)-4. Site Preparation/Wildlife Reconnaissance - The ECC shall walk the site each day before maintenance activities commence to locate wildlife; if any special status wildlife species are noted, work shall not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

V.7(a)-5. Monitoring and Reporting Program- The ECC shall implement a monitoring and reporting program that shall include, but not be limited to: preparing each year's project list, scheduling pre-construction surveys, overseeing project activity during maintenance, preparing photo documentation, and evaluating post-maintenance restoration/revegetation, if necessary. Reporting regarding project impacts to California red-legged frogs shall be performed in accordance with the terms and conditions issued by the USFWS. Report of sightings will be documented using the CNDDDB protocols published by the Department of Fish and Game.

V.7(a)-6. Work Windows - To avoid impacts to special status species, the maintenance activities carried out shall typically occur during the summer low flow season. The general work window for RMA activities is from April 15th to October 15th, depending on weather. As a rule, work at each site will be scheduled around relevant work windows to avoid impacts. In instances where work needs to be scheduled outside of an established work window for a particular species in a specific location, species-specific pre-construction surveys will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of Avoidance and Minimization Measures before proceeding. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality. The work window for streamside restoration by the STRAW Program is from October-March when schools are in session.

SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES (AMMs)

Avoidance and Minimization Measures for Fish

FISH-1: Salmonids

Several project sites within the RMA watersheds have the potential for presence of steelhead trout. If steelhead are known to be absent from the project site based on CEMAR/DFG surveys or there are long-standing natural or artificial downstream barriers sufficient to prevent upstream migration, then avoidance has been accomplished and no further actions are necessary. Presence or absence of steelhead trout in each project area is documented in the project fact sheets which are used on a daily basis by the Environmental Compliance Coordinator to guide the implementation of AMMs and BMPs in the field before, during and after completion of maintenance activities.

If steelhead trout are determined or presumed to be present at the project site, then the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-7. Work Window: All work in and around salmonid streams is restricted to the period of June 15th to October 15th in any given year. This is to take advantage of low stream flow and avoid the spawning and egg/alevin incubation period which occurs in the late fall and the outmigration period in the spring. Work outside of the channel is not subject to this modified work period.

V.7(a)-8. No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified biologist.

V.7(a)-9. To minimize turbidity and stress to salmonid species, personnel shall avoid walking through stream pools and thalwegs, and shall instead walk across riffles or outside of the stream bed to access a project site.

V.7(a)-10. To minimize disturbance during sediment removal activities, if there is flow or seepage in a work site, a reach of creek may have to be de-watered. Before construction of the de-watering system, a qualified biologist shall conduct fish relocation activities, and immediately release captured fish to a suitable habitat near the project site.

V.7(a)-11. Screens shall be placed on all pumps used for dewatering the work site in accordance with NOAA Fisheries' Fish Screening Criteria for Anadromous Salmonids (NMFS, 1997).

V.7(a)-12. If used, coffer dams shall be constructed upstream of the work site within the stream banks, and shall be constructed with clean river gravel or sand bags and covered with sheet plastic. Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into streams.

V.7(a)-13. Pump discharge must be directed into a settling basin to allow silt removal. Once the project work is complete, water shall be slowly released back into the creek to prevent erosion and limit turbidity.

V.7(a)-14. All habitat improvements on salmon and steelhead streams shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (CDFG 2010d).

Avoidance and Minimization Measures for Reptiles

REP-1: Northwestern pond turtle

Several sites may contain suitable habitat for northwestern pond turtle, and they have been known to occur at sites 1-ASJ-1, 1-LYC, and 1-WAR-2.

V.7(a)-15. Work window: There is no work windows for this species; surveys may be required if maintenance activities will occur in potential pond turtle habitat. Prior to and during maintenance work, the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-16. Pre-construction surveys for northwestern pond turtles shall be conducted at these sites by a qualified biologist in accordance with USFWS protocols within 72 hours of the start of maintenance. The creek shall be surveyed for presence of turtles and the creek banks surveyed for presence of burrows; all locations of observed turtles and burrows shall be noted.

V.7(a)-17. Each day, before maintenance activities begin, the Environmental Compliance Coordinator (ECC) shall make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, the ECC shall assess the likelihood of project impacts to these species and coordinate findings with the USFWS and CDFG to ensure that appropriate protective measures are applied including hand removal or installation of fencing to avoid the area completely. At any time during maintenance activities, if a northwestern pond turtle is observed by the ECC, maintenance crew, or other knowledgeable persons, maintenance activities shall stop and the appropriate protective measures shall be applied including hand removal or installation of fencing to avoid the area completely.

V.7(a)-18. All staging areas for all heavy equipment, storage of materials, and any maintenance/fueling of heavy equipment shall be clearly identified in order to minimize impacts to upland habitats outside the project site.

V.7(a)-19. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of northwestern pond turtles, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Avoidance and Minimization Measures for Birds

Following are avoidance and minimization measures for birds. Some of these relate directly to listed species with the potential to occur within one or more of the project sites (the rails, northern spotted owl); however, others relate more generally to a class of species, such as raptors and wading birds and land birds.

V.7(a)-20. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. Because the culverts in the proposed project sites are fairly small, there is minimal likelihood that they would provide suitable habitat for swallows. However, if any culverts show evidence of past or current swallow nesting, the ECC shall identify them and maintenance activities shall occur after August 31 or after all swallows have fledged to avoid impacts.

V.7(a)-21. If work in the riparian zone will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will

not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

BIRD-1: California Clapper Rail and California Black Rail

Several of the sites are within or immediately adjacent to suitable habitat for California clapper rail and California black rails (15-20 sites). The following avoidance and minimization measures apply to all sites within 250 feet of salt or brackish tidal marshland, which will also help to protect other marshland dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

V.7(a)-22. Work window: The work window for maintenance activities within rail habitat is the non-nesting season of September 1st through January 31st. If maintenance activities are scheduled to occur within the nesting season (February 1st to August 31st), the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-23. Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails.

V.7(a)-24. If maintenance activities are scheduled during the nesting season (February 1st to August 31st), a qualified biologist, in coordination with USFWS and/or CDFG, shall conduct a pre-construction survey within 5 days of the start of maintenance activities to check for nests and presence of the rails within the project sites. Additional surveys may be required including visual and/or call surveys to determine presence. A buffer zone of 250 feet from nests or occupied rail habitat shall be established and any activity within that buffer zone that has potential to disturb rails (i.e. high-decibel construction, pumping, use of heavy machinery, etc.) shall be rescheduled for later in the season once nesting has ended and the young have fledged (from September 1st through January 31st). If no nests are found but rails are present, the birds must be allowed to leave the area on their own before work can commence.

V.7(a)-25. When working within 250 feet of salt or brackish marshland, presence for either rail species shall be assumed; therefore, maintenance work in these areas shall be scheduled between September 1st and January 31st in any given year.

V.7(a)-26. Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If maintenance or dredging activity does intrude into tidal marsh habitat, a qualified biologist shall survey the area prior to beginning work in order to determine the presence/absence of rails.

BIRD-2: Northern Spotted Owl

Per Department of Fish and Game Protocol for Surveying Proposed Management Activities that May Affect Northern Spotted Owls (2010), project sites are defined as the project footprint plus a .25 mi. radius buffer around it. Centers of northern spotted owl activity are located on Old Mill Creek, Cascade Creek, Warner Canyon Creek, Bothin Creek, Larkspur Creek, and Ross Creek and several of these documented locations fall within the .25 mi. buffer around several of the work sites: (3-OMC; 3-CAS; 3-WAR; 9-BOTH; 9-LAR-2; and 9-ROS).

V.7(a)-27. Work window: To avoid impacts to breeding northern spotted owls, maintenance activities identified as having potential impact on northern spotted owls or their habitat shall follow a limited operating period (LOP) with no work scheduled during the breeding season of February 1st through July 15th. If a biological evaluation conducted by a qualified biologist determines that vegetation projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location, or where a biological evaluation determines that topographic features may shield nest sites, the LOP may be waived or the buffer distance modified.

BIRD-3: Raptors and wading birds

Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them shall be minimized.

V.7(a)-28. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start outside of the nesting season (July 31 – January 31), then avoidance has been achieved and work can proceed. If maintenance activities are scheduled outside of the work window during the nesting season (Feb 1st - July 31st) then the following AMMs shall be followed:

V.7(a)-29. The ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

V.7(a)-30. During nesting season, (February 1st - September 1st), the ECC shall walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

V.7(a)-31. At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. However, if work in the riparian zone will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

BIRD-4: Landbirds

Many of the project sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. These project sites include: 1-NOV-3, 3-ACMP-3, 3-NYH-2, 5-EAS-2, 9-CMC-4, and many more. Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests would violate the federal Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game (CDFG) Code.

V.7(a)-32. Work window: Avoidance will be achieved if maintenance activities are scheduled between August 1st to January 31st to avoid the nesting season (February 1st - July 31st). If maintenance activities are scheduled outside of the work window, then the following Avoidance and Minimization Measures shall be implemented:

V.7(a)-33. The removal of any trees or shrubs shall occur after August 1st, once the nesting season is complete. If removal of trees or shrubs occurs between February 1st and July 31st, a nesting bird survey shall be performed by a qualified biologist within 14 days prior to the removal or disturbance of potential nesting trees or shrubs. All trees with active nests shall be flagged and a non-disturbance buffer zone shall be established around the nesting tree, or the site shall be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft for passerines and non-passerine land birds. Active nests shall be monitored by a qualified biologist to determine when the young have fledged and are feeding on their own before work is allowed to begin.

V.7(a)-34. In addition to surveying trees and shrubs for nesting birds, surveys shall be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within 14 days prior to the commencement of project related activities by a qualified biologist.

V.7(a)-35. The ECC shall be present at the commencement of maintenance-related activities to ensure that nesting birds and sensitive bird species have not inhabited the project site during the window following pre-construction surveys and commencement of maintenance activities. The ECC shall also survey all staging areas to ensure nesting and special status birds are not present.

V.7(a)-36. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of sensitive habitat and bird species, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Avoidance and Minimization Measures for Mammals

MAMM-1: Salt Marsh Harvest Mouse (SMHM)

Salt marsh harvest mouse is a federal and state listed endangered species although critical habitat has not been designated for this species. This species is found in saline emergent marsh vegetation with dense pickleweed. It is reported to occur within the project site in lower reaches of Novato Creek levees, Gallinas Creek South Fork, and Bothin Marsh sites. Approximately 15-20 sites are adjacent to suitable habitat for salt marsh harvest mouse; and about half of those sites include work where removal of pickleweed may impact salt marsh harvest mouse habitat. For these sites, the following AMMS should be followed:

V.7(a)-37. Work window: There are no seasonal work windows for this species since they breed year around,

V.7(a)-38 Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for SMHM. Generally, work should not be scheduled to occur between two hours before high tide and two hours after high tide.

V.7(a)-39. If maintenance activities are conducted in potential SMHM habitat, a qualified biologist shall conduct a pre-construction survey within 5 days of the start of maintenance activities to determine the presence/absence of SMHM within and adjacent to the work area. Surveys shall follow USFWS protocols. In addition, a biological monitor shall be present during maintenance-related activities within or adjacent to all suitable nesting habitat areas to ensure that salt marsh harvest mice are not present during operations.

V.7(a)-40. For sites where work includes removal of pickleweed, under the supervision of a qualified biologist and according to protocols established by Zedler (2001), vegetation shall be removed only with non-mechanized

hand tools; no motorized equipment shall be used. Vegetation removal may begin only when no mice are observed, and shall start at the edge farthest from the salt marsh and work its way towards the salt marsh. If a mouse of any species is observed within an area where pickleweed is being removed, work shall stop and DFG shall be notified. Unless otherwise approved by DFG, the mouse shall be allowed to leave on its own volition.

V.7(a)-41. If trenching takes place within 50 ft of pickleweed areas, exclusionary fencing shall be installed around worksites before excavation begins, according to DFG specifications on size and placement of fencing. An escape ramp shall be placed in any open trench at the end of the day to allow any entrapped animals to escape.

V.7(a)-42. When implementing maintenance activities in upland areas adjacent to salt or brackish marshland, vehicles shall be confined to existing roads where possible, Crews shall use matting, pontoon boards or other comparable methods whenever feasible to minimize impacts to the existing vegetation. The placement of mats shall be verified by a qualified biologist before their placement to minimize habitat impacts. Crews shall work exclusively from mat boards and boardwalks to minimize trampling of vegetation.

V.7(a)-43. A biological monitor shall be on-site during all work activities within potential SMHM habitat, and will have the authority to halt project activities in order to comply with these terms. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of the SMHM and its habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

MAMM-2: Roosting Bats

V.7(a)-44. Work window: The work window for activities at sites where bats are determined to be present is from September 1st through January 31st. Impacts can be avoided by scheduling work, especially removal of trees and/or dense growths of ivy, after the breeding season ends on September 1st of any given year.

V.7(a)-45. Some of the sites may be within or adjacent to suitable habitat for roosting bats. If work is conducted outside of the work window, pre-construction surveys for signs of roosting bats shall be conducted concurrent with those for land birds. If surveys occur during the daytime, the biologist shall look for presence of bat droppings at likely roost sites (under bridges and trees (in layers of bark, woodpecker holes, and hollow branches). The droppings are black and small, about 4 – 8 mm long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software. If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed.

V.7(a)-46. If bat guano was detected during the pre-construction survey, and removal of trees, shrubs, or dense ivy is scheduled to occur before September 1st, a qualified biologist shall conduct a roosting bat survey within 30 days prior to the removal or disturbance of potential nesting/roosting trees or shrubs. If bats are detected, work shall be re-scheduled for after the breeding season.

Avoidance and Minimization Measures for Plants

PLANT-1: Special Status Plants

Special-status plant species include those listed as Endangered, Threatened, Rare or those species proposed for listing by the USFWS (2001b), the CDFG (2010a,b) and the CNPS (2010). The CNPS listing is sanctioned by the

CDFG and serves essentially as their list of “candidate” plant species. CNPS List 1B and List 2 species are considered eligible for state listing as endangered or threatened under the CDFG Code. Such species should be fully considered during preparation of environmental documents subject to the California Environmental Quality Act (CEQA). CNPS List 3 and List 4 species are considered to be either plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS and CDFG recommend that these species be evaluated for consideration during the preparation of CEQA documents.

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites (Appendix A). Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed; all are species of concern. Based on a reconnaissance-level survey and habitat assessment, many of the 33 species with at least some potential to occur within the region can be ruled out from the work sites due to the lack of suitable habitat within the project corridor. Specialized habitats such as playas, coastal dunes, lower montane coniferous forest, vernal pools, coastal bluff scrub, coastal prairie, and serpentine-derived soils or outcrops are not present within the study area or work sites.

Although location data for several special-status plant species places them within the study corridor, the presence of some of these within the work sites remains highly unlikely. In many cases, the location data from CNDDDB represent historic data from the time period before large-scale development. In other cases, the CNDDDB data represent best guesses as to location, and while shown as covering the proposed project sites, the required habitat may not be present within the work sites.

The following four plant species are considered to have some potential to occur within one or more of the work sites, due to: 1) the presence of suitable habitat, 2) the plant was detected during the site reconnaissance, and/or 3) the species has been reported within the vicinity of the work sites.

1. **Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *Palustris*);** STATUS. *Point Reyes bird's beak is a federal species of special concern and is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE* The CNDDDB lists 42 occurrences of Point Reyes bird's beak in Marin County; the majority of these are on the western coast. Sites near CNDDDB occurrences include: 3-BM, 3-MIL-3, 3-RYC-1, 3-SUT-1.
2. **Pale Yellow/Hayfield tarplant (*Hemizonia congesta* ssp. *congesta*)** STATUS. *The pale yellow tarplant is not listed by the federal or state governments but is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE.* The CNDDDB lists a record in Ignacio near sites 1-ASJ-1, 1-ASJ-2, and 1-ASJ-3.
3. **Marsh microseris (*Microseris paludosa*)** STATUS. *The marsh microseris is not listed by the federal or state governments but is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE.* The CNDDDB lists occurrences in the vicinity of sites: 3-CAS, 3-ACMP-3, and 9-LAR-2.
4. **Marin knotweed (*Polygonum marinense*)** STATUS. *Marin knotweed is a federal species of special concern and is listed by the CNPS as 3 (needing taxonomic review). PROJECT SITE OCCURRENCE.* The CNDDDB contains record for Marin knotweed on Corte Madera Creek, just downstream of site 9-CMC-1 and at the creek mouth.

The following mitigations developed for treatment of special status plants and their habitats shall be adhered to during project implementation; therefore impacts to these species will be less-than-significant:

V.7(a)-47. Work window: There are no work windows for the plant special status species; surveys may be required if species may be impacted.

V.7(a)-48. At sites where vegetation may be modified (such as mowing, clearing, or ground-breaking), and where special status plant species may potentially occur, a qualified biologist should conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

V.7(a)-49. If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000). Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

V.7(a)-50. If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

V.7(a)-51. For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDDB documenting the species and location. The ECC shall ensure that the Project Foreman is aware of these site-specific conditions, and shall inspect the work site before, during, and after completion of the maintenance activities.

MITIGATION MONITORING MEASURES

V.7 (a)-1-51. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

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|--|---|---|---|---|
| <p>b) Substantial change in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur at any time throughout the year? (source #(s): 3, 4)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[X]</p> | <p>Less Than Significant Impact</p> <p>[]</p> | <p>Not Applicable</p> <p>[]</p> |
|--|---|---|---|---|

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed.

As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

All construction activities for the project would be completed in a fashion that minimizes disturbance to existing riparian and aquatic habitat. The proposed removal of riparian vegetation is the absolute minimum necessary to provide access for maintenance equipment, restore the natural flow regime, provide flood protection, and minimize loss of riparian trees. Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program.

Avoidance and minimization measures prescribed for each activity at each site have been established and shall be implemented to ensure that animals inhabiting the project area. The following mitigation measures are proposed to avoid and minimize changes in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur on the project site and would decrease the risk of impacts to a level of less than significant.

MITIGATION MEASURES

V.7(b)-1. DPW shall minimize any riparian tree removal in order to preserve habitat quality. Removal of native riparian vegetation shall be limited to that necessary for equipment access and flood control (e.g., removing fallen trees in channels).

V.7 (b)-2. An Environmental Compliance Coordinator (ECC) shall be designated for all maintenance activities. The ECC shall have an understanding of biological resources, missions of regulatory agencies and regulations as they may affect listed species, and the nature of the maintenance activities. Before commencement of a maintenance activity, the ECC shall review the individual project fact sheets containing project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he shall determine appropriate measures to implement, based on the type of activity, and shall prescribe appropriate avoidance and minimization measures and general and activity-specific conditions and prohibitions.

V. 7 (b)-3. All prescribed General Conditions and Avoidance and Minimization Measures, as described above and documented in the Project Fact Sheets for each project site, shall be adhered to during pre-project planning, implementation and post-project clean-up.

V. 7 (b)-4. The ECC shall ensure that the Project Foreman is aware of any site-specific conditions and avoidance and minimization measure prescribed for the activity at each site, and shall inspect the work site before, during, and after completion of the maintenance activities.

MITIGATION MONITORING MEASURES

V.7(b)-1. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

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|---|---------------------------|---|-------------------------------------|-----------------------|
| <p>c) Introduction of new species of plants or animals into an area, or improvements or alterations that would result in a barrier to the migration, dispersal or movement of animals? (source #(s): 3, 4)</p> | <p>Significant Impact</p> | <p>Potentially Significant Unless Mitigated</p> | <p>Less Than Significant Impact</p> | <p>Not Applicable</p> |
| | <p>[]</p> | <p>[X]</p> | <p>[]</p> | <p>[]</p> |

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary. Exotic plants are often introduced by seed banks contained in imported fill or mud that is caked onto construction equipment that moves from site to site. The District shall not bring any fill to project sites. Invasive plants can also be introduced by seeds contained in hydro-seed mixes or hay products. Therefore, sediment and erosion control measures shall avoid using these products and use only weed-free rice straw or other similar products for erosion control.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program.

The ability of wildlife to move through the landscape is important for migration (seasonal breeding and feeding), dispersal (new home ranges and long-term genetic exchange), and for daily movement within individual territories. Habitat fragmentation creates a greater number of habitat patches that are smaller in size than the original contiguous habitat. This, in turn, can hinder regional wildlife movements, put stress on local populations, and increase the probability of extinction for these populations compared to those associated with non-fragmented landscapes. Considering the impacts resulting in potential fragmentation of primary habitat types and loss of valuable dispersal corridors is important when assessing the biological impacts of a project. Because the activities proposed do not involve the permanent loss of wetland and/or riparian habitat within the work sites, they are not likely to affect wildlife movement corridors or contribute to habitat fragmentation. Given that the proposed work is maintenance-related, the project will likely only result in short-term temporal impacts (1-2 days) to movement for aquatic species dependent the subject habitats. Movement through these areas will be restored as soon as maintenance activities are completed.

Removal of excessive sediment should help to open the channel and enhance opportunities for resident and migratory fish and other aquatic species to move freely to suitable upstream and downstream habitats. Re-colonization of on-site native wetland vegetation communities to their previous condition will occur naturally. Implementation of the following mitigation measures would decrease the risk of impacts caused by the accidental introduction of new species of plants or animals into the project area to a level of less than significant.

MITIGATION MEASURES

V.7(c)-1. The District shall prevent the unintentional introduction of new species of plants or animals into the project area by a wash down of all equipment prior to transporting it to project sites in order to eliminate mud that may harbor exotic plant species and animals.

V.7(c)-2. The District shall not import fill to project sites.

V.7(c)-3. The District shall only use straw wattles that contain weed-free rice straw and shall not use hydro-seeding or seeded hay products.

V.7(c)-4. If kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

MITIGATION MONITORING MEASURES

V.7(c)-1-4. District staff shall verify that these Mitigation Measures have been properly implemented.

8. ENERGY AND NATURAL RESOURCES. *Would the proposal result in:*

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| a) Substantial increase in demand for existing energy sources, or conflict with adopted policies or standards for energy use? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Due to the maintenance nature of the project, no increase in demand for existing energy sources or standards for energy use will be affected. Therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| b) Use of non-renewable resources in a wasteful and inefficient manner? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and implementation will require very little use of non-renewable natural resources, however some fuel will be spent on equipment usage, although the impact of this usage would create a less-than-significant impact.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| c) Loss of significant mineral resource sites designated in the Countywide Plan from premature development or other land uses which are incompatible with mineral extraction? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No significant mineral resources are found on the project site, therefore, this is a less-than-significant impact.

9. HAZARDS. *Would the proposal involve:*

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| a) A risk of accidental explosion or release of hazardous substances including, but not necessarily limited to: 1) oil, pesticides; 2) chemicals; or 3) radiation? (source #(s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Best Management Practices, including those covering Chemical Use shall be employed to prevent or reduce the risk from, or impacts from, the accidental discharge of chemicals from vehicles operating at the project sites. Therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| b) Possible interference with an emergency response plan or emergency evacuation plan? (source #(s): 3, 4). | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The sediment removal activities shall not interfere with an emergency response or evacuation plan. In the case of an emergency, all heavy equipment shall immediately be removed from the roadway in order to allow vehicles to enter the area. Heavy equipment deployed at the project site can be removed in a matter of a few minutes during an emergency or evacuation. Therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| c) The creation of any health hazard or potential health hazard? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The implementation of routine maintenance activities will not create any potential health hazards; therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| d) Exposure of people to existing sources of potential health hazards? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The removal of sediment from the creeks and channels and replanting streambanks with native vegetation will not expose people to existing sources of health hazards; therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| e) Increased fire hazard in areas with flammable brush, grass, or trees? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

One of the primary goals of vegetation management is to reduce fire fuels loading and the potential for fire hazards. Fire fuel reduction is achieved by mowing on tops of banks and levees, removal of fallen trees, removal of standing dead trees, and thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas. Therefore the proposed project will have a positive effect on reducing fire hazards, therefore this is a less-than-significant impact.

10. NOISE. *Would the proposal result in:*

| | | | | |
|--|--------------------|--|------------------------------|----------------|
| a) Substantial increases in existing ambient noise levels? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

There will be a temporary increase in ambient noise levels during normal working hours if heavy equipment (e.g. backhoe or excavator) is used to remove sediment from the creeks, channels and drainage ditches. The duration of the impacts will be short, typically a few days, depending on the site, and the noise level will be comparable to noise generated during typical routine maintenance activities conducted by public works or flood control districts. The noise impact be limited to typical day time construction hours between 7 a.m. and 5 p.m., therefore, this is a less-than-significant impact.

| | | | | |
|--|--------------------|--|------------------------------|----------------|
| b) Exposure of people to significant noise levels, or conflicts with adopted noise policies or standards? (source #(s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

There will be an increase of noise levels during implementation of maintenance activities but only for a temporary time as with any maintenance project. Any increase in noise levels from construction equipment on private property will occur where landowners have given prior permission for maintenance activities to occur. The increase in maintenance related noise levels would only occur during weekdays, from approximately 8:00 a.m. to 4:00 p.m. This is consistent with the County's adopted noise policy from 7am-6pm, Mon.-Fri. and not on holidays. Therefore, this is a less-than-significant impact.

11. PUBLIC SERVICES. *Would the proposal have an effect upon, or result in a need for new or altered government service in any of the following areas:*

| | | | | |
|---|--------------------|--|------------------------------|----------------|
| a) Fire protection? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The fire fuels reduction aspect of the project is designed to reduce the risk of fire along grassy levees and upper stream banks. Mowing is scheduled to be completed before the Fourth of July holiday as an added measure to prevent fires related to holiday fireworks. The project does not include a demand for additional fire protection services; therefore, this is a less-than-significant impact.

| | | | | |
|--|--------------------|--|------------------------------|----------------|
| b) Police protection? (source #(s) 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The sediment removal maintenance project will not have an effect on police protection; therefore, this is a less-than-significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| c) Schools? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Project implementation will not result in dangerous design features or incompatible uses with schools; therefore this be a less than significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| d) Maintenance of public facilities, including roads? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

A primary goal of the proposed RMA program is to perform maintenance operations on County flood control channels and related infrastructure, including levees, tide gates, pump stations and trash racks. The objective of maintaining this infrastructure is to reduce the risk of potential flooding and consequential adverse impacts on other infrastructure including adjacent buildings and roads. The project itself will provide additional government services to protect people and infrastructure from flooding and will benefit the maintenance of public facilities; therefore this is a less-than-significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| e) Other governmental services? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The RMA program does not create an increased demand for additional services but rather the project will increase governmental services by providing greater flood control protection through routine maintenance of flood control channels and related infrastructure, including levees, tide gates, pump stations and trash racks. Regular routine maintenance of facilities will reduce the risk of potential flooding and consequential adverse impacts on other infrastructure including adjacent buildings and roads. This in turn will decrease the need for emergency government services during high storm flows; therefore, this is a less-than-significant impact.

12. UTILITIES AND SERVICE SYSTEMS. *Would the proposal result in a need for new systems, or substantial alterations to the following utilities:*

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| a) Power or natural gas? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to power or natural gas will be required for the maintenance project; therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| b) Communications systems? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to communications systems will be required by the maintenance project; therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| c) Local or regional water treatment or distribution facilities? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to water treatment or distribution will be required by the maintenance project; therefore, this is a less-than-significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| d) Sewer or septic tanks? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to sewer or septic tanks will be required by the maintenance project, therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| e) Storm water drainage? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The flood control routine maintenance activities proposed in this project will have a positive affect on the function of flood control channels and streams to carry and conduct stormwater run-off. Limited removal of obstructing vegetation and excavation of sediment deposits will increase channel function and decrease the potential risk of flooding. The regular maintenance of tide gates and trash racks will increase the ability of storm flows to travel through stream channels. The project's objective is to maintain channel function, especially during peak storm events; therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| f) Solid waste disposal? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to solid waste disposal will be required by the maintenance project; therefore, this is a less-than-significant impact.

13. **AESTHETICS/VISUAL RESOURCES. *Would the proposal:***

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| a) Substantially reduce, obstruct, or degrade a scenic vista open to the public or scenic highway, or conflict with adopted aesthetic or visual policies or standards? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to scenic vistas will result from the maintenance project. The project would minimize potential impacts to sensitive habitats at the project sites and would be designed to blend into the surrounding natural environment to the greatest extent feasible. Some trimming of riparian trees will occur, but the project would not change the riparian character of the project sites. The projects would not obstruct or alter the visual character of the project sites or result in visual impacts to public or scenic views and vistas from adjacent roadways. Because this is a flood control maintenance project that does not result in any permanent structures and is temporary in nature, project activities would not adversely affect views, light or privacy of private properties. Therefore, this is a less-than-significant impact.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| b) Have a demonstrable negative aesthetic effect by causing a substantial alteration of the existing visual resources including, but not necessarily limited to: 1) an abrupt transition in land use; 2) disharmony with adjacent uses because of height, bulk or massing of structures; or 3) cast of a substantial amount of light, glare, or shadow? (source #(s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to visual resources will result from the project. The project would minimize potential impacts to sensitive habitats at the project site and would be designed to blend into the surrounding natural environment to the greatest extent feasible. Some removal and trimming of riparian trees will occur, but the project would not change the riparian character of the sites. The projects would not obstruct or alter the visual character of the sites or result in visual impacts to public or scenic views and vistas from adjacent roadways. Because this is a flood control maintenance program that does not result in any permanent structures, project activities would not adversely affect views, light or privacy of private properties. Therefore, this is a less-than-significant impact.

14. CULTURAL RESOURCES. *Would the proposal:*

| a) Disturb paleontological, archaeological, or historical sites, objects, or structures? (source #(s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
|---|-----------------------|---|------------------------------------|-------------------|
| | [] | [X] | [] | [] |

The proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and many sites where sediment is to be removed have previously been dredged multiple times in the same locations. No historic structures will be impacted by the proposed routine maintenance project since no work is planned to be completed on any structures other than maintenance facilities including weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. Although no human remains or archaeological resources are known to occur within the proposed project sites or in the immediate vicinity, it is possible that there may be undiscovered archaeological resources buried at the sites due to their location in a high sensitive area. Such resources could be discovered during proposed sediment removal on the site, making this a potentially significant impact.

The following mitigation measures would reduce potential impacts to less than significant by detailing a course of action in the unlikely event that archaeological resources or human remains are encountered during construction activities.

MITIGATION MEASURES

V.14(a)-1. In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparations or construction activities on any part of the project sites, all work at the vicinity of the discovery site shall be halted immediately. A registered archaeologist, chosen by the County in consultation with the Federated Indians of Graton Rancheria and paid for by the District, shall assess the site and submit a written evaluation recommending appropriate actions to take to protect the site and the resources discovered, including monitoring of all subsequent work at the site by a Native American monitor from the Federated Indians of Graton Rancheria or other designated tribal representative. If human remains are encountered, the County Coroner must also be contacted and State law designates procedures to follow in the event that human remains are encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendent" can be designated. No work at the site may recommence without approval of the District. If it is determined that a prehistoric site exists, the following shall be implemented:

- (a) No future development activity shall take place at or in close proximity to the prehistoric site within the development area;
- (b) The historical site(s) shall be filled to protect the resources there;
- (c) No additional excavation shall occur at these locations other than to remove surface organic material; and

(d) The District may be required to submit a revised project to protect the resource(s). No further work at the site may recommence without approval of the Department of Public Works Director. All future development of the site must be consistent with findings and recommendations of an archaeological assessment prepared for the site by a registered archaeologist, as approved by the CDA staff.

MITIGATION MONITORING MEASURES

V.14(a)-1. In the event of discovery, DPW staff shall verify that a report has been submitted and all construction work has been stopped. In the event that the report indicates that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, DPW staff shall verify that a registered archaeologist has been retained to assess the site and has submitted a written evaluation to DPW advancing appropriate conditions to protect the site and the resources discovered before work commences on the site. If human remains are encountered, DPW staff shall verify that the County Coroner has been contacted and that all future work is carried out in accordance with the mitigation measures.

| | | | | |
|---|---|---|---|---|
| <p>b) Have the potential to cause a physical change which would adversely affect unique ethnic cultural values, or religious or sacred uses within the project area? (source #(s): 1, 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|---|---|---|---|

No known ethnic, religious or sacred uses are known to exist on or near the project sites. As noted above, the only structures included in the project description are maintenance facilities including weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. No other structures are involved. Accordingly, the proposed maintenance project would not have a significant impact on unique ethnic, cultural or religious uses or structures.

15. SOCIAL AND ECONOMIC EFFECTS. *Would the proposal result in:*

| | | | | |
|---|---|---|---|---|
| <p>Any physical changes which can be traced through a chain of cause and effect to social or economic impacts. (source #(s): 1, 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|---|---|---|---|

The maintenance project will not result in any known physical changes to social or economic entities. Therefore, this is a less-than-significant impact.

VI. MANDATORY FINDINGS OF SIGNIFICANCE. Pursuant to Section 15065 of the State EIR Guidelines, a project shall be found to have a significant effect on the environment if any of the following are true:

(Please explain your answer after each question)

- | | | | |
|--|------------|-----------|--------------|
| | Yes | No | Maybe |
| | [] | [X] | [] |
- a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.

- | | | | |
|--|------------|-----------|--------------|
| | Yes | No | Maybe |
| | [] | [X] | [] |
- b) Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?

As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.

- | | | | |
|--|------------|-----------|--------------|
| | Yes | No | Maybe |
| | [] | [X] | [] |
- c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).

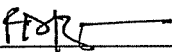
As described in Section V of this Initial Study, any potential environmental impacts from the proposed project and the entire maintenance program would be mitigated to a level of insignificance. Therefore, this project has no cumulatively considerable effects. See Attachment B for assessment of cumulative impacts and mitigation measures associated with the overall maintenance program at 47 culvert/drainage sites in West Marin.

- | | | | |
|--|------------|-----------|--------------|
| | Yes | No | Maybe |
| | [] | [X] | [] |
- d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.

VII. PROJECT SPONSER'S INCORPORATION OF MITIGATION MEASURES:

Acting on behalf of the project sponsor or the authorized agent of the project sponsor, I (undersigned) have reviewed the Initial Study for the Marin County Flood Control and Water Conservation District's Routine Maintenance Activities Program (RMA), and have particularly reviewed the mitigation measures and monitoring programs identified herein. I accept the findings of the Initial Study, including the recommended mitigation measures, and hereby agree to modify the proposed project application now on file with Marin County to include and incorporate all mitigation measures and monitoring programs set out in this Initial Study.


Robert Beaumont; Director

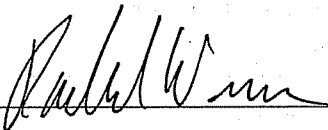
6/4/12
Date

VII. DETERMINATION: Pursuant to Sections 15081 and 15070 of the State Guidelines, the foregoing Initial Study evaluation, and the entire administrative record for the project:

I find that the proposed project WILL NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Signature  Date 2/14/12

Printed Name Rachel Warner Date 2/14/12

RECORD OF PROJECT APPROVAL

CEQA Record of Comments and Responses Draft Negative Declaration (ND) and Initial Study (IS)

Marin County Flood Control Routine Maintenance Activities

- 1) Letter from State of California, Governor's Office of Planning and Research, State Clearinghouse, dated 3-26-12.

Comments: Letter acknowledges that the Clearing House submitted the Initial Study Negative Declaration to the appropriate state agencies for review and they sent copies of comments from the Department of Fish and Game and Cal Trans, which are addressed separately below. State Clearing House acknowledges that Marin County has complied with the review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Response: Response to individual agency comment letters below.

- 2) Letter from Scott Wilson; California Department of Fish and Game; Bay-Delta Region; dated 3-19-12.

Comment: This Project will impact the bed, bank, channel, and riparian vegetation along numerous streams in the Project area. For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, DFG may require a Lake and Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of an LSAA is subject to the California Environmental Quality Act (CEQA). DFG, as a responsible agency under CEQA, will consider the CEQA document for the Project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for completion of the agreement.

Response: The Marin County Flood Control District acknowledges that a 1600 permit is needed for the project and an application for a five year Routine Maintenance Agreement has been submitted to Tim Dodson of the Department of Fish and Game in Region 3.

Comment: DFG recommends that all mitigation measures within the draft MND include the word "shall" as opposed to "should."

Response: The Program documents have been altered to change the word "should" to "shall" in the General Conditions and Avoidance and Minimization Measures where appropriate.

Comments: The comments listed below are related to work conducted near salt or brackish tidal marshlands and potential impacts to Clapper and Black Rails marshlands.

- On page 43, BIRD-1, DFG recommends that all mitigation measures apply to sites that are within 700 feet of salt or brackish tidal marshland.
- Similarly, Mitigation Measures V.7(a)-24 and 25 should be revised to include a 700-foot buffer.
- DFG recommends that Mitigation Measure V.7(a)-23 be revised to state that no work shall occur near the salt marsh within two hours before or after predicted extreme high tides of 6.5 feet above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the Project site.
- DFG recommends that Mitigation Measure V.7(a)-26 be revised to state that any tidal marsh vegetation removal be conducted outside of the breeding season. All vegetation removal should be conducted by hand. To the extent possible, salt marsh vegetation should be salvaged and placed back on-site with intention and care given so that the vegetation may reestablish.
- DFG recommends Mitigation Measure V.7(a)-24 be revised to include the following language to protect clapper and black rails:

If maintenance activities are scheduled during the nesting season (February 1st to August 31st), the County will retain a qualified biologist with a valid 10(A)(1)(a) permit for conducting California clapper transect surveys in potential habitat within 700 feet of the Project site. The biologist will submit a survey protocol to the U.S. Fish and Wildlife Service (USFWS) and DFG for approval prior to implementation. The methodology of this survey effort will be developed utilizing USFWS's December 2009 draft survey protocol for California clapper rail and augmented by the Point Reyes Bird Observatory Black Rail Survey Protocol by Jules Evens (unpublished). The following survey effort timing and methodology will be compliant with both protocols:

1. Surveys will be conducted between January 15 and April 1;
2. A minimum of three individual passive-listening surveys will be conducted. If California clapper rails have not been detected after three passive-listening surveys, call-playback methods will be utilized adhering to the requirements of the permit on the fourth survey;
3. All surveys will be conducted no less than fourteen days apart from each other;
4. The listening station will be manned continuously by at least one biologist during each survey;

5. Surveys will be conducted at sunrise or sunset. Protocol stipulates that surveys conducted at sunrise will begin 45 minutes before sunrise and continue until 1.25 hours after sunrise and that surveys conducted at sunset will begin 1.25 hours before sunset and continue for 45 minutes after sunset;

6. Surveys will not be conducted when tides greater than 4.5 feet NGVD are predicted at the Golden Gate Bridge during the survey period, or during full moon periods (i.e., clear nights within two days of the actual full moon);

7. Surveys will not be conducted when wind velocities exceed 10 miles-per hour (mph) or wind gusts exceed 12 mph or during moderate to heavy rains; and

8. All rail vocalizations will be noted, including the types, locations and times, on a detailed map of the survey area. Biologists will use compasses and distance sampling techniques to estimate the location of detected rails.

Response: Several of the sites are within (5-10 sites) or immediately adjacent (15-20 sites) to suitable habitat for California clapper rail and California black rails.

The following Avoidance and Minimization Measures shall apply to all sites in or near salt or brackish marshland and will also serve to protect other tidal-marsh dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

- When working within 250 ft. of salt or brackish marshland during the period February 1st through August 31st, presence for either rail species shall be assumed.

For all maintenance activities except for mowing of levees:

- Maintenance activities shall be scheduled to occur between September 1st and January 31st to avoid the rail breeding season.
- Work shall be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active.
- Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work shall occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.

- Activities shall proceed as quickly as possible to reduce disturbance from noise, dust, etc.
- Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If removal is necessary, the work shall be scheduled outside of the breeding season (February 1 – August 31st); all vegetation shall be removed by hand, and shall be salvaged and retained for replacement after work is completed.
- If, for any reason other than fire fuel reduction levee mowing, the District must perform maintenance activities within 250 ft of salt or brackish marshland during the rail breeding season, the District shall retain a qualified biologist to conduct clapper rail surveys in accordance to most currently available protocols from the Department of Fish and Game and the US Fish and Wildlife Service.

Comment: On March 7, 2012, DFG updated the 1995 Staff Report on burrowing owl mitigation. DFG recommends revising Section BIRDS-3 to include these new guidelines which can be found at:
www.dfg.ca.gov/wildlife/nongame/docs/BUOWStaffReport.pdf.

Response: The following Avoidance and Minimization Measures have been included in the RMA program documents to protect burrowing owls:

BIRD-3: Raptors and wading birds- Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them should be minimized.

Burrowing owls, a federal and state species of special concern, are not known at the sites and there are no CNDDDB occurrence records for burrowing owl on or near the sites. However, if burrowing owls are observed and/or if signs are found, then guidelines as outlined in the DFG's 2012 Staff Report on Burrowing Owl Mitigation shall be followed.

If work occurs after the nesting season (August 31 – January 31), then avoidance has been achieved and work can proceed. During nesting season, (February 1st - September 1st), the ECC should walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

Comment: DFG recommends that Mitigation Measure V.7(a)-44 and -45 be combined and revised to include the following language:

A qualified biologist should conduct a habitat assessment for potentially suitable bat habitat. If the survey reveals suitable bat habitat and tree removal is scheduled from April 16 through August 31 and/or October 16 through February 28 then

presence/absence surveys should be conducted prior to any tree removal. If presence/absence surveys are negative then trees may be removed following the two-phase tree removal system. If presence/absence surveys result in bat occupancy then the occupied trees should only be removed from March 1 through April 15 and/or August 31 through October 15 following the two-phased tree removal system. If trees that are suitable for bat habitat are to be removed from March 1 through April 15 and/or August 31 through October 15, then the trees should be removed following the two-phased removal system. The two-phased removal system should be conducted over two consecutive days. The first day (in the afternoon), limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures would be avoided, and only branches or limbs without those features would be removed. On the second day, the entire tree would be removed.

Response: These Avoidance and Minimization Measures have been revised in the RMA program documents as recommended.

Comment: The MND identified the possible presence of state-listed species such as, but not limited to, the Central California Coast coho salmon. The California Endangered Species Act (CESA) prohibits take of state-listed species. Please be advised that a CESA Permit must be obtained if the Project has the potential to result in take of species of plants or animals listed under CESA, either during construction or over the life of the Project. Issuance of a CESA Permit is subject to CEQA documentation; therefore the CEQA document must specify impacts, mitigations measures and a mitigation monitoring and reporting program. If the project will impact CESA listed species, early consultation is encouraged, as significant modifications to the Project and mitigation measures may be required in order to obtain a CESA Permit.

Response: Marin County Flood Control District acknowledges that a CESA permit is required if any work included in the RMA will have the potential to result in take of a state listed plant or animal. The District notes that there are no activities programmed to date that will cause take of state listed species, but if any new species are listed under CESA and the program has the potential to cause take of those species, the District will initiate early consultation with resource agencies regarding any new mitigations or modifications to the project that may be required to obtain a CESA Permit.

Comment: Page 23 of the draft MND states that there are potential wetlands in the Project area and that a formal wetland delineation will be completed for 38 sites during the spring and summer of 2012. These potential wetlands could be impacted by Project activities. The California Wetlands Conservation Policy goal is to ensure no overall net-loss of wetlands and to achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage. It is the policy of the Fish and Game Commission to seek to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California. The Fish and Game Commission's Wetland Policy stresses the need to compensate for the loss of wetland habitat on an acre-for-acre basis. For every acre of wetland loss, no less than an acre

of wetland must be created from non-wetland habitat. This amount may increase based on the quality of the impacted wetlands. DFG recommends that the Project avoid potential wetland impacts. If avoidance is not possible, fill of wetlands should be minimized and mitigated and such measures should be detailed in the MND.

Response: The estimated number of sites that may be potentially identified as wetlands has been revised from 38 to 17. These sites will be identified during formal wetland delineation and all project activities within a delineated wetland area will avoid direct impacts to the wetland areas. No permanent impacts or fill of wetlands will occur at these sites.

- 3) Letter from Gary Arnold; District Branch Chief of Local Development and Intergovernmental Review of State Department of Transportation (CalTrans) dated 12-17-10 and 3-07-12;

Comment: Letter was sent to advise the District that any work or traffic control that encroaches onto State ROW requires an encroachment permit issued by the Department of Transportation.

Response: The District will notify CalTrans and obtain an encroachment permit if any work or traffic control related to the project encroaches to State ROW.

- 4) Letter from Barbara Salzman and Phil Peterson; Marin Audubon Society, dated 3-22-12;

Comments: If non-native invasive plants are removed the denuded areas should be replanted with native plants.

Response: Activities conducted for flood control purposes minimize ground disturbance when removing non-native plants. Areas are replanted with seeds and native plants and treated with erosion control measures.

Comment: Mowing for fire fuel reduction could adversely impact avian species nesting along levees.

Response: Avoidance and Minimization Measure (below) has been revised to include mowing of levees:

V.7(a)-21 If work in the riparian zone *or mowing on levees* will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests

are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

Comment: Fallen trees in streams can provide important refuge habitat for fish. Before removal the habitat function that they serve should be assessed. Non-native trees should be left in place if they provide habitat or the habitat function they provide should be replaced in a manner that minimizes fuel build-up.

Response: The role of the Environmental Compliance Coordinator is to walk the site with the project manager before any work begins to assess what vegetation and debris need to be removed and what may remain in the creek. The ECC will be trained and knowledgeable of the benefits of leaving wood in the creek for habitat and will only instruct wood to be removed if it is causing an obstruction that could lead to damage to infrastructure or increase in potential risk for flooding.

Comment: AMMs in Section 7 should include protections for non-listed birds. This is important because many migratory and resident species will be nesting in habitats within the program area.

Response- The following Avoidance and Minimization Measures apply to all birds, not just listed species:

V.7(a)-20. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st, potential impacts will be avoided and no surveys will be required. Because the culverts in the proposed project sites are fairly small, there is minimal likelihood that they would provide suitable habitat for swallows. However, if any culverts show evidence of past or current swallow nesting, the ECC shall identify them and maintenance activities shall occur after August 31 or after all swallows have fledged to avoid impacts.

V.7(a)-21. If work in the riparian zone *or mowing on levees* will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

Comment: Timing issue with work window. Surveys and stop work orders should continue through August for species that re-nest or nest late. Surveys should be conducted within several days of commencement of the work to avoid losing a nest that may be constructed between survey date and work start.

Response: Avoidance and Minimization Measures V.7(a)-2. And V.7(a)-21 (*revised versions below*) protect nesting birds that may be found in the proposed work area both before and after July 31st.

V.7(a)-2. Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

V.7(a)-21. If work in the riparian zone *or mowing on levees* will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

Comment: Non-native invasive plants should be removed whenever possible. Need to wash tool and clean clothes to avoid spread of non-native invasive plants.

Response: The STRAW program focuses on removal of non-native invasive plants in the riparian zone. STRAW follows the protocols and BMPs identified in the CCNB database for preventing the transfer of invasive plant materials, seeds or disease from one location to another.

Comment: Reach of Arroyo de San Jose adjacent to Bel Marin Keys Blvd. and extending east is owned by Marin Audubon Society. We are pleased about flood control activities but worried about impacts. Encourage non-native removal but not native removal. To avoid nesting impacts perform work after Aug 31. Please notify when work will occur if possible. Take extra care to perform surveys and implement AMMs in this reach (noted Green Heron nest)

Response: The project description includes guidance for removing invasive non-native plants and re-vegetating with native plants where necessary to control erosion and maintain riparian habitat. Native plants are not removed. Birds nesting before and after July 31st are protected by the following Avoidance and Minimization Measures:

Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

If work in the riparian zone or mowing on levees will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

Comment: Map 5 Bel Aire Watershed- take care in this area to leave native plants between houses and tidal marsh during fire fuel reduction activities. If not possible to retain natives because of density of non-natives, replant with native shrubs and grasses immediately.

Response: Comment noted.

Comment: Delete the tidal reach of Larkspur Creek from fire fuel reduction. It is extremely unlikely that fire fuels would build-up in this reach and it is in violation of the permit conditions for this program.

Response: The District does not conduct fire fuel reduction activities in the tidal reach area of Larkspur Creek, just limbing and trimming for flood control purposes

5) Letter from Sandy Guldman; friends of Corte Madera Creek; CA, dated 3-20-12;

Comments: Map Corrections

On Map 8, the portion of Murphy Creek coincident with Kent Avenue is shown as a site for vegetation maintenance. In fact, Murphy Creek enters a culvert when it meets Kent Avenue, so there is no vegetation to maintain.

On Map 9, it appears that the course of Ross Creek should be adjusted to match the recent LIDAR topography.

Response: Map Corrections noted

Comments: Scope of Maintenance:

Map 7 shows vegetation maintenance along the tidal reach of Larkspur Creek (9-LAR-1); the creek in this reach has tidal marsh plants and does not need maintenance. Currently, adjacent riparian areas on the right bank are maintained by Friends of Corte Madera Creek Watershed. Non-native vegetation along the left bank will be removed and native plants installed as part of the Rose Garden project, which is just beginning.

One site on Map 8 is designated for fuels reduction. It seems unlikely that there is any riparian vegetation that should be removed to reduce fuels. The site is along a berm

adjacent to wetlands; it appears that a very much smaller area could be designated for fuels management, focusing on the area nearest the homes.

One site on Map 9 has a few broom plants on the bank of Corte Madera Creek, but great care should be taken during vegetation maintenance on that site because it is an important source of dogwood cuttings for revegetation projects. The upland areas are limited in extent and could be easily mowed without impacting riparian vegetation.

Four new culverts were installed during the Kentfield Force Main replacement project: one on Beren's Drainage and three on McAllister Slough. The interiors of these culverts should be cleaned regularly to prevent the growth of organisms and the accumulation of debris, both of which would reduce capacity. Although we appreciate the emphasis on limiting maintenance to protect resources, leaving out cleaning the interiors of culverts overlooks the value of maintaining flow.

The tide gate on the Berens Drainage, to comply with California Department of Fish and Game conditions, should be kept open during the summer to allow tidal flow into the wetland.

One site on Map 9 has a few broom plants on the bank of Corte Madera Creek, but great care should be taken during vegetation maintenance on that site because it is an important source of dogwood cuttings for revegetation projects. The upland areas are limited in extent and could be easily mowed without impacting riparian vegetation.

Response: Comments noted and information passed on to project manager.

Comments : Mitigation Measures: Starting at the bottom of page 43, BIRD-4 identifies measures to protect various birds. We urge you to carefully enforce these measures, including establishing non-disturbance buffer zones around nests or avoiding work at the site.

Response: Mitigation measure V.7(a)-2 addresses this issue:

V.7(a)-2. Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

Comment: The last paragraph on page 47 reads: the ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or

any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

The spread of invasive upland plants and diseases is also a serious concern. We request that you add a requirement that tires, equipment, boots, clothing, and any other item that could transfer seeds or disease be thoroughly washed before being moved between work areas in different sub-watersheds.

Response: Comments noted.

Comment: To improve readability (and printability for those of us who do not have plotters), we also recommend that the large table in Attachment B be divided up so that each zone is in a separate table.

Response: Comment noted

6) E-mail from Sebastyen Jackovics dated 3-07-12;

Comment: We request notification of all projects as it may relate to Marin County Flood Control and Conservation actions within the area effecting our properties in Corte Madera at 101 Nellen; 150 Nellen; 110 Nellen; 200 Nellen; 10 Fifer; and 2 Fifer

Response: The proposed project activities will be conducted on public lands owned or under easement by the County of Marin. No work will be conducted on private property unless the Marin County Flood Control District enters into an agreement with the private landowner with a Right-to-Enter for construction agreement in place.

Comment: We also want to bring our concerns about additional run off and flooding issues that will likely be created by road and freeway modifications as it relates to the possible 101 freeway project at the Lucky Drive interchanges.

Response: Highway 101 is a State Highway and any work done would be under the jurisdiction of CalTrans, not the Marin County Flood Control District.

7) E-mail from Eva Buxton; California Native Plant Society; dated 3-19-12

Comments: Please let me know if any impacts to special-status species are expected in the present project.

Response: We don't anticipate impacts to listed plant species with this project since the work is routine maintenance on sites that have been regularly disturbed for flood protection for many years. Any listed plants or animals with the potential to occur in the project areas have Avoidance and Minimization Measures in place to identify them via pre-project surveys or to protect them during project implementation.

8) E-mail from Doreen Smith; California Native Plant Society; dated 3-19-12

Comments: I'm assuming that the Flood Control district will be doing surveys and follow the protocol outlined in supporting documents: Marin County Flood Control - RMA Program Supporting Documents below: (basis for the Neg Dec)?

(4.4; PLA-2; p. 32-33) "If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000). Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site. If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDDB documenting the species and location."

Response: Yes, following the protocols outlined above is integrated into the Routine Maintenance Activities Program.

Comments: Regarding plant species of concern: Pt. Reyes Bird's beak, *Cordylanthus maritimus* ssp. *palustris* is strictly a plant of saltmarshes, it's taxonomy has been updated to *Chloropyron maritimum* ssp. *palustre*.

Pale yellow tarplant/hayfield tarplant has had a significant taxonomic revision: what once was recognized as *Hemizonia congesta* ssp. *leucophylla* is now known to be *H. congesta* ssp. *congesta*. It has WHITE flowers (that may turn yellow in dried herbarium specimens). It is fairly common in grassland in the Tomales area but very rarely encountered otherwise in Marin County. The common grassland yellow tarplant, ONCE THOUGHT to be *H. congesta* ssp. *congesta* is NOW *H. congesta* ssp. *lutescens* and is NOT a species of concern. Marsh microseris, *Microseris paludosa*, so far seems to be extirpated from all historic locations except on Pt. Reyes Peninsula. It grows in seasonally moist grassland swales. Marin knotweed, *Polygonum marinense*, grows at the high tideline with pickleweed, *Salicornia pacifica*, in saline and brackish marshes.

Response: Comments noted.



EDMUND G. BROWN JR.
GOVERNOR

STATE OF CALIFORNIA
GOVERNOR'S OFFICE of PLANNING AND RESEARCH



KEN ALEX
DIRECTOR

RECEIVED

MAR 26 2012

MARIN COUNTY
DEPARTMENT OF PUBLIC WORKS

March 22, 2012

Kallie Kull
Marin County Flood Control District and Water Conservation
3501 Civic Center Drive, Rm 304
San Rafael, CA 94903

Subject: Marin County Flood Control Routine Maintenance Activities Program
SCH#: 2012022053

Dear Kallie Kull:

The State Clearinghouse submitted the above named Mitigated Negative Declaration to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on March 21, 2012, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

"A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures

cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

**Document Details Report
State Clearinghouse Data Base**

SCH# 2012022053
Project Title Marin County Flood Control Routine Maintenance Activities Program
Lead Agency Marin County Flood Control District

Type MND Mitigated Negative Declaration
Description The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Levee maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities.

Lead Agency Contact

Name Kallie Kull
Agency Marin County Flood Control District and Water Conservation
Phone 415 473 6532 **Fax**
email
Address 3501 Civic Center Drive, Rm 304
City San Rafael **State** CA **Zip** 94903

Project Location

County Marin
City Unincorporated
Region
Lat / Long
Cross Streets
Parcel No. County jurisdictions
Township **Range** **Section** **Base**

Proximity to:

Highways Hwy 101
Airports
Railways
Waterways numerous East Marin County waterways
Schools
Land Use

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Public Services; Recreation/Parks; Soil Erosion/Compaction/Grading; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Landuse

Reviewing Agencies Resources Agency; Department of Fish and Game, Region 3; Department of Parks and Recreation; Department of Water Resources; Office of Emergency Management Agency, California; California Highway Patrol; Caltrans, District 4; State Water Resources Control Board, Division of Water Rights; Regional Water Quality Control Board, Region 2; Department of Toxic Substances Control; Native American Heritage Commission

Date Received 02/21/2012 **Start of Review** 02/21/2012 **End of Review** 03/21/2012

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

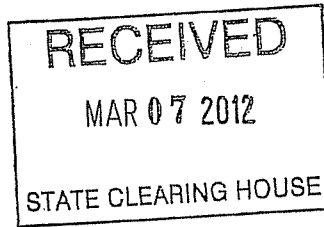
EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION

111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5541
FAX (510) 286-5559
TTY 711



Flex your power!
Be energy efficient!



3/21/12
Jenny

March 7, 2012

MRN000074
SCH 2012022053

Ms. Kallie Kull
Marin County Flood Control and Water Conservation District
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Dear Ms. Kull:

Marin County Flood Control Routine Maintenance Activities Program – Mitigated Negative Declaration

Thank you for including the California Department of Transportation (Department) in the environmental review process for the proposed project. The Department is particularly concerned with the potential for work within State right-of-way (ROW), particularly on US-101 and/or State Route (SR) 37.

Encroachment Permit:

Please be advised that any work or traffic control that encroaches on State ROW requires an encroachment permit issued by the Department. Further information is available on the following website: <http://www.dot.ca.gov/hq/traffops/developserv/permits/>.

To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW must be submitted to the address below. Traffic-related mitigation measures should be incorporated into the construction plans during the encroachment permit process.

Office of Permits
California Department of Transportation, District 4
P.O. Box 23660
Oakland, CA 94623-0660

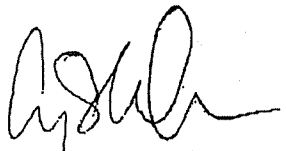
Ms. Kallie Kull/Marin County Flood Control and Water Conservation District

March 7, 2012

Page 2

Should you require further information or have any questions regarding this letter, please contact Connery Cepeda of my staff at (510) 286-5535.

Sincerely,



GARY ARNOLD
District Branch Chief
Local Development – Intergovernmental Review

c: Scott Morgan (State Clearinghouse)



DEPARTMENT OF FISH AND GAME

CHARLTON H. BONHAM, Director

Bay Delta Region
7329 Silverado Trail
Napa, CA 94558
(707) 944-5500
www.dfg.ca.gov



RECEIVED

MAR 22 2012

MARIN COUNTY
DEPARTMENT OF PUBLIC WORKS

March 19, 2012

Ms. Kallie Kull
Marin County Flood Control and Water Conservation District
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Dear Ms. Kull:

Subject: Marin County Flood Control Routine Maintenance Activities Program, Mitigated Negative Declaration, SCH #2012022053, Marin County

The Department of Fish and Game (DFG) has reviewed the draft Mitigated Negative Declaration (MND) for the Marin County Flood Control Routine Maintenance Activities Program (Project). DFG is providing comments on the draft MND as a Trustee Agency and Responsible Agency. As Trustee for the State's fish and wildlife resources, DFG has jurisdiction over the conservation, protection, and management of the fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species for the benefit and use by the people of California.

The proposed Project is a program of routine maintenance flood control activities that will be implemented by the Marin County Flood Control and Water Conservation District. Activities will be located within eastern Marin County and include the Novato, Richards Bay, Bel Air and Strawberry Circle, Santa Venetia, and Ross Valley Flood Control Zones (#1, 3, 4, 7, and 9, respectively), as well as the Upper Lucas Valley which is defined as County Service Area 13. Within these Flood Control Zones and Service Area, five general types of flood control activities are proposed. These are: 1) vegetation management, 2) sediment and debris removal, 3) erosion control, 4) maintenance and repair of flood control structures, and 5) levee maintenance. Ninety three (93) specific sites have been identified in this Project.

General Comments

This Project will impact the bed, bank, channel, and riparian vegetation along numerous streams in the Project area. For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, DFG may require a Lake and Streambed Alteration Agreement (LSAA), pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant. Issuance of an LSAA is subject to the California Environmental Quality Act (CEQA). DFG, as a responsible agency under CEQA, will consider the CEQA document for the Project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring

and reporting commitments for completion of the agreement. To obtain information about the LSAA notification process, please access our website at <http://www.dfg.ca.gov/habcon/1600/>; or to request a notification package, contact the Lake and Streambed Alteration Program at (707) 944-5520.

DFG recommends that all mitigation measures within the draft MND include the word "shall" as apposed to "should." For example, see Mitigation Measures V.7(a)-48-51.

On page 43, BIRD-1, DFG recommends that all mitigation measures apply to sites that are within 700 feet of salt or brackish tidal marshland. Similarly, Mitigation Measures V.7(a)-24 and 25 should be revised to include a 700-foot buffer.

DFG recommends that Mitigation Measure V.7(a)-23 be revised to state that no work shall occur near the salt marsh within two hours before or after predicted extreme high tides of 6.5 feet above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the Project site. DFG recommends Mitigation Measure V.7(a)-24 be revised to include the following language:

The County will retain a qualified biologist with a valid 10(A)(1)(a) permit for conducting California clapper transect surveys in potential habitat within 700 feet of the Project site. The biologist will submit a survey protocol to the U.S. Fish and Wildlife Service (USFWS) and DFG for approval prior to implementation. The methodology of this survey effort will be developed utilizing USFWS's December 2009 draft survey protocol for California clapper rail and augmented by the Point Reyes Bird Observatory Black Rail Survey Protocol by Jules Evens (unpublished). The following survey effort timing and methodology will be compliant with both protocols:

1. Surveys will be conducted between January 15 and April 1;
2. A minimum of three individual passive-listening surveys will be conducted. If California clapper rails have not been detected after three passive-listening surveys, call-playback methods will be utilized adhering to the requirements of the permit on the fourth survey;
3. All surveys will be conducted no less than fourteen days apart from each other;
4. The listening station will be manned continuously by at least one biologist during each survey;
5. Surveys will be conducted at sunrise or sunset. Protocol stipulates that surveys conducted at sunrise will begin 45 minutes before sunrise and continue until 1.25 hours after sunrise and that surveys conducted at sunset will begin 1.25 hours before sunset and continue for 45 minutes after sunset;

6. Surveys will not be conducted when tides greater than 4.5 feet NGVD are predicted at the Golden Gate Bridge during the survey period, or during full moon periods (i.e., clear nights within two days of the actual full moon);
7. Surveys will not be conducted when wind velocities exceed 10 miles-per-hour (mph) or wind gusts exceed 12 mph or during moderate to heavy rains; and
8. All rail vocalizations will be noted, including the types, locations and times, on a detailed map of the survey area. Biologists will use compasses and distance sampling techniques to estimate the location of detected rails.

DFG recommends that Mitigation Measure V.7(a)-26 be revised to state that any tidal marsh vegetation removal be conducted outside of the breeding season. All vegetation removal should be conducted by hand. To the extent possible, salt marsh vegetation should be salvaged and placed back on-site with intention and care given so that the vegetation may reestablish.

On March 7, 2012, DFG updated the 1995 Staff Report on burrowing owl mitigation. DFG recommends revising Section BIRDS-3 to include these new guidelines which can be found at: www.dfg.ca.gov/wildlife/nongame/docs/BUOWStaffReport.pdf.

DFG recommends that Mitigation Measure V.7(a)-44 and -45 be combined and revised to include the following language:

A qualified biologist should conduct a habitat assessment for potentially suitable bat habitat. If the survey reveals suitable bat habitat and tree removal is scheduled from April 16 through August 31 and/or October 16 through February 28 then presence/absence surveys should be conducted prior to any tree removal. If presence/absence surveys are negative then trees may be removed following the two-phase tree removal system. If presence/absence surveys result in bat occupancy then the occupied trees should only be removed from March 1 through April 15 and/or August 31 through October 15 following the two-phased tree removal system. If trees that are suitable for bat habitat are to be removed from March 1 through April 15 and/or August 31 through October 15, then the trees should be removed following the two-phased removal system. The two-phased removal system should be conducted over two consecutive days. The first day (in the afternoon), limbs and branches would be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices or deep bark fissures would be avoided, and only branches or limbs without those features would be removed. On the second day, the entire tree would be removed.

The MND identified the possible presence of state-listed species such as, but not limited to, the Central California Coast coho salmon. The California Endangered Species Act (CESA) prohibits take of state-listed species. Please be advised that a CESA Permit must be obtained if the Project has the potential to result in take of species of plants or animals listed under CESA, either during construction or over the life of the Project. Issuance of a CESA

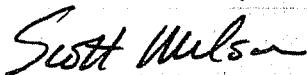
Ms. Kallie Kull
March 19, 2012
Page 4

Permit is subject to CEQA documentation; therefore, the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the Project will impact CESA listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA Permit.

Page 23 of the draft MND states that there are potential wetlands in the Project area and that a formal wetland delineation will be completed for 38 sites during the spring and summer of 2012. These potential wetlands could be impacted by Project activities. The California Wetlands Conservation Policy goal is to ensure no overall net-loss of wetlands and to achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage. It is the policy of the Fish and Game Commission to seek to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California. The Fish and Game Commission's Wetland Policy stresses the need to compensate for the loss of wetland habitat on an acre-for-acre basis. For every acre of wetland loss, no less than an acre of wetland must be created from non-wetland habitat. This amount may increase based on the quality of the impacted wetlands. DFG recommends that the Project avoid potential wetland impacts. If avoidance is not possible, fill of wetlands should be minimized and mitigated and such measures should be detailed in the MND.

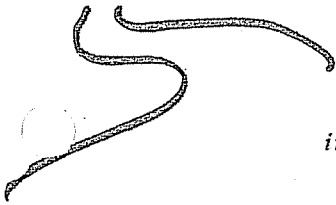
If you have any questions, please contact Mr. Timothy Dodson, Environmental Scientist, at (707) 944-5513 or by email at tdodson@dfg.ca.gov; or Ms. Stephanie Buss, Staff Environmental Scientist, at (707) 944-5502.

Sincerely,



Scott Wilson
Acting Regional Manager
Bay Delta Region

cc: State Clearinghouse



Friends of Corte Madera Creek Watershed

P.O. Box 415 • Larkspur • California 94977

info@friendsofcortemaderacreek.org (415) 456-5052 www.friendsofcortemaderacreek.org

March 20, 2012

RECEIVED

Kallie Kull, Senior Planner
Marin County DPW
3501 Civic Center Drive Room 304
San Rafael CA 94903

MAR 22 2012

MARIN COUNTY
DEPARTMENT OF PUBLIC WORKS

RE: Routine Maintenance Program (RMA) in Eastern Marin County
Draft Negative Declaration of Environmental Impact

Dear Ms. Kull,

Kallie
Friends of Corte Madera Creek Watershed appreciates the opportunity to comment on the RMA Negative Declaration. In general, we are impressed by the scope of the documents. Our comments are in three categories: map corrections, scope of maintenance, and mitigation measures.

Map Corrections:

1. On Map 8, the portion of Murphy Creek coincident with Kent Avenue is shown as a site for vegetation maintenance. In fact, Murphy Creek enters a culvert when it meets Kent Avenue, so there is no vegetation to maintain.
2. On Map 9, it appears that the course of Ross Creek should be adjusted to match the recent LIDAR topography.

Scope of Maintenance:

3. Map 7 shows vegetation maintenance along the tidal reach of Larkspur Creek (9-LAR-1); the creek in this reach has tidal marsh plants and does not need maintenance. Currently, adjacent riparian areas on the right bank are maintained by Friends of Corte Madera Creek Watershed. Non-native vegetation along the left bank will be removed and native plants installed as part of the Rose Garden project, which is just beginning.
4. One site on Map 8 is designated for fuels reduction. It seems unlikely that there is any riparian vegetation that should be removed to reduce fuels. The site is along a berm adjacent to wetlands; it appears that a very much smaller area could be designated for fuels management, focusing on the area nearest the homes.
5. One site on Map 9 has a few broom plants on the bank of Corte Madera Creek, but great care should be taken during vegetation maintenance on that site because it is an important source of dogwood cuttings for revegetation projects. The upland areas are limited in extent and could be easily mowed without impacting riparian vegetation.
6. Four new culverts were installed during the Kentfield Force Main replacement project: one on Berens Drainage and three on McAllister Slough. The interiors of these culverts should be cleaned regularly to prevent the growth of organisms and the accumulation of debris, both of which would reduce capacity. Although we

appreciate the emphasis on limiting maintenance to protect resources, leaving out cleaning the interiors of culverts overlooks the value of maintaining flow. Also, the tide gate on the Berens Drainage, to comply with California Department of Fish and Game conditions, should be kept open during the summer to allow tidal flow into the wetland.

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Mitigation Measures:

8. Starting at the bottom of page 43, BIRD-4 identifies measures to protect various birds. We urge you to carefully enforce these measures, including establishing non-disturbance buffer zones around nests or avoiding work at the site.
9. The last paragraph on page 47 reads:
The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

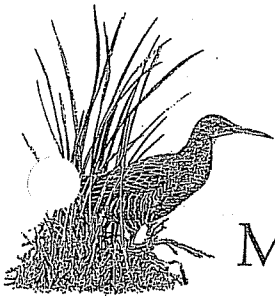
The spread of invasive upland plants and diseases is also a serious concern. We request that you add a requirement that tires, equipment, boots, clothing, and any other item that could transfer seeds or disease be thoroughly washed before being moved between work areas in different sub-watersheds.

To improve readability (and printability for those of us who do not have plotters), we also recommend that the large table in Attachment B be divided up so that each zone is in a separate table.

Sincerely,



Sandra Guldman, President



Marin Audubon Society

P.O. Box 599 | MILL VALLEY, CA 94942-0599 | MARINAUDUBON.ORG

March 22, 2012

Kalli Kull, Senior Planner
Marin County DPW
3501 Civic Center Drive, Rm. 304
San Rafael, CA 94993

RE: MARIN COUNTY FLOOD CONTROL ROUTINE MAINTENANCE PROGRAM

Dear Ms. Kull:

Marin Audubon appreciates the opportunity to comment on the routine maintenance program and thank you for sending the draft Negative Declaration, maps and plans related to this program. The stated purpose of the program is to reduce the risk of flooding on Marin County streams in and around flood control facilities. The program is intended to avoid high impact activities, such as major dredging projects and DPW is seeking a general permit for these activities.

The project plans contain many conditions that, if followed, will provide important protections for wildlife and their habitats, such as leaving snags and retaining maximum vegetation. We have the following comments and questions:

- While the purpose of the project is flood control, the scope of work includes “fire fuel reduction” activities to reduce fuel loads. A fuel reduction purpose is likely to have a more aggressive approach to vegetation removal which could be in conflict with protecting the natural environment that is discussed in this Negative Declaration. The fuel reduction measures are apparently achieved by (p. 5) removing invasive non-native species, mowing the tops of banks and levees, and removing downed trees.

We have no problem with removing non-native invasive species as long as the denuded areas are revegetated with native plants. Mowing the upper parts of levees or berms, however, could adversely impact avian species nesting along levees. Fallen trees in streams can provide important refuge habitat for fish. Before removal, the habitat function that they serve should be assessed. Non-native trees should be left in place if they provide habitat, or the habitat function they provide should be replaced in a manner that minimizes fuel build up.

- SWP Policy BIO 1.1 and BIO 2.5 call for protecting migratory species and wildlife movement corridors. The discussion only addresses requiring surveys for special status species and wetlands which do not comply with BIO 1.1 and BIO 2.5. There are General Conditions and Avoidance and Minimization Measures for non-special status nesting species but these are not mentioned.

The BIOLOGICAL RESOURCES (7.) discussion lists "proposed" Mitigations "to avoid and minimize the reduction in the number of endangered, threatened and rare species or alteration of their habitat...." These Mitigations include GENERAL CONDITIONS and SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES for birds, raptors, wading birds and land birds. We, however, could not find a commitment to implement the measures for non-listed birds. This is important because many migratory and resident species will be nesting in habitats that are covered by this program.

- There appear to be some discrepancies in the timing of the work windows. CWP BIO 2.5 calls for restricting disturbance in sensitive habitat during nesting season from March 1 through August 1 to protect bird nesting, rearing and feeding activities. The general work window, however, would allow work in that time period, from April 15 to October 15. The general work window for birds begins July 31, which is fine. It should be recognized, however, that some species nest late and some re-nest, particularly if there has been problem with their first attempt. Surveys and stop work order requirements should continue through August for landbirds, raptors and wading birds to ensure protection of nests. In addition, except during the very end of the nesting season, surveys should be conducted within several days of the commencement of work to avoid losing a nest that may be constructed in the interim.
- Invasive non-native plants should be removed wherever possible. In addition to the transport methods noted on page 50, seeds and pieces of invasive plants can be transported in clothing, shoes and work equipment (clippers, shovels, spades, etc.). In order to prevent or minimize the spread of invasives, the above mentioned clothing and equipment should be washed or cleaned at each new site. This should apply to the STRAW program as well.

Comments on Maps:

Map 2 Novato. The reach of Arroyo de San Jose adjacent to Bel Marin Keys Boulevard extending east and downstream of the Humane society is owned by MAS. Mas property is a dense mix of native riparian and non-native species. Vegetation maintenance is shown for this segment and fuel reduction is shown further downstream. While we are pleased that the county maintains flood control responsibility, we are also concerned about impacts. We encourage removal of non-natives but not natives and, to avoid nesting impacts, we would like the work should be performed in the non-nesting season after August 31. If possible we would like to know what work is planned and when it will be performed.

We also note that particular care should be taken in performing surveys and avoidance measures along this creek. It was further downstream on this where the Green Heron nest was cut down some years ago in the process of removing a tree limb.

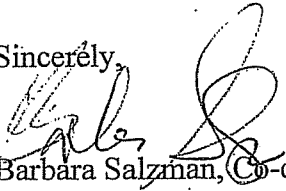
Map 5 Bel Aire Watershed. The small area adjacent to the north of the tidal marsh is shown for fuel reduction. This area provides a buffer from uses of adjacent houses. It is important that a fringe of native species remain for refuge habitat along the marsh edge. Care should be taken to leave natives wherever possible. If this is not possible, and if there are many non-natives, the area should be revegetated with native shrub and grass species quickly.

Maps 7 and 8 Map 7 shows vegetation maintenance along Larkspur Creek and Map 8 shows an even longer stretch of Larkspur Creek that is slated for fuel reduction. Larkspur Creek is tidal to upstream beyond Doherty Drive. Removing vegetation through this reach is not only unnecessary, but would remove tidal marsh vegetation and would be in violation of the condition for this permit. It is extremely unlikely that any vegetation would be a fuel risk in this section. The tidal reach of Larkspur Creek should be deleted from the program.


Map 9 The section identified as for fuel reduction does not appear to be necessary. Care should be taken to remove non-native broom.

Thank you for considering our comments.

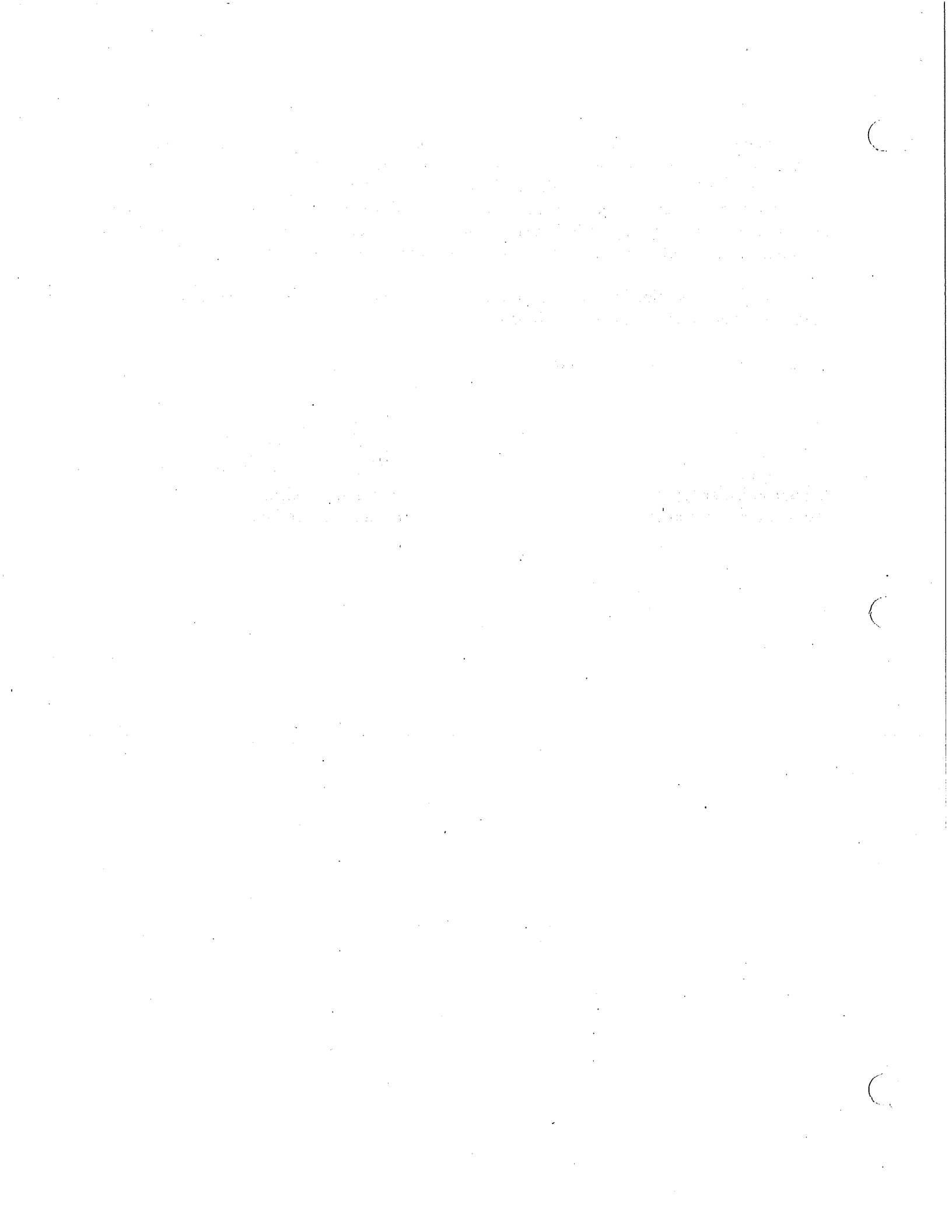
Sincerely,



Barbara Salzman, Co-chair
Conservation Committee



Phil Peterson, Co-chair
Conservation Committee



Kull, Kallie

Subject: Kull, Kallie
RE: No 227 February 22, 2012

From: seb [mailto:sjackovics@aol.com]
Sent: Wednesday, March 07, 2012 2:12 PM
To: EnvPlanning,
Cc: zsolt@ggsf.com; t.jackovics@comcast.net
Subject: No 227 February 22, 2012

Kallie Kull and to whom it may concern,

We write you on behalf of the ownership for commercial properties located in Corte Madera at the following addresses:

101 Nellen

150 Nellen

110 Nellen

200 Nellen

10 Fifer

Fifer

We request notification of all projects as it may relate to Marin County Flood Control and Conservation actions within the area effecting our properties in Corte Madera.

We also want to bring our concerns about additional run off and flooding issues that will likely be created by road and freeway modifications as it relates to the possible 101 freeway project at the Lucky Drive interchanges.

Please keep us informed and log our concerns and ADDRESS in the EIR process.

Sincerely,

Sebastyen Jackovics

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. This is essential for ensuring the integrity of the financial data and for providing a clear audit trail. The records should be kept up-to-date and should be accessible to all relevant parties.

2. The second part of the document outlines the procedures for handling incoming payments. It is important to ensure that all payments are recorded promptly and accurately. This includes verifying the amount and the source of the payment, and ensuring that the funds are deposited into the correct account. Any discrepancies should be reported immediately to the appropriate authority.

3. The third part of the document describes the process for issuing invoices. Invoices should be generated in a timely manner and should clearly state the amount due, the terms of payment, and the contact information for the provider. It is also important to keep copies of all invoices for future reference.

4. The fourth part of the document discusses the process for reconciling the accounts. This involves comparing the bank statements with the internal records to ensure that they match. Any differences should be investigated and resolved as soon as possible. Regular reconciliations are essential for maintaining accurate financial records.

5. The fifth part of the document provides a summary of the key points discussed in the document. It emphasizes the importance of maintaining accurate records, handling payments correctly, issuing invoices promptly, and reconciling the accounts regularly. These practices are essential for ensuring the financial health and transparency of the organization.

Kull, Kallie

Subject: Kull, Kallie
RE: Marin CNPS

From: Eva Buxton [<mailto:evabuxton@sbcglobal.net>]
Sent: Tuesday, March 20, 2012 8:24 PM
To: Choo, Chris
Cc: Kull, Kallie; Williams, Laurie; Lewis, Liz; Doreen Smith; carnelian@pacbell.net
Subject: Re: Marin CNPS

Hi,

I'm sorry that I was not aware of the fact that CNPS is always notified when a CEQA document is prepared for a County project, including private ones. I know now! I assume that the areas to be impacted have been surveyed by a botanist or someone with enough botanical knowledge to id the plants of concern, as was outlined in the Neg Dec and its supporting document. I understand that Doreen offered to help out. Although I normally comment on CEQA documents, I would not be able to do so before the deadline this coming Thursday. I would appreciate it if CNPS could receive notifications of projects a little more in advance in order for volunteers to address issues.

Please let me know if any impacts to special-status species are expected in the present project.

Eva Buxton
Conservation Chair



Kull, Kallie

Subject: Kull, Kallie
RE: Marin CNPS

From: Doreen Smith [mailto:dsmith@lvha.net]
Sent: Monday, March 19, 2012 12:13 PM
To: evabuxton@sbcglobal.net; Kull, Kallie
Cc: Doreen L. Smith; carnelian@pacbell.net
Subject: Re: Marin CNPS :

Kallie, Eva,

When Ruth Pratt was employed , I was her liaison with Marin DPW when rare plants were suspected to be in the way of drainage-correction problems. I can come out and check sites when necessary.

Those species of concern:

Pt. Reyes Bird's beak, *Cordylanthus maritimus* ssp. *palustris* is strictly a plant of saltmarshes, it's taxonomy has been updated to *Chloropyron maritimum* ssp. *palustre*.

Pale yellow tarplant/hayfield tarplant has had a significant taxonomic revision: what once was recognized as *Hemizonia congesta* ssp. *leucophylla* is now known to be *H. congesta* ssp. *congesta* .It has WHITE flowers (that may turn yellow in dried herbarium specimens) . It is fairly common in grassland in the Tomales area but very rarely encountered otherwise in Marin County. The common grassland yellow tarplant, ONCE THOUGHT to be *H. congesta* ssp. *congesta* is NOW *H. congesta* ssp. *lutescens* and is NOT a species of concern.

Marsh microseris, *Microseris paludosa*, so far seems to be extirpated from all historic locations except on Pt. Reyes Peninsula. It grows in seasonally moist grassland swales

Marin knotweed, *Polygonum marinense*, grows at the high tideline with pickleweed, *Salicornia pacifica*, in saline and brackish marshes .

Doreen Smith (Rare Plant information co-ordinator, Marin Chapter CNPS.

Kallie,

Thanks for your information. I'm not quite sure why you contacted the CNPS unless the Flood Control district has been asked to do so in the past. It appears that your maintenance will take place on disturbed land. It's not possible for me to determine if the four plants listed in the documents (Point Reyes bird's beak, hayfield tarplant, marsh microseris, Marinknotweed) have been found on the sites in the past.

Below is a portion from Marin County Flood Control - RMA Program Supporting Documents - basis for the Neg Dec (4.4; PLA-2; p. 32-33)

"If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S.

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Final block of faint, illegible text at the bottom of the page, possibly a conclusion or signature area.

Fish and Wildlife Service 2000).

Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture floristic diversity present at the site.

If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

Marin County Flood Control and Water Conservation District / RMA Program 33

For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDDB documenting the species and location."

I'm assuming that the Flood Control district will be doing surveys and follow the protocol outlined in documents.

Please let me know more specifically what you might expect the CNPS to do.

Eva

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Main body of the document consisting of several paragraphs of extremely faint and illegible text.

Kull, Kallie

From: Kull, Kallie
Sent: Friday, March 16, 2012 3:45 PM
To: 'mwilliams@lgvdsd.org'
Cc: Williams, Laurie; Taylor, Tammy
Subject: Routine Maintenance Activities- Miller and Gallinas Creeks
Attachments: AppendixA_RMA_Master_List_Project_Sites.pdf;
AppendixB_RMA_Sediment_Removal_Sites.pdf

Hi Mark-

I received your request (below) from our planning department and am forwarding you the main spreadsheets that describe the types of Flood Control Routine Maintenance activities within the Miller and Gallinas Creek watersheds. When viewing the main list entitled Appendix A Master List, you can scroll down to find the activities listed for Gallinas Creek under Flood Zone 7 and activities for Miller Creek at the very bottom of the page under CSA 13 (Community Service Area).

The second spreadsheet lists the sediment removal sites Zone 7 where Gallinas Creek is located. There are no proposed sediment removal sites in Miller Creek CSA 13 area.

Please let me know if you need anything else to review the CEQA document on this project-

Kallie Kull
Marin County Flood Control and Water Conservation District
473-6532

From: Mark Williams [<mailto:mwilliams@lgvdsd.org>]
Sent: Thursday, March 15, 2012 1:17 PM
To: EnvPlanning,
Cc: Susan McGuire
Subject: Routine Maintenance Activities Draft Negative Declaration

Could you please provide the specific locations and activities to be performed regarding the Miller Creek and Gallinas Creek routine maintenance activities outlined in your notice of availability?

Thank you,

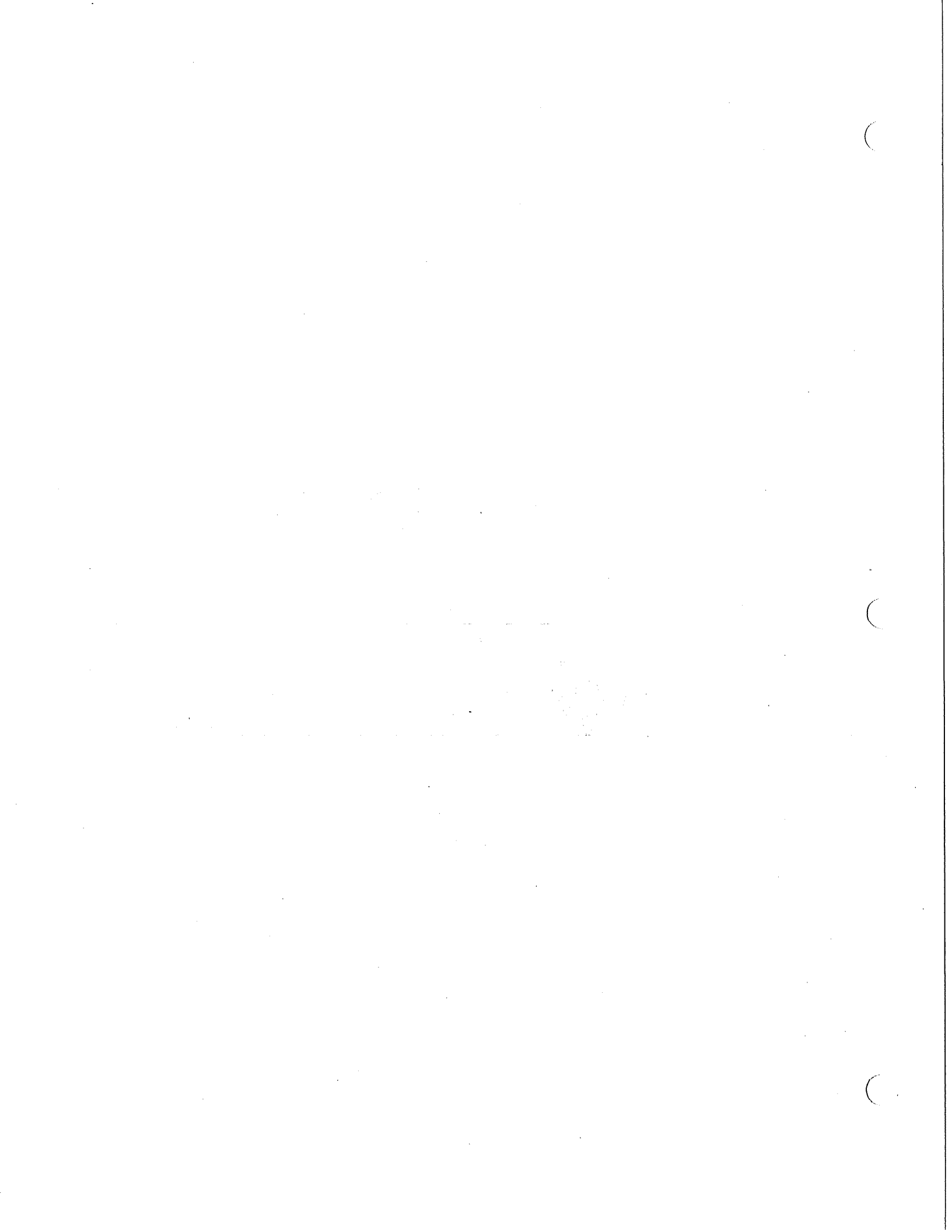
Mark R. Williams
General Manager
Las Gallinas Valley Sanitary District
300 Smith Ranch Road
San Rafael, CA 94903
Phone 415-472-1734
Fax 415-499-7715



[The text in this document is extremely faint and illegible. It appears to be a multi-paragraph document with several sections, possibly containing a list or a series of entries. The content is mostly lost due to the low contrast and quality of the scan.]

Offer

(did not go to DPH
unless in previous)



NEGATIVE DECLARATION

Marin County
Environmental Coordination and Review

Pursuant to Section 21000 et. seq. of the Public Resources Code and the Marin County Environmental Impact Review Guidelines and Procedures, a Negative Declaration is hereby granted for the following project.

- 1. **Project Name:** **Marin County Flood Control Routine Maintenance Activities Program**
- 2. **Location and Description:** **Eastern Marin County Flood Control Zones 1, 3, 4, 7, 9, and Community Service Area 13 in Upper Lucas Valley**

The Marin County Flood Control and Water Conservation District's (MCFCWCD) Routine Maintenance Activities (RMA) program defines the scope and timing of the maintenance activities conducted annually in and around flood control channels and facilities in East Marin County. The MCFCWCD is responsible for maintenance of 37 miles of stream channels, two sediment basins, and numerous flood control facilities throughout East Marin County (e.g. weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drains and pump station inlet/outlet structures). The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Levee maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program does not include projects requiring individual agency permits, such as larger capital improvement projects (e.g. building a new pump station), large dredging projects (e.g. dredging the mainstem of Novato Creek), or new bank stabilization projects using only hardened materials such as rock rip rap. The RMA program establishes programmatic guidance to conduct these maintenance activities for flood control purposes while avoiding and minimizing environmental impacts. The program provides the organizational framework to ensure that routine maintenance work complies with the terms of State and Federal regulations and permit conditions to protect water quality, wetlands and riparian habitats.

- 3. **Project Sponsor:** **Marin County Flood Control and Water Conservation District**
- 4. **Finding:** **Based on the attached Initial Study and without a public hearing, it is my judgment that:**

- The project will not have a significant effect on the environment.
- The significant effects of the project noted in the Initial Study attached have been mitigated by modifications to the project so that the potential adverse effects are reduced to a point where no significant effects would occur.



Marin County Environmental Coordinator

Date: 2/14/12

Based on the attached Initial Study and the comments received during the public review period, the Marin County Department of Public Works grants a Negative Declaration.

Robert Beaumont, ctor
Marin County Flood Control and Water Conservation District

Date: _____

5. Mitigation Measures:

(Select one of the following statements)

- The Initial Study did not identify any potential adverse impacts and, therefore, the project does not require mitigation measures.
- Please refer to mitigation measures in the attached Initial Study.
- The Initial Study concludes that the Department can modify the project's potential adverse impacts, as noted under the following factors in the attached Initial Study.

The Department of Public Works has incorporated into the project all of the mitigation measures described in the attached Initial Study.

6. Preparation:

The Marin County Flood Control and Water Conservation District prepared this Negative Declaration and interested parties may obtain copies at the address listed below.

Kallie Kull, Senior Planner
Marin County Department of Public Works
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

Monday through Friday
8:30 a.m. to 4:30 p.m.
Telephone (415) 473-6528

**MARIN COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT**

DRAFT INITIAL STUDY

***Marin County Flood Control District
Routine Maintenance Activities Program***

I. BACKGROUND

- A. Project Sponsor's Name and Address: Marin County Flood Control District
3501 Civic Center Drive, Room 304
San Rafael, CA 94903
- B. Lead Agency Name and Address: Marin County Flood Control District
3501 Civic Center Drive, Room 304
San Rafael, CA 94913-4186
- C. Contact Person and Phone Number: Kallie Kull; Senior Planner, (415) 499-6532

II. PROJECT DESCRIPTION

- A. Project Title: Marin County Flood Control District: Routine Maintenance Activities Program (RMA)
- B. Type of Application(s): Flood Control Routine Maintenance Projects
- C. Project Location: The geographic extent of the RMA program includes routine maintenance activities carried out in and around creeks, channels, ditches, levees, flood control structures and facilities, located within six project areas: one each for five flood control zones in East Marin County (Zones 1,3,4,7,9), and County Service Area 13 in Upper Lucas Valley (See Figure 1):

Flood Control Zone 1 – Novato
Flood Control Zone 3 – Richardson Bay
Flood Control Zone 4 – Bel Aire and Strawberry Circle
Flood Control Zone 7 – Santa Venetia
Flood Control Zone 9 – Ross Valley
County Service Area 13 – Upper Lucas Valley

Refer to:

Figure 1: Map of County Flood Control Zones and CSA/CSD areas included in the project

Attachment A: Maps 1-12 of Project Areas and Species of Concern

Attachment B: Master list of Project Areas and RMA Activities

Attachment C: Master List of all Sediment Removal Sites

- D. General Plan Designation: The proposed project area is vast in extent and includes creeks which are located within the mapped City Centered and Coastal Baylands Corridors of East Marin (Countywide Plan 2007) and within Streamside Conservation Areas (SCAs).

- E. Zoning: Project areas within the RMA program fall into the land use and zoning categories of Residential, General Commercial/Mixed Use, Office/Commercial Mixed Use, Neighborhood/Commercial Mixed- Use/Recreational Commercial, Industrial, Agricultural, Public and Open Space Lands.

PROJECT AREA

The Marin County Flood Control District is responsible for maintenance of 37 miles of stream channels, two sediment basins, and numerous flood control facilities (e.g. weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drains and pump station inlet/outlet structures), throughout East Marin County. The geographic extent of the proposed Routine Maintenance Program (RMA) includes six project areas: one each for five flood control zones (Zones 1, 3, 4, 7 and 9), and one project site in County Service Area 13 in Upper Lucas Valley (*Figure 1*). The Flood Control Zones included in this project are located exclusively in Eastern Marin County. Each zone includes a number of project sites, which are differentiated based on stream reaches and habitat types. In all, there are 93 specific sites where the District performs routine maintenance activities. There are 26 project sites located in Flood Control Zone 1 in the Novato Creek watershed, 33 project sites in Flood Control Zone 3 in Mill Valley, six project sites in Flood Control Zone 4 in Bel Aire/Strawberry, 13 project sites in Flood Control 7 in Santa Venetia, 14 project sites in Flood Control Zone 9 in the Corte Madera Creek watershed, and one project site in County Service Area 13 in Upper Lucas Valley.



Figure 1. Project areas covered by the Marin County Flood Control District’s Routine Maintenance Activities Program; Flood Control Zones 1, 3, 4, 7, 9, and Community Service Area 13 in Upper Lucas Valley, all in East Marin County.

PROGRAM OVERVIEW

Program Purpose

The Marin County Flood Control District's Routine Maintenance Activities Program (RMA) defines the types and scope of the District's annual routine maintenance activities conducted in and around flood control channels and facilities. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program establishes programmatic guidance to conduct these activities for flood control purposes while avoiding and minimizing environmental impacts. The RMA program provides the organizational framework for flood control staff and managers to oversee maintenance crews and their activities and to ensure that their work complies with the terms of State and Federal regulations and permit conditions to protect water quality, wetlands and riparian habitats. The RMA program does not include projects requiring individual agency permits, such as larger capital improvement projects (e.g. building a new pump station), large dredging projects (e.g. dredging the mainstem of Novato Creek), or new bank stabilization projects using only hardened materials such as rock rip rap. The District will implement the RMA program in a yearly work cycle, to include pre-project notification, project implementation, and annual reporting.

Jurisdictional Boundaries

Maintenance activities are implemented on an annual basis only in locations where the Marin County Flood Control District and/or its municipal partners own the land outright in fee title or holds legal easements; with the exception of four sites on private property, where the District annually receives written landowner permission before performing maintenance activities. No aspect of the RMA program shall be implemented in areas where the County or its municipal partners do not have direct legal jurisdiction or landowner permission.

Environmental Setting

Eastern Marin County watersheds share the same general anatomy: the ridge-tops and upper slopes of the watersheds are in generally protected open space areas, the valley floors are densely developed, and the lower reaches are tidally-influenced and quite flat. The District's 93 RMA sites are located mainly in the valley floors and lower creek reaches. The uplands encompass the hilly, often steep, terrain from the top of the ridges down to where the valleys flatten out. They are dominated by mixed evergreen forest and oak-bay woodlands, interspersed with open annual grasslands, chaparral, and coastal scrub. Much of the upland habitats in Marin County are protected as public and municipal open space. The valley floors are developed with dense residential and commercial developments, often right up to, and sometimes in, the creek channels. The road network can also be quite dense, with many bridges spanning the creeks. In almost all cases, creeks are heavily impacted by historic human use, including concrete channelization and straightening, constrained riparian corridors, impacted floodplains, and non-native invasive species. The lower reaches of creeks have very little topographic relief, they are either tidally influenced and support saltwater or brackish-water marsh, or are protected by levees for agricultural or residential use. While often less developed, these lower marsh areas have altered hydrology and are constrained by roads, levees, and other human-induced development. Freshwater seasonal wetlands have become established in areas that were once historical baylands and which have been diked for agriculture. These seasonal wetlands provide habitat for migratory waterfowl and shorebirds, including California clapper and black rails.

Scope of Work

The RMA program covers five categories of routine flood control maintenance activities:

- 1) Vegetation management
- 2) Sediment and debris removal
- 3) Erosion control
- 4) Maintenance and repair of flood control structures
- 5) Levee maintenance

1) Vegetation Management Activities are employed to achieve three main goals:

- maintain channel function
- reduce fire fuels,
- restore creek habitat

These goals are achieved by removing invasive non-native plants and re-vegetating with native plants where necessary to control erosion and maintain riparian habitat. Channel maintenance is achieved by limbing and trimming of riparian trees and shrubs, selective cattail cutting and removing trash. Occasionally trees growing on the channel bed need to be removed because they obstruct flow or divert flow and cause bank erosion. This work is typically limited to the removal of arroyo willow or white alder growing in the center of the channel bed.

Vegetation management activities are performed by crews using hand tools and do not include ground-disturbing activities. Cattails are removed from selected reaches as part of sediment removal activities. All vegetation maintenance is done without the use of herbicides.

Vegetation management takes place from the channel bottom to the top of the high water mark, and includes trimming limbs from trees and shrubs growing over the channel and trimming branches that hang down into the active channel. The goal of vegetation management within natural channels is to establish a canopy cover that will suppress invasive plant growth and maintain cooler stream temperatures.

Fire fuel reduction is achieved by mowing on tops of banks and levees and the thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas.

Tree removal is a rare event with the exception of non-native trees such as acacia. Once or twice a year crews may need to remove a tree that has died and poses a hazard to adjacent structures or could pose a flood hazard if it falls into the channel. Removal of these trees is conducted in consultation with the Department of Fish and Game.

Removal of non-native vegetation takes place as part of maintaining channel function but also occurs in a more strictly restoration-type activity led by Point Reyes Bird Observatory's STRAW Program (Students and Teachers Restoring a Watershed) in partnership with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP). Students working in the STRAW Program remove invasive non-natives and replant sites with native vegetation. The program has worked at creek sites near schools where access and proximity allow for the removal of all traces of the non-native vegetation and the return to sites to continue maintenance and restoration of the creek corridor. These restoration activities have been ongoing for over 10 years. The partnership with the STRAW Program demonstrates the County's efforts to manage creeks through stewardship of the land. Native plant restoration reduces the maintenance needs in these creeks and allows for better habitat to be established in the urban creek corridors. The students, teachers and parents working in their local creeks increases the community awareness of the habitat and supports the County's watershed-based approach to caring for our creeks.

2) Sediment and Debris Removal

Sediment and debris removal from channels, sediment basins and around flood control facilities (e.g. trash racks) is completed on a routine basis in order to maintain channel function and facilitate unobstructed flow around structures including bridges, storm drain outlets, and pump stations. Excavated sediment is hauled away to a permitted spoils disposal site. Debris items found in the channels and around flood control facilities (e.g. tires, shopping carts, trash, furniture), are typically removed by hand and hauled to a certified disposal site, such as a landfill. Attachment B lists all sediment removal sites included in the RMA program with specific information regarding dimensions of work area, equipment used, location of equipment, and expected duration of work at each site.

3) Erosion Control

Erosion control activities take place only where the District and/or its partners hold fee title to the land. Most large erosion control and large bank stabilization projects are not routine and therefore are not included in the RMA program. The only erosion control projects included in the RMA program are those where a failing streambank is composed of earthen materials and biotechnical engineering techniques are used to stabilize the bank and prevent further erosion (e.g. brush mattresses and willow walls). Erosion control activities will generally be minor in nature and completed in 2-4 days.

4) Maintenance and Repair of Flood Control Structures

Annual routine maintenance and repair of Marin County flood control structures is a key objective of the RMA program. Flood control structures are defined to include all structures built or maintained by the District, including, but not limited to, weirs, tide gates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, culverts, outfalls, storm drain or pump station inlet/outlet structures and similar structures. The maintenance, repair or rehabilitation of flood control structures does not exceed 100 linear feet upstream or downstream of each structure and does not include increasing the footprint of any structure.

5) Levee Maintenance and Repair

Levee maintenance includes mowing levee tops and banks above the high water line for fire fuel reduction, stabilizing levees by placing fill on the levee tops, and controlling burrowing rodent populations. Levee stabilization may occur on any levee maintained by the District; a landowner access agreement is required for activities at site 7-GAL on the Santa Venetia levee, which is private property. If a gopher infestation occurs, the gophers are trapped and their burrows are filled with an earth/concrete mix or bentonite, following FEMA guidelines. The County of Marin does not use rodenticides or other poisons in rodent control for levee maintenance or in any other RMA program activity.

PROGRAM IMPLEMENTATION

Environmental Staff and Oversight

The Marin County Flood Control District will designate environmental staff who will provide day-to-day oversight of the RMA program including: 1) pre-project planning and notification to applicable resource agencies, 2) pre-project surveys for special status wildlife and plant species depending on site location and designated work windows, 3) project implementation including site surveys, conducting crew trainings, and coordinating with crews in the field, and 4) annual reporting to permitting resource agencies. The District will designate Environmental Compliance Coordinators (ECCs) to specifically oversee the biological aspects of the RMA program. The ECCs shall have an understanding of biological resources, permit regulations that may affect listed species and/or water quality, familiarity with the maintenance activities, and how to implement Avoidance and Minimization Measures and BMPs in the field. The ECCs will coordinate activities with input and review from County of Marin Public Works' staff biologists.

A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the project's potential

impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Avoidance and Minimization Measures (AMMs) to be employed at each project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

General and activity-specific conditions, AMMs and BMPs are incorporated into the overall project description and spelled out in the individual project fact sheets for each site. The job of the ECCs is to ensure that all measures are employed as prescribed in the field, depending on the location and nature of the activity.

Schedule and Timing of Maintenance Activities

The Routine Maintenance Activities Program is implemented annually throughout the project area in East Marin County. The general work window for RMA activities is the dry season, from April 15th to October 15th, depending on weather. Dry years may mean a longer work season; wet weather may halt the work season early. Table 1 below shows the Special Status Species potentially found within the project area and the established work windows for each species relative to the proposed work periods. As a general rule, work at each site will be scheduled around relevant work windows to avoid impacts. In instances where work needs to be scheduled outside of an established work window for a particular species in a specific location, species-specific pre-construction surveys will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of Avoidance and Minimization Measures before proceeding. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality.

Responsible Parties and Program Partners

Marin County Flood Control and Water Conservation District (District)- The Marin County Flood Control and Water Conservation District is the primary proponent for the RMA program, which utilizes the labor and expertise of the County of Marin Department of Public Works (DPW), County road maintenance crews, Conservation Corps North Bay crews (CCNB), and private contractors to manage and implement routine maintenance activities. The Marin County Flood Control and Water Conservation District (District) was formed in 1955 by an act of the California State Legislature with the primary purpose of controlling flood and storm waters of streams which flow within and into the county. The Marin County Board of Supervisors sits as its board and the District is staffed by the County of Marin Department of Public Works (DPW). The boundaries of the District are contiguous with those of the county and eight flood control zones have been established to address specific issues related to flooding within individual watersheds.

County of Marin Department of Public Works Road Crew (DPW)- DPW road maintenance crews perform a portion of the vegetation management, sediment removal, erosion control, and facility maintenance activities.

Marin County Parks - The District coordinates with Marin County Parks to perform vegetation maintenance activities on certain lands under their jurisdiction.

Conservation Corps North Bay (CCNB)- Conservation Corps North Bay is a non-profit job training and educational organization which has been operating in Marin County since 1982. CCNB will be the primary active partner and contractor with the District for many of the activities included in the RMA program. CCNB Maintenance Supervisors and staff will be trained annually by the District staff to incorporate the general and activity-specific conditions, AMMs, and BMPs required for each activity at each site in order to protect water quality, habitat and special status species.

Municipal Partners- Cities of Mill Valley, Novato, Larkspur, Ross, Fairfax, and San Anselmo- In addition to the work it oversees directly on County unincorporated lands, the District has a formal agreement with the City of Mill Valley that enables the City of Mill Valley to perform routine flood control maintenance activities on an annual basis on properties that fall within the District's flood control easements. In Novato, the District performs flood control maintenance activities in areas within the City of Novato's jurisdiction. The District is currently negotiating similar agreements for the District to conduct maintenance activities on a routine basis within the smaller municipalities of the Ross Valley (Cities of Larkspur, Ross, San Anselmo and Fairfax).

MCSTOPPP and STRAW- The District partners with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP) and the Point Reyes Bird Observatory's (PRBO) Students and Teachers Restoring a Watershed (STRAW) to perform restoration work in eastern Marin County. Activities consist primarily of removal of invasive plants and planting of native species by groups of teachers and students organized by STRAW.

Private Contractors - District environmental staff will work with outside contractors prior to implementing activities covered by the RMA. The ECC will be responsible for making sure that hired contractors understand what materials they need to have in hand and what methods to employ when implementing prescribed AMM's and BMPs during and post-construction. Companies contracting with the County of Marin for RMA program activities will be held to standards described in the Specifications that are included in their County contracts.

Foundation Documents for the RMA

The RMA program is largely based on program documents and studies previously developed by the Bay Area Stormwater Management Agencies Association (BASMAA). The District, as a member of MCSTOPPP, has been an active member of BASMAA since 1989. BASMAA is a consortium of 90 Bay Area county and city governments, local water and sanitation districts, and state agencies and was formed in response to the National Pollutant Discharge Elimination System (NPDES) permitting program to promote regional consistency. In 1998, BASMAA formed an Operational Permit Committee (OPC) which worked for several years to develop a Regional General Permit with the USACE to cover routine maintenance activities in flood control channels within BASMAA's jurisdictional areas. Although a Regional General Permit was not obtained, the OPC produced several documents which have been used by several BASMAA members to obtain individual permits. In addition to previous documents developed for BASMAA, the District commissioned a Biologic Assessment for the RMA program. Biological Assessment for Routine Flood Control Maintenance Activities; Marin County, California (July 2011).

The District is utilizing the information in these documents to support programmatic permit applications to the Department of Fish and Game, the Army Corps of Engineers, and the Regional Water Quality Control Board for the RMA program.

- Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works. July 2011.
- Minimal Threat Channel and Basin Maintenance Activities. October 2009. This document describes routine flood control maintenance activities.
- Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. October 2006. This document describes the environmental setting, special status species within the BASMAA jurisdictional area, the extent and scope of proposed activities, and a suite of AMMs and BMPs.
- Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities. June 2000. The manual describes BMPs for equipment and vehicles, sediment control, soil stabilization, natural resource protection and restoration, vegetation and debris management, and water diversions.

III. CIRCULATION AND REVIEW

A. Responsible Agencies: *(agencies whose approval is required and permits needed)*

- U.S. Army Corps of Engineers – Section 404 permit under the Clean Water Act with consultation from the U.S. Fish and Wildlife Service (Endangered Species Act of 1973, as amended) and NOAA Fisheries (Endangered Species Act of 1973, as amended);
- San Francisco Bay Regional Water Quality Control Board – Section 401 Water Quality Certification; and
- California Department of Fish and Game - 1600 Streambed Alteration Agreement Programmatic Routine Maintenance Agreement.

DOCUMENTS INCORPORATED BY REFERENCE

The following is a list of relevant information sources, which have been incorporated by reference into the foregoing Initial Study pursuant to Section 15150 of the State CEQA Guidelines. The number assigned to each information source corresponds to the number listed in parenthesis following the incorporating topical question of the Initial Study checklist. These documents are both a matter of public record and available for public inspection at the County of Marin. Copies of Documents (1-2) below are available for public review at the County of Marin Planning Department (Room 308), 3501 Civic Center Drive, San Rafael, California, Monday through Friday between the hours of 8:00 a.m. to 4:00 p.m. Copies of documents (3-8) are available for public review at the Marin County Public Works Department (Room 304) or at the Marin County website www.marinwatersheds.org. Copies of Documents (9 – 10)) can be found on-line at the individual municipal websites.

- 1) Marin Countywide Plan, Marin County Community Development Agency, Planning Division (2007).
- 2) Marin County Code; Supp. No. 6-11, Update 1; (June 7, 2011).
- 3) A Programmatic Approach to Routine Flood Control Maintenance Activities; County of Marin (October 2011).
- 4) Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works. (October 2011).
- 5) Minimal Threat Channel and Basin Maintenance Activities. BASMAA OPC (October 2009).
- 6) Minimal Threat Flood Control Routine Maintenance Activities: Regional Biological Assessment. BASMAA OPC October 2006.
- 7) Flood Control Facility Maintenance Best Management Practices: A Manual for Minimizing Environmental Impacts from Stream and Channel Maintenance Activities. BASMAA OPC, (June 2000).
- 8) County Road Maintenance Guidelines for Protecting Aquatic Habitat and Salmon Fisheries; FishNet 4C; Dec 2004; updated 2007)
- 9) City of Mill Valley General Plan (1989).
- 10) City of Novato General Plan (1996).

IV. EVALUATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Pursuant to Section 15063 of the State CEQA Guidelines, and the County EIR Guidelines, Marin County will prepare an Initial Study for all projects not categorically exempt from the requirements of CEQA. The Initial Study evaluation is a preliminary analysis of a project which provides the County with information to use as the basis for deciding whether to prepare an Environmental Impact Report (EIR) or Negative Declaration. The points enumerated below describe the primary procedural steps undertaken by the County in completing an Initial Study checklist evaluation and, in particular, the manner in which significant environmental effects of the project are made and recorded.

- A. The determination of significant environmental effect is to be based on substantial evidence contained in the administrative record and the County's environmental database consisting of factual information regarding environmental resources and environmental goals and policies relevant to Marin County. As a procedural

device for reducing the size of the Initial Study document, relevant information sources cited and discussed in topical sections of the checklist evaluation are incorporated by reference into the checklist (e.g. general plans, zoning ordinances). Each of these information sources has been assigned a number which is shown in parenthesis following each topical question and which corresponds to a number on the data base source list provided herein as Attachment A. See the sample question below. Other sources used or individuals contacted may also be cited in the discussion of topical issues where appropriate.

- B. In general, a Negative Declaration shall be prepared for a project subject to CEQA when either the Initial Study demonstrates that there is no substantial evidence that the project may have one or more significant effects on the environment. A Negative Declaration shall also be prepared if the Initial Study identifies potentially significant effects, but revisions to the project made by or agreed to by the applicant prior to release of the Negative Declaration for public review would avoid or reduce such effects to a level of less than significance, and there is no substantial evidence before the Lead County Department that the project as revised will have a significant effect on the environment. A signature block is provided in Section VII of this Initial Study to verify that the project sponsor has agreed to incorporate mitigation measures into the project in conformance with this requirement.
- C. All answers to the topical questions must take into account the whole of the action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts. Significant unavoidable cumulative impacts shall be identified in Section VI of this Initial Study (Mandatory Findings of Significance).
- D. A brief explanation shall be given for all answers except "Not Applicable" answers that are adequately supported by the information sources the Lead County Department cites in the parenthesis following each question. A "Not Applicable" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A "Not Applicable" answer shall be discussed where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- E. "Less-than-significant Impact" is appropriate if an effect is found to be less-than-significant based on the project as proposed and without the incorporation of mitigation measures recommended in the Initial Study.
- F. "Potentially Significant Unless Mitigated" applies where the incorporation of recommended mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less-than-significant Impact." The Lead County Department must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from Section V, "Earlier Analyses", may be cross-referenced).
- F. "Significant Impact" is appropriate if an effect is significant or potentially significant, or if the Lead County Department lacks information to make a finding that the effect is less-than-significant. If there are one or more effects which have been determined to be significant and unavoidable, an EIR shall be required for the project.
- G. The answers in this checklist have also considered the current California Environmental Quality Act Guidelines and the Initial Study Checklist contained in those Guidelines.
- H. This Initial Study checklist was prepared consistent with current California Environmental Quality Act Guidelines and the Initial Study checklist contained in those Guidelines.

V. ISSUES (for source #(s) see: Documents Included by Reference; Page 13)

1. LAND USE AND PLANNING. *Would the proposal:*

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| a) Conflict with applicable Countywide Plan designation or zoning standards? (source #(s): 1, 2) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The determinations of policy consistency as discussed in this Initial Study section represent County staff interpretation of policies. However, this Initial Study does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

Section 15358(b) of the CEQA Guidelines states that “effects analyzed under CEQA must be related to a physical change in the environment”, however policy inconsistencies may not necessarily indicate significant environmental effects. Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environment are considered significant impacts pursuant to CEQA. Where potentially significant environmental impacts are raised in the discussion below, they have been mitigated to a less-than-significant impact and, therefore, project activities are determined to be consistent with the relevant policies cited. Mitigations are addressed further in the topical impact sections following the plan, policies and regulations analyses.

LOCAL PLANS, POLICIES, AND REGULATIONS

Land use designations and development of the project sites are governed by the objectives and policies of the 2007 Marin Countywide Plan (CWP), sections of the Marin County Code, including Title 22 (Zoning) and Title 23 (Natural Resources) and Title 24 (Development Standards). And General Plans for local municipal program partners including; City of Novato, City of Mill Valley, Town of Ross, City of Larkspur, Town of San Anselmo and the Town of Fairfax.

MARIN COUNTY CODE

TITLE 22- DEVELOPMENT CODE; Chapter 22.27- Native Tree Protection and Preservation

Section 22.27.040 (k)- Exemption to the Prohibition of Removal of a Protected Tree states that the project proponent must demonstrate that the tree removal is by a public agency to provide for the routine management and maintenance of public land.

Consistent- The project is consistent with the Marin County Code (Title 22) which requires projects to minimize tree removal and grading, as well as to maintain adequate site features that establish the visual character of the site. Marin County Flood Control District during RMA Program implementation, will minimize any riparian tree removal unless absolutely necessary to achieve the goals of the program, which are to protect the public and public facilities from flooding, while protecting water quality and sensitive habitats. To protect sites that are environmentally sensitive, the District will employ a suite of Avoidance and Minimization Measures and Best Management Practices to protect existing habitats and species of concern. Therefore, the project is consistent with the development standards set forth in Title 22.

TITLE 23- NATURAL RESOURCES;

The provisions of Title 23 are enacted to protect and promote the public health, safety and general welfare, to preserve environmental qualities, and to protect the value, worth and enjoyment of the use of real property to the fullest extent possible, through the regulation of the uses or activities of the property in a manner which will prevent serious public injury.

Chapter 23.08 Excavating, Grading, and Filling

Chapter 23.08 establishes regulations for excavation, grading and filling in order to:

- (1) Preserve and enhance the natural beauties of the land, streams, bays and shorelines;
- (2) Reduce or eliminate the hazards of earth slides, mudflows, rock falls, undue settlement, erosion, siltation, sedimentation and flooding;
- (3) Protect and enhance the water quality of watercourses, water bodies and wetlands and vegetation for wildlife habitat;
- (4) Regulate de facto development caused by uncontrolled grading.

Activities of this nature which are considered exempt from the provisions of this chapter include:

- (a) Grading done by or on behalf of a public agency that assumes full responsibility for the work.

Consistent: The project as described will be implemented by the County of Marin Flood Control District, local municipalities or private contractors under contract with the District. The District is a public agency and assumes full responsibility for the work conducted under the RMA program, therefore the program is exempt from the terms of Chapter 23.08, and consistent with the requirements of this section of County code.

Chapter 23.09 Floodplain Management

It is the purpose of Chapter 23.09 to promote the public health, safety and general welfare and to minimize the losses described in this section by provisions designed to:

- (A) Protect human life and health;
- (B) Minimize expenditure of public money for flood control projects;
- (C) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- (D) Minimize prolonged business interruptions;
- (E) Minimize damage to public facilities and utilities, such as water located in areas of special flood hazard;
- (F) Help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
- (G) Ensure that potential buyers are notified that property is in an area of special flood hazard;
- and
- (H) Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

- (2) In order to accomplish its purposes, Chapter 23.09 includes methods and provisions for:

- (A) Restricting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- (B) Requiring that uses vulnerable to flood, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- (C) Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- (D) Controlling filling, grading, dredging and other development which may increase flood damage; and
- (E) Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Consistent- The project is consistent with the Marin County Code Title 23 which was enacted to protect and promote the public health, safety and general welfare, and to preserve environmental qualities in a manner which would prevent serious public injury. The objective of the project is to promote flood control and minimize risk to public health, safety and welfare. The program as designed will minimize potential impacts to sensitive habitats and will be designed to blend into the surrounding natural environment to the greatest extent feasible. The proposed flood control project incorporates practices which enhance the biological and visual character of the creek corridor. Although some trimming of riparian trees will occur to prevent flooding, the project will not alter the riparian character of the project sites. The implementation of the proposed program will respect the surrounding natural environment and return channel elevations to their previous condition prior to sedimentation.

In summary, the proposed project is maintenance in nature, and will not change the Land Use Designations at the project sites or conflict with zoning standards or the objectives of the above-mentioned code in any way; therefore, the project will be consistent with applicable Marin County Code.

| | | | | |
|--|---------------------------|---|-------------------------------------|-----------------------|
| b) Conflict with applicable environmental plans or policies adopted by Marin County? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

MARIN COUNTYWIDE PLAN (2007)

Specific Countywide Plan policies which pertain to the proposed project are associated with the following subjects:

- (1) Include Resource Preservation in Environmental Review;
 - BIO- 2.1 Include Resources Protection in Environmental Review
- (2) Coordinate with Trustee Agencies and Promote Early Consultation with Agencies;
 - BIO-2.8 Coordinate with Trustee Agencies during environmental review when special-status species, sensitive natural communities, or wetlands may be affected.
 - BIO-2.9 Promote early consultation with other agencies.
- (3) Protection of Riparian Systems
 - BIO-1.5 Promote Use of Native Plant Species

- BIO-1.7 Remove Invasive Exotic Plants
- BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials
- BIO-4.6 Control Exotic Vegetation
- BIO-4.7 Protect Riparian Vegetation

(4) Protection of Stream Conservation Areas

- BIO- 4.4 Promote Natural Stream Channel Function
- BIO-4.5 Restore and Stabilize Stream Channels
- BIO-4.10 Promote Interagency Cooperation
- BIO-4.19 Maintain Channel Stability

(5) Species and Habitat Preservation

- BIO-1.1 Protect Wetlands, Habitat for Special -Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors.
- BIO-1.3 Protect Woodlands, Forests, and Tree Resources
- BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors.
- BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season
- BIO-2.7 Protect Sensitive Coastal Habitat.
- BIO-5.3 Leave Tidelands in the Natural State
- BIO-5.5 Protect Freshwater Habitats
- BIO-5.6 Use Flood Basins for Seasonal Habitat

(6) Protection of Watersheds and Water Quality

- WR-1.1 Protect Watersheds and Aquifer Recharge
- WR-2.3 Avoid Erosion and Sedimentation
- WR-2.4 Design County Facilities to Minimize Pollutant Input

(7) Avoidance of Environmental Hazards

- EH-2.1. Avoid Hazard Areas
- EH-3.2. Retain Natural Conditions
- EH-4.1. Limit Risks to Structures
- EH-4.2 Remove Hazardous Vegetation

(8) Protection of Air Quality

- AIR-2.0 Protection from Emissions
- AIR-5.0 Adaptation to Climate Change

(9) Minimize Noise Impacts;

- NO-1.3 Regulate Noise Generating Activities

(10) Protection of Visual Resources

- DES-4.1. Preserve Visual Quality

(11) Avoid Impacts to Historical Resources;

- HAR-1.3. Avoid Impacts to Historical Resources

CONSISTENCY OF PROJECT WITH EXISTING MARIN COUNTYWIDE PLAN POLICIES

(1) Include Resource Preservation in Environmental Review

BIO-2.1 Include Resource Preservation in Environmental Review to assess the impact of proposed development on native species and habitat diversity, particularly special-status species, sensitive natural communities, wetlands, and important wildlife nursery areas and movement corridors. Require adequate mitigation measures for ensuring the protection of any sensitive resources and achieving "no net loss" of sensitive habitat acreage, values, and functions.

Consistent: The Marin County Department of Public Works (DPW) developed a biological assessment for the RMA program which evaluated potential impacts to native species, habitat diversity and special-status species and natural communities (Biological Assessment for Routine Flood Control Maintenance Activities; July 2011). The objective of the biological assessment was to identify adequate measures to protect any sensitive resources and achieve "no net loss" of sensitive habitat acreage, values, and functions. Prescriptions contained in the Biological Assessment include species related Avoidance and Minimization Measures as well as Special Conditions and Best Management Practices to be employed during project implementation. The project is guided by these prescriptions from the Biological Assessment so therefore, the project will be consistent with Policy BIO-2.1.

(2) Coordinate with Trustee Agencies and Promote Early Consultation with Other Agencies

BIO-2.8 Coordinate with Trustee Agencies. Consult with trustee agencies (the California Department of Fish and Game, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration (NOAA) Fisheries, U.S. Army Corps of Engineers, Environmental Protection Agency, Regional Water Quality Control Board, and Bay Conservation and Development Commission) during environmental review when special-status species, sensitive natural communities, or wetlands may be adversely affected.

BIO-2.9 Promote Early Consultation with Other Agencies. Require applicants to consult with all agencies with review authority for projects in areas supporting wetlands and special-status species at the outset of project planning.

Consistent: DPW has coordinated the development and review of this project and its associated environmental documents with natural resource trustee agencies who require permits for the proposed work. Permitting agencies include the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), the California Department of Fish and Game for all sites. A select number of sites will need permits from the U.S. Army Corps of Engineers with consultation with U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. Regulatory permit applications have been submitted to all these agencies. Project coordination with these regulatory agencies and notification to all interested parties and the general public will continue throughout the public review process. Therefore, the project is consistent with Policies BIO-2.8 and BIO-2.9.

(3) Protection of Riparian Systems

BIO-1.5 Promote Use of Native Plant Species. Encourage use of a variety of native or compatible non-native, non-invasive plant species indigenous to the site vicinity as part of project landscaping to improve wildlife habitat values.

BIO-1.7 Remove Invasive Exotic Plants. *Require the removal of invasive exotic specie, to the extent feasible, when considering applicable measures in discretionary permit approvals for development projects unrelated to agriculture, and include monitoring to prevent re-establishment in managed areas.*

BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials. *Encourage the use of integrated pest management and organic practices to manage pest with the least possible hazard to the environment. Restrict the use of insecticide, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared; the habitat itself is threatened; a substantial risk to public health and safety exists, including maintenance for flood control; or such use is authorized pursuant to a permit issues by the agricultural commissioner. Encourage non-toxic strategies for pest control, such as habitat management using physical and biological control, as an alternative to chemical treatment, and allow use of toxic substances only after approaches have been tried and determines unsuccessful. Continue to implement the Integrated Pest Management ordinance for county-related operations.*

BIO- 4.6 Control Exotic Vegetation. *Remove and replace invasive exotic plants with native plants as part of stream restoration projects and as a condition of site-specific development approval in than SCA and include monitoring to prevent reestablishment.*

BIO-4.7 Protect Riparian Vegetation. *Retain riparian vegetation for stabilization of stream banks and floodplains, moderating water temperatures, trapping and filtering sediments and other water pollutants, providing wildlife habitat, and aesthetic reasons.*

Consistent: Vegetation management activities are employed to achieve three main goals: maintain channels, reduce fire fuels, and restore creek habitat by removing invasive non-native plants and re-vegetating with native plants. Maintaining channel function is achieved by limbing and trimming, cattail cutting, removing vegetation from channel bottoms, and clearing trash. These activities occur from the channel bottom to the top of the high water mark, and include trimming tree limbs from trees and shrubs growing in the channel and trimming branches that hang down into the active channel. These activities employ vegetation control methods such as cutting and removing vegetation above the ground by hand or with loppers, hand saws, chainsaws, pole saws, weed eaters and other hand tools. Bladed weed-eaters are used to cut cattails. Fire fuel reduction is achieved by mowing on tops of banks and levees, removal of fallen trees, removal of standing dead trees, and thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas. Tree removal and thinning employ a mix of tools including chainsaws, loppers, hand saws, pole saws, hedge trimmers, and other hand tools.

Tree removal is a rare event. Program BIO-4f of the Countywide Plan recognizes that tree growth may be cleared from the stream channel where removal is essential to protect against property damage or prevent safety hazards. Removal of mature, healthy, native trees is only indicated when pruning is insufficient to reduce unacceptably high hydraulic roughness in the channel. For example, an arroyo willow growing on a newly established gravel bar may need to be removed if it threatens to block flow through a structure. Removal of sick, dying, or dead trees is indicated when they reduce channel capacity, increase flood hazard, and/or are a safety hazard to adjacent structures. Tree health and hazard potential will be determined by appropriate environmental staff (arborist or biologist). Snags shall be left in place to provide habitat for birds and small mammals if they do not otherwise pose a flood or safety hazard. Staff will consult with CDFG whenever possible if tree removal is necessary, and retention of large wood debris in the creeks will follow CDFG protocols.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program. Since 1999 STRAW has restored 7,159 linear feet (5.9 acres) of riparian corridor along east Marin creeks, removing invasive non-native plants and revegetating with natives to restore streamside habitat. The STRAW Program is included as a partner in the Marin County Flood Control District's Routine Maintenance Program (RMA).

Overall, the vegetation removal within flood control creeks and drainages will be the minimum amount necessary to clear these areas of obstructions. As discussed in detail in Sections V. 7, the proposed project will adhere to the mitigation measures outlined in that section, ensuring that the project would have less-than-significant impacts on riparian systems or the plants and animals that inhabit the riparian zone. Therefore, the project has been mitigated to consistency with Policies BIO-1.5, BIO-1.7, BIO-1.8, BIO-4.6 and BIO-4.7.

(4) Protection of Stream Conservation Areas

BIO-4.1 Restrict Land Use in Stream Conservation Areas. *A Stream Conservation Area (SCA) is established to protect the active channel, water quality and flood control functions, and associated fish and wildlife habitat values along streams. Development shall be set back to protect the stream and provide an upland buffer, which is important to protect significant resources that may be present and provide a transitional protection zone. Best management practices shall be adhered to in all designated SCAs. Best management practices are also strongly encouraged in ephemeral streams not defined as SCAs.*

Allowable uses in SCAs in any corridor consist of the following, provided they conform to zoning and all relevant criteria and standards for SCAs, as follows:

- Existing permitted or legal nonconforming structures or improvements, their repair, and their retrofit within the existing footprint;
- Projects to improve fish and wildlife habitat;
- Driveway, road and utility crossings, if no other location is feasible;
- Water monitoring installations;
- Passive recreation that does not significantly disturb native species;
- Necessary water supply and flood control projects that minimize impacts to stream function and to fish and wildlife habitat;
- Agricultural uses that do not result in any of the following:
 - a. The removal of woody riparian vegetation;
 - b. The installation of fencing within the SCA that prevents wildlife access to the riparian habitat within the SCA;
 - c. Animal confinement within the SCA; and
 - d. A substantial increase in sedimentation.

BIO-4.4 Promote Natural Stream Channel Function. *Retain and, where possible, restore the hydraulic capacity and natural functions of stream channels in SCAs. Discourage alteration of the bed or banks of the stream, including filling, grading, excavating, and installation of storm drains and culverts. When feasible replace impervious surfaces with pervious surfaces. Protect*

and enhance fish habitat, including through retention of large woody debris, except in cases where removal is essential to protect against property damage or prevent safety hazards. In no case shall alterations that create barriers to fish migration be allowed on streams mapped as historically supporting salmonids. Alteration of natural channels within SCAs for flood control shall be designed and constructed in a manner that retains and protects the riparian vegetation, allows for sufficient capacity and natural channel migration, and allows for reestablishment of woody trees and shrubs without compromising the flood flow capacity where avoidance of existing riparian vegetation is not possible.

BIO- 4.5 Restore and Stabilize Stream Channels. Pursue stream restoration and appropriate channel redesign where sufficient right-of-way exists that includes the following: a hydraulic design, a channel plan form, a composite channel cross-section that incorporates low flow and bankfull channels, removal and control of invasive exotic plant species, and bio-technical bank stabilization methods to promote quick reestablishment of riparian trees and other native vegetation.

BIO-4.10 Promote Interagency Cooperation. Work in close cooperation with flood control districts, water districts, and wildlife agencies in the design and choice of materials for construction and alterations within SCAs.

Consistent: Many of the channels included in the project areas are subject to protection under the Stream Conservation Area protection policies as set forth in the Countywide Plan. As discussed in Section V. 3. (c) And V. 11. (d, e), the proposed project is a flood control project that will maintain functioning channels for conveyance of water flow, minimize impacts to fish and wildlife habitat and reduce risk of fire and flooding. Thus, it is a permitted activity within the SCA, as set forth in the Countywide Plan Policy BIO-4.1 Excavation of accumulated sediment, selective vegetation removal within the creeks, channels and drainage ditches at the project sites, and minimal streambank stabilization where needed will work to restore the hydraulic and natural functions of project drainages to reduce the risk of flooding, thus the project is consistent with Policies BIO-4.4 and 4.5. The project promote interagency cooperation in that it will be implemented by the Marin County Flood Control District in collaboration with local municipalities including the Cities of Mill Valley, Larkspur, Ross, San Anselmo, Fairfax and Novato. Permits for the project will be issued by the trustee agencies including the Department of Fish and Game, the US Army Corps of Engineers, the Regional Water Quality Control Board, the US Fish and Wildlife Service and the National Marine Fisheries Service.

(5) Species and Habitat Preservation

BIO-1.1 Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors. Protect sensitive biological resources, wetlands, migratory species of the Pacific Flyway, and wildlife movement corridors through careful environmental review of proposed development applications, including consideration of cumulative impacts, participation in comprehensive habitat management programs with other local and resource agencies, and continue acquisition and management of open space lands that provide for permanent protection of important natural habitats.

BIO-1.3 Protect Woodlands, Forests, and Tree Resources. Protect large native trees, trees with historical importance; oak woodlands; healthy and safe eucalyptus groves that support colonies of monarch butterflies, colonial nesting birds, or known raptor sites; and forest habitats. Prevent the untimely removal of trees through the implementation of standards in the Development Code and

Native Tree Preservation and Protection Ordinance. Encourage other local agencies to adopt tree preservation ordinances to protect native trees and woodlands, regardless of whether they are located in urban or undeveloped areas

BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors. *Ensure that important corridors for wildlife movement and dispersal are protected as a condition of discretionary permits, including consideration of cumulative impacts. Features of particular importance to wildlife for movement may include riparian corridors, shorelines of the coast and bay, and ridgelines. Linkages and corridors shall be provided that connect sensitive habitat areas such as woodlands, forests, wetlands, and essential habitat for special-status species, including an assessment of cumulative impacts.*

BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season. *Limit construction and other sources of potential disturbance in sensitive riparian corridors, wetlands, and baylands to protect bird nesting activities. Disturbance should generally be set back from sensitive habitat during the nesting season from March 1 through August 1 to protect bird nesting, rearing, and fledging activities. Pre-construction surveys should be conducted by a qualified professional where development is proposed in sensitive habitat areas during the nesting season, and appropriate restrictions should be defined to protect nests in active use and ensure that any young have fledged before construction proceeds.*

BIO-2.7 Protect Sensitive Coastal Habitat. *Protect coastal dunes, streams, and wetlands, and sensitive wildlife habitat from development in accordance with coastal resource management standards in the development code.*

BIO-5.1 Protect the Baylands Corridor. *Ensure that baylands and large, adjacent essential uplands are protected, and encourage enhancement efforts for baylands, including those in the baylands corridor.*

BIO-5.3 Leave Tidelands in Their Natural State. *Require that all tidelands be left in their natural state to respect their biological importance to the estuarine ecosystem. Any modifications should be limited to habitat restoration or enhancement plans approved by regulatory agencies.*

BIO-5.5 Protect Freshwater Habitats. *Preserve and where possible expand habitats associated with freshwater streams, seasonal wetlands, and small former marshes to facilitate the circulation, distribution, and flow of fresh water, and to enhance associated habitat values.*

BIO-5.6 Use Flood Basins for Seasonal Habitat. *Utilize natural or manage man-made flood basins to provide seasonal habitat for waterfowl and shorebirds and prohibit development in these basins to protect habitat values.*

Consistent: A Biological Assessment (BA) was completed for the RMA program in June 2011, which addresses the project's potential impacts to water quality, wildlife and sensitive native habitats. Based on the findings in the BA, the RMA program specifies appropriate General and Activity-specific Conditions, and species-specific Avoidance and Minimization Measures (AMMs) to be employed at each project site and for each type of maintenance activity. Program implementation also includes employment of existing Best Management Practices (BMPs) from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and the Federal Emergency Management Agency (FEMA).

General and activity-specific conditions, AMMs and BMPs are incorporated into the overall RMA project description and spelled out in the individual project fact sheets for each site. An Environmental Compliance Coordinator (ECC) will work with the project on a daily basis to ensure that all AMMs and BMPs are implemented as prescribed in the field, depending on the location and nature of the activity. The ECC will be on-site to monitor the outcome of all conservation measures to assure protection of all fish and wildlife species and their habitats

As prescribed in the Biological Assessment, pre-construction surveys for special-status animal and plant species will be completed at individual sites as necessary depending on work windows and seasonal conditions. If surveys confirm species occurrence at a project site, a biologist will oversee all construction work and implement appropriate conservation measures to protect these species. If necessary, avoidance of work areas and stop work orders will be employed if impacts to sensitive species and their habitat cannot be mitigated to a less-than-significant level or avoided completely. As discussed in detail in Sections V. 7. (a, b, c), the proposed project, will adhere to the mitigation measures outlined in those sections, ensuring that the project would have less-than-significant impacts on all special-status species, wildlife and habitat diversity. Therefore, the project has been mitigated to consistency with Policies BIO-1.1, BIO-1.3, BIO-2.4, BIO-2.5, BIO-2.7.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program. Since 1999 STRAW has restored 7,159 linear feet (5.9 acres) of riparian corridor along east Marin creeks, removing invasive non-native plants and revegetating with natives to restore streamside habitat. The STRAW Program is included as a partner in the Marin County Flood Control District's Routine Maintenance Program (RMA).

Sensitive natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection (i.e., §404 of the Clean Water Act and/or the §§1600 et seq. of the California Fish and Game Code). Within the project sites, two sensitive natural communities have the potential to be affected by project activities: northern coastal salt marsh and coastal brackish marsh (CDFG 2011). These communities are found within or adjacent to some of the project sites and are expected to fall under federal and/or state jurisdictions as wetlands or waters of the U.S. or waters of the state. Wetlands and Other Waters of the U.S. Wetlands and other aquatic resources such as riparian areas and certain aquatic vegetation communities are considered sensitive biological resources and can fall under the jurisdiction of several regulatory agencies. Wetlands are generally defined by the USACE as "those areas that are inundated or saturated by surface or ground water... that under normal circumstances support a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 [b]). Indicators of three wetland parameters determined by field investigation must be present for a site to be classified as a wetland by the USACE; these are hydric soils, hydrophytic vegetation, and wetlands hydrology. Approximately one third of the sites have been initially identified as possibly meeting the USACE definition of wetlands. A formal wetlands delineation for those 38 sites will be completed in Spring or Summer 2012. Mitigation measures to protect these sites are outlined in Section 7 below. In tideland areas maintenance work will be limited to that which is absolutely necessary to restore flow through to the tidelands from upland drainage areas (e.g. clearing sediment from culvert outfalls). The minimal amount of work proposed in the tidelands area will be conditioned by permits issued by the Department of Fish and Game (1600 Streambed Alteration Agreement) and the Army Corps of Engineers (404 permit), with consultation from US Fish and

Wildlife Service the National Marine Fisheries Service, and the Regional Water Quality Control Board (401 Certification). General and activity-specific conditions, AMMs and BMPs prescribed for all project sites located in tideland areas will mitigate the project's impacts to less-than-significant, therefore, the project will be consistent with Policies BIO-5.1, BIO-5.3, BIO-5.5, and BIO-5.6.

(6) Protection of Watersheds and Water Quality

WR-1.1. Protect Watersheds and Aquifer Recharge. *Give high priority to the protection of watersheds, aquifer-recharge areas, and natural drainage systems in any consideration of land use.*

WR-2.3. Avoid Erosion and Sedimentation. *Minimize soil erosion and discharge of sediments into surface runoff, drainage systems, and water bodies. Continue to require grading plans that address avoidance of soil erosion and on-site sediment retention. Require developments to include on-site facilities for the retention of sediments, and, if necessary, require continued monitoring and maintenance of these facilities upon project completion.*

WR-2.4 Design County Facilities to Minimize Pollutant Input. *Design, construct, and maintain County building, landscaped areas, roads, bridges, drainages, and other facilities to minimize the volume of toxic, nutrients, sediment, and other pollutants in stormwater flows, and continue to improve road maintenance methods to reduce erosion and sedimentation potential.*

Consistent: Implementation of this project will help to restore the normal drainage patterns within the project area by removing accumulated sediment from the creeks, channels and drainage ditches at selected sites. There will be a temporary increase in turbidity in these drainages as sediment is disturbed from the dredging process. These impacts will be short-term and localized over the 1-7 day sediment removal project period. DPW will use Best Management Practices (BMPs) outlined in the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance. These BMPs include minimizing loss of native vegetation, conducting the work from the road whenever possible, timing the work prior to the rainy season, minimizing sediment disturbance and suspension within the water, taking all excavated material to an upland disposal site, and sediment/erosion controls to keep excess soil from washing or blowing away during removal, transport and storage (including sediment traps, silt fences, coir logs and wattles containing weed-free rice straw, as necessary). Dewatering will be conducted in a manner to reduce turbidity downstream of the project area. To prevent streambed erosion from the use of cofferdams, pipes and pumps used to de-water the creek, diversion pipe outlets shall be placed on hard surfaces or temporary outfall dissipation structures shall be installed (i.e. rock piles). No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start-up of any phase of the project that may result in sediment run-off to the stream. If rainfall is predicted, erosion control measures must be kept on-site and be in place prior to the onset of precipitation. As discussed in detail in Sections V. 3. (b) and V. 4. (c), the proposed project will adhere to the mitigation measures outlined in those sections, ensuring that the project would have less-than-significant impacts on water quality and watersheds. Therefore, the project has been mitigated to consistency with Policies WR-1.1, 2.3 and 2.4.

(7) Avoidance of Environmental Hazards

EH-2.1. Avoid Hazard Areas. *Require development to avoid or minimize potential hazards from earthquakes and unstable ground conditions.*

EH-3.2. Retain Natural Conditions. *Ensure that flow capacity is maintained in stream channels and floodplains, and achieve flood control using biotechnical techniques instead of storm drains, culverts, riprap, and other forms of structural stabilization.*

EH-4.2 Remove Hazardous Vegetation. *Abate the build-up of vegetation around existing structures or on vacant properties that could help fuel fires.*

Consistent: The RMA project is maintenance in nature and no new development or increases of footprint of existing development is proposed; therefore no increase in impacts from an earthquakes on structures is predicted for the project. This project will restore the channel function of these drainages by removing obstructing vegetation and accumulated sediment, which should reduce the potential for flooding of adjacent roadways and promote public safety of people and property from the risks associated with flooding. The proposed bank stabilization associated with the RMA uses biotechnical designs and does not include installation of rip rap or other forms of structural stabilization. Bank stabilization and channel clearing activities will be implemented in a way that maintains natural channel features and watershed functions. Mowing of levees and along top of bank in selected channel reaches is done before the July 4th holiday in order to reduce fire fuel loading and to minimize the risk of grass fires, therefore, the project will be consistent with Policies EH-2.1, 3.2 and 4.2.

(8) Protection of Air Quality

AIR-2.0. Protection from Emissions. *Minimize the potential impacts from land uses that may emit pollution and/or odors on residential and other land uses sensitive to such emissions in unincorporated Marin County.*

AIR-5.0 Adaptation to Climate Change- *Adopt policies and programs that promote resilient human and natural systems in order to ease the impacts of climate change.*

Consistent: The effects on air quality are from exhaust coming from heavy equipment during dredging. These impacts are short-term and temporal, occurring incrementally over the 1-7 day work periods. As discussed in Section V. 5.(a), the project would contribute minimally to air impacts; no significant negative impacts related to air quality are identified. The re-vegetation of stream banks by the STRAW program serves to sequester carbon and thus reduce the impacts of climate change. Consequently, the proposed project will be consistent with Policy AIR-2.1.

(9) Protection of Open Space and Trails

Policy TRL-1.1. Protect the Existing Countywide Trail System. *Maintain the existing countywide trail system and protect the public's right to access it.*

Consistent: The project will not impede access to the Countywide Trail System in any way nor will it create any impacts that will decrease the public's enjoyment of the trail system or open space areas in any way, therefore it is consistent with the Countywide Plan Policies to protect open space and trails.

(10) Minimize Noise Impacts

NO-1.3. Regulate Noise Generating Activities. *Require measures to minimize noise exposure to neighboring properties, open space, and wildlife habitat from construction-related activities, yard maintenance equipment, and other noise sources, such as amplified music.*

Consistent: As discussed in Section V. 10. (a, b), the noise associated with sediment removal activities is limited to the sound of heavy equipment operating during normal daytime working hours (approximately 8:00 a.m. to 4:00 p.m.). The project is short-term (approximately 1-7 days, depending on site), most of the work is not near residences and for those that are, private landowners have concurred with implementation of this flood control maintenance project on their lands and project dates will be coordinated with these landowners in advance of project commencement. Noise impacts could cause temporary disturbance to wildlife species such as songbirds that use the riparian zone. Any disturbed or flushed resident wildlife are expected to return to the project area after completion of daily construction activities. The project would contribute minimally to noise impacts; no significant impacts related to noise pollution are identified. Therefore, the project will be consistent with Policy NO-1.3.

(11) Protection of Visual Resources

DES-4.1. Preserve Visual Quality *Protect scenic quality and views of the natural environment – including ridgelines and upland greenbelts, hillsides, water, and trees – from adverse impacts related to development.*

Consistent: The visual resources of the project sites would not be adversely impacted by maintenance activities because the overall project is designed to respect the surrounding natural environment and return it to its previous condition (i.e., by removing aggraded sediment, fallen trees or overgrown weeds). Some trimming of riparian trees will occur, but the maintenance project would not result in visual impacts to public or scenic views and vistas from adjacent roadways, therefore, the project will be consistent with Policy DES-4.1.

(12) Avoid Impacts to Historical Resources

HAR-1.3. Avoid Impacts to Historical Resources. *Ensure that human activity avoids damaging cultural resources.*

Consistent: As discussed in Sections V. 14. (a, b), the proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and some sites to be dredged have previously been dredged multiple times in the same locations. Should any cultural resources be discovered during sediment removal activities, all work shall immediately be stopped and the services of a qualified archaeologist from Sonoma State University's Cultural Resources Department shall be engaged to assess the value of the resource and to develop appropriate mitigation measures. As discussed in detail in Sections V. 14. (a), the proposed project will adhere to the mitigation measures outlined in that section, ensuring that the project would have less-than-significant impacts on historical resources. Therefore, the project has been mitigated to consistency with Policy HAR-1.3.

CITY OF MILL VALLEY GENERAL PLAN (1989)

Section 5: Public Health and Safety; PH-1: The City shall strive to ensure that all grading, site improvements and structures minimize geotechnical, seismic and flood hazards to people and property.

A large portion of developed and undeveloped Mill Valley lands are subject to flooding due to a combination of factors including periodic heavy winter rainfalls, tidal fluctuations, and potentials for tsunami and dam failure due to seismic activity. Flooding as a result of heavy rainfall can result from either of two phenomena: (1) storm water run-off inundation of lowlands due to an inadequate drainage network, and (2) high Bay tides and winds which force the storm water up stream channels. Mill Valley drains into the Richardson Bay Drainage Basin mainly by way of the Basin's major stream, Arroyo Corte Madera Del Presidio. The creek often overflows its banks in the lower reaches during a period of heavy rainfall. Significant encroachment has occurred along Arroyo Corte Madera by urban development and excessive vegetative growth. Both factors have imposed extreme limitations on channel flow capacities along substantial portions of the stream, resulting in major flood problems. Damaging floods have periodically occurred over this area as a result.

Consistent: The primary objective of the proposed RMA project within the City of Mill Valley's jurisdiction is to reduce the potential risk of flooding by maintaining the channels and removing obstructions from related flood control infrastructure such as tidegates, weirs and trash racks; therefore the RMA program is consistent with the PH-1 Policy of the City of Mill Valley General Plan.

CITY OF NOVATO GENERAL PLAN (1996)

The City of Novato General Plan contains the following policies to protect Watercourses, Wetlands, and Baylands Areas that are applicable to the proposed RMA activities that will be conducted on properties within the City of Novato jurisdiction.

CHAPTER IV- Environment; Watercourses, Wetlands, and Baylands Areas

EN Objective 1- Preserve, protect, and enhance streams and other bodies of water.

EN Policy 1 Ecology of Creeks and Streams. *Preserve and enhance the ecology of creeks and streams.*

EN Policy 2 Vegetation in Watercourse Areas. *Protect vegetation in watercourse areas.*

EN Policy 3 Wildlife Habitat. *Endeavor to preserve and enhance wildlife habitat areas in watercourse areas and control human use of these areas as necessary to protect them.*

EN Policy 4 Erosion Control. *Minimize soil disturbance and surface runoff in the Stream Protection Zones. Pursuant to the City's grading ordinance, work in and adjacent to the zones shall be conducted during the dry season only, at times when the Community Development Department determines that surface runoff will be minimal or containable.*

EN Policy 5 Habitat Restoration. *Restore damaged portions of riparian areas to their natural state, wherever feasible.*

EN Policy 7 Water Quality. Encourage protection of water resources from pollution and sedimentation, and preserve their environmental and recreation values. count the project's size and cumulative impacts.

EN Policy 8 Environmentally Sound Flood Control Measures. Encourage flood control measures that retain the natural features and conditions of watercourses to the maximum feasible extent.

EN Objective 2- Preserve, protect, and enhance wetlands.

EN Policy 9 Determination of Wetlands. Recognize the U.S. Army Corps of Engineers (ACE) as the designated permitting agency that regulates wetlands. In regulating wetland activities, the ACE consults with other agencies and organizations including but not limited to U.S. Fish and Wildlife and State Department of Fish and Game.

EN Policy 10 Wetlands Ecology. Preserve and enhance wetlands ecology.

EN Objective 3- Preserve, protect and enhance historic bayland areas.

EN Policy 12 Bayland Area Protection. Regulate development in the Bayland Overlay Zone so that it does not encroach into wetlands or sensitive wildlife habitats, provided that this regulation does not prevent all use of a property. Discourage human activity that damages fisheries, or habitat for birds, fish or other wildlife.

EN Objective 4 - Preserve and protect native plant and animal species and their habitat.

EN Policy 18 Species Diversity and Habitat. Protect biological resources that are necessary to maintain a diversity of plant and animal species.

EN Policy 19 Special Status Species. Cooperate with State and Federal Agencies to ensure that development does not substantially adversely affect special status species appearing on the State or Federal list for any rare, endangered, or threatened species. The environmental documentation will screen for the Federal Candidate Species, plants listed on lists 1A, 1B, or 2 of the California Native Plant Society (CNPS), inventory of rare and endangered vascular plants of California and animals designated by CDFG as species of special concern or their current equivalent.

CHAPTER V- Safety and Noise

SF Objective 3- Reduce flood hazards.

SF Policy 6 Cooperation with Marin County. Continue to work with the Marin County Public Works Department to minimize negative impacts of storm runoff.

SF Policy 8 Reducing Flood Hazards. Reduce flood risk by maintaining effective flood drainage systems and regulating construction.

SF Policy 9 Storm Drainage System. Maintain unobstructed water flow in the storm drainage system.

Consistent: The proposed project is consistent with City of Novato General Plan policies listed above, since the primary objective of the RMA project is to reduce the potential risk and hazards

associated with flooding and to maintain unobstructed flow in the storm drainage systems. During all RMA activities Avoidance and Minimization Measures and BMPs will be implemented to protect and enhance the streams and wetlands within the project area and native habitat found within these systems. Therefore the RMA program is consistent with the Policies EN 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 18, and 19 and SF 6, 8 and 9.

LAND USE AND PLANNING Section 1- (continued...)

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| c) Affect agricultural resources, operations, or contracts (e.g. impacts to soils or farmlands, impacts from incompatible land uses, or conflicts with Williamson Act contracts)? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not change any agricultural resources, operation or contracts; therefore this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| d) Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not divide or affect the physical arrangement of the established communities; therefore this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| e) Result in substantial alteration of the character or functioning of the community, or present or planned use of an area? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not alter the character or function of the community and will actually be a benefit to the community by reducing the potential frequency of flooding; therefore, the project will result in less-than-significant impacts.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| f) Substantially increase the demand for neighborhood or regional parks or other recreational facilities, or affect existing recreational opportunities? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not increase demand for parks or other facilities, therefore this is a less-than-significant impact.

2. **POPULATION AND HOUSING. *Would the proposal:***

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|--|--|--|--|--------------------------------------|
| <p>a) Increase density that would exceed official population projections for the planning area within which the project site is located as set forth in the Countywide Plan and/or community plan? (source #(s): 1)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|--|--|--|--|--------------------------------------|

The project is maintenance in nature and will not have an effect on population nor density of housing; therefore, this is a less-than-significant impact.

| | | | | |
|---|--|--|--|--------------------------------------|
| <p>b) Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or extension of major infrastructure)? (source #(s): 1)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|--|--|--|--------------------------------------|

The project is maintenance in nature and will not have an effect on growth of an area either directly or indirectly; therefore the project will result in less-than-significant impacts.

| | | | | |
|---|--|--|--|--------------------------------------|
| <p>c) Displace existing housing, especially affordable housing? (source #(s): 1)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|--|--|--|--------------------------------------|

The project is maintenance in nature and will not displace existing housing of any kind; therefore, the project will result in a less-than-significant impact.

3. **GEOPHYSICAL. *Would the proposal result in or expose people to potential impacts involving:***

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|---|--|--|--|---------------------------------------|
| <p>a) Location in an area of geologic hazards, including but not necessarily limited to: 1) active or potentially active fault zones; 2) landslides or mudslides; 3) slope instability or ground failure; 4) subsidence; 5) expansive soils; 6) liquefaction; 7) tsunami ; or 8) similar hazards? (source #(s): 1)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable.</p> <p>[]</p> |
|---|--|--|--|---------------------------------------|

This is a routine flood control maintenance project, which will not result in the building of any structures, not increase the vulnerability of other structures to geologic hazards, nor diminish stability of structures within the project area. Rather, the maintenance activities will add to the protection of the public and public infrastructure from potential geologic hazards by increasing channel function and removing debris from culverts and around

flood control infrastructure such as trash racks and pump stations. Therefore the project will result in less-than-significant impacts.

| | | | | |
|---|---|---|---|---|
| <p>b) Substantial erosion of soils due to wind or water forces and attendant siltation from excavation, grading, or fill? (source #(s): 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[X]</p> | <p>Less Than Significant Impact</p> <p>[]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|---|---|---|---|

This is a flood control maintenance project with primary objectives to remove vegetation, debris and accumulated sediment to maintain channel function and facilitate unobstructed flow around public infrastructure including bridges, storm drains, trash racks, and pump stations. Another aspect of the project is to prevent bank erosion and sedimentation into adjacent creek channels. The only sediment that will be excavated is below water line in creeks, channels sediment basins and drainage ditches; there will be no excavating or grading of adjacent channel banks, and no permanent fill is involved in the project unless it is related to a bio-engineered streambank stabilization project. Each activity includes prescribed Best Management Practices (BMPs), which are mandated to be employed during and after project implementation. Erosion control BMPs are implemented to keep soil from leaving the work sites. During work activities there may be a temporary increase in turbidity in drainages as sediment is disturbed from the dredging process and potential water quality impacts could have a negative effect upon aquatic life. Avoidance and minimization measures to protect threatened and endangered species and sensitive habitats are discussed in Section V. 7 (a). Implementation of the following mitigation measures are incorporated into the project description and will decrease the impacts of erosion and sedimentation to a less than significant level.

MITIGATION MEASURES

V.3 (b)-1. The District shall designate an Environmental Compliance Coordinator (ECC) to oversee the implementation of the RMA in the field. Before commencement of a maintenance activity, the ECC shall review Site Fact Sheets for specific information on the type, location and extent of the activity and associated areas of disturbance and determine the Avoidance and Minimization Measures and Best Management Practices (BMPs) to implement prior to the maintenance activity. The ECC shall distribute the Site Fact Sheet to the Maintenance Supervisor five days before beginning the maintenance activity.

V.3 (b)-2. Erosion control BMPs shall be incorporated into each project to minimize the discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. Erosion control measures shall be monitored during and after storm events and modifications shall be made, if needed.

V.3 (b)-3. If a maintenance activity may cause the introduction of sediments into the stream, no phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start up of any phase of the project that may result in sediment run-off to the stream. All associated erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the ECC shall inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

V.3 (b)-4. DPW shall construct the project in a manner that reduces turbidity and protects water quality, resident fish and other aquatic species. To prevent streambed erosion from the use of temporary cofferdams, pipes and pumps used to de-water the creek channel, diversion pipe outlets would be placed on hard surfaces or outfall

protection in the form of rock or similar material would be installed. These temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after project completion and the creeks shall be restored to their natural condition.

V.3 (b)-5. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material that may be washed into waters of the State shall be removed from the work area and transported to a legal upland spoils disposal site.

MITIGATION MONITORING MEASURES

V.3(b)-1-5. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

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| <p>c) Substantial changes in topography from excavation, grading or fill, including but not necessarily limited to: 1) ground surface relief features; 2) geologic substructures or unstable soil conditions; and 3) unique geologic or physical features? (source #(s): 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|--|---|---|---|---|

A long-term objective of this maintenance project is to restore natural channel formation and to decrease the potential risk and frequency of flooding. A localized change in stream channel and sediment basin topography will occur through the removal of sediment within the creek channels and drainages. It shall be the minimum amount needed to restore natural channel function and facilitate unobstructed flow conditions. Given the nature of the project, the changes in channel topography are desired outcomes. Given that the sediment to be removed is caused by deposition of eroded sediment from the upper watershed into the lower flood control drainages, impacts to these channels from excavation should be positive in nature. Consequently, the project will result in less-than-significant impacts.

4. WATER. Would the proposal result in:

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|---|---|---|---|---|
| <p>a) Substantial changes in absorption rates, drainage patterns, or the rate and amount of surface runoff? (source #(s): 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|---|---|---|---|

Drainage patterns and rate of surface run-off into drainages within the project area from the upper watersheds and adjacent neighborhoods will remain unaltered. The removal of sediment and obstructing vegetation from these channels will increase the channel's ability to carry surface run-off during high flood flows and improve connectivity between downstream and upstream habitats. If the channels have greater functional ability after

maintenance has been performed, the potential risk of flooding of adjacent roads and property will be reduced. Consequently, the project will result in less-than-significant impacts.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| b) Exposure of people or property to water related hazards, including, but not necessarily limited to: 1) flooding; 2) debris deposition; or 3) similar hazards ? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

This is a flood control project which will decrease potential for flood hazards caused by vegetation or debris deposition around culverts, trash racks, pump stations, and tide gates during high flows. By removing vegetation and sediment from the channels, ditches and sediment basins identified within the project area, the channels will be altered to improve natural channel function and decrease the threat of potential flooding of adjacent roads and property. The project will have an overall beneficial effect on preventing potential flood hazards and debris deposition; consequently the project will result in less-than-significant impacts.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| c) Discharge of pollutants into surface or ground waters or other alteration of surface or ground water quality (e.g. temperature, dissolved oxygen or turbidity)? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

This is a routine flood control maintenance project with the primary objective to remove vegetation and accumulated sediment to maintain channel function and unobstructed flow around structures including bridges, storm drain outlets, and pump stations, and to maintain stable stream banks where necessary. The only sediment that will be excavated is below water line in creeks, channels and drainage ditches; there will be no excavating or grading of adjacent channel banks, and no permanent fill is involved in the project. Each activity includes prescribed Best Management Practices (BMPs), which are mandated to be employed during and after project implementation. The BMPs are designed to keep soil from leaving the work sites (erosion control BMPs) and to repair collapsing stream banks which often contribute to siltation of streams (bio-engineered stream bank repair BMPs). During implementation there may be a temporary increase in turbidity as sediment is disturbed by the dredging process. Potential water quality impacts could have a negative effect upon water quality and aquatic life. Potential impacts to threatened and endangered species that are present within or near the project site area are discussed in Section V.7(a). Implementation of the following mitigation measures will decrease the risk of impacts of erosion or siltation to water quality and aquatic resources and will reduce these impacts to less than significant.

MITIGATION MEASURES

V.4(c)-1. The District shall implement maintenance activities in a manner that reduces turbidity and protects water quality, resident fish and other aquatic species. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the State. When operations are completed, any excess material shall be removed from the work area and transported to a legal upland spoils disposal site.

V.4(c)-2. Appropriate BMPs shall be incorporated into each project to minimize the re-suspension and discharge of sediments and other pollutants downstream and to prevent channel or streambank erosion or destabilization once the activity has been completed. BMPs to be implemented for each type of activity are referenced in the

program documents and prescribed in the Project Fact Sheets for each site. Erosion control measures shall be monitored during and after storm events and modifications made, if needed. BMPS to be implemented are taken from the the Bay Area Stormwater Management Agencies Association (BASMAA) Manual and the FishNet4C Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance.

V.4(c)-3. To prevent streambed erosion from the use of cofferdams, pipes and pumps used to de-water the creek, diversion pipe outlets shall be placed on hard surfaces or temporary outfall dissipation structures shall be installed (i.e. rock piles). Temporary cofferdams shall be secured with plastic sheeting and anchored in place. All temporary fill for construction of cofferdams, pumps, pipes and sheet plastic shall be removed from the stream after project completion and the creeks shall be restored to their natural condition.

V.4(c)-4. No phase of the activity shall be started unless all equipment and materials are able to be removed from the channel at least 12 hours prior to the onset of precipitation. Seventy-two hour weather forecasts from the National Weather Service shall be consulted prior to the start up of any phase of the project that may result in sediment run-off to the stream. If rainfall is predicted, erosion control measures must be kept on-site and be in place prior to the onset of precipitation. After any storm event, the Environmental Compliance Coordinator shall inspect all sites under construction and all sites scheduled to begin construction within the next 72 hours, for erosion and sedimentation problems and take corrective action as needed.

MITIGATION MONITORING MEASURES

V.4(c)-1-6. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

| | | | | |
|---|---|---|---|---|
| <p>d) Substantial change in the amount of surface water in any water body or ground water either through direct additions or withdrawals, or through intersection of an aquifer by cuts or excavations? (source #(s): 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[X]</p> | <p>Less Than Significant Impact</p> <p>[]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|---|---|---|---|

A select set of sites within the project will need to be temporarily dewatered for equipment access for sediment removal and bank stabilization aspects of the project and to protect special status species such as steelhead trout. Creek flows will be diverted by the construction of temporary cofferdams around the active construction site and water will be transported from upstream to downstream reaches via pumps and pipes/hoses. The cofferdams will be constructed with native materials, including sand bags, gravel bags or equivalent materials and be sealed and secured with plastic sheeting and anchored in place. There will be temporary impacts on water resources within these creek channels during the dewatering process. This impact will be short-term and localized but has the potential to adversely affect aquatic resources in the project area. Threatened and endangered species that are present or near the project site are discussed in Section V.7.(a) and applicable mitigations are proposed to protect these species during dewatering. Implementation of the following best management practices will decrease the risk of impacts to water resources resulting from the dewatering process and reduce these impacts to less than significant.

MITIGATION MEASURES

V.4(d)-1. The District shall construct the projects in a manner that protects fish and other aquatic resources and avoids loss of their habitat. A biologist shall oversee project work and implement any necessary conservation

measures to protect these species, including pre-construction surveys and rescue and relocation to suitable upstream or downstream habitat.

V.4(d)-2. Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic. Intakes and outlets should be designed to minimize turbidity and the potential to wash contaminants into the stream. If a work site is to be temporarily dewatered by pumping, intakes should be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFG and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997). A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe should discharge onto the top of bank into a densely vegetated area, which may require extra hose length. Once the project work is complete, water should be slowly released back into the work area to prevent erosion and decrease turbidity. The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless required for erosion control or habitat enhancement and/or restoration. All cofferdams, pumps, pipes, sheet plastic, silt fences or other non-native materials shall be removed from the stream upon project completion.

V.4(d)-3. Sufficient water shall at all times be allowed to pass downstream to maintain aquatic life below the diversion dam.

V.4(d)-4. For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures shall be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials shall be removed from the stream following completion of the activity.

MITIGATION MONITORING MEASURES

V.4(d)-1-4. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

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|---|---|---|---|---|
| <p>e) Substantial changes in the flow of surface or ground waters, including, but not necessarily limited to: 1) currents; 2) rate of flow; or 3) the course or direction of water movements? (source #(s): 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|---|---|---|---|

The natural direction and rate of flow of groundwater will remain unchanged. The natural direction of flow of the creeks and channels will not change, but the rates of surface flow in some areas may increase with the decreased coefficient of friction resulting from the removal of sediment. As the channel function is increased, there may be a decrease in flood flows coming from the creeks and channels onto adjacent roads and properties, which is the objective of the project. Therefore, this is a less-than-significant impact.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| f) Substantial reduction in the amount of water otherwise available for public water supplies? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and will not reduce the amount of water supply available to the public; therefore, this is a less-than-significant impact.

5. **AIR QUALITY. *Would the proposal:***

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| a) Generate substantial air emissions that could violate official air quality standards or contribute substantially to an existing or projected air quality violation? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the maintenance project. Since the work will occur out in the open air and over a short duration in each project area (1-7 days, depending on project site), the impact on air quality will be less-than-significant.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| b) Expose sensitive receptors to pollutants, such as noxious fumes or fugitive dust? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The only air pollutants that will be produced will come from the exhaust fumes from the heavy equipment used for the maintenance project. Since the work will occur out in the open air and over a short duration in each project area (1-7 days, depending on project site), the impact to sensitive receptors will be less-than-significant. The impact from dust will be minimal during sediment removal since the work is being done in the wet environment with very little volatile dust, therefore the impact to sensitive receptors will be less-than-significant.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| c) Alter air movement, moisture, or temperature, or cause any change in climate? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Planting of streamside native vegetation occurs as part of the STRAW Program, serving to decrease stream temperatures, increase carbon sequestration and reduce the impacts of global climate change, therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| d) Create objectionable odors? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The only odors that will be produced will come from the exhaust fumes from the heavy equipment used for the project and potentially smell coming from anaerobic soil conditions in a super saturated environment. The work will occur out in the open air and over a short duration (1-7 days, depending on project site), therefore the impact from objectionable odors will be less-than-significant.

6. TRANSPORTATION/CIRCULATION. *Would the proposal result in:*

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| a) Substantial increase in vehicle trips or traffic congestion such that existing levels of service on affected roadways will deteriorate below acceptable County standards? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project will deploy vehicles and equipment on a daily basis to the various project sites, where it will remain until the project is completed each day. No substantial increase in vehicular traffic or congestion will occur because of the project. The level of service on affected roadways will not drop below acceptable County standards. These impacts will be minor and are commensurate with currently-occurring traffic impacts associated with routine road maintenance activities along these roads in Marin County. Therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| b) Traffic hazards related to: 1) safety from design features (e.g. sharp curves or dangerous intersections); 2) barriers to pedestrians or bicyclists; or 3) incompatible uses (e.g. farm equipment)? ((source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

Project implementation will not result in dangerous design features or incompatible uses. Temporary staging of equipment along the road right-of-way could result in the temporary re-direction of vehicle, bicycle and pedestrian traffic. The proposed maintenance project is along County of Marin or local municipality maintained roads and road crews and contractors are experienced at conducting procedures to avoid road traffic hazards. Implementation of the following mitigation measure will decrease the risk of impacts to traffic hazards and reduce these impacts to less than significant.

MITIGATION MEASURES

V.6 (b)-1. The County maintenance crews and any Contractors on the project shall clearly mark alternative routes with traffic control signs during project implementation to ensure public safety.

MITIGATION MONITORING MEASURES

V.6 (b)-1. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| c) Inadequate emergency access or access to nearby uses? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Alternative routes shall be clearly marked with County of Marin traffic control signs or communicated on site by County Roads maintenance crews. Emergency vehicles would be given special consideration to provide unimpeded and continual access to roadways during the maintenance period. Therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| d) Insufficient parking capacity on-site or off-site? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Because equipment will sometimes be staged from the road right-of-way, there could be a temporary loss of pull-out areas used for parking at some sites along project related roads, where staging of County vehicles and equipment could result in the temporary use of part of these pull-out areas. Due to the temporary maintenance nature of the project, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| e) Substantial impacts upon existing transportation systems, including rail, waterborne or air traffic systems? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Due to the temporary maintenance nature of the project, no substantial impacts upon existing transportation systems will occur on or around the project sites. Minor road diversions may be required during project activities, with alternative routes clearly marked with County of Marin traffic control signs or communicated on site by County Roads maintenance crews. Therefore, this is a less-than-significant impact.

7. BIOLOGICAL RESOURCES. *Would the proposal result in:*

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| a) Reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats including, but not necessarily limited to: 1) plants; 2) fish; 3) insects; 4) animals; and 5) birds listed as special-status species by State or Federal Resource Agencies? (source #(s): 3, 4) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

In order to assess and mitigate for potential impacts to special status species and their habitats, a biologic assessment was conducted which looked at potential impacts of all routine maintenance activities on special status species and their habitats; (Biological Assessment for Routine Flood Control Maintenance Activities; Marin County Public Works, California. July 2011). Those species with a moderate to high potential to occur, or those species prominent in the regulatory environment are discussed in detail in the Biological Assessment and actions to avoid impacts to these species and their habitats are summarized in this section.

Based on quad searches and special status species listings from federal and state agencies searches, 80 special status animal species have been identified as having some potential of occurring within the project sites. Of these, only 16 species, based on literature and database reviews and familiarity with local fauna, are considered likely to occur within the project sites and eight of these are listed as threatened or endangered including:

- Central California Coast coho salmon (*Oncorhynchus kisutch*)
- Central California Coast steelhead trout (*Oncorhynchus mykiss irideus*)
- California red-legged frog (*Rana draytonii*)
- Northwestern pond turtle (*Clemmys (Actinemys) marmorata marmorata*)
- California clapper rail (*Rallus longirostris obsoletus*)
- California black rail (*Laterallus jamaicensis coturniculus*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Salt marsh harvest mouse (*Reithrodontomys raviventris*)

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites. Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed as threatened or endangered; all are species of concern.

- Point Reyes bird's-beak (*Cordylanthus maritimus ssp. palustris*)
- Pale Yellow/Hayfield tarplant (*Hemizonia congesta ssp. congesta*)
- Marsh microseris (*Microseris paludosa*)
- Marin knotweed (*Polygonum marinense*)

The RMA program is complex; at any one time during the work season, different work activities may be occurring at several sites, with several different contractors. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality. Pre-construction surveys to locate special status species will be conducted before maintenance activities commence as prescribed and work at each site will be scheduled around relevant work windows where possible to avoid impacts (Table 1; page 7). Work at a site may be re-scheduled based on survey finding if necessary. A suite of General and Activity-Specific Conditions apply to activities implemented as part of the RMA program as well as species-specific Avoidance and Minimization Measures (AMMs).

Best Management Practices (BMPs) have been prescribed for each project site, depending on activity type, site constraints, and species presumed to be present. BMPs to be implemented at each site are referenced from the Bay Area Stormwater Management Agencies Association (BASMAA), California Department of Fish and Game (CDFG), the Fishery Network of the Central California Coastal Counties (FishNet4C), and FEMA.

General and Activity-Specific Conditions, AMMs and BMPs are incorporated into the RMA project description and included in the individual Project Fact Sheets for each site. The job of the Environmental Compliance Coordinator is to ensure that all measures are employed as prescribed in the field prior to, during and after implementation. The General and Activity-Specific Conditions, AMMs and species-specific AMMs are described in detail below and included in the Project Fact Sheets developed for each site.

MITIGATIONS

The following mitigation measures are proposed to avoid and minimize the reduction in the number of endangered, threatened or rare species, or substantial alteration of their habitats and would decrease the risk of impacts to a level of less than significant.

GENERAL CONDITIONS

V.7(a)-1. Designation of Environmental Compliance Coordinator- An Environmental Compliance Coordinator (ECC) shall be designated by the County of Marin Flood Control District. The ECC shall have an understanding of biological resources, missions of regulatory agencies, regulations as they may affect listed species, and the nature of the maintenance activities. In the planning stage, before commencement of a maintenance activity, the ECC shall review project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he shall determine appropriate pre-construction surveys that may be required, depending on the species involved and the type of activity planned for that project site. The ECC shall ensure that the project crews adhere to General and Activity-Specific Conditions and Avoidance and Minimization Measures prescribed for each site and type of activity.

V.7(a)-2. Assessment, Buffers, and Stop Work Orders- The ECC shall assess field conditions at the start of each work day. If any special status species or nesting birds are observed, the ECC shall coordinate with the contractor foreman to either establish buffers areas, if sufficient, or to stop any activity the ECC deems may result in take or destruction of habitat. Stopped work shall not be allowed to resume until appropriate corrective measures have been completed or it has been determined that nesting is complete. The ECC shall immediately report any unauthorized impacts to the appropriate trustee agency (i.e. USACE, USFWS, NMFS, and/or CDFG).

V.7(a)-3. Contractor Crew Training- The ECC shall ensure that before work starts, all on-site maintenance activity personnel and contractors receive instruction regarding the presence and description of listed species at each project site and the details of appropriate avoidance and minimization measures.

V.7(a)-4. Site Preparation/Wildlife Reconnaissance - The ECC shall walk the site each day before maintenance activities commence to locate wildlife; if any special status wildlife species are noted, work shall not commence until all individuals have left the work site on their own and/or it has been determined that they are not nesting within the project site.

V.7(a)-5. Monitoring and Reporting Program- The ECC shall implement a monitoring and reporting program that shall include, but not be limited to: preparing each year's project list, scheduling pre-construction surveys, overseeing project activity during maintenance, preparing photo documentation, and evaluating post-maintenance restoration/revegetation, if necessary. Reporting regarding project impacts to California red-legged frogs shall be performed in accordance with the terms and conditions issued by the USFWS. Report of sightings will be documented using the CNDDB protocols published by the Department of Fish and Game. .

V.7(a)-6. Work Windows - To avoid impacts to special status species, the maintenance activities carried out shall typically occur during the summer low flow season. The general work window for RMA activities is from April

15th to October 15th, depending on weather. As a rule, work at each site will be scheduled around relevant work windows to avoid impacts. In instances where work needs to be scheduled outside of an established work window for a particular species in a specific location, species-specific pre-construction surveys will be conducted before maintenance activities commence. Work at a site may be re-scheduled based on survey findings, and/or may require application of Avoidance and Minimization Measures before proceeding. In all cases, all routine maintenance activities shall be conducted in such a way as to avoid and/or minimize environmental impacts to special status species, sensitive habitats, and water quality. The work window for streamside restoration by the STRAW Program is from October-March when schools are in session.

SPECIES SPECIFIC AVOIDANCE AND MINIMIZATION MEASURES (AMMs)

Avoidance and Minimization Measures for Fish

FISH-1: Salmonids

Several project sites within the RMA watersheds have the potential for presence of steelhead trout. If steelhead are known to be absent from the project site based on CEMAR/DFG surveys or there are long-standing natural or artificial downstream barriers sufficient to prevent upstream migration, then avoidance has been accomplished and no further actions are necessary. Presence or absence of steelhead trout in each project area is documented in the project fact sheets which are used on a daily basis by the Environmental Compliance Coordinator to guide the implementation of AMMs and BMPs in the field before, during and after completion of maintenance activities.

If steelhead trout are determined or presumed to be present at the project site, then the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-7. Work Window: All work in and around salmonid streams is restricted to the period of June 15th to October 15th in any given year. This is to take advantage of low stream flow and avoid the spawning and egg/alevin incubation period which occurs in the late fall and the outmigration period in the spring. Work outside of the channel is not subject to this modified work period.

V.7(a)-8. No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified biologist.

V.7(a)-9. To minimize turbidity and stress to salmonid species, personnel shall avoid walking through stream pools and thalwegs, and shall instead walk across riffles or outside of the stream bed to access a project site.

V.7(a)-10. To minimize disturbance during sediment removal activities, if there is flow or seepage in a work site, a reach of creek may have to be de-watered. Before construction of the de-watering system, a qualified biologist shall conduct fish relocation activities, and immediately release captured fish to a suitable habitat near the project site.

V.7(a)-11. Screens shall be placed on all pumps used for dewatering the work site in accordance with NOAA Fisheries' Fish Screening Criteria for Anadromous Salmonids (NMFS, 1997).

V.7(a)-12. If used, coffer dams shall be constructed upstream of the work site within the stream banks, and shall be constructed with clean river gravel or sand bags and covered with sheet plastic. Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into streams.

V.7(a)-13. Pump discharge must be directed into a settling basin to allow silt removal. Once the project work is complete, water shall be slowly released back into the creek to prevent erosion and limit turbidity.

V.7(a)-14. All habitat improvements on salmon and steelhead streams shall be done in accordance with techniques in the California Salmonid Stream Habitat Restoration Manual (CDFG 2010d).

Avoidance and Minimization Measures for Reptiles

REP-1: Northwestern pond turtle

Several sites may contain suitable habitat for northwestern pond turtle, and they have been known to occur at sites 1-ASJ-1, 1-LYC, and 1-WAR-2.

V.7(a)-15. Work window: There is no work windows for this species; surveys may be required if maintenance activities will occur in potential pond turtle habitat. Prior to and during maintenance work, the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-16. Pre-construction surveys for northwestern pond turtles shall be conducted at these sites by a qualified biologist in accordance with USFWS protocols within 72 hours of the start of maintenance. The creek shall be surveyed for presence of turtles and the creek banks surveyed for presence of burrows; all locations of observed turtles and burrows shall be noted.

V.7(a)-17. Each day, before maintenance activities begin, the Environmental Compliance Coordinator (EEC) shall make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, the ECC shall assess the likelihood of project impacts to these species and coordinate findings with the USFWS and CDFG to ensure that appropriate protective measures are applied including hand removal or installation of fencing to avoid the area completely. At any time during maintenance activities, if a northwestern pond turtle is observed by the ECC, maintenance crew, or other knowledgeable persons, maintenance activities shall stop and the appropriate protective measures shall be applied including hand removal or installation of fencing to avoid the area completely.

V.7(a)-18. All staging areas for all heavy equipment, storage of materials, and any maintenance/fueling of heavy equipment shall be clearly identified in order to minimize impacts to upland habitats outside the project site.

V.7(a)-19. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of northwestern pond turtles, their upland and aquatic habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Avoidance and Minimization Measures for Birds

Following are avoidance and minimization measures for birds. Some of these relate directly to listed species with the potential to occur within one or more of the project sites (the rails, northern spotted owl); however, others relate more generally to a class of species, such as raptors and wading birds and land birds.

V.7(a)-20. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. Because the culverts in the proposed project sites are fairly small, there is minimal likelihood that they would provide suitable habitat for swallows. However, if any culverts show evidence of past or current swallow nesting, the ECC shall identify them and maintenance activities shall occur after August 31 or after all swallows have fledged to avoid impacts.

V.7(a)-21. If work in the riparian zone will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until the young have left the nest and will no longer be impacted by the project.

BIRD-1: California Clapper Rail and California Black Rail

Several of the sites are within or immediately adjacent to suitable habitat for California clapper rail and California black rails (15-20 sites). The following avoidance and minimization measures apply to all sites within 250 feet of salt or brackish tidal marshland, which will also help to protect other marshland dependent species such as saltmarsh common yellowthroat and San Pablo song sparrow.

V.7(a)-22. Work window: The work window for maintenance activities within rail habitat is the non-nesting season of September 1st through January 31st. If maintenance activities are scheduled to occur within the nesting season (February 1st to August 31st), the following Avoidance and Minimization Measures shall be implemented; therefore project impacts will be mitigated to a less-than-significant level:

V.7(a)-23. Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails.

V.7(a)-24. If maintenance activities are scheduled during the nesting season (February 1st to August 31st), a qualified biologist, in coordination with USFWS and/or CDFG, shall conduct a pre-construction survey within 5 days of the start of maintenance activities to check for nests and presence of the rails within the project sites. Additional surveys may be required including visual and/or call surveys to determine presence. A buffer zone of 250 feet from nests or occupied rail habitat shall be established and any activity within that buffer zone that has potential to disturb rails (i.e. high-decibel construction, pumping, use of heavy machinery, etc.) shall be rescheduled for later in the season once nesting has ended and the young have fledged (from September 1st through January 31st). If no nests are found but rails are present, the birds must be allowed to leave the area on their own before work can commence.

V.7(a)-25. When working within 250 feet of salt or brackish marshland, presence for either rail species shall be assumed; therefore, maintenance work in these areas shall be scheduled between September 1st and January 31st in any given year.

V.7(a)-26. Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water (MHHW) line. If maintenance or dredging activity does intrude into tidal marsh habitat, a qualified biologist shall survey the area prior to beginning work in order to determine the presence/absence of rails.

BIRD-2: Northern Spotted Owl

Per Department of Fish and Game Protocol for Surveying Proposed Management Activities that May Affect Northern Spotted Owls (2010), project sites are defined as the project footprint plus a .25 mi. radius buffer around it. Centers of northern spotted owl activity are located on Old Mill Creek, Cascade Creek, Warner Canyon Creek, Bothin Creek, Larkspur Creek, and Ross Creek and several of these documented locations fall within the .25 mi. buffer around several of the work sites: (3-OMC; 3-CAS; 3-WAR; 9-BOTH; 9-LAR-2; and 9-ROS).

V.7(a)-27. Work window: To avoid impacts to breeding northern spotted owls, maintenance activities identified as having potential impact on northern spotted owls or their habitat shall follow a limited operating period (LOP) with no work scheduled during the breeding season of February 1st through July 15th. If a biological evaluation conducted by a qualified biologist determines that vegetation projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location, or where a biological evaluation determines that topographic features may shield nest sites, the LOP may be waived or the buffer distance modified.

BIRD-3: Raptors and wading birds

Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them shall be minimized.

V.7(a)-28. Work window: At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start outside of the nesting season (July 31 – January 31), then avoidance has been achieved and work can proceed. If maintenance activities are scheduled outside of the work window during the nesting season (Feb 1st- July 31st) then the following AMMs shall be followed:

V.7(a)-29. The ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

V.7(a)-30. During nesting season, (February 1st - September 1st), the ECC shall walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.

V.7(a)-31. At most sites with potential for raptor and migratory bird nesting, if work is conditioned to start after July 31st potential impacts will be avoided and no surveys will be required. However, if work in the riparian zone will occur between before July 31st the ECC shall conduct a survey for nesting birds within one week prior to the proposed vegetation removal and/or maintenance activities and ensure no nesting birds will be impacted by the project. Work can proceed if surveys determine that nesting birds will not be impacted or if no nesting birds are observed. If active nests are found, the ECC shall postpone maintenance activities for that site until young have left the nest and will no longer be impacted by the project.

BIRD-4: Landbirds

Many of the project sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are year-round residents. These project sites include: 1-NOV-3, 3-ACMP-3, 3-NYH-2, 5-EAS-2, 9-CMC-4, and many more. Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or

premature fledging. Destruction or disturbance of active nests would violate the federal Migratory Bird Treaty Act (MBTA) and California Department of Fish and Game (CDFG) Code.

V.7(a)-32. Work window: Avoidance will be achieved if maintenance activities are scheduled between August 1st to January 31st to avoid the nesting season (February 1st - July 31st). If maintenance activities are scheduled outside of the work window, then the following Avoidance and Minimization Measures shall be implemented:

V.7(a)-33. The removal of any trees or shrubs shall occur after August 1st, once the nesting season is complete. If removal of trees or shrubs occurs between February 1st and July 31st, a nesting bird survey shall be performed by a qualified biologist within 14 days prior to the removal or disturbance of potential nesting trees or shrubs. All trees with active nests shall be flagged and a non-disturbance buffer zone shall be established around the nesting tree, or the site shall be avoided until it has been determined that the young have fledged. Buffer zones typically range between 50-90 ft for passerines and non-passerine land birds. Active nests shall be monitored by a qualified biologist to determine when the young have fledged and are feeding on their own before work is allowed to begin.

V.7(a)-34. In addition to surveying trees and shrubs for nesting birds, surveys shall be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within 14 days prior to the commencement of project related activities by a qualified biologist.

V.7(a)-35. The ECC shall be present at the commencement of maintenance-related activities to ensure that nesting birds and sensitive bird species have not inhabited the project site during the window following pre-construction surveys and commencement of maintenance activities. The ECC shall also survey all staging areas to ensure nesting and special status birds are not present.

V.7(a)-36. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of sensitive habitat and bird species, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

Avoidance and Minimization Measures for Mammals

MAMM-1: Salt Marsh Harvest Mouse (SMHM)

Salt marsh harvest mouse is a federal and state listed endangered species although critical habitat has not been designated for this species. This species is found in saline emergent marsh vegetation with dense pickleweed. It is reported to occur within the project site in lower reaches of Novato Creek levees, Gallinas Creek South Fork, and Bothin Marsh sites. Approximately 15-20 sites are adjacent to suitable habitat for salt marsh harvest mouse; and about half of those sites include work where removal of pickleweed may impact salt marsh harvest mouse habitat. For these sites, the following AMMS should be followed:

V.7(a)-37. Work window: There are no seasonal work windows for this species since they breed year around,

V.7(a)-38 Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for SMHM. Generally, work should not be scheduled to occur between two hours before high tide and two hours after high tide.

V.7(a)-39. If maintenance activities are conducted in potential SMHM habitat, a qualified biologist shall conduct a pre-construction survey within 5 days of the start of maintenance activities to determine the presence/absence of SMHM within and adjacent to the work area. Surveys shall follow USFWS protocols. In addition, a biological

monitor shall be present during maintenance-related activities within or adjacent to all suitable nesting habitat areas to ensure that salt marsh harvest mice are not present during operations.

V.7(a)-40. For sites where work includes removal of pickleweed, under the supervision of a qualified biologist and according to protocols established by Zedler (2001), vegetation shall be removed only with non-mechanized hand tools; no motorized equipment shall be used. Vegetation removal may begin only when no mice are observed, and shall start at the edge farthest from the salt marsh and work its way towards the salt marsh. If a mouse of any species is observed within an area where pickleweed is being removed, work shall stop and DFG shall be notified. Unless otherwise approved by DFG, the mouse shall be allowed to leave on its own volition.

V.7(a)-41. If trenching takes place within 50 ft of pickleweed areas, exclusionary fencing shall be installed around worksites before excavation begins, according to DFG specifications on size and placement of fencing. An escape ramp shall be placed in any open trench at the end of the day to allow any entrapped animals to escape.

V.7(a)-42. When implementing maintenance activities in upland areas adjacent to salt or brackish marshland, vehicles shall be confined to existing roads where possible, Crews shall use matting, pontoon boards or other comparable methods whenever feasible to minimize impacts to the existing vegetation. The placement of mats shall be verified by a qualified biologist before their placement to minimize habitat impacts. Crews shall work exclusively from mat boards and boardwalks to minimize trampling of vegetation.

V.7(a)-43. A biological monitor shall be on-site during all work activities within potential SMHM habitat, and will have the authority to halt project activities in order to comply with these terms. Training sessions shall be given to all workers to inform them of protective measures, instruct them in identification of the SMHM and its habitat requirements, and inform them of when work needs to be stopped and appropriate officials informed of species presence.

MAMM-2: Roosting Bats

V.7(a)-44. Work window: The work window for activities at sites where bats are determined to be present is from September 1st through January 31st. Impacts can be avoided by scheduling work, especially removal of trees and/or dense growths of ivy, after the breeding season ends on September 1st of any given year.

V.7(a)-45. Some of the sites may be within or adjacent to suitable habitat for roosting bats. If work is conducted outside of the work window, pre-construction surveys for signs of roosting bats shall be conducted concurrent with those for land birds. If surveys occur during the daytime, the biologist shall look for presence of bat droppings at likely roost sites (under bridges and trees (in layers of bark, woodpecker holes, and hollow branches)). The droppings are black and small, about 4 – 8 mm long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software. If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed.

V.7(a)-46. If bat guano was detected during the pre-construction survey, and removal of trees, shrubs, or dense ivy is scheduled to occur before September 1st, a qualified biologist shall conduct a roosting bat survey within 30 days prior to the removal or disturbance of potential nesting/roosting trees or shrubs. If bats are detected, work shall be re-scheduled for after the breeding season.

Avoidance and Minimization Measures for Plants

PLANT-1: Special Status Plants

Special-status plant species include those listed as Endangered, Threatened, Rare or those species proposed for listing by the USFWS (2001b), the CDFG (2010a,b) and the CNPS (2010). The CNPS listing is sanctioned by the CDFG and serves essentially as their list of "candidate" plant species. CNPS List 1B and List 2 species are considered eligible for state listing as endangered or threatened under the CDFG Code. Such species should be fully considered during preparation of environmental documents subject to the California Environmental Quality Act (CEQA). CNPS List 3 and List 4 species are considered to be either plants about which more information is needed or are uncommon enough that their status should be regularly monitored. Such plants may be eligible or may become eligible for state listing, and CNPS and CDFG recommend that these species be evaluated for consideration during the preparation of CEQA documents.

Based on quad searches and special status species listings from federal and state agencies searches, 33 plant species have been identified as having some potential of occurring within the project sites (Appendix A). Of these, only four species, based on literature and database reviews and familiarity with local flora, are considered likely to occur within the project sites. None are listed; all are species of concern. Based on a reconnaissance-level survey and habitat assessment, many of the 33 species with at least some potential to occur within the region can be ruled out from the work sites due to the lack of suitable habitat within the project corridor. Specialized habitats such as playas, coastal dunes, lower montane coniferous forest, vernal pools, coastal bluff scrub, coastal prairie, and serpentine-derived soils or outcrops are not present within the study area or work sites.

Although location data for several special-status plant species places them within the study corridor, the presence of some of these within the work sites remains highly unlikely. In many cases, the location data from CNDDDB represent historic data from the time period before large-scale development. In other cases, the CNDDDB data represent best guesses as to location, and while shown as covering the proposed project sites, the required habitat may not be present within the work sites.

The following four plant species are considered to have some potential to occur within one or more of the work sites, due to: 1) the presence of suitable habitat, 2) the plant was detected during the site reconnaissance, and/or 3) the species has been reported within the vicinity of the work sites.

1. **Point Reyes bird's-beak (*Cordylanthus maritimus* ssp. *Palustris*;** STATUS. *Point Reyes bird's beak is a federal species of special concern and is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE* *The CNDDDB lists 42 occurrences of Point Reyes bird's beak in Marin County; the majority of these are on the western coast. Sites near CNDDDB occurrences include: 3-BM, 3-MIL-3, 3-RYC-1, 3-SUT-1.*
2. **Pale Yellow/Hayfield tarplant (*Hemizonia congesta* ssp. *congesta*)** STATUS. *The pale yellow tarplant is not listed by the federal or state governments but is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE.* *The CNDDDB lists a record in Ignacio near sites 1-ASJ-1, 1-ASJ-2, and 1-ASJ-3.*
3. **Marsh microseris (*Microseris paludosa*)** STATUS. *The marsh microseris is not listed by the federal or state governments but is listed by the CNPS as 1B. PROJECT SITE OCCURRENCE.* *The CNDDDB lists occurrences in the vicinity of sites: 3-CAS, 3-ACMP-3, and 9-LAR-2.*
4. **Marin knotweed (*Polygonum marinense*)** STATUS. *Marin knotweed is a federal species of special concern and is listed by the CNPS as 3 (needing taxonomic review). PROJECT SITE OCCURRENCE.* *The CNDDDB contains record for Marin knotweed on Corte Madera Creek, just downstream of site 9-CMC-1 and at the creek mouth.*

The following mitigations developed for treatment of special status plants and their habitats shall be adhered to during project implementation; therefore impacts to these species will be less-than-significant:

V.7(a)-47. Work window: There are no work windows for the plant special status species; surveys may be required if species may be impacted.

V.7(a)-48. At sites where vegetation may be modified (such as mowing, clearing, or ground-breaking), and where special status plant species may potentially occur, a qualified biologist should conduct a habitat assessment during blooming periods to determine the presence of suitable habitat. If no potentially suitable habitat is identified during the habitat assessment, then avoidance has been accomplished and no further actions are necessary.

V.7(a)-49. If suitable habitat is determined to be present within the maintenance site, botanical surveys should be conducted before activities commence to determine whether any special status plant species are present. Rare plant surveys, if necessary, should be conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009b) and Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (U.S. Fish and Wildlife Service 2000). Surveys should be conducted in the field when species are both evident and identifiable, normally during flowering or fruiting. Multiple visits to a site may be necessary to capture the floristic diversity present at the site.

V.7(a)-50. If listed species are observed or presumed present, then the ECC should take such action as is necessary to protect the plants, using fencing, buffers, etc. If possible and practicable, the project should be redesigned to avoid listed plant species.

V.7(a)-51. For all observed special status species, the ECC should complete and submit a California Native Species (or Community) Field Survey Form to the CNDDDB documenting the species and location. The ECC shall ensure that the Project Foreman is aware of these site-specific conditions, and shall inspect the work site before, during, and after completion of the maintenance activities.

MITIGATION MONITORING MEASURES

V.7 (a)-1-51. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

| | | | | |
|---|---------------------------|---|-------------------------------------|-----------------------|
| b) Substantial change in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur at any time throughout the year? (source #(s): 3, 4) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

All construction activities for the project would be completed in a fashion that minimizes disturbance to existing riparian and aquatic habitat. The proposed removal of riparian vegetation is the absolute minimum necessary to provide access for maintenance equipment, restore the natural flow regime, provide flood protection, and minimize loss of riparian trees. Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program.

Avoidance and minimization measures prescribed for each activity at each site have been established and shall be implemented to ensure that animals inhabiting the project area. The following mitigation measures are proposed to avoid and minimize changes in the diversity, number, or habitat of any species of plants or animals currently present or likely to occur on the project site and would decrease the risk of impacts to a level of less than significant.

MITIGATION MEASURES

V.7(b)-1. DPW shall minimize any riparian tree removal in order to preserve habitat quality. Removal of native riparian vegetation shall be limited to that necessary for equipment access and flood control (e.g., removing fallen trees in channels).

V.7 (b)-2. An Environmental Compliance Coordinator (ECC) shall be designated for all maintenance activities. The ECC shall have an understanding of biological resources, missions of regulatory agencies and regulations as they may affect listed species, and the nature of the maintenance activities. Before commencement of a maintenance activity, the ECC shall review the individual project fact sheets containing project specific information on the type, location, and extent of the activity and associated areas of disturbance. S/he shall determine appropriate measures to implement, based on the type of activity, and shall prescribe appropriate avoidance and minimization measures and general and activity-specific conditions and prohibitions.

V. 7 (b)-3. All prescribed General Conditions and Avoidance and Minimization Measures, as described above and documented in the Project Fact Sheets for each project site, shall be adhered to during pre-project planning, implementation and post-project clean-up.

V. 7 (b)-4. The ECC shall ensure that the Project Foreman is aware of any site-specific conditions and avoidance and minimization measure prescribed for the activity at each site, and shall inspect the work site before, during, and after completion of the maintenance activities.

MITIGATION MONITORING MEASURES

V.7(b)-1. The District shall verify that these Mitigation Measures comply with mitigation standards and have been properly implemented.

| | | | | |
|---|----------------------------------|--|--|------------------------------|
| <p>c) Introduction of new species of plants or animals into an area, or improvements or alterations that would result in a barrier to the migration, dispersal or movement of animals? (source #(s): 3, 4)</p> | <p>Significant Impact</p> | <p>Potentially Significant Unless Mitigated</p> | <p>Less Than Significant Impact</p> | <p>Not Applicable</p> |
| | <p>[]</p> | <p>[X]</p> | <p>[]</p> | <p>[]</p> |

The ECC shall ensure that the spread or introduction of invasive exotic plants shall be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site shall be removed. As a precaution against invasive quagga and zebra mussels, if kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary. Exotic plants are often introduced by seed banks contained in imported fill or mud that is caked onto construction equipment that moves from site to site. The District shall not bring any fill to project sites. Invasive plants can also be introduced by seeds contained in hydro-seed mixes or hay products. Therefore, sediment and erosion control measures shall avoid using these products and use only weed-free rice straw or other similar products for erosion control.

Removal of non-native vegetation takes place as part of channel maintenance but also occurs as a restoration activity with the STRAW Program (Students and Teachers Restoring a Watershed Program) project in collaboration with the County of Marin Stormwater Pollution Prevention Program (MCSTOPPP). Re-vegetation activities generally occur after other maintenance work has occurred or in conjunction with STRAW's annual stream restoration program.

The ability of wildlife to move through the landscape is important for migration (seasonal breeding and feeding), dispersal (new home ranges and long-term genetic exchange), and for daily movement within individual territories. Habitat fragmentation creates a greater number of habitat patches that are smaller in size than the original contiguous habitat. This, in turn, can hinder regional wildlife movements, put stress on local populations, and increase the probability of extinction for these populations compared to those associated with non-fragmented landscapes. Considering the impacts resulting in potential fragmentation of primary habitat types and loss of valuable dispersal corridors is important when assessing the biological impacts of a project. Because the activities proposed do not involve the permanent loss of wetland and/or riparian habitat within the work sites, they are not likely to affect wildlife movement corridors or contribute to habitat fragmentation. Given that the proposed work is maintenance-related, the project will likely only result in short-term temporal impacts (1-2 days) to movement for aquatic species dependent the subject habitats. Movement through these areas will be restored as soon as maintenance activities are completed.

Removal of excessive sediment should help to open the channel and enhance opportunities for resident and migratory fish and other aquatic species to move freely to suitable upstream and downstream habitats. Re-colonization of on-site native wetland vegetation communities to their previous condition will occur naturally. Implementation of the following mitigation measures would decrease the risk of impacts caused by the accidental introduction of new species of plants or animals into the project area to a level of less than significant.

MITIGATION MEASURES

V.7(c)-1. The District shall prevent the unintentional introduction of new species of plants or animals into the project area by a wash down of all equipment prior to transporting it to project sites in order to eliminate mud that may harbor exotic plant species and animals.

V.7(c)-2. The District shall not import fill to project sites.

V.7(c)-3. The District shall only use straw wattles that contain weed-free rice straw and shall not use hydro-seeding or seeded hay products.

V.7(c)-4. If kayaks or any other vessels are used in maintenance activities, crew shall wash and dry them off-site prior to using them in another creek or tributary.

MITIGATION MONITORING MEASURES

V.7(c)-1-4. District staff shall verify that these Mitigation Measures have been properly implemented.

8. ENERGY AND NATURAL RESOURCES. *Would the proposal result in:*

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| a) Substantial increase in demand for existing energy sources, or conflict with adopted policies or standards for energy use? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Due to the maintenance nature of the project, no increase in demand for existing energy sources or standards for energy use will be affected. Therefore, this is a less-than-significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| b) Use of non-renewable resources in a wasteful and inefficient manner? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The project is maintenance in nature and implementation will require very little use of non-renewable natural resources, however some fuel will be spent on equipment usage, although the impact of this usage would create a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| c) Loss of significant mineral resource sites designated in the Countywide Plan from premature development or other land uses which are incompatible with mineral extraction? (source #(s): 1) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No significant mineral resources are found on the project site, therefore, this is a less-than-significant impact.

9. HAZARDS. *Would the proposal involve:*

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| a) A risk of accidental explosion or release of hazardous substances including, but not necessarily limited to: 1) oil, pesticides; 2) chemicals; or 3) radiation)? (source #(s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Best Management Practices, including those covering Chemical Use shall be employed to prevent or reduce the risk from, or impacts from, the accidental discharge of chemicals from vehicles operating at the project sites. Therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| b) Possible interference with an emergency response plan or emergency evacuation plan? (source #(s): 3, 4) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The sediment removal activities shall not interfere with an emergency response or evacuation plan. In the case of an emergency, all heavy equipment shall immediately be removed from the roadway in order to allow vehicles to enter the area. Heavy equipment deployed at the project site can be removed in a matter of a few minutes during an emergency or evacuation. Therefore, this is a less-than-significant impact.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| c) The creation of any health hazard or potential health hazard? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The implementation of routine maintenance activities will not create any potential health hazards; therefore, this is a less-than-significant impact.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| d) Exposure of people to existing sources of potential health hazards? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The removal of sediment from the creeks and channels and replanting streambanks with native vegetation will not expose people to existing sources of health hazards; therefore, this is a less-than-significant impact.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| e) Increased fire hazard in areas with flammable brush, grass, or trees? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

One of the primary goals of vegetation management is to reduce fire fuels loading and the potential for fire hazards. Fire fuel reduction is achieved by mowing on tops of banks and levees, removal of fallen trees, removal of standing dead trees, and thinning and removal of non-native species such as ivy and Himalayan blackberry. For mowing, crews use weed-eaters for smaller areas and tractors with mowing attachments for larger, more open areas. Therefore the proposed project will have a positive effect on reducing fire hazards, therefore this is a less-than-significant impact.

10. NOISE. *Would the proposal result in:*

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| a) Substantial increases in existing ambient noise levels? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

There will be a temporary increase in ambient noise levels during normal working hours if heavy equipment (e.g. backhoe or excavator) is used to remove sediment from the creeks, channels and drainage ditches. The duration of the impacts will be short, typically a few days, depending on the site, and the noise level will be comparable to noise generated during typical routine maintenance activities conducted by public works or flood control districts. The noise impact be limited to typical day time construction hours between 7 a.m. and 5 p.m., therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| b) Exposure of people to significant noise levels, or conflicts with adopted noise policies or standards? (source #(s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

There will be an increase of noise levels during implementation of maintenance activities but only for a temporary time as with any maintenance project. Any increase in noise levels from construction equipment on private property will occur where landowners have given prior permission for maintenance activities to occur. The increase in maintenance related noise levels would only occur during weekdays, from approximately 8:00 a.m. to 4:00 p.m. This is consistent with the County's adopted noise policy from 7am-6pm, Mon.-Fri. and not on holidays. Therefore, this is a less-than-significant impact.

11. PUBLIC SERVICES. *Would the proposal have an effect upon, or result in a need for new or altered government service in any of the following areas:*

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| a) Fire protection? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The fire fuels reduction aspect of the project is designed to reduce the risk of fire along grassy levees and upper stream banks. Mowing is scheduled to be completed before the Fourth of July holiday as an added measure to prevent fires related to holiday fireworks. The project does not include a demand for additional fire protection services; therefore, this is a less-than-significant impact.

| | | | | |
|--|-----------------------|---|------------------------------------|-------------------|
| b) Police protection? (source #(s) 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The sediment removal maintenance project will not have an effect on police protection; therefore, this is a less-than-significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| c) Schools? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

Project implementation will not result in dangerous design features or incompatible uses with schools; therefore this be a less than significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| d) Maintenance of public facilities, including roads? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

A primary goal of the proposed RMA program is to perform maintenance operations on County flood control channels and related infrastructure, including levees, tide gates, pump stations and trash racks. The objective of maintaining this infrastructure is to reduce the risk of potential flooding and consequential adverse impacts on other infrastructure including adjacent buildings and roads. The project itself will provide additional government services to protect people and infrastructure from flooding and will benefit the maintenance of public facilities; therefore this is a less-than-significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| e) Other governmental services? (source #(s): 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The RMA program does not create an increased demand for additional services but rather the project will increase governmental services by providing greater flood control protection through routine maintenance of flood control channels and related infrastructure, including levees, tide gates, pump stations and trash racks. Regular routine maintenance of facilities will reduce the risk of potential flooding and consequential adverse impacts on other infrastructure including adjacent buildings and roads. This in turn will decrease the need for emergency government services during high storm flows; therefore, this is a less-than-significant impact.

12. UTILITIES AND SERVICE SYSTEMS. *Would the proposal result in a need for new systems, or substantial alterations to the following utilities:*

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| a) Power or natural gas? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to power or natural gas will be required for the maintenance project; therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| b) Communications systems? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to communications systems will be required by the maintenance project; therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| c) Local or regional water treatment or distribution facilities? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to water treatment or distribution will be required by the maintenance project; therefore, this is a less-than-significant impact.

| | | | | |
|--|-------------------------------|---|---|---------------------------|
| d) Sewer or septic tanks? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to sewer or septic tanks will be required by the maintenance project, therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| e) Storm water drainage? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

The flood control routine maintenance activities proposed in this project will have a positive affect on the function of flood control channels and streams to carry and conduct stormwater run-off. Limited removal of obstructing vegetation and excavation of sediment deposits will increase channel function and decrease the potential risk of flooding. The regular maintenance of tide gates and trash racks will increase the ability of storm flows to travel through stream channels. The project's objective is to maintain channel function, especially during peak storm events; therefore, this is a less-than-significant impact.

| | | | | |
|---|-------------------------------|---|---|---------------------------|
| f) Solid waste disposal? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to solid waste disposal will be required by the maintenance project; therefore, this is a less-than-significant impact.

13. AESTHETICS/VISUAL RESOURCES. *Would the proposal:*

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| a) Substantially reduce, obstruct, or degrade a scenic vista open to the public or scenic highway, or conflict with adopted aesthetic or visual policies or standards? (source # (s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to scenic vistas will result from the maintenance project. The project would minimize potential impacts to sensitive habitats at the project sites and would be designed to blend into the surrounding natural environment to the greatest extent feasible. Some trimming of riparian trees will occur, but the project would not change the riparian character of the project sites. The projects would not obstruct or alter the visual character of the project sites or result in visual impacts to public or scenic views and vistas from adjacent roadways. Because this is a flood control maintenance project that does not result in any permanent structures and is temporary in nature, project activities would not adversely affect views, light or privacy of private properties. Therefore, this is a less-than-significant impact.

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| b) Have a demonstrable negative aesthetic effect by causing a substantial alteration of the existing visual resources including, but not necessarily limited to: 1) an abrupt transition in land use; 2) disharmony with adjacent uses because of height, bulk or massing of structures; or 3) cast of a substantial amount of light, glare, or shadow? (source #(s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [] | [X] | [] |

No alterations to visual resources will result from the project. The project would minimize potential impacts to sensitive habitats at the project site and would be designed to blend into the surrounding natural environment to the greatest extent feasible. Some removal and trimming of riparian trees will occur, but the project would not change the riparian character of the sites. The projects would not obstruct or alter the visual character of the sites or result in visual impacts to public or scenic views and vistas from adjacent roadways. Because this is a flood control maintenance program that does not result in any permanent structures, project activities would not adversely affect views, light or privacy of private properties. Therefore, this is a less-than-significant impact.

14. CULTURAL RESOURCES. *Would the proposal:*

| | | | | |
|---|-----------------------|---|------------------------------------|-------------------|
| a) Disturb paleontological, archaeological, or historical sites, objects, or structures? (source #(s): 1, 3) | Significant Impact | Potentially Significant Unless Mitigated | Less Than Significant Impact | Not Applicable |
| | [] | [X] | [] | [] |

The proposed project will disturb only aggraded sediment that has been carried from the upper watershed down through the stream and channel system, and many sites where sediment is to be removed have previously been dredged multiple times in the same locations. No historic structures will be impacted by the proposed routine maintenance project since no work is planned to be completed on any structures other than maintenance facilities including weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. Although no human remains or archaeological resources are known to occur within the proposed project sites or in the immediate vicinity, it is possible that there may be undiscovered archaeological resources buried at the sites due to their location in a high sensitive area. Such resources could be discovered during proposed sediment removal on the site, making this a potentially significant impact.

The following mitigation measures would reduce potential impacts to less than significant by detailing a course of action in the unlikely event that archaeological resources or human remains are encountered during construction activities.

MITIGATION MEASURES

V.14(a)-1. In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparations or construction activities on any part of the project sites, all work at the vicinity of the discovery site shall be halted immediately. A registered archaeologist, chosen by the County in consultation with the Federated Indians of Graton Rancheria and paid for by the District, shall assess the site and submit a written evaluation recommending appropriate actions to take to protect the site and the resources discovered, including monitoring of all subsequent work at the site by a Native American monitor from the Federated Indians of Graton Rancheria or other designated tribal representative. If human remains are encountered, the County Coroner must also be contacted and State law designates procedures to follow in the event that human remains are encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendent" can be designated. No work at the site may recommence without approval of the District. If it is determined that a prehistoric site exists, the following shall be implemented:

- (a) No future development activity shall take place at or in close proximity to the prehistoric site within the development area;
- (b) The historical site(s) shall be filled to protect the resources there;
- (c) No additional excavation shall occur at these locations other than to remove surface organic material; and
- (d) The District may be required to submit a revised project to protect the resource(s). No further work at the site may recommence without approval of the Department of Public Works Director. All

future development of the site must be consistent with findings and recommendations of an archaeological assessment prepared for the site by a registered archaeologist, as approved by the CDA staff.

MITIGATION MONITORING MEASURES

V.14(a)-1. In the event of discovery, DPW staff shall verify that a report has been submitted and all construction work has been stopped. In the event that the report indicates that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, DPW staff shall verify that a registered archaeologist has been retained to assess the site and has submitted a written evaluation to DPW advancing appropriate conditions to protect the site and the resources discovered before work commences on the site. If human remains are encountered, DPW staff shall verify that the County Coroner has been contacted and that all future work is carried out in accordance with the mitigation measures.

| | | | | |
|---|---|---|---|---|
| <p>b) Have the potential to cause a physical change which would adversely affect unique ethnic cultural values, or religious or sacred uses within the project area? (source #(s): 1, 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|---|---|---|---|

No known ethnic, religious or sacred uses are known to exist on or near the project sites. As noted above, the only structures included in the project description are maintenance facilities including weirs, gates, tidegates, diversion structures, trash racks, stream gauge structures, grade control structures, energy dissipaters, utility line crossings, culverts, outfalls, stormdrain or pump station inlet/outlet structures and similar structures. No other structures are involved. Accordingly, the proposed maintenance project would not have a significant impact on unique ethnic, cultural or religious uses or structures.

15. SOCIAL AND ECONOMIC EFFECTS. *Would the proposal result in:*

| | | | | |
|---|---|---|---|---|
| <p>Any physical changes which can be traced through a chain of cause and effect to social or economic impacts. (source #(s): 1, 3)</p> | <p>Significant Impact</p> <p>[]</p> | <p>Potentially Significant Unless Mitigated</p> <p>[]</p> | <p>Less Than Significant Impact</p> <p>[X]</p> | <p>Not Applicable</p> <p>[]</p> |
|---|---|---|---|---|

The maintenance project will not result in any known physical changes to social or economic entities. Therefore, this is a less-than-significant impact.

VI. MANDATORY FINDINGS OF SIGNIFICANCE. Pursuant to Section 15065 of the State EIR Guidelines, a project shall be found to have a significant effect on the environment if any of the following are true:

(Please explain your answer after each question)

- | | Yes | No | Maybe |
|---|-----|-------|-------|
| a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory? | [] | [X] | [] |

As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.

- | | Yes | No | Maybe |
|--|-----|-------|-------|
| b) Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? | [] | [X] | [] |

As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.

- | | Yes | No | Maybe |
|--|-----|-------|-------|
| c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects). | [] | [X] | [] |

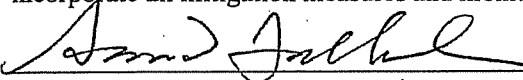
As described in Section V of this Initial Study, any potential environmental impacts from the proposed project and the entire maintenance program would be mitigated to a level of insignificance. Therefore, this project has no cumulatively considerable effects. See Attachment B for assessment of cumulative impacts and mitigation measures associated with the overall maintenance program at 47 culvert/drainage sites in West Marin.

- | | Yes | No | Maybe |
|---|-----|-------|-------|
| d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | [] | [X] | [] |

As described in Section V of this Initial Study, any potential environmental impacts from the proposed project would be mitigated to a level of insignificance.

VII. PROJECT SPONSER'S INCORPORATION OF MITIGATION MEASURES:

Acting on behalf of the project sponsor or the authorized agent of the project sponsor, I (undersigned) have reviewed the Initial Study for the Marin County Flood Control and Water Conservation District's Routine Maintenance Activities Program (RMA), and have particularly reviewed the mitigation measures and monitoring programs identified herein. I accept the findings of the Initial Study, including the recommended mitigation measures, and hereby agree to modify the proposed project application now on file with Marin County to include and incorporate all mitigation measures and monitoring programs set out in this Initial Study.

For  2/16/2012
Robert Beaumont; Director Date

VII. DETERMINATION: Pursuant to Sections 15081 and 15070 of the State Guidelines, the foregoing Initial Study evaluation, and the entire administrative record for the project:

I find that the proposed project WILL NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Signature  Date 2/16/12

Printed Name Rachel Warner Date 2/16/12

ATTACHMENT A

MAPS OF PROJECT AREAS AND SPECIAL STATUS SPECIES

Please see Appendix C in Programmatic Approach to Routine Maintenance Activities document for the maps.

ATTACHMENT B
MASTER LIST OF MAINTENANCE SITES

Please see Appendix A in Programmatic Approach to Routine Maintenance Activities document for the maps.

ATTACHMENT C

MASTER LIST OF SEDIMENT REMOVAL SITES

*Please see Appendix B in Programmatic Approach to Routine Maintenance Activities
document for the maps.*

444 307

**NOTICE OF DETERMINATION
Marin County Environmental Coordination and Review**

FILED

APR 14 2014

RICHARDSON
MARIN COUNTY CLERK
BY: O. Lobeck Deputy

TO: Office of Planning and Research
 County Clerk, County of Marin

FROM: Marin County Department of Public Works
(Lead Agency)

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title: Flood Control Routine Maintenance Activities (RMA)

State Clearinghouse #: 2012022053

Contact Person: Laurie Williams **Telephone Number:** 415-473-4301

Project Location: The geographic extent of the RMA program includes routine maintenance activities carried out in and around creeks, channels, ditches, levees, flood control structures and facilities, located within six project areas::

- Flood Control Zone 1 – Novato
- Flood Control Zone 3 – Richardson Bay
- Flood Control Zone 4 – Bel Aire and Strawberry Circle
- Flood Control Zone 7 – Santa Venetia
- Flood Control Zone 9 – Ross Valley
- County Service Area 13 – Upper Lucas Valley

Project Description:

Previous Entitlement

A previously adopted Negative Declaration was prepared for the Marin County Flood Control Maintenance Activities Project, which was approved on June 4, 2012.

The Marin County Flood Control and Water Conservation District's (District) Routine Maintenance Activities (RMA) program defines the scope and timing of the maintenance activities conducted annually in and around flood control channels and facilities in East Marin County. The RMA program covers five types of routine flood control maintenance activities: 1) Vegetation management; 2) Sediment and debris removal; 3) Erosion control; 4) Maintenance and repair of flood control structures; and 5) Levee maintenance. The primary purpose of the program is to reduce the potential risk of flooding and associated damage to adjacent properties and infrastructure such as bridges, culverts, roads and flood control facilities. The RMA program establishes programmatic guidance to conduct these maintenance activities for flood control purposes while avoiding and minimizing environmental impacts.

The District proposed work at 93 sites in six project areas: one each for five flood control zones in East Marin County (Zones 1, 3, 4, 7, 9), and County Service Area 13 in Upper Lucas Valley.

- Flood Control Zone 1 – Novato
- Flood Control Zone 3 – Richardson Bay
- Flood Control Zone 4 – Bel Aire and Strawberry Circle
- Flood Control Zone 7 – Santa Venetia
- Flood Control Zone 9 – Ross Valley
- County Service Area 13 – Upper Lucas Valley

POSTED 4-14-14 TO 5-14-14
NCE-14-93

N-14-07

Each of the site locations was analyzed for habitat type, the presence of special status species, and for potential impacts by type of proposed activity. The RMA program calls for species-specific avoidance and minimization measures to be employed in habitats where those species may potentially be found. In addition, the RMA program sets forth general and activity-specific conditions to be employed at each site and lists best management practices.

Proposed Modifications to the Original 2007 Project

In this addendum, the original 2012 Project description has been modified to include the addition of one project area, 21 new sites, and 7 revised sites, as follows:

- Flood Control Zone 1 – Novato: 2 new sites and one revised site
- Flood Control Zone 3 – Richardson Bay: one revised site
- Flood Control Zone 4 – Bel Aire and Strawberry Circle: no change
- Flood Control Zone 6 – San Rafael Meadows: New project area with 3 new sites
- Flood Control Zone 7 – Santa Venetia: no change
- Flood Control Zone 9 – Ross Valley: 16 new sites and 4 revised sites
- County Service Area 13 – Upper Lucas Valley: One revised site

All new sites are within habitats analyzed in the original Initial Study. No additional special-status species are indicated as being potentially impacted by work at the new sites. No new activity types have been proposed. All existing avoidance and minimization measures, general and activity-specific conditions, and best management practices will apply to the new sites as appropriate.

The new and revised sites are summarized below:

| SiteID | Name/Location | Tidal | Activity | | | Special Status Species | | |
|-----------|---|-------|----------|------------|-----------------------------------|------------------------|-------------|------------------------------|
| | | | Sediment | Vegetation | Habitat | Plants | Animals | Comments |
| 1-NMWD-1 | Novato Creek | No | X | X | north coast riparian scrub/forest | None | None | new site |
| 1-NMWD-2 | NMWD near IVGC | No | X | X | north coast riparian scrub/forest | None | None | new site |
| 1-VIN | Vineyard; new location DS | No | X | | north coast riparian scrub/forest | None | Steelhead | additional length |
| 3-RYC-1 | Ryan Cr at Camino Alto | No | X | X | diked baylands | None | None | adding vegetation |
| 6-SRM-1 | San Rafael Meadows ditches | YES | | X | California annual grassland | None | Rails; SMHM | new site |
| 6-SRM-2 | San Rafael Meadows ditches | No | | X | California annual grassland | None | None | new site |
| 6-SMART | San Rafael Meadows ditches | No | | X | California annual grassland | None | None | new site |
| 9-CCT | 10-14 College Ct | YES | X | | northern coastal salt marsh | None | Rails; SMHM | new site |
| 9-LAD | Laurel Avenue Ditch | No | X | X | north coast riparian scrub/forest | None | None | new site |
| 9-LAR-2 | Larkspur bikepath bridge | No | X | | mixed evergreen forest | None | None | adding sediment |
| 9-MAG-1 | 1100 Magnolia Ave | YES | X | X | northern coastal salt marsh | None | Rails; SMHM | new site |
| 9-MAG-2 | 1028 Magnolia Ave | YES | X | X | northern coastal salt marsh | None | Rails; SMHM | new site |
| 9-MAG-3 | 965 Magnolia Ave/King Mtn Cr | YES | X | X | northern coastal salt marsh | None | Rails; SMHM | new site |
| 9-SAC-1 | Fr Ross Cr to San Anselmo border | No | | X | north coast riparian scrub/forest | None | Steelhead | split by jurisdiction |
| 9-SAC-2 | San Anselmo Creek in San Anselmo | No | | X | north coast riparian scrub/forest | None | Steelhead | split by jurisdiction |
| 9-SAC-3 | From Fairfax border to Pastori | No | | X | north coast riparian scrub/forest | None | Steelhead | additional length |
| 9-SHC-2 | Sleepy Hollow Creek: unincorp. | No | | X | north coast riparian scrub/forest | None | None | split by jurisdiction |
| 9-SHC-3 | 300 Hidden Valley Ln culvert | No | X | | north coast riparian scrub/forest | None | None | new site |
| 9-SHC-4 | 960 Butterfield Rd at Green Valley Ct | No | X | | north coast riparian scrub/forest | None | Steelhead | new site; lower bed level |
| 9-SHC-5 | Butterfield Rd/Sleepy Hollow Dr bridge | No | X | | north coast riparian scrub/forest | None | Steelhead | new site |
| 9-SHC-6 | Katrina Ln culvert | No | X | X | north coast riparian scrub/forest | None | Steelhead | new site |
| 9-SHC-7 | Van Winkle Dr culvert | No | X | | north coast riparian scrub/forest | None | None | new site |
| 9-VAN-2 | Ichabod Ct culvert | No | X | | north coast riparian scrub/forest | None | None | new site |
| 9-VAN-3 | Tappen Rd culvert | No | X | | north coast riparian scrub/forest | None | None | new site |
| 9-VAN-4 | Mather Rd culvert | No | X | | north coast riparian scrub/forest | None | None | new site |
| 9-VAN-6 | Manitou Dr culvert | No | X | X | north coast riparian scrub/forest | None | None | new site; remove 1 oak 8"DBH |
| 9-WARD | Larkspur: City lot across fr 25 Ward St | No | X | | California annual grassland | None | None | new site |
| CSA-13-MC | CSA 13 Miller Creek | No | | X | north coast riparian scrub/forest | None | Steelhead | additional length |

This is to advise that the Department of Public Works approved the above described project on April 2, 2014, and has made the following determinations regarding the above described project:

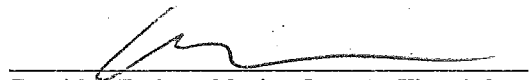
1. The project for which a Negative Declaration was previously adopted, pursuant to the provisions of CEQA, will not have a significant effect on the environment.
2. The current agency approval considered the previously adopted Negative Declaration.
3. Mitigation measures to the previously adopted Negative Declaration **were** made a condition of the approval of that project.

I certify that a copy of the previously adopted Negative Declaration, and record of project approval is on file and may be examined at:

Agency: Marin County Department of Public Works

Address: 3501 Civic Center Drive, #304
San Rafael, CA 94903

By:



Raul M. Rojas, Marin County Flood Control
and Water Conservation District

Date:

4/7/14

The filing of this Notice of Determination starts a 30 day statute of limitations on court challenges to the approval under CEQA.

APPENDIX H

BOLOGICAL SURVEY DATA SHEET

**Marin County / Department of Public Works / Flood Control and Water Conservation District
 Routine Maintenance Agreement Site Assessment Data Sheet**

Site ID: _____ Date: _____

Staff Name: _____ Photo#: _____

Site Notes: _____

Wetlands / US: _____

VEGETATION

Shading of stream: None Low Moderate High

Riparian Vegetation Trees > 10m Present Absent

| | | |
|-------------------------|---------|-------------------|
| Percentage Cover: | | Dominant species: |
| Trees | _____ % | _____ |
| Shrubs / vines / rushes | _____ % | _____ |
| Grasses / herbs / ferns | _____ % | _____ |
| Barren | _____ % | |

Weeds observed _____

Special status species observed: _____

ANIMALS

| | | | |
|------------------|----------------|--------------|----------------------|
| Habitat present: | Coho / SH / CH | Rails / SMHM | Birds (tree-nesting) |
| | NWPT | Bats | BUOW |

Species observed:

Birds _____

Amph / Reptiles _____

Mammals _____

Other _____

APPENDIX I

SITE REPORT FORM

**Marin County / Department of Public Works / Flood Control and Water Conservation District
RMA Site Report Form**

Site ID: _____ Date: _____

Work Type: Vegetation Levee Sediment Erosion Pump Stn /
Maintenance Mowing Removal Cattail Control Tide Gate

Work Date(s): _____

If Vegetation Maintenance:

Linear ft of channel treated: _____

Before/After photos _____

If Sediment Removal:

Linear ft earthen channel: _____ Cofferdam? Yes/No

Linear ft concrete channel: _____

Width (ft) _____

Depth (ft) _____

Yd³ sediment removed: _____ *(no more than 2,100 yd³ per site)*

Before/After photos _____

If Levee Mowing before Sept 1:

Time of High Tide: _____

Hours of work: _____

Before/After photos _____

If Mitigation is required:

Trees (dbh > 4") removed: _____

Trees planted: _____

Before/After photos _____

Site Notes:

Filling out this form should provide most of the information required for the permit, but it should not be assumed to fulfill all permit requirements.

APPENDIX J

SITE RECONNAISSANCE FORM

Marin County / Department of Public Works / Flood Control and Water Conservation District
Stream Maintenance Program
Reconnaissance Data Sheet

Site ID: _____ Date: _____

Staff Name: _____ Photo#: _____

Site Notes: _____

- Activity Type:
- Vegetation maintenance/fire fuel reduction
 - Sediment removal
 - Facilities maintenance/Levee maintenance
 - Erosion control

- This site is:
- | | |
|---|--|
| <input type="checkbox"/> Culvert | <input type="checkbox"/> Outfall |
| <input type="checkbox"/> Channel - earthen | <input type="checkbox"/> Silt basin |
| <input type="checkbox"/> Channel - concrete | <input type="checkbox"/> Sediment trap |

- Facility condition:
- | | |
|-------------------------------|------------------------------------|
| <input type="checkbox"/> Poor | <input type="checkbox"/> Good |
| <input type="checkbox"/> Fair | <input type="checkbox"/> Excellent |

Current status: _____

Has the public called: No Yes

Work this year? No
 Maybe/Monitor
 Yes If yes, high priority? No Yes

If yes, describe why: _____

