Appendix A

Notice of Preparation/Initial Study and Public Comments

NOTICE OF PREPARATION

From: Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Project Title: Sunnyvale East West Channels Flood Protection Project

Project Location: Sunnyvale and Cupertino, California.

The Santa Clara Valley Water District will be the Lead Agency and will prepare an environmental impact report for the above project. The District needs to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials.

Please send your response via the Access Valley Water online customer service center at: www.valleywater.org. Click on the Access Valley Water link on the main page. Select the "Public review documents" tab. From the drop down menu select "Sunnyvale East and West Channels Flood Protection Project DEIR and follow the detailed instructions.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but **not later than 30 days after receipt of this notice**.

Please send your response to:

Tiffany Hernandez
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 630-3094
thernandez@valleywater.org

Please provide the name of a contact person in your agency.

Beau Goldie
Chief Executive Officer

1/14/13
Date

Notice of Preparation

Draft Environmental Impact Report
Sunnyvale East and West Channel Flood Protection Project
SCH No. *26074002*

Santa Clara County, California
January 2013

Introduction

This notice announces that a draft Environmental Impact Report (EIR) will be prepared for the Sunnyvale East and West Channel Flood Protection Project (Project or Proposed Project). The EIR will identify and evaluate possible environmental impacts of Project alternatives, and develop strategies to avoid, reduce, or compensate for any significant impacts.

As the lead agency responsible for compliance with the California Environmental Quality Act (CEQA), the Santa Clara Valley Water District (District) has determined that the Project may have a significant impact on the physical environment, and has decided to prepare an EIR to provide ample opportunity for public disclosure and participation in the planning and decision making process. The purpose of the draft EIR process is to develop and assess a recommended plan and alternatives for the Project and to avoid and mitigate significant adverse effects on environmental resources, while aiming to achieve the primary project objectives.

This document, which serves as the Notice of Preparation (NOP) required by CEQA and the state's CEQA Guidelines (CCR §15082), contains a brief description of the Project, including its goals and objectives, the Project alternatives identified to date, possible environmental impacts, and the resulting need for an EIR. It also discusses the process that will be used to determine the scope of analysis in the EIR, and provides an overview of the opportunities for participation in review of the EIR, along with contact information.

Project Overview

The District is undertaking the CEQA environmental review process as part of the overall Project review and design process. During this CEQA environmental review process the Sunnyvale Project is considered as a Proposed Project only. Pending the outcome of the environmental review process and any subsequent design revisions to improve the project, the Proposed Project will be submitted to the District Board of Directors for their review and potential approval. This project description is aimed to provide the public with a clear understanding of the activities, elements, and methods involved with the Proposed Project. However, this project description does not presume that the Proposed Project is considered approved, or will necessarily be approved until the complete environmental and planning process occurs according to CEQA guidelines and internal District Project review and approval protocol.

Background

The Sunnyvale East and West Channels (Sunnyvale Channels) are engineered water conveyance channels that collect and transport stormwater runoff from urban areas in the cities of Sunnyvale and Cupertino to the southern portion of the San Francisco Bay. The Sunnyvale Channels are primarily open-water channel features, with subsurface culverts and road crossings in several locations.

Unlike many of the flood control channels in Santa Clara County where engineered systems replaced a historic creek alignment, the Sunnyvale Channels are not located along the alignment of a historic creek. Between the early 1900s and 1950s, land surface subsidence caused by groundwater extraction from artesian wells and groundwater pumping altered the areas drainage. Consequently, runoff from portions of the watershed that would have drained to Stevens Creek or Calabazas Creek became isolated, ponded and caused flooding in the Sunnyvale area.

In response to this flooding, the District constructed the Sunnyvale Channels in the 1960's and 1970's. The channels were designed with a capacity to convey runoff from the 10-year storm event (an event with a 10% likelihood of occurring in any given year). Since construction of the channels, the Project Area experienced flooding during major storm events in 1963, 1968, 1983, 1986, and 1998. Current Federal Emergency Management Agency (FEMA) mapping shows that the Project Area is susceptible to flooding and overbank flows from the Sunnyvale Channels at several locations during a 100-year storm event (an event with a 1% likelihood of occurring in any given year).

The District is now proposing the Project to provide additional flood protection benefits to the cities of Sunnyvale and Cupertino and water quality improvements to the Sunnyvale Channels.

Goals and Objectives

The Proposed Project involves constructing a series of infrastructure upgrades to provide additional flood protection and improve water quality. The Proposed Project is intended to meet the following objectives:

- Provide flood protection where historic flooding has occurred and future flooding is possible from a 100-year storm event;
- Provide a basis to update FEMA flood hazard maps upon completion of the Proposed Project to reflect 100-year flood protection along the improved channels and alleviate requirements for flood insurance in the communities surrounding the Sunnyvale Channels;
- Provide infrastructure improvements beyond 100-year flood protection as necessary to meet the District's freeboard standards;
- Provide water quality improvements by repairing/stabilizing existing erosion sites; and
- Provide environmental and recreational enhancements in coordination with flood and water quality improvements.

Following Project actions, it is estimated that 100-year flood protection would be provided to 1,618 parcels adjacent to the Sunnyvale East Channel and to 47 acres (11 parcels) adjacent to the Sunnyvale West Channel.

Project Setting

The Sunnyvale Channels flow northward through the City of Sunnyvale (**Figure 1,** located at the end of the NOP). The far southern portion of the Sunnyvale East Channel is located in the northern area of the City of Cupertino. At the northern end of the Project Area, toward San Francisco Bay, the channels discharge to the Guadalupe Slough adjacent to Pond A4. In the northern (downstream) reaches of the channels near San Francisco Bay, the channels receive tidal backwatering via the Guadalupe Slough and can also receive excess flows from nearby Calabazas and San Tomas Aquino Creeks.

The Sunnyvale Channels primarily traverse and collect stormwater runoff from developed and urban areas. The channels are generally trapezoidal with earthen embankments. However, several reaches have hardened concrete or rock banks, and several sections are subsurface culverts, including many road crossings. The channels are typically bordered by 10- to 20-foot easements that run parallel to the channel. Such easements typically contain District maintenance roads and/or undeveloped areas, and buffer the channels from adjacent land uses. The Sunnyvale Channels cross major arterial roadways, including Highway (Hwy) 101, State Route (SR) 237, Caribbean Drive, Central Expressway and El Camino Real, as well as numerous smaller, local roadways (Figure 1). In the northern Project Area, development density is less intense, consisting of baylands that fringe San Francisco Bay. This area is characterized by open spaces in the vicinity of Guadalupe Slough and Pond A4 with higher natural resource value. **Figure 2** presents several photographs of the Sunnyvale Channels.

Sunnyvale East Channel

The Sunnyvale East Channel extends approximately 6.5 miles from Junipero Serra Channel downstream to Guadalupe Slough (Figure 1). The East Channel drains a watershed area of approximately 7.25 square miles. Land uses in the East Channel watershed are primarily medium density residential and some industrial areas. The East Channel is tidally influenced from Guadalupe Slough to approximately halfway between Tasman Drive and Hwy 101.

Sunnyvale West Channel

The Sunnyvale West Channel extends approximately 3 miles from Maude Avenue downstream to Guadalupe Slough (Figure 1). The West Channel drains a watershed area of approximately 2.81 square miles (sq. mi.) from lands adjacent to the West Channel. Additionally, more than half of the runoff from the West Channel watershed area is pumped into the West Channel near the southwest corner of Pond A4 from lands further to the west. Industrial land uses surround the northern (downstream) half of the West Channel, and medium density residential land uses surround the southern (upstream) half of the channel. The West Channel is tidally influenced from Guadalupe Slough to Mathilda Avenue. The West Channel transitions to become the Moffett Channel near the City of Sunnyvale Water Pollution Control Plant (WPCP), just north of Carl Road (Figure 1).

The Moffett Channel is approximately 4,300 feet long. 125 feet wide, and 2 to 15 feet deep (water depth varies throughout the day according to tidal influence). The Moffett Channel covers an area of roughly 12.4 acres and functions as a conveyance channel for stormwater delivered from the West Channel and the Lockheed Channel (to the west), to be conveyed toward the South Bay.

Guadalupe Slough and Pond A4

The Sunnyvale East and Moffett Channels flank the periphery of Pond A4 before flowing into Guadalupe Slough (Figure 1). Pond A4 is an open water salt pond surrounded by an extensive network of sloughs, salt ponds, and channels. Water from the Cargill Channel (immediately to the west) can be siphoned over to Pond A4. Therefore, Pond A4 does not directly receive surface water from the bay, Guadalupe Slough, Sunnyvale East or Sunnyvale West via Moffet Channel. However, Pond A4 is likely hydrologically connected by groundwater to its surrounding waterbodies. Water from Pond A4 can also be siphoned over to Pond A5 (immediately to the east).

Project Description

The Project proposes to provide flood protection and water quality improvements. The Project design also complies with the District's freeboard standards. Freeboard is the additional vertical height of infrastructure built above a predicted flood elevation to provide capacity for additional but unexpected flood elevations. Freeboard is essentially a safety measure taken to reduce the risk from flood events that are larger than those expected for the Project Site. The Districts freeboard standards consider a range of freeboard guidelines developed by federal agencies, including the FEMA, and the United States Army Corps of Engineers, among others.

The District initially developed several conceptual alternatives to meet the Project objectives (stated above). Alternatives were reviewed and refined based on site conditions and Project needs. Several alternatives were screened and eliminated from consideration based on environmental considerations, risk assessment, cost evaluation, and public input. Out of this process, a preferred alternative was identified and then further refined based on site-specific factors. The use of Pond A4 as a detention basin to store stormwater was originally considered but eliminated from the Project due to concerns regarding potential water quality and ecologic effects. In addition, the location, extent, and height of floodwalls were adjusted based on the location of sensitive biological habitats. Levee modifications around Pond A4 which could have impacted wetland/saltwater marsh habitat associated with Guadalupe Slough were also avoided. These steps were taken during the Project development phase to avoid and minimize potential adverse impacts of the Project.

Proposed channel flood protection and freeboard improvements include floodwalls, levee raising, maintenance road raising, sediment removal, and bridge/culvert modifications. The Project also includes repairing and stabilizing several streambank sections that are unstable and actively eroding. Where feasible, non-hardened earthen channel banks will be used to stabilize the streambanks. Where earthen banks are not feasible due to hydraulic conditions, rock slope stabilization techniques will be used at specific locations. In addition, small spans of concrete will be placed/replaced in the channel to prevent undercutting of existing hardscape features. Stabilizing actively eroding streambanks will provide water quality benefits to the channels. Existing channel maintenance roads will also be improved to enhance use of the roads for recreational purposes. These Project components are described further below.

Project Work Area

Proposed Project activities will occur within a designated work area. This work area consists of the channels themselves, and extends 25 feet outboard from the top of each bank along the Sunnyvale Channels. **Figures 3a – 3g** (located at the end of the NOP) show the locations of Project components.

Please note, as the Project design is finalized, some minor deviations in the location of Project activities from that presented in this document may occur. As the Project design is finalized, any additional changes will be described and analyzed in the draft EIR and will be available for public review.

In many locations, existing structures and development adjacent to the Sunnyvale Channels will restrict where Project activities could occur. New temporary or permanent easements would be obtained for any potential Project activities that would be developed outside of the existing channels and easements.

Project Components

Floodwalls

New vertical floodwalls will be constructed parallel to several reaches of the Sunnyvale Channels. Floodwalls will provide increased flood protection and freeboard to the extent necessary to comply with the District's freeboard standards. These floodwalls will be located along much of the Sunnyvale West Channel, the northern (downstream) half of the East Channel (north of Hwy 101). Refer to Figures 3a – 3g for floodwall locations. Floodwall material would be either concrete or sheet piles. Floodwall heights would range from 1.0 to 6.75 feet above the ground surface.

Floodwalls will be constructed along existing maintenance roads, parallel to the channels, on either the inboard side (between the maintenance road and the channel) or outboard side (outside of the maintenance road and channel). Maintenance roads extend between 10 to 15 feet from the top of the channel bank. The proposed location for floodwalls allows continued easy access for channel maintenance.

Floodwall ramps will also be constructed at several locations where floodwalls meet bridge/culvert wingwalls. These ramps will consist of earthen material constructed with two sloped ramps forming a triangular pyramid type shape between floodwalls located on the outboard and inboard side of the maintenance roads. The ramps will be flattened and leveled at the top of the pyramid at the floodwall height. The ramps will be located on existing District channel maintenance roads. The floodwall ramps will allow pedestrian and vehicle access to channel maintenance roads, where outboard floodwalls are proposed, while providing an elevated barrier for flood protection and freeboard.

Maintenance Road Raising

Existing earthen maintenance roads would be raised at several locations to meet the District's freeboard standards (Figures 3a – 3g). Specifically, maintenance road raising would occur where channel reaches may already provide 100-year flood capacity, but the height of infrastructure above the flood elevation does not meet the District's freeboard standards. In addition, maintenance road raising at some locations will provide a level the maintenance road surface where the surface is currently uneven.

The proposed project includes improvements to existing maintenance roads in areas adjacent to new floodwalls and at several locations without floodwalls. The majority of improvements may involve raising existing maintenance roads, leveling of uneven areas, and resurfacing with 4 - 6 inches of new base rock. A segment of the maintenance road on Sunnyvale East Channel near the confluence with Guadalupe Slough may be raised from 1 to 3 feet and resurfaced. Existing maintenance roads will not be widened but would conform to the existing width.

Levee Raising

Existing levees would be raised at two locations to increase flood protection and freeboard to the extent necessary to comply with the District's freeboard standards. Specifically, levees would be raised along a very short segment of the Sunnyvale West Channel south of Pond A4 and immediately east of the City of Sunnyvale WPCP (Figure 3a), and along a short segment of the south bank of the Sunnyvale East Channel near the southeast corner of Pond A4 (Figure 3c). No floodwalls would be constructed where levees are raised.

The existing levees would be raised by the placement of new base rock, similar to how maintenance roads would be elevated as described above. However, levees will be raised from 3 to 5.5 feet, which is greater than for maintenance road raising, discussed above. Existing levees would not be widened but would conform to the existing grade.

Bridge and Culvert Modifications

Bridges and culverts will be modified at several roadway crossings (crossings) to increase flow capacity and reduce historic bridge overtopping or culvert backwatering due to insufficient capacity. Bridge and culvert modifications will also increase freeboard to the extent necessary to comply with the District's freeboard standards.

Modifications are currently proposed at 6 crossings along the East Channel and 4 crossings along the West Channel (Figures 3a – 3g). **Table 1** provides an overview of the proposed bridge and culvert modifications. On Sunnyvale East Channel at Caribbean Drive, the existing dual span bridge will be completely replaced with a wider dual span bridge. The existing box culvert at Carl Road and Sunnyvale West Channel will be replaced with a new slightly larger box culvert. The remaining modifications primarily consist of raising headwall (concrete walls extending vertically from the road crossing over the channel) elevations by adding concrete material to the existing structures or demolishing existing headwalls and rebuilding new headwalls at a higher elevation. Headwalls would be raised between 0.5 and 3.5 feet.

Table 1. Currently Proposed Bridge/Culvert Modifications

ID[1]	Roadway Crossing	Proposed Modification
Sunnyvale East Channel		
E1	Caribbean Drive	Demolish existing and reconstruct slightly larger dual span bridge.
E2	Moffett Park Drive	Raise headwall downstream of Moffett Park Drive crossing.
E3	Highway 237	Raise headwall upstream and downstream of Highway 237 crossing.
E4	Persian Drive	Raise headwall upstream of Persian Drive crossing.
E5	East Arques Avenue	Demolish existing sidewalk/gutter and install 16-foot sidewalk/driveway on downstream end of East Arques Avenue.
E6	East Evelyn Avenue	Raise headwall upstream of East Evelyn Avenue.
Sunnyvale West Channel		
W1	Carl Road	Demolish existing and reconstruct slightly larger single chamber concrete box culvert bridge.

ID[1]	Roadway Crossing	Proposed Modification
W2	Caribbean Drive	Demolish existing and reconstruct slightly larger headwalls on the upstream and downstream face of Caribbean Drive.
W3	West Java Drive	Raise headwalls on the upstream and downstream face of West Java Drive.
W4	Bordeaux Drive	Install driveway cut and apron upstream and downstream of Bordeaux Drive.

Note: [1] ID corresponds to reference number on Figures 3a – 3g.

Sediment Removal

Sediment will be removed from several locations along the East Channel where excessive sediment has aggregated over time and reduced channel capacity. Sediment removal from the Sunnyvale Channels typically occurs as an ongoing maintenance activity (discussed in the Channel Maintenance Activities section below). However, excessive sediment currently identified for removal is included as a Proposed Project element and this sediment removal will be conducted together with other Project components identified along the same channel reaches.

Earthen Channel Restoration

Earthen channel restoration will be used to stabilize existing eroding banks and improve flow of flood waters at certain locations: along the West Channel (between Carl Road and Caribbean Drive) and the East Channel (between Hwy 101 and Blythe Avenue) (Figures 3a – 3g). Actively eroding earthen streambanks will be regraded to a less steep and more stable bank slope. In addition, an instream bench will be constructed along one or both sides of the channel. Bench construction would involve expanding the channel, by grading the bank outward to shift the existing streambank or levee outward. Benches would have a 2:1 (h:v) side slope. Where necessary, the grading of banks will integrate access to the maintenance road to preserve maintenance access. Existing levees/maintenance roads will be set back and widened with placement of new earthen material. Sediment excavated for bench creation will be reused as fill material for other construction purposes onsite to the extent possible. Finally, a low-flow channel will be excavated in these locations to improve water and sediment conveyance during lower flow conditions.

Rock Slope Protection

Rock slope protection will be used to stabilize existing unstable and eroding banks at several locations along the Sunnyvale Channels (Figures 3a – 3g). This approach is favored where earthen repair techniques alone (as described above) are not sufficient to adequately repair existing erosion sites. In these cases, a layer of rock will be placed along the channel. A few variations of rock slope protection are proposed. At several locations along the East and West Channel rock will be placed on the channel toe/ bottom and on both channel banks up to the 10-year flood event water level, or in tidal reaches up to the mean higher high water level. At a few other locations, the following rock slope protection techniques will also be used: rock will be placed only on the channel toe/bottom and not up the banks; rock will be placed on the channel

toe/bottom and the low-flow channel; or rock will be placed on the channel toe/bed and up one channel bank.

Above the rock, the banks will be re-graded to a stable slope angle, back filled with earth (as needed), and covered with erosion control fabric. Hydro-seeding will follow to establish a protective layer of vegetation. Individual tree planting may be added to the protected bank slope in certain situations to provide additional bank stabilization and vegetative cover.

Other Channel Modifications

To prevent undermining existing outfall (typically pipes that discharge stormwater to the channels) and wingwall (concrete channel walls extending from road crossings) structures, small spans of concrete will be installed at several locations along the Sunnyvale Channels. Modifications will be limited to the channel area immediately adjacent to existing outfall and wingwall structures; however, the outfalls and wingwall structures themselves will not be modified. Concrete and slurry will be installed on the channel to support outfalls, thereby repairing existing erosion and preventing future erosion and undercutting of the outfall structures. Concrete and slurry will also be installed at the interface of existing wingwalls and the channel, thereby repairing existing erosion and preventing future erosion and undercutting of the wingwalls. In most locations, existing slope protection features, such as sack concrete or rock, will be removed prior to repair.

Low flow notches will be cut into an existing concrete channel encapsulation located on the East Channel between Iris Avenue and El Camino Real. The channel encapsulation is a concrete box type structure that is causing ponding of water in the East Channel during low flow conditions. The Project proposes to cut notches into the encapsulation at several locations to improve flow conditions.

Finally, a concrete trapezoidal channel will be constructed on the East Chanel between East Duane Avenue and North Wolfe Road. Severe erosion currently occurs throughout this reach and existing sack concrete slope protection is failing in several places. Existing concrete and sack concrete covering a porting of this channel will first be removed. Then addition material will be excavated from the channel to accommodate concrete and the trapezoidal concrete structure will be installed along the entire channel bottom and toe up to the bank.

Recreational Improvements

The Project also includes improvements to District channel maintenance roads used for recreational activities, including walking, jogging, bird watching, and biking. These improvements would occur along several downstream/northern reaches of the Sunnyvale Channels (Figures 3a – 3g). Channel maintenance roads will be improved for bicycling, as requested by the City of Sunnyvale. Specifically, maintenance roads will be paved with asphalt and be at least 10 feet wide. All maintenance roads are currently composed of a gravel rock base. At several locations where maintenance road recreational improvements are made, floodwalls will be located on the inboard side to accommodate existing recreational access to the roads, which often occurs from parking lots adjacent to the roads.

Cyclone Fence

A cyclone fence will be installed on the West Channel between Highway 101 and Almanor Avenue. The fence will be located on the outboard side of the existing maintenance road. Vegetation removal will be required from this area prior to fence installation.

Easements

Currently, the District does not have adequate right of way to accommodate all of the proposed floodwall construction. Temporary construction easements or permanent easements will be obtained from several parcels along the Sunnyvale Channels. Easements will be confined to the designated work area discussed in Section 4.1 above.

Channel Maintenance Activities

Following Project construction, the Sunnyvale Channels will be maintained according to the District's on-going Stream Maintenance Program (SMP). Routine maintenance activities likely to continue at the Sunnyvale Channels will include trash and debris removal, vegetation maintenance, sediment removal, and bank stabilization if necessary.

The proposed erosion repairs of the Project would result in a reduced amount of sediment eroding into the channel and likely reduce the amount and frequency of sediment removal and bank stabilization activities in the future. No increase in any maintenance activities is expected to result from the Project.

The SMP Update and Subsequent EIR was recently approved and certified by the District in February 2012. The SMP Update EIR includes several impact avoidance, minimization, and best management practices to reduce potential impacts to resources from routine maintenance activities. Activities associated with existing and future maintenance of the Sunnyvale Channels are included and evaluated in the recent SMP Subsequent EIR. Therefore, potential impacts due to channel maintenance activities are not evaluated in the Initial Study or EIR. The reader is referenced to the District's SMP Update and Subsequent EIR to see the discussion of maintenance activities and potential impacts. This Initial Study and the pending draft EIR for the Proposed Project will focus on the impacts associated with the construction and operation of the new Sunnyvale Channels improvements.

Topics to be Analyzed in the EIR

The District has prepared this NOP pursuant to CEQA Guidelines section 15082. Attached to the NOP is an Initial Study which provides a preliminary environmental impact analysis for the Proposed Project. The Initial Study evaluates the Proposed Project as it is currently envisioned.

Based on the Proposed Project's potential for significant impacts on the environment, the District has decided to prepare an EIR. The EIR will serve to further assess the Proposed Project's effects on the environment, to identify significant impacts, and to identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts. Only those topics identified in the Initial Study as having potentially significant adverse effects will be further evaluated in the EIR. The word "significant" is only used in the Initial Study related to the significance of an environmental impact. An analysis of alternatives to the Proposed Project will also be included in the EIR. Topics to be analyzed in the EIR, include but are necessarily limited to the following:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Geomorphology
- Land Use and Planning
- Noise and Vibrations
- Recreation
- Transportation/Traffic
- Utilities and Service Systems
- Water Quality
- Cumulative Impacts
- Irreversible Impacts

Responses received to this NOP may modify or add to the preliminary assessment of potential issues addressed in the EIR.

Environmental Process and Public Scoping Meeting

This NOP initiates the CEQA process through which the District will refine the range of issues and Project alternatives to be addressed in the draft EIR. Comment is invited on the proposal to prepare the EIR and on the scope of issues to be included in the EIR.

Please submit any comments within 30 days of receipt of this notice to Tiffany Hernandez, the District's environmental planner for the Sunnyvale East and West Channel Flood Protection Project, at the Santa Clara Valley Water District (see *Contact Information* below). In conjunction with the 30-day review period for the NOP, the District will hold a scoping meeting to provide an additional opportunity to learn about the Project, ask questions, and provide comments about the scope and content of the information to be addressed in the draft EIR. The scoping meeting

will be held at 6:30pm on January 24, 2013 at Fairwood Elementary School, 1110 Fairwood Avenue, Sunnyvale, CA 94089

After the 30-day review period for the NOP is complete and all comments are received, a draft EIR will be prepared in accordance with CEQA, as amended (Public Resources Code §21000 et seq.), and the State Guidelines for Implementation of CEQA (CCR §15000 et seq.).

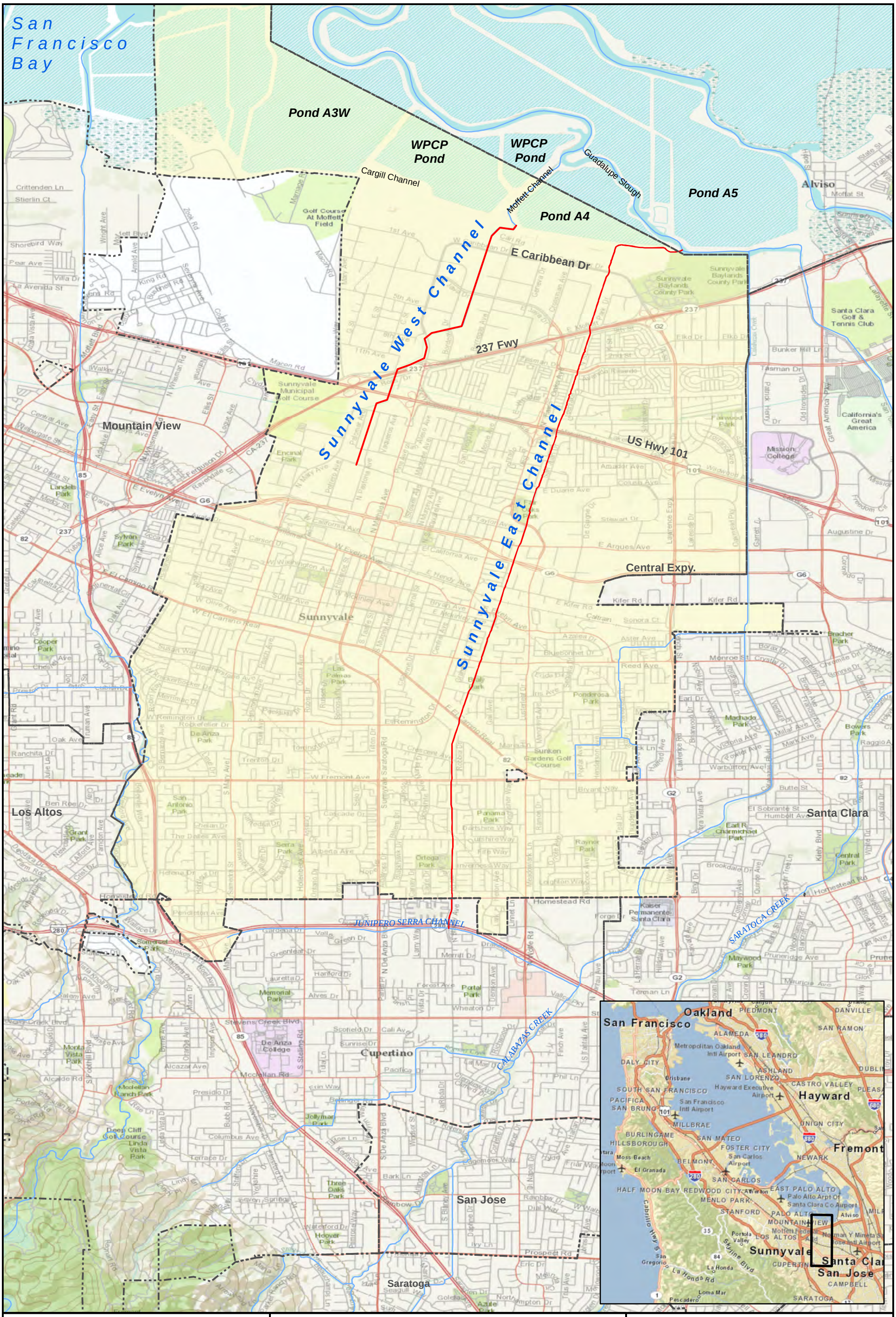
Once the draft EIR is completed, it will be made available for a 45-day public review and comment period. Copies of the draft EIR will be sent directly to those agencies commenting on the NOP, and will also be made available to the public at a number of locations, including the District headquarters and public libraries in the area. Information about availability of the draft EIR will also be posted on the District's website (http://www.valleywater.org).

Contact Information

For further information, contact the following:

Tiffany Hernandez
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614
(408) 265-2607 ext. 3094
thernandez@valleywater.org

Additional information relevant to the Project and the draft EIR can also be found Online via the Access Valley Water customer service center at: www.valleywater.org



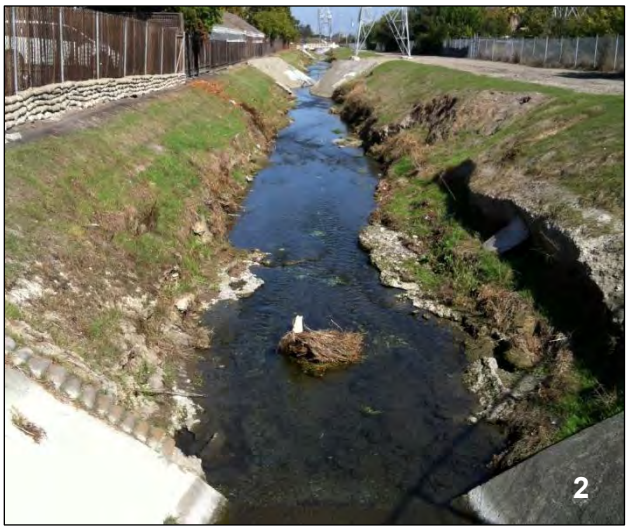
Horizon WATER and ENVIRONMENT

Prepared for Santa Clara Valley Water Distict

September 2012

Figure 1
Sunnyvale East and West Channels Flood Protection Project Site

Sunnyvale East Channel



1) Looking east near Pond A4; 2) Existing bank erosion, looking north from Blythe Avenue;
3) Existing Caribbean Drive bridge; 4) Looking south from Caribbean Drive

Sunnyvale West Channel

5) Looking north from Carl Road; 6) Looking from north (left) to south (right) at the Caribbean Drive bridge

Figure 2. Site Photographs

Sunnyvale East and West Channel Flood Protection Project

January 2013

Prepared for:
Santa Clara Valley Water District

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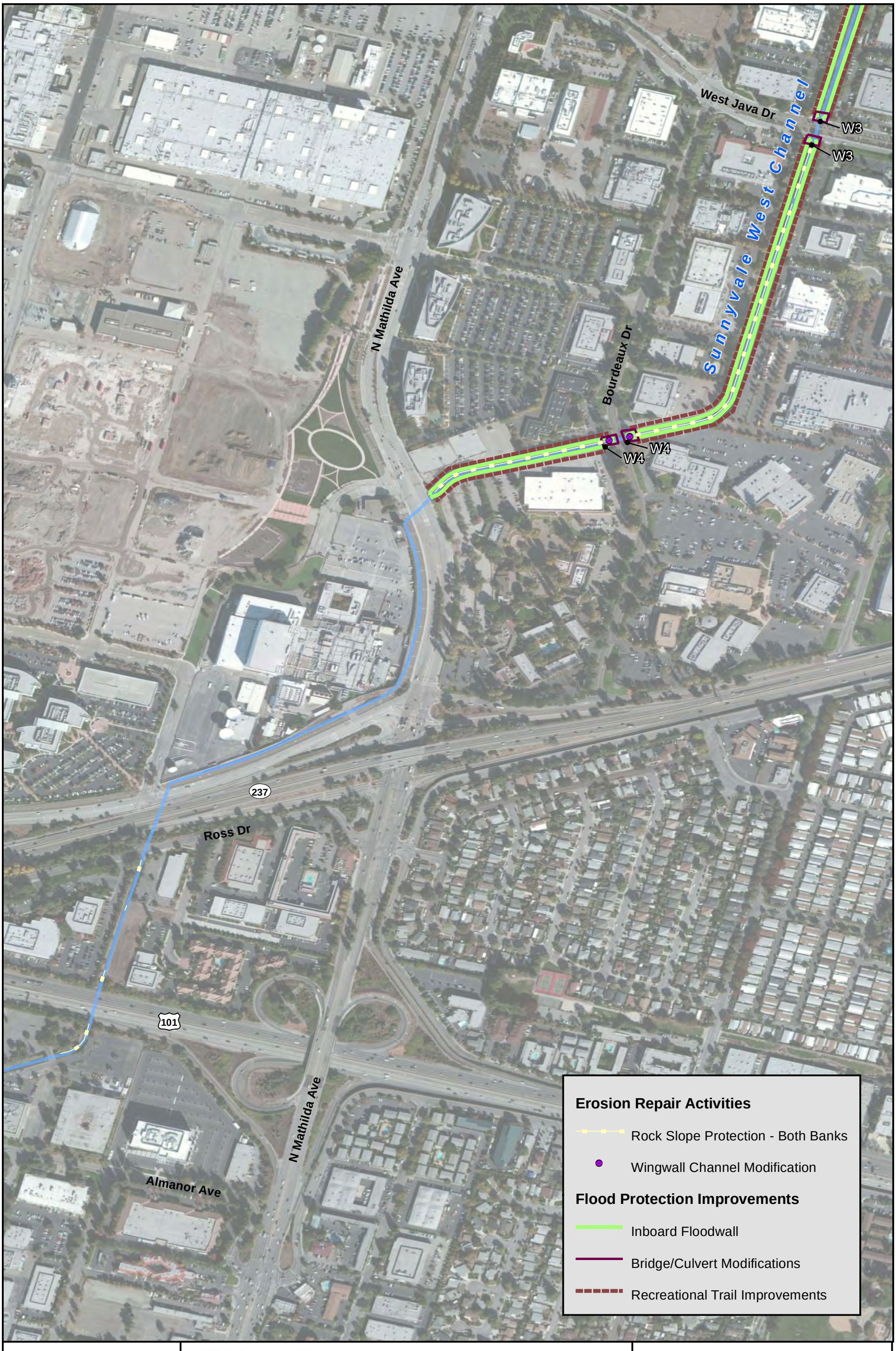
Source: SCVWD 2012; Bing Maps

Figure 3A
Proposed Flood Protection and Water Quality Improvements



Sunnyvale East and West Channel Flood Protection Project

January 2013

Horizon WATER and ENVIRONMENT

Prepared for:
Santa Clara Valley Water District

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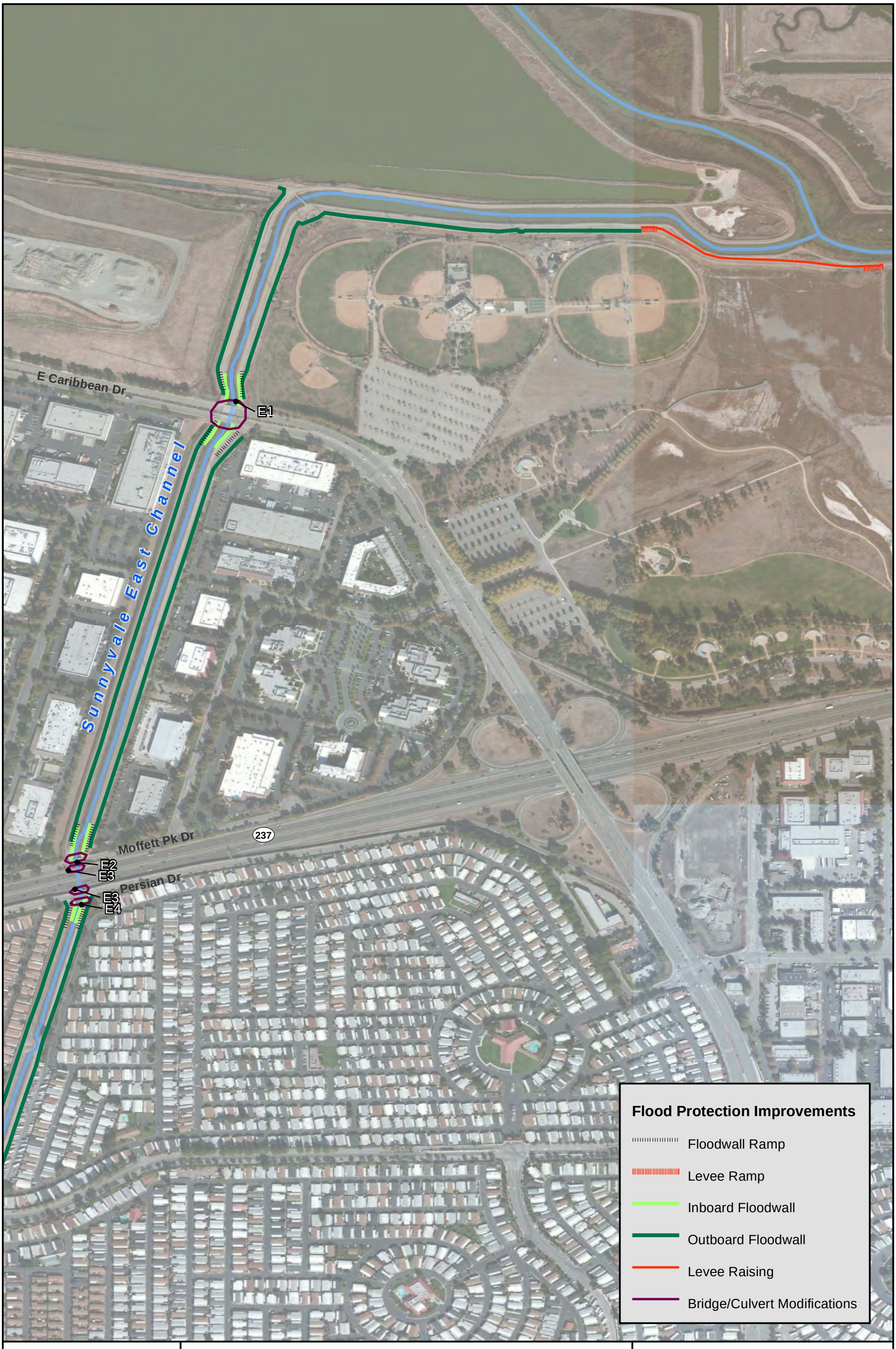
Source: SCVWD 2012; Bing Maps

Figure 3B
Proposed Flood Protection and Water Quality Improvements



Sunnyvale East and West Channel Flood Protection Project

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Horizon WATER and ENVIRONMENT

Prepared for:
Santa Clara Valley Water District

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Source: SCVWD 2012; Bing Maps

Figure 3C
Proposed Flood Protection and Water Quality Improvements

Sunnyvale East and West Channel Flood Protection Project

January 2013

Prepared for:
Santa Clara Valley Water District

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Source: SCVWD 2012; Bing Maps

Figure 3D
Proposed Flood Protection and Water Quality Improvements

Erosion Repair Activities

- Earthen Bank with Rock Toe
- Concrete Lined Channel
- Rock Slope Protection - Both Banks
- Rock Slope Protection - West Bank
- Outfall Channel Modification
- Wingwall Channel Modification

101

Blythe Ave

East Duane Ave

Sunnyvale East Channel

N Wolfe Rd

Sunnyvale East and West Channel Flood Protection Project

January 2013

Horizon WATER and ENVIRONMENT

Prepared for:
Santa Clara Valley Water District

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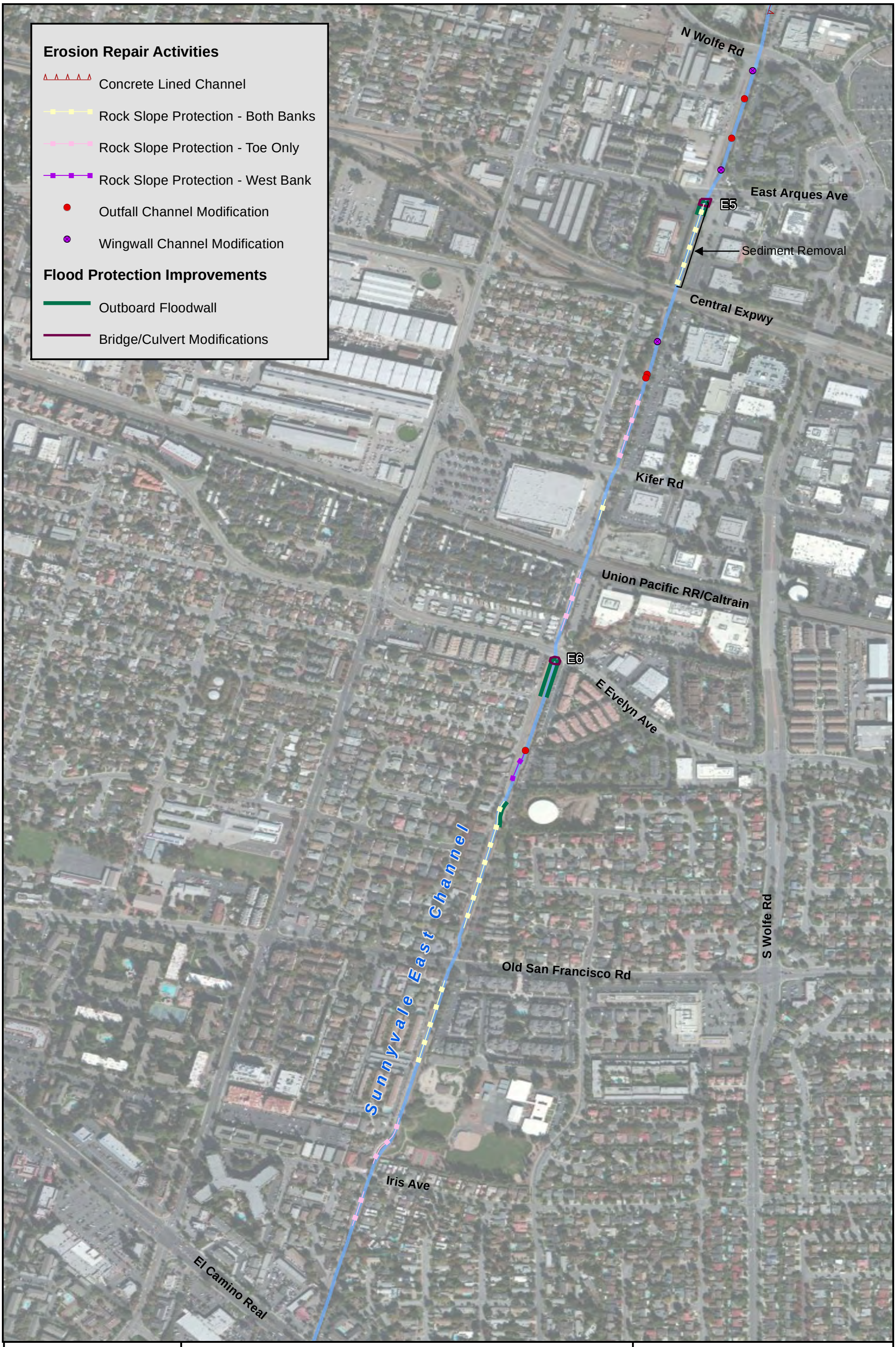
Source: SCVWD 2012; Bing Maps

Figure 3E
Proposed Flood Protection and Water Quality Improvements



Sunnyvale East and West Channel Flood Protection Project

January 2013

Prepared for:
Santa Clara Valley Water District

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Source: SCVWD 2012; Bing Maps

Figure 3F
Proposed Flood Protection and Water Quality Improvements

Sunnyvale East and West Channel Flood Protection Project

January 2013

Horizon WATER and ENVIRONMENT

Prepared for:
Santa Clara Valley Water District

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Source: SCVWD 2012; Bing Maps

Figure 3G
Proposed Flood Protection and Water Quality Improvements

Environmental Checklist

1. Project Title:	Sunnyvale East and West Channel Flood Protection Project
2. Lead Agency Name and Address:	Santa Clara Valley Water District 5750 Almaden Expressway San Jose, CA 95118
3. Contact Person and Phone Number:	Tiffany Hernandez (408) 265-2607 x3094
4. Project Location:	Sunnyvale and Cupertino, California
5. Project Lead Contact and Address:	Tiffany Hernandez Santa Clara Valley Water District 5750 Almaden Expressway San Jose, CA 95118
6. General Plan Designation (Sunnyvale Channels and adjacent areas):	Parks, Environmental Services, Commercial Intensification, Industry, Mobile Home Residential, (Low to Medium/Medium/Medium to High) Density Industrial to Residential, (Low/Medium/High) Density Residential, and Neighborhood Commercial.

7. Zoning (Sunnyvale Channels and adjacent areas):	Public Facilities, Moffitt Park Industrial, Moffett Park TOD, MS Industrial and Service, Residential Mobile Home,C2-OPD Highway Business/Office-Planned Development, R1/R2/R3/R4 Residential, M3 General Industrial, C1 Neighborhood Business, and C2-ECR Highway Business/El Camino Real.
8. Description of Project:	See Project Description
9. Surrounding Land Uses and Setting:	Baylands, residential developments (mobile home, multi-family, single-family), commercial and industrial facilities, public facilities (schools, parks, utilities), and undeveloped areas.

10. Other Public Agencies whose Approval or Input May Be Needed:

United States Army Corps of Engineers

United States Fish and Wildlife Service

National Marine Fisheries Service

California Department of Fish and Wildlife (Formerly CA Department of Fish and Game)

California State Water Resources Control Board

Bay Area Air Quality Management District

San Francisco Bay Regional Water Quality Control Board (Region 2)

San Francisco Bay Conservation and Development Commission

City of Sunnyvale

Environmental Factors Potentially Affected:

The environmental factors checked below would potentially be affected by this Project (i.e., the Project would involve at least one impact that is a "Potentially Significant Impact"), as indicated by the checklist on the following pages.

[X] Aesthetics	[ ] Agricultural Resources	[X] Air Quality
[X] Biological Resources	[X] Cultural Resources	[X] Geology & Soils
[X] Hazards & Hazardous Materials	[X] Hydrology & Geomorphology	[X] Land Use & Planning
[ ] Mineral Resources	[X] Noise & Vibrations	[ ] Population & Housing
[ ] Public Services	[X] Recreation	[X] Transportation/Traffic
[X] Utilities & Service Systems	[X] Mandatory Findings of Significance	[X] Water Quality
[X] Greenhouse Gas Emissions		

Determination:

On the basis of this initial evaluation:

☐ I find that the Proposed Program COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the Proposed Program could have a significant effect on the environment, there will not be a significant effect in this case because revisions to the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the Proposed Program MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

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

☐ I find that although the Proposed Program could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Project, nothing further is required.

Signature _____ Date 1/14/13

Tiffany Hernandez
Environmental Planner

Santa Clara Valley Water District

1. AESTHETICS

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	X		
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a designated scenic highway?			X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	X		
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	X		

a, c. Substantial Adverse Changes to Scenic Vistas and the Existing Visual Character and Quality — *Potentially Significant Issues*

Project components, such as floodwalls and headwalls, would be visible to sensitive viewers at the Project Site and would potentially obstruct views of existing aesthetic resources, such as vegetation, fences, and other natural and landscape features. High-quality aesthetic resources are especially present in views from the northern Project boundary, such as from recreational areas along the San Francisco Bay shoreline and from water-based vantages.

Construction-related activities, such as presence of heavy machinery and staging areas, vegetation removal and grading activities, and dust, could also temporarily impact views of existing aesthetic resources.

These impacts are considered potentially significant. The EIR will further evaluate these topics, based on Project-specific design and construction details to be developed during the EIR process. The analysis will also consider critical viewpoints that could be affected by the Project. Critical viewpoints will be identified during a comprehensive site survey based on visibility of the Project elements, and presence of aesthetic resources and sensitive viewer groups, among other factors. Photographic visual simulations of the final Project design will be developed to help determine the extent of visual impacts, if necessary.

b. Substantial Adverse Changes to Scenic Highways — *No Impact*

There are no roadways within or near the Project Site that are designated in federal, state, or local plans as a scenic highway or route worthy of protection for maintaining and enhancing scenic viewsheds. Highway 280 is eligible for designation as a state scenic highway, but is not officially designated (Caltrans 2012). Therefore, there is no

potential for impact to scenic resources, such as trees, rock outcroppings, and historic buildings along a scenic highway.

d. Substantial Adverse Changes to Light and Glare — *Potentially Significant Issues*

The Project does not include any new permanent sources of nighttime lighting. However, Proposed Project components have the potential to increase glare in the Project Area through the introduction of hardscape surfaces, and potentially through the removal of trees and shrubs that provide shade and visual screening. In addition, Project construction could introduce temporary sources of light and glare, such as from high-intensity lighting during nighttime construction activities. These impacts are considered potentially significant.

The Project EIR will further evaluate this topic, based on Project-specific design and construction details to be developed during the EIR process, and will consider the location of sensitive viewer groups at the Project site.

2. AGRICULTURE RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?			X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?			X
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?			X

a-c. Conflicts or Loss of Agricultural Lands — *No Impact*

The Proposed Project would be confined to the Sunnyvale Channels, contiguous channel easements and immediately adjacent areas. The Sunnyvale Channels are located within an urban setting. No farmland, agricultural land or other zoning for agricultural use is located near the channels. The flood control and water quality improvement activities of the Proposed Project would not result in future conversion of Farmland to non-agricultural use.

No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, or lands under a Williamson Act contract would be converted by, or conflict with, the Proposed Project. For these reasons, there is no potential for impact to agricultural resources.

3. AIR QUALITY

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of applicable air quality plans?	X		
b) Exceed any air quality standard by failing to adhere to assumptions used in the preparation of any Air Quality Plans?	X		
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	X		
d) Expose sensitive receptors to substantial pollutant concentrations?	X		
e) Create objectionable odors affecting a substantial number of people?	X		

a-d. Emissions of Air Pollutants — *Potentially Significant Issues*

Project construction activities would have the potential to generate the following types of emissions: (1) release of particulate matter (PM) dust during construction; and (2) release of criteria pollutants from fuel combustion by construction equipment, materials delivery and fill hauling vehicles, and construction worker vehicle trips. In addition, diesel PM, a toxic air contaminant (TAC), would be emitted from equipment and vehicles using diesel as a fuel source. These impacts are considered potentially significant.

The EIR will further evaluate these topics, based on Project-specific design and construction details to be developed during the EIR process. The analysis will utilize the appropriate thresholds to evaluate the significance of potential impacts.

e. Create Objectionable Odors — *Potentially Significant Issues*

Construction of the Project components could potentially generate objectionable odors through excavation and/or decomposition of sediment from and adjacent to the channels. This impact is considered potentially significant. The EIR will further evaluate this topic, based on Project-specific design and construction details related to excavation and potential use of sediment to be developed during the EIR process.

4. BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special status species in any local, regional, state, or federal plan, policy, or regulation?	X		
b) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal) through direct removal, filling, hydrological interruption, or other means?	X		
c) Have a substantial adverse effect on any other sensitive natural community identified in local, regional, state, or federal plans, policies, or regulations (such as riparian habitat, oak woodlands, etc.)?	X		
d) Interfere substantially with the movement of any native resident or migratory species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X	
e) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?			X

a-b. Effects to Special-Status Species

Sensitive biological resources with potential to occur at the Project Area were identified from a comprehensive review of the following references: the California Natural Diversity Database (CNDDB), California Native Plant Society (CNPS), U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG), as well as information from previous studies performed for the District in portions of the Project Area.

According to the literature review, the Project Area supports potentially regulated and sensitive habitats, as well as habitats that could support a variety of special-status plant and wildlife species. The Proposed Project has the potential to impact some special-status species and would have a less than significant impact to other special-status species. The discussion below is organized by the Project's level of potential effect to special-status species.

Special-Status Species for which Impacts Would Be Less than Significant

Potential impacts from the Proposed Project to the following species are considered less than significant. As such, these species will not be evaluated further in the EIR.

Northern Harrier and American Peregrine Falcon

Neither the Northern Harrier (*Circus cyaneus*), a California species of special concern, nor the American Peregrine Falcon (*Falco peregrinus anatum*), a state fully protected species, is expected to nest within the Project Area due to the absence of suitable habitat within the Project work area. Thus, the Project would not directly impact any breeding habitat for, or nests of, these species. However, both species are known or expected to breed in the vicinity, and breeding individuals of both species may forage within the Project boundary along the lower Sunnyvale Channels. Thus, the Proposed Project would have some potential to impact foraging habitats and/or individuals of these species. Project activities may result in a temporary loss of foraging habitat during construction activities and the alteration of foraging patterns (e.g., avoidance of work sites because of increased noise and activity levels during Project activities) but would not result in the loss of individuals. Furthermore, the Project Area does not provide important or extensive foraging habitat used regularly or by large numbers of individuals of either of these species, or heavily relied upon by a nesting pair of either species. Thus, impacts on these species and their habitats resulting from the Proposed Project would be very limited. Accordingly, Project activities would not result in substantial reductions in local or regional populations, and would affect a very low proportion of regionally available habitat. Therefore, such an impact is considered less than significant.

Habitat for and Individuals of Certain Non-breeding Special-status Wildlife Species

Several special-status species may forage in the study area in low numbers, particularly as transients or migrants, but they are not expected to breed at the site or to be present in large numbers. These species include the California Brown Pelican (*Pelecanus occidentalis californicus*), California Least Tern (*Sterna antillarum browni*), Redhead (*Aythya americana*), Western Least Bittern (*Ixobrychus exilis hesperis*), Black Skimmer (*Rynchops niger*), Golden Eagle (*Aquila chrysaetos*), Bank Swallow (*Riparia riparia*), Vaux's Swift (*Chaetura vauxi*), Olive-sided Flycatcher (*Contopus cooperi*), Yellow Warbler (*Dendroica petechia*), Tricolored Blackbird (*Agelaius tricolor*), and western red bat (*Lasiurus blossevillii*),

Project construction would not result in injury or mortality of any individuals of these species, which are mobile enough to avoid construction equipment. None of these species is expected to occur on the site in large numbers or use the site regularly, and there would be no substantial loss of foraging or non-breeding habitat for any of these species. As a result, conversion of habitat resulting from the Project would not be expected to have any impact on populations of these species. Thus, the Project would have a less-than-significant impact on these species.

Pacific Harbor Seal

Although the Pacific harbor seal (*Phoca vitulina richardii*) is not on any special-status species list, it is protected by the Marine Mammal Protection Act; therefore, the potential effects of the Project on this species have been evaluated. No pupping sites or major haul-out sites for Pacific harbor seals are present within the Project Area or its vicinity, and the species occurs only as an occasional visitor to Moffett Channel and Guadalupe Slough.

If sedimentation, contaminated runoff, or hazardous material spills resulted from construction activities, temporary degradation of construction sites and areas downstream may result, although such effects likely would be negligible in the context of all the factors affecting this species and its habitats.

Potential impacts on individuals are expected to be temporary, and Project construction-related disturbances would not lead to the separation of pups from nursing mothers or the abandonment of traditional haul-out sites. Thus, this impact would be considered less than significant.

Special-Status Species Potentially Affected by Significant Impacts

The Proposed Project has the potential to impact several special-status species, as further discussed below. Potential impacts to these species will be evaluated in greater detail in the EIR.

Special-status Fish Species

Some potential exists for the federally-threatened Central California Coast steelhead (*Oncorhynchus mykiss*) and green sturgeon (*Acipenser medirostris*), the state-threatened longfin smelt (*Spirinchus thaleichthys*), and Central Valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*, a California species of special concern) to occur in the lower, tidal reaches of the Sunnyvale Channels. Although none of these species are expected to occur in these areas frequently and/or in large numbers, Project activities could result in injury or mortality of individuals as a result of stranding during dewatering activities or crushing by equipment. In addition, temporary increases in turbidity may occur during construction as the streambed and banks are disturbed. Increases in turbidity and sediment input may cause stress on fish because of feeding difficulties or displacement. Minor spills of petrochemicals, hydraulic fluids, and solvents may occur during vehicle and equipment refueling or as a result of leaks, adversely affecting water quality and potentially killing or injuring fish. Therefore, Project activities could result in impacts on special-status fish species and their aquatic habitat as a result of direct mortality or injury of individuals, impacts on water quality, and impairment of health of individuals. Due to the rarity of these species, these impacts are considered potentially significant.

This impact will be further evaluated based on a site visit by a qualified fisheries biologist and an analysis of the potential for special-status fish to occur within the Project boundary. The EIR will further assess the potential for construction activities to impact special-status fish and their habitat based on Project-specific design and construction details to be developed during the EIR process and best management practices (BMPs) that may be incorporated into the Project.

Salt Marsh Harvest Mouse and the Salt Marsh Wandering Shrew

The salt marsh harvest mouse (*Reithrodontomys raviventris*), federally- and state-listed as endangered and a state fully protected species, and the salt marsh wandering shrew (*Sorex vagrans halicoetes*), a California species of special concern, may occur in salt marsh and brackish marsh habitat along the lower reaches of the Sunnyvale Channels. Potentially suitable habitat for the salt marsh harvest mouse and salt marsh wandering shrew is present along the northeastern-most portion of the East Channel and immediately adjacent to the Project Area within Guadalupe Slough and along the interior waterline of Pond A4. Thus, Project activities along the northernmost extent of the Project Area could result in impacts on these species.

In the absence of protective measures, Project activities may result in the injury or mortality of salt marsh harvest mice and salt marsh wandering shrews as a result of crushing by equipment, vehicle traffic, and worker foot traffic. Individuals that vacate the area because of increased levels of noise and disturbance may be exposed to increased competition from conspecifics already occupying the area to which they were displaced and increased levels of predation because of unfamiliarity with the new area or lack of sufficient cover. Removal of vegetation may expose individual mice and shrews to predation. Due to the rarity of these species, such impacts would be considered significant.

The potential for construction activities to impact these species and their habitat will be determined based on Project-specific design and construction details to be developed during the EIR process, and BMPs to be incorporated into the Project.

California Clapper Rail and California Black Rail

Neither the California Clapper Rail (*Rallus longirostris obsoletus*), federally- and state-listed as endangered and a state fully protected species, nor the California Black Rail (*Laterallus jamaicensis coturniculus*), state-listed as threatened and a fully protected species, are expected to breed within the Project area due to the absence of suitable habitat. Therefore, the Project would not directly impact any breeding habitat for or nests of these species. However, California Clapper Rails may breed downstream along Guadalupe Slough and may occasionally wander into tidal channels of the Project Area, and California Black Rails may occur in marshes along the lower, tidal reaches of the Sunnyvale Channels during the non-breeding season. Therefore, the Proposed Project

would have some potential to impact foraging habitats and/or individuals of these species.

Project activities may result in a temporary impact through the loss of foraging habitat during construction activities and the alteration of foraging patterns (e.g., avoidance of work sites because of increased noise and activity levels during Project activities). Human-related disturbance may also increase the Rails' vulnerability to predators. During high tides, Rails hide within any available cover in the transition zone and high marsh. As people approach, the birds may flush and attract predators. The presence of people, such as Project construction personnel, in or near the high marsh plain or upland areas during marsh inundation may even prevent Rails from leaving the lower marsh plain to seek cover, which also leaves them vulnerable to predation (Evens and Page 1983, 1986). In addition, removal of vegetation from the sides of levees adjacent to Rail habitat, and particularly from lower portions of banks and benches, would reduce the amount of vegetative cover that may be used to conceal individuals from predators during high tides, especially during the winter. In the absence of mitigation measures, this could result in injury or mortality of individuals as a result of predation or trampling by construction personnel or equipment. Because populations of these species and suitable habitat are limited locally and regionally, these impacts would be potentially significant.

The potential for construction activities to impact these species and their habitat will be evaluated in the EIR, based on Project-specific design and construction details to be developed during the EIR process and BMPs to be incorporated into the Project.

Western Pond Turtle

A small population of the western pond turtle (*Actinemys marmorata*), a California species of special concern, is known to occur in channels north of Moffett Field not far west of the Project Area, and thus may occur in small numbers in the Sunnyvale Channels within the Project Area. Individual turtles or their eggs might be directly harmed or killed during construction activities as a result of crushing by construction personnel or equipment or as a result of desiccation or burying. In addition, channel and upland areas that provide nesting habitat, dispersal habitat, and refugia for western pond turtles might be temporarily or permanently lost during floodwall construction, earthen channel restoration, and installation of rock slope protection and other channel modification. Activities requiring dewatering also would result in a temporary loss of aquatic habitat. Due to the isolated nature of the small population near Moffett Field, the loss of individuals could reduce the viability of this local population to the extent that it would be extirpated. Because regional populations of western pond turtles are small, this impact would be considered potentially significant.

A qualified biologist will analyze this impact in the EIR by evaluating the potential for construction activities to impact this species and its habitat, based on Project-specific

design and construction details to be developed during the EIR process and BMPs to be incorporated into the Project.

Burrowing Owl

The Burrowing Owl (*Athene cunicularia*), a California species of special concern, has been recorded within the northernmost portion of the Project Area, and ruderal habitats in the Project Area, particularly those on the former landfills near the City of Sunnyvale Recycle Center and WPCP, which provide suitable breeding, roosting, and foraging habitat for one or two pairs. Thus, Proposed Project activities may result in direct and indirect impacts on this species.

The Proposed Project may affect burrowing owl habitat (nesting, foraging, or wintering) and/or individuals. Burrowing owls can adapt to the presence of humans and are known to nest and forage in open grassland areas adjacent to human developments. However, because they nest underground, individual burrowing owls (especially young or adults in burrows) may be killed or injured during construction activities from trampling by construction personnel or equipment. Project activities that occur in close proximity to active burrows may disturb owls to the point of abandoning their burrows, including active nests, eggs, and young. In addition, clearing and grading for floodwall construction, earthen channel restoration, and installation of rock slope protection activities and other channel modification could result in the direct loss of habitat or individuals through the disturbance of grassland areas that support ground squirrel (*Spermophilus beecheyi*) burrows, and construction activities may result in a reduction in the quality of breeding or foraging habitat because of the introduction of non-native vegetation.

Because this species has experienced substantial regional losses in habitat and populations, and the South Bay population is now very small, loss of occupied breeding habitat from the Proposed Project may cause a substantial impact on regional burrowing owl populations. Thus, this impact would be considered potentially significant.

A qualified biologist will analyze this impact in the EIR by evaluating the potential for construction activities to impact burrowing owls and their habitat, based on Project-specific design and construction details to be developed during the EIR process and BMPs to be incorporated into the Project.

Loggerhead Shrike and White-tailed Kite

Ruderal habitats in the Project Area, particularly those on the former landfills near the City of Sunnyvale Recycle Center and WPCP, provide suitable breeding and foraging habitat for the loggerhead shrike (*Lanius ludovicianus*), a California species of special concern, and the white-tailed kite (*Elanus leucurus*), a state fully protected species, and one or two pairs of each species could potentially nest in or near the Project Area. Thus, Proposed Project activities may affect loggerhead shrike and white-tailed kite

breeding and foraging habitat and could possibly impact active nests, including eggs or nestlings.

Eggs or young in nests may be killed or injured during construction activities, resulting from destruction by construction personnel or equipment, or removal of vegetation containing nests. In addition, nesting by both species may be disrupted to the extent that nests would fail because of disturbance that was too frequent or too severe. Furthermore, increased human activity may affect the behavior of birds, causing them to avoid work sites and possibly exposing them to increased competition with other birds in the areas to which they dispersed. In addition, clearing and grading for Project construction activities could result in the direct loss of habitat through the disturbance of grasslands. However, there is a relatively small amount of grassland and ruderal habitat that would potentially be affected by the Project relative to the extent of suitable foraging habitat in the region. Because these species' populations are very low in the Sunnyvale area and regionally fairly limited, potential impacts may be considered significant, particularly if a relatively large number of individuals in the local population were lost.

The potential for construction activities to impact these species will be evaluated in the EIR, based on Project-specific design and construction details to be developed during the EIR process and BMPs to be incorporated into the Project.

Alameda Song Sparrow, Bryant's Savannah Sparrow, and San Francisco Common Yellowthroat

The San Francisco Common Yellowthroat (*Geothlypis trichas sinuosa*), a California species of special concern, is a fairly common breeder in fresh and brackish marshes in the Project region, and is known to breed near the edge of the South Bay, as well as in herbaceous riparian habitat and ruderal floodplain habitat along streams entering the Bay. Within the Project Area, marsh vegetation along the lower, tidal reaches of the Sunnyvale Channels provides suitable breeding and foraging habitat.

Song Sparrows (*Melospiza melodia*) breed along the lengths of tidal sloughs and the creeks that flow into them, and where suitable song sparrow breeding habitat is continuous along such creeks, the species appears to breed continuously from tidal salt marshes, where the breeding subspecies is *pusillula* (a California species of special concern), upstream to freshwater marsh and woody riparian habitats, where the breeding subspecies is *gouldii*. The zone of intergradation along these sloughs between these two subspecies is unknown (Rottenborn 2007). The Alameda Song Sparrow may thus be present, although in low numbers, in the Project Area along the lower, tidal reaches of the Sunnyvale Channels.

Bryant's Savannah Sparrow (*Passerculus sandwichensis alaudinus*), a California species of special concern, breeds in the South San Francisco Bay area, primarily in short pickleweed-dominated portions of diked/muted tidal salt marsh habitat, and (in very limited numbers) in adjacent ruderal habitat. Bryant's Savannah Sparrows may breed in

low numbers in the Project Area, particularly along the lower, tidal reaches of the East Channel, and may forage in open areas throughout the Project Area.

Because individuals of these species may nest in vegetation along the lower Sunnyvale Channels, eggs or young in nests may be killed or injured during construction activities as a result of destruction by construction personnel or equipment, or removal of vegetation containing nests. Construction activities causing a substantial increase in noise, movement of equipment, or human presence near active nests could result in the abandonment of nests, and possibly the loss of eggs or young as a result. In addition, increased human activity may affect the behavior of birds, causing them to avoid work sites and possibly exposing them to increased competition with other birds in the areas to which they dispersed and increased levels of predation caused by unfamiliarity with the new area. Increases in human concentration and activity associated with construction in the vicinity of suitable habitat also may result in an increase in native and non-native predators that would be attracted to trash left in the work site and a reduction in the quality of breeding or foraging habitat caused by the introduction of non-native vegetation. Clearing and grading may result in the temporary or permanent loss of breeding and/or foraging habitat. In addition, increased sedimentation or hazardous material spills from construction activities may result in the temporary or permanent degradation of water quality and, hence, habitat quality in marsh or aquatic habitats downstream from work sites and could impact habitat quality for these species.

Although it is considered unlikely that Project activities would affect a large number of individuals of, or habitat for, these species, the significance of the potential impact cannot be determined without further investigation of the extent and quality of suitable habitat present within the Project Area. Because these species' populations are relatively limited both locally and regionally, a potentially significant impact would occur if a relatively large number of individuals were lost or if breeding habitat were lost.

Thus, the EIR will further evaluate this impact. Based on Project-specific design and construction details to be developed during the EIR process, the potential for Alameda Song Sparrows, Bryant's Savannah Sparrows, and San Francisco Common Yellowthroats to nest within the Project boundary, as well as the potential for construction activities to impact these species, will be analyzed.

<u>San Francisco Dusky-footed Woodrat</u>

The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), a California species of special concern, may be present along easements of the Sunnyvale Channels supporting denser vegetation or scrub, particularly along the upper portions of the Sunnyvale West Channel. If the species is present, construction activities may result in the injury or mortality of dusky-footed woodrats because of equipment use, vehicle traffic, and worker foot traffic, particularly when woodrats are taking refuge in their stick nests. Suitable habitat and nests may be directly lost as a result of Project construction

activities. In addition, indirect impacts could occur as a result of over-crowding (as individuals lost habitat and moved to areas that were already occupied) and increased risk of predation.

As a result of the species' regional abundance and high reproductive capabilities, Project impacts on dusky-footed woodrats would not have a substantial effect on regional populations. Nevertheless, woodrats are very important ecologically in that they provide an important prey source for raptors (particularly owls) and for predatory mammals, and their nests also provide habitat for a wide variety of small mammals, reptiles, and amphibians. Although the urban context of the Project Area makes it unlikely that Project activities would affect a large number of woodrats, the significance of the potential impact cannot be determined without further investigation. If a large number of woodrats and their nests were to be lost, it would be considered a significant impact.

Thus, the EIR will further evaluate this impact based on the results of a focused survey of the Project Area by a qualified biologist for San Francisco dusky-footed woodrat nests. Based on the survey results and Project-specific design and construction details to be developed during the EIR process, the potential for dusky-footed woodrats to occur within the Project boundary, as well as the potential for construction activities to impact this species, will be analyzed.

Pallid Bat

Suitable roosting sites for the pallid bat (*Antrozous pallidus*), a California species of special concern, may be present in the Project Area, and individuals could forage in open habitats within the Project Area. In particular, it is possible that more mature trees along the upper East Channel may be suitable for use as roost sites by this species. If suitable roosting habitat (i.e., cavities within trees) is present, Project activities that result in the removal or modification of occupied trees could result in individual bats being physically injured or killed; subjected to physiological stress resulting from being disturbed during torpor; or facing increased predation because of exposure during daylight. In addition, nursing young may be subjected to disturbance-related abandonment by their mothers. Project-related disturbance in close proximity to a maternity roost of pallid bats potentially could cause females to abandon their young.

If an occupied maternity roost were removed, or if disturbance of a maternity roost causing long-term roost abandonment occurred, the impact would be significant because this species' populations and available habitat are limited locally and regionally, and loss of habitat or individuals may therefore have a substantial impact on local and regional populations of the species.

The EIR will further evaluate this impact by conducting a habitat survey of the Project Area by a qualified biologist. Based on the survey results and Project-specific design and construction details to be developed during the EIR process, the potential for pallid

bats to occur within the Project boundary, as well as the potential for construction activities to impact this species, will be analyzed.

b. Effect on Wetlands — *Potentially Significant Issues*

Activities associated with the Proposed Project would result in the short-term disturbance of jurisdictional wetland and aquatic communities, which provide habitat for fish and wildlife. Project activities could result in the placement of fill, hydrological interruption (e.g., dewatering or diversion), alteration of bed and bank, degradation of water quality (e.g., increased sedimentation and turbidity), and other direct impacts. The activities would primarily result in the short-term loss and disturbance of wetlands and aquatic habitats; however, small permanent losses would occur because of the use of hardscape for bank stabilization activities.

This impact is considered significant because it would result in short-term degradation and permanent losses of ecologically valuable wetlands and aquatic habitats, including jurisdictional wetlands and other waters, and temporary disruption of stream continuity during Project activities within the channels.

The EIR will further evaluate the magnitude of impacts of construction activities on wetlands. This evaluation will be based on Project-specific design and construction details to be developed during the EIR process and BMPs to be incorporated into the Project.

c. Effect on Other Sensitive Natural Communities — *Potentially Significant Issues*

No plant communities designated as rare or threatened by the CDFG are present within the Project Area. However, aquatic, wetland, and riparian habitats protected by federal, state, and/or local regulations are present within the Project Area, and several ordinance-sized trees are present along the channel banks in areas where tree removal may be necessary (e.g., along the upper reaches of the East Channel). Project activities, such as clearing and grading for floodwall construction, earthen channel restoration, and installation of rock slope protection and other channel modifications, could result in the temporary disturbance and permanent loss of these habitats and ordinance-sized trees. This impact is considered potentially significant because it could result in short-term degradation and permanent losses of ecologically sensitive natural communities.

The Project EIR will further evaluate this impact based on the completion of mapping of sensitive natural communities and trees that may require removal, and an analysis of the potential for construction activities to impact sensitive natural communities based on Project-specific design and construction details to be developed during the EIR process.

d. Effect on Wildlife Movement Corridors — *Less than Significant*

For many species, the landscape is a mosaic of suitable and unsuitable habitat types. Environmental corridors, such as stream courses, are segments of suitable habitat that provide connectivity between larger areas of suitable habitat, allowing species to disperse through otherwise unsuitable areas. On a broader level, corridors also function as avenues along which wide-ranging animals can travel, plants can propagate, genetic interchange can occur, populations can move in response to environmental changes and natural disasters, and threatened species can be replenished from other areas.

Within the Project Area, the Sunnyvale Channels may function as wildlife movement pathways that allow animals to move along these channels through the urban matrix (e.g., between the central Sunnyvale area south of Highway 101 and areas closer to the bay). Thus, the effects of the Proposed Project on wildlife movement must examine how the Project may change the degree to which wildlife move along the channels. In addition, it is possible that some animals move perpendicular to the channels; as a result, it is also necessary to assess whether Project features such as floodwalls affect movement across the channels.

Wildlife Movement along the Sunnyvale Channels

The quality of habitat provided in channel easements and wetland habitats along the Sunnyvale Channels is generally relatively low. Habitats within the existing corridors have typically been subjected to moderate to high levels of disturbance as a result of the hardening of streambanks, installation of culverts, and other factors associated with the urban surroundings. As a result, many areas have little vegetation, and where vegetation is present, it is mostly dominated by non-native species.

Upstream/south of their crossings with Caribbean Drive, the Sunnyvale Channels, and associated vegetation, can be described as urban and ruderal in context. The channels are typically narrow, channel easements are generally confined on both sides by dense urban development, and channel and easement vegetation is often sparse or non-existent. Both Sunnyvale Channels are routed through several culverts, for up to several hundred feet in a few places. Thus, in the areas upstream (south) of Caribbean Drive, the Sunnyvale Channels likely do not function as high quality movement corridors for most species, particularly special-status species, due to the patchy nature of high-quality habitat and the small, scarce amount of cover in some areas. Downstream (north) of their crossings with Caribbean Drive, the Sunnyvale Channels are more vegetated, have been subjected to lower levels of disturbance, and are surrounded by more open and less developed ruderal habitats, thus providing generally higher quality wildlife habitat and better conditions for wildlife movement.

Even within heavily urbanized areas, the ruderal habitats associated with the Sunnyvale Channels may represent the most direct, feasible avenue for dispersal of mammals,

reptiles, and amphibians between the urban areas of central Sunnyvale and less heavily urbanized areas near the edge of the bay. However, the species most likely to use these channels for dispersal are common urban dwelling species in the Project Area, such as raccoons and California ground squirrels.

Proposed Project activities that would potentially modify habitat in and around the channels include earthen channel restoration, rock slope protection, other channel modifications, floodwall construction, and bridge/culvert modifications. These activities could have adverse effects on wildlife movement along the channels as a result of impacts on both habitat patch size and connectivity. By creating open areas or patches with unsuitable vegetation types, these activities could impede some wildlife species from moving between patches of habitat along the channels (e.g., species may be less willing to move through areas where vegetation is sparse or absent as it increases their susceptibility to predation). However, proposed activities are not expected to create complete barriers to movement along the channels, as animals will still be able to move along the Sunnyvale Channels through the urban matrix. Further, the installation of rock slope protection could potentially provide some escape cover for small mammals, reptiles, and amphibians moving along the channels, especially in areas where little vegetation exists and no cover is present. As a result, the common, urban-adapted animals that are most likely to move along these channels will be able to continue such movements following Project implementation.

Wildlife Movement across the Sunnyvale Channels

Upstream from Caribbean Drive, the urban matrix through which the channels flow supports a relatively low diversity of common, urban-adapted mammal and reptile species; other than Sierra chorus frogs, it is likely that no native amphibians occur within these heavily urbanized areas. In order to survive and move within such heavily urbanized land uses, such species must be able to tolerate and disperse through and around a variety of anthropogenic obstacles, such as buildings, roads, and fences. When dispersing between urban areas on either side of the Sunnyvale Channels, such animals currently cross the channels via existing crossings such as bridges and culverted areas, or through the water. These animals will be able to navigate through Project components, such as benches (constructed for earthen channel restoration) and rock slope protection, as easily as they are currently able to move within and across the ruderal areas along these channels.

Floodwalls will pose greater impediments to movement by these animals. Although more agile species such as western fence lizards, raccoons, and California ground squirrels may be able to climb over floodwalls and floodwall ramps, species such as striped skunks and gopher snakes may not be able to cross over the floodwalls. Such species would still be able to cross over the channels at bridge/culvert and possibly floodwall ramp locations. Although their ability to cross the channels would be reduced somewhat owing to the distance between bridge/culvert and floodwall ramp locations, these urban-

adapted species are expected to be able to cross the channels frequently enough that the Project would not significantly impact wildlife movement within the urban matrix.

Downstream/north of their crossings with Caribbean Drive the Sunnyvale Channels are more vegetated, have been subjected to lower levels of disturbance, and are surrounded by more open and less developed areas, thus providing generally higher quality wildlife habitat. Within this area, mammals and reptiles moving along the edge of the bay and its associated managed ponds and wetlands cross the Sunnyvale Channels (either through the water or via existing bridges and culverted locations), and they may use vegetation along the channels for cover or breeding/foraging habitat. Along the Sunnyvale West Channel, new floodwalls downstream from Caribbean Drive will be limited to a short segment of channel adjacent to the main WPCP area. Animals moving east-west along the edge of the bay will still be able to use existing road crossings at Carl Road and Caribbean Drive, or they can cross the West Channel between these Carl Road and Caribbean Drive, as no floodwalls will be constructed in the middle section of this reach. In addition, animals could possible use floodwall ramps. Therefore, the Proposed Project poses little impediment to wildlife movement in an east-west direction across the West Channel.

Along the East Channel, new floodwalls downstream from Caribbean Drive will be more extensive. However, mammals or reptiles attempting to move in an east-west direction across this channel will still be able to use the Caribbean Drive bridge and the footbridge northwest of the City of Sunnyvale's Twin Creeks Sports Complex, which provide the only two existing above-water crossings of this reach. As a result, the only impediment to movement posed by the floodwalls would be to wildlife attempting to cross across the channel on land; while reptiles may cross through the channel, mammals are expected to do so infrequently. Along the East Channel next to the salt marsh harvest mouse mitigation site, the existing maintenance road levee would be raised. By raising the levee at this location, instead of installing a floodwall, the salt marsh harvest mouse and other wildlife could move up and over the levee and continue moving across the East Channel.

Conclusion

In conclusion, while Project activities are expected to impact wildlife movement both along and across the channel, for the reasons stated above, the Project is not expected to interfere substantially from the existing baseline condition for the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. Therefore, this impact is considered less than significant.

e. Conflict with Approved Conservation Plans — *Less than Significant*

The District is an applicant on two Habitat Conservation Plans (HCPs): the Santa Clara Valley Habitat Plan (an HCP/natural community conservation plan [NCCP]) and the Three Creeks HCP.

Santa Clara Valley Habitat Plan. The Santa Clara Valley Habitat Plan is being pursued by the District along with five other local partners (the County of Santa Clara, the Santa Clara Valley Transportation Authority, and the cities of San Jose, Gilroy, and Morgan Hill) and two resource agencies (the CDFG and USFWS). The Proposed Project activities are not considered covered activities under the Santa Clara Valley HCP/NCCP because the Project Area is not included in the HCP/NCCP area. Therefore, the Sunnyvale Channels Project is not subject to conditions of the HCP/NCCP.

Three Creeks Habitat Conservation Plan (HCP). This HCP, still under development by the District, provides multiple conservation approaches to address potential impacts caused by District water supply operations, seismic retrofit projects, and dam maintenance activities. Proposed Sunnyvale Channels Project activities are not considered covered activities under this HCP, and thus the Project is not subject to conditions of this HCP.

No other HCPs have been approved or are in preparation in the Project Area, and aside from the Santa Clara Valley Habitat Plan, no NCCPs in Santa Clara County have been approved or are in preparation (CDFG 2012).

Therefore, the Proposed Project would not conflict with any adopted HCPs or NCCPs, or with any other approved local, regional, or state habitat conservation plans, and thus the impact associated with conflicts between the Project and any adopted HCP or NCCP would be less than significant.

5. CULTURAL RESOURCES

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical or archaeological resource as defined in '15064.5?	X		
b) Directly or indirectly destroy a unique paleontological resource or site?	X		

a-b. Substantial Adverse Changes to Cultural or Paleontological Resources — *Potentially Significant Issues*

The location or potential presence of cultural resources in the Project work area is not currently known. Cultural resources in the Project Area could include archaeological and architectural resources that would be eligible for listing in the California Register of Historical Resources (CRHR), and significant paleontological resources. Potential impacts to cultural and paleontological resources would occur if these resources are present and would be physically disturbed by proposed project activities. Impacts on

archaeological or architectural resources which cause de-listing from the CRHR, or render the resources ineligible for listing in the CRHR, would also be considered significant.

The EIR will further evaluate these topics based on project-specific design and construction details to be developed during the EIR process.

6. GEOLOGY AND SOILS

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death related to: seismic motion; liquefaction; landslides; unstable geologic or soil units?	X		
b) Result in substantial soil erosion or the loss of topsoil?	X		
c) Directly or indirectly destroy a unique geologic feature?			X

a. Exposure of People or Structures to Adverse Effects Associated with Seismic Activity, Liquefaction, Landslides, or Location on Unstable Geologic or Soil Units — *Potentially Significant Issues*

The Project Site could be subject to ground shaking from earthquakes on nearby faults. The District has identified several locations along the designated Project work area where up to 2.5 inches of liquefaction-induced ground settlement may occur following a major earthquake (SCVWD 2008a and SCVWD 2008b). Further, the stability of the existing channel slopes on certain reaches was found to perform below design standards when subjected to steady seepage, sudden drawdown, or earthquakes.

Proposed erosion repair activities (i.e., earthen channel restoration, rock slope protection, and other channel modifications) would improve channel slope stability. However, new structures developed by the project – specifically, floodwalls and modifications to existing bridges/culverts – would be exposed to liquefaction and stability risks. Potential impacts would occur if these structures were to fail as a result of liquefaction or other geologic instability. This impact is considered potentially significant.

Using on Project-specific design details to be developed during the EIR process, the EIR will evaluate the ability of proposed structures to withstand seismic activity, considering the unstable soil units in the underlying geology.

b. Result in Substantial Soil Erosion or Loss of Topsoil — *Potentially Significant Issues*

Currently, numerous localized slope failures and erosion sites exist along the banks of the Sunnyvale Channels. Existing erosion is caused by historic invert erosion, localized scour, slumping failures, toe erosion, and undermining of hardscape features. Proposed erosion repair activities (i.e., earthen channel restoration, rock slope protection, and other channel modifications) would improve channel slope stability, thereby reducing the quantity of sediment eroding into the Sunnyvale Channels. Overall, by reducing existing erosion and preventing future erosion from channel banks, the Proposed Project would have the long-term beneficial impact of reducing sediment transport.

New areas of surface soils would be exposed and loosened from ground disturbing activities associated with construction of Project components. A potentially significant impact would occur if substantial amounts of soil is exposed or loosened during Project construction. The EIR will further consider this issue based on Project-specific construction details to be further developed during the EIR process. This analysis will also consider BMPs typically implemented by the District to prevent soil erosion and loss of topsoil during construction activities, if necessary.

c. Destruction of Unique Geologic Features — *No Impact*

The Proposed Project is located in an urbanized area underlain by existing geological conditions, consisting of clays, silts, sand, and gravel. The underlying geologic features that would be temporarily affected by ground-disturbing activities from the Proposed Project are common to the surrounding areas. No unique geologic features have been identified in the Project Area. Therefore, no impact to unique geologic features would result.

7. GREENHOUSE GAS EMISSIONS

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	X		
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purposed of reducing the emissions of greenhouse gases?	X		

a-b. Greenhouse Gas Emissions — *Potentially Significant Issues*

Project construction would cause emissions of greenhouse gases (GHGs) from fuel combustion by construction equipment, materials delivery and fill hauling vehicles, and construction worker vehicle trips. These impacts are considered potentially significant. The EIR will evaluate the emissions of GHGs associated with construction activities based on project-specific design and construction details to be developed during the EIR process.

8. HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, storage or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	X		
b) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school?	X		
c) Create a significant hazard to the public or the environment from existing hazardous material contamination on site or nearby?	X		
d) For a project located within two miles of an airport or in the vicinity of a private airstrip, would the project result in a substantial safety hazard for people residing or working in the project area or to aircraft utilizing the airport?			X
e) Impair implementation of an adopted emergency response plan?			X
f) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?		X	

a. Transportation, Use and/or Disposal of Hazardous Materials — *Potentially Significant Issues*

The Project would not result in new permanent use of any hazardous materials. During Project construction, hazardous materials such as fuels or other hazardous construction materials may be temporarily used to power construction equipment or perform construction activities. Potential significant impacts could occur if these hazardous materials are released into the environment from improper transport, use or disposal. The EIR will further evaluate this topic, based on Project-specific construction details to

be developed during the EIR process. This analysis will also consider BMPs typically implemented by the District for the proper handling and disposal of hazardous materials during construction.

b. Generation of Hazardous Emissions or Use of Hazardous Materials with 0.25 Miles of Schools — *Potentially Significant Issues*

Seven schools are located within approximately a quarter mile of the Project Site. Project construction activities could potentially expose existing contamination, as described in question (c) of this section, or potentially released hazardous materials during construction through the transport, use or disposal of these materials, as described in question (a) of this section. This impact is considered potentially significant.

The EIR will further evaluate this topic, based on Project-specific design and construction details to be developed during the EIR process. The analysis will begin with the analysis for questions (a) and (c) in this section, considering the close proximity of schools to the Project Site. Additional BMPs or mitigation measures necessary to protect schools will be identified, if necessary.

c. Exposure of Existing Hazardous Materials Contamination at the Project Site — *Potentially Significant Issues*

An environmental site assessment for the Project revealed a variety of known (historic and current) hazardous materials contamination sites in the City of Sunnyvale and surrounding areas, including residual traces of chlorinated pesticides in the channel levees and surrounding areas (TRC Solutions 2007). Three open, active leaking underground fuel tanks (LUFTs) are also known to be located within 1,000 feet of the Project Site (SWRCB 2012)

No existing hazardous materials contamination has been identified within the Project work area. However, due to the presence of existing hazardous materials sites in the areas surrounding the Project Site, it is considered possible that Project construction activities, such as excavation, could expose or disturb existing hazardous materials contamination sites previously unknown within the Project work area. Furthermore, as the District intends to reuse excavated soil and sediment for the Project, additional health and safety effects could occur if this soil or sediment is hazardous.

Studies of water and sediment in the Cargill Channel (west of the West Channel), drainage ditches associated with the Cargill Channel, and Moffett Channel have detected contaminants including pesticides, polychlorinated biphenyls (PCBs), metals, and polycyclic aromatic hydrocarbons (PAHs) (TRC Solutions 2007). Because these channels are near to the Sunnyvale Channels and similarly used for stormwater drainage, similar contaminants may also be present in levee soil and sediment within the

Sunnyvale Channels. As such, Project construction activities, such as excavation, could expose or disturb existing contaminated soils and sediment. This impact is considered potentially significant.

The EIR will further evaluate this topic, based on Project-specific construction details to be developed during the EIR process.

d. Location in the Vicinity of A Public or Private Airstrip — *No Impact*

The nearest airport to the Project work area is the Moffett Field Naval Air Station, located approximately 2,000 feet from the West Channel. The site is moderately used for air flights by the California National Guard, NASA, private organizations and the Santa Clara County Sheriff's Department. Although the Project Site is located within two miles of the Moffett Field Naval Air Station, construction activities would be confined to the Project work area (25 feet from the banks of the channels) and would not involve the use of any equipment that would affect aircraft utilizing the airport. As such, the Proposed Project would not result in a substantial safety hazard to people residing in or working in the vicinity of the airport. Therefore, there would be no impact.

e. Interfere with an Adopted Emergency Response Plan — *No Impact*

The City of Sunnyvale, through its Office of Emergency Services (OES), provides services to the community and departments to prepare for effective response to all types of disasters. At this time there is no official adopted emergency response plan, however the OES does operate the AlertSCC, an emergency notification system to communicate warnings in the event of public safety emergencies. In addition, two volunteer programs, Sunnyvale Neighborhoods Actively Prepare and the Sunnyvale Amateur Radio Emergency Service, are both in place to encourage self-sufficiency and collaboration between residents in the event of a disaster (City of Sunnyvale 2012). None of the elements proposed by the Project would have an effect on these programs or services. Therefore, there would be no impact on adopted emergency response plans.

Construction-related roadway closures or detours that could affect the provision of emergency services in the vicinity of the work site are discussed in Section 17 "Transportation and Traffic."

f. Exposure of People or Structures to Risk of Wildland Fires — *Less than Significant*

The primary fire season in the Project Area extends from late summer through fall when air temperatures are high and conditions are driest. Fire hazards in Santa Clara Valley are influenced by topography and wind patterns. However, the Project Area is not located in a fire hazard area or within the wildland-urban interface (County of Santa

Clara 2012). While a slight possibility exists that construction equipment could cause a fire, the risk of exposure of people or structures to fire danger would be very small, and emergency response would be available to respond to any fires. Therefore, impacts are considered less than significant.

9. HYDROLOGY AND GEOMORPHOLOGY

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (for example, the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?		X	
b) Substantially deplete surface water supplies?			X
c) Alter existing drainage courses or patterns of the site or area, including changes to the timing or amount of runoff or alteration of the course of a stream or river, in a manner which would result in substantial erosion, siltation, or stream instability?	X		
d) Contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems?		X	
e) Place structures within a 100-year flood-hazard area which would impede or redirect flood flows?			X
f) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?			X
g) Expose people or structures to a significant risk of inundation by seiche, tsunami, or mudflow?		X	

a. Interfere Substantially with Groundwater Recharge — *Less than Significant*

The Proposed Project would not involve the direct use of groundwater. Instream construction activities may involve temporary dewatering of stream reaches. Channel dewatering reduces the channel's ability to recharge groundwater in the specific reach under construction. However, based on summer flows in the Sunnyvale Channels when construction will occur, it is believed that this would be a very small amount of flow diverted for the channel dewatering process. Additionally, the diverted streamflow will be discharged to the channel immediately downstream of the construction zone. In the lower tidal reaches of the Project Area, construction activities may similarly require

dewatering. In these locations along the bay fringe where tidal flows occur, the potential impact on groundwater recharge is not significant.

While groundwater recharge is not a primary use or purpose of the Sunnyvale Channels, the earthen portions of the channels bed and banks may allow for groundwater recharge in the non tidal portions of the channels. Most recharge would occur through the channel bed if it is comprised of porous materials (like sand and gravel) that promote infiltration. Where channel bed or bank conditions are not porous or permeable, such as finer silt or clay earthen materials, then the likelihood for infiltration is greatly reduced. Some recharge will occur during higher flows through the stream banks. Though, the streambanks may also act as a source for some inflow to the channel from soil moisture and shallow subsurface flow from the shallow soil zones beneath the streambanks. Where the Proposed Project includes bank hardening techniques such as short spans of concrete, then infiltration of channel flows to the groundwater will be restricted in those specific locations. However, due to the limited extent of channel hardening and because the channel bed where the bulk of groundwater recharge occurs will not be affected, restriction of groundwater recharge with be minimal. Additionally, the District will be identifying locations to remove existing bank hardening to offset the addition of any additional hardening. As a result potential impacts to groundwater recharge would be less than significant.

b. Deplete Surface Water Supplies — *No Impact*

The Sunnyvale Channels are used for stormwater conveyance and flood control purposes, and are not used to generate surface water supplies. The Proposed Project would use small amounts of water for dust control, mixing of concrete, vehicle cleaning, etc., but not to a level which would cause a substantial depletion of surface water supplies. No impact would occur.

c. Alter Existing Drainage Courses in a Manner That Would Result in Substantial Erosion, Siltation or Stream Instability — *Potentially Significant Issues*

The Proposed Project does not affect or alter the drainage network, increase impermeable surfaces, or increase runoff in the watershed. The Proposed Project does involve stabilizing many eroding streambank sites that are currently yielding sediment to the channels, primarily along the East Channel. Bank stabilization activities may result in local hardening of streambanks, including use of riprap, sack concrete, and concrete. Where possible, the Project will use earthen streambanks, graded banks, and other non-hardened approaches to repair eroding banks and provide a stable stream channel.

The Project is expected to reduce bank erosion. However, the placement of some localized hardened streambank materials may result in accelerated flows (compared to

current conditions), which may have the potential to increase scouring and erosion downstream. The District understands this potential result and will design features such that substantial downstream erosion or stream instability will not result. Because of this, and in combination with the large number of existing bank failures that will be repaired and stabilized to prevent future erosion, the Project is expected to result in a net reduction in channel erosion. By reducing existing erosion and preventing future erosion from channel banks, the Proposed Project is expected to have long-term beneficial impacts. However, because the potential for erosion due to bank hardening could occur, this topic will be examined as a potential impact in the EIR.

In addition, Project components such as new floodwalls and road crossings would keep channel flows which previously may have overtopped the channels, within the channels. Project features will be designed such that this increased channel discharge within floodwalls will not result in substantial erosion, siltation or stream instability. While these potential effects are considered unlikely, they will be examined further in the EIR.

The Proposed Project also involves some locations where the existing channel cross section will be enlarged through grading the existing streambanks back to provide an instream bench area (for earthen channel restoration). This will result in a larger channel area that can convey more flow. Changes in the cross sectional channel area can result in increased deposition or erosion depending on the site specific condition. As such, this issue will also be considered in the EIR.

Similarly, a minor amount of locally generated runoff may reach the outboard portion of floodwalls and be impeded or detained behind these floodwall features. It is anticipated that this would only involve a very small amount of local runoff from the areas immediately adjacent to floodwalls that do not drain to local storm drains. The great majority of stormwater in the Project Area is collected by local storm drains and discharged to the channels. Such regular storm drain flows would not be affected at all by the floodwalls. The floodwalls would be designed to minimize local detention and direct any runoff to enter the channel or another storm drainage facility without causing undue erosion, siltation, or stream instability. While this impact is considered unlikely, it will be examined further in the EIR.

d. Contribute Runoff Water That Would Exceed the Capacity of Existing or Planned Stormwater Drainage Systems — *Less than Significant*

The Proposed Project would not result in the increase or generation of any new runoff sources. The stormwater conveyance capacity of the Sunnyvale Channels would be increased by the Project through development of increased flood conveyance and storage within the channels and contiguous easements. The Proposed Project would not change the existing runoff sources or storm drainage pathways draining to the Sunnyvale Channels. Thus, the general volume of stormwater delivered to the

Sunnyvale Channels during a particular storm event would remain unchanged by the Proposed Project.

Overall, the project would not create any runoff water, would be designed to adequately manage existing runoff, and would improve the capacity of existing stormwater drainage systems. Impacts are considered less than significant.

e,f. Creation of 100-Year Flood-Hazard Protection — *No Impact (Beneficial)*

The watersheds of the Sunnyvale Channels have a history of recurring flooding. Overtopping of the Sunnyvale Channels is known to occur from a combination of: 1) lack of capacity to convey and store flood flows during heavy storm events, 2) tidal backwatering and storm surge, and 3) backwater flows from San Tomas Aquino Creek during flood events. FEMA mapping of the 100-year floodplain delineates four principal areas within the Sunnyvale Channels that currently would be flooded during a 100-year storm event.

In addition, several locations along the Sunnyvale Channels have been identified as having deficient freeboard, based on District freeboard standards (SCVWD 2010). Freeboard is the additional height above a projected flood elevation (for instance, on a channel bank), and is typically incorporated into the design of flood control facilities to provide a margin of safety for unknown risks, such as uncertainties in flood hazard modeling and backwater conditions.

The Proposed Project would address flooding and freeboard deficiencies by constructing a series of flood protection improvements. The flood protection elements would provide 100-year riverine flood protection to 1,618 parcels in the Sunnyvale East Channel watershed and to 47 acres (11 parcels) of industrial and government lands in the West Channel watershed. These Project improvements would reduce potential for flooding in these areas and allow for adequate freeboard and flood conveyance capacity. Therefore, this potential impact is considered beneficial.

g. Expose People or Structures to a Significant Risk of Inundation by Seiche, Tsunami, or Mudflow — *Less than Significant*

The California Emergency Management Agency's (Cal EMA) tsunami inundation map shows a potential risk of inundation by tsunamis caused by local and distant faults within the Project Area (Cal EMA 2009). Areas alongside the shoreline and up to approximately 1 mile upstream of the outflow of Guadalupe Slough are at risk from tsunami inundation. The shoreline along the San Francisco Bay in the northern terminus of the Project Area is also at risk from a seiche, or a tidal change in an enclosed or semi-enclosed water body caused by sustained high winds or an earthquake. As the topography adjacent to the Sunnyvale Channels is low gradient, there is little risk of mudflow in the Project Area.

Some new Project components may be located in areas at risk of inundation from seiches or tsunamis. However, the Proposed Project would construct no new housing or structures for human occupancy, nor would it exacerbate existing seiche or tsunami risks. Therefore, no people would be exposed to risks from seiche or tsunamis and this impact is less than significant.

10. LAND USE AND PLANNING

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the policies of the general plan, specific plan, or zoning ordinance) adopted to protect environmental resources?	X		
b) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	X		

a. Potential Conflicts with Land Use Plans, Policies — *Potentially Significant Issues*

The Proposed Project would provide a series of infrastructure upgrades to improve flood protection and water quality in the Project Area. As such, the Project would generally support general plan policies which call for environmental sustainability and protection, as well as the maintenance of public health and safety (i.e. Sunnyvale General Plan Policy SN-1.2 Take Measures to Protect Life and Property from the Effects of a 1 Percent Flood).

However, to implement the Project, a number of easement acquisitions (both permanent and temporary) would be required to ensure the District has adequate right-of-way along the Sunnyvale Channels. The District will obtain encroachment permits for any work within Sunnyvale's public right of way. The Project's effect on land use plans and/or policies will depend on the location and nature of the proposed easement acquisitions. Until this issue is investigated further, this impact is considered potentially significant. The EIR will further evaluate this topic, based on Project-specific easement acquisition needs to be developed during the EIR process.

b. Potential Conflicts with Policies or Ordinances Protecting Biological Resources — *Potentially Significant Issues*

The Sunnyvale General Plan includes policies specifically directed at protecting biological resources, such as General Plan Policy LT. 8.4 (Sunnyvale Municipal Code

Section 13.16.060) which requires that trees removed from City of Sunnyvale public right of way are replaced at an equal or greater ratio.

Trees would be removed during Project construction. The Project could possibly remove trees from Sunnyvale's public right of way, and in this instance the Project has the potential to conflict with adopted protective measures if tree removal from these areas is not implemented in accordance with Sunnyvale's tree removal policy. This impact is considered potentially significant. The EIR will further evaluate this topic, based on Project-specific details of tree removal to be developed during the EIR process.

11. MINERAL RESOURCES

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Result in the loss of availability of mineral resources designated priority by the State Department of Conservation or mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?			X

a. Loss of Mineral Resources — *No Impact*

The Sunnyvale Channels are located primarily in developed and urban areas. Mineral, oil, or gas resource-producing areas are not known to be located in the Project Area. While a number of recently active quarries exist in Santa Clara County, they are all located in undeveloped mountainous areas of the county and not near the Project Area (OMR 2012). Santa Clara County has not designated any mineral resource recovery sites within the Project work area (Santa Clara County 1994). The Project also would not affect any salt production ponds located nearby in South San Francisco Bay. Furthermore, the Proposed Project would not involve any activities that could directly affect mineral production sites or prevent future availability of mineral resources. Therefore, no impact would result.

12. NOISE AND VIBRATIONS

Would the project result in:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	X		
b) Exposure of persons to or generation of excessive vibration?	X		
c) A substantial temporary or permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	X		

a-c. Construction Noise and Vibrations — *Potentially Significant Issues*

Operation of heavy construction equipment in the Project work area would temporarily increase noise and possibly groundborne vibration levels. Such noise and/or vibration needs to be evaluated to determine the extent to which it would be audible at properties adjacent to the Project work area. In addition, heavy trucks accessing the work sites through local streets would temporarily increase traffic noise levels, and would also be potentially audible at properties along these streets.

Although the construction generated noise and/or vibrations would be short-term and temporary, increased levels could potentially exceed the construction noise limits established in the Sunnyvale noise ordinance. This impact is considered potentially significant. The EIR will further evaluate this topic, based on project-specific construction details to be developed during the EIR process.

13. POPULATION AND HOUSING

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Induce substantial growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure) that was not anticipated in approved local or regional planning documents?			X
b) Displace substantial numbers of existing housing or residents, necessitating the construction of replacement housing elsewhere?			X

a. Substantial Induction of Growth in the City of Sunnyvale — *No Impact*

The Proposed Project would not involve the construction of new housing, nor would it generate any long-term employment opportunities that could cause substantial population growth.

The Project will provide 100-year flood protection to an estimated 1,618 parcels adjacent to the Sunnyvale East Channel and 11 parcels adjacent to the Sunnyvale West Channel. As a result of the project, flood insurance rates are expected to decrease for these parcels. Decreased flood insurance rates could make development of currently undeveloped parcels more desirable. Development of currently undeveloped parcels would result in growth inducement.

Recreation areas along the northern portions of both Sunnyvale Channels are expected to be the primary undeveloped areas that would potentially receive flood protection from the Project. These recreational areas are currently highly used. Any other undeveloped areas receiving flood protection are expected to be associated with existing residential, commercial and industrial uses. The City of Sunnyvale General Plan guides development in areas where flood protection would be improved (no protection would be provided to parcels within the City of Cupertino). Due to the highly developed nature of existing land uses and high usage of recreational facilities, it is not expected that flood protection would change the demand for existing land uses. It is expected increased flood protection would further support existing uses. As a result, it is not reasonably foreseeable that the City would change existing land use designations due to increased flood protection provided by the Project.

The flood management benefits of the Proposed Project are not expected to make land parcels that are currently undeveloped more easily developable due to the decrease in flood insurance rates. That is not the focus or objective of the Proposed Project. Rather, the Project provides increased flood protection to existing urban development and infrastructure. No impact would occur.

b. Displacement of Existing Housing Units — *No Impact*

Construction of flood protection and water quality improvements would be limited to the designated Project work area, a short distance (within 25 feet) from the top of the channel banks. While construction would occur nearby and up to several existing homes, no homes would be altered, physically disturbed or removed. To implement the Project, a number of easement acquisitions (both permanent and temporary) would be required to ensure the District has adequate rights-of-way along the Sunnyvale Channels. However, these easements would not involve disruption or displacement of any housing units. Therefore, no impact would result.

14. PUBLIC SERVICES

Would the project result in the need for additional, or physically altered, public services or facilities, the provision of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any public service:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Fire protection?			X
b) Police protection?			X
c) Schools?			X
d) Parks?			X
e) Other public facilities?			X

a-e. Need for Additional or Physically Altered Public Services or Facilities — *No Impact*

As noted in question (a) of Section 13, "Population and Housing" section of this checklist, the Proposed Project would not result in direct or indirect population growth. As such, the Project would have no impact on demand related to police, fire, parks, schools, or other public services as a result of population growth. Therefore, the Project would not require additional or altered facilities to maintain service ratios or performance objectives due to such demands.

The Proposed Project may result in permanent and/or temporary alterations in portions of adjacent land uses associated with required easement acquisitions, which could in theory affect existing public facilities such as parks. This specific project effect is evaluated in Section 10, "Land Use and Planning" and Section 15, "Recreation," and no impact conclusion with respect to those effects is made here.

Similarly, construction-related roadway closures or detours could affect the provision of emergency services in the vicinity of the Project Site. These impacts are evaluated in Section 17, "Transportation and Traffic," and no impact conclusion with respect to those effects is made here.

Once completed, the Proposed Project would have an overall benefit to any service providers in the immediate area by reducing the risk of flood threats and damage to properties. There would be no impact.

15. RECREATION

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Result in the loss or deterioration of available public recreational opportunities?	X		

a. Loss or Deterioration of Available Public Recreational Opportunities — *Potentially Significant*

Channel maintenance roads in the Project Area are not officially designated for public use, with the exception of the San Francisco Bay trail located along the perimeter levees surrounding Pond A4. However, access to the maintenance roads is typically available, especially through parking lots adjacent to the roads, and it is not uncommon for the maintenance roads to be used for recreational activities such as jogging, walking, and bicycling. Public recreational facilities of the City of Sunnyvale in the vicinity of the Project site are generally limited to areas adjacent to the Sunnyvale East Channel, including the Baylands, Fair Oaks, Braly, and Ortega parks.

The Proposed Project would enhance existing recreational use of the District's channel maintenance roads in several areas, by paving existing rock roads with asphalt. Asphalt will provide a harder and more durable surface than rock, which is ideal for bicycle recreation. In addition, Project floodwalls are designed in such a manner that existing access to channel maintenance roads for recreational use will not be prohibited.

Construction activities could temporarily disturb existing parks and trails. Temporary disturbances to public parks and similar facilities would occur during the construction period and may include secondary nuisance effects (i.e., air quality, noise, traffic, and aesthetics), as well as direct closures or obstructions. While construction is being conducted, portions of existing channel areas or temporary easements on adjacent recreation areas may be needed for access or staging of vehicles and equipment, or may need to be closed for public safety reasons.

As noted above in question (a) in Section 10 "Land Use and Planning", the Project would require several permanent right-of-way easements along adjacent parcels to develop the proposed easements. Some of the proposed easements may include portions of public parks located in the vicinity of the Sunnyvale Channels. Depending on the exact location and extent of the proposed acquisitions, a substantial permanent loss of existing recreational area could occur. This impact would be considered potentially significant.

The EIR will further evaluate this topic, based on Project-specific construction details and easement acquisition needs (temporary and permanent), to be developed during the EIR process.

16. TRANSPORTATION/TRAFFIC

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Exceed, either individually or cumulatively, level of service standards established by local or regional agencies for designated roads or highways; or otherwise cause a substantial increase in traffic in relation to the planned or designated traffic load and capacity of the circulation system?	X		
b) Substantially increase hazards or result in substantial safety risks due to a design feature (e.g., sharp curves, inadequate emergency service access, or dangerous intersections) or incompatible uses (e.g., haul routes through residential neighborhoods or by schools)?	X		
c) Result in inadequate emergency access or interfere with an adopted emergency evacuation plan?	X		
d) Result in incompatible land uses through inadequate parking capacity or parking / staging activities on residential streets?	X		
e) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle lanes, bicycle racks)?	X		

a. Traffic Operation and Circulation — *Potentially Significant Issues*

A temporarily increase in traffic volumes would result from construction-generated truck and worker trips along designated Project Site access routes. Short-term lane closures may also be required to construct proposed bridge/culvert modifications and potentially other proposed improvements. Temporary reductions in the capacity of the roadway segments may occur where lanes are closed during construction of the Proposed Project. Construction-generated traffic and temporary lane closures have the potential to substantially increase traffic levels along affected roadways during peak commute hours, including exceedance of established level of service standards. This has potential to result in a significant impact. The EIR will further evaluate this topic, based on Project-specific design and construction details to be developed during the EIR process. Existing information of local roadway capacity will be supplemented with additional traffic counts of key Project roadways, if necessary to evaluated potential impacts.

b-e. Safety Hazards, Emergency Access, Parking Capacity, and Alternative Transportation — *Potentially Significant Issues*

Short-term lane closures may be required to construct proposed bridge/culvert modifications and potentially other proposed improvements. The Project could also require using parking lanes/roadway shoulders for on-street staging areas. Lane closures and on-street staging areas may present roadway safety hazards, result in inadequate sight distance, inadequate emergency access, reduced parking spaces, and disruption of alternative transportation on the affected roadways. These impacts have the potential to be significant. The EIR will further evaluate these topics, based on project-specific design and construction details to be developed during the EIR process.

17. UTILITIES AND SERVICE SYSTEMS

Would the project result in a need for new, relocated, upgraded, or expanded utilities and service system facilities that could cause significant environmental impacts in order to maintain acceptable service levels or other performance objectives for:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Water?	X		
b) Wastewater/Reclaimed Water?	X		
c) Stormwater?	X		
d) Solid Waste?	X		
e) Streets and roadways?	X		
f) Power systems (e.g. electricity, natural gas)?	X		
g) Other utility systems?	X		
h) Would the project have sufficient water supplies available to serve the project from existing entitlements?		X	

a-c,f-g. Effects on Water, Wastewater, Stormwater, Power Systems and Other Utility System Facilities — *Potentially Significant Issues*

The Project does not include any uses, features, or facilities that would generate additional demands and require new or expanded utilities or service systems (refer to discussion of growth inducement in question (a) in Section 13, “Population and Housing”). As such, the Project would have no impact related to new or expanded utilities associated with increased demands.

Buried and aboveground pipes, cables, or other utility delivery systems for utilities including wastewater, stormwater, water, and power transmission, are generally present throughout the Project Area. In particular, PG&E towers, San Francisco Public Utility

Commission's Hetch Hetchy pipeline, City of Sunnyvale stormwater/wastewater and recycled water pipelines, and the City of Sunnyvale's Water Pollution Control Plant are known to be located within or in proximity to the designated Project work area.

Any of these utilities could potentially experience a disruption in service if construction activities accidentally damaged the utilities' distribution or transmission systems. In addition, the Proposed Project could potentially result in the need for new, relocated, upgraded, or otherwise altered utilities and service system facilities to accommodate the Project designs. This impact is considered potentially significant. The EIR will further evaluate this topic, based on Project-specific design and construction details to be developed during the EIR process.

At several locations PG&E towers supporting power lines exist within the channel easements. In some locations the concrete tower footings and abutments are directly along the channel bank, and serve as the channel bank, in place of the earthen sides slopes that occur at most locations. Actively eroding stream banks are commonly found upstream and/or downstream of these tower abutments. As such, a hazard would be presented to these towers if existing erosion continued to undermine them. However, the Project would stabilize existing erosion sites and reduce current and potential future hazards presented to PG&E towers from channel erosion.

d. Effects on Solid Waste Facilities — *Potentially Significant Issues*

The Proposed Project would not generate any on-going or long-term solid waste requiring disposal. However, during the construction period, the Proposed Project may generate spoils or other construction waste requiring disposal. Excavated materials would first be considered for reuse by the District to the extent feasible. However, not all excavated materials may be suitable for reuse. For instance, if soil or sediment is identified as contaminated, disposal at a hazardous materials facility would be necessary. Evaluation of the use and disposal of contaminated soil or sediment is evaluated in question (c) in Section 8, "Hazards and Hazardous Materials."

Non-hazardous materials that would not be reused by the District would require disposal. An impact would result if waste generated by the Project were to exceed available capacity of local waste disposal facilities. This is considered a potentially significant impact. The EIR will further evaluate these topics, based on project-specific details of construction waste generation, to be developed during the EIR process.

e. Effects on Roadways — *Less than Significant*

Impact to capacity and circulation of the local roadways system from temporary lane closures is evaluated in question (a) in Section 16, "Transportation/Traffic," and no impact conclusion is made with respect to those effects here.

The Project proposes to reconstruct an existing dual-span bridge at the Caribbean Drive crossing of the East Channel and reconstruct the box culvert and roadway segment of Carl Road crossing of the West Channel. Reconstruction would be limited to the portion of these roadways crossing the Sunnyvale Channels. Bridge and culvert would be reconstructed following the existing roadway configurations and meet relevant City and/or County standards. Over the long term, the Project would reduce flood hazards providing protection to roadways nearby the Project Site.

Construction activities are not expected to substantially damage City of Sunnyvale roadways. Construction activities would occur at several locations along the Sunnyvale Channels. Thus, the duration of activities and associated use of City of Sunnyvale roadways would be temporary and limited at any particular location. While City of Sunnyvale Roadways would be utilized for transportation of equipment and supplies and to and from the Project work area, equipment would primarily be used on District owned and rocked channel easements/maintenance roads.

Overall, there would be no additional need for new, updated or expanded roadways during construction. This impact is considered less than significant.

g. Effects on Water Supply – *Less than Significant*

The Proposed Project would use small amounts of water during construction for dust control, mixing of concrete, vehicle cleaning, etc., but not to a level which would cause substantial water demand that would exceed existing entitlements. This impact is considered less than significant.

18. WATER QUALITY

Would the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	X		
b) Create or contribute substantial additional source of polluted runoff?			X

a. Water Quality Degradation Resulting in Violation of Water Quality Standards or Waste Discharge Requirements — *Potentially Significant Issues*

The Proposed Project would have long-term beneficial impacts on sediment by addressing existing locations of bank failure and associated erosion, and by preventing future erosion from channel banks.

Ground-disturbing activities during construction—including levee and maintenance road raising, floodwall construction, bridge and culvert modifications, sediment removal, rock slope protection, other channel modifications, and earthen channel restoration – have the potential to release sediment into the Sunnyvale Channels. Other contaminants, such as fuels, could also be introduced to surface or groundwater during construction. Finally, excavation and other forms of ground disturbance could result in accidental release of urban and legacy contamination into the Channels. This is considered a potentially significant impact.

These impacts can generally be addressed through implementation of appropriate construction BMPs; however, this issue will be discussed further in the EIR.

b. Create or Contribute Runoff Water That Would Provide Substantial Additional Sources of Polluted Runoff — *No Impact, (Beneficial)*

The Proposed Project does not involve any actions that would increase the volume of stormwater delivered to the channels. Importantly, the Proposed Project, through reducing the flooding potential in adjacent urban areas, will provide a water quality benefit. The Proposed Project will result in less contaminated runoff entering the Sunnyvale Channels and being transported to downstream sensitive habitat areas. . Since the volume and composition of runoff water would be delivered to the Channels would be effectively unchanged, there would be no additional sources of polluted runoff. Therefore, no impact would result.

19. MANDATORY FINDINGS OF SIGNIFICANCE

Does the project:	Potentially Significant Issues	Less Than Significant Impact	No Impact
a) 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		
b) 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 the past projects, the effects of other current projects, and the effects of probable future projects.)	X		
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	X		

These issues will be evaluated in the Project EIR.

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Sunnyvale East and West Channels Flood Protection Project
Public Scoping Comments

Public Scoping Meeting Information

January 24, 2013; 6:30-8:00pm
Fairwood Elementary School, Multi-Purpose Room

Spoken Comments Received during the Scoping Meeting

Comment	
Comment Letter 1. Spoken Public Meeting Comments (1/24/13)	
1-1	The commenter asked: if flood water would be contained in the channels up to the top height of the floodwalls; how would adjacent city and street water not in the channel be impounded or affected by the floodwalls; would the floodwalls increase localized flooding outside of the channels due to impounded water; and how would high water levels in the adjacent Sunnyvale storm sewer system be managed, considering the City doesn't operate any pumps.
1-2	The commenter asked how a future sea level rise scenario of 2 feet was selected by the Santa Clara Valley Water District (District) for the Proposed Project. The District selected a 2-ft sea level rise based on the Army Corps of Engineers standard. The commenter stated that the San Francisco Bay Conservation and Development Commission has projected 40 inches of sea level rise will occur by 2040.
1-3	The commenter is concerned about the local effects of construction related traffic and air quality and asked where traffic will be routed during construction.
1-4	The commenter asks if the District has conducted outreach to local businesses regarding the potential construction related impacts which the Project could have on these businesses.
1-5	The commenter asks if the Army Corps of Engineers has revised its 2-foot sea level rise projection, and if the District has considered there could potentially be more than 2 feet of sea level rise.
1-6	The commenter asks why the Proposed Project was not designed such that the Sunnyvale Channels would be concrete lined, similar to channels in Los Angeles.
1-7	The commenter stated they live on Tasman Drive near the Project Site and this roadway already has a bit of traffic from construction of the new 49ers stadium. The commenter is concerned about this existing traffic combined with traffic from the Proposed Project and additional projects.
1-8	The commenter asked how much trail development the City of Sunnyvale is considering along the Sunnyvale East Channel.
1-9	The commenter asked if there is any increased risk of flooding during Project construction.
1-10	The commenter asked if a list of native plants used to revegetate the Sunnyvale Channels could be obtained.
1-11	The commenter asked where in the Proposed Project would the channel benches be located, where would the channels be widened, where is the extent of tidal activity, and if the Proposed Project would consider tidal changes.

Comment	
1-12	The commenter asked if the Project was going to consider restoring burrowing owl habitat.
1-13	The commenter asked why the Proposed Project took so long to be built – 15 years.
1-14	The commenter asked how long it will take to work with the Federal Emergency Management Agency (FEMA) to revise flooding hazard maps for the Project area.
1-15	The commenter asked what the anticipated useful life of the Proposed Project is.
1-16	The commenter asked what happens if more sea level rise occurs than the Proposed Project is planned to accommodate.
1-17	The commenter asked what the floodwalls will look like and if the floodwalls will reflect sound into surrounding neighborhoods.
1-18	The commenter asked if the Proposed Project considered climate change scenarios including more or less rainfall and snowfall.
1-19	The commenter asks if the District considered designs that would increase infiltration and if infiltration will increase due to the removal of some concrete? The commenter asked if there are opportunities for the surrounding areas in the watershed to reduce their runoff contribution to the Sunnyvale Channels through improving infiltration conditions in those areas.

Written Comments Received during the Scoping Meeting

Comment	
Comment Letter 2. David Riviera Senior	
2-1	The commenter asked how long after the end of the project does the District estimate it will take FEMA to change the flood zones and remove costs to residents.
2-2	The commenter asked what the items were that caused the Project to take 15 years.
Comment Letter 3. Tim Evatt	
3-1	The commenter does not want the state or federal Environmental Protection Agencies to get too involved in the planning of the community. In addition, the commenter states they don't want environmental extremist to take over any part of the Project.
3-2	The commenter states that global warming is a hoax and just a way for out green community to justify certain things that aren't necessitates.
Comment Letter 4. John Cordes	
4-1	The commenter states that fly ash concrete should be used instead of regular concrete because it is a lower greenhouse gas material.
4-2	The commenter states that all concrete removed onsite should be recycled.
4-3	The commenter stated that it seems too optimistic to only consider 2 feet of sea level rise.
Comment Letter 5. Libby Lucas	
5-1	The commenter stated that on the East Channel north of Caribbean Drive there is high value habitat, as there are side channels to the main channel that are well vegetated and always used by wildlife. The commenter asks if this element could be retained by staggering box culverts with low flow channel.

Comment Letter 6. Libby Lucas	
6-1	Sunnyvale West Channel has a reasonably foxy interface with Northern Channel that runs behind Moffett Field and Lockheed which provides critical functional drainage for these major low-lying facilities. SCVWD pumps transfer flows to Sunnyvale West which flows into Guadalupe Slough around Sunnyvale water plant.
6-2	Northern Channel has impressive Western Pond Turtle colony so that heads list for species consideration.
6-3	Sunnyvale Water Quality Control Plant is most likely planning for an upgrade and super levee may affect their holding pond configuration so this facility needs to be coordinated with - in earliest planning stages.
6-4	Really think you have to have some idea of COE levee location and tide gate constraints early on as well.
6-5	Sunnyvale East Channel north of Caribbean abuts Santa Clara County wetlands and sports complex park so not sure how appropriate floodwalls would be here. This extensive open space uplands area was subtly engineered, as you no doubt know, to interface with Calabazas, and San Tomas Aquino Creeks, mitigation wetlands for #237 and Salt Ponds. It is challenge not to compromise this confluence with Guadalupe Slough
6-6	Western Pond Turtles have been seen in lower San Tomas Aquino Creek along with wandering salmon so it is most important to consider all aspects of natural resource protection in your design.
6-7	Wildlife connectivity around south end of Bay is vital to preserve in this region, in wetlands and uplands, both inboard and outboard of COE levee. Not sure that floodwalls won't preclude this inherent beneficial use.
6-8	Is there an in-house design that SCVWD staff have worked out for tributary stream tide gates to coordinate with COE levee? With a two to ten foot anticipation of ocean level rise think this is practical place to start.
6-9	Lastly, not sure in your NOP presentation on January 24 that I heard mention of Round the Bay Trail. This too needs to be addressed early on. Hesitate to mention also that recreation parking is needed for trail head.
6-10	Think my concern about baylands reach of Sunnyvale East is still paramount. Could improved levee design be reduced to leaving levee adjacent to Santa Clara County park wetlands as is, once levee has passed the baseball complex? This uplands marsh open space preserve is an all important buffer of rather unique habitat that interfaces with subtle design at confluence of San Tomas Aquino, Calabazas, Sunnyvale East channels and Guadalupe Slough. Have yet to figure out hydrology that has been implemented here but it is successful!
6-11	As mentioned before, mitigation wetlands extend here along Route #237 and across railroad tracks to east so any alteration of levees on lower reaches of these three streams will result in a cumulative ripple effect.
6-12	Wildlife and vegetation presently found in this county wetlands preserve need delineation in EIR in order to fully assess impacts that alteration of hydrology may incur. Audubon Christmas counts might be of help.
6-13	Then, as previously commented, the Bay Trail crosses both Sunnyvale West and Sunnyvale East Channels and a spur borders this Santa Clara County parklands marsh, if I'm not mistaken. If I find maps will submit.

6-14	Western Pond Turtles need to be monitored for during channel excavation and levee construction as they are often concealed in channel mud. US Navy contractor found over fifty on site when working in adjacent Northern Channel. Also Burrowing Owls were encouraged to locate in Sunnyvale's baylands complex.

DEPARTMENT OF TRANSPORTATION
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Flex your power!
Be energy efficient!

February 1, 2013

Ms. Tiffany Hernandez
Santa Clara Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

SCLVAR043
SCH#2013012041

Dear Ms Hernandez:

Sunnyvale East and West Channel Flood Protection Project / Notice of Preparation

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. The following comments are based on review of the Notice of Preparation provided on January 17, 2013.

Lead Agency
As the lead agency, Santa Clara Water District is responsible for all project mitigation, including any needed improvements to State highways. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures.

This information should also be presented in the Mitigation Monitoring and Reporting Plan of the environmental document. Required roadway improvements should be completed prior to issuance of the Certificate of Occupancy. Since an encroachment permit is required for work in the State Right-of-Way (ROW), and Caltrans will not issue a permit until our concerns are adequately addressed, we strongly recommend that the Santa Clara Water District work with both the applicant and Caltrans to ensure that our concerns are resolved during the environmental process, and in any case prior to submittal of an encroachment permit application. Further comments will be provided during the encroachment permit process; see end of this letter for more information regarding encroachment permits.

Traffic Impact Study
During construction or starting "opening day," this project may generate traffic at volumes sufficient to impact the operations of nearby State highway facilities, and it may be necessary to prepare a Traffic Impact Study (TIS). If it is found that a TIS is not

required, please provide a verifiable explanation for this finding. The following criteria are among those that may be used to determine whether a TIS is warranted:

1. The project will generate over 100 peak hour trips assigned to a State highway facility.

2. The project will generate between 50 and 100 peak hour trips assigned to a State highway facility, and the affected highway facilities are experiencing noticeable delay; approaching unstable traffic flow (level of service (LOS) "C" or "D") conditions.

3. The project will generate between one to 49 peak hour trips assigned to a State highway facility, and the affected highway facilities are experiencing significant delay; unstable or forced traffic flow (LOS "E" or "F") conditions.

We recommend using the Caltrans *Guide for the Preparation of Traffic Impact Studies* for determining which scenarios and methodologies to use in the analysis. It is available at the following website address:
http://dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf

Bridges, Trestles, Culverts and Other Structures in Riparian Environments
Some project level activities may affect riparian flow patterns upstream of bridges, trestles, culverts or other structures for which Caltrans holds responsibility. Please ensure your project level environmental documents include hydrological studies to determine whether such impacts will occur, and to identify appropriate mitigation measures.

Sea Level Rise
The effects of sea level rise may have impacts on transportation facilities located in the project area. Executive Order (EO) S-13-08 directs State agencies planning construction projects in areas vulnerable to sea level rise to begin planning for potential impacts by considering a range of sea level rise scenarios for the years 2050 and 2100. Higher water levels may increase erosion rates, change environmental characteristics that affect material durability, lead to increased groundwater levels and change sediment movement along shores and at estuaries and river mouths, as well as affect soil pore pressure at dikes and levees on which transportation facilities are constructed. All these factors must be addressed through geotechnical and hydrological studies conducted in coordination with Caltrans.

Encroachment Permit
Please be advised that any work or traffic control that encroaches onto the State ROW requires an encroachment permit that is issued by Caltrans. 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. David Salladay, District Office Chief, Office of Permits, California Department of Transportation, District 4, P.O. Box 23660, Oakland, CA 94623-0660. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment permit process. See

the website linked below for more information.
http://www.dot.ca.gov/hq/traffops/developserv/permits/

Should you have any questions regarding this letter, please contact Keith Wayne of my staff by telephone at (510) 286-5737, or by email at Keith_Wayne@dot.ca.gov.

Sincerely,

ERIK ALM, AICP
District Branch Chief
Local Development – Intergovernmental Review

c: Scott Morgan, State Clearinghouse

Santa Clara Valley
Audubon Society

February 13, 2013 *via email*

Ms. Tiffany Hernandez,
Santa Clara Valley Water District

Scoping Comments: Sunnyvale East and Sunnyvale West Channels Flood Protection Project

Dear Ms. Hernandez,

Santa Clara Valley Audubon Society (SCVAS) thanks you for the opportunity to provide scoping comments for the Sunnyvale East and Sunnyvale West Channels Flood Protection Project (Project.) SCVAS has over 3500 members in Santa Clara County who share a passion for birds and wildlife, and the habitats and ecosystems that support them. The Project is planned in an area rich in bird species and thus of interest to our members.
The overall Project goals are to:
• Provide flood protection for properties and industrial land
• Prevent potential damages caused by flooding
• Provide erosion reduction measures to improve stream water quality
• Revise FEMA flood hazard map to reflect 100-year protection
• Identify recreational and environmental enhancement opportunities

Comment 1: Goals – Santa Clara Valley Water District Fact Sheet promises: "The Sunnyvale East and West Channel flood protection projects offer a tremendous opportunity to improve flood protection, create recreational opportunities and enhance the environment." Unfortunately, there seem to be no goal for the project to actually provide environmental enhancement. Please consider modifying the project goals so that habitat enhancement, beyond mitigation, is an integral part of the project design and construction.

Comment 2: Biological resources baseline, analysis and mitigation
The project can be expected to impact the avifauna of the channels, open space near the water pollution control plant, the ponds adjacent to the channels outflows and Guadalupe Slough. These sites are frequented by birdwatchers, and many report their observations online.

The EIR should include a comprehensive biological resources baseline that includes all resident, migratory and special status species on the project footprint and in adjacent habitats. We ask that the baseline include current situation as well as historical records. Please use all available databases regarding the bird and wildlife biodiversity in the Project area and its vicinity,

22221 McClellan Road, Cupertino, CA 95014 Phone: (408) 252-3748 * Fax: (408) 252-2850
email: scvas@scvas.org * www.scvas.org

including ebird (see www.ebird.org) and local resources such as the Santa Clara Valley Breeding Bird Atlas (SCVAS) and the South Bay Birds list serve (SBB.) In addition to SCVAS, we recommend outreach to the San Francisco Bay Bird Observatory, the Salt pond Restoration Project and the Don Edwards National Wildlife Refuge for additional information. The City of Sunnyvale Burrowing Owl consulting biologist should also be consulted and her burrowing owl monitoring reports considered.

Comment 3: Listed species – Changes in flow patterns during storm events could potentially result in changes to listed species habitat. Please analyze Project-specific and cumulative impacts to State and Federally listed species, including California Species of Special Concern.

Comment 4: Use of Herbicides, Insecticides and Rodenticides- Please analyze the potential of herbicides, insecticides and rodenticides to impact habitats during the construction and the projected lifespan of the project. Please list all the biocides that may be used on the Project site. Please analyze potential for direct and secondary poisoning of birds and wildlife during construction and operations. Please consider disallowing use of rodent baits and other chemical rodenticides onsite.

Comment 5: Cumulative temporal analysis – Please analyze timing of construction cumulatively with projected construction periods of other projects that could potentially affect the same group of resident and migratory bird species as well as listed species. A large number of projects is moving forward along the shores of the Peninsula and the South Bay, including but not limited to: Sunnyvale Water pollution Control Plant, San Jose-Santa Clara Sunnyvale Water pollution Control Plant, Palo Alto capping of the landfill at Byxbee Park, San Francisquito Creek Flood Protection Project, Google's Bay View Campus at Moffett Field, the Salt Pond Restoration Project, Facebook's Levee Trail and new campus construction. We ask that the EIR provide sufficient information and analysis of the cumulative impacts of the timing of the Project construction period to allow coordination to allow selection of the least harmful construction period.

Comment 6: Growth inducing impacts - Please discuss Project-related growth inducing impacts.

Comment 7: Alternatives – please offer and analyze alternatives that provide significant enhancement of habitat for avian and other wildlife species that inhabit the urban interface with waterways and the sloughs at the edge of the bay.

Please keep us informed on any further opportunity for public review and input on this project. Please call us at (650) 868 2114 if we can be of help,

Thank you,

Shani Kleinhaus,
Environmental Advocate

22221 McClellan Road, Cupertino, CA 95014 Phone: (408) 252-3748 * Fax: (408) 252-2850
email: scvas@scvas.org * www.scvas.org

County of Santa Clara

Parks and Recreation Department

298 Garden Hill Drive
Los Gatos, California 95032-7669
(408) 355-2200 FAX 355-2290
Reservations (408) 355-2201
www.parkhere.org

February 14, 2013

Tiffany Hernandez
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: Notice of Preparation of a Draft Environmental Impact Report for the Sunnyvale East West Channels Flood Protection Project in the Cities of Sunnyvale and Cupertino

Dear Ms. Hernandez:

The County of Santa Clara Parks and Recreation Department ("County Parks Department") is in receipt of a Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) for the Sunnyvale East West Channels Flood Protection Project in the Cities of Sunnyvale and Cupertino.

The County Parks Department's comments are primarily focused on potential impacts related to the *Santa Clara County Countywide Trails Master Plan Update*, an element of the Parks and Recreation Element of the County General Plan that the Board of Supervisors adopted on November 14, 1995, relative to countywide trail routes, public access and regional parks.

Recreation
This section of the Draft EIR should include the following countywide trail routes, which have the potential to be impacted as a result of the proposed project.

- **Regional Trail Route R1-B (Juan Bautista de Anza NHT)**
  Per the Countywide Trails Master Plan Update, this regional trail alignment is designated as a trail route within other public lands, for hiking and off-road cycling.

- **Regional Trail Route R4 (San Francisco Bay Trail)**
  Per the Countywide Trails Master Plan Update, this regional trail alignment is designated as a trail route within other public lands, for hiking and off-road cycling.

Thank you for the opportunity to comment on the NOP for a Draft EIR for the Sunnyvale East West Channels Flood Protection Project. We look forward to reviewing the Draft EIR when it becomes available. If you have any questions regarding these comments, please feel free to contact me at (408) 355-2230 or via email at Kimberly.Brosseau@prk.sccgov.org.

Sincerely,

Kimberly Brosseau
Park Planner III

cc: Jane Mark, Senior Planner
Laura Thompson, Bay Trail Manager

February 12, 2013
CIWQS Place No. 742602 (MB)
Site No. 02-43-C0618

Sent via electronic mail: No hardcopy to follow

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Attn: Tiffany Hernandez
Email: thernandez@valleywater.org

SUBJECT: Sunnyvale East and West Channels Flood Protection Project

Dear Ms. Hernandez:

The San Francisco Bay Regional Water Quality Control Board (Water Board) appreciates the opportunity to review the Santa Clara Valley Water District's (District) Notice of Preparation (NOP) of the Draft Environmental Impact Report for the Sunnyvale East and West Channel Flood Protection Project (Project) submitted January 14, 2013. The proposed Project includes constructing floodwalls, raising levees and maintenance roads, removing sediment, replacing or modifying bridges and culverts, and repairing bank erosion along approximately 9.5 miles of Sunnyvale East and West flood control channels in the City of Mt. View, Santa Clara County. The purpose of the NOP is to obtain comments from regulatory agencies specific to the environmental assessment of the Project in order to prepare the Draft Environmental Impact Report (DEIR).

We have the following comments, which are described in more detail further below, and should be assessed in the DEIR.

- Full evaluation of potential impacts to U.S. Corps jurisdictional waters and non-jurisdictional waters (waters of the State including riparian habitat).
- Discussion of the sources and locations of previous flooding events along with corrective measures implemented to address the flooding events.
- Discussion and evaluation of alternative analysis only after all potential impacts are fully assessed.
- Evaluation of adverse impacts to water quality and beneficial uses resulting from an increase in impermeable surfaces.

1. Waters of the State and the U.S.: The DEIR should include jurisdictional waters of the State (jurisdiction of the Water Board) in addition to waters of the U.S. (jurisdiction of

the U.S. Army Corps (Corps)). Please note that the Water Board has regulatory authority over waters of the State and U.S. under both the Clean Water Act (CWA) and the State of California's Porter-Cologne Water Quality Control Act (California Water Code, Division 7). Activities in areas that are outside of waters of the U.S. (i.e. surface area above ordinary high water mark (OHWM) and riparian habitat not regulated by the Corps) may be regulated by the Water Board, under the authority of the Porter-Cologne Water Quality Control Act. Activities that are outside of waters of the U.S. may require the issuance of either individual or general Waste Discharge Requirements (WDRs) from the Water Board. The DEIR should include a clear distinction between impacts to waters of the U.S. and State.

2. Flooding Source: The DIER should include a discussion and evaluation of previous flooding events including the cause or source of the flooding (e.g. constrictions along the channel such bridges, culverts etc.), locations along the channels susceptible to flooding (and bank erosion), and the methods and outcome of previous corrective actions implemented to address the flooding events.

3. Alternative Analysis:

   a. In accordance with specifications of the CWA Section 404(b)(1) "Guidelines for Specification of Disposal Sites for Dredge or Fill Material," the Project shall not result in discharge of dredge or fill material if a practicable alternative to the proposed discharge would result in less adverse impacts to wetlands and other waters. The DEIR needs to include a thorough description of all impacts associated with the Project in order to assess which feasible alternative would be considered the Least Environmentally Damaging Practicable Alternative (LEDPA). The entire area between top-of-bank on each side of the channel should be described as potential waters of the State. The DEIR should include a discussion of how impacts to waters of the State associated with the proposed alternatives will be avoided and minimized in these areas.

   b. The NOP indicates that the Pond A4 detention basin feature was removed from the proposed Project. In addition, the off-stream detention basins at Braly Park, Fair Oaks, and Kings Academy School have also been removed from the Project. The DEIR should include, in the detailed alternative analysis, a discussion demonstrating that Pond A4 and the off-stream detention basins are not suitable in developing the least environmentally damaging project.

4. Hydrology and Water Quality:

   a. The NOP states that the proposed project will "not affect or alter the drainage network, increase impermeable surfaces, or increase runoff in the watershed." The NOP also states that the proposed Project includes installing rock, concrete, and sack concrete for bank stabilization along both channels, which are generally earthen. Furthermore, the NOP states "small permanent losses would occur because of the use of hardscape for bank stabilization activities." This bank stabilization method can increase the area of impermeable surfaces, which may result in adverse impacts to water quality and beneficial uses. In fact, the NOP includes figures showing hardscape for bank stabilization along half of Sunnyvale West channel and a significant portion of Sunnyvale East channel. The DEIR should demonstrate, supported by engineering analysis,

that softscape bio-engineering methods are technically infeasible and that hardscape methods are necessary. Attached is a technical publication, entitled "*Stability Thresholds for Stream Restoration Materials*" which provides guidance to determine the most appropriate bank stabilization methods and the permissible shear stress and velocity.

b. The NOP states that the existing gravel maintenance roads will be paved with asphalt. The DEIR should include a discussion of the adverse impacts to water quality and beneficial uses associated with paving the maintenance road and discuss alternatives that would result in fewer impacts to waters of the State, such as topping the maintenance roads with gravel instead of asphalt where possible.

c. The NOP states that "new floodwalls and road crossings would keep channel flows which previously may have overtopped the channels, within the channels." Floodwalls and road crossings, in addition to hardscape bank stabilization methods and channel widening, can change the sediment transport regime. The DEIR should include a scientific basis (i.e. sediment transport, hydraulic, and/or hydrology studies) demonstrating that these Project features will not result in adverse impacts to water quality and beneficial uses from erosion (upstream and downstream of the Project), channel incision and depositional features within the Project.

d. The Sunnyvale East and West channels currently and will continue to receive stormwater runoff from the highly urbanized/industrial/commercial area, which contributes to reduced water quality. Furthermore, the NOP states runoff may be detained behind the floodwalls, which will be redirected towards the channel or other storm drain facility. The DEIR should include a discussion of possible low impact development (LID) options while assessing the stormwater runoff pollution prevention to reduce adverse impacts to water quality.

In summary, the Water Board recommends that the District provide a full evaluation of both waters of the U.S. and State as well as appropriate alternative analysis, including supporting documentation, and demonstrating that the proposed Project design is the least environmentally damaging practicable alternative.

If you have any questions, please contact Maggie Beth via email at mabeth@waterboards.ca.gov or at (510) 622-2338.

Sincerely,

William B. Hurley
Senior Engineer
Leader, North Bay Watershed Section

Cc:

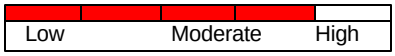
Luisa Valiela, U.S. EPA, valiela.luisa@epamail.epa.gov
Holly Costa, USACE, Holly.N.Costa@usace.army.mil
Lisa Mangione, USACE, Lisa.Mangione@usace.army.mil
Gary Stern, NMFS, Gary.Stern@noaa.gov
Darren Howe, NMFS, Darren.Howe@noaa.gov
Tami Schane, CDFG, TSchane@dfg.ca.gov

Stability Thresholds for Stream Restoration Materials

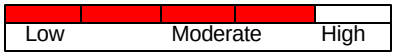
by Craig Fischenich[1]

May 2001

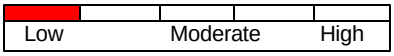
Complexity



Value as a Planning Tool



Cost



OVERVIEW

Stream restoration projects usually involve some modification to the channel or the banks. Designers of stabilization or restoration projects must ensure that the materials placed within the channel or on the banks will be stable for the full range of conditions expected during the design life of the project. Unfortunately, techniques to characterize stability thresholds are limited. Theoretical approaches do not exist and empirical data mainly consist of velocity limits, which are of limited value.

Empirical data for shear stress or stream power are generally lacking, but the existing body of information is summarized in this technical note. Whereas shear thresholds for soils found in channel beds and banks are quite low (generally < 0.25 lb/sf), those for vegetated soils (0.5 – 4 lb/sf), erosion control materials and bioengineering techniques (0.5 – 8 lb/sf), and hard armoring (< 13 lb/sf) offer options to provide stability.

STABILITY CRITERIA

The stability of a stream refers to how it accommodates itself to the inflowing water and sediment load. In general, stable streams may adjust their boundaries but do not exhibit trends in changes to their geometric character. One form of instability occurs when a stream is unable to transport its sediment load (i.e., sediments deposited within the channel), leading to the condition referred to as aggradation.

When the ability of the stream to transport sediment exceeds the availability of sediments within the incoming flow, and stability thresholds for the material forming the boundary of the channel are exceeded, erosion occurs. This technical note deals with the latter case of instability and distinguishes the presence or absence of erosion (threshold condition) from the magnitude of erosion (volume).

Erosion occurs when the hydraulic forces in the flow exceed the resisting forces of the channel boundary. The amount of erosion is a function of the relative magnitude of these forces and the time over which they are applied. The interaction of flow with the boundary of open channels is only imperfectly understood. Adequate analytical expressions describing this interaction have not yet been developed for conditions associated with natural channels. Thus, means of characterizing erosion potential must rely heavily upon empiricism.

Traditional approaches for characterizing erosion potential can be placed in one of two categories: maximum permissible velocity, and tractive force (or critical shear stress). The former approach is advantageous in that velocity is a parameter that can be measured within the flow. Shear stress cannot be directly measured – it must be computed from other flow parameters. Shear stress is a better measure of the fluid force on the channel boundary than is velocity. Moreover, conventional guidelines, including ASTM standards, rely upon the shear stress as a

[1] USAE Research and Development Center, Environmental Laboratory, 3909 Halls Ferry Rd., Vicksburg MS 39180

means of assessing the stability of erosion control materials. Both approaches are presented in this paper.

Incipient Motion (Threshold Condition)

As flow over the bed and banks of a stream increases, a condition referred to as the threshold state is reached when the forces tending to move materials on the channel boundary are in balance with those resisting motion. The forces acting on a noncohesive soil particle lying on the bed of a flowing stream include hydrodynamic lift, hydrodynamic drag, submerged weight ($F_w - F_b$), and a resisting force F_r. as seen in Figure 1. The drag is in the direction of the flow and the lift and weight are normal to the flow. The resisting force depends on the geometry of the particles. At the threshold of movement, the resultant of the forces in each direction is zero. Two approaches for defining the threshold state are discussed herein, initial movement being specified in terms of either a critical velocity (v_{cr}) or a critical shear stress (τ_{cr}).

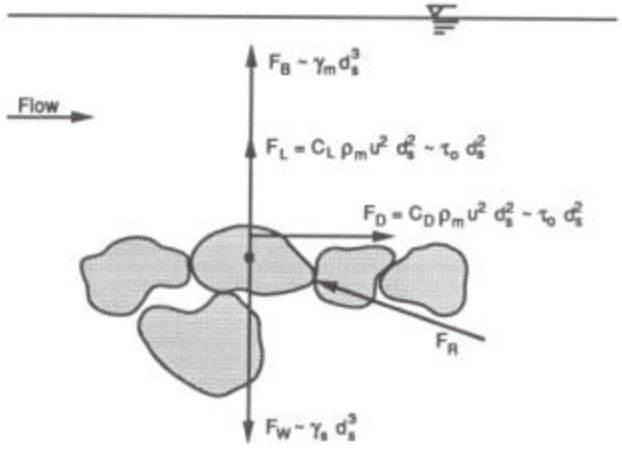


Figure 1. Forces acting on the boundary of a channel (adapted from Julien (1995)).

Critical Velocity

Figure 1 shows that both the lift and the drag force are directly related to the velocity squared. Thus, small changes in the velocity could result in large changes in these forces. The permissible velocity is defined as the maximum velocity of the channel that will not cause erosion of the channel boundary. It is often called the critical velocity because it refers to the condition for the initiation of motion. Early works in canal design and in evaluating the stability of waterways relied upon this method. Considerable empirical data exist relating maximum velocities to various soil and vegetation conditions.

However, this simple method for design does not consider the channel shape or flow depth. At the same mean velocity, channels of different shapes or depths may have quite different forces acting on the boundaries. Critical velocity is depth-dependent, and a correction factor for depth must be applied in this application. Despite these limitations, maximum permissible velocity can be a useful tool in evaluating the stability of various waterways. It is most frequently applied as a cursory analysis when screening alternatives.

Critical Shear Stress

The forces shown in Figure 1 can also be expressed in terms of the shear stress. Shear stress is the force per unit area in the flow direction. Its distribution in steady, uniform, two-dimensional flow in the channel can be reasonably described. An estimate of the average boundary shear stress (τ_o) exerted by the fluid on the bed is:

$$\tau_o = \gamma D S_f \qquad (1)$$

where γ is the specific weight of water, D is the flow depth (~ hydraulic radius), and S_f is the friction slope. Derived from consideration of the conservation of linear momentum, this quantity is a spatial average and may not provide a good estimate of bed shear at a point.

Critical shear stress (τ_{cr}) can be defined by equating the applied forces to the resisting forces. Shields (1936) determined the threshold condition by measuring sediment transport for values of shear at least twice the critical value and then extrapolating to the point vanishing sediment transport. His laboratory experiments have since served as a basis for defining critical shear stress. For soil grains of diameter d and angle of repose ϕ on a flat bed, the following relations can approximate the critical shear for various sizes of sediment:

$$\tau_{cr} = 0.5(\gamma_s - \gamma_w) d \, Tan\phi \quad \text{For clays} \qquad (2)$$

$$\tau_{cr} = 0.25 d_*^{-0.6} (\gamma_s - \gamma_w) d \, Tan\phi \quad \text{For silts and sands} \qquad (3)$$

$$\tau_{cr} = 0.06(\gamma_s - \gamma_w)d\,Tan\phi$$ For gravels and cobbles (4)

Where

$$d_* = d\left[\frac{(G-1)g}{\nu^2}\right]^{1/3} \quad (5)$$

γ_s = the unit weight of the sediment
γ_w = the unit weight of the water/sediment mixture
G = the specific gravity of the sediment
G = gravitational acceleration
ν = the kinematic viscosity of the water/sediment mixture

The angle of repose ϕ for noncohesive sediments is presented in Table 1 (Julien 1995), as are values for critical shear stress. The critical condition can be defined in terms of shear velocity rather than shear stress (note that shear velocity and channel velocity are different). Table 1 also provides limiting shear velocity as a function of sediment size. The V_{*c} term is the critical shear velocity and is equal to

$$V_{*c} = \sqrt{gR_hS_f} \quad (6)$$

Table 1. Limiting Shear Stress and Ve locity for Uniform Noncohesive Sediments

Class name	d_s (in)	ϕ (deg)	τ_{*c}	τ_{cr} (lb/sf)	V_{*c} (ft/s)
Boulder					
Very large	>80	42	0.054	37.4	4.36
Large	>40	42	0.054	18.7	3.08
Medium	>20	42	0.054	9.3	2.20
Small	>10	42	0.054	4.7	1.54
Cobble					
Large	>5	42	0.054	2.3	1.08
Small	>2.5	41	0.052	1.1	0.75
Gravel					
Very coarse	>1.3	40	0.050	0.54	0.52
Coarse	>0.6	38	0.047	0.25	0.36
Medium	>0.3	36	0.044	0.12	0.24
Fine	>0.16	35	0.042	0.06	0.17
Very fine	>0.08	33	0.039	0.03	0.12
Sands					
Very coarse	>0.04	32	0.029	0.01	0.070
Coarse	>0.02	31	0.033	0.006	0.055
Medium	>0.01	30	0.048	0.004	0.045
Fine	>0.005	30	0.072	0.003	0.040
Very fine	>0.003	30	0.109	0.002	0.035
Silts					
Coarse	>0.002	30	0.165	0.001	0.030
Medium	>0.001	30	0.25	0.001	0.025

Table 1 provides limits best applied when evaluating idealized conditions, or the stability of sediments in the bed. Mixtures of sediments tend to behave differently from uniform sediments. Within a mixture, coarse sediments are generally entrained at lower shear stress values than presented in Table 1. Conversely, larger shear stresses than those presented in the table are required to entrain finer sediments within a mixture.

Cohesive soils, vegetation, and other armor materials can be similarly evaluated to determine empirical shear stress thresholds. Cohesive soils are usually eroded by the detachment and entrainment of soil aggregates. Motivating forces are the same as those for noncohesive banks; however, the resisting forces are primarily the result of cohesive bonds between particles. The bonding strength, and hence the soil erosion resistance, depends on the physio-chemical properties of the soil and the chemistry of the

fluids. Field and laboratory experiments show that intact, undisturbed cohesive soils are much less susceptible to flow erosion than are non-cohesive soils.

Vegetation, which has a profound effect on the stability of both cohesive and noncohesive soils, serves as an effective buffer between the water and the underlying soil. It increases the effective roughness height of the boundary, increasing flow resistance and displacing the velocity upwards away from the soil, which has the effect of reducing the forces of drag and lift acting on the soil surface. As the boundary shear stress is proportional to the square of the near-bank velocity, a reduction in this velocity produces a much greater reduction in the forces responsible for erosion.

Vegetation armors the soil surface, but the roots and rhizomes of plants also bind the soil and introduce extra cohesion over and above any intrinsic cohesion that the bank material may have. The presence of vegetation does not render underlying soils immune from erosion, but the critical condition for erosion of a vegetated bank is usually the threshold of failure of the plant stands by snapping, stem scour, or uprooting, rather than for detachment and entrainment of the soils themselves. Vegetation failure usually occurs at much higher levels of flow intensity than for soil erosion.

Both rigid and flexible armor systems can be used in waterways to protect the channel bed from erosion and to stabilize side slopes. A wide array of differing armor materials are available to accomplish this. Many manufactured products have been evaluated to determine their failure threshold. Products are frequently selected using design graphs that present the flow depth on one axis and the slope of the channel on the other axis. Thus, the design is based on the depth/slope product (i.e., the shear stress). In other cases, the thresholds are expressed explicitly in terms of shear stress. Notable among the latter group are the field performance testing results of erosion control products conducted by the TXDOT/TTI Hydraulics and Erosion Control Laboratory (TXDOT 1999).

Table 2 presents limiting values for shear stress and velocity for a number of different channel lining materials. Included are soils, various types of vegetation, and number of different commonly applied stabilization techniques. Information presented in the table was derived from a number of different sources. Ranges of values presented in the table reflect various measures presented within the literature. In the case of manufactured products, the designer should consult the manufacturer's guidelines to determine thresholds for a specific product.

Uncertainty and Variability

The values presented in Table 2 generally relate to average values of shear stress or velocity. Velocity and shear stress are neither uniform nor steady in natural channels. Short-term pulses in the flow can give rise to instantaneous velocities or stresses of two to three times the average; thus, erosion may occur at stresses much lower than predicted. Because limits presented in Table 2 were developed empirically, they implicitly include some off this variability. However, natural channels typically exhibit much more variability than the flumes from which these data were developed.

Sediment load can also profoundly influence the ability of flow to erode underlying soils. Sediments in suspension have the effect of damping turbulence within the flow. Turbulence is an important factor in entraining materials from the channel boundaries. Thus, velocity and shear stress thresholds are 1.5 to 3 times that presented in the table for flows carrying high sediment loads.

In addition to variability of flow conditions, variation in the channel lining characteristics can influence erosion predictions. Natural bed material is neither spherical nor of uniform size. Larger particles may shield smaller ones from direct impact so that the latter fail to move until higher stresses are attained. For a given grain size, the true threshold criterion may vary by nearly an order of magnitude depending on the bed gradation. Variation in the installation of erosion control measures can reduce the threshold necessary to cause erosion.

Table 2. Permissible Shear and Velocity for Selected Lining Materials[1]

Boundary Category	Boundary Type	Permissible Shear Stress (lb/sq ft)	Permissible Velocity (ft/sec)	Citation(s)
Soils	Fine colloidal sand	0.02 - 0.03	1.5	A
	Sandy loam (noncolloidal)	0.03 - 0.04	1.75	A
	Alluvial silt (noncolloidal)	0.045 - 0.05	2	A
	Silty loam (noncolloidal)	0.045 - 0.05	1.75 – 2.25	A
	Firm loam	0.075	2.5	A
	Fine gravels	0.075	2.5	A
	Stiff clay	0.26	3 – 4.5	A, F
	Alluvial silt (colloidal)	0.26	3.75	A
	Graded loam to cobbles	0.38	3.75	A
	Graded silts to cobbles	0.43	4	A
	Shales and hardpan	0.67	6	A
Gravel/Cobble	1-in.	0.33	2.5 – 5	A
	2-in.	0.67	3 – 6	A
	6-in.	2.0	4 – 7.5	A
	12-in.	4.0	5.5 – 12	A
Vegetation	Class A turf	3.7	6 – 8	E, N
	Class B turf	2.1	4 - 7	E, N
	Class C turf	1.0	3.5	E, N
	Long native grasses	1.2 – 1.7	4 – 6	G, H, L, N
	Short native and bunch grass	0.7 - 0.95	3 – 4	G, H, L, N
	Reed plantings	0.1-0.6	N/A	E, N
	Hardwood tree plantings	0.41-2.5	N/A	E, N
Temporary Degradable RECPs	Jute net	0.45	1 – 2.5	E, H, M
	Straw with net	1.5 – 1.65	1 – 3	E, H, M
	Coconut fiber with net	2.25	3 – 4	E, M
	Fiberglass roving	2.00	2.5 – 7	E, H, M
Non-Degradable RECPs	Unvegetated	3.00	5 – 7	E, G, M
	Partially established	4.0-6.0	7.5 – 15	E, G, M
	Fully vegetated	8.00	8 – 21	F, L, M
Riprap	6 – in. d_{50}	2.5	5 – 10	H
	9 – in. d_{50}	3.8	7 – 11	H
	12 – in. d_{50}	5.1	10 – 13	H
	18 – in. d_{50}	7.6	12 – 16	H
	24 – in. d_{50}	10.1	14 – 18	E
Soil Bioengineering	Wattles	0.2 – 1.0	3	C, I, J, N
	Reed fascine	0.6-1.25	5	E
	Coir roll	3 - 5	8	E, M, N
	Vegetated coir mat	4 - 8	9.5	E, M, N
	Live brush mattress (initial)	0.4 – 4.1	4	B, E, I
	Live brush mattress (grown)	3.90-8.2	12	B, C, E, I, N
	Brush layering (initial/grown)	0.4 – 6.25	12	E, I, N
	Live fascine	1.25-3.10	6 – 8	C, E, I, J
	Live willow stakes	2.10-3.10	3 – 10	E, N, O
Hard Surfacing	Gabions	10	14 – 19	D
	Concrete	12.5	>18	H

[1] Ranges of values generally reflect multiple sources of data or different testing conditions.

A. Chang, H.H. (1988).
B. Florineth. (1982)
C. Gerstgraser, C. (1998).
D. Goff, K. (1999).
E. Gray, D.H., and Sotir, R.B. (1996).
F. Julien, P.Y. (1995).
G. Kouwen, N.; Li, R. M.; and Simons, D.B., (1980).
H. Norman, J. N. (1975).
I. Schiechtl, H. M. and R. Stern. (1996).
J. Schoklitsch, A. (1937).
K. Sprague, C.J. (1999).
L. Temple, D.M. (1980).
M. TXDOT (1999)
N. Data from Author (2001)
O. USACE (1997).

Changes in the density or vigor of vegetation can either increase or decrease erosion threshold. Even differences between the growing and dormant seasons can lead to one- to twofold changes in erosion thresholds.

To address uncertainty and variability, the designer should adjust the predicted velocity or shear stress by applying a factor of safety or by computing local and instantaneous values for these parameters. Guidance for making these adjustments is presented in the section titled "Application" below.

EROSION MAGNITUDE

The preceding discussion dealt with the presence or absence of erosion, but did not address the extent to which erosion might occur for a given flow. If the thresholds presented in Table 2 are exceeded, erosion should be expected to occur. In reality, even when those thresholds are not exceeded, some erosion in a few select locations may occur. The extent to which this minor erosion could become a significant concern depends in large measure on the duration of the flow, and upon the ability of the stream to transport those eroded sediments.

Flow Duration

Although not stated, limits regarding erosion potential published by manufacturers for various products are typically developed from studies using short flow durations. They do not reflect the potential for severe erosion damage that can result from moderate flow events over several hours. Studies have shown that duration of flow reduces erosion resistance of many types of erosion control products, as shown in Figures 2 - 4. A factor of safety should be applied when flow duration exceeds a couple of hours.

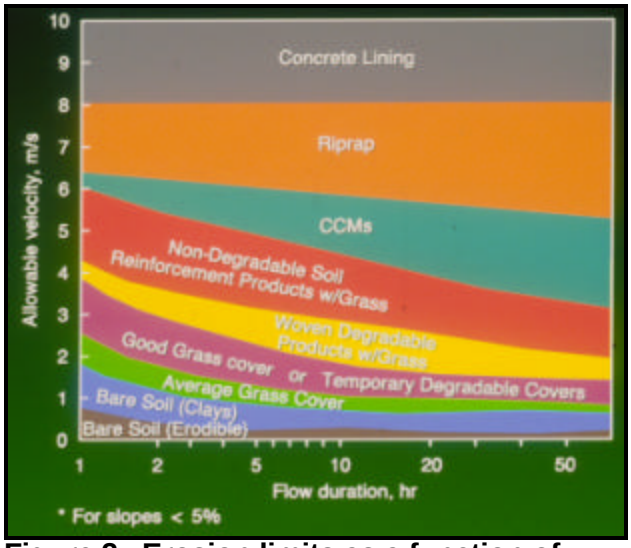


Figure 2. Erosion limits as a function of flow duration (from Fischenich and Allen (2000)).

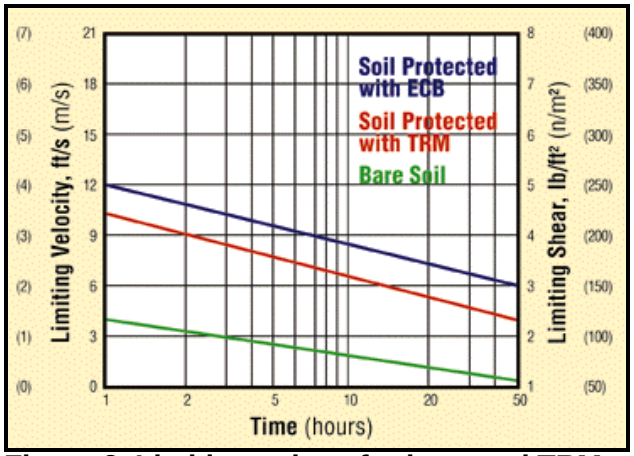


Figure 3. Limiting values for bare and TRM protected soils (from Sprague (1999))

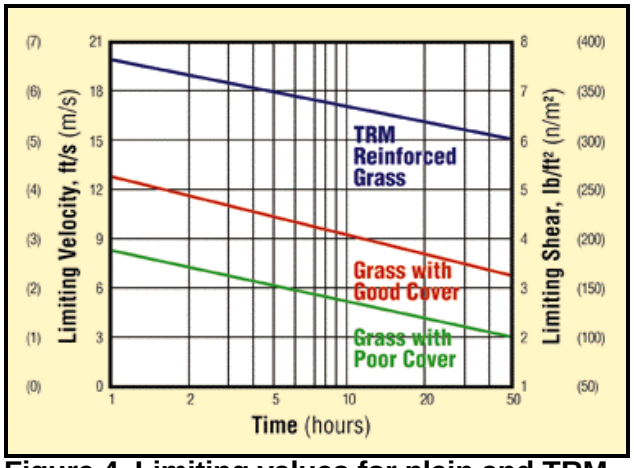


Figure 4. Limiting values for plain and TRM reinforced grass (from Sprague (1999))

Correlations between flow volume and amount of erosion tend to be poor. Multi-peaked flows may be more effective than single flows of comparable or greater magnitude because of the increased incidence of wetting. Flows with long durations often have a more significant effect on erosion than short-lived flows of higher magnitude. Sediment transport analysis can be used to gauge the magnitude of erosion potential in the channel design, but predictive capability is limited.

Sediment Transport

A number of flow measures can be used to assess the ability of a stream to transport sediment. The unit stream power (P_m) is one common approach, and is related to the earlier discussion in that stream power includes both velocity and shear stress as components. Sediment transport (Q_s) increases when the unit stream power (P_m) increases. Unit stream power in turn is controlled by both tractive stress and flow velocity:

$$P_m = v \cdot \tau = v \cdot \gamma_w \cdot D \cdot S_f \quad (7)$$

The total power (P_t) is the product of the unit power times the channel width (W):

$$P_t = P_m \cdot W = v \cdot W \cdot D \cdot \gamma_w \cdot S_f = v \cdot A \cdot \gamma_w \cdot S_f = Q_w \cdot \gamma_w \cdot S_f \quad (8)$$

Stream power assessments can be useful in evaluating sediment discharge within a stream channel and the deposition or erosion of sediments from the streambed. However, their utility for evaluating the stability of measures applied to prevent erosion is limited because of the lack of empirical data relating stream power to stability. The analysis of general streambank erosion is not a simple extension of the noncohesive bed case with an added downslope gravity component. Complication is added by other influencing variables, such as vegetation, whose root system can reinforce bank material and increase erosion resistance. Factors influencing bank erosion are summarized in Table 3.

Table 3. Factors Influencing Erosion

Factor	*Relevant characteristics*
Flow properties	Magnitude, frequency and variability of stream discharge; Magnitude and distribution of velocity and shear stress; Degree of turbulence
Sediment composition	Sediment size, gradation, cohesion and stratification
Climate	Rainfall amount, intensity and duration; Frequency and duration of freezing
Subsurface conditions	Seepage forces; Piping; Soil moisture levels
Channel geometry	Width and depth of channel; Height and angle of bank; Bend curvature
Biology	Vegetation type, density and root character; Burrows
Anthropogenic factors	Urbanization, flood control, boating, irrigation

APPLICATION

The stability of a waterway or the suitability of various channel linings can be determined by first calculating both the mean velocity and tractive stress (by the previous equations). These values can then be compared with allowable velocity and tractive stress for a particular ground cover or lining system under consideration (e.g., existing vegetation cover, an erosion control blanket, or bioengineering treatment). Allowable tractive stresses for various types of soil, linings, ground covers, and stabilization measures including soil bioengineering treatments, are listed in Table 2. Additionally, manufacturers' product literature can provide allowable tractive stresses or velocities for various types of erosion control products.

An iterative procedure may be required when evaluating channel stability because various linings will affect the resistance coefficient,

which in turn may change the estimated flow conditions. A general procedure for the application of information presented in this paper is outlined in the following paragraphs.

Step 1-Estimate Mean Hydraulic Conditions.
Flow of water in a channel is governed by the discharge, hydraulic gradient, channel geometry, and roughness coefficient. This functional relationship is most frequently evaluated using normal depth or backwater computations that take into account principles of conservation of linear momentum. The latter is preferable because it accounts for variations in momentum slope, which is directly related to shear stress. Several models are available to aid the hydraulic engineer in assessing hydraulic conditions. Notable examples include HEC-2, HEC-RAS, and WSP2. Channel cross sections, slopes, and Manning's coefficients should be determined based upon surveyed data and observed or predicted channel boundary conditions. Output from the model should be used to compute main channel velocity and shear stress at each cross section.

Step 2- Estimate Local/Instantaneous Flow Conditions.
The computed values for velocity and shear stress may be adjusted to account for local variability and instantaneous values higher than mean. A number of procedures exist for this purpose. Most commonly applied are empirical methods based upon channel form and irregularity. Several references at the end of this paper present procedures to make these adjustments. Chang (1988) is a good example. For straight channels, the local maximum shear stress can be assumed from the following simple equation:

$$\tau_{max} = 1.5\tau \qquad (9)$$

for sinuous channels, the maximum shear stress should be determined as a function of the planform characteristics using Equation 10:

$$\tau_{max} = 2.65\,\tau \left(\frac{R_c}{W}\right)^{-0.5} \qquad (10)$$

where R_c is the radius of curvature and W is the top width of the channel. Equations 9 and 10 adjust for the spatial distribution of shear stress; however, temporal maximums in turbulent flows can be 10 – 20 percent higher, so an adjustment to account for instantaneous maximums should be added as well. A factor of 1.15 is usually applied.

Step 3- Determine Existing Stability.
Existing stability should be assessed by comparing estimates of local and instantaneous shear and velocity to values presented in Table 2. Both the underlying soil and the soil/vegetation condition should be assessed. If the existing conditions are deemed stable and are in consonance with other project objectives, then no further action is required. Otherwise, proceed to step 4.

Step 4- Select Channel Lining Material.
If existing conditions are unstable, or if a different material is needed along the channel perimeter to meet project objectives, a lining material or stabilization measure should be selected from Table 2, using the threshold values as a guideline in the selection. Only material with a threshold exceeding the predicted value should be selected. The other project objectives can also be used at this point to help select from among the available alternatives. Fischenich and Allen (2000) characterize attributes of various protection measures to help in the selection.

Step 5- Recompute Flow Values.
Resistance values in the hydraulic computations should be adjusted to reflect the selected channel lining, and hydraulic condition should be recalculated for the channel. At this point, reach- or section-averaged hydraulic conditions should be adjusted to account for local and instantaneous extremes.
Table 4 presents velocity limits for various channel boundaries conditions. This table is useful in screening alternatives, or as an alternative to the shear stress analysis presented in the preceding sections.

Table 4. Stability of Channel Linings for Given Velocity Ranges

Lining	0 – 2 fps	2 – 4 fps	4 – 6 fps	6 – 8 fps	> 8 fps
Sandy Soils					
Firm Loam					
Mixed Gravel and Cobbles					
Average Turf					
Degradable RECPs					
Stabilizing Bioengineering					
Good Turf					
Permanent RECPs					
Armoring Bioengineering					
CCMs & Gabions					
Riprap					
Concrete					

Key:

	Appropriate
	Use Caution
	Not Appropriate

Step 6– Confirm Lining Stability.

The stability of the proposed lining should be assessed by comparing the threshold values in Table 2 to the newly computed hydraulic conditions. These values can be adjusted to account for flow duration using Figures 2-4 as a guide. If computed values exceed thresholds, step 4 should be repeated. If the threshold is not exceeded, a factor of safety for the project should be determined from the following equations:

$$FS = \frac{\tau_{max}}{\tau_{est}} \quad or \quad FS = \frac{V_{max}}{V_{est}} \qquad (11)$$

In general, factors of safety in excess of 1.2 or 1.3 should be acceptable. The preceding five steps should be conducted for every cross section used in the analysis for the project. In the event that computed hydraulic values exceed thresholds for any desirable lining or stabilization technique, measures must be undertaken to reduce the energy within the flow. Such measures might include the installation of low-head drop structures or other energy-dissipating devices along the channel. Alternatively, measures implemented within the watershed to reduce total discharge could be employed.

APPLICABILITY AND LIMITATIONS

Techniques described in this technical note are generally applicable to stream restoration projects that include revegetation of the riparian zone or bioengineering treatments.

ACKNOWLEDGEMENTS

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POINTS OF CONTACT

For additional information, contact the author, Dr. Craig Fischenich, (601-634-3449, fischec@wes.army.mil), or the manager of the Ecosystem Management and Restoration Research Program, Dr. Russell F. Theriot (601-634-2733, therior@wes.army.mil). This technical note should be cited as follows:

Fischenich, C. (2001). "Stability Thresholds for Stream Restoration Materials," EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-29), U.S. Army Engineer Research and Development Center, Vicksburg, MS. www.wes.army.mil/el/emrrp

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USACE TR EL 97-8

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EDMUND G. BROWN JR., *Governor*
CHARLTON H. BONHAM, *Director*

February 13, 2013

Ms. Tiffany Hernandez
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
thernandez@valleywater.org

Dear Ms. Hernandez:

Subject: Sunnyvale East and West Flood Channels Protection Project, Notice of Preparation of a Draft Environmental Impact Report, SCH #2013012041, Santa Clara County

The California Department of Fish and Wildlife (CDFW) has reviewed the Santa Clara Valley Water District's (District) Notice of Preparation (NOP) of a draft Environmental Impact Report provided for the Sunnyvale East and West Flood Channels Protection Project (Project), and we have the following recommendations for issues to be addressed in development of the California Environmental Quality Act (CEQA) document:

The CEQA document should clearly describe how the District selected the preferred alternative amongst the draft feasible alternatives that were provided to CDFW in July 2009. The document should quantify the impacts associated with each of the draft feasible alternatives, and describe the reasoning that led to the elimination of the rejected alternatives. The NOP states that the use of Pond A4 as a detention basin to store stormwater was originally considered but eliminated from the Project due to concerns regarding potential water quality and ecological impacts. Since the preferred alternative includes the construction of more floodwalls in comparison to the alternatives that incorporated Pond A4, CDFW requests that the District show a side-by-side comparison of the impacts to ecological resources, including tidal and brackish marsh and their associated wildlife species, that would be associated with the use of Pond A4 as a detention basin versus the additional length of floodwalls identified in the preferred alternative.

The NOP describes the use of inboard floodwalls, outboard floodwalls, and levee raising for flood control measures. The CEQA document should clearly describe how inboard and outboard floodwalls differ from each other, the different purposes that each type would meet, and the need for both types in this Project. In addition, the CEQA document should address the need for the concurrent use of at least two (but sometimes all three) flood control measures in a few distinct locations (the crossing at Carl Road, and adjacent to Pond A4 in Figure 3A; the crossings at East Caribbean Drive and Moffett Park Drive in Figure 3C; and the crossings at Persian Drive and Tasman Drive, and at the southern end of the floodwall on Sunnyvale East Channel in Figure 3D).

The CEQA document should explain whether and how the proposed Project will reduce maintenance needs in the Project area and how maintenance needs will be accommodated with the placement of floodwalls resulting from the Project.

While the NOP states that there will be sections where existing levees will be raised, page 8 of the document states that existing levees will not be widened. The CEQA document should confirm whether this is correct, and if so, explain how levee raising will be accomplished without widening the base footprint of the levees. Any impact to adjacent wildlife habitat resulting from levee raising should be accounted for in the impacts section of the CEQA document.

The NOP states that the existing bridge at Caribbean Drive will be demolished and replaced with a slightly larger dual span bridge. The CEQA document should describe whether the new bridge will be freespan, and if not, provide a justification of why in-channel footings will be needed at this location.

The CEQA document should clearly define the impacts to vegetation, differentiating between impacts to tidal marsh; brackish marsh; freshwater marsh; native and non-native botanical species; disclosing the number, size distribution, and species identification of any trees removed as a result of the Project; and quantifying impacts to riparian vegetation according to species, diameter at breast height, linear feet and percent canopy cover.

The CEQA document should clearly define potential Project-related impacts to sensitive wildlife species, including but not limited to, the federally and state endangered and fully protected California clapper rail (Rallus *longirostris obsoletus*) and salt-marsh harvest mouse (*Reithrodontomys raviventris*); the state threatened and fully protected black rail (*Laterallus jamaicensis coturniculus*); the federally threatened Central California Coast steelhead (*Oncorhynchus mykiss*); the federally threatened and California species of special concern green sturgeon (*Acipenser medirostris*) and snowy plover (*Charadrius alexandrinus nivosus*); the state threatened longfin smelt (*Sprinichus thaleichthys*); and the California species of special concern salt-marsh wandering shrew (*Sorex vagrans halicoetes*), Central Valley fall-run chinook salmon (*O. tshawytscha*), western pond turtle (*Emys marmorata*), burrowing owl (*Athene cunicularia*), San Francisco common yellowthroat (*Geothlypis trichas sinuosa*), Alameda song sparrow (*Melospiza melodia pusillula*), Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*), pallid bat (*Antrozous pallidus*), and San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*). The CEQA document should describe adequate measures to avoid and minimize impacts to all sensitive species to the extent practicable. Note that there is not a permitting process for the take of fully protected species (Fish and Game Code sections 3511 and 4700). Take, as defined by Fish and Game Code Section 86, means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill. Therefore, it is imperative that the CEQA document identify measures that will completely avoid take of California clapper rail, black rail, and salt-marsh harvest mouse.

The CEQA document should clearly specify whether there will be impacts in-channel due to equipment use, dewatering, etc. that may impact the fish species listed above, and describe the potential need for a California Endangered Species Act (CESA) Incidental Take Permit (ITP) for longfin smelt.

Floodwalls can impact some wildlife species (including some of those listed above) due to the vertical orientation of the walls, which may serve as a barrier to lateral movement of those species to adjacent habitat. The NOP mentions the Project's potential to impact wildlife movement both along and across the Sunnyvale Channels. The CEQA document should address how the installation of floodwalls in the Project area, particularly north of Caribbean Drive where the likelihood of the presence of sensitive wildlife species is greater, may restrict the ability of some species to escape predation, and the potential for that new condition (of artificially high predation) to create a population sink of resident wildlife. The discussion in the CEQA document should include the affect of this potential population sink on all of the life stages of the species affected, and propose mitigation measures that will adequately compensate for this unintended consequence of the floodwalls.

The CEQA document should describe any net benefits of the Project to native species, both listed and non-listed. Mitigation site(s) should be disclosed and specific mitigation types should be quantified that will adequately compensate for Project-related impacts.

CDFW appreciates the opportunity to comment on the District's NOP for the Sunnyvale East and West Flood Channels Protection Project. Questions regarding this letter and further coordination on this Project should be directed to Ms. Tami Schane, Environmental Scientist, at (415) 831-4640; or Mr. Craig Weightman, Acting Environmental Program Manager, at (707) 944-5577.

Sincerely,

Scott Wilson
Acting Regional Manager
Bay Delta Region

cc: State Clearinghouse

Ms. Margarete Beth – mabeth@waterboards.ca.gov
San Francisco Regional Water Quality Control Board