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**Google West Channel Enhancement Project  
Biological Resources Report**

**Project #3475-54**

Prepared for:

**Google Devco**

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# Section 1. Introduction

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## 1.1 Project Location

The Sunnyvale West Channel (storm drain channel) bisects Google's proposed Caribbean Campus/West Channel Enhancement Project in Sunnyvale, California (Figure 1). The campus is bordered by Caribbean Drive to the north, Borregas Avenue to the east, Caspian Court and Bordeaux Drive to the south, and North Mathilda Avenue to the west. The Channel Enhancement portion of the Project is 8.10 ac, while the larger campus Project area is 43.89 ac. Outside of the Sunnyvale West Channel, the site is fully developed. The Project area is between West Caribbean Drive and Caspian Court and is located within the *Mountain View, California* U.S. Geological Survey (USGS) 7.5-minute quadrangle.

The Project area is accessible from U.S. Highway 101 via State Route 237, which is approximately 1.5 miles (mi) to the north. Regional access to the storm drain channel is from North Mathilda Street or East Java Street via State Route 237. Caspian Court and West Caribbean Drive provide the primary access points to the Project area.

The Project area encompasses the following parcels: 11026028, 11026025, 11026029, 11026031, 11026030, 11026049, 11026027, 11026020, 11026021, 11026022, and 11026023.

## 1.1 Project Purpose

The project purpose is to enhance the storm drain channel through restoring and enhancing areas of tidal aquatic, estuarine wetland and riparian habitats, as well as to provide enhanced pedestrian connections over the channel. The project will also provide 100-year flood protection for the city of Sunnyvale and facilitate redevelopment of several commercial/office parcels surrounding the Sunnyvale West Channel.

**Valley Water Sunnyvale East and West Channel Flood Protection Project.** The existing Sunnyvale East and West Channels were constructed by Valley Water in the 1960's and 1970's to alleviate local ponding resulting from historic ground subsidence and in cooperation with the local storm drain systems of Sunnyvale and Cupertino designed for a 10-year storm by directing the flows through the channels to San Francisco Bay. Since construction of the channels, the project area has experienced flooding during major storm events in 1963, 1968, 1983, 1986 and 1998.

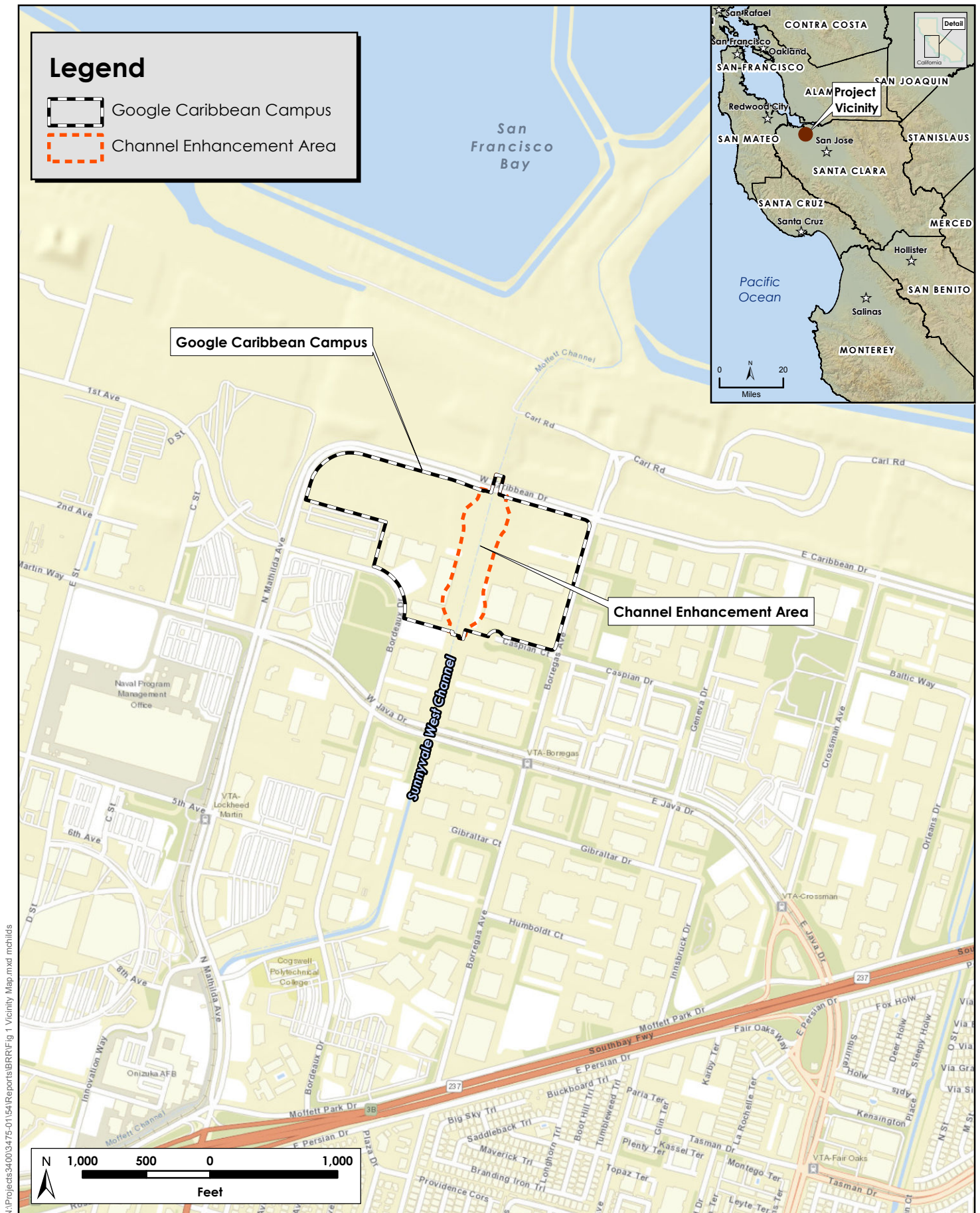
The proposed Google Caribbean Campus, West Channel Enhancement Project has modified a part of Valley Water's Clean, Safe Creeks and Natural Flood Protection (CSC) Plan to provide 100-year flood protection to approximately 1,618 properties and 47 acres within the city of Sunnyvale. Valley Water's Project involves constructing a series of infrastructure upgrades to provide additional flood protection and improve water quality and 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 Federal Emergency Management Agency flood hazard maps to reflect a 100-year flood protection along the improved storm drain channels and reduce or eliminate flood insurance requirements in the communities surrounding the Sunnyvale storm drain channels.
- Provide infrastructure improvements beyond 100-year flood protection as necessary to meet the Valley Water's freeboard standards.
- Provide water quality improvements by repairing/stabilizing existing erosion sites.
- Provide recommendations for recreational enhancements in coordination with flood and water quality improvements.

In lieu of conventional flood protection improvements planned by Valley Water's Flood Protection Project, Google's proposed Project, which is part of the development of their Caribbean Campus, includes an enhanced drainage corridor that will provide flood protection while improving campus aesthetics, increasing recreational opportunities, and enhancing wildlife habitat. The proposed Project will meet Valley Water's design criteria and Federal Emergency Management Agency's requirements for flood protection throughout the Project reach, including 100-year storm events and sea level rise, while enhancing tidal aquatic, estuarine wetland and riparian habitats.

## 1.2 Project Description

The Google Sunnyvale Caribbean Campus/West Channel Enhancement Project (Project) involves both landward and in-channel components encompassing 43.89 acres. The proposed Project includes two new five story office buildings totaling over 1,000,000 sq ft of space, a parking garage, and central utility plant. The Campus portion of the Project replaces thirteen existing office/research & development buildings. This will enhance the area by replacing a collection of aging, low density structures with two new buildings and a redesigned site. The Project responds to the City of Sunnyvale's goals set forth in the Moffett Park Specific Plan to increase development density of office and research & development in the area. In addition, the buildings are designed to minimize footprint through innovative sustainability strategies. For example, a series of cascading green roofs respond to the adjacent San Francisco Bay condition and reduce the carbon footprint of the Project. Planned central utility plants will optimize efficient building power and support future net positive water strategies.



The storm drain channel reach through the project site consists of an earthen channel with wetland patches along the length of the invert and ruderal grasslands on the existing levee slopes and banks. There are no trees or shrubs located within the bed and banks; however, there are several trees located beyond the top of bank along the toe of the outboard levee as part of landscaping for the adjacent, developed properties. Most of these trees are nonnative species and are too distant from the channel to provide substantial benefits to the aquatic habitats therein, or to be considered riparian woodland habitat and are scheduled for removal as part of the Caribbean campus project. All trees, including those mentioned in this report, were analyzed in the attached arborist report (Appendix A).

It is understood that the U.S. Army Corps of Engineers (USACE) is preparing a jurisdictional determination for this reach of the storm drain channel, based on Valley Water's submission of the *Preliminary Identification of Wetlands and Other Waters for the Sunnyvale East and West Channels Flood Protection Project* (H. T. Harvey & Associates 2013). Existing habitat areas and impact assessments herein are based on the 2013 delineation report. The storm drain channel reach in the project site supports a mix of tidal aquatic habitat (other waters) (0.73 ac), estuarine wetland (0.17) and ruderal riparian (0.44 ac) habitats and is hydrologically connected to San Francisco Bay through Guadalupe Slough and Moffett Channel. These habitats fall under the jurisdiction of USACE, San Francisco Bay Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW).

Google's proposed storm drain channel enhancement involves both landward and in-channel components, including the following:

- temporarily dewatering the storm drain channel during construction
- excavating the existing channel to meet new design grades
- building set-back levees
- grading a new storm drain channel with associated low-flow channel and floodplains
- constructing short sections of floodwalls at the upstream extent of the project reach to conform to Valley Water floodwall design elevations
- constructing two new bridge crossings (one exclusively for pedestrian use and one pedestrian-engineered to support emergency vehicle access at the Caspian Court extension)
- extending the box culvert with new headwall/floodwall to accommodate a sidewalk along West Caribbean Drive (as required by the City of Sunnyvale) and conform to the new earthen levee top
- relocating an existing storm drain pipe
- constructing a temporary bridge to accommodate a 3-year construction period
- implementing habitat mitigation and additional habitat creation

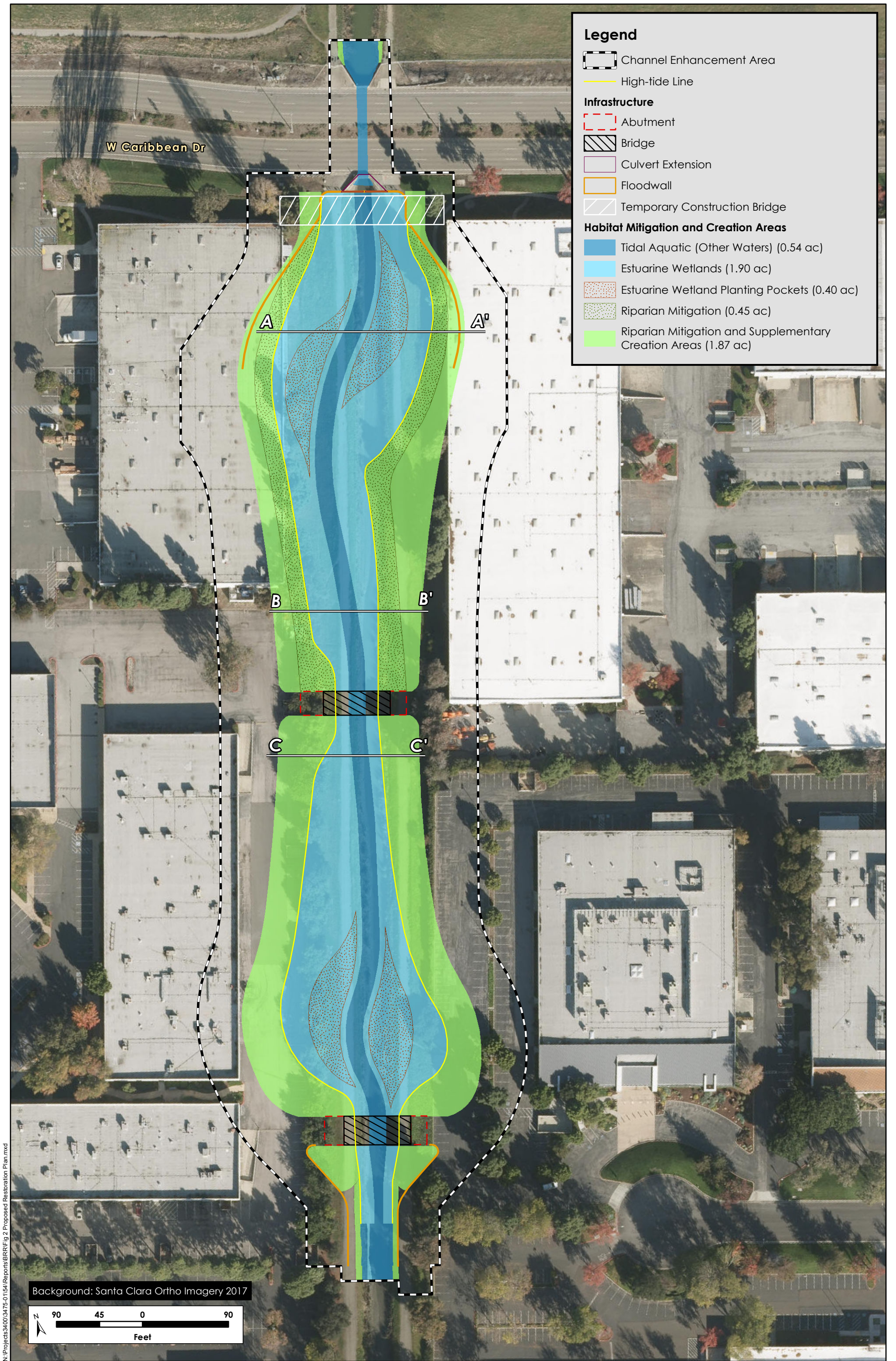


The project design (channel realignment, floodplain creation and levee reconstruction) will create conditions conducive to supporting diverse habitats, including tidal aquatic, estuarine wetland, willow-cottonwood riparian forest, oak riparian forest, and bayside scrub. Setting back the levees will allow creation of a more natural, meandering channel, with relatively broad hydrologically-connected floodplains that will be set at elevations below the high-tide line and provide conditions favorable for the natural recruitment of estuarine wetland plant species. It is anticipated that adjacent wetland plants located throughout the west channel will provide adequate seed sources to allow passive restoration (i.e., natural recolonization) within the project reach, although the project design does include installing small pockets of native wetland plantings. Four distinct native plant palettes are proposed for the levee banks. At the lower elevations along the banks, patches of willow-cottonwood riparian forest and a mesic mix of bayside scrub species will be installed. At the upper elevations but below the tops of banks, oak riparian forest will be interspersed with a mix of more drought-tolerant bayside scrub species. The patches of willow-cottonwood and oak riparian forest will be intermingled and discontinuous to create canopy gaps and provide view corridors into and across the channel enhancement area. All installed plants will be native to California and appropriate to the regional setting and habitat types. Levee slopes will also be seeded with an appropriate native grass and forb seed mix.

Project construction within the channel enhancement area will affect wetlands and waters of the United State/state and will result in temporary impacts on 0.72 ac of tidal aquatic habitat (other waters) and 0.16 ac of estuarine wetlands. In addition, there will be a small area of permanent impact to tidal aquatic habitat (0.01 ac) from the culvert extension. There will also be permanent changes to channel conditions from the realignment of the channel and from channel shading by the two proposed bridges, resulting in 0.01 ac of permanent impact to estuarine wetland habitat. Additional temporary impacts to existing habitats will include the removal of 0.43 ac of ruderal riparian grassland habitat associated with reconstruction of the levees and permanent conversion of 0.01 ac of ruderal riparian habitat to hardscape to accommodate construction of headwalls/floodwalls, one bridge abutment and the culvert extension.

The project proposes to provide onsite mitigation for temporary tidal aquatic impacts at a 1:1 ratio and permanent impacts at 2:1, through a combination of restored tidal aquatic (0.54 ac) and estuarine wetland habitats (0.24 ac) and increasing the linear footage of tidal aquatic habitat from 1,299 ln ft to 1,325 ln ft (Figure 2). The project proposes to mitigate for temporary estuarine wetland habitat impacts (dewatering and grading) at a 1.2:1 ratio and permanent impacts (shading from bridges) at a 2:1 ratio, totaling 0.21 ac of estuarine wetland. These mitigation ratios represent a total of 0.54 ac of tidal aquatic habitat and 0.45 ac of estuarine wetland habitat. Temporary impacts on ruderal riparian habitat will be mitigated at a 1:1 ratio and permanent impacts at a 2:1 ratio, resulting in a total of 0.46 ac. The actual area to be tracked for ruderal riparian habitat mitigation will be a dedicated zone along the lower levee slopes on both sides of the channel from the West Caribbean Drive culvert upstream to the first new pedestrian bridge. This area will provide stable vegetated slopes. Although woody species will be installed throughout this zone, they will not be linked to any specific monitoring or success criteria metrics because there will be no impacts on woody plants within existing jurisdictional areas.





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The project will create approximately 1.85 ac of additional estuarine wetland habitat on the expanded floodplains adjacent to the channel, resulting in a total of 2.30 ac of restored and created estuarine wetland habitat. In all, the area of waters of the United States/state (tidal aquatic habitat and estuarine wetlands) will be more than doubled, with a final anticipated area of 2.84 ac. The project will also create an additional 1.34 ac of riparian habitat for a total of 1.80 ac of restored riparian habitat along the banks. Through the implementation of the measures outlined in this report, replacement and enhancement of temporarily impacted habitats, and additional habitat creation, the project will substantially increase the area and quality of jurisdictional habitats through the project reach as compared to the current conditions. In addition, as detailed in this report, all potentially significant impacts identified in this report were previously identified and analyzed in prior EIRs, which also included mitigation prescriptions. Therefore, this report applies the previously adopted mitigation prescriptions to the project's potential impacts

The project will require the following regulatory agency permits or approvals:

- USACE – Clean Water Act (CWA) Section 404 Nationwide Permit 27 and Section 10 Letter of Permission
- CDFW – California Fish and Game Code Section 1600 Lake and Streambed Alteration Agreement
- San Francisco Bay RWQCB – CWA Section 401 Water Quality Certification

The Google Sunnyvale West Channel Enhancement Project is designed to conform to the requirements and measures for the Santa Clara Valley Water District's Sunnyvale East and West Channels Flood Control Project. All project actions will be executed in conformance with all requirements of the larger project and will apply all relevant avoidance measures and mitigation measures prescribed by the *Sunnyvale East and West Storm Drain Channels Flood Protection Project Environmental Impact Report* (SEWSDC EIR) (SCVWD 2014). There are no impacts to biological resources or mitigation measures relative to those impacts in this report that are not covered under the SEWSDC EIR and impacts and mitigation measures presented in this report conform to the impacts and mitigations to the same specific resources covered under the SEWSDC EIR. In addition, The City of Sunnyvale Land Use and Transportation Element Environmental Impact Report (LUTE EIR) analyzes the potential environmental effects associated with the implementation of the LUTE, which is an element of the City of Sunnyvale General Plan. The EIR analysis focuses on environmental impacts that could arise through development of the land uses in Sunnyvale as regulated and guided by the LUTE. The EIR was prepared as a program EIR per CEQA guidelines Section 15168. Thus, any impacts previously analyzed by the LUTE EIR will be acknowledged, in this report, as being covered under the LUTE program EIR.

## **1.2.1 In-Channel Components**

### **1.2.1.1 Water Diversion**

A temporary water diversion plan for the Project has been prepared that will maintain the work area as water-free as possible. The plan addresses the placement of cofferdams, cofferdam construction, best management practices (BMPs) to avoid discharge of sediment into waters of the United States, construction phasing and

timing, placement of a water diversion pipe that will maintain upstream flow into the lower reaches of the storm drain channel, and the removal of the water diversion equipment after construction ends. In-channel work will require two April – October construction seasons to complete, and dewatering will occur during both seasons (Appendix B).

The full width and length of the storm drain channel through the Channel Enhancement reach will be dewatered and all construction and grading work will be implemented under dewatered conditions during both years. Water encroachment is expected from bay tides and urban runoff flows from upstream. Cofferdams will be placed downstream and upstream of the Channel Enhancement reach to prevent tidal and stream flows from entering the work site.

The anticipated maximum storm drain channel flow during the construction period (from April 15 to October 15) is 12 cubic feet per second (cfs). This flow estimate is based on an upstream drainage area of 2.87 square miles and weighted based on drainage area to the maximum summer flows recorded in nearby San Francisquito Creek.

Each construction season, an aquadam or sheet pile cofferdam will be placed on the bay side of West Caribbean Drive and will prevent bay tidal waters from entering the work site from the downstream side. The aquadam will be inflated to a height of 9 ft North American Vertical Datum (NAVD88) from the existing downstream invert of the West Caribbean bridge culvert. The upstream cofferdam will prevent stream flows from entering the work site. The upstream cofferdam will be constructed using earthen materials or an aqua dam.

A 28-inch (in) diameter fused high-density polyethylene (HDPE) pipe or multiple pipes with an equivalent carrying capacity will be installed to bypass the construction area. The pipe(s) will use gravity to convey water impounded by the upstream cofferdam to the low-flow storm drain channel below the lower cofferdam. If gravity is not effective in conveying water due to tidal influence, pumps will be used as necessary. Riprap (up to ½ ton) will be placed at the downstream discharge point of the pipe to prevent erosion of the storm drain channel bed. The pipe outlets will be placed above the mean high water (MHW) line. Additionally, an energy flow dissipater will be installed downstream of the aquadam or sheet pile cofferdam to reduce erosion, sedimentation, and siltation associated with the diversion. The riprap and energy dissipater are temporary fills and will be fully removed from the channel following each construction season.

A dry season contingency plan will be in place to mitigate a dry season precipitation event or high tide event that could exceed the design capacity of the dewatering system. If the volume of water impounded at the upstream coffer dam or tide levels at the downstream aquadam exceeds the capacity of the dewatering system, the excess water will be pumped into baker tanks for temporary storage and then pumped back into the dewatering system when the system returns to normal capacity. Additionally, if groundwater seepage occurs within the dewatered reach, pumps will be used to discharge the seepage flows into the intakes of the HDPE pipe(s).

A contingency plan will be in place in case of failure of the dewatering system. The dewatering system could fail due to mechanical problems or unusually heavy flows exceeding the design flow. Spare pipe materials, fittings, and pumps will be stored on site to facilitate timely repairs of damaged parts, thereby ensuring that the system has a high degree of reliability and operability. Additional pumps and baker tanks will also be maintained on site. Excess flows will be filtered through the baker tanks and appropriately discharged downstream of the active reach.

In the case of actual or incipient system failure, the contractor will immediately perform all practical actions to remove sources of pollutants associated with the construction effort from the storm drain channel or prevent their entrainment by water flowing in the storm drain channel. This includes removing equipment and vehicles from the storm drain channel and protecting material stockpiles from in-channel flows.

Dewatering is expected to occur from April 15 – October 15 in both year 1 and year 2 of in-stream construction. When all work within the construction area is complete and no access to the storm drain channel will be required for that winter, the temporary water diversion system and cofferdams will be removed. Dewatering infrastructure removal will occur within 48 hours after construction work ends for the season and no later than October 15, unless permitted by the San Francisco Bay Regional Water Quality Control Board. Flows will be restored within the new construction area in a manner that minimizes erosion and any ponded waters will be directed into the established storm drain channel. Dewatering infrastructure removal will start with the riprap/energy flow dissipater and downstream aquadam, followed by pipe sections moving up to the upstream cofferdam.

## **1.2.2 Excavation and Grading**

The storm drain channel will expand from 52–65 ft wide from top of bank to top of bank to a varying bank-to-bank width of 127–187 ft. The levees will be widened and raised to an elevation of 18 ft NAVD88. The design incorporates a low-flow storm drain channel with a broadened floodplain and laid-back levees banks. The proposed storm drain channel is generally straight through the reach with small meander bends and the variance mostly associated with coming from width. Storm drain channel invert elevations are designed to match the existing channel invert, which is estimated to be the long term sedimentation elevation. Spoils from this excavation and grading will be reused to re-contour the new channel and spoils not used will be off-hauled from the Project site and legally disposed of at an approved landfill facility.

As described above, excavation and grading of the channel will occur over two construction seasons. During the first year, expected to occur in spring – fall of 2021 all major grading and structures such as bridges and the culvert extension would be constructed. During the second year, finish grading, completion of floodwalls and installation of irrigation and plantings would occur. At the end of the first season of construction, the channel will be re-watered during the winter months; it will be dewatered again before the start of the second season. Dewatering and re-watering will be completed according to the procedure outlined in the water diversion section above and included in the Dewatering Plan for the Google West Channel Enhancement (Schaaf & Wheeler 2019).

### **1.2.3 Transportation and Utility Components**

#### **1.2.3.1 Bridge Crossings**

The Project includes two proposed permanent bridges and one temporary bridge for construction access. The two permanent bridges will consist of a pedestrian bridge in the middle of campus measuring 70 ft long by 22 ft wide and a pedestrian/emergency vehicle bridge at Caspian Court measuring 70 ft long by 30 ft wide. The bridges will be designed to fre-span the storm drain channel with 4 feet of freeboard to account for the 100-year high discharge rate of 380 cfs, which is 13.87 ft NAVD88 upstream of the Channel Enhancement reach. Due to the urbanized source of the flow to the storm drain channel and no natural upstream watershed, it is unlikely that large debris (e.g., trees) would be carried in the storm drain channel and cause an obstruction of flow at the bridges. The fre-span design will not result in impacts to the storm drain channel hydraulics or the target design water surface criteria.

A total of four cast-in-place concrete sill abutments (two per permanent bridge) will be constructed to support the bridge decks. Each abutment measures approximately 15 ft wide by 18 ft tall by 19 ft long and will be supported by driven steel pile foundations (24" diameter steel pipe or H-pile). All four abutments will be placed outside of waters of the U.S. The bridges will be constructed in the first season of in-channel construction, expected to be spring – fall 2021.

The temporary construction bridge will be installed near West Caribbean Drive and will not result in impacts to waters of the United States. It is required to allow access between the Caribbean 100 and 200 work areas over the channel during construction of the larger campus. It will be a fre-span design (railroad Flatcar Bridge) over the storm drain channel supported by earthen abutments constructed on top of the current levees. The bridge would be installed when construction of campus elements begins, anticipated in spring of 2020, and would remain in place for the duration of the channel enhancement project. This bridge would have greater freeboard than the bankfull capacity of the existing channel, so no blockages or impacts to winter flows are anticipated.

#### **1.2.4 Culvert Extension/Headwall and Floodwalls**

The culvert extension will be a cast-in-place concrete structure, new cast-in-place headwall, and the existing box culvert. Temporary shoring and falsework will be erected to support the culvert extension during construction. Construction equipment will include a land-based crane, concrete transit trucks, concrete pumpers, material delivery trucks, air compressors, generators, loaders, backhoes, and dump trucks.

#### **1.2.5 Storm Drain Relocation**

The Project will require the relocation of a 48-inch diameter City of Sunnyvale storm drain line which runs within a City easement parallel to the Valley Water right-of-way on the west side of the storm drain channel, along the outboard side of the levee. The storm drain line will be relocated outside of the proposed realignment of the storm drain channel and levee. No storm drain outfalls that flow into the storm drain channel are



proposed by the Project; therefore, the storm drain relocation will not result in impacts to waters of the United States.

## **1.3 Construction Methods**

### **1.3.1 Vegetation Removal**

Delays in construction could jeopardize the ability of the project to complete rough/mass grading of the channel during the first construction season. Therefore, due to the density of existing emergent wetland vegetation throughout the channel enhancement reach, the project proposes to remove channel vegetation outside the nesting bird season, prior to February 1, 2021, in preparation for year 1 construction. Vegetation will be cut at the mudline at low tide using hand tools and removed from the channel. Because substantial disturbance of the channel bottom is not anticipated, no turbidity curtains will be necessary. The in-channel vegetation will then be maintained at a very low height unsuitable for nesting birds until April 15, 2021 in preparation for year 1 dewatering activities. Due to mass grading of the channel during year 1, the channel is likely to remain unvegetated or very sparsely vegetated during the winter of 2021-2022 in between the two in-channel construction seasons. However, if this is not the case and suitable substrate for nesting birds develops quickly during the 2021-2022 winter, vegetation removal would again be necessary prior to February 1, 2022 and then maintained until April 2022 in anticipation of dewatering activities for year 2.

Installation of the temporary bridge will be necessary in 2020, the year prior to commencing instream earthwork, to facilitate movement of construction vehicles and workers associated with campus construction activities. As previously described, installation of the temporary bridge will not result in any impacts to waters of the U.S.

### **1.3.2 Grading and Earthwork**

The entire storm drain channel will be contour graded by a combination of removing and reusing existing material, as appropriate, and importing earthen fill to construct the levees. The Project will match the existing invert of the channel, widen the channel cross-section, and raise the levee elevations. It is anticipated that cutting to the finish grade within floodplain areas (i.e. estuarine wetland habitat) will expose suitable soil conditions that will not require any additional treatment or amendments and will support both actively planted and naturally recruited tidal wetland species. However, a project specific site management plan will be prepared that outlines the protocol to ensure floodplain soils meet appropriate requirements for soil and sediment characteristics for areas subject to tidal inundation. The levees will be constructed to meet geotechnical stability requirements and will include placement of a stable 3 ft deep zone of horticulturally suitable soil as the final series of lifts across the inboard levee slopes to facilitate long-term establishment of the riparian plantings. The project's construction documents will provide detailed drawings and specifications for the grading and soil preparation. Rough grading will be performed prior to construction of bridge, culvert extension/headwall or floodwall construction and after dewatering activities. Construction equipment will include bulldozers, excavators, soil compactors, air compressors, generators, loaders, backhoes, and dump trucks.

### **1.3.3 Bridge Construction**

The proposed pedestrian bridges will be single-span, cast-in-place reinforced concrete slab structures and the abutments will be cast-in-place concrete structures supported by piles. After excavation and grading, the piles will be installed with specialized equipment. Once the piles are driven, formwork for the abutments and header cap for the bent will be installed on top of the piles. The formwork will subsequently be removed and falsework will be installed on the abutments and header cap to support the bridge during construction. After completion of the bridge, the falsework will be removed. Construction equipment will include a land-based crane, concrete transit trucks, concrete pumpers, material delivery trucks, air compressors, generators, loaders, backhoes, and dump trucks.

### **1.3.4 Culvert Extension/Headwall**

The culvert extension will be a cast-in-place concrete structure supported by a steel beam, new headwall, and the existing box culvert. Once the steel support beam is installed on the existing headwall, falsework will be erected to support the culvert extension during construction. Construction equipment will include a land-based crane, concrete transit trucks, concrete pumpers, material delivery trucks, air compressors, generators, loaders, backhoes, and dump trucks.

### **1.3.5 Floodwall Construction**

The floodwalls will be cast-in-place concrete structures. After excavation and grading, formwork for the floodwalls will be installed and concrete poured using land-based concrete transit trucks. Once the concrete has gained adequate strength, the formwork will be removed. Construction equipment will include a land-based crane, concrete transit trucks, concrete pumpers, material delivery trucks, air compressors, generators, loaders, backhoes, and dump trucks.

### **1.3.6 Construction Staging**

Equipment and construction materials will be staged in existing open areas above the top of the bank.

### **1.3.7 Construction Schedule**

Construction is expected to begin in 2020 with landside elements, including installation of the temporary bridge over the channel. The first activities to impact regulated habitats specific to the channel enhancement would be vegetation removal prior to the nesting bird season prior to February 1, 2021. Construction would then be completed over the next 2 years (2021-2022). The storm drain channel will be excavated and contoured, and the bridges and culvert extension will be built during the first in-channel construction season from April 15 – October 15, 2021. Finish grading, completions of floodwalls, and other final improvements such as the installation of irrigation and plantings would occur during the second in-channel construction season, anticipated in April 15 – October 15, 2022.

Ground-disturbing work within the storm drain channel and wetland areas will only occur in the dry season (i.e., between April 15 and October 15). Additionally, once the new topography of the storm drain channel is established, this temporal restriction will extend to all areas within the new top of bank. Work in areas outside the current and proposed top of bank, and access over the temporary bridge, may take place in the wet season. Best management practices and measures to protect potential fish, wildlife, and plant resources for wet season work are included in Box 9 Attachment below. Specific activities are discussed in further detail below:

Work to Occur in Waters or Wetland Areas between April 15 and October 15

- All grading, excavation, and dewatering related to widening the storm drain channel
- Grading and dewatering related to bridge abutment construction, placement of abutment structures, and placement of bridge decks
- Culvert extension and headwall construction
- Floodwall construction

Work that May Occur in Waters or Wetland Areas between October 15 and April 15

- Installation of erosion control measures and BMPs within completed work areas for the season
- Planting and/or seeding of restored areas
- All campus development beyond the top of the enclosing levee (either current or proposed levee, whichever is existing at that time)
- Construction of and/or access over the temporary construction bridge
- Vegetation removal using hand tools

## Section 2. Methods

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### 2.1 Background Review

Prior to conducting field work, H. T. Harvey & Associates ecologists reviewed aerial images (Google Inc. 2019) of the project area; a U.S. Geological Survey (USGS) topographic map; the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB 2019); and other relevant scientific literature and technical databases. Previous reports prepared for the project vicinity were also reviewed, including the Final Environmental Impact Reports (EIR) for the SCVWD Sunnyvale East and West Channels Flood Protection Project (SCVWD 2014); the Sunnyvale East and West Channels Flood Protection Project – Preliminary Identification of Wetland and Other Waters (H. T. Harvey and Associates 2013); and Biological Resources Reports for the Google West Borregas Campus (H.T. Harvey and Associates 2017a) and Google Caribbean Campus Project (H.T. Harvey and Associates 2017b). In addition, for plants, we reviewed all species on current California Native Plant Society (CNPS) California Rare Plant Rank (CRPR) 1A, 1B, 2A, and 2B lists occurring in the *Mountain View, California* 7.5-minute USGS quadrangle and surrounding eight quadrangles (*San Jose West, Palo Alto, Redwood Point, Niles, Milpitas, Newark, Cupertino, Mindego Hill, and La Honda*). Quadrangle-level results are not maintained for CRPR 3 and 4 species, so we also conducted a search of the CNPS Inventory records for these species occurring in Santa Clara County (CNPS 2019). In addition, we queried the CNDDB (2019) for natural communities of special concern that occur in the project region. For the purposes of this report, the “project vicinity” encompasses a 5-mi radius surrounding the study area.

### 2.2 Site Visits

Reconnaissance-level field surveys of the study area were conducted by H. T. Harvey & Associates senior wildlife ecologist Robin Carle on March 24 and July 18, 2017 and an additional visit by senior wildlife ecologist Scott Terrill, Ph.D. on February 5, 2019 to evaluate the current habitats associated with the channel. Specifically, surveys were conducted to (1) assess existing biotic habitats and general plant and wildlife communities in the study area, (2) assess the potential for the project to impact special-status species and/or their habitats, and (3) identify potential jurisdictional habitats, such as waters of the U.S./State and riparian habitat.

## Section 3. Regulatory Setting

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Biological resources in the study area are regulated by a number of federal, state, and local laws and ordinances, as described below.

### 3.1 Federal

#### 3.1.1 Clean Water Act

The Clean Water Act (CWA) functions to maintain and restore the physical, chemical, and biological integrity of waters of the U.S., which include, but are not limited to, tributaries to traditionally navigable waters currently or historically used for interstate or foreign commerce, and adjacent wetlands. Historically, in non-tidal waters, U.S. Army Corp of Engineers (USACE) jurisdiction extends to the ordinary high water (OHW) mark, which is defined in Title 33, Code of Federal Regulations (CFR), Part 328.3. If there are wetlands adjacent to channelized features, the limits of USACE jurisdiction extend beyond the OHW mark to the outer edges of the wetlands. Wetlands that are not adjacent to waters of the U.S. are termed “isolated wetlands” and, depending on the circumstances, may be subject to USACE jurisdiction. In tidal waters, USACE jurisdiction extends to the landward extent of vegetation associated with salt or brackish water or the high tide line. The high tide line is defined in 33 CFR Part 328.3 as “the line of intersection of the land with the water’s surface at the maximum height reached by a rising tide.” If there are wetlands adjacent to channelized features, the limits of USACE jurisdiction extend beyond the OHW mark or high tide line to the outer edges of the wetlands.

Construction activities within jurisdictional waters are regulated by the USACE. The placement of fill into such waters must comply with permit requirements of the USACE. No USACE permit will be effective in the absence of Section 401 Water Quality Certification. The State Water Resources Control Board (SWRCB) is the state agency (together with the Regional Water Quality Control Boards [RWQCBs]) charged with implementing water quality certification in California.

Project Applicability: A jurisdictional wetland delineation has identified portions of the study area that contain wetlands which are considered waters of the U.S. by the USACE. Any placement of fill within waters of the U.S. would likely be considered a significant impact under CEQA unless mitigated and would require a Section 404 permit from the USACE. Ultimately the project will result in a net gain of acreage of waters and wetlands as well as a functional enhancement of existing waters.

#### 3.1.2 Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 prohibits the creation of any obstruction to the navigable capacity of waters of the U.S., including discharge of fill and the building of any wharfs, piers, jetties, and other structures without Congressional approval or authorization by the Chief of Engineers and Secretary of the Army (33 U.S.C. 403).



Navigable waters of the U.S., which are defined in 33 CFR, Part 329.4, include all waters subject to the ebb and flow of the tide, and/or those which are presently or have historically been used to transport commerce. The shoreward jurisdictional limit of tidal waters is further defined in 33 CFR, Part 329.12 as “the line on the shore reached by the plane of the mean (average) high water.” It is important to understand that the USACE does not regulate wetlands under Section 10, only the aquatic or open waters component of bay habitat, and that there is overlap between Section 10 jurisdiction and Section 404 jurisdiction. According to 33 CFR, Part 329.9, a waterbody that was once navigable in its natural or improved state retains its character as “navigable in law” even though it is not presently used for commerce as a result of changed conditions and/or the presence of obstructions. Historical Section 10 waters may occur behind levees in areas that are not currently exposed to tidal or muted-tidal influence, and meet the following criteria: (1) the area is presently at or below the mean high water line; (2) the area was historically at or below mean high water in its “unobstructed, natural state”; and (3) there is no evidence that the area was ever above mean high water.

As mentioned above, Section 404 of the CWA authorizes the USACE to issue permits to regulate the discharge of dredged or fill material into waters of the U.S. If a project also proposes to discharge dredged or fill material and/or introduce other potential obstructions in navigable waters of the U.S., a Letter of Permission authorizing these impacts must be obtained from the USACE under Section 10 of the Rivers and Harbors Act.

Project Applicability: Northern portions of the study area overlap with historical bay lands (Nichols and Wright 1971), are below the mean high water elevation, and are separated from tidal influence by dikes or levees. Therefore, historical Section 10 Waters are present in the study area. If direct project impacts fall within these areas, a Letter of Permission would be required from the USACE. Current Section 10 Waters are not present in the study area.

### **3.1.3 Federal Endangered Species Act**

The Federal Endangered Species Act (FESA) protects federally listed wildlife species from harm or “take”, which is broadly defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct.” Take can also include habitat modification or degradation that directly results in death or injury of a listed wildlife species. An activity can be defined as “take” even if it is unintentional or accidental. Listed plant species are provided less protection than listed wildlife species. Listed plant species are legally protected from take under FESA only if they occur on federal lands.

The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) have jurisdiction over federally listed, threatened, and endangered species under FESA. The USFWS also maintains lists of proposed and candidate species. Species on these lists are not legally protected under FESA, but may become listed in the near future and are often included in their review of a project.

Project Applicability: The *Sunnyvale East and West Storm Drain Channels Flood Protection Project Environmental Impact Report* (SEWSDC EIR) reviews the status of all the special-status species that are known to occur in the

Sunnyvale West Channel site, that may occur on the site, and that occur regionally, but are not likely to occur on the site (SCVWD 2013). Only those species determined to be present or likely to be present along the project reach of the Sunnyvale West Channel are covered in this Biological Resources Report. Two federally listed species and/or their critical habitat have the potential to occur in the project site: Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and North American green sturgeon (*Acipenser medirostris*). The project reach of the Sunnyvale West Channel comprises critical habitat for both the federally listed species. Longfin smelt (*Spirinchus thaleichthys*), a species listed as threatened under the California Endangered Species Act and a Candidate for listing under the Federal Endangered Species Act, also has the potential to occur in the project area.

Due to the marginal quality of the habitat and very low summer flows, as well as inclusion of avoidance measures designed to protect fish, the USACE previously concluded that the SCVWD Flood Protection project would not require Section 7 Consultation for activities in this reach (pers. communication between SCVWD and Keith Hess of the USACE, July 29, 2017).

### **3.1.4 Magnuson-Stevens Fishery Conservation and Management Act**

The Magnuson-Stevens Fishery Conservation and Management Act governs all fishery management activities that occur in federal waters within the United States' 200-nautical-mile limit. The Act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans (FMPs) to achieve the optimum yield from U.S. fisheries in their regions. These councils, with assistance from the NMFS, establish Essential Fish Habitat (EFH) in FMPs for all managed species. Federal agencies that fund, permit, or implement activities that may adversely affect EFH are required to consult with the NMFS regarding potential adverse effects of their actions on EFH, and respond in writing to recommendations by the NMFS.

Project Applicability: Due to the marginal quality of the habitat and very low summer flows, as well as inclusion of avoidance measures designed to protect fish, the USACE previously concluded that the SCVWD Flood Protection project would not require Section 7 Consultation for activities in this reach (pers. communication between SCVWD and Keith Hess of the USACE, July 29, 2017). Several project measures, intended to protect aquatic wildlife and habitat that require passive fish relocation and measures to prevent entrapment, will be implemented to avoid and minimize impacts to Essential Fish Habitat (EFH) within the project reach and any fish regulated by the Coastal Pelagics and Pacific Groundfish Fishery Management Plan. Dewatering and other BMPs, as described in the project's regulatory permit applications, will further be used to prevent water-quality impacts. In-channel work will be restricted to the dry season from April 15 to October 15, when flows are low and warm within the channel and listed fish are not expected to occur.

### **3.1.5 Federal Migratory Bird Treaty Act**

The federal Migratory Bird Treaty Act (MBTA), 16 U.S.C. Section 703, prohibits killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. The MBTA protects whole birds, parts of birds, and bird eggs and nests, and prohibits the possession of all nests of

protected bird species whether they are active or inactive. An active nest is defined as having eggs or young, as described by the Department of the Interior in its April 16, 2003 Migratory Bird Permit Memorandum. Nest starts (nests that are under construction and do not yet contain eggs) are not protected from destruction. Per a December 22, 2017 memorandum issued by the U.S. Department of the Interior, the MBTA's prohibition on taking migratory birds and their active nests applies only to direct, purposeful actions, and does not include take incidental to other activities. However, native birds are protected from direct take and take incidental to other activities by California state law under the California Department of Fish and Wildlife Code (see below).

Project Applicability: All native bird species that occur in the study area are protected under the MBTA and the state Fish and Wildlife Code. "Take –avoidance" measures for these species are presented below. These measures are taken to comply with relevant regulations.

## 3.2 State

### 3.2.1 Clean Water Act Section 401/Porter-Cologne Water Quality Control Act

The SWRCB works in coordination with the nine RWQCBs to preserve, protect, enhance, and restore water quality. Each RWQCB makes decisions related to water quality for its region, and may approve, with or without conditions, or deny projects that could affect waters of the State. Their authority comes from the CWA and the State's Porter-Cologne Water Quality Control Act (Porter-Cologne). Porter-Cologne broadly defines waters of the State as "any surface water or groundwater, including saline waters, within the boundaries of the state." Because Porter-Cologne applies to any water, whereas the CWA applies only to certain waters, California's jurisdictional reach overlaps and may exceed the boundaries of waters of the U.S. For example, Water Quality Order No. 2004-0004-DWQ states that "shallow" waters of the State include headwaters, wetlands, and riparian areas. Moreover, the San Francisco Bay Region RWQCB's Assistant Executive Director, has stated that, in practice, the RWQCBs claim jurisdiction over riparian areas. Where riparian habitat is not present, such as may be the case at headwaters, jurisdiction is taken to the top of bank.

Pursuant to the CWA, projects that are regulated by the USACE must also obtain a Section 401 Water Quality Certification permit from the RWQCB. This certification ensures that the proposed project will uphold state water quality standards. Because California's jurisdiction to regulate its water resources is much broader than that of the federal government, proposed impacts on waters of the State require Water Quality Certification even if the area occurs outside of USACE jurisdiction. Moreover, the RWQCB may impose mitigation requirements even if the USACE does not. Under the Porter-Cologne, the SWRCB and the nine regional boards also have the responsibility of granting CWA National Pollutant Discharge Elimination System (NPDES) permits and Waste Discharge Requirements for certain point-source and non-point discharges to waters. These regulations limit impacts on aquatic and riparian habitats from a variety of urban sources.

Project Applicability: A verified jurisdictional wetland delineation has identified portions of the study area that contain wetlands which are considered waters of the State by the RWQCB. Such areas would fall under jurisdiction of the San Francisco RWQCB, and a Section 401 Water Quality Certification would be required if

any impacts on these waters would occur. Ultimately the project will result in a net gain of acreage wetlands as well as a functional enhancement of these areas.

### 3.2.2 California Endangered Species Act

The California Endangered Species Act (CESA; California Fish and Game Code, Chapter 1.5, Sections 2050-2116) prohibits the take of any plant or animal listed or proposed for listing as rare (plants only), threatened, or endangered. In accordance with CESA, the CDFW has jurisdiction over state-listed species (Fish and Game Code 2070). The CDFW regulates activities that may result in “take” of individuals (i.e., “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill”). Habitat degradation or modification is not expressly included in the definition of “take” under the California Fish and Game Code. The CDFW, however, has interpreted “take” to include the “killing of a member of a species which is the proximate result of habitat modification.”

Project Applicability: No suitable habitat for any state listed plant species occurs in the study area. Thus, no state listed plant species are expected to occur in the study area. One California Endangered Species Act avian species listed as threatened, the tricolored blackbird (*Agelaius tricolor*), has the potential to be present in the project area, and is discussed below.

### 3.2.3 California Environmental Quality Act

CEQA is a state law that requires state and local agencies to document and consider the environmental implications of their actions and to refrain from approving projects with significant environmental effects if there are feasible alternatives or mitigation measures that can substantially lessen or avoid those effects. CEQA requires the full disclosure of the environmental effects of agency actions, such as approval of a general plan update or the projects covered by that plan, on resources such as air quality, water quality, cultural resources, and biological resources. The State Resources Agency promulgated guidelines for implementing CEQA are known as the State CEQA Guidelines.

Section 15380(b) of the State CEQA Guidelines provides that a species not listed on the federal or state lists of protected species may be considered rare if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definitions in FESA and CESA and the section of the California Fish and Game Code dealing with rare or endangered plants and animals. This section was included in the guidelines primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on a species that has not yet been listed by either the USFWS or CDFW or species that are locally or regionally rare.

The CDFW has produced three lists (amphibians and reptiles, birds, and mammals) of “species of special concern” that serve as “watch lists”. Species on these lists are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Thus, their populations should be monitored. They may receive special attention during environmental review as potential

rare species, but do not have specific statutory protection. All potentially rare or sensitive species, or habitats capable of supporting rare species, are considered for environmental review per the CEQA Section 15380(b). The CNPS, a non-governmental conservation organization, has developed CRPRs for plant species of concern in California in the Inventory of Rare and Endangered Plants (CNPS 2019). The CRPRs include lichens, vascular, and non-vascular plants, and are defined as follows:

- CRPR 1A        Plants considered extinct.
- CRPR 1B        Plants rare, threatened, or endangered in California and elsewhere.
- CRPR 2A        Plants considered extinct in California but more common elsewhere.
- CRPR 2B        Plants rare, threatened, or endangered in California but more common elsewhere.
- CRPR 3         Plants about which more information is needed - review list.
- CRPR 4         Plants of limited distribution-watch list.

The CRPRs are further described by the following threat code extensions:

- .1—seriously endangered in California;
- .2—fairly endangered in California;
- .3—not very endangered in California.

Although the CNPS is not a regulatory agency and plants on these lists have no formal regulatory protection, plants appearing as CRPR 1B or 2 are, in general, considered to meet CEQA’s Section 15380 criteria, and adverse effects on these species may be considered significant. Impacts on plants that are listed by the CNPS as CRPR 3 or 4 are also considered during CEQA review, although because these species are typically not as rare as those of CRPR 1B or 2, impacts on them are less frequently considered significant.

Rare Plants Project Applicability: The CNDDB (2017) and the CNPS Inventory of Rare and Endangered Plants (CNPS 2017) were queried for rare plant species that occur in the project region. The majority of potentially occurring rare plant species were determined to be absent from the project site for at least one of the following reasons: (1) absence of suitable habitat types; (2) lack of specific microhabitat or edaphic requirements, such as serpentine soils; (3) the elevation range of the species is outside of the range on the site; and/or (4) the species is presumed extirpated from the project region. Based on this analysis and the habitat types observed during the site survey, Congdon’s tarplant, which has a CNPS Rare Plant Ranking of 1B.1 (seriously threatened in California), was the only special-status plant species determined to have the potential to occur on the site, but determined to be absent from the site (see below).

Compliance with CEQA Guidelines Section 15065(a) requires consideration of natural communities of special concern, in addition to plant and wildlife species. Vegetation types of “special concern” are tracked in Rarefind



(CNDDDB 2019). Further, the CDFW ranks sensitive vegetation alliances based on their global (G) and state (S) rankings analogous to those provided in the CNDDDB. Global rankings (G1–G5) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas S rankings reflect the condition of a habitat within California. If an alliance is marked as a G1–G3, all the associations within it would also be of high priority. The CDFW provides the Vegetation Classification and Mapping Program’s currently accepted list of vegetation alliances and associations (CDFW 2019).

Project Applicability: All potential impacts on biological resources will be considered during CEQA review of the project. This Biological Resources Report assesses these impacts to facilitate project planning and CEQA review of the project by the City of Sunnyvale. Project impacts are discussed in Section 6 below.

### 3.2.4 California Fish and Game Code

Ephemeral and intermittent streams, rivers, creeks, dry washes, sloughs, blue line streams on USGS maps, and watercourses with subsurface flows fall under CDFW jurisdiction. Canals, aqueducts, irrigation ditches, and other means of water conveyance may also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. A *stream* is defined in Title 14, California Code of Regulations Section 1.72, as “a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports fish and other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation.” Using this definition, the CDFW extends its jurisdiction to encompass riparian habitats that function as part of a watercourse. California Fish and Game Code Section 2786 defines *riparian habitat* as “lands which contain habitat which grows close to and which depends upon soil moisture from a nearby freshwater source.” The lateral extent of a stream and associated riparian habitat that would fall under the jurisdiction of the CDFW can be measured in several ways, depending on the particular situation and the type of fish or wildlife at risk. At minimum, the CDFW would claim jurisdiction over a stream’s bed and bank. In areas that lack a vegetated riparian corridor, CDFW jurisdiction would be the same as USACE jurisdiction. Where riparian habitat is present, the outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats.

Pursuant to California Fish and Game Code Section 1603, the CDFW regulates any project proposed by any person that will “substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds.” California Fish and Game Code Section 1602 requires an entity to notify the CDFW of any proposed activity that may modify a river, stream, or lake. If the CDFW determines that proposed activities may substantially adversely affect fish and wildlife resources, a Lake and Streambed Alteration Agreement (LSAA) must be prepared. The LSAA sets reasonable conditions necessary to protect fish and wildlife, and must comply with CEQA. The applicant may then proceed with the activity in accordance with the final LSAA.

Specific sections of the California Fish and Game Code describe regulations pertaining to protection of certain wildlife species. For example, Code Section 2000 prohibits take of any bird, mammal, fish, reptile, or amphibian except as provided by other sections of the code.

The California Fish and Game Code Sections 3503, 3513, and 3800 (and other sections and subsections) protect native birds, including their nests and eggs, from all forms of take. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “take” by the CDFW. Raptors (i.e., eagles, hawks, and owls) and their nests are specifically protected in California under Code Section 3503.5. Section 3503.5 states that it is “unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.”

Bats and other non-game mammals are protected by California Fish and Game Code Section 4150, which states that all non-game mammals or parts thereof may not be taken or possessed except as provided otherwise in the code or in accordance with regulations adopted by the commission. Activities resulting in mortality of non-game mammals (e.g., destruction of an occupied nonbreeding bat roost, resulting in the death of bats), or disturbance that causes the loss of a maternity colony of bats (resulting in the death of young), may be considered “take” by the CDFW.

Project Applicability: The west Sunnyvale channel would be considered a river or streams regulated by the CDFW under California Fish and Game Code Section 1603 and therefore any work on this channel would require a LSAA from CDFW. Most native bird, mammal, and other wildlife species that occur in the study area and in the immediate vicinity are protected by the California Fish and Game Code. Measures to comply with the relevant migratory bird sections of the code are presented below.

## **3.3 Local**

### **3.3.1 Santa Clara Valley Water District**

The project is designed to conform to the requirements and measures for the SCVWD’s Sunnyvale East and West Channels Flood Control Project. The existing Sunnyvale East and West Channels were constructed by the SCVWD in the 1960’s and 1970’s to alleviate local ponding resulting from historic ground subsidence and in cooperation with the local storm drain systems of Sunnyvale and Cupertino designed for a 10-year storm by directing the flows through the channels to San Francisco Bay. Since construction of the channels, the project area has experienced flooding during major storm events in 1963, 1968, 1983, 1986 and 1998.

The proposed Caribbean Campus/West Channel Enhancement Project has modified a part of SCVWD’s Clean, Safe Creeks and Natural Flood Protection (CSC) Plan to provide 100-year flood protection to approximately 1,618 properties and 47 acres within the city of Sunnyvale. The SCVWD’s Project involves constructing a series of infrastructure upgrades to provide additional flood protection and improve water quality and 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 Federal Emergency Management Agency flood hazard maps to reflect a 100-year flood protection along the improved storm drain channels and reduce or eliminate flood insurance requirements in the communities surrounding the Sunnyvale storm drain channels.
- Provide infrastructure improvements beyond 100-year flood protection as necessary to meet the SCVWD's freeboard standards.
- Provide water quality improvements by repairing/stabilizing existing erosion sites.
- Provide recommendations for recreational enhancements in coordination with flood and water quality improvements.
- This SCVWD Project does not provide for protection from tidal flooding. Potential flood damages from tidal flooding will be addressed with the pending SCVWD/USACE Shoreline Project.

In lieu of conventional flood protection improvements planned by the SCVWD's Flood Protection Project, Google's proposed Project, which is part of the development of their Caribbean Campus, includes an enhanced drainage corridor that will provide flood protection while improving campus aesthetics, increasing recreational opportunities, and enhancing wildlife habitat. The proposed Project will meet SCVWD's design criteria and Federal Emergency Management Agency's requirements for flood protection throughout the Project reach, including 100-year storm events and sea level rise, while enhancing tidal aquatic, estuarine wetland and riparian habitats.

Project Applicability: As mentioned above, the project is designed to conform to the requirements and measures for the SCVWD's Sunnyvale East and West Channels Flood Control Project. All project actions will be executed in conformance with all requirements of the larger project and will apply all relevant avoidance measures and mitigation measures prescribed by the District EIR.

### 3.3.2 City of Sunnyvale General Plan

The City of Sunnyvale General Plan, adopted in 2011, specifies goals, policies and programs that convey a long-term vision for the Sunnyvale community and guides local decision-making to advance that vision (City of Sunnyvale 2011). The Land Use and Transpiration Element, updated in April 2017, lays out goals and policies related to biological resources that are relevant to the proposed project (City of Sunnyvale 2017). They include the following;

- ***Goal LT-1: Coordinated Regional and Local Planning:*** Environmentally sustainable land use and transportation planning and development; Participate in federal, state, and regional programs and processes in order to protect the natural and human environment in Sunnyvale and the region.
  - Policy LT-1.10a: Protect and preserve the diked wetland areas in the baylands to preserve or enhance flood protection.

- Policy LT-1.10b: Coordinate with regional agencies such as the Bay Area Conservation and Development Commission (BCDC) regarding new and changing land uses proposed along the San Francisco Bay.
  - Policy LT-1.10c: Advocate the City's interests to regional, state, and federal agencies that have influence over the natural environment in Sunnyvale.
  - Policy LT-1.10d: Work with regional agencies on land use and transportation issues that affect the human environment, such as air, water, and noise, for Sunnyvale residents and businesses.
  - Policy LT-1.10e: Continue to evaluate and ensure mitigation of potential biological impacts of future development and redevelopment projects in a manner consistent with applicable local, state, and federal laws and regulations.
  - Policy LT-1.10f: Continue to condition projects to halt all ground-disturbing activities when unusual amounts of shell or bone, isolated artifacts, or other similar features are discovered. Retain an archaeologist to determine the significance of the discovery. Mitigation of discovered significant cultural resources shall be consistent with Public Resources Code Section 21083.2 to ensure protection of the resource.
- ***Goal LT-2: Environmentally Sustainable Land Use and Transportation Planning and Development;*** Streamside development: Streamside development can affect the health, safety, and general welfare of the city's residents and environment. The following policies are intended to mitigate negative effects of streamside development by avoiding impacts of projects located in proximity to streams.
    - Policy LT-2.6: Address sea level rise, increased rainfall, and other impacts of climate change when reviewing new development near creeks, and consider the projected flood levels over the economic lifespan of the project.

Project Applicability: The project is located within the City of Sunnyvale General Plan area and would need to conform to all applicable requirements. The project will include restoration of tidal aquatic, estuarine wetland, and riparian habitat to compensate for impacts to sensitive habitats, incorporates measures to prevent impacts to water quality within the channel and the lagoon, and will reduce siltation, and will therefore be in line with the vision of City of Sunnyvale. Further, this project will result in a net ecological benefit.

### 3.3.3 Sunnyvale Tree Ordinance

The City of Sunnyvale's Tree Preservation Ordinance (Sunnyvale Municipal Code, Chapter 19.94) provides for protection, installation, removal, and long-term management of significantly sized trees on private property and on City-owned golf courses and parks. The ordinance defines "protected tree" as a tree of "significant size" (i.e., a tree which has at least one trunk with a circumference 38 inches or greater measured 4.5 feet above ground level, or in which the measurements of the circumferences of each of the multi-trunks, when measured 4.5 feet above the ground level, added together equal an overall circumference of 113 inches or greater). The ordinance sets standards and criteria for issuance of tree removal permits, criteria for replacement trees, and

requirements for replanting programs, tree relocation, and tree protection during site development or modification.

Project Applicability: Arborist reports for two adjacent projects, the Google Caribbean Campus Project and the West Borregas Campus Project, which overlap completely with the Google Sunnyvale West Channel Enhancement Project site have been completed. The results of those reports are provided in Appendix A. The Proposed Project is expected to impact several trees of municipal ordinance size. The loss of non-native ornamental tree species will be compensated by planting of native, riparian trees as part of the riparian mitigation plan.

## Section 4. Environmental Setting

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### 4.1 General Project Area Description

The project site and surrounding areas have been heavily disturbed by anthropogenic activities as a result of urbanization and the development of commercial buildings. The project site is located in the city of Sunnyvale in Santa Clara County, California, and is surrounded by dense commercial development. A review of historical aerial photographs indicates that land use within the project region was previously agricultural, but the site has been developed for at least 40 years. The Natural Resource Conservation Service has mapped two soil units for the project: Urbanland-Hangerone complex, 0–2 % slopes, and Urbanland-Embarcadero complex, 0–2 % slopes (Natural Resource Conservation Service 2018). These soil type have variable profiles to a depth of more than 80 inches, with alluvial material generally occurring throughout the soil profile, and are considered a poorly drained soil.

### 4.2 Biotic Habitats

Reconnaissance level surveys of the site have identified four general habitat types on the site: tidal aquatic and estuarine wetland in the channel itself, ruderal riparian grassland on the banks of the levee, and developed/landscaped outside the levee (Figure 3).

#### 4.2.1 Estuarine Wetlands

**Vegetation.** Wetlands within the site are classified in the National Wetlands Inventory as Estuarine and Marine Wetland (E2SBNx) (USFWS 2019). Wetlands with this classification are estuarine and intertidal, occurring within a streambed that is completely dewatered at low tide but is regularly flooded and was originally excavated by humans. There is 0.17 acre of estuarine wetlands on the site, consisting of several discontinuous patches of hydrophytic wetland vegetation along either side of the channel (Photo 1). Wetland plant species include California bulrush (*Schoenoplectus californicus*) and alkali bulrush (*Bolboschoenus maritimus*).



**Photo 1.** Estuarine wetlands occur along the fringes of the channel and are dominated by bulrushes.

**Wildlife.** This habitat is relatively narrow and linear in the project site and is located adjacent to maintenance road with disturbance from pedestrians and, to some degree, vehicles. Channel maintenance activities by



SCVWD periodically reduce the amount of vegetation in the channel. At the time of the preparation of this biological resources report (February 2019), the channel was fairly well grown with bulrush (Photo 1).

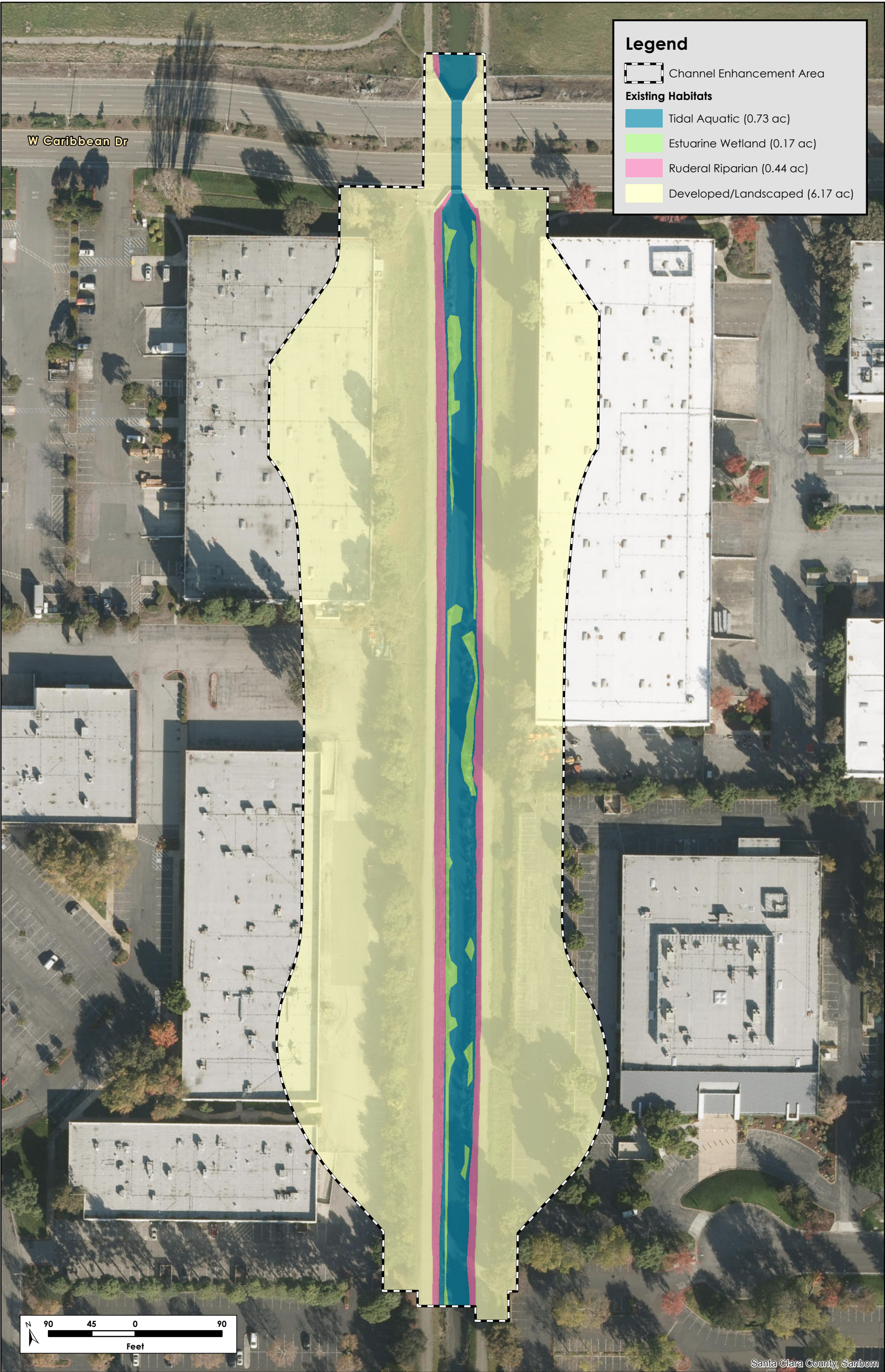
Two state taxa of special concern, the Alameda song sparrow, *Melospiza melodia pusillula*, (but see further discussion of the song sparrow taxonomic complex below) and the San Francisco common yellowthroat (*Geothlypis trichas sinuosa*) breed downstream from the project site and the yellowthroat may breed in the project section of the channel when vegetation is extensive enough to provide nesting and foraging habitat. Other species such as Pied-billed grebes (*Podilymbus Podiceps*) and American coots (*Fulica americana*) forage in and around clumps of emergent vegetation, as do various herons and egrets, including green herons (*Butorides virescens*) and snowy egrets (*Egretta thula*). The California vole (*Microtus californicus*) occurs in terrestrial habitats and will forage in adjacent brackish marshes.

The narrow, tidal aquatic channel and its adjacent habitats have been subjected to moderate to high levels of disturbance as a result of anthropogenic channelization, hardening of streambanks, installation of culverts, and other factors associated with major human influences. The channel is confined on both sides by urban development and lacks native habitats associated with more natural channel systems. The relatively low-quality habitats currently associated with the channel are reflective of those influences, and include: a narrow, linear channel; relatively steep banks dominated by low, ruderal riparian vegetation lacking woody species; an unvegetated top of bank supporting roads on both levees; and ruderal, nonnative grassland and scattered nonnative trees on the outboard sides. These conditions contribute to low wildlife value for the channel system as a whole.

The combination of the absence of channel diversity and the narrow nature of the channel substantially diminish the value of the channel to wildlife compared to more naturally formed channels, due to the lack of high-quality habitat complexity such as riffle and pool complexes, the relatively shallow water (and thus relatively high temperatures in summer), and regular disturbance of habitats and associated species due to anthropogenic activities. The channel supports few aquatic species, but nonnative crayfish (*Procambarus clarkia*) are present and birds such as mallards (*Anas platyrhynchos*), American coots (*Fulica americana*) and great blue herons (*Ardea herodias*) and other common, widespread wetland species occur. Mammals such as raccoons (*Procyon lotor*), introduced eastern gray squirrels (*Sciurus carolinensis*), and introduced rodents (*Rattus spp.* and *Mus musculus*) likely use the channels for drinking water and foraging. Common, widespread amphibians such as the Pacific treefrog (*Hyla regilla*) occur in the channel. Wider, more natural channels would support a richer assemblage of species, especially with respect to avian fauna, such as marsh wrens that use emergent marsh habitats.

The lack of quality habitat associated with the other areas of the existing channel system also translates into a less diverse species community relative to more diverse, native marsh, riparian, and upland habitats associated with more natural river and stream systems in the region.





N:\Projects\3400\3475-01\SA\Reports\BRR\Fig 3 Biotic Habitats.mxd

Santa Clara County, Sanborn



This project will result in a net increase in wetland and associated upland habitat functions and values for native wildlife associated with the site, as well as increasing the diversity of wildlife that will use the site.

#### 4.2.2 Tidal Aquatic

**Vegetation.** There is 0.73 acre of tidal aquatic habitat on the site (Figure 3). Tidal aquatic habitat consists entirely of the unvegetated muddy channel bed subject to tidal inundation (Photo 2). This habitat type is located in the middle of the storm drain channel.



**Photo 2.** Tidal aquatic habitat consists of the unvegetated muddy channel bed that subject to tidal inundation.

**Wildlife.** Although quite limited in extent in the project area, the unvegetated tidal aquatic habitat provides foraging opportunities for shorebirds such as the spotted sandpiper (*Actitis macularius*), least sandpiper (*Calidris minutilla*) and greater yellowlegs (*Tringa melanolenca*) when water levels allow for foraging in the channel. Song sparrows and other species of sparrows and red-winged blackbirds (*Agelaius phoeniceus*) forage on mudflats adjacent to terrestrial and emergent vegetation.

#### 4.2.3 Ruderal Riparian Grassland

**Vegetation.** There is 0.44 acre of ruderal riparian habitat on the site (Photo 3). This habitat type occurs on the banks and levees of the channel, from the high tide line to top of bank. This habitat consist of predominantly nonnative herbaceous species, such as wild oats (*Avena* sp.), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), yellow star thistle (*Centaurea solstitialis*), and black mustard (*Brassica nigra*) and is routinely mowed as part of SCVWD's routine channel maintenance program. There are no woody plants present within the existing riparian habitat.



**Photo 3.** Ruderal riparian habitat on the banks of the channel levee.

**Wildlife.** Wildlife use of the ruderal riparian grassland on the project area is limited not only by the limited and isolated extent of the habitat in the project area, but by frequent human disturbance and an abundance of non-native and invasive species. Resident species that occur in this habitat include the mourning dove, (*Zenaida*

*macroura*), bushtit (*Psaltirparus minimus*), lesser goldfinch (*Spinus psaltria*), and Brewer's blackbird (*Euphagus cyanocephalus*). A number of other avian species use this habitat during the migration and wintering periods, including the warbling vireo, yellow warbler (*Setophaga petechia*), golden-crowned sparrow (*Zonotrichia atricapilla*), white-crowned sparrow (*Z. leucophrys*) and Lincoln's sparrow (*Melospiza lincolni*).

Few species of reptiles and amphibians occur in the ruderal riparian grassland in the study area due to its limited extent and disturbed nature. Reptiles such as the western fence lizard (*Sceloporus occidentalis*) and gopher snake (*Pituophis melanoleucus*) occur in this habitat type. Small mammals expected to be present include the native western harvest mouse (*Reithrodontomys megalotis*) and nonnative house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), and black rat (*Rattus rattus*) and larger mammals, such as the striped skunk, Virginia opossum (*Didelphis virginiana*), and raccoon (*Procyon lotor*) are likely to occur in this habitat.

#### 4.2.4 Developed/Landscaped

**Vegetation.** Beyond the top of the levee the habitat type is characterized as developed/landscaped, consisting of asphalt pavement and existing commercial buildings with associated landscaping (Photo 4). A complete list of trees on the project site is provided in the arborist report for the project (Appendix A). Non-native tree species on the site include Canary Island pine (*Pinus canariensis*), lemonwood (*Pittosporum eugenioides*), glossy privet (*Ligustrum lucidum*), carob (*Ceratonia siliqua*), eucalyptus (*Eucalyptus* spp.), and liquidambar (*Liquidambar styraciflua*). Landscaped areas also contained a variety of non-native plants and shrubs, such as oleander (*Nerium oleander*), as well as ground cover, such as grass lawns and English ivy (*Hedera helix*).



**Photo 4. Developed and landscaped areas adjacent the channel levee.**

**Wildlife.** The wildlife associated with the developed/landscaped areas on the project site primarily represent species that are widespread, common, urban-adapted species. Such resident bird species include American Crows (*Corvus brachyrhynchos*), Anna's hummingbirds (*Calypte anna*), chestnut-backed chickadees (*Poecile rufescens*), black phoebes (*Sayornis nigricans*), house finches (*Haemorhous mexicanus*), dark-eyed juncos (*Junco hyemalis*) and, house sparrows (*Passer domesticus*). Avian species that use this habitat during migration or winter include species such as the yellow-rumped warbler (*Setophaga coronata*) and white-crowned sparrow. Mammals and reptiles that use this habitat are the same as those described for ruderal riparian grassland habitat on the site.

## Section 5. Special-Status Species and Sensitive Habitats

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CEQA requires assessment of the effects of a project on species that are protected by state, federal, or local governments as “threatened, rare, or endangered”; such species are typically described as “special-status species”. For the purpose of the environmental review of the project, special-status species have been defined as described below. Impacts on these species are regulated by some of the federal, state, and local laws and ordinances described in Section 3.0 above.

For purposes of this analysis, “special-status” plants are considered plant species that are:

- Listed under FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species.
- Listed under CESA as threatened, endangered, rare, or a candidate species.
- Listed by the CNPS as CRPR 1A, 1B, 2, 3, or 4.

For purposes of this analysis, “special-status” animals are considered animal species that are:

- Listed under FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species.
- Listed under CESA as threatened, endangered, or a candidate threatened or endangered species.
- Designated by the CDFW as a California species of special concern.
- Listed in the California Fish and Game Code as fully protected species (fully protected birds are provided in Section 3511, mammals in Section 4700, reptiles and amphibians in Section 5050, and fish in Section 5515).

Information concerning threatened, endangered, and other special-status species that potentially occur in the study area was collected from several sources and reviewed by H. T. Harvey & Associates biologists as described in Section 2.1 above. Figure 4 depicts CNDDDB records of special-status plant species in the general vicinity of the study area and Figure 5 depicts CNDDDB records of special-status animal species. These generalized maps show areas where special-status species are known to occur or have occurred historically.

### 5.1 Special-Status Plant Species

The CNDDDB (2019) and the CNPS Inventory of Rare and Endangered Plants (CNPS 2019) were queried for rare plant species that occur in the project region. The majority of potentially occurring rare plant species were determined to be absent from the project site for at least one of the following reasons: (1) absence of suitable habitat types; (2) lack of specific microhabitat or edaphic requirements, such as serpentine soils; (3) the elevation



range of the species is outside of the range on the site; and/or (4) the species is presumed extirpated from the project region. Based on this analysis and the habitat types observed during the site survey, Congdon's tarplant, which has a CNPS Rare Plant Ranking of 1B.1 (seriously threatened in California), was the only special-status plant species determined to have the potential to occur on the site.

Congdon's tarplant is an annual herb in the composite family (Asteraceae) that is endemic to California. It has a variable blooming period extending from May through November. Congdon's tarplant occurs in valley and foothill grassland habitat, floodplains, and swales (particularly those with alkaline substrates) and in disturbed areas with non-native grasses (CNDDDB 2019, CNPS 2019, Baldwin et al. 2012). The CNDDDB has recorded two occurrences of Congdon's tarplant in buffer lands within 2.0 mile of the site (CNDDDB 2019), and the species can persist in disturbed grassland habitats such as the ruderal habitat on the project site. The closest occurrences of the species to the project site (CNDDDB occurrences #41 and #102) are located approximately 1.3 mile to the west at Moffett Federal Airfield and 1.3 mile to the east at the Sunnyvale Baylands Park in disturbed grasslands (CNDDDB 2019). Thus, the ruderal grassland habitat on the project site could potentially support this special-status plant species, as suitable habitat is present on the site and populations of the species are present in similar habitats nearby. However, protocol-level surveys conducted by H. T. Harvey & Associates staff in August 2012 along the Sunnyvale West Channel, which included the area of ruderal grassland habitat on the project site, did not detect this species (SCVWD 2014), and there have been no changes to this habitat since the surveys were performed to indicate the species would now be present. Thus, **Congdon's tarplant is determined to be absent** from the project site.

## 5.2 Special-Status Animal Species

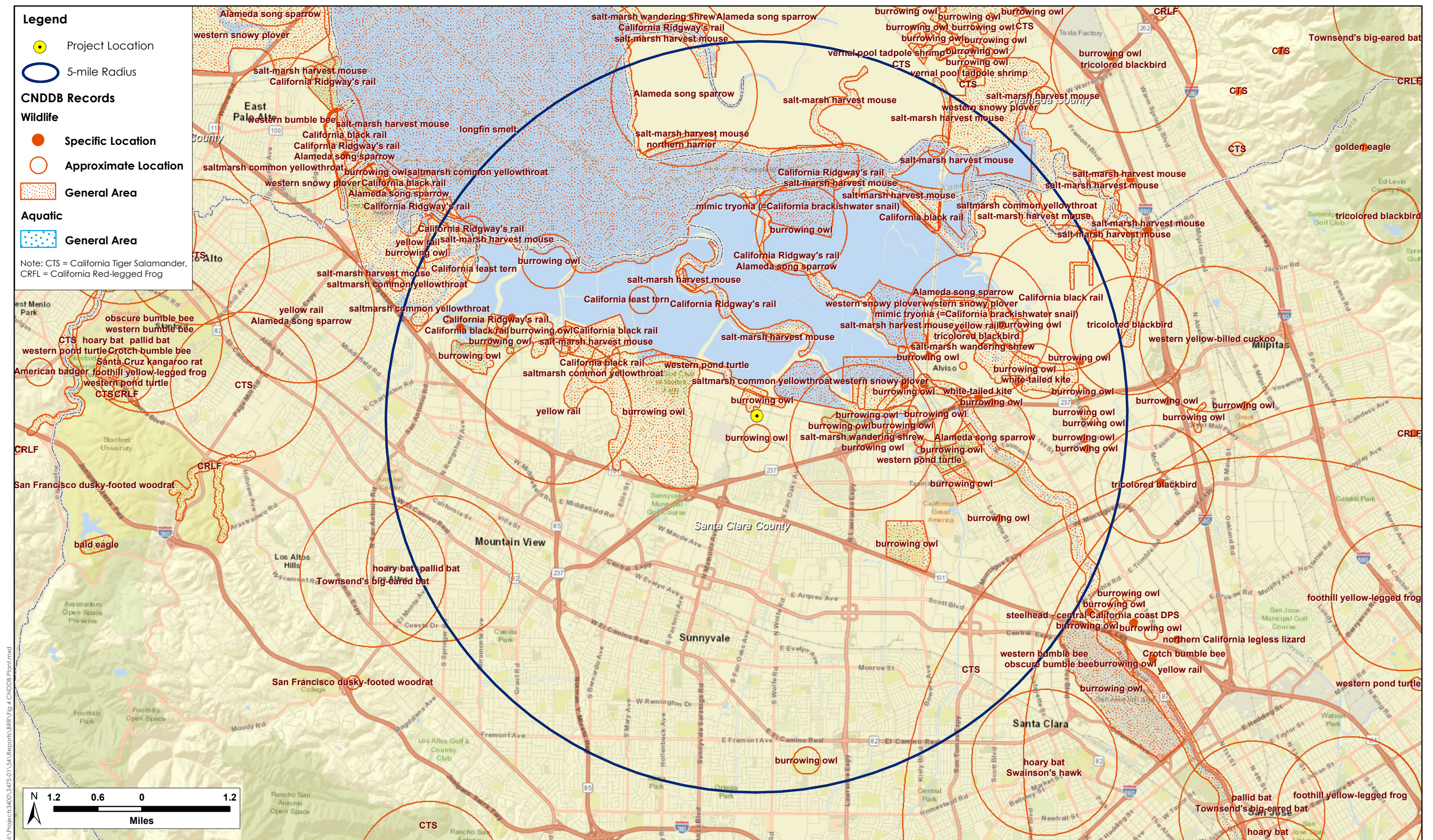
The SEWSDC EIR reviews the status of all the special-status species that are known to occur in the Sunnyvale West Channel site, that may occur on the site, and that occur regionally, but are not likely to occur on the site (SCVWD 2014). Only those species determined to be present or likely to be present along the project reach of the Sunnyvale West Channel are covered in this BRR, and the reader is referred to the SEWSDC EIR for further information on species determined to be absent from the site. Two federally listed species and/or their critical habitat have the potential to occur in the project site: Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and North American green sturgeon (*Acipenser medirostris*). The project reach of the Sunnyvale West Channel comprises critical habitat for both the federally listed species. Longfin smelt (*Spirinchus thaleichthys*), a species listed as threatened under the California Endangered Species Act and a Candidate for listing under the Federal Endangered Species Act, also has the potential to occur in the project area.

Due to the marginal quality of the habitat and very low summer flows, as well as inclusion of avoidance measures designed to protect fish, the USACE previously concluded that the SCVWD Flood Protection project would not require Section 7 Consultation for activities in this reach (pers. communication between SCVWD and Keith Hess of the USACE, July 29, 2017). Several project measures, intended to protect aquatic wildlife and habitat that require passive fish relocation and measures to prevent entrapment, will be implemented to avoid and minimize impacts to Essential Fish Habitat (EFH) within the project reach and any fish regulated by









**Figure 5. CNDDDB animals**



the Coastal Pelagics and Pacific Groundfish Fishery Management Plan. Dewatering and other BMPs as described in the project's regulatory permit applications will further be used to prevent water-quality impacts. In-channel work will be restricted to the dry season from April 15 to October 15, when flows are low and warm within the channel and listed fish are not expected to occur.

Native nesting birds, including special-status species, are protected under the federal Migratory Bird Treaty Act and the California Department of Fish and Wildlife code. Loss of eggs or nestlings ("take") via project activities would violate these laws. Take-avoidance measures for these species are presented below. The LUTE EIR includes the protection of nesting native species of birds under the federal Migratory Bird Treaty Act and the California Fish and Game Code.

One California Endangered Species Act species listed as threatened, the tricolored blackbird (*Agelaius tricolor*) and several California Species of Special Concern (CSSC) that are not state or federally listed as threatened or endangered that are known to be, or have the potential to be, present in the project area, and are discussed below. Impacts on these and other special-status species were discussed in the SEWSDC EIR, which addressed potential environmental impacts of the Flood Protection Project that is part of the SCVWD's Clean, Safe Creeks and Natural Flood Protection (CSC) Plan. The goal of the CSC Plan is to provide 100-year riverine flood protection to approximately 1,618 properties and 47 acres within the city of Sunnyvale. The SEWSDC EIR considered activities that would potentially modify habitat in and around the storm drain channels, including earthen storm drain channel restoration, installation of rock slope protection, floodwall construction, bridge/culvert modifications, and other storm drain channel modifications.

The following descriptions comprise an overview of the existing habitat value for the special-status species wildlife that occur, or might occur, within the project area.

### 5.2.1 Tricolored Blackbird (*Agelaius tricolor*)

**Federal Listing Status: None; State Listing Status: Threatened**—This species was listed as a threatened species by the California Fish and Game Commission on April 19, 2018. Tricolored blackbirds are found primarily in the Central Valley and in central and southern coastal areas of California. Suitable nesting habitat for the tricolored blackbird is not present in the project site; however, the species is known to forage on the lower reaches of the Sunnyvale West Channel and the former landfills just north of the project site during the nonbreeding season (Santa Clara Valley Water District Sunnyvale East and West Channels Flood Protection Project Draft Environmental Impact Report (SEWSDCEIR – SCVWD 2013). Lack of breeding habitat on the project site indicates that this species will not be significantly impacted by the project.

### 5.2.2 Western Pond Turtle (*Actinemys marmorata*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—The western pond turtle may be present in the project site. Western pond turtles still occur in urban streams and ponds in the region. Ponds or slack-water pools with suitable basking sites (e.g., logs, banks) are an important habitat component



for this species. Nesting habitat is typically found within 600 feet of aquatic habitat (Jennings and Hayes 1994), but if no suitable nesting habitat can be found close by, adults may travel overland considerable distances to nest. Females lay eggs in upland habitats with clay or silty soils in unshaded, often south-facing areas up to 0.25 mile from aquatic habitat (Jennings and Hayes 1994). Juveniles feed and grow in shallow aquatic habitats (often creeks) with emergent vegetation and ample invertebrate prey.

In the project vicinity, the western pond turtle has been documented within the Lockheed Channel and North Moffett Channel west of the Sunnyvale West Channel (TN & Associates, Inc. and Tetra Tech EC, Inc. 2006, as cited in EDAW 2007). Consequently, although no western pond turtles were observed in the lower reaches of the project area during focused surveys in 2012 for the SEWSDCEIR (SCVWD 2013), it is likely that small numbers of pond turtles occur in channels in the project region, including the Sunnyvale West Channel, especially in the northern portion of the channel given its hydrological connection to North Moffett Channel. The channel does not currently provide optimal habitat for western pond turtle. Both adults and juveniles prefer deep, slow water and suitable basking sites. The project site is of marginal habitat quality due to the narrow width and relatively shallow nature of the channel, lacking structural complexity that would provide refugia and basking sites.

### 5.2.3 Northern Harrier (*Circus cyaneus*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting)**—The northern harrier is not expected to nest within the project site due to the absence of suitable nesting substrate or habitat; however, this species is known to breed in the vicinity of the project site. Breeding individuals may at least occasionally forage within the project site boundary, but the site does not provide important or extensive foraging habitat used regularly by this species.

### 5.2.4 Burrowing Owl (*Athene cunicularia*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—The burrowing owl, a CSSC, occurs in the project region. The abundance of this species has decreased dramatically in the South Bay region, including the project vicinity. During surveys conducted in the winter of 2007–2008 (EDAW 2008), a burrowing owl was detected on the west bank of the Sunnyvale East Channel opposite the Twin Creeks Sports Complex; a burrow with evidence of owl use (i.e., whitewash) was documented along the Sunnyvale West Channel. During 2012 and early 2013, one to two burrowing owls were reported on the landfill (north of the project site) just west of the Sunnyvale West Channel, north of Caribbean Drive (South Bay Birds List-serve 2013), although the last successful nesting attempts occurred on the landfill in 1999 and inside the Water Pollution Control Plant in 2004 (H. T. Harvey & Associates 2015). In addition, in November 2012 the SCVWD reported a burrowing owl on the west side of the Sunnyvale West Channel just upstream of the Carl Road Bridge (Hernandez pers. comm. 2012). The CNDDDB (2019) includes two records of burrowing owls along the northernmost portion of the West Channel, and one record adjacent to the northernmost portion of the Sunnyvale East Channel. Although burrows of California ground squirrels were observed along the Sunnyvale East and West Channels throughout the project area for the SEWSDC EIR during surveys conducted in January

2013, burrowing owls are unlikely to nest in such limited habitat areas surrounded by dense development and large trees and buildings that provide perches for predatory raptors. Nevertheless, owls are known to use extremely small areas of ruderal habitat in the South Bay, and it is possible that owls could occasionally roost along the Sunnyvale West Channel in developed areas.

### 5.2.5 Loggerhead Shrike (*Lanius ludovicianus*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting)**—Loggerhead shrikes nest in a number of locations in the project region where open grassland, ruderal, or agricultural habitat with scattered brush, chaparral, or trees that provide perches and nesting sites, occur (Bousman 2007a). This species occurs slightly more widely (i.e., in smaller patches of open areas providing foraging habitat) during the nonbreeding season. Ruderal habitats near the project site, particularly those on the former landfills surrounding the City of Sunnyvale Recycle Center and Water Pollution Control Plant (WPCP), provide suitable nesting, roosting, and foraging habitat for one or two pairs of loggerhead shrikes, but the species is not expected to breed on the project site due to the limited extent of open habitat in the surrounding area.

### 5.2.6 Yellow Warbler (*Setophaga petechia*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—Small numbers of yellow warblers still nest in remnant riparian areas within Santa Clara County (Bousman 2007b). Suitable nesting habitat consists of riparian corridors, often with an overstory of mature cottonwoods (*Populus* sp.) and sycamores (*Platanus* sp.), a midstory of box elder (*Acer negundo*) and willow (*Salix* sp.), and a substantial shrub understory (Bousman 2007b). Riparian areas with a reduced understory due to grazing or disturbance are generally not used by this species, and riparian corridors lacking open ruderal or herbaceous vegetation along the edges of the corridors, or with development up to the corridor edge, are often avoided as well. Thus, suitable nesting habitat for yellow warbler is absent from the project site. However, the yellow warbler is an abundant migrant throughout the project region during the spring and especially in fall, and it occurs along the Sunnyvale Channels as an occasional forager during the nonbreeding season.

### 5.2.7 San Francisco Common Yellowthroat (*Geothlypis trichas sinuosa*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—The San Francisco common yellowthroat inhabits emergent vegetation, and nests in freshwater and brackish marshes and moist floodplain vegetation around San Francisco Bay. Common yellowthroats will use small and isolated patches of habitat as long as groundwater is close enough to the surface to encourage the establishment of dense stands of rushes (*Scirpus* and *Juncus* spp.), cattails (*Typha* spp.), willows, and other emergent vegetation (Nur et al. 1997, Terrill 2000, Gardali and Evens 2008). Ideal habitat comprises extensive and thick riparian, marsh, or herbaceous floodplain vegetation in perpetually moist areas, where populations of brown-headed cowbirds are low (Menges 1998). San Francisco common yellowthroats nest primarily in freshwater and brackish marshes, although they also nest in salt marsh habitats that support tall vegetation. This subspecies builds open-cup nests low in the vegetation, and nests from mid-March through late July (Gardali and Evens 2008).

In the South Bay, the San Francisco common yellowthroat is a fairly common breeder in freshwater and brackish marshes. This species is known to nest 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 vicinity, the species has been recorded in both the spring and summer in Pond A4, as well as along Moffett Channel and Guadalupe Slough. The lower, tidal reaches of the Sunnyvale West Channel also provide suitable nesting and foraging habitat for this species. However, the limited amount of vegetation along the project section of the channel and the narrow swaths of channel habitat confined by the levees limit the extent of breeding habitat, and the quality and extent of foraging habitat, on the project site. However, this taxon may breed in the project reach when emergent vegetation is sufficiently dense.

### 5.2.8 Alameda Song Sparrow (*Melospiza melodia pusillula*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—Prime habitat for the Alameda song sparrow is fully tidal salt marsh consisting of large areas of tidally influenced salt marsh vegetation dominated by cordgrass (*Spartina* sp.) and gumplant (*Grindelia* sp.) and intersected by tidal sloughs, offering dense vegetative cover and singing perches. Although the special-status *pusillula* subspecies of song sparrow is occasionally found in brackish marshes dominated by bulrushes, it is apparently very sedentary and is not known to disperse upstream into freshwater habitats (Basham and Mewaldt 1987). Where suitable nesting habitat is continuous along creeks, song sparrows appear to nest continuously from tidal salt marshes, where the breeding subspecies is *pusillula*, upstream to freshwater marsh and woody riparian habitats, where the breeding subspecies is an upland or freshwater associated subspecies *gouldii*. The line of demarcation (or perhaps more accurately, the zone of intergradation) along these sloughs between these two subspecies is unknown (Rottenborn 2007); a recent study indicates that song sparrows nesting along the lower portions of the Sunnyvale Channels may belong to the *pusillula* or *gouldii* subspecies, or may be intergrades between the two (SFBBO 2012).

### 5.2.9 American Peregrine Falcon (*Falco peregrinus anatum*)

**Federal Listing Status: None; State Listing Status: Fully Protected**—The only locations in the project vicinity where peregrine falcons have been detected nesting are old raven and hawk nests on electrical transmission towers within managed ponds in the Mountain View/Alviso area, more than 2 miles north of the project site. The species is not known or expected to nest in the immediate project area; however, peregrine falcons nesting elsewhere in the South Bay, as well as migrants and wintering birds, forage occasionally in the project region, particularly in the vicinity of Pond A4 and the WPCP ponds.

### 5.2.10 Golden Eagle (*Aquila chrysaetos*)

**Federal Listing Status: None; State Listing Status: Fully Protected**—Suitable foraging habitat for golden eagles occurs in the northern portion of the project region (i.e., north of Caribbean Drive), and nonbreeding eagles may occasionally forage there. For example, an immature golden eagle was observed along the canals west of the WPCP in January 2012 (South Bay Birds List-serve 2013). However, this species occurs very rarely around the immediate edge of the baylands in the South Bay, and based on the infrequency with which it has been reported in this area (which is heavily used by birders), it is expected to forage infrequently in open habitats

within and adjacent to the project area (such as on the old landfills). The reach of the Sunnyvale West Channel associated with this project offers extremely limited foraging habitat for this species and the developed nature of much of the surroundings further limits the value of the site to the species.

#### 5.2.11 White-Tailed Kite (*Elanus leucurus*)

**Federal Listing Status: None; State Listing Status: Fully Protected**—In the project vicinity, white-tailed kites are known to nest along the northern edge of Santa Clara County throughout the open areas edging the San Francisco Bay (Bousman 2007c). Although neither the Breeding Bird Atlas of Santa Clara County, California (Bousman 2007c) nor the Santa Clara County Bird Data (unpublished) contained specific mention of the species as occurring at the project site, there are a number of records from Moffett Field to the west and some from Sunnyvale Baylands Park to the east (South Bay Birds List-serve 2013). White-tailed kites nest in trees or shrubs, typically in areas away from high human activity, and those with extensive open foraging habitat with adequate prey. Thus, the project site may provide some limited foraging opportunities for this species, but it does not provide breeding habitat, and the quality of the foraging habitat is quite limited. However, there are trees within the 300 foot buffer zone of the limit of project activities that provide potential breeding sites.

### 5.3 Sensitive Natural Communities, Habitats, and Vegetation Alliances

Natural communities have been considered part of the Natural Heritage Conservation triad, along with plants and animals of conservation significance, since the state inception of the Natural Heritage Program in 1979. The CDFW determines the level of rarity and imperilment of vegetation types, and tracks sensitive communities in its Rarefind database (CNDDB 2019). Global rankings (G) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas state (S) rankings are a reflection of the condition of a habitat within California. Natural communities are defined using NatureServe's standard heritage program methodology as follows (Faber-Langendoen et al. 2012):

G1/S1:	Critically imperiled.
G2/S2:	Imperiled.
G3/S3:	Vulnerable.
G4/S4:	Apparently secure.
G5/S4:	Secure.

In addition to tracking sensitive natural communities, the CDFW also ranks vegetation alliances, defined by repeating patterns of plants across a landscape that reflect climate, soil, water, disturbance, and other environmental factors (Sawyer et al. 2009). If an alliance is marked G1-G3, all of the vegetation associations within it will also be of high priority (CDFW 2019). The CDFW provides the Vegetation Classification and Mapping Program's (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2019).



Impacts on CDFW sensitive natural communities, vegetation alliances/associations, or any such community identified in local or regional plans, policies, and regulations, must be considered and evaluated under CEQA (Title 14, Division 6, Chapter 3, Appendix G of the California Code of Regulations). Furthermore, aquatic, wetland and riparian habitats are also protected under applicable federal, state, or local regulations, and are generally subject to regulation, protection, or consideration by the USACE, RWQCB, CDFW, and/or the USFWS.

**Sensitive Natural Communities.** A query of sensitive habitats in Rarefind (CNDDDB 2019) identified three sensitive habitats as occurring within the nine USGS quadrangles containing or surrounding the study area: serpentine bunchgrass (Rank G2/S2.2), valley oak woodland (G3/S2.1), and northern coastal salt marsh (Rank G3/S3.2). Serpentine bunchgrass occurs only on serpentine soils, which do not occur in the study area. Valley oak woodland is characterized by valley oak (*Quercus lobata*) as the dominant or co-dominant species in the tree canopy. While some valley oak trees do occur in the study area, they are ornamental plantings along buildings and roadways, and thus do not constitute this sensitive habitat type. The last sensitive habitat type, northern coastal salt marsh, is described by Holland (1986) as occurring along sheltered inland margins of bays, often co-dominated by pickleweed (*Salicornia* spp.), cordgrass (*Spartina* spp.), and sometimes saltgrass (*Distichlis spicata*). Northern coastal salt marsh occurs north of the project in channel but does not occur in the study area (Figure 3).

**Sensitive Vegetation Alliances.** There are no sensitive vegetation alliances in the study area.

**Sensitive Habitats (Waters of the U.S./State).** The tidal aquatic and estuarine wetlands in the study area may be considered waters of the U.S./state. Any impacts on verified waters of the U.S./state within the study area would require a Section 404 permit from the USACE and Section 401 Water Quality Certification from the San Francisco RWQCB.

## Section 6. Impacts and Mitigation Measures

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The State CEQA Guidelines provide direction for evaluating the impacts of projects on biological resources and determining which impacts will be significant. CEQA defines a “significant effect on the environment” as “a substantial adverse change in the physical conditions which exist in the area affected by the proposed project.” Under State CEQA Guidelines Section 15065, a project's impacts on biological resources are deemed significant if the project would:

- A. “substantially reduce the habitat of a fish or wildlife species”
- B. “cause a fish or wildlife population to drop below self-sustaining levels”
- C. “threaten to eliminate a plant or animal community”
- D. “reduce the number or restrict the range of a rare or endangered plant or animal”

In addition to the Section 15065 criteria that trigger mandatory findings of significance, Appendix G of State CEQA Guidelines provides a checklist of other potential impacts to consider when analyzing the significance of project effects. The impacts listed in Appendix G may or may not be significant, depending on the level of the impact. For biological resources, these impacts include whether the project would:

- A. “have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service”
- B. “have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service”
- C. “have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means”
- D. “interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites”
- E. “conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance”
- F. “conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan”

## 6.1 Approach to the Analysis

Project construction will result in temporary impacts on 0.73 ac of tidal aquatic habitat, 0.17 ac of estuarine wetland, and 0.44 ac of ruderal riparian habitat (Figure 2). No permanent loss of wetlands or waters of the United States/state will result from implementation of this project; however, there will be two permanent changes to channel conditions. These changes will consist of the realignment of the channel and the channel shading by the two proposed bridges and the cantilevered culvert extension at West Caribbean Drive. There is also a small area (less than 0.01 ac; 13 sq ft) of ruderal riparian habitat that will be converted to hardscape associated with construction of a floodwall.

### 6.1.1 Temporary Impacts

In order to achieve project design goals, extensive grading is required on the site. Grading will result in temporarily affecting 100% of the tidal aquatic habitat, estuarine wetland, and ruderal riparian habitat types on site. The grading will require dewatering the entire project reach, removing all existing vegetation, and importing soil to build up the new, larger earthen levees.

### 6.1.2 Permanent Impacts

The addition of two new bridges across the project reach and the culvert extension at West Caribbean Drive will not require placement of fill within existing tidal aquatic or estuarine wetland habitats. However, the installation of these structures will result in some shading of estuarine wetlands, which is considered a permanent impact. There will also be a small permanent conversion of less than 0.01 ac (13 sq ft) of existing ruderal riparian habitat to hardscape for floodwall construction.

## 6.2 Impacts on Special-Status Species: Will the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS? (Less than Significant with Mitigation)

### 6.2.1 Impacts on Steelhead, Green Sturgeon, and Longfin Smelt (Less than Significant with Mitigation)

As indicated earlier, two federally listed species and/or their critical habitat have the potential to occur in the project site: Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and North American green sturgeon (*Acipenser medirostris*). In addition, the longfin smelt (*Spirinchus thaleichthys*), a species listed as threatened under the California Endangered Species Act and a Candidate for listing under the Federal Endangered Species Act, also has the potential to occur in the project area.

Due to the marginal quality of the habitat and very low summer flows, as well as inclusion of avoidance measures designed to protect fish, the USACE previously concluded that the SCVWD Flood Protection project

would not require Section 7 Consultation for activities in this reach (pers. communication between SCVWD and Keith Hess of the USACE, July 29, 2017).

Several project mitigation measures, intended to protect aquatic wildlife and habitat that require passive fish relocation and measures to prevent entrapment, will be implemented to avoid and minimize impacts to EFH within the project reach and any fish regulated by the Coastal Pelagics and Pacific Groundfish Fishery Management Plan. Dewatering and other BMPs as described in the project's regulatory permit applications will further be used to prevent water-quality impacts. In-channel work will be restricted to the dry season from April 15 to October 15, when flows are low and warm within the channel and listed fish are not expected to occur. Dewatering and Best Management Practices will follow those covered in the SEWSDC EIR (BMP-2).

### **6.2.2 Western Pond Turtle (Less than Significant with Mitigation)**

A small population of western pond turtles is known to be present within the Lockheed Channel and North Moffett Channel west of the Sunnyvale West Channel (TN & Associates, Inc. and Tetra Tech EC, Inc. 2006 as cited in EDAW 2007; Santa Clara Valley Water District 3.3 Biological Resources Sunnyvale East and West Channels Flood Protection Project Draft Environmental Impact Report 3.3-63 October 2013). Consequently, it is likely that small numbers of western pond turtles occur in the Sunnyvale Channels, especially in the northern portion of the West Channel given its hydrological connection to North Moffett Channel. However, given that no western pond turtles were observed in these lower portions of the Sunnyvale Channels during a focused survey for the species in by H. T. Harvey & Associates in 2012, and given that urbanization likely precludes the maintenance of a viable population in the upper portions of these channels, western pond turtles are expected to occur in the Sunnyvale Channels infrequently and in low numbers. Dewatering and other BMPs as described in the project's regulatory permit applications that cover applicable best management practices (see below) for performing project activities within and adjacent to an active channel will further be used to prevent water-quality impacts, including those to western pond turtles and the channel habitat.

Although western pond turtles are widespread in the project region, the species is not particularly abundant. Because individuals of this species can be long-lived, the widespread nature of the species in the project region may belie a population that likely would decline substantially in the future because of poor reproduction, as young turtles are seen in relatively few parts of the project region. Therefore, the loss of individuals could reduce the viability of a population to the extent that it would be extirpated. This impact would be considered significant under CEQA and is covered under the SEWSDC EIR (Impact BIO-5)

Implementation of the mitigation measure below would reduce these impacts to a less-than-significant level by minimizing the potential for the loss of individual western pond turtles and their nests as covered under Mitigation Measure BIO-3 of the SEWSDC EIR (which the mitigation measures in the document conform to) and was determined to be less than significant with mitigation.

A qualified biologist shall conduct a pre-activity survey for western pond turtles and their nests within 48 hours prior to the commencement of project work, including dewatering, within the Sunnyvale West Channel. If an



adult or juvenile western pond turtle is found, project activities in the vicinity of the turtle shall cease until the individual has either left the work area on its own, or it has been relocated to an appropriate site outside the project area by a qualified biologist. If an active western pond turtle nest is detected within the activity area, a 25-foot buffer zone around the nest will be established and maintained during the nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist.

Following the initial survey, a construction crewmember who has been trained to identify western pond turtles by a qualified biologist shall conduct a survey of the in-channel activity area each morning prior to the onset of construction activities. If a turtle is located, all work in the vicinity shall immediately cease, and a qualified biologist shall be contacted. Work within the area shall not resume until the turtle has been relocated or has moved out of the area where it could be impacted.

### **6.2.3 White-Tailed Kite (Less than Significant with Mitigation)**

The white-tailed kite is a state fully protected species. In California white-tailed kites can be found in the Central Valley and along the coast in grasslands, agricultural fields, cismontane woodlands, and other open habitats (Zeiner et al. 1990, Dunk 1995, Erichsen et al. 1996). White-tailed kites are year-round residents of the state, establishing nesting territories that encompass open areas with healthy prey populations and snags, shrubs, trees, or other substrates for nesting (Dunk 1995). Nonbreeding birds typically remain in the same area over the winter, although some movements do occur (Polite 1990). The presence of white-tailed kites is closely tied to the presence of prey species, particularly voles, and prey base may be the most important factor in determining habitat quality for white-tailed kites (Dunk and Cooper 1994, Skonieczny and Dunk 1997). Although the species recovered after population declines during the early 20th century, its populations may be exhibiting new declines because of recent increases in habitat loss and disturbance (Dunk 1995, Erichsen et al. 1996).

White-tailed kites are common residents in less-developed portions of the project region where open grassland, ruderal, or agricultural habitats are present. Although there is not breeding habitat for this species in the project area, white-tailed kites occur year-round at the WPCP and at the Sunnyvale Baylands Park. Large trees near the project site provide potential nesting sites for up to one pair of kites, and the species may nest in these trees and forage over the open grassland areas at the Landfill/WPCP. Based on site observations, the areal extent of the study area, and known breeding densities of these species, it is likely that no more than one pair of white-tailed kites could potentially nest in the vicinity of the project site. If project construction cannot occur outside the breeding season (February 1 to August 31), surveys will be conducted for active white-tailed kite nests within 300 feet of the project construction area. If an active kite nest is found, a 300 foot (or an alternative buffer area established via consultation with the California Department of Fish and Wildlife) non-construction buffer area shall be established between the nest and project construction activities. Impacts to white-tailed kites in the SEWSDC EIR are covered under Impact BIO-7 and the mitigation measures outlined above fit within the applicable best management practices BMP BIO-8 and BMP BIO-9 in the SEWSDC EIR. In

addition, these best management practices comply with federal (the Migratory Bird Treaty Act) and State (The California Department of Fish and Game Code) laws as presented in the LUTE EIR.

#### **6.2.4 Burrowing Owl (Less than Significant with Mitigation)**

Pre-construction surveys for burrowing owls shall be conducted prior to the initiation of all Project activities within suitable burrowing owl habitat (i.e., ruderal/grassland habitat with burrows of California ground squirrels)<sup>1</sup>. Pre-construction surveys will be completed in conformance with the CDFW's 2012 guidelines (CDFG 2012). An initial habitat assessment will be conducted by a qualified biologist to determine if suitable burrowing owl habitat is present in a given area. During the initial site visit, a qualified biologist will survey the entire activity area and (to the extent that access allows) the area within 250 feet of the site for suitable burrows that could be used by burrowing owls for nesting or roosting. If no suitable burrowing owl habitat (i.e., ruderal grasslands with burrows of California ground squirrels) is present within a given area, no additional surveys will be required. If suitable burrows are determined to be present within 250 feet of work areas, a qualified biologist will conduct three additional surveys to investigate each burrow within the survey area for signs of owl use and to determine whether owls are present in areas where they could be affected by proposed activities. The final survey shall be conducted within the 24-hour period prior to the initiation of Project activities in any given area. Because Project activities may be phased, these survey efforts may also need to be performed in phases to ensure that burrowing owls are not present in work areas when Project activities commence. This measure applies to the staging areas as well as the Project areas along the Sunnyvale Channels.

If burrowing owls are present during the non-breeding season (generally September 1 to January 31), a 150-foot buffer zone shall be maintained around the occupied burrow(s), if feasible. If maintaining such a buffer is not feasible, then the buffer must be great enough to avoid injury or mortality of individual owls, or else the owls should be passively relocated in consultation with CDFW. During the breeding season (generally February 1 to August 31), a 250-foot buffer, within which no new Project-related activities will be permissible, will be maintained between Project activities and occupied burrows. Owls present between February 1 and August 31 will be assumed to be nesting, and the 250-foot protected area will remain in effect until August 31. If monitoring evidence indicates that the owls are no longer nesting or the young owls are foraging independently, the buffer may be reduced or the owls may be relocated prior to August 31, in consultation with the CDFW.

If construction will directly impact occupied burrows, a qualified biologist will passively evict owls from burrows during the nonbreeding season (September 1 to January 31). No burrowing owls will be evicted during the nesting season (February 1 through August 31) except with the CDFW's concurrence that evidence demonstrates that nesting is not actively occurring (e.g., because the owls have not yet begun nesting early in the season, or because young have already fledged late in the season). Eviction will occur through the use of

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<sup>1</sup> Although burrowing owls are not expected to breed on the Project site and suitable habitat for owls on the Project site south of Caribbean is limited to the storm drain channel banks, there is possibility an owl could use the site during the winter non-breeding season if ground squirrel burrows are present. If in the very unlikely event a burrowing owl nest is established on the Project site, see Impact BIO-8 in the Sunnyvale East and West Channels Flood Protection Project EIR for the full suite of required burrowing owl mitigation measures.

one-way doors inserted into the occupied burrow and all burrows within impact areas that are within 250 feet of the occupied burrow (to prevent occupation of other burrows that will be impacted). One-way doors will be installed by a qualified biologist and left in place for at least 48 hours before they are removed. The burrows will then be back-filled to prevent re-occupation.

Although relocation of owls may be necessary to avoid the direct injury or mortality of owls during construction, relocated owls may suffer predation, competition with other owls, or reduced health or reproductive success as a result of being relegated to more marginal habitat. However, the benefits of such relocation, in terms of avoiding direct injury or mortality, would outweigh any adverse effects.

Impacts to burrowing owls in the SEWSDC EIR are covered under Impact BIO-8 and the mitigation measures outlined above fit within the applicable best management practice BMP BIO-8 in the SEWSDC EIR to reduce impacts to a less than significant level. In addition, these best management practices comply with federal (the Migratory Bird Treaty Act) and State (The California Department of Fish and Game Code) laws as presented in the LUTE EIR.

#### **6.2.5 San Francisco Common Yellowthroat and Alameda Song Sparrow (Less than Significant)**

Two state taxa of special concern, the Alameda song sparrow (*Melospiza melodia pusillula*) and the San Francisco common yellowthroat (*Geothlypis trichas sinuosa*) breed downstream from the project site and the yellowthroat may breed in the project section of the channel when vegetation is extensive enough to provide nesting and foraging habitat. Where suitable nesting habitat is continuous along creeks, the song sparrows appear to nest continuously from tidal salt marshes, where the breeding subspecies is *pusillula* (the Alameda song sparrow), upstream to freshwater marsh and woody riparian habitats, where the breeding subspecies is an upland or freshwater associated subspecies *gouldii* (not a species of special concern). The line of demarcation (or perhaps more accurately, the zone of intergradation) along these sloughs between these two subspecies is unknown (Rottenborn 2007); a recent study indicates that song sparrows nesting along the lower portions of the Sunnyvale Channels may belong to the *pusillula* or *gouldii* subspecies, or may be intergrades between the two (SFBBO 2012).

Regardless of the uncertainty regarding the exact distribution of the Alameda Song Sparrow along the Sunnyvale West Channel, both song sparrows and yellowthroats will benefit from the project-related improvement in habitat quality. Because the number of nesting pairs that could be disturbed is very small (the current channel area is very limited relative to the regional populations of both these taxa), the projects impacts would not substantially reduce regional populations of these birds, and thus, the impacts would not meet the CEQA standard of having a substantial adverse effects. In addition, project impacts to habitat will be temporary and impacts to habitat occur currently under the District maintenance program. Finally, although the project will increase the extent and quality of habitat for yellowthroats and song sparrows, a loss of nestlings or eggs (“take”) due to project activities would be a violation of federal and state laws. Thus, compliance measures to avoid the loss of eggs and nestlings will be implemented. It should be noted that these measures would extend to avoiding



the loss of eggs or nestlings of other species of birds not considered special status. Although these other species are common and loss of individuals or eggs would not be considered significant under CEQA, such a loss would violate federal and state laws. The measures implemented to avoid take of salt marsh common yellowthroat and Alameda song sparrow extended to cover all native birds that might be breeding on the project site will allow the project to avoid violating state and federal laws protecting these other species as well. Impacts to these taxa are covered under the SEWSDC EIR under BMP BIO-8 and BMP BIO-9 and correspond to the following measures:

**Measure 1. Avoidance of the Nesting Season.** To the extent feasible, commencement of demolition and construction activities should be scheduled to avoid the nesting season. If demolition and construction activities are scheduled to take place outside the nesting season, all potential demolition/construction impacts on nesting birds protected under the MBTA and California Fish and Game Code will be avoided. The nesting season for most birds in Santa Clara County extends from February 1 through August 31.

**Measure 2. Pre-Activity/Pre-Disturbance Surveys.** If it is not possible to schedule demolition and construction activities between September 1 and January 31, then pre-activity surveys for nesting birds should be conducted by a qualified ornithologist to ensure that no nests will be disturbed during project implementation. We recommend that these surveys be conducted no more than seven days prior to the initiation of demolition or construction activities. During this survey the ornithologist will inspect all trees and other potential nesting habitats (e.g., trees, shrubs, and buildings) in and immediately adjacent to the impact areas for nests.

**Measure 3. Non-Disturbance Buffers.** If an active nest is found sufficiently close to work areas to be disturbed by these activities, the ornithologist will determine the extent of a construction-free buffer zone to be established around the nest (typically 300 feet for diurnal raptors, including the white-tailed kite, 250 feet for burrowing owl nests and active burrows, and 100 feet for other species), to ensure that no nests of species protected by the MBTA and California Fish and Game Code will be disturbed during project implementation.

**Measure 4. Inhibition of Nesting.** If construction activities will not be initiated until after the start of the nesting season, all potential nesting substrates (e.g., bushes, trees, grasses, and other vegetation) that are scheduled to be removed by the project may be removed prior to the start of the nesting season (e.g., prior to February 1). This will preclude the initiation of nests in this vegetation, and minimize the potential delay of the project due to the presence of active nests in these substrates.

In addition, these measures comply with federal (the Migratory Bird Treaty Act) and State (The California Department of Fish and Game Code) laws as presented in the LUTE EIR.

### 6.2.6 Pallid Bat (Less than Significant)

Historically, pallid bats (*Antrozous pallidus*), a California species of special concern, were likely present in a number of locations throughout the project region, but their populations have declined in recent decades. No known maternity colonies are present on the project site or within the general area of the project site, and this species has been extirpated as a breeder from urban areas close to the Bay, as in the case of the project site. There is a low probability that the species occurs in the project vicinity at all due to urbanization; however, individuals from more remote areas could potentially forage in the project region on rare occasions, especially over the Sunnyvale West Channel. However, because of that low frequency of occurrence the project is not expected to have a significant impact on this species.

### 6.2.7 Impacts on Non-Special-Status Species (Less than Significant)

Impacts to non-special-status species, typically common to abundant and urban adapted in the project area, would not reach CEQA significance thresholds due to their local population levels and the relative narrow, linear, and small total area comprising the project, and high degree of ongoing anthropogenic disturbance in and around the site. Nevertheless, “take” of most of these species would violate federal and state laws as described above. Therefore, to comply with federal and state law, the nest-take-avoidance measures described immediately above will be applied to all species of covered native birds that potentially breed within the project activity zone and adjacent areas.

## 6.3 Impacts on Sensitive Communities: Will the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

### 6.3.1 Impacts on Ruderal Riparian Habitat or Other Sensitive Natural Communities (Less than Significant with Mitigation)

The proposed Project would result in temporary impacts to the 0.43 acre of ruderal riparian habitat currently existing on the site. This habitat type occurs on the banks and levees of the channel, from the high tide line to top of bank and consists of predominantly nonnative herbaceous species, such as wild oats (*Avena* sp.), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), yellow star thistle (*Centaurea solstitialis*), and black mustard (*Brassica nigra*). There are no woody plants present within the existing ruderal riparian habitat and the area is routinely mowed as part of SCVWD’s routine channel maintenance program. The Project would also result in a small (less than 0.01 ac; 13 square [sq] feet) permanent conversion of ruderal riparian habitat to hardscape to accommodate construction of a floodwall.

The existing banks will be contoured to create a wider storm drain channel and the top of bank will be raised from the existing elevation of 11 ft NAVD88 to an elevation of 18 ft NAVD88 (Figure 2). As a result, the proposed Project would substantially alter and enlarge the banks of the existing storm drain channel, affecting ruderal riparian habitat as summarized in Tables 1 and 2 and shown in Figure 2. Project activities would not

alter bank stability of the waterways or result in effects on adjacent properties upstream or downstream of the affected waters. Indirect effects could include possible water quality effects from both landward and in-channel construction activities (though these will be minimized and avoided by the use of BMPs and erosion and sedimentation controls).

Temporary impacts on ruderal riparian habitat will be mitigated at 1:1, for a baseline mitigation requirement of 0.44 ac. This baseline mitigation will be increased by an additional 0.01 ac (total of 0.45 ac) to compensate for less than 0.01 acre (13 sq ft) of permanent impacts, which exceeds a 2:1 mitigation ratio that would typically apply to permanent impacts on riparian habitat. The actual area to be tracked for ruderal riparian habitat mitigation will be a dedicated zone along the lower levee slopes on both sides of the channel from the West Caribbean Drive culvert upstream to the first new pedestrian bridge. This area will provide stable vegetated slopes. Although woody species will be installed throughout this zone, they will not be linked to any specific monitoring or success criteria metrics because there will be no impacts on woody plants within existing jurisdictional areas.

In addition, project mitigation will restore and enhance riparian habitats within the project site. There will be a 0.75-ac, 1,360 ln ft low-flow storm drain channel, bordered on both sides by a wetland floodplain bench set at elevations below the high-tide line and subject to regular tidal inundation, and the levee banks will be laid back to provide stable slopes where a mix of native riparian trees, shrubs, grasses, and forbs can be established. The project will provide all necessary mitigation per the description above, as well as voluntarily create 1.41 acres of additional riparian habitat (total of 1.86 ac). The following mitigation ratios were determined in keeping with the applicable best management practices required by the SEWSDC EIR (see SEWSDC list below under "Applicable Best Management Practices") and in response to comments submitted on the SWESDC Draft EIR by the California Department of Fish and Wildlife. These requirements also fit the objectives and requirements of the federal Clean Water Act Section 404 and the state Clean Water Act, Section 401 as covered in the LUTE EIR. As described in the LUTE EIR, the overall goal of the California Wetlands Conservation Strategy is to ensure “no overall net loss and achieve a long-term net gain in the quantity, quality and performance of wetlands acreage and values in California in a manner that fosters creativity, stewardship and respect of private property.”

**Table 1. Habitat Impacts and U.S. Army Corps of Engineers Permitting Mitigation Requirements**

Impacted Habitat Type	Acreage	Mitigation Ratio	Mitigation Requirement (acres)
<i>Temporary Impacts</i>			
Tidal Aquatic (Dewatering and Grading)	0.72 ac	1:1	0.54 ac in-kind (plus 0.18 ac included in estuarine wetland below)
Estuarine Wetland (Dewatering and Grading)	0.16 ac (plus 0.18 to compensate for tidal aquatic)	1.2:1 (accounts for temporal loss due to 2-year construction period)	0.20 ac in-kind



Ruderal Riparian (Grading)	0.43 ac	1:1	0.43 ac riparian
<b>Permanent Impacts</b>			
Estuarine Wetland (Shading)	0.01 ac (573 sq ft)	2:1	0.02 ac in-kind
Ruderal Riparian (Conversion to hardscape)	<0.01 ac (457 sq ft)	2:1	0.02 ac riparian

**Table 2. Habitat Mitigation and Creation Summary**

Habitat Type	Mitigation Requirement	Additional Habitat Creation	Total Habitat Mitigation and Creation
<b>Total Mitigation and Additional Creation</b>			
Tidal Aquatic	0.54 ac	N/A	0.54 ac
Estuarine Wetland	0.45 ac	1.85 ac	2.30 ac
Total Jurisdictional Waters of the United States/state (including wetlands)	0.99 ac	1.52 ac	2.47 ac
Riparian	0.45 ac	1.34 ac	1.80 ac

**Applicable Best Management Practices.** The project would implement the BMPs described in the SEWSDC EIR. The following list of BMPs would be implemented to avoid and minimize any temporary or permanent impacts to water quality, riparian or wetland habitat. A description of each BMP is provided in Table 2-8 in Chapter 2, “Project Description.” of the SEWSDC EIR:

- BMP BIO-4: Minimize Waterway Access Impacts
- BMP BIO-5: Remove Temporary Fills as Appropriate
- BMP BIO-13: Plant Local Ecotypes of Native Plants and Choose Appropriate Erosion-Control Seed Mixes
- BMP HM-9: Clean Vehicles and Equipment
- BMP HM-10: Assure Proper Vehicle and Equipment Fueling
- BMP HM-11: Assure Proper Vehicle and Equipment Maintenance
- BMP HM-13: Prevent Spills
- BMP HM-12: Know the Spill Kit Location
- BMP WQ-1: Conduct Work from Top of Bank
- BMP WQ-2: Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
- BMP WQ-3: Assess Pump/Generator Set Operations and Maintenance
- BMP WQ-4: Handle Sediments so as to Minimize Water Quality Impacts
- BMP WQ-5: Avoid Runoff from Soil Stockpiles
- BMP WQ-6: Stabilize Construction Entrances and Exits
- BMP WQ-7: Prevent Erosion Downstream of Bank Protection Sites
- BMP WQ-9: Minimize Local Erosion Increase from In-channel Vegetation Removal
- BMP WQ-10: Evaluate and Select the Most Appropriate Use of Concrete Near Waterways

BMP WQ-11: Use Cofferdams for Tidal Work Areas  
BMP WQ-13: Minimize Hardscape in Bank Protection Design  
BMP WQ-14: Use Temporary Seeding for Erosion Control As Appropriate  
BMP WQ-15: Manage Groundwater at Work Sites  
BMP WQ-16: Avoid Erosion When Restoring Flows  
BMP WQ-17: Prevent Scour Downstream of Sediment Removal  
BMP WQ-18: Maintain Clean Conditions at Work Sites  
BMP WQ-19: Control Emergency Discharges  
BMP WQ-20: Control Unplanned Discharges  
BMP WQ-21: Control Sediment/Turbidity for Discharges Less than 50 NTU  
BMP WQ-22: Control Sediment/Turbidity for Discharge Greater than 50 NTU  
BMP WQ-23: Evaluate Use of Flow Path - Vegetation Filtration  
BMP WQ-24: Evaluate Use of Flow Path - Check Filters  
BMP WQ-25: Evaluate Use of On-Line Filter Systems  
BMP WQ-26: Evaluate Use of Silt Fence Culvert Entrance Protection  
BMP WQ-27: Evaluate Use of Surface Protection - Armoring  
BMP WQ-28: Evaluate Use of Surface Protection - Flow Diversion  
BMP WQ-30: Evaluate Use of Discharging to Sanitary Sewer System  
BMP WQ-40: Prevent Water Pollution  
BMP WQ-41: Prevent Stormwater Pollution  
BMP WQ-42: Prevent Sedimentation of Aquatic Habitats during Construction

**Conclusion.** Water quality and habitat values in the ruderal riparian habitats subject to temporary disturbance are expected to return to pre-project condition following the completion of Project activities. Implementation of the BMPs listed above would minimize changes to water quality by reducing erosion, controlling sediment and preventing spills. Nevertheless, the proposed project would result in temporal loss of habitat functions and values, provided by ruderal riparian habitat, such as sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and aquatic and terrestrial wildlife species habitat. Thus, in the absence of any mitigation measures, temporary impacts on ruderal riparian is considered potentially significant because it could result in the temporal loss of ecologically valuable habitat (Significance Criteria B and C).

The proposed project would also result in the permanent loss of 13 square feet of ruderal riparian habitat that are ecologically valuable from conversion to hardscape for the construction of the headwalls and bridge abutments. Thus, permanent impacts on even a small amount of ruderal riparian habitat is considered significant (Significance Criteria B and C). Impacts on special-status wildlife species resulting from disturbance or loss of riparian habitat are addressed in separate impact discussions above.

The above-described project mitigation would be implemented to reduce residual impacts on ruderal riparian habitats to a less-than-significant level by compensating for temporary impacts on estuarine wetlands and tidal aquatic habitat and permanent impacts on estuarine wetland habitats. These mitigation measures correspond

to mitigation measures in the SEWSDC EIR (as modified in response to CDFW comments) for corresponding impacts and are consistent with the LUTE EIR adopted goal of "no overall net loss" of wetland values.

**Mitigation Measure: Implement Compensatory Mitigation for Temporal and Permanent Loss of Ruderal Riparian Habitat (Less than Significant with Mitigation)**

Mitigation for impacts on ruderal riparian habitat shall be provided at a ratio of 1:1 (1 acre of mitigation for every 1 acre of disturbed) for temporary impacts and 2:1 for permanent impacts. Mitigation shall be provide via creation and restoration of riparian habitat in the restored West Sunnyvale channel. In all, the area of riparian habitat will be more than doubled, with a final anticipated area of 1.86 ac. The project will substantially increase the area and quality of jurisdictional habitat through the project reach as compared to the current conditions. Riparian plantings will include a mosaic of native species associated with willow-cottonwood forest, oak riparian forest, and bayside scrub communities. This net increase in the area and quality of riparian habitat as a result of this project meets the goals of the California Wetlands Conservation Policy as described in the LUTE EIR:

*"Ensure no overall net loss and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California..."*

A mitigation and monitoring plan (MMP) has been developed for the West Channel Enhancement project and is attached to this report as Appendix C. The MMP contains the following components:

- Summary of habitat impacts and proposed mitigation ratios.
- Goal of the restoration to achieve no net loss of habitat functions and values.
- Location of mitigation site(s) and description of existing site conditions.
- Mitigation design describing the following:
  - Existing and proposed site hydrology
  - Grading plan if appropriate, including bank stabilization or other site stabilization features
  - Soil amendments and other site preparation elements as appropriate
  - Planting plan
  - Irrigation and maintenance plan
  - Remedial measures/adaptive management, etc.
- Monitoring plan (including final and performance criteria, monitoring methods, data analysis, reporting requirements, monitoring schedule, etc.). The success criteria includes quantifiable measurements of wetland vegetation type (e.g., dominance by native hydrophytes) and extent appropriate for the wetland restoration location, and provision of ecological functions and values equal to or exceeding those in the wetlands and waters that are impacted.
- Contingency plan for mitigation elements that do not meet performance or final success criteria.



The project proponent shall implement the MMP and will be a Condition of Approval by the City of Sunnyvale, thereby achieving the recommended environmental protections. Monitoring shall be conducted annually to document whether the success criteria are achieved, and to identify any remedial actions that must be taken if the identified success criteria are not met. Monitoring shall continue until the mitigation has been determined to be successful per project permit requirements (i.e., success criteria are achieved).

Implementation of MM BIO-1 would result in the creation, restoration, and enhancement of wetlands, and would reduce this potential impact to a less-than-significant level.

### **6.3.2 Impacts Caused by Non-Native and Invasive Species (Less than Significant)**

In order to achieve project design goals, extensive grading is required on the site. Grading will result in temporarily affecting all habitat types on site, removing all existing vegetation, and importing soil to build up the new, larger earthen levee. Several non-native, invasive plant species occur in the natural habitats located throughout the study area. Following such large grading efforts, invasive species that occur in the vicinity have the potential to colonize newly created bare ground and spread quickly. Disturbed areas are highly susceptible to colonization by non-native, invasive species that occur locally, or whose propagules are transported by personnel, vehicles, and other equipment. Activities such as grading, equipment staging and vegetation removal are all factors that would contribute to disturbance. Invasive species can have an adverse effect on native species and habitats in several ways, including by altering nutrient cycles, fire frequency and/or intensity, and hydrologic cycles; by creating changes in sediment deposition and erosion; by dominating habitats and displacing native species; by hybridizing with native species; and by promoting non-native animal species (Bossard et al. 2000). The study area contains invasive species with the potential to invade other sensitive riparian and wetland habitats if not prevented. Therefore, this impact would be considered significant if not mitigated. However, the project also includes implementation of a MMP for the newly planted and revegetated areas within the channel, includes success criteria limiting the cover of weed species within the project area and will include maintenance weed removal, if needed, for at least five years post-construction. Therefore potential weed-related impacts on sensitive habitats and the species they support are considered less-than-significant.

### **6.4 Impacts on Wetlands: Will the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act? (Less than Significant with Mitigation)**

Construction activities associated with the proposed project would result in both temporary and permanent disturbance to wetland and aquatic communities as noted above. Wetlands often serve a variety of important functions, such as sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and aquatic and terrestrial wildlife species habitat. The tidal aquatic and estuarine wetland habitat within the Sunnyvale Channel within the project study area are of relatively low quality as they are entirely within constructed linear flood control channels. Nevertheless, wetland and aquatic habitats in these channels are important within the urban matrix of the Project vicinity.

As described above Project activities will result in temporary direct impacts on wetlands and other waters in the form of hydrologic interruption (e.g., dewatering or diversion), vegetation removal, degradation of water quality (e.g., increased sedimentation and turbidity). In total, the Project would result in direct temporary impacts on 0.73 acres of tidal aquatic habitat and 0.17 acres of estuarine wetlands. In addition there will be permanent impacts on 0.01 ac (472 sq ft) of estuarine wetlands associated with shading from the two bridges and culvert extension.

The project will restore and enhance tidal aquatic and estuarine wetland habitats within the project site. There will be a 0.75-ac, 1,360 ln ft low-flow storm drain channel, bordered on both sides by a wetland floodplain bench set at elevations below the high-tide line and subject to regular tidal inundation, and the levee banks will be laid back to provide stable slopes where a mix of native riparian trees, shrubs, grasses, and forbs can be established. The project will provide all necessary mitigation per the description above, as well as voluntarily create 0.02 ac of additional tidal aquatic habitat (total of 0.75 ac) and 1.50 ac of additional estuarine wetland habitat (total of 1.72 ac). Figure 2 shows the habitat mitigation. Tables 1 and 2 summarize habitat impacts, mitigation ratios and requirements, and additional habitat creation for tidal aquatic and estuarine wetland habitat.

**Applicable Best Management Practices.** As mentioned above under impact 6.3.1, the project would implement the BMPs described in the SEWSDC EIR. The list of BMPs mentioned above would similarly avoid and minimize temporary and permanent water quality impacts on tidal aquatic and estuarine wetland habitat.

The BMPs listed above would be incorporated into the project's Storm Water Pollution Prevention Plan (SWPPP) in compliance with State requirements to control discharge of stormwater pollutants under the NPDES *General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; Water Board Order No. 2009-0009-DWQ). Standard permit conditions under the Construction General Permit require that the applicant utilize various measures including: on-site sediment control best management practices, damp street sweeping, temporary cover of disturbed land surfaces to control erosion during construction, and utilization of stabilized construction entrances and/or wash racks, among other factors. In many Bay Area counties, including Santa Clara County, projects must also comply with the *California Regional Water Quality Control Board, San Francisco Bay Region, Municipal Regional Stormwater NPDES Permit* (MRP) (Water Board Order No. R2-2015-0049). This MRP requires that all projects implement BMPs and incorporate Low Impact Development practices into the design to prevent stormwater runoff pollution, promote infiltration, and hold/slow down the volume of water coming from a site after construction has been completed. To meet these permit and policy requirements, projects must incorporate the use of green roofs, impervious surfaces, tree planters, grassy swales, bioretention and/or detention basins, among other factors. These same features will be used to treat any stormwater that flows to the wetland habitat during large storm events. With the above BMPs, impacts on water quality would be reduced to a level of less-than-significant.

**Conclusion.** Water quality and habitat values in unvegetated aquatic habitats subject to temporary disturbance are expected to quickly return to pre-construction conditions following the completion of Project activities.

Thus, no mitigation is necessary for temporary impacts to unvegetated tidal aquatic habitats. Even in the vegetated wetlands, recolonization is expected to occur relatively quickly. Implementation of the BMPs listed above would minimize changes to water quality by reducing erosion, controlling sediment and preventing spills. Nevertheless, the proposed project would result in temporal loss of habitat functions and values, provided by tidal aquatic and estuarine wetland habitat, such as sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and aquatic and terrestrial wildlife species habitat. Thus, in the absence of any mitigation measures, temporary impacts on estuarine wetlands is considered potentially significant because it could result in the temporal loss of ecologically valuable habitat (Significance Criteria B and C).

The proposed project would also result in the permanent loss of 472 square feet estuarine wetland that are ecologically valuable from shading. Thus, permanent impacts on even a small amount of estuarine wetland habitat is considered significant (Significance Criteria B and C). Impacts on special-status wildlife species resulting from disturbance or loss of estuarine wetland and tidal aquatic habitat are addressed in separate impact discussions below.

The following Mitigation Measure would be implemented to reduce residual impacts on estuarine wetland and tidal aquatic habitats to a less-than-significant level by compensating for temporary impacts on estuarine wetlands and tidal aquatic habitat and permanent impacts on estuarine wetland habitats.

**Mitigation Measure: Implement Compensatory Mitigation for Temporal Loss of Estuarine Wetlands and Tidal Aquatic and Permanent Loss of Estuarine Wetlands (Less than Significant with Mitigation)**

Consistent with the mitigation measures in the SEWSDC EIR (as modified in response to CDFW comments) and the LUTE EIR's adopted goal of "no overall net loss" of wetland values, mitigation for temporary impacts on tidal aquatic habitat shall be provided at a ratio of 1:1 (1 acre of mitigation for every 1 acre of disturbed). Mitigation for impacts on estuarine wetland habitat shall be provided at a ratio of 1.2:1 for temporary impacts and at ratio of 2:1 for permanent impacts. Mitigation shall be provided via creation and restoration of wetlands/other waters in the restored West Sunnyvale channel. In all, the area of waters of the United States/state (tidal aquatic habitat and estuarine wetlands) will be more than doubled, with a final anticipated area of 2.47 ac. Along with an anticipated 1.86 ac of riparian habitat (described above in Impact 6.3.1), the project will substantially increase the area and quality of jurisdictional habitat through the project reach as compared to the current conditions. Estuarine wetland habitat will be passively restored by allowing sedimentation and plant detritus accumulation to restore the intertidal elevations, and natural colonization to establish the plant and wildlife communities. However, a few pockets will be planted with California bulrush and alkali bulrush.

As described above in Impact 6.3.1, the project-specific MMP describes in detail how the project proponent shall implement the compensatory mitigation required, as well as the monitoring plan required to ensure the success of the mitigation.



Implementation of this mitigation measure would result in the creation, restoration, and enhancement of wetlands, and would reduce this potential impact to a less-than-significant level.

**6.5 Will the project have significant impacts on Wildlife Movement:  
Interfere substantially with the movement of any native resident or migratory  
fish or wildlife species or with established native resident or migratory wildlife  
corridors, or impede the use of native wildlife nursery sites? (Less than  
Significant)**

This project could temporarily effect movement of aquatic species through the project site during the dewatering periods. However, the conditions associated with the project post construction would not interfere with the movement of any native fish or wildlife species.

**6.6 Will the project have Impacts due to Conflicts with Local Policies:  
Will the project conflict with any local policies or ordinances protecting  
biological resources? (Less than Significant)**

**6.6.1 Impacts Related to Compliance with City of Sunnyvale General Plan Policy (Less  
than Significant)**

General Plan Policies LT-1.10, LT-1.10e and LT-2.6 are relevant to the proposed project. Each policy is briefly discussed below, including a discussion of how the project will comply with each policy.

- Policy LT-1.10a seeks to protect and preserve the diked wetland areas in the baylands to preserve or enhance flood protection. This report serves an analysis to determine the effects of the proposed project on the aforementioned resources. As discussed above the stated purpose of this project is habitat enhancement and the end result of the project will result in a net gain of tidal aquatic, estuarine wetland, and riparian habitat that is of functionally higher quality than the existing condition on the site.
- Policy LT-1.10e seeks to continue to evaluate and ensure mitigation of potential biological impacts of future development and redevelopment projects in a manner consistent with applicable local, state, and federal laws and regulations. Mitigation proposed for this project is in line with the policy goal of the city's general plan.
- Policy LT-2.6 seeks to address sea level rise, increased rainfall, and other impacts of climate change when reviewing new development near creeks, and consider the projected flood levels over the economic lifespan of the project. The proposed project is in line with and part of the SCVWD's larger Sunnyvale East and West Channel Flood Protection Project with aims to provide increased flood protection and water quality improvements to the City of Sunnyvale.

### **6.6.2 Municipal Code Chapter 19.94, Tree Preservation (Less than Significant)**

An Arborist report for the two adjacent projects, the Google Caribbean Campus Project and the West Borregas Campus Project have been completed (Appendix A). The areas covered by this arborist report overlaps completely with the Google Sunnyvale West Channel Enhancement Project site. Per City of Sunnyvale Municipal Code, Chapter 19.94, Tree Preservation, tree removal permits, criteria for replacement trees, and requirements for replanting programs, tree relocation, and tree protection during site development would be required for the removal of any trees which meets the definition of heritage tree, as defined in Section 3.3.3 above. The removal or pruning of trees protected by the City of Sunnyvale municipal code is considered potentially significant under CEQA (Criterion I). As such, the project would need to comply with the City's tree preservation ordinance, including obtaining a permit from the City to remove protected trees and paying any applicable fee if impacts to heritage trees are proposed. The project plan includes the planting of native trees to compensate for the removal of non-native ornamental landscape trees. Therefore, any potential impacts related to conflict with local policies or ordinances protecting trees would be less than significant.

### **6.7 Will the project result in Impacts due to Conflicts with an Adopted Habitat Conservation Plan: Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan? (No Impact)**

The study area is not located within an area covered by an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Therefore, the project would not conflict with any such documents.

### **6.8 Cumulative Impacts**

Cumulative impacts arise due to the linking of impacts from past, current, and reasonably foreseeable future projects in the region. Future development activities in the City of Sunnyvale will result in impacts on the same habitat types and species that will be affected by the project. Project development, in combination with other projects in the area and other activities that impact the species that are affected by this project, could contribute to cumulative effects on special-status species. Other projects in the area include office and commercial development (e.g., various Google properties in between Caribbean Dr., North Mathilda Ave. and Highway 237), as well SCVWD projects (e.g. the Sunnyvale East and West Channels Flood Protection Project) that could adversely affect these species, as well as restoration projects (e.g., the South Bay Salt Pond Restoration Project Phase 2, SAFER Bay Project) that will benefit these species.

The cumulative impact on biological resources resulting from the project in combination with other projects in the project area and larger region would be dependent on the relative magnitude of adverse effects of these projects on biological resources compared to the relative benefit of impact avoidance and minimization efforts prescribed by planning documents, CEQA mitigation measures, and permit requirements for each project; compensatory mitigation and proactive conservation measures associated with each project. In the absence of

such avoidance, minimization, compensatory mitigation, and conservation measures, cumulatively significant impacts on biological resources would occur.

However, the City of Sunnyvale General Plan contains conservation measures that would benefit biological resources, as well as measures to avoid, minimize, and mitigate impacts on these resources. Further, the proposed project would result in net beneficial enhancement habitat for special-status species and biological resources in general. Thus, provided that this project successfully incorporates the mitigation measures described in this biological resources report and that the project is executed as described, the project will not contribute to substantial cumulative effects on biological resources.

## 6.9 Net Ecological Benefit of the Project

Riparian ecosystems support some of the highest wildlife species diversity and abundance in North America, and are particularly important in the western portion of the continent (Poff et al. 2011). For example, riparian zones in many areas of the western United States comprise less than 1% of the total land area, yet these areas are used by more species of breeding birds than any other habitat in North America (Knopf et al. 1988, as cited in Fischer 2000). Riparian zones provide valuable habitat and resources to a rich diversity of fish and wildlife, including a number of species dependent on riparian habitat. For example, resident and migratory birds use riparian areas for breeding, nesting, and foraging, while providing refuge and foraging for mammals, reptiles and amphibians. Riparian habitats also provide critical elements for fish habitat, including shading the channel, large woody debris to form pools, and floodplain habitat for rearing, spawning, and resources (Opperman and Merenlender 2011).

Unfortunately, riparian ecosystems are one of the most heavily degraded ecosystems, as is the current case with the Sunnyvale West Channel. Vast amounts of this important habitat have been lost to development through the construction of dams, river and stream channelization, grazing, agriculture, cities, urban landscaping, invasive species, and other anthropogenic activities over the past several hundred years of human expansion in North America. For example, around 95% of the riparian habitat in the Sacramento Valley has been lost (Gardali et al. 2004) and such amounts of loss are common throughout the West (Poff et al. 2011). In a study of the effects of urbanization on riparian habitats in Silicon Valley, Rottenborn (1999) found that bird species richness and density decreased as the volume of native riparian decreased. In Silicon Valley, riparian corridors along the Guadalupe River in San Jose have shrunk from vast riparian willow complexes over 0.5 kilometer wide, to a strip between ~20-50 meters wide in most places (Beller et al. 2010). Thus, the vast majority of this valuable habitat has been lost both regionally and locally, which emphasizes the importance of riparian habitat conservation and restoration.

This project will increase the habitat value of this reach of the Sunnyvale West Channel substantially relative to existing conditions, and contribute to the ongoing restoration of native habitat (including riparian habitat) that is occurring in the South Bay, which will result in a local and a cumulative benefit to the suite of species that utilizes this habitat. In particular note, Neotropical migrants that utilize riparian habitats for breeding, migratory



stopovers, and wintering will benefit from the project mitigation. Neotropical migrants are showing significant declines and thus, are of conservation concern in general.

The net increase in riparian habitat will also help special-status species known to occur, or likely to occur, on the project site following project completion. Migrant yellow warblers will benefit from the additional native riparian habitat. San Francisco common yellowthroats will benefit from the additional willow and estuarine wetland habitats. Although the northern harrier, American peregrine falcon, and white-tailed kite are not anticipated to nest on the project site, the potential for an increased prey base associated with the additional native vegetation may provide some benefit to these species. Western pond turtles would benefit from the increased vegetation providing cover from predators.

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## Appendix A. Arborist Report

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**H. T. HARVEY & ASSOCIATES**

Ecological Consultants



**Google Caribbean Campus**

**Arborist Report**

**Project #3475-45**



Prepared for:

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## Section 1. Introduction

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H. T. Harvey & Associates has prepared this preliminary arborist report, which describes current conditions on a complex of light-industrial properties (collectively referred to as the site) located in Sunnyvale, California (Table 1). This report provides an inventory of all trees on the project site (with diameter at breast height [DBH] greater than 4 inches) including species, DBH, an assessment of each tree's health and structural condition, and figures showing the location of each tree in the inventory. In addition, this arborist report includes a list of trees to be removed. Appropriate mitigation measures are also provided, per the City of Sunnyvale (City) Municipal Code (code). This arborist report is sufficient to submit with initial planning applications to the City.

**Table 1. Properties Included in this Report**

Street Address	Assessor's Parcel Number
390 - 394 Caribbean Drive	110 - 26 - 020
380 - 382 Caribbean Drive	110 - 26 - 021
370 - 376 Caribbean Drive	110 - 26 - 022
360 - 364 Caribbean Drive	110 - 26 - 023
1330 - 1370 Bordeaux Drive	110 - 26 - 025
140 - 146 Caribbean Drive	110 - 26 - 027
1393 - 1395 Borregas Avenue	110 - 26 - 028
1383 Borregas Avenue	110 - 26 - 029
1325 Borregas Avenue and 133 Caspian Court	110 - 26 - 030
141 Caspian Court	110 - 26 - 031

## Section 2. Methods

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This report is based on a tree inventory that was completed in November 2016, with a follow up site visit on January 8, 2019 to document any changes in tree health, structure or survival. H. T. Harvey & Associates' arborist Matt Pollock performed both the inventory and follow-up visit. Matt is an American Society of Consulting Arborists (ASCA) Registered Consulting Arborist (#631) and an International Society of Arboriculture (ISA) Certified Arborist (WE-11610A). All trees with a DBH greater than 4 inches were included in the inventory. Tasks conducted during the tree inventory consisted of the following:

- identifying each tree to species (scientific name and common name);
- tagging each tree with an identifying number;
- recording the approximate location of each tree;
- measuring tree trunk diameter at 54 inches above finish grade (DBH);
- determining the protected status of each tree; and
- evaluating tree health and structural condition using a scale of 0 to 5 as shown in Table 2.

Tree assessments were based on ground-level visual observations and physical measurements. Field data collection was conducted using a diameter tape to measure DBH. A Trimble Geo 7X GPS with laser offset capability was used to determine and record the location of each tree. Evaluations of tree health considered crown indicators such as vigor, density, leaf size and quality, and stem shoot extensions. Evaluations of tree structural condition considered root condition/form, trunk condition/form, and branch assembly and arrangement as well as any visible indicators of diminished structural integrity including cavities, dead limbs, and excessive leaning.

An advanced assessment to quantify interior wood structure, root condition, and upper canopy condition was not performed as part of this assessment. Therefore, tasks performed did not include an excavation of the root zones of the trees, drilling for decay detection, collecting soil samples for laboratory testing, sending animal or vegetative material for laboratory testing, climbing the trees for an aerial inspection, a tree risk assessment, or a valuation (see Appendix A: Assumptions and Limiting Conditions and Appendix B: Certification of Performance). These tasks are not typically included in a standard arborist report.

**Table 2. Tree Health and Structural Condition Evaluation Criteria**

Condition Rating	Tree Health	Tree Structure
5	A healthy, vigorous tree with a well-balanced crown. No apparent pest problems or signs and symptoms of disease. Normal to exceeding shoot length on new growth. Leaf size and color normal. Exceptional life expectancy for the species.	Root plate undisturbed and clear of any obstructions. Root flare has normal development. Trunk is sound and solid. No visible trunk defects or cavities. Branch spacing / structure and attachments are free of any defects.
4	Tree with slight decline in vigor. Imperfect canopy density in few parts of the tree, 10% or less, lacking natural symmetry. Less than half normal growth rate and minor deficiency in leaf development. Few pest issues or damage, controllable. Normal branch and stem development with healthy growth. Small amount of twig dieback. Typical life expectancy for the species.	Root plate appears normal; only minor damage may be found. Possible signs of root dysfunction around trunk flare. Minor trunk defects from previous injury, with good closure; less than 25% of bark section missing. Good branch habit, minor dieback with some signs of previous pruning. Co-dominant stem formation may be present. Minor corrections required.
3	Tree with moderate vigor. Crown decline and dieback up to 30% of the canopy. Overall poor symmetry. Leaf color somewhat chlorotic with smaller leaves. Shoot extensions indicate some stunting and stressed growing conditions. Obvious signs of pest problems contributing to lesser condition. Some decay areas found in main stem and branches. Below average life expectancy.	Root plate reveals previous damage or disturbance and dysfunctional roots may be visible around main stem. Evidence of trunk damage or cavities with decay or defects present. Less than 30% of bark sections missing on trunk. Co-dominant stems are present. Branching habit and attachments indicate poor pruning or damage, which requires moderate corrections.
2	Tree in decline. Epicormic growth. Lacking full crown, more than 50% decline and dieback, especially affecting larger branches. Stunting obvious with little evidence of growth on smaller stems. Leaf size and color reveal overall stress in the plant. Insect or disease infestation may be severe. Overmature. Life expectancy is low.	Root plate disturbance and defects indicate major damage with girdling roots around the trunk flare. Trunk reveals more than 50% of bark section missing. Branch structure has poor attachments, with several structurally important dead or broken branches. Canopy reveals signs of severe damage or topping, with major corrective actions required. Extensive decay or hollow.
1	Tree in severe decline. Crown has very little vigor and/or has a disease or insect problem that is ultimately fatal and, if not corrected, may threaten other nearby trees.	Root plate has major structural problems that present an unacceptable risk. Tree is in severe decline, with dieback of scaffold branches and/or trunk.
0	Dead	Dead



## Section 3. Results

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### 3.1 Site History and General Condition

The site is located on land historically used for agriculture (row crops) (Google Earth 2019). The buildings that currently occupy the site were constructed prior to 1991 and the configuration of planting beds appears largely unchanged since that time. Therefore, some trees on the site could potentially be more than 27 years old.

### 3.2 Summary of Findings

Four hundred and twenty-five trees were identified on the site (Figures 1a and 1b). Descriptions of each tree are included in Appendix C (Tree Assessment), including DBH, tree health and structural scores, and protected status. Table 3 provides a summary of the assessed trees, which represent 35 species. Of the 425 trees located on the site, 293 (69%) met the City of Sunnyvale's criteria for protected trees (see Section 3.4 below). The most common species on the site (27%) was Canary Island pine (*Pinus canariensis*). Forty-three percent of trees were in good condition, 48% were in fair condition, and 9% were in poor condition. Many of the trees in fair or poor condition were overmature, short-lived species such as lemonwood (*Pittosporum eugenioides*), sweetgum (*Liquidambar styraciflua*), and glossy privet (*Ligustrum lucidum*). However, 52 of the 116 Canary Island pines were also in fair or poor condition due to excessive pruning or other visible flaws.

### 3.3 Tree Condition

A summary of tree condition ratings is provided in Table 3. The condition ratings in the table are based on both the tree health and structural ratings from Appendix C. Tree condition was rated as follows:

- **Poor** if their combined rating was less than 40%.
- **Fair** if their combined rating was between 40% and 60%; or
- **Good** if their combined rating was 60% or greater;

Table 3. Tree Condition Summary

Scientific Name	Common Name	Poor	Fair	Good	Total Trees
<i>Afrocarpus falcatus</i>	African fern pine	0	11	7	18
<i>Alnus rubra</i>	Red alder	3	6	0	9
<i>Betula pendula</i>	White birch	1	2	2	5
<i>Ceratonia siliqua</i>	carob tree	2	13	5	20
<i>Corymbia citriodora</i>	lemon scented gum	0	1	1	2
<i>Eriobotrya japonica</i>	Loquat	0	1	0	1

Scientific Name	Common Name	Poor	Fair	Good	Total Trees
<i>Eucalyptus nicholii</i>	peppermint eucalypt	0	2	2	4
<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	1	9	11	21
<i>Eucalyptus sideroxylon</i>	red ironbark	2	7	2	11
<i>Eucalyptus</i> sp.	Eucalyptus sp.	0	1	1	2
<i>Fraxinus uhdei</i>	shamel ash	0	1	6	7
<i>Gleditsia triacanthos</i> 'inermis'	thornless honey locust	0	1	2	3
<i>Jacaranda mimosifolia</i>	Jacaranda	1	2	4	7
<i>Juniperus chinensis</i>	Hollywood juniper	0	1	1	2
<i>Ligustrum lucidum</i>	glossy privet	1	15	7	23
<i>Liquidamber styraciflua</i>	Sweetgum	1	14	23	38
<i>Maytenus boaria</i>	Mayten tree	0	1	2	3
<i>Olea europaea</i>	Olive	0	1	2	3
<i>Osmanthus fragrans</i>	Fragrant Olive	0	8	5	13
<i>Picea pungens glauca</i>	Blue Spruce	1	0	0	1
<i>Pinus canariensis</i>	Canary Island pine	3	49	64	116
<i>Pinus halapensis</i>	Aleppo pine	0	2	0	2
<i>Pinus mugo</i>	Mugho pine	0	1	0	1
<i>Pinus pinea</i>	Italian stone pine	1	3	2	6
<i>Pittosporum eugenioides</i>	Lemonwood	13	27	6	46
<i>Populus nigra</i> 'italica'	Lombardy poplar	4	5	3	12
<i>Prunus cerasifera</i>	purple leaf plum	2	4	3	9
<i>Prunus serrulata</i>	Kwanzan cherry	0	0	0	0
<i>Pyrus calleryana</i>	Callery pear	0	1	0	1
<i>Quercus agrifolia</i>	California live oak	0	2	3	5
<i>Quercus ilex</i>	Holly oak	0	3	3	6
<i>Salix lasiandra</i>	Pacific willow	1	0	0	1
<i>Schinus molle</i>	Peruvian pepper	0	1	0	1
<i>Sequoia sempervirens</i>	Coast redwood	0	7	9	16
<i>Ulmus parvifolia</i>	Chinese elm	1	3	6	10
<b>Total</b>		<b>38</b>	<b>205</b>	<b>182</b>	<b>425</b>

### 3.4 Protected Trees

The protected status of trees is defined under items 3 and 4 in the City of Sunnyvale Municipal Code (code), Section 19.94.030 as:

- 3) *“Protected tree” means a tree of significant size.*
- 4) *“Significant size” means a tree thirty-eight inches or greater in circumference measured four and one-half feet above ground for single-trunk trees. For multi-trunk trees “significant size” means a tree which has at least one trunk with a circumference thirty-eight inches or greater measured four and one-half feet above ground level, or in which the measurements of the*

*circumferences of each of the multi-trunks, when measured four and one-half feet above the ground level, added together equal an overall circumference one hundred thirteen inches or greater.*

Based on this definition, 293 protected trees were identified on the site. Protected trees include 112 Canary Island pine, 35 sweetgum, and 20 silver dollar eucalypt (*Eucalyptus polyanthemos*) (see Appendix C: Tree Assessment).

If redevelopment of this parcel creates impacts to or requires removal of protected status trees, the City may require reasonable alterations to the project design in order to retain protected trees per Section 19.94.110 of the Code. For protected trees to be preserved, a tree protection plan is required. For protected trees to be removed, a replanting plan is required, per Section 19.94.090 of the Code. Typically, the minimum size for the replacement of a protected tree is a standard twenty-four inch box size tree, subject to review by the city's director of community development. Tree removal, replacement, and preservation are discussed in further detail in Section 4.

### 3.5 Invasive Trees

Of the 425 trees (35 species) on the site, 36 trees (4 species) are listed by the California Invasive Plant Council (Cal-IPC, 2019) as a limited invasive species. A single Callery pear (*Pyrus calleryana*) on the site is watch-listed by Cal-IPC as a species of potential concern. These results are shown in Table 4.

**Table 4. Invasive Species**

Scientific Name	Common Name	Count	Cal-IPC Rating
Ligustrum lucidum	glossy privet	23	Limited
Olea europaea	Olive	3	Limited
Prunus cerasifera	purple leaf plum	9	Limited
Pyrus calleryana	Callery pear	1	Watch
Schinus molle	Peruvian pepper	1	Limited
<b>Total</b>		<b>37</b>	





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**H. T. HARVEY & ASSOCIATES**  
Ecological Consultants

**Figure 1a. Locations of Existing Trees**  
Google Caribbean Campus Draft Arborist Report (3475-45)  
July 2019





N:\Projects\3400\3475-01\45\Report\Figure 1b. Locations of Existing Trees.mxd

**Figure 1b. Locations of Existing Trees**  
 Google Caribbean Campus Draft Arborist Report (3475-45)  
 July 2019

## Section 4. Tree Removal, Replacement, and Preservation

### 4.1 Tree Removal

There were 425 trees (35 species) identified on the site. According to the Planning Submittal dated October 26, 2018, 382 trees will be removed. Table 5 provides a summary of the trees to be removed. Two hundred and fifty of the trees to be removed are of sufficient size to be “protected” under the City’s Code (see Section 3.4 above).

**Table 5. Tree Removal**

Scientific Name	Common Name	Total	Non-Protected Trees		Protected Trees	
			Preserve	Remove	Preserve	Remove
<i>Afrocarpus falcatus</i>	African fern pine	18	0	11	0	7
<i>Alnus rubra</i>	Red alder	9	0	0	0	9
<i>Betula pendula</i>	White birch	5	0	4	0	1
<i>Ceratonia siliqua</i>	carob tree	20	0	4	0	16
<i>Corymbia citriodora</i>	lemon scented gum	2	0	0	0	2
<i>Eriobotrya japonica</i>	Loquat	1	0	1	0	0
<i>Eucalyptus nicholii</i>	peppermint eucalypt	4	0	1	0	3
<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	21	0	1	2	18
<i>Eucalyptus sideroxylon</i>	red ironbark	11	0	0	0	11
<i>Eucalyptus sp.</i>	Eucalyptus sp.	2	0	0	0	2
<i>Fraxinus uhdei</i>	shamel ash	7	0	4	3	0
<i>Gleditsia triacanthos</i>	thornless honey locust	3	0	0	0	3
<i>Jacaranda mimosifolia</i>	Jacaranda	7	0	5	0	2
<i>Juniperus chinensis</i>	Hollywood juniper	2	0	0	0	2
<i>Ligustrum lucidum</i>	glossy privet	23	0	15	0	8
<i>Liquidamber styraciflua</i>	Sweetgum	38	0	3	1	34
<i>Maytenus boaria</i>	Mayten tree	3	0	1	0	2
<i>Olea europaea</i>	Olive	3	0	3	0	0
<i>Osmanthus fragrans</i>	Fragrant Olive	13	0	13	0	0
<i>Picea pungens glauca</i>	Blue Spruce	1	0	1	0	0
<i>Pinus canariensis</i>	Canary Island pine	116	0	4	28	84
<i>Pinus halapensis</i>	Aleppo pine	2	0	0	0	2
<i>Pinus mugo</i>	Mugho pine	1	0	1	0	0
<i>Pinus pinea</i>	Italian stone pine	6	0	0	0	6
<i>Pittosporum eugenioides</i>	Lemonwood	46	0	45	0	1
<i>Populus nigra 'italica'</i>	Lombardy poplar	12	0	0	0	12



Scientific Name	Common Name	Total	Non-Protected Trees		Protected Trees	
			Preserve	Remove	Preserve	Remove
<i>Prunus cerasifera</i>	purple leaf plum	9	0	9	0	0
<i>Prunus serrulata</i>	Kwanzan cherry	0	0	0	0	0
<i>Pyrus calleryana</i>	Callery pear	1	0	0	0	1
<i>Quercus agrifolia</i>	California live oak	5	0	4	0	1
<i>Quercus ilex</i>	Holly oak	6	0	2	0	4
<i>Salix lasiandra</i>	Pacific willow	1	0	0	0	1
<i>Schinus molle</i>	Peruvian pepper	1	0	0	0	1
<i>Sequoia sempervirens</i>	Coast redwood	16	0	0	9	7
<i>Ulmus parvifolia</i>	Chinese elm	10	0	0	0	10
<b>Total - Trees to be Preserved</b>		<b>43</b>	<b>0</b>	<b>-</b>	<b>43</b>	<b>-</b>
<b>Total - Trees to be Removed</b>		<b>382</b>	<b>-</b>	<b>132</b>	<b>-</b>	<b>250</b>
<b>Total - All Trees</b>		<b>425</b>				

## 4.2 Tree Replacement

The 250 protected trees to be removed are to be replaced per the City's Code, Section 19.94.080, which considers factors such as the following:

- (1) *The number, species, size and location of existing trees on the site; and*
- (2) *Good forestry practices such as, but not limited to, the number of healthy trees a given parcel of land will support.*

The City typically requires planting of a replacement tree somewhere on the property as a standard condition of approval for removal of each protected tree. At the time of writing this report, a detailed planting plan was not available. To meet the City's requirements for replacement of protected trees, the Project will need to include a minimum of 250 new trees with a container size of 24-inches or larger.

## 4.3 Tree Preservation

A total of 43 trees will be preserved on the site, as shown in Table 6. The tree protection measures described in Section 5 will apply to these trees.

**Table 6. Tree Preservation**

Tree Tag	Scientific Name	Common Name	Protected?
82	<i>Pinus canariensis</i>	Canary Island pine	Yes
1006	<i>Pinus canariensis</i>	Canary Island pine	Yes
1009	<i>Pinus canariensis</i>	Canary Island pine	Yes
1020	<i>Pinus canariensis</i>	Canary Island pine	Yes
1021	<i>Pinus canariensis</i>	Canary Island pine	Yes

Tree Tag	Scientific Name	Common Name	Protected?
1022	<i>Pinus canariensis</i>	Canary Island pine	Yes
1023	<i>Pinus canariensis</i>	Canary Island pine	Yes
1024	<i>Pinus canariensis</i>	Canary Island pine	Yes
1025	<i>Pinus canariensis</i>	Canary Island pine	Yes
1026	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1027	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1028	<i>Pinus canariensis</i>	Canary Island pine	Yes
1029	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1030	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1031	<i>Pinus canariensis</i>	Canary Island pine	Yes
1032	<i>Pinus canariensis</i>	Canary Island pine	Yes
1033	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1034	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1097	<i>Pinus canariensis</i>	Canary Island pine	Yes
1099	<i>Pinus canariensis</i>	Canary Island pine	Yes
1100	<i>Pinus canariensis</i>	Canary Island pine	Yes
1101	<i>Pinus canariensis</i>	Canary Island pine	Yes
1102	<i>Pinus canariensis</i>	Canary Island pine	Yes
1103	<i>Pinus canariensis</i>	Canary Island pine	Yes
1105	<i>Pinus canariensis</i>	Canary Island pine	Yes
1107	<i>Pinus canariensis</i>	Canary Island pine	Yes
1108	<i>Pinus canariensis</i>	Canary Island pine	Yes
1109	<i>Pinus canariensis</i>	Canary Island pine	Yes
1110	<i>Pinus canariensis</i>	Canary Island pine	Yes
1111	<i>Pinus canariensis</i>	Canary Island pine	Yes
1112	<i>Pinus canariensis</i>	Canary Island pine	Yes
1113	<i>Pinus canariensis</i>	Canary Island pine	Yes
1114	<i>Pinus canariensis</i>	Canary Island pine	Yes
1241	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1242	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1243	<i>Sequoia sempervirens</i>	Coast redwood	Yes
1320	<i>Fraxinus uhdei</i>	shamel ash	Yes
1321	<i>Fraxinus uhdei</i>	shamel ash	Yes
1322	<i>Fraxinus uhdei</i>	shamel ash	Yes
1323	<i>Pinus canariensis</i>	Canary Island pine	Yes
2196	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	Yes
2197	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	Yes
2301	<i>Liquidamber styraciflua</i>	Sweetgum	Yes



## Section 5. Tree Protection

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### 5.1 Tree Protection Plan

The City of Sunnyvale requires a Tree Protection Plan to safeguard the health of Protected trees before and during construction (Municipal Code Sections 19.94.110, 19.94.120, and 19.94.140).

### 5.2 Tree Protection Zones (TPZ)

For each tree to be preserved, a Tree Protection Zone (TPZ) will be established. The size and layout of each TPZ are required by the City of Sunnyvale to be no smaller than the dripline of each protected tree to be preserved. However, we recommend that the size of each TPZ be increased based on each species' sensitivity to construction impacts, the health and age of the tree, the root and crown conformation, and development constraints. It may be necessary to identify where roots actually are through hand excavation in order to properly protect a highly valued tree (Matheny and Clark 1998). The following activities shall be prohibited within each Tree Protection Zone:

- Storage of construction materials, debris, excavated material, waste, or washout water.
- Parking construction trailers, vehicles, or equipment.
- Foot traffic.
- Erection of sheds or structures.
- Impoundment of water.
- Excavation for underground utilities, drain or irrigation lines, or other digging unless approved by the City or Consulting Arborist.
- Attachment of signs to or wrapping materials around trees or plants unless approved by the City or Consulting Arborist.

### 5.3 Requirements for Tree Protection during Construction

Protected trees designated for preservation shall be protected during construction by use of the following methods:

- Protective fencing shall be installed no closer to the trunk than the dripline, and far enough from the trunk to protect the integrity of the tree. The fence shall be a minimum of four (4) feet in height and shall be set securely in place. The fence shall be of a sturdy but open material (i.e., chain link) to allow visibility to the trunk for inspections and safety.

- The existing grade level around a tree shall normally be maintained out to the dripline of the tree. Alternate grade levels, as described in the tree protection plan, may be approved by the director of community development.
- Drain wells shall be installed whenever impervious surfaces will be placed over the root system of a tree (the root system generally extends to the outermost edges of the branches).
- Pruning that is necessary to accommodate a project feature, such as a building, road or walkway shall be reviewed and approved by the department of community development and the department of public works. Pruning, if necessary, shall be reviewed and approved by the City Arborist.
- New landscaping installed within the dripline of an existing tree shall be designed to reproduce a similar environment to that which existed prior to construction.
- Appropriate city staff shall be authorized to conduct on-site inspections during construction to ensure that tree preservation procedures are being followed and replanting plans implemented.

### 5.3.1 Recommendations for Tree Protection during Construction

The following recommendations are intended to supplement City requirements.

- Protective fencing should completely enclose the Tree Protection Zone and should be installed prior to demolition, grubbing, or grading. Protective fencing should be maintained in good condition and free of trash, debris, excess soil, chemicals, or equipment until construction is completed and accepted by the City inspector.
- Pruning prior to construction with the intent of improving tree health is not recommended. Where temporary clearance is needed for access, tree branches should be tied back to provide clearance. If any tree to be preserved requires pruning to provide construction clearance, the work must be approved in advance by the City or Consulting Arborist and performed by a Certified Arborist or Tree Worker according to the latest edition of the ANSI Z133 and A300 standards as well as the *Best Management Practices—Tree Pruning* published by the International Society of Arboriculture. Pruning should not occur during periods of flight of adult boring insects.
- Any work that is expected to encounter tree roots should be monitored by the City or Consulting Arborist.
- Excavation at the edge of Tree Protection Zones should include the following tree protection measures:
  - Hand excavate under or around tree roots to depth of three (3) feet.
  - Tunneling should only be employed with approval of the City or Consulting Arborist.
  - Do not cut main lateral tree roots or taproots. When main lateral tree roots or taproots are exposed, excavation should be discontinued until instructions to resolve the conditions are received from the City or Consulting Arborist.
  - Redirect roots in backfill areas where possible.

- Expose main lateral roots beyond excavation limits as required to bend and redirect them without breaking.
- If redirection is not practical, cut roots approximately three (3) inches back from new construction.
- Protect exposed roots from drying out before placing permanent backfill.
- Prune roots that are affected by temporary and permanent construction only with the prior approval of the City or Consulting Arborist. Prune roots as follows:
  - Cut roots manually.
  - Cleanly cut exposed roots one (1) inch diameter and greater with sharp pruning instrument.
  - Do not use a backhoe or other equipment that rips, tears, or pulls roots.
  - Do not paint cut root ends.
- Injuries to any Protected trees during construction should be reported to the City or Consulting Arborist, who can evaluate the injury and recommend appropriate treatments.

## Section 6. References

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- [Cal-IPC] California Invasive Plant Council. 2019. California Invasive Plant Inventory Database. Accessed online at <http://cal-ipc.org/paf/> [January 2019].
- Google Earth. 2019. Aerial imagery of project site in Sunnyvale, California. <<https://www.google.com/earth/>>. Accessed March 13, 2019.
- Matheny, N. and J.R. Clark. 1998. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. Champaign, IL: International Society of Arboriculture.
- Sunnyvale [City of]. *Municipal Code*. Title 19. Zoning, Article 6, Discretionary Permits and Procedures, Chapter 19.94. Tree Preservation. Accessed online at [qcode.us/codes/sunnyvale](http://qcode.us/codes/sunnyvale).



## Appendix A. Assumptions and Limiting Conditions

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1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.
2. Property lines were not clearly surveyed or marked in the field by the owner, consultant attempted to provide as accurate of boundary for the inventory as possible using the limited data available.
3. Care has been taken to obtain all information from reliable sources. All data have been verified insofar as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of information provided by others.
4. The consultant shall not be required to give testimony or attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.
5. Loss or alteration of any part of this report invalidates the entire report.
6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of the consultant.
7. Neither all nor any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales, or other media, without the prior expressed written or verbal consent of the consultant particularly as to value conclusions, identity of the consultant, or any reference to any professional society or institute or to any initialed designation conferred upon the consultant as stated in her qualifications.
8. This report and values expressed herein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
10. Unless expressed otherwise: a) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection and b) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

## Appendix B. Certification of Performance

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I, Matthew Pollock, certify that:

I have personally inspected the trees and the property referred to in this report and have stated my findings accurately. The extent of the evaluation is stated in the attached report and the terms of the assignment.

I have no current or prospective interest in the vegetation or the property that is the subject of this report and have no personal interest or bias with respect to the parties involved.

The analysis, opinions, and conclusions stated herein are my own and are based on current scientific procedures and facts.

My analysis, opinions, and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices.

No one provided significant professional assistance to me, except as indicated within the report.

Compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.



Matthew Pollock

ASCA-Registered Consulting Arborist #631

ISA-Certified Arborist WE-11610A

## Appendix C. Tree Assessment

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
71	<i>Jacaranda mimosifolia</i>	Jacaranda	12	2	4	Yes	Fair	-
72	<i>Ligustrum lucidum</i>	glossy privet	10, 10, 9, 7, 4, 3	4	3	Yes	Fair	-
82	<i>Pinus canariensis</i>	Canary Island pine	23	4	4	Yes	Good	Yes
1001	<i>Pinus canariensis</i>	Canary Island pine	26	3	3	Yes	Fair	-
1002	<i>Pinus canariensis</i>	Canary Island pine	22	3	4	Yes	Fair	-
1003	<i>Pinus canariensis</i>	Canary Island pine	24	3	3	Yes	Fair	-
1004	<i>Pinus canariensis</i>	Canary Island pine	21	3	3	Yes	Fair	-
1005	<i>Pinus canariensis</i>	Canary Island pine	23	3	3	Yes	Fair	-
1006	<i>Pinus canariensis</i>	Canary Island pine	24	4	4	Yes	Good	Yes
1007	<i>Eucalyptus sp.</i>	Eucalyptus sp.	22	4	4	Yes	Good	-
1008	<i>Pinus canariensis</i>	Canary Island pine	29	4	4	Yes	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1009	<i>Pinus canariensis</i>	Canary Island pine	21	3	4	Yes	Fair	Yes
1010	<i>Pinus canariensis</i>	Canary Island pine	20	4	4	Yes	Good	-
1011	<i>Prunus cerasifera</i>	purple leaf plum	9	3	4	No	Fair	-
1012	<i>Prunus cerasifera</i>	purple leaf plum	9	4	4	No	Good	-
1013	<i>Prunus cerasifera</i>	purple leaf plum	6	2	4	No	Fair	-
1014	<i>Olea europaea</i>	Olive	7, 7, 6	5	5	No	Good	-
1017	<i>Pinus canariensis</i>	Canary Island pine	22	5	4	Yes	Good	-
1018	<i>Pinus canariensis</i>	Canary Island pine	9	4	4	No	Good	-
1020	<i>Pinus canariensis</i>	Canary Island pine	18	4	3	Yes	Fair	Yes
1021	<i>Pinus canariensis</i>	Canary Island pine	12	3	4	Yes	Fair	Yes
1022	<i>Pinus canariensis</i>	Canary Island pine	21	4	4	Yes	Good	Yes
1023	<i>Pinus canariensis</i>	Canary Island pine	15	5	4	Yes	Good	Yes
1024	<i>Pinus canariensis</i>	Canary Island pine	14	5	5	Yes	Good	Yes
1025	<i>Pinus canariensis</i>	Canary Island pine	21	5	4	Yes	Good	Yes



Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1026	<i>Sequoia sempervirens</i>	Coast redwood	15	5	4	Yes	Good	Yes
1027	<i>Sequoia sempervirens</i>	Coast redwood	12	5	3	Yes	Good	Yes
1028	<i>Pinus canariensis</i>	Canary Island pine	13	3	4	Yes	Fair	Yes
1029	<i>Sequoia sempervirens</i>	Coast redwood	12	5	4	Yes	Good	Yes
1030	<i>Sequoia sempervirens</i>	Coast redwood	14	5	3	Yes	Good	Yes
1031	<i>Pinus canariensis</i>	Canary Island pine	25	5	4	Yes	Good	Yes
1032	<i>Pinus canariensis</i>	Canary Island pine	15	5	5	Yes	Good	Yes
1033	<i>Sequoia sempervirens</i>	Coast redwood	16	3	4	Yes	Fair	Yes
1034	<i>Sequoia sempervirens</i>	Coast redwood	17	5	4	Yes	Good	Yes
1035	<i>Fraxinus uhdei</i>	shamel ash	6	5	4	No	Good	-
1036	<i>Fraxinus uhdei</i>	shamel ash	5	5	4	No	Good	-
1037	<i>Fraxinus uhdei</i>	shamel ash	6	5	4	No	Good	-
1038	<i>Fraxinus uhdei</i>	shamel ash	7	4	2	No	Fair	-
1039	<i>Ulmus parvifolia</i>	Chinese elm	18	4	3	Yes	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1040	<i>Ulmus parvifolia</i>	Chinese elm	14	5	4	Yes	Good	-
1041	<i>Ulmus parvifolia</i>	Chinese elm	17	5	4	Yes	Good	-
1042	<i>Afrocarpus falcatus</i>	African fern pine	15	5	3	Yes	Good	-
1043	<i>Afrocarpus falcatus</i>	African fern pine	35, 11, 9	5	3	Yes	Good	-
1044	<i>Afrocarpus falcatus</i>	African fern pine	11	3	3	No	Fair	-
1046	<i>Prunus cerasifera</i>	purple leaf plum	9	2	2	No	Poor	-
1047	<i>Eucalyptus nicholii</i>	peppermint eucalypt	8	4	5	No	Good	-
1048	<i>Ulmus parvifolia</i>	Chinese elm	15	5	3	Yes	Good	-
1049	<i>Ulmus parvifolia</i>	Chinese elm	18	5	3	Yes	Good	-
1050	<i>Ulmus parvifolia</i>	Chinese elm	17	5	3	Yes	Good	-
1051	<i>Ulmus parvifolia</i>	Chinese elm	17	5	3	Yes	Good	-
1052	<i>Eucalyptus sideroxylon</i>	red ironbark	28	4	4	Yes	Good	-
1053	<i>Eucalyptus sideroxylon</i>	red ironbark	19	4	3	Yes	Fair	-
1054	<i>Quercus agrifolia</i>	California live oak	6	4	5	No	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1055	<i>Ceratonia siliqua</i>	carob tree	22	4	3	Yes	Fair	-
1056	<i>Quercus agrifolia</i>	California live oak	9	5	4	No	Good	-
1057	<i>Ceratonia siliqua</i>	carob tree	15	4	3	Yes	Fair	-
1058	<i>Prunus cerasifera</i>	purple leaf plum	8, 6, 3	4	4	No	Good	-
1059	<i>Ceratonia siliqua</i>	carob tree	25	3	3	Yes	Fair	-
1060	<i>Ceratonia siliqua</i>	carob tree	29	3	3	Yes	Fair	-
1061	<i>Ligustrum lucidum</i>	glossy privet	4	4	5	No	Good	-
1062	<i>Quercus agrifolia</i>	California live oak	4	3	3	No	Fair	-
1063	<i>Olea europaea</i>	Olive	5, 4, 4, 3, 2	5	3	No	Good	-
1064	<i>Ceratonia siliqua</i>	carob tree	21	4	4	Yes	Good	-
1065	<i>Quercus agrifolia</i>	California live oak	4, 4	5	4	No	Good	-
1066	<i>Prunus cerasifera</i>	purple leaf plum	6, 4	4	3	No	Fair	-
1067	<i>Quercus ilex</i>	Holly oak	14	5	5	Yes	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1068	<i>Ceratonia siliqua</i>	carob tree	21	3	4	Yes	Fair	-
1069	<i>Ceratonia siliqua</i>	carob tree	12	4	5	Yes	Good	-
1070	<i>Ceratonia siliqua</i>	carob tree	15	4	3	Yes	Fair	-
1071	<i>Ligustrum lucidum</i>	glossy privet	6, 2	5	5	No	Good	-
1072	<i>Ligustrum lucidum</i>	glossy privet	7, 6, 4, 4, 3	5	5	No	Good	-
1073	<i>Ceratonia siliqua</i>	carob tree	16	4	5	Yes	Good	-
1074	<i>Ceratonia siliqua</i>	carob tree	18	4	4	Yes	Good	-
1075	<i>Ceratonia siliqua</i>	carob tree	18	3	4	Yes	Fair	-
1076	<i>Ceratonia siliqua</i>	carob tree	5, 4, 4	3	4	No	Fair	-
1077	<i>Ceratonia siliqua</i>	carob tree	12	3	4	Yes	Fair	-
1078	<i>Ceratonia siliqua</i>	carob tree	20	4	5	Yes	Good	-
1079	<i>Ceratonia siliqua</i>	carob tree	13	4	3	Yes	Fair	-
1080	<i>Ceratonia siliqua</i>	carob tree	6	5	1	No	Fair	-



Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1081	<i>Ceratonia siliqua</i>	carob tree	10, 7, 7, 5	4	2	No	Fair	-
1082	<i>Ceratonia siliqua</i>	carob tree	10	3	2	No	Fair	-
1083	<i>Ceratonia siliqua</i>	carob tree	25	1	1	Yes	Poor	-
1084	<i>Ceratonia siliqua</i>	carob tree	23	1	2	Yes	Poor	-
1085	<i>Prunus cerasifera</i>	purple leaf plum	6	1	1	No	Poor	-
1086	<i>Prunus cerasifera</i>	purple leaf plum	6	4	1	No	Fair	-
1087	<i>Ulmus parvifolia</i>	Chinese elm	20	2	1	Yes	Poor	-
1088	<i>Ulmus parvifolia</i>	Chinese elm	15	3	3	Yes	Fair	-
1089	<i>Ulmus parvifolia</i>	Chinese elm	19	4	2	Yes	Fair	-
1090	<i>Liquidamber styraciflua</i>	Sweetgum	18	5	3	Yes	Good	-
1091	<i>Afrocarpus falcatus</i>	African fern pine	17	5	2	Yes	Fair	-
1092	<i>Pinus canariensis</i>	Canary Island pine	26	3	3	Yes	Fair	-
1093	<i>Pinus canariensis</i>	Canary Island pine	26	4	1	Yes	Fair	-
1094	<i>Pinus canariensis</i>	Canary Island pine	11	3	4	No	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1095	<i>Olea europaea</i>	Olive	7, 7, 6, 5, 4, 4	4	3	No	Fair	-
1096	<i>Eucalyptus nicholii</i>	peppermint eucalypt	28	5	1	Yes	Fair	-
1097	<i>Pinus canariensis</i>	Canary Island pine	18	4	4	Yes	Good	Yes
1098	<i>Pinus canariensis</i>	Canary Island pine	18	4	1	Yes	Fair	-
1099	<i>Pinus canariensis</i>	Canary Island pine	19	5	4	Yes	Good	Yes
1100	<i>Pinus canariensis</i>	Canary Island pine	26	4	4	Yes	Good	Yes
1101	<i>Pinus canariensis</i>	Canary Island pine	18	5	4	Yes	Good	Yes
1102	<i>Pinus canariensis</i>	Canary Island pine	27	4	4	Yes	Good	Yes
1103	<i>Pinus canariensis</i>	Canary Island pine	18	5	4	Yes	Good	Yes
1104	<i>Pinus canariensis</i>	Canary Island pine	9	4	2	No	Fair	-
1105	<i>Pinus canariensis</i>	Canary Island pine	18	5	4	Yes	Good	Yes
1106	<i>Pinus canariensis</i>	Canary Island pine	15	1	4	Yes	Fair	-
1107	<i>Pinus canariensis</i>	Canary Island pine	20	4	3	Yes	Fair	Yes

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1108	<i>Pinus canariensis</i>	Canary Island pine	22	4	4	Yes	Good	Yes
1109	<i>Pinus canariensis</i>	Canary Island pine	14	3	4	Yes	Fair	Yes
1110	<i>Pinus canariensis</i>	Canary Island pine	17	5	3	Yes	Good	Yes
1111	<i>Pinus canariensis</i>	Canary Island pine	18	5	5	Yes	Good	Yes
1112	<i>Pinus canariensis</i>	Canary Island pine	23	5	5	Yes	Good	Yes
1113	<i>Pinus canariensis</i>	Canary Island pine	20	5	5	Yes	Good	Yes
1114	<i>Pinus canariensis</i>	Canary Island pine	15	5	5	Yes	Good	Yes
1184	<i>Quercus ilex</i>	Holly oak	17	5	5	Yes	Good	-
1185	<i>Ligustrum lucidum</i>	glossy privet	5, 4, 3	5	5	No	Good	-
1186	<i>Salix lasiandra</i>	Pacific willow	19	3	1	Yes	Poor	-
1187	<i>Osmanthus fragrans</i>	Fragrant Olive	4, 4, 3, 3	4	3	No	Fair	-
1188	<i>Pinus canariensis</i>	Canary Island pine	19	3	4	Yes	Fair	-
1189	<i>Pinus canariensis</i>	Canary Island pine	22	3	4	Yes	Fair	-
1190	<i>Afrocarpus falcatus</i>	African fern pine	7	3	4	No	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1191	<i>Afrocarpus falcatus</i>	African fern pine	11	3	5	No	Good	-
1192	<i>Afrocarpus falcatus</i>	African fern pine	8, 7, 6, 5	3	4	No	Fair	-
1193	<i>Afrocarpus falcatus</i>	African fern pine	9	3	4	No	Fair	-
1194	<i>Afrocarpus falcatus</i>	African fern pine	11	5	4	No	Good	-
1195	<i>Afrocarpus falcatus</i>	African fern pine	11	3	4	No	Fair	-
1196	<i>Afrocarpus falcatus</i>	African fern pine	12	4	4	Yes	Good	-
1197	<i>Afrocarpus falcatus</i>	African fern pine	13	4	3	Yes	Fair	-
1198	<i>Pinus canariensis</i>	Canary Island pine	26	4	3	Yes	Fair	-
1199	<i>Pinus canariensis</i>	Canary Island pine	26	4	4	Yes	Good	-
1200	<i>Pinus canariensis</i>	Canary Island pine	20	4	5	Yes	Good	-
1201	<i>Afrocarpus falcatus</i>	African fern pine	9	3	4	No	Fair	-
1202	<i>Afrocarpus falcatus</i>	African fern pine	9	4	5	No	Good	-
1203	<i>Afrocarpus falcatus</i>	African fern pine	12	4	3	Yes	Fair	-
1204	<i>Pinus mugo</i>	Mugho pine	11	3	4	No	Fair	-



Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1205	<i>Afrocarpus falcatus</i>	African fern pine	6, 5	3	3	No	Fair	-
1206	<i>Afrocarpus falcatus</i>	African fern pine	11	5	4	No	Good	-
1207	<i>Afrocarpus falcatus</i>	African fern pine	13	4	3	Yes	Fair	-
1208	<i>Eriobotrya japonica</i>	Loquat	9, 5	5	2	No	Fair	-
1209	<i>Maytenus boaria</i>	Mayten tree	17, 14	2	3	Yes	Fair	-
1210	<i>Maytenus boaria</i>	Mayten tree	21	5	3	Yes	Good	-
1211	<i>Maytenus boaria</i>	Mayten tree	3, 3	5	3	No	Good	-
1212	<i>Pinus canariensis</i>	Canary Island pine	23	3	4	Yes	Fair	-
1213	<i>Pinus canariensis</i>	Canary Island pine	23	3	4	Yes	Fair	-
1214	<i>Eucalyptus sideroxylon</i>	red ironbark	21	4	3	Yes	Fair	-
1215	<i>Sequoia sempervirens</i>	Coast redwood	12	3	5	Yes	Good	-
1216	<i>Sequoia sempervirens</i>	Coast redwood	19	4	4	Yes	Good	-
1217	<i>Sequoia sempervirens</i>	Coast redwood	15	5	4	Yes	Good	-
1218	<i>Sequoia sempervirens</i>	Coast redwood	20	4	5	Yes	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1219	<i>Populus nigra 'italica'</i>	Lombardy poplar	53, 21, 3 20, 18, 11		1	Yes	Poor	-
1221	<i>Betula pendula</i>	White birch	11	3	4	No	Fair	-
1222	<i>Betula pendula</i>	White birch	6	3	1	No	Poor	-
1228	<i>Juniperus chinensis</i>	Hollywood juniper	15	5	4	Yes	Good	-
1229	<i>Juniperus chinensis</i>	Hollywood juniper	15	4	1	Yes	Fair	-
1230	<i>Betula pendula</i>	White birch	12, 10	5	4	Yes	Good	-
1231	<i>Betula pendula</i>	White birch	9	3	4	No	Fair	-
1232	<i>Betula pendula</i>	White birch	11	5	5	No	Good	-
1233	<i>Pinus pinea</i>	Italian stone pine	31	4	3	Yes	Fair	-
1234	<i>Pinus pinea</i>	Italian stone pine	25	3	2	Yes	Fair	-
1235	<i>Pinus pinea</i>	Italian stone pine	25	3	1	Yes	Poor	-
1236	<i>Pinus pinea</i>	Italian stone pine	28	3	3	Yes	Fair	-
1237	<i>Alnus rubra</i>	Red alder	24	2	1	Yes	Poor	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1238	<i>Alnus rubra</i>	Red alder	24	3	2	Yes	Fair	-
1239	<i>Alnus rubra</i>	Red alder	22	3	2	Yes	Fair	-
1240	<i>Alnus rubra</i>	Red alder	26	3	1	Yes	Poor	-
1241	<i>Sequoia sempervirens</i>	Coast redwood	13	4	3	Yes	Fair	Yes
1242	<i>Sequoia sempervirens</i>	Coast redwood	13	4	3	Yes	Fair	Yes
1243	<i>Sequoia sempervirens</i>	Coast redwood	14	4	3	Yes	Fair	Yes
1244	<i>Pyrus calleryana</i>	Callery pear	15	4	3	Yes	Fair	-
1245	<i>Alnus rubra</i>	Red alder	19	4	2	Yes	Fair	-
1256	<i>Pinus pinea</i>	Italian stone pine	32	4	4	Yes	Good	-
1257	<i>Pinus pinea</i>	Italian stone pine	29	5	4	Yes	Good	-
1258	<i>Alnus rubra</i>	Red alder	26	3	1	Yes	Poor	-
1259	<i>Pinus halapensis</i>	Aleppo pine	23	3	2	Yes	Fair	-
1261	<i>Sequoia sempervirens</i>	Coast redwood	26	3	4	Yes	Fair	-
1262	<i>Sequoia sempervirens</i>	Coast redwood	24	3	4	Yes	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1263	<i>Sequoia sempervirens</i>	Coast redwood	26	3	4	Yes	Fair	-
1264	<i>Pinus halapensis</i>	Aleppo pine	24	3	3	Yes	Fair	-
1271	<i>Alnus rubra</i>	Red alder	15	3	4	Yes	Fair	-
1273	<i>Alnus rubra</i>	Red alder	21	5	1	Yes	Fair	-
1276	<i>Alnus rubra</i>	Red alder	23	4	1	Yes	Fair	-
1277	<i>Liquidamber styraciflua</i>	Sweetgum	16	3	3	Yes	Fair	-
1278	<i>Liquidamber styraciflua</i>	Sweetgum	16	4	2	Yes	Fair	-
1279	<i>Liquidamber styraciflua</i>	Sweetgum	22	3	3	Yes	Fair	-
1280	<i>Liquidamber styraciflua</i>	Sweetgum	18	5	3	Yes	Good	-
1281	<i>Liquidamber styraciflua</i>	Sweetgum	14	5	3	Yes	Good	-
1282	<i>Liquidamber styraciflua</i>	Sweetgum	12	5	4	Yes	Good	-
1283	<i>Liquidamber styraciflua</i>	Sweetgum	12	4	4	Yes	Good	-
1284	<i>Liquidamber styraciflua</i>	Sweetgum	20	5	3	Yes	Good	-
1285	<i>Liquidamber styraciflua</i>	Sweetgum	12	4	4	Yes	Good	-



Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
1286	<i>Liquidamber styraciflua</i>	Sweetgum	14	4	4	Yes	Good	-
1318	<i>Picea pungens glauca</i>	Blue Spruce	6	2	1	No	Poor	-
1319	<i>Liquidamber styraciflua</i>	Sweetgum	5, 4	3	4	No	Fair	-
1320	<i>Fraxinus uhdei</i>	shamel ash	21	4	4	Yes	Good	Yes
1321	<i>Fraxinus uhdei</i>	shamel ash	17	5	4	Yes	Good	Yes
1322	<i>Fraxinus uhdei</i>	shamel ash	23	4	4	Yes	Good	Yes
1323	<i>Pinus canariensis</i>	Canary Island pine	22	3	4	Yes	Fair	Yes
1324	<i>Pinus canariensis</i>	Canary Island pine	23	4	4	Yes	Good	-
2001	<i>Populus nigra 'italica'</i>	Lombardy poplar	49	3	1	Yes	Poor	-
2002	<i>Populus nigra 'italica'</i>	Lombardy poplar	53	3	4	Yes	Fair	-
2003	<i>Populus nigra 'italica'</i>	Lombardy poplar	58, 35	5	3	Yes	Good	-
2004	<i>Corymbia citriodora</i>	lemon scented gum	22	5	4	Yes	Good	-
2005	<i>Populus nigra 'italica'</i>	Lombardy poplar	52	5	4	Yes	Good	-
2006	<i>Schinus molle</i>	Peruvian pepper	54	4	3	Yes	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2007	<i>Eucalyptus nicholii</i>	peppermint eucalypt	46	4	2	Yes	Fair	-
2008	<i>Pinus canariensis</i>	Canary Island pine	26	3	3	Yes	Fair	-
2009	<i>Pinus canariensis</i>	Canary Island pine	21	2	3	Yes	Fair	-
2010	<i>Pinus canariensis</i>	Canary Island pine	15	2	4	Yes	Fair	-
2011	<i>Eucalyptus sp.</i>	Eucalyptus sp.	28, 21	4	3	Yes	Fair	-
2012	<i>Eucalyptus nicholii</i>	peppermint eucalypt	31	5	4	Yes	Good	-
2013	<i>Pinus canariensis</i>	Canary Island pine	21	4	4	Yes	Good	-
2014	<i>Pinus canariensis</i>	Canary Island pine	30	4	2	Yes	Fair	-
2015	<i>Pinus canariensis</i>	Canary Island pine	20	4	3	Yes	Fair	-
2016	<i>Pinus canariensis</i>	Canary Island pine	21	4	3	Yes	Fair	-
2017	<i>Pinus canariensis</i>	Canary Island pine	23	4	3	Yes	Fair	-
2018	<i>Ligustrum lucidum</i>	glossy privet	11	3	3	No	Fair	-
2020	<i>Ligustrum lucidum</i>	glossy privet	6	4	3	No	Fair	-
2023	<i>Ligustrum lucidum</i>	glossy privet	13	4	2	Yes	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2024	<i>Ligustrum lucidum</i>	glossy privet	17	4	4	Yes	Good	-
2025	<i>Ligustrum lucidum</i>	glossy privet	13	3	4	Yes	Fair	-
2028	<i>Ligustrum lucidum</i>	glossy privet	15	3	3	Yes	Fair	-
2029	<i>Jacaranda mimosifolia</i>	Jacaranda	13	2	2	Yes	Poor	-
2030	<i>Jacaranda mimosifolia</i>	Jacaranda	10	4	4	No	Good	-
2031	<i>Jacaranda mimosifolia</i>	Jacaranda	8	4	4	No	Good	-
2032	<i>Jacaranda mimosifolia</i>	Jacaranda	11	4	4	No	Good	-
2033	<i>Jacaranda mimosifolia</i>	Jacaranda	9	2	3	No	Fair	-
2034	<i>Ligustrum lucidum</i>	glossy privet	9	4	3	No	Fair	-
2035	<i>Ligustrum lucidum</i>	glossy privet	10	4	1	No	Fair	-
2037	<i>Ligustrum lucidum</i>	glossy privet	16	4	3	Yes	Fair	-
2038	<i>Pinus canariensis</i>	Canary Island pine	19	4	5	Yes	Good	-
2039	<i>Pinus canariensis</i>	Canary Island pine	25	4	3	Yes	Fair	-
2040	<i>Ligustrum lucidum</i>	glossy privet	6	4	3	No	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2043	<i>Ligustrum lucidum</i>	glossy privet	8	2	2	No	Poor	-
2044	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	35	5	4	Yes	Good	-
2045	<i>Corymbia citriodora</i>	lemon scented gum	23	5	2	Yes	Fair	-
2046	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	24	3	4	Yes	Fair	-
2047	<i>Pinus canariensis</i>	Canary Island pine	33	5	4	Yes	Good	-
2048	<i>Pinus canariensis</i>	Canary Island pine	26	2	3	Yes	Fair	-
2049	<i>Pittosporum eugenioides</i>	Lemonwood	6, 3, 3	1	1	No	Poor	-
2050	<i>Pittosporum eugenioides</i>	Lemonwood	7, 6, 6	1	1	No	Poor	-
2051	<i>Pittosporum eugenioides</i>	Lemonwood	5, 4	1	1	No	Poor	-
2052	<i>Pinus canariensis</i>	Canary Island pine	27	4	3	Yes	Fair	-
2053	<i>Pinus canariensis</i>	Canary Island pine	21	4	4	Yes	Good	-



Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2054	<i>Pinus canariensis</i>	Canary Island pine	25	4	2	Yes	Fair	-
2055	<i>Pittosporum eugenioides</i>	Lemonwood	6	0	0	No	Poor	-
2056	<i>Pittosporum eugenioides</i>	Lemonwood	7, 6	1	1	No	Poor	-
2057	<i>Pittosporum eugenioides</i>	Lemonwood	9, 6, 5	1	1	No	Poor	-
2058	<i>Pinus canariensis</i>	Canary Island pine	24	5	4	Yes	Good	-
2059	<i>Pinus canariensis</i>	Canary Island pine	23	5	4	Yes	Good	-
2060	<i>Pittosporum eugenioides</i>	Lemonwood	7	0	0	No	Poor	-
2061	<i>Pittosporum eugenioides</i>	Lemonwood	8, 7	0	0	No	Poor	-
2062	<i>Pinus canariensis</i>	Canary Island pine	22	4	4	Yes	Good	-
2063	<i>Pittosporum eugenioides</i>	Lemonwood	9, 5	2	1	No	Poor	-
2064	<i>Pittosporum eugenioides</i>	Lemonwood	5, 4	4	2	No	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2065	<i>Pittosporum eugenioides</i>	Lemonwood	7	3	1	No	Poor	-
2066	<i>Pittosporum eugenioides</i>	Lemonwood	10, 10, 5	4	3	No	Fair	-
2067	<i>Ligustrum lucidum</i>	glossy privet	12	4	3	Yes	Fair	-
2068	<i>Pinus canariensis</i>	Canary Island pine	24	5	3	Yes	Good	-
2069	<i>Pinus canariensis</i>	Canary Island pine	22	4	3	Yes	Fair	-
2070	<i>Pinus canariensis</i>	Canary Island pine	19	4	3	Yes	Fair	-
2071	<i>Pinus canariensis</i>	Canary Island pine	22	4	4	Yes	Good	-
2072	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	29	5	3	Yes	Good	-
2073	<i>Pinus canariensis</i>	Canary Island pine	14	3	4	Yes	Fair	-
2074	<i>Pittosporum eugenioides</i>	Lemonwood	6, 5, 5, 3, 3	3	4	No	Fair	-
2076	<i>Pittosporum eugenioides</i>	Lemonwood	6, 5, 5	1	2	No	Poor	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2078	<i>Pittosporum eugenioides</i>	Lemonwood	6	1	2	No	Poor	-
2079	<i>Ligustrum lucidum</i>	glossy privet	10	5	4	No	Good	-
2080	<i>Ligustrum lucidum</i>	glossy privet	7	3	4	No	Fair	-
2081	<i>Ligustrum lucidum</i>	glossy privet	13	3	4	Yes	Fair	-
2082	<i>Pinus canariensis</i>	Canary Island pine	24	5	4	Yes	Good	-
2083	<i>Eucalyptus sideroxylon</i>	red ironbark	27	4	4	Yes	Good	-
2085	<i>Ligustrum lucidum</i>	glossy privet	9	4	5	No	Good	-
2086	<i>Ligustrum lucidum</i>	glossy privet	5	3	2	No	Fair	-
2089	<i>Ligustrum lucidum</i>	glossy privet	5	4	2	No	Fair	-
2091	<i>Populus nigra 'italica'</i>	Lombardy poplar	51	5	3	Yes	Good	-
2092	<i>Pinus canariensis</i>	Canary Island pine	31	5	5	Yes	Good	-
2093	<i>Pinus canariensis</i>	Canary Island pine	17	5	4	Yes	Good	-
2094	<i>Pinus canariensis</i>	Canary Island pine	18	5	5	Yes	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2095	<i>Pinus canariensis</i>	Canary Island pine	23	5	4	Yes	Good	-
2096	<i>Pinus canariensis</i>	Canary Island pine	24	4	4	Yes	Good	-
2097	<i>Pittosporum eugenioides</i>	Lemonwood	7, 6, 6, 5, 5	4	3	No	Fair	-
2098	<i>Pittosporum eugenioides</i>	Lemonwood	7, 6, 6, 5, 3	4	3	No	Fair	-
2099	<i>Pittosporum eugenioides</i>	Lemonwood	7, 7, 6	4	1	No	Fair	-
2100	<i>Pittosporum eugenioides</i>	Lemonwood	7, 5, 5	4	3	No	Fair	-
2101	<i>Pittosporum eugenioides</i>	Lemonwood	6, 4, 4	2	4	No	Fair	-
2102	<i>Pittosporum eugenioides</i>	Lemonwood	7, 4	4	3	No	Fair	-
2103	<i>Pittosporum eugenioides</i>	Lemonwood	5, 3	4	3	No	Fair	-
2104	<i>Pittosporum eugenioides</i>	Lemonwood	6, 6	4	3	No	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2105	<i>Pinus canariensis</i>	Canary Island pine	22	5	5	Yes	Good	-
2106	<i>Pinus canariensis</i>	Canary Island pine	17	5	4	Yes	Good	-
2107	<i>Pinus canariensis</i>	Canary Island pine	26	5	5	Yes	Good	-
2108	<i>Pittosporum eugenioides</i>	Lemonwood	6, 5, 4, 4, 4, 3	4	4	No	Good	-
2109	<i>Pittosporum eugenioides</i>	Lemonwood	8, 5, 5, 4, 4, 3	3	4	No	Fair	-
2110	<i>Pittosporum eugenioides</i>	Lemonwood	4, 3, 2	3	4	No	Fair	-
2111	<i>Pittosporum eugenioides</i>	Lemonwood	8, 5, 3, 3, 3, 3	3	3	No	Fair	-
2112	<i>Pittosporum eugenioides</i>	Lemonwood	4, 3, 3, 3, 3, 3	4	4	No	Good	-
2113	<i>Pittosporum eugenioides</i>	Lemonwood	9, 4, 4, 2, 2	4	3	No	Fair	-
2114	<i>Pittosporum eugenioides</i>	Lemonwood	5, 2, 2, 2	4	4	No	Good	-



Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2115	<i>Pittosporum eugenioides</i>	Lemonwood	9, 8, 7, 5	3	4	No	Fair	-
2116	<i>Pittosporum eugenioides</i>	Lemonwood	5	0	0	Yes	Poor	-
2118	<i>Pinus canariensis</i>	Canary Island pine	22	5	4	Yes	Good	-
2119	<i>Pinus canariensis</i>	Canary Island pine	19	4	4	Yes	Good	-
2120	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	30	4	3	Yes	Fair	-
2121	<i>Liquidamber styraciflua</i>	Sweetgum	14	5	4	Yes	Good	-
2122	<i>Liquidamber styraciflua</i>	Sweetgum	17	5	3	Yes	Good	-
2123	<i>Liquidamber styraciflua</i>	Sweetgum	15	4	4	Yes	Good	-
2124	<i>Liquidamber styraciflua</i>	Sweetgum	18	5	3	Yes	Good	-
2125	<i>Liquidamber styraciflua</i>	Sweetgum	16	5	4	Yes	Good	-
2126	<i>Liquidamber styraciflua</i>	Sweetgum	12	5	3	Yes	Good	-
2127	<i>Liquidamber styraciflua</i>	Sweetgum	16	5	3	Yes	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2128	<i>Liquidamber styraciflua</i>	Sweetgum	16	5	3	Yes	Good	-
2129	<i>Pinus canariensis</i>	Canary Island pine	25	3	4	Yes	Fair	-
2130	<i>Pinus canariensis</i>	Canary Island pine	20	4	5	Yes	Good	-
2131	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	18	5	4	Yes	Good	-
2132	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	20	4	5	Yes	Good	-
2133	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	25	4	3	Yes	Fair	-
2134	<i>Pinus canariensis</i>	Canary Island pine	16	3	4	Yes	Fair	-
2135	<i>Pinus canariensis</i>	Canary Island pine	23	4	4	Yes	Good	-
2140	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	9	4	4	No	Good	-
2142	<i>Pinus canariensis</i>	Canary Island pine	21	5	4	Yes	Good	-
2143	<i>Pinus canariensis</i>	Canary Island pine	21	5	4	Yes	Good	-
2144	<i>Jacaranda mimosifolia</i>	Jacaranda	9	5	4	No	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2147	<i>Pinus canariensis</i>	Canary Island pine	27	3	3	Yes	Fair	-
2148	<i>Pinus canariensis</i>	Canary Island pine	27	5	5	Yes	Good	-
2149	<i>Pittosporum eugenioides</i>	Lemonwood	4, 4, 2	5	4	No	Good	-
2151	<i>Gleditsia triacanthos</i> 'inermis'	thornless honey locust	12	4	4	Yes	Good	-
2152	<i>Liquidamber styraciflua</i>	Sweetgum	16	5	4	Yes	Good	-
2153	<i>Liquidamber styraciflua</i>	Sweetgum	18	3	4	Yes	Fair	-
2154	<i>Liquidamber styraciflua</i>	Sweetgum	18	5	4	Yes	Good	-
2156	<i>Liquidamber styraciflua</i>	Sweetgum	15	3	1	Yes	Poor	-
2157	<i>Liquidamber styraciflua</i>	Sweetgum	17	3	2	Yes	Fair	-
2158	<i>Liquidamber styraciflua</i>	Sweetgum	16	4	3	Yes	Fair	-
2159	<i>Pinus canariensis</i>	Canary Island pine	24	5	4	Yes	Good	-
2160	<i>Pinus canariensis</i>	Canary Island pine	22	3	4	Yes	Fair	-
2161	<i>Pinus canariensis</i>	Canary Island pine	22	4	5	Yes	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2162	<i>Eucalyptus sideroxylon</i>	red ironbark	19	4	2	Yes	Fair	-
2163	<i>Pinus canariensis</i>	Canary Island pine	28	4	5	Yes	Good	-
2164	<i>Pinus canariensis</i>	Canary Island pine	22	4	3	Yes	Fair	-
2165	<i>Pinus canariensis</i>	Canary Island pine	24	5	2	Yes	Fair	-
2166	<i>Eucalyptus sideroxylon</i>	red ironbark	35	5	2	Yes	Fair	-
2167	<i>Eucalyptus sideroxylon</i>	red ironbark	19	5	2	Yes	Fair	-
2168	<i>Eucalyptus sideroxylon</i>	red ironbark	22	5	2	Yes	Fair	-
2170	<i>Quercus ilex</i>	Holly oak	5, 4	5	2	No	Fair	-
2172	<i>Quercus agrifolia</i>	California live oak	16, 13	15, 4	3	Yes	Fair	-
2173	<i>Liquidamber styraciflua</i>	Sweetgum	12	5	2	Yes	Fair	-
2174	<i>Liquidamber styraciflua</i>	Sweetgum	10	4	4	No	Good	-
2175	<i>Liquidamber styraciflua</i>	Sweetgum	14	5	2	Yes	Fair	-
2176	<i>Liquidamber styraciflua</i>	Sweetgum	9	5	2	No	Fair	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2177	<i>Liquidamber styraciflua</i>	Sweetgum	13	4	3	Yes	Fair	-
2180	<i>Pinus canariensis</i>	Canary Island pine	25	3	4	Yes	Fair	-
2181	<i>Pinus canariensis</i>	Canary Island pine	19	4	4	Yes	Good	-
2182	<i>Pinus canariensis</i>	Canary Island pine	24	4	4	Yes	Good	-
2183	<i>Pittosporum eugenioides</i>	Lemonwood	6, 5	3	2	No	Fair	-
2184	<i>Eucalyptus sideroxylon</i>	red ironbark	23	2	2	Yes	Poor	-
2185	<i>Pittosporum eugenioides</i>	Lemonwood	5, 3, 2	4	3	No	Fair	-
2186	<i>Pittosporum eugenioides</i>	Lemonwood	3, 2, 2, 1	4	3	No	Fair	-
2187	<i>Pittosporum eugenioides</i>	Lemonwood	4, 3	5	3	No	Good	-
2188	<i>Pinus canariensis</i>	Canary Island pine	20	4	3	Yes	Fair	-
2189	<i>Pinus canariensis</i>	Canary Island pine	18	4	4	Yes	Good	-



Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2190	<i>Pittosporum eugenioides</i>	Lemonwood	3, 3	3	3	No	Fair	-
2191	<i>Pittosporum eugenioides</i>	Lemonwood	4, 3, 3, 3, 3, 3	3	3	No	Fair	-
2192	<i>Pittosporum eugenioides</i>	Lemonwood	3, 3, 2	3	2	No	Fair	-
2193	<i>Gleditsia triacanthos</i> 'inermis'	thornless honey locust	12	5	4	Yes	Good	-
2194	<i>Liquidamber styraciflua</i>	Sweetgum	13	5	3	Yes	Good	-
2195	<i>Liquidamber styraciflua</i>	Sweetgum	16	5	3	Yes	Good	-
2196	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	30	4	3	Yes	Fair	Yes
2197	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	24	4	3	Yes	Fair	Yes
2198	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	22	2	3	Yes	Fair	-
2199	<i>Eucalyptus sideroxylon</i>	red ironbark	17	2	2	Yes	Poor	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2200	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	20	2	3	Yes	Fair	-
2201	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	28	5	3	Yes	Good	-
2202	<i>Populus nigra 'italica'</i>	Lombardy poplar	71	3	1	Yes	Poor	-
2203	<i>Populus nigra 'italica'</i>	Lombardy poplar	37, 36	3	3	Yes	Fair	-
2204	<i>Populus nigra 'italica'</i>	Lombardy poplar	27	3	4	Yes	Fair	-
2205	<i>Populus nigra 'italica'</i>	Lombardy poplar	57	3	4	Yes	Fair	-
2206	<i>Populus nigra 'italica'</i>	Lombardy poplar	29	3	1	Yes	Poor	-
2207	<i>Populus nigra 'italica'</i>	Lombardy poplar	60	3	4	Yes	Fair	-
2208	<i>Pinus canariensis</i>	Canary Island pine	9	3	2	No	Fair	-
2209	<i>Pinus canariensis</i>	Canary Island pine	29	4	4	Yes	Good	-
2210	<i>Eucalyptus sideroxylon</i>	red ironbark	20	3	4	Yes	Fair	-
2213	<i>Pinus canariensis</i>	Canary Island pine	20	4	4	Yes	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2214	<i>Prunus cerasifera</i>	purple leaf plum	4, 3, 3, 2, 2	5	4	No	Good	-
2218	<i>Pittosporum eugenioides</i>	Lemonwood	4, 3, 3, 3, 3	4	2	No	Fair	-
2219	<i>Pinus canariensis</i>	Canary Island pine	15	3	1	Yes	Poor	-
2220	<i>Pinus canariensis</i>	Canary Island pine	27	4	4	Yes	Good	-
2221	<i>Pinus canariensis</i>	Canary Island pine	19	3	4	Yes	Fair	-
2222	<i>Pinus canariensis</i>	Canary Island pine	17	3	4	Yes	Fair	-
2223	<i>Pittosporum eugenioides</i>	Lemonwood	5, 5, 4, 3	3	2	No	Fair	-
2224	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	21	4	2	Yes	Fair	-
2225	<i>Pittosporum eugenioides</i>	Lemonwood	7	4	4	No	Good	-
2226	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	29	4	4	Yes	Good	-
2227	<i>Osmanthus fragrans</i>	Fragrant Olive	6, 4	4	4	No	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2228	<i>Osmanthus fragrans</i>	Fragrant Olive	8, 6, 2, 1	4	4	No	Good	-
2229	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	23	5	3	Yes	Good	-
2230	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	22	4	4	Yes	Good	-
2231	<i>Osmanthus fragrans</i>	Fragrant Olive	5, 4, 3	3	3	No	Fair	-
2232	<i>Osmanthus fragrans</i>	Fragrant Olive	6, 6, 1	3	3	No	Fair	-
2233	<i>Osmanthus fragrans</i>	Fragrant Olive	7, 5, 4	3	3	No	Fair	-
2234	<i>Pinus canariensis</i>	Canary Island pine	30	4	4	Yes	Good	-
2235	<i>Pinus canariensis</i>	Canary Island pine	26	4	5	Yes	Good	-
2236	<i>Liquidamber styraciflua</i>	Sweetgum	18	4	2	Yes	Fair	-
2238	<i>Osmanthus fragrans</i>	Fragrant Olive	10	4	3	No	Fair	-
2239	<i>Osmanthus fragrans</i>	Fragrant Olive	11	4	2	No	Fair	-
2240	<i>Osmanthus fragrans</i>	Fragrant Olive	9, 8, 4, 4	4	2	No	Fair	-
2241	<i>Osmanthus fragrans</i>	Fragrant Olive	9, 8, 4	4	4	No	Good	-

Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2242	<i>Liquidamber styraciflua</i>	Sweetgum	15	4	4	Yes	Good	-
2243	<i>Osmanthus fragrans</i>	Fragrant Olive	7, 7, 6	4	4	No	Good	-
2244	<i>Osmanthus fragrans</i>	Fragrant Olive	6, 5, 4	4	3	No	Fair	-
2245	<i>Osmanthus fragrans</i>	Fragrant Olive	6, 5, 5	4	4	No	Good	-
2246	<i>Liquidamber styraciflua</i>	Sweetgum	12	5	4	Yes	Good	-
2247	<i>Quercus ilex</i>	Holly oak	17	5	4	Yes	Good	-
2248	<i>Quercus ilex</i>	Holly oak	11	3	4	No	Fair	-
2249	<i>Quercus ilex</i>	Holly oak	21	4	2	Yes	Fair	-
2250	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	33	4	4	Yes	Good	-
2251	<i>Pinus canariensis</i>	Canary Island pine	21	3	3	Yes	Fair	-
2252	<i>Pinus canariensis</i>	Canary Island pine	26	1	1	Yes	Poor	-
2253	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	27	2	1	Yes	Poor	-



Tree Tag	Scientific Name	Common Name	DBH	Health	Structure	Protected Tree?	Health and Structure Rating	Preserve?
2254	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	26	4	3	Yes	Fair	-
2255	<i>Eucalyptus polyanthemos</i>	silver dollar eucalypt	18	4	5	Yes	Good	-
2256	<i>Gleditsia triacanthos</i> 'inermis'	thornless honey locust	12	3	2	Yes	Fair	-
2257	<i>Liquidamber styraciflua</i>	Sweetgum	12	4	3	Yes	Fair	-
2259	<i>Pittosporum eugenioides</i>	Lemonwood	9, 4, 3	3	2	No	Fair	-
2260	<i>Pittosporum eugenioides</i>	Lemonwood	7, 5, 4, 4	4	2	No	Fair	-
2261	<i>Pittosporum eugenioides</i>	Lemonwood	6, 5	3	2	No	Fair	-
2301	<i>Liquidamber styraciflua</i>	Sweetgum	14	3	3	Yes	Fair	Yes
2302	<i>Pinus canariensis</i>	Canary Island pine	23	2	2	Yes	Poor	-

## Appendix D. Representative Photos

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Photo 1. Tree #1043, African fern pine (*Afrocarpus falcatus*).



Photo 2. Tree 1006 (left side), Canary Island pine (*Pinus canariensis*). Tree #1011 (right side), purple leaf plum (*Prunus cerasifera*).





Photo 3. Tress 1048-1051 (left to right), all are Chinese elm (*Ulmus parvifolia*).



Photo 4. Trees 2124-2126 (left to right), all are sweetgum (*Liquidambar styraciflua*).





Photo 5. Tree 2144 (foreground), jacaranda (*Jacaranda mimosifolia*) and Trees 2142-2143 (background), Canary Island pine (*Pinus canariensis*).

## Appendix B. Dewatering Plan for the Google West Channel Enhancement

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## MEMORANDUM

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TO: Scott Smithwick, DEVCON Construction  
Virginia Calkins, SRGNC

DATE: August 15, 2019

FROM: Caitlin Gilmore, PE  
Chuck Anderson, PE

JOB#: GOOG.03.18

SUBJECT: Dewatering Plan for the Google West Channel Enhancement

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The following conceptual dewatering plan was developed based on the draft 50% Design Development (DD) plan set dated June 29, 2018 and is intended to be used as an internal document to support environmental permit applications. This draft plan does not consider construction scheduling with the adjacent Santa Clara Valley Water District (District) West Channel Flood Control Project nor does it consider the development of the Google properties 100 and 200 Caribbean adjacent to the channel enhancement project reach.

### Objectives

- Temporarily divert water from the project reach of Sunnyvale West Channel from upstream of the project to downstream of Caribbean Drive, a total length of approximately 1,300 feet.
- Create a dewatered work area and facilitate construction by dewatering the entire length of the channel within the project site.
- Prevent erosion, sedimentation and siltation from occurring in the upstream or downstream channel reach under active construction.

### Design Event

The anticipated channel flow during construction is 1.4 cubic feet per second (cfs) which is the likely average flow in West Channel during the construction period from April 15<sup>th</sup> to October 15<sup>th</sup> with a maximum flow of 12 cfs. This is based on an upstream drainage area of 2.87 square miles and a flow of 0.5 cfs per square mile in urban areas drained by gravity based on the approximate pumping needed from the urbanized City of Milpitas storm drainage systems. There is no natural upstream watershed to the Sunnyvale West urbanized channel system.

There are no storm drainage outfalls within the project reach.

### Schedule

The dewatering system will be in place and functioning prior to the start of in-channel construction work and will be removed only after all construction work at a dewatered reach is complete with a maximum duration of 6 months. The contractor may dewater the project areas in phases or all at once. The construction period will be during the dry season from April 15<sup>th</sup> to October 15<sup>th</sup> 2019.

Installation of the dewatering system will take approximately one week, and will commence at an allowed start date per the regulatory approvals. After construction activities at a reach are completed, the AquaDam and earthen coffer dams and diversion system will be removed within 48 hours. Flows will be

restored to the new construction reach in a manner that minimizes erosion. Ponded water will be re-directed into the established low-flow channel in a gradual manner to avoid an erosive surge of water.

The dewatering and system removal schedule will be coordinated with the upstream and downstream District project as well as the onsite construction.

## Description of Dewatering System

### System Overview

The dewatering system will be composed of an AquaDam spanning the full width of the channel located at the downstream boundary of the construction reach (i.e. just downstream of Caribbean Drive bridge — see Location A in *Appendix A*) and an earthen coffer dam spanning the full width of the channel located at the upstream limits of the construction reach (i.e. upstream of the Caspian Drive Bridge — see Location B in *Appendix A*); 28-inch diameter fused high-density polyethylene (HDPE) pipes (or multiple pipes of the same carrying capacity) to convey the diverted water around the construction reach; and riprap or equivalent erosion protection for the system discharge point (i.e. energy flow dissipater—see Table 1 BMPs below).

### AquaDam Cofferd Dam

A plastic water filled AquaDam will be inflated to a height of 9 feet from the existing downstream invert of the Caribbean bridge culvert and set at a minimum of elevation 7.4 feet NAVD88 (see Tidal Influences below) to prevent the intrusion of tidal water upstream from the coffer dam. The coffer dam must not exhibit UV corrosion for the duration of their installation. The cofferdam must be installed per manufacturer's instruction. Contractor will provide shoring behind the AquaDam as needed (see Detail 2 in *Appendix B*).

### Earthen Cofferd Dam

Earthen coffer dam will constructed using a combination of gravel-filled sandbags and sheet plastic with a minimum thickness of 6 mil. The gravel fill for the sandbags will contain no more than 15% fines. The gravel-filled sandbags will be placed on top of the plastic material, which will be laid above the invert for the 28-inch HDPE pipe. The width of the invert must be enough to wrap the installed sandbags in a "burrito-wrap" configuration. The sandbags will stack in a staggered pyramid-like fashion (see Detail 1 in *Appendix B*). After the design height has been reached, the original sheet plastic shall be placed on top of the sandbags and secured with additional sand bags. Sandbags on top of the sheet plastic will be spaced no more than 3 feet apart. To maximize flow inflow through the 28-inch HDPE pipe, the upstream configuration of the coffer dam will have a funnel shape with the portions closest to the channel banks wider than the mid-channel portion of the coffer dam. The top of the dam will be lowest in height at the center of the dam and increase in height towards the banks, thereby directing overtopping water into the centerline of the channel. See *Appendix E (to be included in final version)* for coffer dam height calculations.

### Pipe System

The pipe system will be composed of a 28-inch diameter fused HDPE pipe trunk line, or two smaller pipes with equivalent capacity. The system will use gravity to convey water impounded by the upstream coffer dam and water collected from storm drain outlets to the low flow channel below the lower coffer dam.

The bypass system can be located either to the east or west of the channel. If gravity flow is not effective in conveying water due to tidal influence, pumps will be used as necessary. Riprap (1/4 to 1/2 ton) will be placed at the downstream discharge point of the HDPE pipe to prevent erosion of the channel

bed. If necessary, one or more check dams, composed of straw/hale bales secured by wooden stakes (straw/hale bales) would be installed to slowly reduce water velocities and prevent bed erosion.

### **Energy Flow Dissipater**

Diversion pipe flow energy (velocity) dissipater will be installed downstream of the AquaDam coffer dam on existing channel invert and banks. Pipe discharges will occur from low to high tide, and outlets shall be located above Mean Higher High Water. Dissipater may be under tide water and shall be designed to resist degradation by tidal movement. Dissipater shall be installed from pipe outlet to channel invert. Design shall be in accordance with CASQA Construction BMP EC-10 (see *Appendix C*).

### **Groundwater**

All construction work will be implemented under dewatered channel conditions. If groundwater seepage occurs within the dewatered reach, pumps will be used to discharge the seepage flows to intakes of the 28-inch HDPE trunk line. When discharging into the intakes of the 28-inch pipe, the top opening of the intake will be sealed.

### **Tidal Influences**

The maximum water surface elevation (WSEL) for the mean higher high water (MHHW) is approximately 7.4 feet NAVD88 (Schaaf & Wheeler, Draft West Channel Enhancement for Google Hydraulic Basis of Design). This tidal influence WSEL is at the mouth of Guadalupe Slough. The downstream AquaDam coffer dam would be set at elevation 7.4 feet NAVD88 to prevent the intrusion of tidal water upstream from the coffer dam. Since tidal waters can potentially reduce the flows downstream or even back up the flows upstream, pumps will be on standby to transfer excess flows downstream of the coffer dam.

### **System Removal**

Once the construction work is completed at a dewatered reach, the diversion system and coffer dams will be removed within 48 hours of completion. Removal of the diversion pipe will start at the downstream terminus of the system and proceed upstream. Flows will be restored within the new construction area in a manner that minimizes erosion. Poned flows will be re-directed into the established low-flow channel. Flows will be gradually restored to the channel to avoid a potentially erosive surge of water. All equipment and materials used in the dewatering system will be removed from the channel for re-use or proper disposal.

### **Water Quality Monitoring**

The dewatering contractor will be responsible for visual observations, collection of water samples, and transportation of samples in a timely manner to an accredited laboratory testing. Water samples will be collected from the channel 100' above and below the dewatered zone and from the HDPE pipe system within the dewatered zone. The HDPE pipe system will include air vents at maximum intervals of 500 feet in to allow collection of water samples from the pipes. During normal operation, the air vents will remain closed; the vents will be opened to obtain water sample. A section of clear pipe shall be installed on groundwater pump discharges to monitor turbidity.

Water quality testing will commence two days prior to installation of the dewatering system and will continue until one day after the dewatering system is completely removed. Observations, testing and sampling will be performed for the parameters listed in Table 1. Water quality readings will be submitted as part of daily QA/QC reports.



**Table 1 – Water Quality Testing Parameters**

Parameter	Frequency of Sampling/Testing	Exceedance Limit
Turbidity	Twice Daily	Incremental increase by 5 NTUs if background <50 NTUs and 10 percent if background ≥50 NTUs
pH	Twice Daily	>0.5 units deviation above or below ambient levels
Dissolved Oxygen	Twice Daily	Minimum of 5.0 mg/l or no change if background <5.0mg/l
Temperature	Twice Daily	Increase by more than 5 degrees Fahrenheit above natural temperatures
Floating matter, foam, alteration of color, visible oil or other petroleum products	Daily	Visual observations only

*Daily is defined as each day in which construction work occurs in the channel reach. Typically, this will be Monday through Friday except for holidays. If any construction occurs on a Saturday, Sunday or holiday, water quality monitoring will occur on that day also.*

If water quality testing parameters are exceeded, the contractor will immediately investigate the potential source of the problem. The contractor shall at a minimum pump effluent from dewatered areas to barge tanks for settling prior to discharge to the 28-in HDPE pipe if turbidity is exceeded. If the contractor's operations are causing the problem, then the issue will be corrected immediately.

If the source is outside of/beyond the project limits, the contractor will notify the Water District, who will then notify the regulatory agencies of the situation, so that the regulatory agencies can determine the proper response to the water quality issue.

## Best Management Practices

### Applicable BMPs

The design and operation of the West Channel dewatering system will conform to the applicable SCVWD BMPs to prevent adverse impacts to water quality. Table 2 lists the applicable BMPs as detailed in *Appendix D (to be included in final version)*.

**Table 2 – Water Quality BMPs Applicable to West Channel Enhancement Dewatering System**

BMP No.	Title
WQ-1	Limit Impact of Pump and Generator Operation and Maintenance
WQ-2	Limit Impacts of Sediments on Water Quality
WQ-3	Limit Impacts from Staging and Stockpiling Materials
WQ-4	Stabilize Construction Entrances and Exits
WQ-5	Limit Impact of Concrete Near Waterways
WQ-6	Isolate Work in Tidal Areas with Use of Cofferdam
WQ-7	Use Seeding for Erosion Control, Weed Suppression and Site Improvement
WQ-8	Manage Exposed Groundwater at Work Sites
WQ-9	Maintain Clean Conditions at Work Sites

BMP No.	Title
WQ-10	Control Sediment/Turbidity from Discharges
WQ-11	Prevent Water Pollution
WQ-12	Prevent Stormwater Pollution

## Contingency Plans

### Storm Event

It is unlikely, but possible, that a dry season precipitation event or high tide event could be of sufficient magnitude to exceed the design capacity of the dewatering system. To prevent damage to the system and adverse environmental impacts, the contractor will adhere to the requirements in Table 3.

If the volume of water impounded at the upstream coffer dam or tide levels at the downstream coffer dam exceeds the capacity of the dewatering system, the excess water will be pumped into baker tanks for temporary storage and proper disposal.

**Table 3 – Dry Season Contingency Plan**

Event	Response
>30% likelihood of significant precipitation	Inspect all BMPs and remedy identified deficiencies
>50% likelihood of significant precipitation or tides above MHHW	Maintain baker tanks and pumps at dewatering site and collect excess water as required
Precipitation causes violation of water quality standard	All construction operations cease until applicable water quality parameter is met

### System Failure

The dewatering system could fail due to mechanical problems or unusually heavy flows exceeding the design flow. As a contingency, spare pipe materials, fittings, and pumps will be stored on site to facilitate timely repairs of damaged parts, thereby ensuring that the systems have a high degree of reliability and operability. In addition, additional pumps and baker tanks will be maintained on site. Excess flows will be filtered through the baker tanks and appropriately discharged downstream of the active reach.

In the case of actual or incipient system failure, the contractor will immediately perform all practical actions to remove sources of pollutants associated with the construction effort from the channel or prevent their entrainment by water flowing in the channel. This includes removing equipment and vehicles from the channel and protecting material stockpiles from in-channel flows.

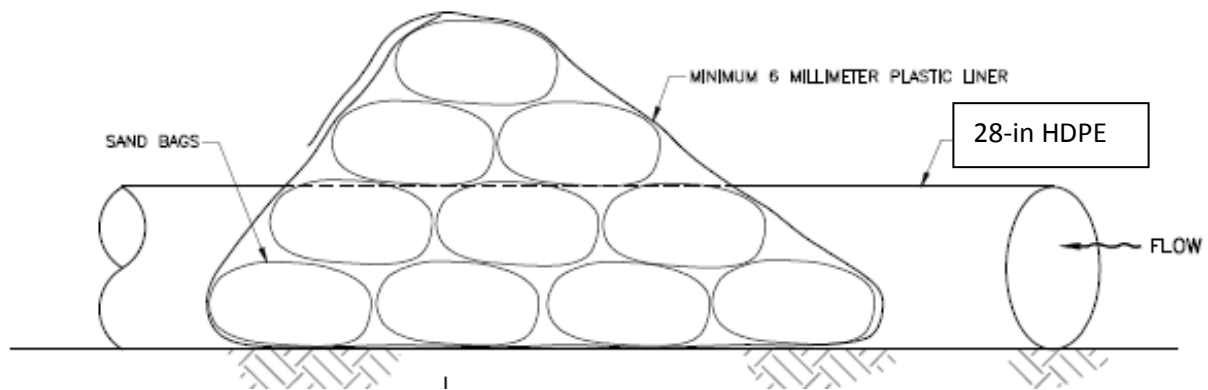
## Appendices

- Appendix A – Site Plans
- Appendix B – Cofferd Dam Details
- Appendix C – Velocity Dissipation Detail
- Appendix D – BMPs (to be included in final)
- Appendix E – Cofferd Dam Calculations (to be included in final)

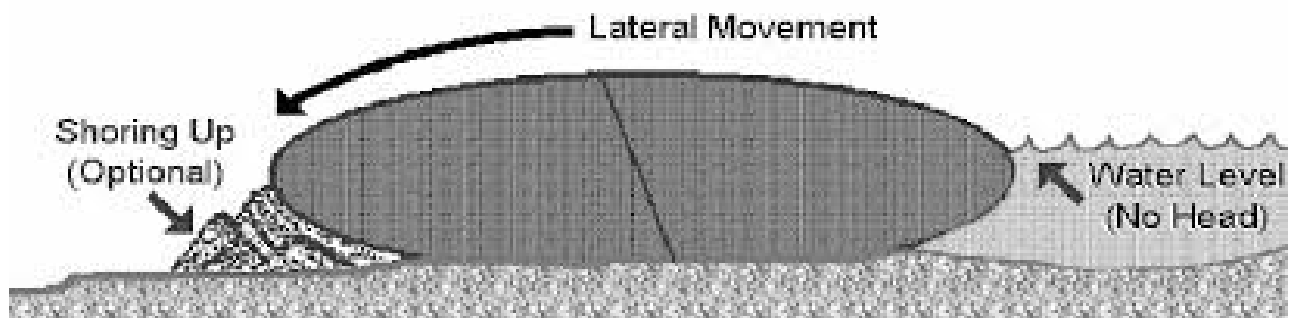








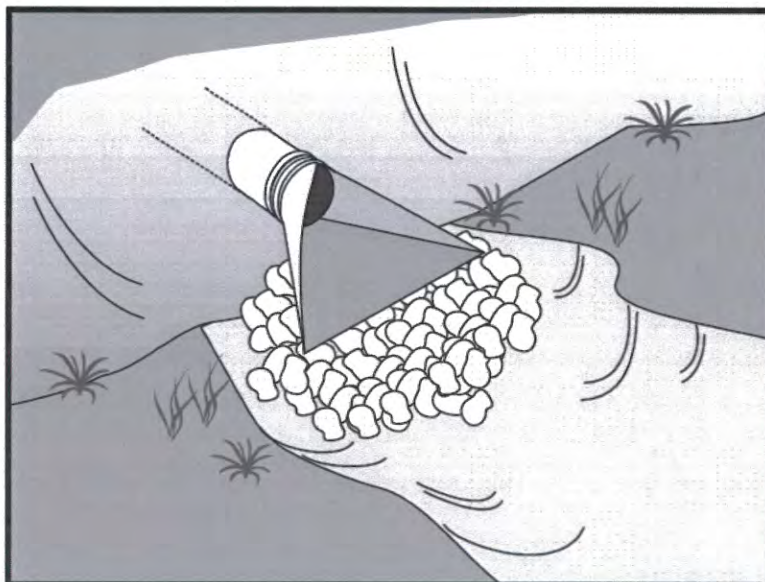
Detail 1 – Typical Earthen Cofferdam (N.T.S)



Detail 2 – Typical AquaDam Cofferd Dam (N.T.S)

# Velocity Dissipation Devices

EC-10



## Description and Purpose

Outlet protection is a physical device composed of rock, grouted riprap, or concrete rubble, which is placed at the outlet of a pipe or channel to prevent scour of the soil caused by concentrated, high velocity flows.

## Suitable Applications

Whenever discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This includes temporary diversion structures to divert runoff during construction.

- These devices may be used at the following locations:
  - Outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits, or channels.
  - Outlets located at the bottom of mild to steep slopes.
  - Discharge outlets that carry continuous flows of water.
  - Outlets subject to short, intense flows of water, such as flash floods.
  - Points where lined conveyances discharge to unlined conveyances

## Limitations

- Large storms or high flows can wash away the rock outlet protection and leave the area susceptible to erosion.

## Objectives

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

## Legend:

- ☒ Primary Objective
- ☐ Secondary Objective

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

## Potential Alternatives

None





- Sediment captured by the rock outlet protection may be difficult to remove without removing the rock.
- Outlet protection may negatively impact the channel habitat.
- Grouted riprap may break up in areas of freeze and thaw.
- If there is not adequate drainage, and water builds up behind grouted riprap, it may cause the grouted riprap to break up due to the resulting hydrostatic pressure.

**Implementation****General**

Outlet protection is needed where discharge velocities and energies at the outlets of culverts, conduits or channels are sufficient to erode the immediate downstream reach. This practice protects the outlet from developing small eroded pools (plunge pools), and protects against gully erosion resulting from scouring at a culvert mouth.

**Design and Layout**

As with most channel design projects, depth of flow, roughness, gradient, side slopes, discharge rate, and velocity should be considered in the outlet design. Compliance to local and state regulations should also be considered while working in environmentally sensitive streambeds. General recommendations for rock size and length of outlet protection mat are shown in the rock outlet protection figure in this BMP and should be considered minimums. The apron length and rock size gradation are determined using a combination of the discharge pipe diameter and estimate discharge rate: Select the longest apron length and largest rock size suggested by the pipe size and discharge rate. Where flows are conveyed in open channels such as ditches and swales, use the estimated discharge rate for selecting the apron length and rock size. Flows should be same as the culvert or channel design flow but never the less than the peak 5 year flow for temporary structures planned for one rainy season, or the 10 year peak flow for temporary structures planned for two or three rainy seasons.

- There are many types of energy dissipaters, with rock being the one that is represented in the attached figure.
- Best results are obtained when sound, durable, and angular rock is used.
- Install riprap, grouted riprap, or concrete apron at selected outlet. Riprap aprons are best suited for temporary use during construction. Grouted or wired tied rock riprap can minimize maintenance requirements.
- Rock outlet protection is usually less expensive and easier to install than concrete aprons or energy dissipaters. It also serves to trap sediment and reduce flow velocities.
- Carefully place riprap to avoid damaging the filter fabric.
  - Stone 4 in. to 6 in. may be carefully dumped onto filter fabric from a height not to exceed 12 in.
  - Stone 8 in. to 12 in. must be hand placed onto filter fabric, or the filter fabric may be covered with 4 in. of gravel and the 8 in. to 12 in. rock may be dumped from a height not to exceed 16 in.



- Stone greater than 12 in. shall only be dumped onto filter fabric protected with a layer of gravel with a thickness equal to one half the  $D_{50}$  rock size, and the dump height limited to twice the depth of the gravel protection layer thickness.
- For proper operation of apron: Align apron with receiving stream and keep straight throughout its length. If a curve is needed to fit site conditions, place it in upper section of apron.
- Outlets on slopes steeper than 10 percent should have additional protection.

## Costs

Costs are low if material is readily available. If material is imported, costs will be higher. Average installed cost is \$150 per device.

## Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect apron for displacement of the riprap and damage to the underlying fabric. Repair fabric and replace riprap that has washed away. If riprap continues to wash away, consider using larger material.
- Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric immediately.
- Temporary devices should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.

## References

County of Sacramento Improvement Standards, Sacramento County, May 1989.

Erosion and Sediment Control Handbook, S.J. Goldman, K. Jackson, T.A. Bursztynsky, P.E., McGraw Hill Book Company, 1986.

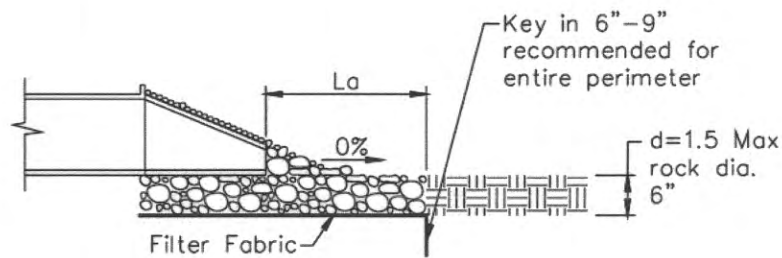
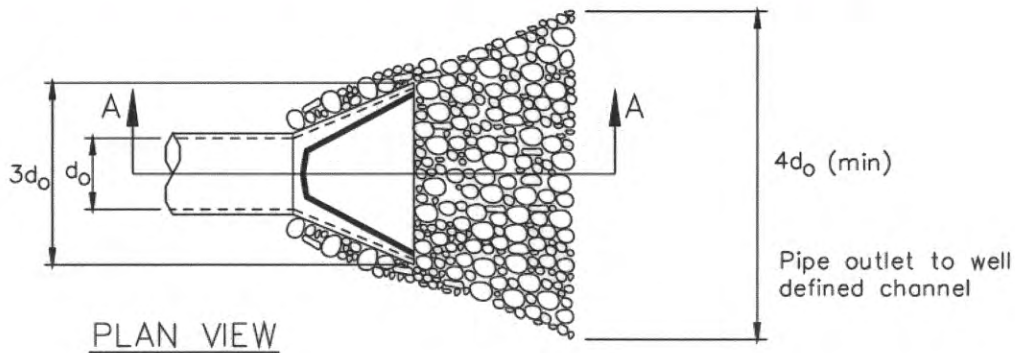
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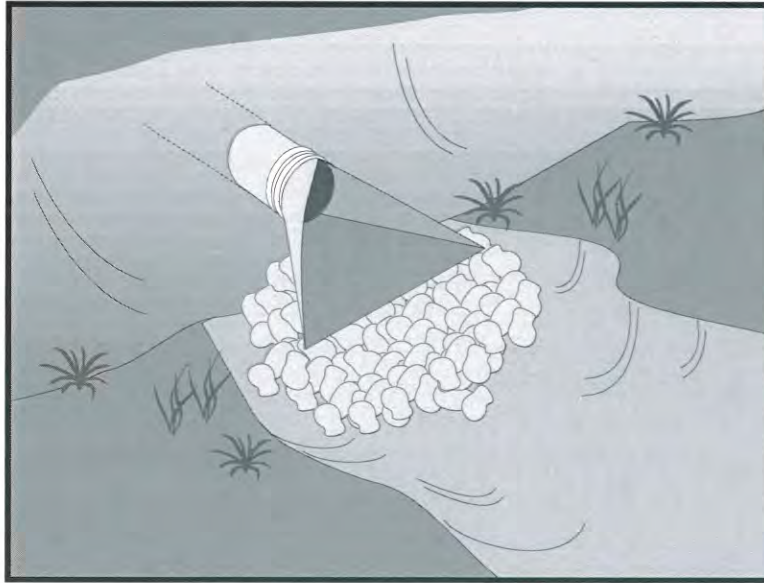
Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



Pipe Diameter inches	Discharge ft <sup>3</sup> /s	Apron Length, L <sub>a</sub> ft	Rip Rap D <sub>50</sub> Diameter Min inches
12	5	10	4
	10	13	6
18	10	10	6
	20	16	8
	30	23	12
	40	26	16
24	30	16	8
	40	26	8
	50	26	12
	60	30	16

For larger or higher flows consult a Registered Civil Engineer  
Source: USDA - SCS





## Description and Purpose

Outlet protection is a physical device composed of rock, grouted riprap, or concrete rubble, which is placed at the outlet of a pipe or channel to prevent scour of the soil caused by concentrated, high velocity flows.

## Suitable Applications

Whenever discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This includes temporary diversion structures to divert runoff during construction.

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  - Points where lined conveyances discharge to unlined conveyances

## Limitations

- Large storms or high flows can wash away the rock outlet protection and leave the area susceptible to erosion.

## Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
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TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
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## Legend:

- ☒ Primary Objective
- ☒ Secondary Objective

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

## Potential Alternatives

None

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- Sediment captured by the rock outlet protection may be difficult to remove without removing the rock.
- Outlet protection may negatively impact the channel habitat.
- Grouted riprap may break up in areas of freeze and thaw.
- If there is not adequate drainage, and water builds up behind grouted riprap, it may cause the grouted riprap to break up due to the resulting hydrostatic pressure.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in velocity dissipation devices.

## Implementation

### General

Outlet protection is needed where discharge velocities and energies at the outlets of culverts, conduits or channels are sufficient to erode the immediate downstream reach. This practice protects the outlet from developing small eroded pools (plunge pools), and protects against gully erosion resulting from scouring at a culvert mouth.

### Design and Layout

As with most channel design projects, depth of flow, roughness, gradient, side slopes, discharge rate, and velocity should be considered in the outlet design. Compliance to local and state regulations should also be considered while working in environmentally sensitive streambeds. General recommendations for rock size and length of outlet protection mat are shown in the rock outlet protection figure in this BMP and should be considered minimums. The apron length and rock size gradation are determined using a combination of the discharge pipe diameter and estimate discharge rate: Select the longest apron length and largest rock size suggested by the pipe size and discharge rate. Where flows are conveyed in open channels such as ditches and swales, use the estimated discharge rate for selecting the apron length and rock size. Flows should be same as the culvert or channel design flow but never the less than the peak 5 year flow for temporary structures planned for one rainy season, or the 10 year peak flow for temporary structures planned for two or three rainy seasons.

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- Stone greater than 12 in. shall only be dumped onto filter fabric protected with a layer of gravel with a thickness equal to one half the  $D_{50}$  rock size, and the dump height limited to twice the depth of the gravel protection layer thickness.
- For proper operation of apron: Align apron with receiving stream and keep straight throughout its length. If a curve is needed to fit site conditions, place it in upper section of apron.
- Outlets on slopes steeper than 10 percent should have additional protection.

## Costs

Costs are low if material is readily available. If material is imported, costs will be higher. Average installed cost is \$150 per device.

## Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur. Minimize areas of standing water by removing sediment blockages and filling scour depressions.
- Inspect apron for displacement of the riprap and damage to the underlying fabric. Repair fabric and replace riprap that has washed away. If riprap continues to wash away, consider using larger material.
- Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric immediately.
- Temporary devices should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.

## References

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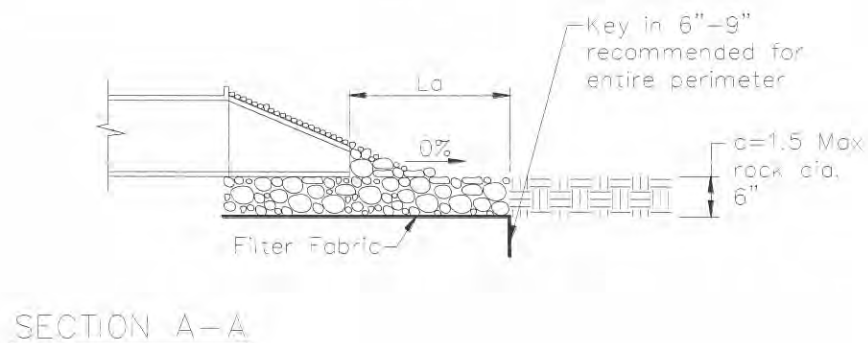
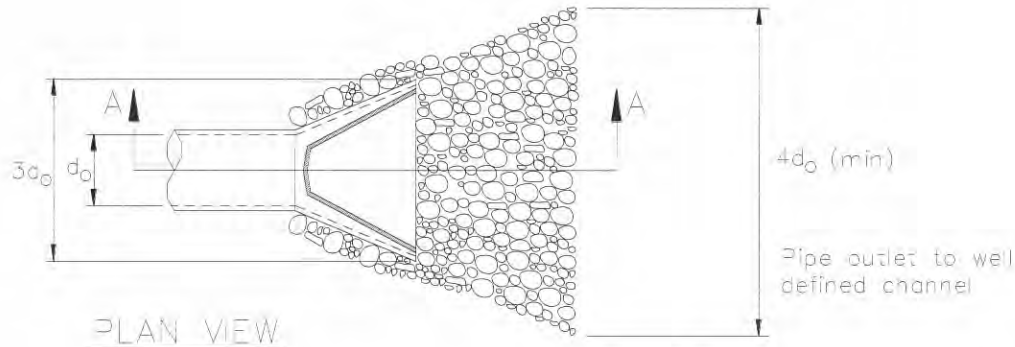
Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Metzger, M.E. 2004. Managing mosquitoes in stormwater treatment devices. University of California Division of Agriculture and Natural Resources, Publication 8125. On-line: <http://anrcatalog.ucdavis.edu/pdf/8125.pdf>

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	60	30	16

For larger or higher flows consult a Registered Civil Engineer  
Source: USDA - SCS

## Appendix C. Mitigation and Monitoring Plan

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**H. T. HARVEY & ASSOCIATES**

Ecological Consultants



**Google Caribbean Campus,  
West Channel Enhancement  
Mitigation and Monitoring Plan**

**Project # 3475-54**

Prepared for:

Andy Springer  
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Prepared by:

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August 15, 2019



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# Section 1.0 Project Description

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## 1.1 Project Summary

Google LLC (Google) has proposed the Google Caribbean Campus, West Channel Enhancement Project (project) to improve a portion of the Sunnyvale West Storm Drain Channel (storm drain channel) through restoring and enhancing areas of tidal aquatic, estuarine wetland and riparian habitats, as well as providing enhanced pedestrian connections over the channel. The project will also provide 100-year flood protection for the city of Sunnyvale. The project reach of the storm drain channel bisects Google's Caribbean Campus, which is divided into the Caribbean 100 and Caribbean 200 properties. The campus is bordered by West Caribbean Drive to the north, Borregas Avenue to the east, Caspian Court and Bordeaux Drive to the south, and North Mathilda Avenue and Bordeaux Drive to the west (Figure 1). The storm drain channel is on Santa Clara Valley Water District (Valley Water) property and the project reach is approximately 1,299 feet (ft) long. The channel was constructed in the 1960s in response to flooding caused by major storm events, land subsidence, and inadequate drainage to San Francisco Bay. The channel was constructed in a straight alignment with a trapezoidal cross-section and confined by earthen levees. Google and Valley Water entered into a memorandum of understanding (MOU) in order for the project to be integrated into Valley Water's larger Sunnyvale East and West Channels Flood Protection Project (Flood Protection Project).

The entire Caribbean Campus project site encompasses 43.89 acres (ac), which includes an approximately 7.50 ac channel enhancement area (Figure 2). The storm drain channel reach through the project site consists of an earthen channel with wetland patches along the length of the invert and ruderal grasslands on the existing levee slopes and banks. There are no trees or shrubs located within the bed and banks; however, there are several trees located beyond the top of bank along the toe of the outboard levee as part of landscaping for the adjacent, developed properties. Most of these trees are nonnative species and are too distant from the channel to provide substantial benefits to the aquatic habitats therein, or to be considered riparian woodland habitat and are scheduled for removal as part of the Caribbean campus project.

It is understood that the U.S. Army Corps of Engineers (USACE) is preparing a jurisdictional determination for this reach of the storm drain channel, based on Valley Water's submission of the *Preliminary Identification of Wetlands and Other Waters for the Sunnyvale East and West Channels Flood Protection Project* (H. T. Harvey & Associates 2013). Existing habitat areas and impact assessments herein are based on the 2013 delineation report. The storm drain channel reach in the project site supports a mix of tidal aquatic habitat (other waters) (0.73 ac), estuarine wetland (0.17) and ruderal riparian (0.44 ac) habitats and is hydrologically connected to San Francisco Bay through Guadalupe Slough and Moffett Channel. These habitats fall under the jurisdiction of USACE, San Francisco Bay Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW).

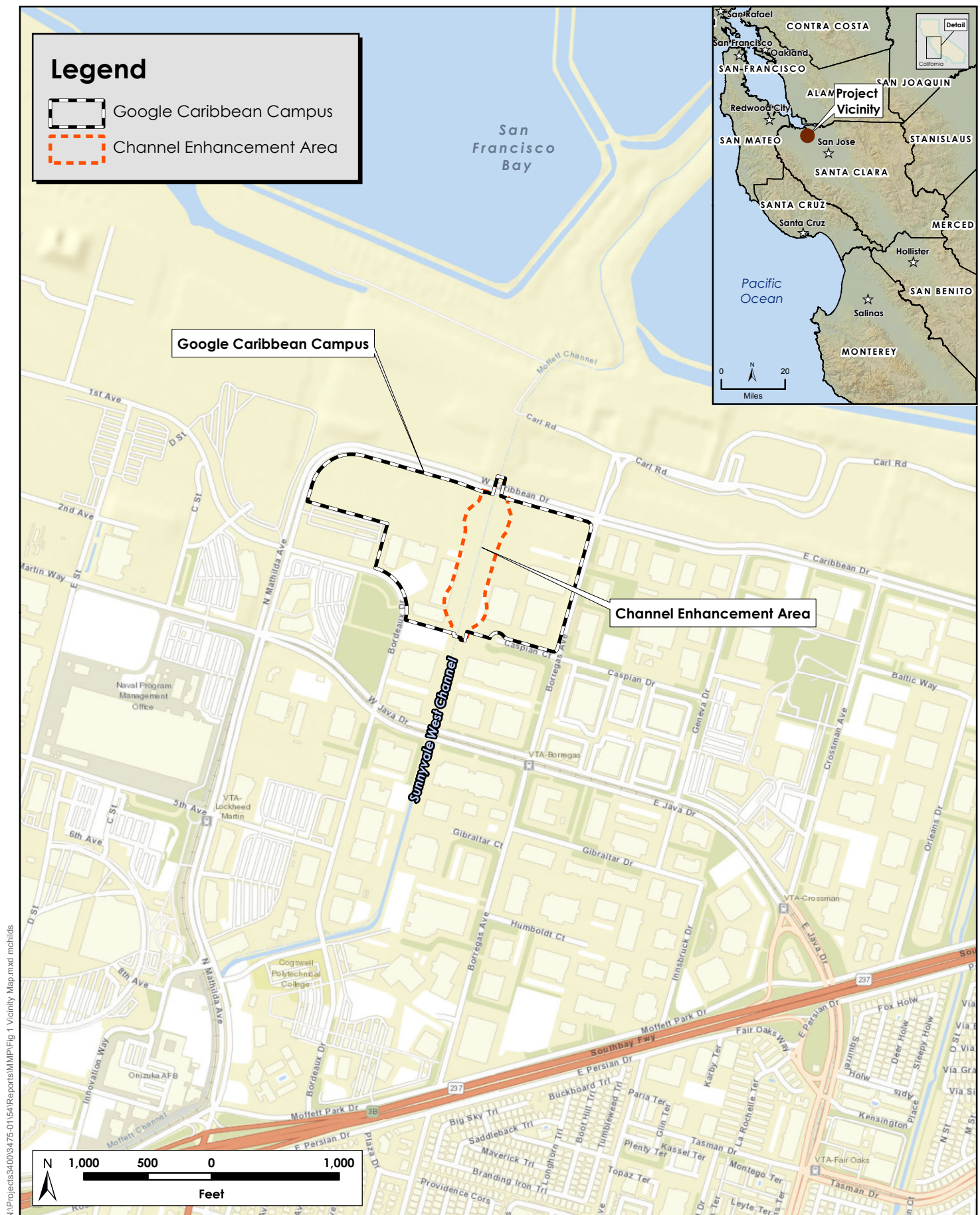
Valley Water is in the process of obtaining regulatory permits that will allow the construction of a channel improvement project for flood control and erosion protection on Sunnyvale West Channel within the city of Sunnyvale, including the project reach. In adjacent reaches of the channel, the Valley Water's project involves the construction of floodwalls atop existing earthen levees, as well as bridge improvements. Google proposes to provide, at a minimum, an equivalent level of flood protection through the project reach while providing enhanced ecological function. Channel invert and levee top elevations at the upper and lower ends of the project reach will match the design elevations of Valley Water's Flood Protection Project. In lieu of the floodwall dependent flood protection improvements planned by Valley Water, a widened naturalized channel corridor extending beyond Valley Water's parcel will become part of the development and provide flood protection while enhancing aesthetics and increasing habitat functions and values.

Google's proposed storm drain channel enhancement involves both landward and in-channel components, including the following:

- temporarily dewatering the storm drain channel during construction
- excavating the existing channel to meet new design grades
- building set-back levees
- grading a new storm drain channel with associated low-flow channel and floodplains
- constructing short sections of floodwalls at the upstream extent of the project reach to conform to Valley Water floodwall design elevations
- constructing two new bridge crossings (one exclusively for pedestrian use and one pedestrian-engineered to support emergency vehicle access at the Caspian Court extension)
- extending the box culvert with new headwall/floodwall to accommodate a multi-use pathway along West Caribbean Drive (as required by the City of Sunnyvale) and conform to the new earthen levee top
- relocating an existing storm drain pipe
- constructing a temporary bridge to accommodate a 3-year construction period
- implementing habitat mitigation and additional habitat creation

The project design (channel realignment, floodplain creation and levee reconstruction) will create conditions conducive to supporting diverse habitats, including tidal aquatic, estuarine wetland, willow-cottonwood riparian forest, oak riparian forest, and bayside scrub. Setting back the levees will allow creation of a more natural, meandering channel, with relatively broad hydrologically-connected floodplains that will be set at elevations below the high-tide line and provide conditions favorable for the natural recruitment of estuarine wetland plant species. It is anticipated that adjacent wetland plants located throughout the west channel will provide adequate seed sources to allow passive restoration (i.e., natural recolonization) within the project reach, although the project design does include installing small pockets of native wetland plantings. Four distinct native plant









N:\Projects\34000\3475-01\54\Reports\MMP\Fig 2 Site Map.mxd mchids



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**Figure 2. Site Map**  
Google West Channel Enhancement Project -  
Mitigation and Monitoring Plan (3475-54)  
August 2019



palettes are proposed for the levee banks. At the lower elevations along the banks, patches of willow-cottonwood riparian forest and a mesic mix of bayside scrub species will be installed. At the upper elevations but below the tops of banks, oak riparian forest will be interspersed with a mix of more drought-tolerant bayside scrub species. The patches of willow-cottonwood and oak riparian forest will be intermingled and discontinuous to create canopy gaps and provide view corridors into and across the channel enhancement area. All installed plants will be native to California and appropriate to the regional setting and habitat types. Levee slopes will also be seeded with an appropriate native grass and forb seed mix.

Project construction within the channel enhancement area will affect wetlands and waters of the United State/state and will result in temporary impacts on 0.72 ac of tidal aquatic habitat (other waters) and 0.16 ac of estuarine wetlands. In addition, there will be a small area of permanent impact to tidal aquatic habitat (0.01 ac) from the culvert extension. There will also be permanent changes to channel conditions from the realignment of the channel and from channel shading by the two proposed bridges, resulting in 0.01 ac of permanent impact to estuarine wetland habitat. Additional temporary impacts to existing habitats will include the removal of 0.43 ac of ruderal riparian grassland habitat associated with reconstruction of the levees and permanent conversion of 0.01 ac of ruderal riparian habitat to hardscape to accommodate construction of headwalls/floodwalls, one bridge abutment and the culvert extension.

The project proposes to provide onsite mitigation for temporary tidal aquatic impacts at a 1:1 ratio and permanent impacts at 2:1, through a combination of restored tidal aquatic (0.54 ac) and estuarine wetland habitats (0.24 ac) and increasing the linear footage of tidal aquatic habitat from 1,299 ln ft to 1,325 ln ft. The project proposes to mitigate for temporary estuarine wetland habitat impacts (dewatering and grading) at a 1.2:1 ratio and permanent impacts (shading from bridges) at a 2:1 ratio, totaling 0.21 ac of estuarine wetland. These mitigation ratios represent a total project mitigation obligation of 0.54 ac of tidal aquatic habitat and 0.45 ac of estuarine wetland habitat. Temporary impacts on ruderal riparian habitat will be mitigated at a 1:1 ratio and permanent impacts at a 2:1 ratio, resulting in a total of 0.46 ac. The actual area to be tracked for ruderal riparian habitat mitigation will be a dedicated zone along the lower levee slopes on both sides of the channel from the West Caribbean Drive culvert upstream to the first new pedestrian bridge. This area will provide stable vegetated slopes. Although woody species will be installed throughout this zone, they will not be linked to any specific monitoring or success criteria metrics because there will be no impacts on woody plants within existing jurisdictional areas.

The project will create approximately 1.85 ac of additional estuarine wetland habitat on the expanded floodplains adjacent to the channel, resulting in a total of 2.30 ac of restored and created estuarine wetland habitat. In all, the area of waters of the United States/state (tidal aquatic habitat and estuarine wetlands) will be more than doubled, with a final anticipated area of 2.84 ac. The project will also create an additional 1.34 ac of riparian habitat for a total of 1.80 ac of restored riparian habitat along the banks. Through the implementation of the project specific mitigation, replacement and enhancement of temporarily impacted habitats, and additional habitat creation, the project will substantially increase the area and quality of jurisdictional habitats through the project reach as compared to the current conditions.

The applicant's MOU with Valley Water requires that this restored reach provide some of the required mitigation for permanent impacts related to Valley Water's Flood Protection Project, which targets mitigation ratios of 1.2:1 for wetlands and 1:1 for tidal aquatic habitat. The exact amount of mitigation that will be provided to Valley Water will be determined based on the excess available after meeting project mitigation obligations.

The project will require the following regulatory agency permits or approvals:

- USACE – Clean Water Act (CWA) Section 404 Nationwide Permit 27 and Section 10 Letter of Permission
- CDFW – California Fish and Game Code Section 1600 Lake and Streambed Alteration Agreement
- San Francisco Bay RWQCB – CWA Section 401 Water Quality Certification

## 1.2 Purpose of this Mitigation and Monitoring Plan

This Mitigation and Monitoring Plan (MMP) describes the habitat mitigation proposed by the project proponent (Google) to offset project impacts on habitats regulated by USACE, RWQCB, and CDFW. This MMP describes the mitigation approach, standards for success, and details how restored and created habitats will be established, maintained, and monitored. The proposed mitigation will be implemented on site on properties owned by both Valley Water and Google; however, the project proponent will be responsible for implementing this MMP.

## 1.3 Type, Functions, and Values of Existing Habitats

Table 1 provides a summary of the existing jurisdictional habitats and Figure 3 shows the locations of these habitats within the channel enhancement area. Appendix A includes representative photos of the existing conditions.

**Table 1. Acreages of Existing Jurisdictional Habitats**

Habitat Type (Agency Jurisdiction)	Acreage
Estuarine Wetlands (USACE, RWQCB, CDFW)	0.17
Tidal Aquatic (Other Waters) (USACE, RWQCB, CDFW)	0.73
Ruderal Riparian (RWQCB, CDFW)	0.44

### 1.3.1 Wetlands

Wetlands within the site are classified in the National Wetlands Inventory as Estuarine and Marine Wetland (E2SBNx) (USFWS 2018). Wetlands with this classification are estuarine and intertidal, occurring within a channel bed that is completely dewatered at low tide but is regularly flooded and was originally excavated by humans. There is 0.17 acre of jurisdictional wetlands on the site, consisting of several discontinuous patches of hydrophytic wetland vegetation along either side of the channel (Figure 3). Wetland plant species include





N:\Projects\3400\3475-01\SA\Reports\MMP\Fig 3 Existing Conditions.mxd



California bulrush (*Schoenoplectus californicus*) and alkali bulrush (*Bolboschoenus maritimus*). A formal wetland delineation was completed and it is understood that a jurisdictional determination is currently being prepared by the USACE that will cover the project reach of the storm drain channel based on Valley Water's submission of the *Preliminary Identification of Wetlands and Other Waters for the Sunnyvale East and West Channels Flood Protection Project* (H. T. Harvey & Associates 2013).

### 1.3.2 Tidal Aquatic Habitat (Other Waters)

There is 0.73 acre of jurisdictional tidal aquatic habitat (i.e., other waters) on the site (Figure 3). Tidal aquatic habitat consists entirely of the unvegetated muddy channel bed, subject to tidal inundation.

### 1.3.3 Ruderal Riparian

There is 0.44 acre of ruderal riparian habitat on the site (Figure 3). This habitat type occurs on the banks and levees of the channel, from the high tide line to top of bank. This habitat consists of predominantly nonnative herbaceous species, such as wild oats (*Avena* sp.), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), yellow star thistle (*Centaurea solstitialis*), and black mustard (*Brassica nigra*) and is routinely mowed as part of Valley Water's routine channel maintenance program. There are no woody plants present within the existing riparian habitat.

### 1.3.4 Uplands

There is also upland habitat beyond the top of bank consisting of the access roads along each levee top, the ruderal grasslands on the outboard levee slopes, and some nonnative trees along the toe of the outboard levee slopes.

### 1.3.5 Developed

A combination of asphalt parking areas and existing commercial buildings dominates the project site beyond the toe of the outboard levee slopes that are within the project boundary.

### 1.3.6 Existing Topography and Hydrology

The existing storm drain channel through the project reach is confined by an earthen levee system with a top-of-levee elevation of approximately 11 ft North American Vertical Datum of 1988 (NAVD 88) and adjacent (outboard) elevation of approximately 6 ft NAVD 88. The channel is trapezoidal in cross-section and has a straight alignment throughout the reach. The entire project reach is tidally influenced, ranging from an elevation of -1.3 ft NAVD 88 at mean lower low water (MLLW) to 7.4 ft NAVD 88 at mean higher high water (MHHW); the latter equates to a maximum water depth of 5.1 ft above the invert of the West Caribbean Drive culvert. More details are provided in the *West Channel Enhancement for Google Hydraulic Basis of Design* (Schaaf & Wheeler 2019a).



### 1.3.7 Existing Soil/Substrate

According to the Natural Resources Conservation Service (NRCS), there are two soil mapping units that occur onsite: unit #150 (Urbanland-Embarcadero complex, 0–2% slopes, drained) and unit #145 (Urbanland-Hangerone complex, 0–2% slopes, drained) (NRCS 2018). Both soil mapping units are typically comprised of approximately 70% Urbanland soils, which are often disturbed soils containing unknown quantities of imported fill material. The Embarcadero soil series consists of very deep, naturally poorly-drained soils that may now be artificially drained. Embarcadero soils occur in geologic basins near the edge of marshes. The Hangerone soil series consists of very deep, poorly drained soils that may now be artificially drained. Hangerone soils occur in geologic basins. Mapping unit #150 covers the northern one-third of the site, while unit #145 covers the southern two-thirds.

## 1.4 Wildlife

The narrow, tidal aquatic channel and its adjacent habitats have been subjected to moderate to high levels of disturbance as a result of anthropogenic channelization, hardening of streambanks, installation of culverts, and other factors associated with major human influences. The channel is confined on both sides by urban development and lacks native habitats associated with more natural channel systems. The relatively low-quality habitats currently associated with the channel are reflective of those influences, and include: a narrow, linear channel; relatively steep banks dominated by low, ruderal riparian vegetation lacking woody species; an unvegetated top of bank supporting roads on both levees; and ruderal, nonnative grassland and scattered nonnative trees on the outboard sides. These conditions contribute to low wildlife value for the channel system as a whole.

The combination of the absence of channel diversity and the narrow nature of the channel substantially diminish the value of the channel to wildlife compared to more naturally formed channels, due to the lack of high-quality habitat complexity such as riffle and pool complexes, the relatively shallow water (and thus relatively high temperatures in summer), and regular disturbance of habitats and associated species due to anthropogenic activities. The channel supports few aquatic species, but nonnative crayfish (*Procambarus clarkia*) are present and birds such as mallards (*Anas platyrhynchos*), American coots (*Fulica americana*) and great blue herons (*Ardea herodias*) and other common, widespread wetland species occur. Mammals such as raccoons (*Procyon lotor*), introduced eastern gray squirrels (*Sciurus carolinensis*), and introduced rodents (*Rattus spp.* and *Mus musculus*) likely use the channels for drinking water and foraging. Common, widespread amphibians such as the Pacific treefrog (*Hyla regilla*) occur in the channel. Wider, more natural channels would support a richer assemblage of species, especially with respect to avian fauna, such as marsh wrens that use emergent marsh habitats.

The lack of quality habitat associated with the other areas of the existing channel system also translates into a less diverse species community relative to more diverse native marsh, riparian, and upland habitats associated with more natural river and stream systems in the region.

This project will result in a net increase in wetland and associated upland habitat functions and values for native wildlife associated with the site, as well as increasing the diversity of wildlife that will use the site.

### 1.4.1 Special-Status Species

The *Sunnyvale East and West Storm Drain Channels Flood Protection Project Environmental Impact Report* (SEWSDC EIR) reviews the status of all the special-status species that are known to occur in the Sunnyvale West Channel site, that may occur on the site, and that occur regionally, but are not likely to occur on the site (Valley Water 2013). Only those species determined to be present or likely to be present along the project reach of the Sunnyvale West Channel are covered in this MMP, and the reader is referred to the SEWSDC EIR for further information on species determined to be absent from the site. Two federally listed species and/or their critical habitat have the potential to occur in the project site: Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and North American green sturgeon (*Acipenser medirostris*). The project reach of the Sunnyvale West Channel comprises critical habitat for both the federally listed species. Longfin smelt (*Spirinchus thaleichthys*), a species listed as threatened under the California Endangered Species Act and a Candidate for listing under the Federal Endangered Species Act, also has the potential to occur in the project area.

Due to the marginal quality of the habitat and very low summer flows, as well as inclusion of avoidance measures designed to protect fish, the USACE previously concluded that the Valley Water Flood Protection project would not require Section 7 Consultation for activities in this reach (pers. communication between Valley Water and Keith Hess of the USACE, July 29, 2017). Several project measures, intended to protect aquatic wildlife and habitat that require passive fish relocation and measures to prevent entrapment, will be implemented to avoid and minimize impacts to Essential Fish Habitat (EFH) within the project reach and any fish regulated by the Coastal Pelagics and Pacific Groundfish Fishery Management Plan. Dewatering and other BMPs as described in the project's regulatory permit applications will further be used to prevent water-quality impacts. In-channel work will be restricted to the dry season from April 15 to October 15, when flows are low and warm within the channel and listed fish are not expected to occur.

Native nesting birds, including special-status species, are protected under the federal Migratory Bird Treaty Act and the California Department of Fish and Wildlife code. Loss of eggs or nestlings ("take") via project activities would violate these laws. Take-avoidance measures for these species are presented in the *Impacts Requiring Mitigation* section below.

One California Endangered Species Act species listed as threatened, the tricolored blackbird (*Agelaius tricolor*) and several California Species of Special Concern (CSSC) that are not state or federally listed as threatened or endangered that are known to be, or have the potential to be, present in the project area, and are discussed below. Impacts on these and other special-status species were discussed in the SEWSDC EIR, which addressed potential environmental impacts of the Flood Protection Project that is part of Valley Water's Clean, Safe Creeks and Natural Flood Protection (CSC) Plan. The goal of the CSC Plan is to provide 100-year riverine flood protection to approximately 1,618 properties and 47 acres within the city of Sunnyvale. The SEWSDC EIR considered activities that would potentially modify habitat in and around the storm drain channels,

including earthen storm drain channel restoration, installation of rock slope protection, floodwall construction, bridge/culvert modifications, and other storm drain channel modifications. Impacts and avoidance measures associated with special-status species in the project site are described in the project's regulatory permit applications.

The following descriptions comprise an overview of the existing habitat value for the special-status species wildlife that occur, or might occur, within the project area.

#### **1.4.1.1 Tricolored Blackbird (*Agelaius tricolor*)**

**Federal Listing Status: None; State Listing Status: Threatened—**This species was listed as a threatened species by the California Fish and Game Commission on April 19, 2018. Tricolored blackbirds are found primarily in the Central Valley and in central and southern coastal areas of California. Suitable nesting habitat for the tricolored blackbird is not present in the project site; however, the species is known to forage on the lower reaches of the Sunnyvale West Channel during the nonbreeding season.

#### **1.4.1.2 Western Pond Turtle (*Actinemys marmorata*)**

**Federal Listing Status: None; State Listing Status: Species of Special Concern—**The western pond turtle may be present in the project site. Western pond turtles still occur in urban streams and ponds in the region. Ponds or slack-water pools with suitable basking sites (e.g., logs, banks) are an important habitat component for this species. Nesting habitat is typically found within 600 feet of aquatic habitat (Jennings and Hayes 1994), but if no suitable nesting habitat can be found close by, adults may travel overland considerable distances to nest. Females lay eggs in upland habitats with clay or silty soils in unshaded, often south-facing areas up to 0.25 mile from aquatic habitat (Jennings and Hayes 1994). Juveniles feed and grow in shallow aquatic habitats (often creeks) with emergent vegetation and ample invertebrate prey.

In the project vicinity, the western pond turtle has been documented within the Lockheed Channel and North Moffett Channel west of the Sunnyvale West Channel (TN & Associates, Inc. and Tetra Tech EC, Inc. 2006 as cited in EDAW 2007). Consequently, although no western pond turtles were observed in the lower reaches of the project area for the SEWSDCEIR during focused surveys in 2012, it is likely that small numbers of pond turtles occur in channels in the project region, including the Sunnyvale West Channel, especially in the northern portion of the channel given its hydrological connection to North Moffett Channel. The channel does not currently provide optimal habitat for western pond turtle. Both adults and juveniles prefer deep, slow water and suitable basking sites. The project site is of marginal habitat quality due to the narrow width and relatively shallow nature of the channel, lacking structural complexity that would provide refugia and basking sites.

#### **1.4.1.3 Northern Harrier (*Circus cyaneus*)**

**Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting)—**The northern harrier is not expected to nest within the project site due to the absence of suitable nesting substrate or habitat; however, this species is known to breed in the vicinity of the project site. Breeding individuals may

at least occasionally forage within the project site boundary, but the site does not provide important or extensive foraging habitat used regularly by this species.

#### 1.4.1.4 Burrowing Owl (*Athene cunicularia*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—The burrowing owl, a CSSC, occurs in the project region. The abundance of this species has decreased dramatically in the South Bay region, including the project vicinity. During surveys conducted in the winter of 2007–2008 (EDAW 2008), a burrowing owl was detected on the west bank of the Sunnyvale East Channel opposite the Twin Creeks Sports Complex; a burrow with evidence of owl use (i.e., whitewash) was documented along the Sunnyvale West Channel. During 2012 and early 2013, one to two burrowing owls were reported on the landfill (north of the project site) just west of the Sunnyvale West Channel, north of Caribbean Drive (South Bay Birds List-serve 2013), although the last successful nesting attempts occurred on the landfill in 1999 and inside the Water Pollution Control Plant in 2004 (H. T. Harvey & Associates 2015). In addition, in November 2012 Valley Water reported a burrowing owl on the west side of the Sunnyvale West Channel just upstream of the Carl Road Bridge (Hernandez pers. comm. 2012). The CNDDDB (2013) includes two records of burrowing owls along the northernmost portion of the West Channel, and one record adjacent to the northernmost portion of the Sunnyvale East Channel. Although burrows of California ground squirrels were observed along the Sunnyvale East and West Channels throughout the project area for the SEWSDC EIR during surveys conducted in January 2013, burrowing owls are unlikely to nest in such limited habitat areas surrounded by dense development and large trees and buildings that provide perches for predatory raptors. Nevertheless, owls are known to use extremely small areas of ruderal habitat in the South Bay, and it is possible that owls could occasionally roost along the Sunnyvale West Channel in developed areas.

#### 1.4.1.5 Loggerhead Shrike (*Lanius ludovicianus*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting)**—Loggerhead shrikes nest in a number of locations in the project region where open grassland, ruderal, or agricultural habitat with scattered brush, chaparral, or trees that provide perches and nesting sites, occur (Bousman 2007a). This species occurs slightly more widely (i.e., in smaller patches of open areas providing foraging habitat) during the nonbreeding season. Ruderal habitats near the project site, particularly those on the former landfills surrounding the City of Sunnyvale Recycle Center and Water Pollution Control Plant (WPCP), provide suitable nesting, roosting, and foraging habitat for one or two pairs of loggerhead shrikes, but the species is not expected to breed on the project site due to the limited extent of open habitat in the surrounding area.

#### 1.4.1.6 Yellow Warbler (*Setophaga petechia*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—Small numbers of yellow warblers still nest in remnant riparian areas within Santa Clara County (Bousman 2007b). Suitable nesting habitat consists of riparian corridors, often with an overstory of mature cottonwoods (*Populus* sp.) and sycamores (*Platanus* sp.), a midstory of box elder (*Acer negundo*) and willow (*Salix* sp.), and a substantial shrub understory (Bousman 2007b). Riparian areas with a reduced understory due to grazing or disturbance are



generally not used by this species, and riparian corridors lacking open ruderal or herbaceous vegetation along the edges of the corridors, or with development up to the corridor edge, are often avoided as well. Thus, suitable nesting habitat for yellow warbler is absent from the project site. However, the yellow warbler is an abundant migrant throughout the project region during the spring and fall, and it occurs along the Sunnyvale Channels as an occasional forager during the nonbreeding season.

#### 1.4.1.7 San Francisco Common Yellowthroat (*Geothlypis trichas sinuosa*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—The San Francisco common yellowthroat inhabits emergent vegetation, and nests in freshwater and brackish marshes and moist floodplain vegetation around San Francisco Bay. Common yellowthroats will use small and isolated patches of habitat as long as groundwater is close enough to the surface to encourage the establishment of dense stands of rushes (*Scirpus* and *Juncus* spp.), cattails (*Typha* spp.), willows, and other emergent vegetation (Nur et al. 1997, Terrill 2000, Gardali and Evens 2008). Ideal habitat comprises extensive and thick riparian, marsh, or herbaceous floodplain vegetation in perpetually moist areas, where populations of brown-headed cowbirds are low (Menges 1998). San Francisco common yellowthroats nest primarily in freshwater and brackish marshes, although they also nest in salt marsh habitats that support tall vegetation). This subspecies builds open-cup nests low in the vegetation, and nests from mid-March through late July (Gardali and Evens 2008).

In the South Bay, the San Francisco common yellowthroat is a fairly common breeder in freshwater and brackish marshes. This species is known to nest 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 vicinity, the species has been recorded in both the spring and summer in Pond A4, as well as along Moffett Channel and Guadalupe Slough. The lower, tidal reaches of the Sunnyvale West Channel also provide suitable nesting and foraging habitat for this species, and it breeds in small numbers on the project site. However, the limited amount of vegetation along the channel and the narrow swaths of channel habitat that are confined by the levees limit the extent of breeding habitat, and the quality and extent of foraging habitat, on the project site.

#### 1.4.1.8 Alameda Song Sparrow (*Melospiza melodia pusillula*)

**Federal Listing Status: None; State Listing Status: Species of Special Concern**—Prime habitat for the Alameda song sparrow is fully tidal salt marsh consisting of large areas of tidally influenced salt marsh vegetation dominated by cordgrass (*Spartina* sp.) and gumplant (*Grindelia* sp.) and intersected by tidal sloughs, offering dense vegetative cover and singing perches. Although the special-status *pusillula* subspecies of song sparrow is occasionally found in brackish marshes dominated by bulrushes, it is apparently very sedentary and is not known to disperse upstream into freshwater habitats (Basham and Mewaldt 1987). Where suitable nesting habitat is continuous along creeks, the species appears to nest continuously from tidal salt marshes, where the breeding subspecies is *pusillula*, upstream to freshwater marsh and woody riparian habitats, where the breeding subspecies is an upland or freshwater associated subspecies *gouldii*. The line of demarcation (or perhaps more accurately, the zone of intergradation) along these sloughs between these two subspecies is unknown (Rottenborn 2007); a recent study indicates that song sparrows nesting along the lower portions of the Sunnyvale Channels may

belong to the *pusillula* or *gouldii* subspecies, or may be intergrades between the two (SFBBO 2012). The Alameda song sparrow is thus presumed to be present in the project site in brackish marsh habitat.

#### 1.4.1.9 American Peregrine Falcon (*Falco peregrinus anatum*)

**Federal Listing Status: None; State Listing Status: Fully Protected**—The only locations in the project vicinity where peregrine falcons have been detected nesting are old raven and hawk nests on electrical transmission towers within managed ponds in the Mountain View/Alviso area, more than 2 miles north of the project site. The species is not known or expected to nest in the immediate project area; however, peregrine falcons nesting elsewhere in the South Bay, as well as migrants and wintering birds, forage occasionally in the project region, particularly in the vicinity of Pond A4 and the WPCP ponds.

#### 1.4.1.10 Golden Eagle (*Aquila chrysaetos*)

**Federal Listing Status: None; State Listing Status: Fully Protected**—Suitable foraging habitat for golden eagles occurs in the northern portion of the project region (i.e., north of Caribbean Drive), and nonbreeding eagles may occasionally forage there. For example, an immature golden eagle was observed along the canals west of the WPCP in January 2012 (South Bay Birds List-serve 2013). However, this species occurs very rarely around the immediate edge of the baylands in the South Bay, and based on the infrequency with which it has been reported in this area (which is heavily used by birders), it is expected to forage infrequently in open habitats within and adjacent to the project area (such as on the old landfills). The reach of the Sunnyvale West Channel associated with this project offers extremely limited foraging habitat for this species and the developed nature of much of the surroundings further limits the value of the site to the species.

#### 1.4.1.11 White-Tailed Kite (*Elanus leucurus*)

**Federal Listing Status: None; State Listing Status: Fully Protected**—In the project vicinity, white-tailed kites are known to nest along the northern edge of Santa Clara County throughout the open areas edging the San Francisco Bay (Bousman 2007c). Although neither the Breeding Bird Atlas of Santa Clara County, California (Bousman 2007c) nor the Santa Clara County Bird Data (unpublished) contained specific mention of the species as occurring at the project site, there are a number of records from Moffett Field to the west and some from Sunnyvale Baylands Park to the east (South Bay Birds List-serve 2013). White-tailed kites nest in trees or shrubs, typically in areas away from high human activity, and those with extensive open foraging habitat with adequate prey. Thus, the project site may provide some limited foraging opportunities for this species, but it does not provide breeding habitat, and the quality of the foraging habitat is quite limited.

## Section 2.0 Impacts Requiring Mitigation

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Project construction will result in temporary impacts on 0.72 ac of tidal aquatic habitat, 0.16 ac of estuarine wetland, and 0.43 ac of ruderal riparian habitat (Figure 4). The project will also result in small areas of permanent impacts including, 0.01 ac of tidal aquatic habitat, 0.01 ac of estuarine wetland habitat and 0.01 ac of ruderal riparian.

### 2.1 Temporary Impacts

In order to achieve project design goals, extensive grading is required on the site. Grading will result in temporarily affecting nearly the entirety of the tidal aquatic habitat, estuarine wetland, and ruderal riparian habitat types on site (Table 1 and Figure 4). Small areas of permanent impacts, as described below, account for the remaining surface area of the jurisdictional areas within the site. The grading will require dewatering the entire project reach, removing all existing vegetation, removing portions of the existing levees, and importing soil to build up the new, larger earthen levees.

### 2.2 Permanent Impacts

The culvert extension, headwalls/floodwalls and bridge construction will result in small areas of permanent impacts to tidal aquatic, estuarine and ruderal riparian habitats, as described below and shown on Figure 4.

#### 2.2.1 Tidal Aquatic

A small 0.01 ac (573 sq ft) area of tidal aquatic habitat will be permanently impacted by construction of the culvert extension at West Caribbean Drive.

#### 2.2.2 Estuarine Wetlands

Although construction of the two new bridges across the project reach will not require placement of fill within existing estuarine wetland habitat, the installation of these structures will result in shading approximately 0.01 ac (520 sq ft) of estuarine wetlands, which is considered a permanent impact.

#### 2.2.3 Ruderal Riparian

A total of 0.01 ac (457 sq ft) of ruderal riparian habitat will be permanently impacted through construction of the culvert extension, headwalls/floodwalls, and one bridge abutment.

## 2.3 Wildlife

### 2.3.1 Central California Coast Steelhead, North American Green Sturgeon and Longfin Smelt

As indicated earlier, two federally listed species and/or their critical habitat have the potential to occur in the project site: Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) and North American green sturgeon (*Acipenser medirostris*). In addition, the longfin smelt (*Spirinchus thaleichthys*), a species listed as threatened under the California Endangered Species Act and a Candidate for listing under the Federal Endangered Species Act, also has the potential to occur in the project area.

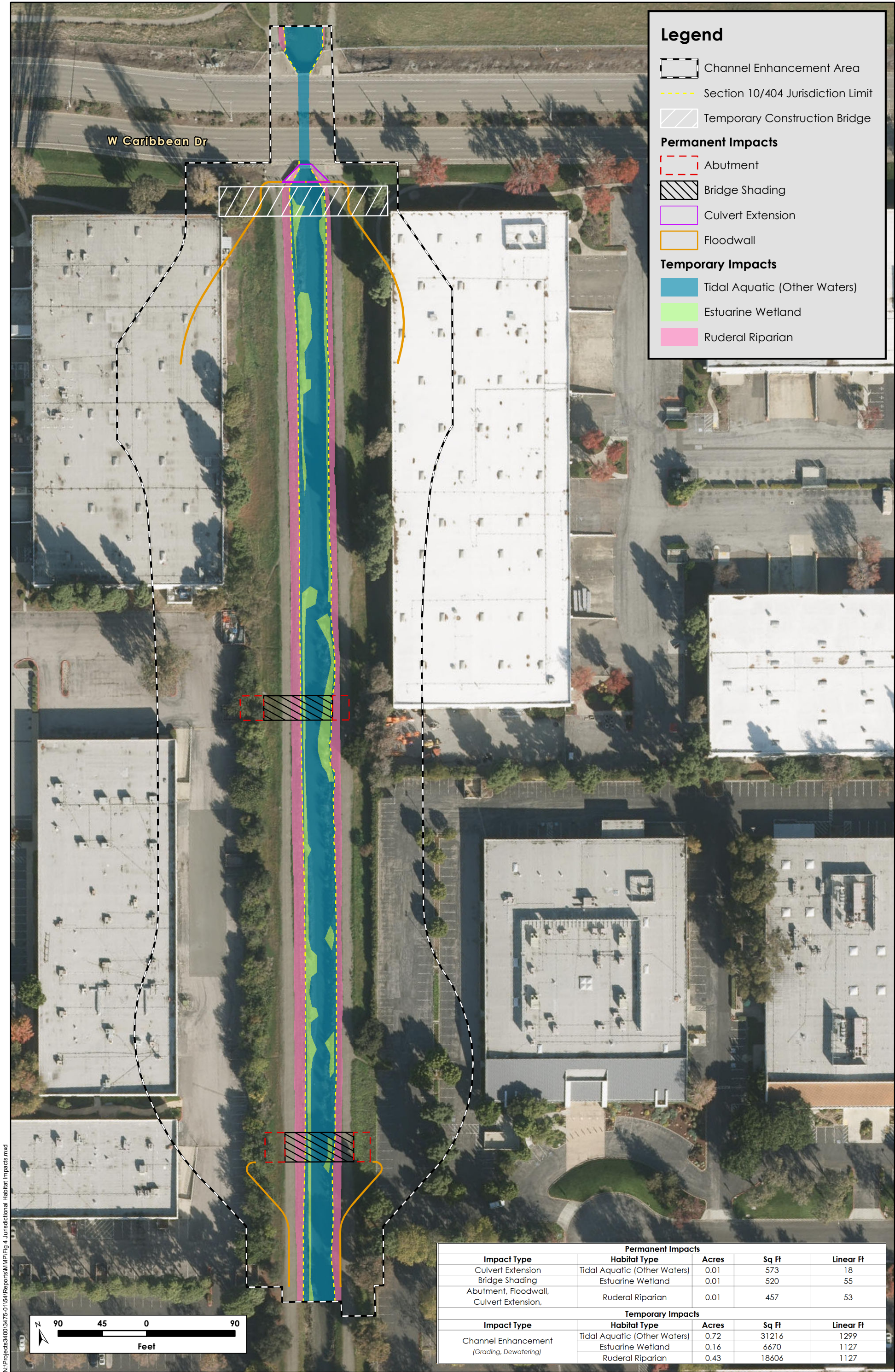
Due to the marginal quality of the habitat and very low summer flows, as well as inclusion of avoidance measures designed to protect fish, the USACE previously concluded that the Valley Water Flood Protection project would not require Section 7 Consultation for activities in this reach (pers. communication between Valley Water and Keith Hess of the USACE, July 29, 2017).

Several project mitigation measures, intended to protect aquatic wildlife and habitat that require passive fish relocation and measures to prevent entrapment, will be implemented to avoid and minimize impacts to EFH within the project reach and any fish regulated by the Coastal Pelagics and Pacific Groundfish Fishery Management Plan. Dewatering and other BMPs as described in the project's regulatory permit applications will further be used to prevent water-quality impacts. In-channel work will be restricted to the dry season from April 15 to October 15, when flows are low and warm within the channel and listed fish are not expected to occur.

### 2.3.2 Western Pond Turtle

A small population of western pond turtles is known to be present within the Lockheed Channel and North Moffett Channel west of the Sunnyvale West Channel (TN & Associates, Inc. and Tetra Tech EC, Inc. 2006 as cited in EDAW 2007). Santa Clara Valley Water District 3.3 Biological Resources Sunnyvale East and West Channels Flood Protection Project Draft Environmental Impact Report 3.3-63 October 2013 Consequently, it is likely that small numbers of western pond turtles occur in the Sunnyvale Channels (H. T. Harvey & Associates 2012b), especially in the northern portion of the West Channel given its hydrological connection to North Moffett Channel. However, given that no western pond turtles were observed in these lower portions of the Sunnyvale Channels during a focused survey for the species in 2012 (H. T. Harvey & Associates 2012b), and given that urbanization likely precludes the maintenance of a viable population in the upper portions of these channels, western pond turtles are expected to occur in the Sunnyvale Channels infrequently and in low numbers. Dewatering and other BMPs as described in the project's regulatory permit applications that cover applicable best management practices for performing project activities within and adjacent to an active channel will further be used to prevent water-quality impacts, including those to western pond turtles and the channel habitat.







Although western pond turtles are widespread in the project region, the species is not particularly abundant. Because individuals of this species can be long-lived, the widespread nature of the species in the project region may belie a population that likely would decline substantially in the future because of poor reproduction, as young turtles are seen in relatively few parts of the project region. Therefore, the loss of individuals could reduce the viability of a population to the extent that it would be extirpated. This impact would be considered significant under CEQA.

Implementation of the mitigation measure below would reduce these impacts to a less-than-significant level by minimizing the potential for the loss of individual western pond turtles and their nests.

A qualified biologist shall conduct a pre-activity survey for western pond turtles and their nests within 48 hours prior to the commencement of project work, including dewatering, within the Sunnyvale West Channel. If an adult or juvenile western pond turtle is found, project activities in the vicinity of the turtle shall cease until the individual has either left the work area on its own, or it has been relocated to an appropriate site outside the project area by a qualified biologist. If an active western pond turtle nest is detected within the activity area, a 25-foot buffer zone around the nest will be established and maintained during the nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist.

Following the initial survey, a construction crewmember who has been trained to identify western pond turtles by a qualified biologist shall conduct a survey of the in-channel activity area each morning prior to the onset of construction activities. If a turtle is located, all work in the vicinity shall immediately cease, and a qualified biologist shall be contacted. Work within the area shall not resume until the turtle has been relocated or has moved out of the area where it could be impacted.

### **2.3.3 Burrowing Owl**

Pre-construction surveys for burrowing owls shall be conducted prior to the initiation of all Project activities within suitable burrowing owl habitat (i.e., ruderal/ grassland habitat with burrows of California ground squirrels)<sup>1</sup>. Pre-construction surveys will be completed in conformance with the CDFW's 2012 guidelines (CDFG 2012). An initial habitat assessment will be conducted by a qualified biologist to determine if suitable burrowing owl habitat is present in a given area. During the initial site visit, a qualified biologist will survey the entire activity area and (to the extent that access allows) the area within 250 feet of the site for suitable burrows that could be used by burrowing owls for nesting or roosting. If no suitable burrowing owl habitat (i.e., ruderal grasslands with burrows of California ground squirrels) is present within a given area, no additional surveys will be required. If suitable burrows are determined to be present within 250 feet of work areas, a qualified biologist

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<sup>1</sup> Although burrowing owls are not expected to breed on the Project site and suitable habitat for owls on the Project site south of Caribbean is limited to the storm drain channel banks, there is possibility an owl could use the site during the winter non-breeding season if ground squirrel burrows are present. If in the very unlikely event a burrowing owl nest is established on the Project site, see Impact BIO-8 in the Sunnyvale East and West Channels Flood Protection Project EIR for the full suite of required burrowing owl mitigation measures.

will conduct three additional surveys to investigate each burrow within the survey area for signs of owl use and to determine whether owls are present in areas where they could be affected by proposed activities. The final survey shall be conducted within the 24-hour period prior to the initiation of Project activities in any given area. Because Project activities may be phased, these survey efforts may also need to be performed in phases to ensure that burrowing owls are not present in work areas when Project activities commence. This measure applies to the staging areas as well as the Project areas along the Sunnyvale Channels.

If burrowing owls are present during the non-breeding season (generally September 1 to January 31), a 150-foot buffer zone shall be maintained around the occupied burrow(s), if feasible. If maintaining such a buffer is not feasible, then the buffer must be great enough to avoid injury or mortality of individual owls, or else the owls should be passively relocated as described in MM BIO-9 below. During the breeding season (generally February 1 to August 31), a 250-foot buffer, within which no new Project-related activities will be permissible, will be maintained between Project activities and occupied burrows. Owls present between February 1 and August 31 will be assumed to be nesting, and the 250-foot protected area will remain in effect until August 31. If monitoring evidence indicates that the owls are no longer nesting or the young owls are foraging independently, the buffer may be reduced or the owls may be relocated prior to August 31, in consultation with the CDFW.

If construction will directly impact occupied burrows, a qualified biologist will passively evict owls from burrows during the nonbreeding season (September 1 to January 31). No burrowing owls will be evicted during the nesting season (February 1 through August 31) except with the CDFW's concurrence that evidence demonstrates that nesting is not actively occurring (e.g., because the owls have not yet begun nesting early in the season, or because young have already fledged late in the season). Eviction will occur through the use of one-way doors inserted into the occupied burrow and all burrows within impact areas that are within 250 feet of the occupied burrow (to prevent occupation of other burrows that will be impacted). One-way doors will be installed by a qualified biologist and left in place for at least 48 hours before they are removed. The burrows will then be back-filled to prevent re-occupation.

Although relocation of owls may be necessary to avoid the direct injury or mortality of owls during construction, relocated owls may suffer predation, competition with other owls, or reduced health or reproductive success as a result of being relegated to more marginal habitat. However, the benefits of such relocation, in terms of avoiding direct injury or mortality, would outweigh any adverse effects.

#### **2.3.4 Salt Marsh Common Yellowthroat and Alameda Song Sparrow (and other Native Nesting Birds)**

Although both of these taxa nest within the project area of the Sunnyvale West Channel, both will benefit from the improvement in habitat quality. However, loss of nests or eggs would be a violation of federal and state law. Thus, measures to avoid the loss of eggs and nestlings will be implemented. It should be noted that these measures would extend to avoiding the loss of eggs or nestlings of other species of birds not considered special status. Although these other species are common and loss of individuals or eggs would not be considered

significant under CEQA, such a loss would violate federal and state laws. The compliance measures implemented to avoid take of salt marsh common yellowthroat and Alameda song sparrow, extended to cover all native birds that might be breeding on the project site, will allow the project to avoid violating state and federal laws protecting these other species as well.

To the extent possible, project activities that could result in direct loss of eggs or young, or in indirect loss through abandonment as a result of disturbance, should be scheduled outside the nesting season (February 1 through August 31 in this region). If project activities cannot be scheduled between September 1 and January 31 season, then pre-activity/pre-disturbance surveys for nesting birds will be conducted by a qualified ornithologist to ensure that no nests will be disturbed during project implementation. The surveys will be conducted no more than seven days prior to the initiation of project activities. The ornithologist will inspect all potential nesting sites in and immediately adjacent to the impact area. If an active nest is found sufficiently close to work areas to be disturbed by these activities, the ornithologist will determine the extent of a construction-free buffer zone to be established around the nest (typically 300 feet for raptors and 100 feet for other species), to ensure that no nest of protected species will be disturbed during project implementation.



## Section 3.0 Mitigation Approach

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### 3.1 Proposed Mitigation

The project proposes to provide onsite mitigation for temporary and permanent impacts to tidal aquatic, estuarine wetland and ruderal riparian habitats, as described below.

The project proposes to mitigate the temporary tidal aquatic impacts at a 1:1 ratio and permanent impacts at 2:1, through a combination of restored tidal aquatic (0.54 ac) and estuarine wetland habitats (0.24 ac) and increasing the linear footage of tidal aquatic habitat from 1,299 ln ft to 1,325 ln ft (Tables 2 and 3). The project proposes to mitigate for temporary estuarine wetland habitat impacts (dewatering) at a 1.2:1 ratio and permanent impacts (shading from bridges) at a 2:1 ratio (Tables 2 and 3).

These mitigation ratios represent a total project mitigation requirement of approximately 0.99 ac of jurisdictional wetlands and waters of the United States/state as a mix of estuarine wetland and tidal aquatic habitat.

Temporary impacts on ruderal riparian habitat will be mitigated at a 1:1 ratio and permanent impacts at a 2:1 ratio. The actual area to be tracked for ruderal riparian habitat mitigation will be a dedicated zone along the lower levee slopes on both sides of the channel from the West Caribbean Drive culvert upstream to the first new pedestrian bridge (Figure 5). This area will provide stable vegetated slopes. Although woody species will be installed throughout this zone, they will not be linked to any specific monitoring or success criteria metrics because there will be no impacts on woody plants within existing jurisdictional areas.

Project mitigation will restore and enhance tidal aquatic, estuarine wetland, and riparian habitats within the project site. There will be a 0.54-ac, 1,325 ln ft low-flow storm drain channel, bordered on both sides by a wetland floodplain bench set at elevations below the high-tide line and subject to regular tidal inundation, and the levee banks will be laid back to provide stable slopes where a mix of native riparian trees, shrubs, grasses, and forbs can be established. The project will provide all necessary mitigation per the descriptions above, as well as voluntarily create additional habitat. In all, the area of waters of the United States/state (tidal aquatic habitat and estuarine wetlands) will be more than doubled, with a final anticipated area of 2.84 ac (Tables 2 and 3 and Figure 5). Along with an anticipated 1.80 ac of riparian habitat, the project will substantially increase the area and quality of jurisdictional habitat through the project reach as compared to the current conditions (Tables 2 and 3 and Figure 5). Estuarine wetland habitat will be passively restored by allowing sedimentation and plant detritus accumulation to restore the intertidal elevations, and natural colonization to establish the plant and wildlife communities. However, a few pockets will be planted with California bulrush and alkali bulrush. Riparian plantings will include a mosaic of native species associated with willow-cottonwood forest, oak riparian forest, and bayside scrub communities. Figure 6 provides conceptual cross-sections through the channel enhancement reach.

**Table 2. Habitat Impacts and Mitigation Requirements**

Impacted Habitat Type	Acreage	Mitigation Ratio	Mitigation Requirement (acres)
Temporary Impacts			
Tidal Aquatic (Dewatering and Grading)	0.72 ac	1:1	0.54 ac in-kind plus 0.18 ac included in estuarine wetland below)
Estuarine Wetland (Dewatering and Grading)	0.16 ac plus 0.18 to compensate for tidal aquatic	1.2:1 (accounts for temporal loss due to 2-year construction period)	0.41 ac in-kind
Ruderal Riparian (Grading)	0.43 ac	1:1	0.43 ac riparian
Permanent Impacts			
Tidal Aquatic (Culvert Extension)	0.01 ac (573 sq ft)	2:1	0.02 ac as estuarine wetland
Estuarine Wetland (Shading)	0.01 ac (520 sq ft)	2:1	0.02 ac in-kind
Ruderal Riparian (Conversion to hardscape)	0.01 ac (457 sq ft)	2:1	0.02 ac riparian

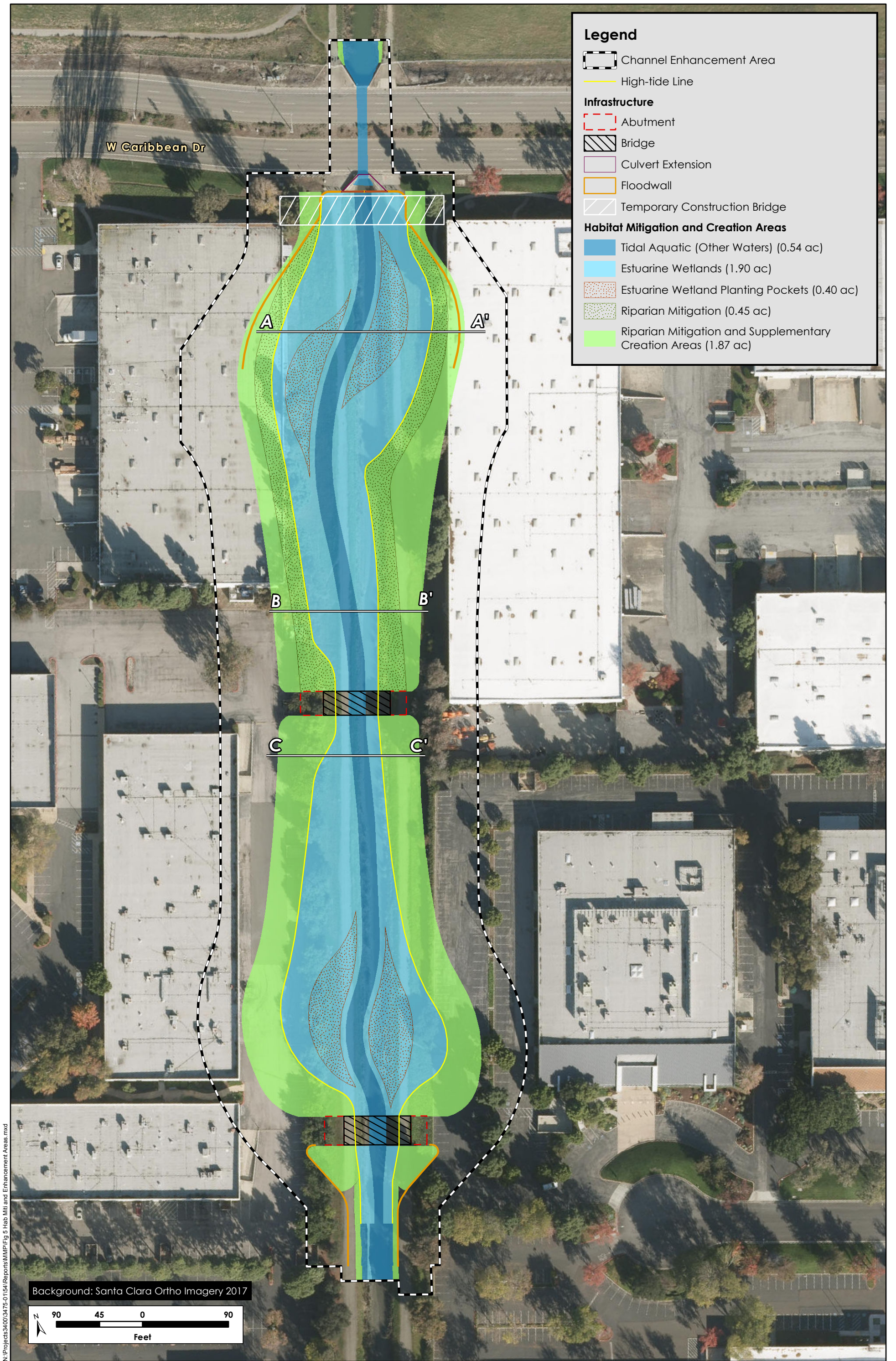
**Table 3. Habitat Mitigation and Creation Summary**

Habitat Type	Mitigation Requirement	Additional Habitat Creation	Total Habitat Mitigation and Creation
Total Mitigation and Additional Creation			
Tidal Aquatic	0.54 ac	N/A	0.54 ac
Estuarine Wetland	0.45 ac	1.85 ac	2.30 ac
<b>Total Jurisdictional Waters of the United States/state (including wetlands)</b>	<b>0.99 ac</b>	<b>1.85 ac</b>	<b>2.84 ac</b>
Riparian	0.46 ac	1.34 ac	1.80 ac

## 3.2 Mitigation Goals

The project design allows for full compensation for all temporary and permanent impacts on jurisdictional habitats as described above. The project will result in creating and enhancing tidal aquatic, estuarine wetland, and riparian habitats. The created estuarine and riparian habitats that are in excess of project needs will be available for potential use as mitigation, as yet to be determined, for Valley Water's Flood Protection Project.



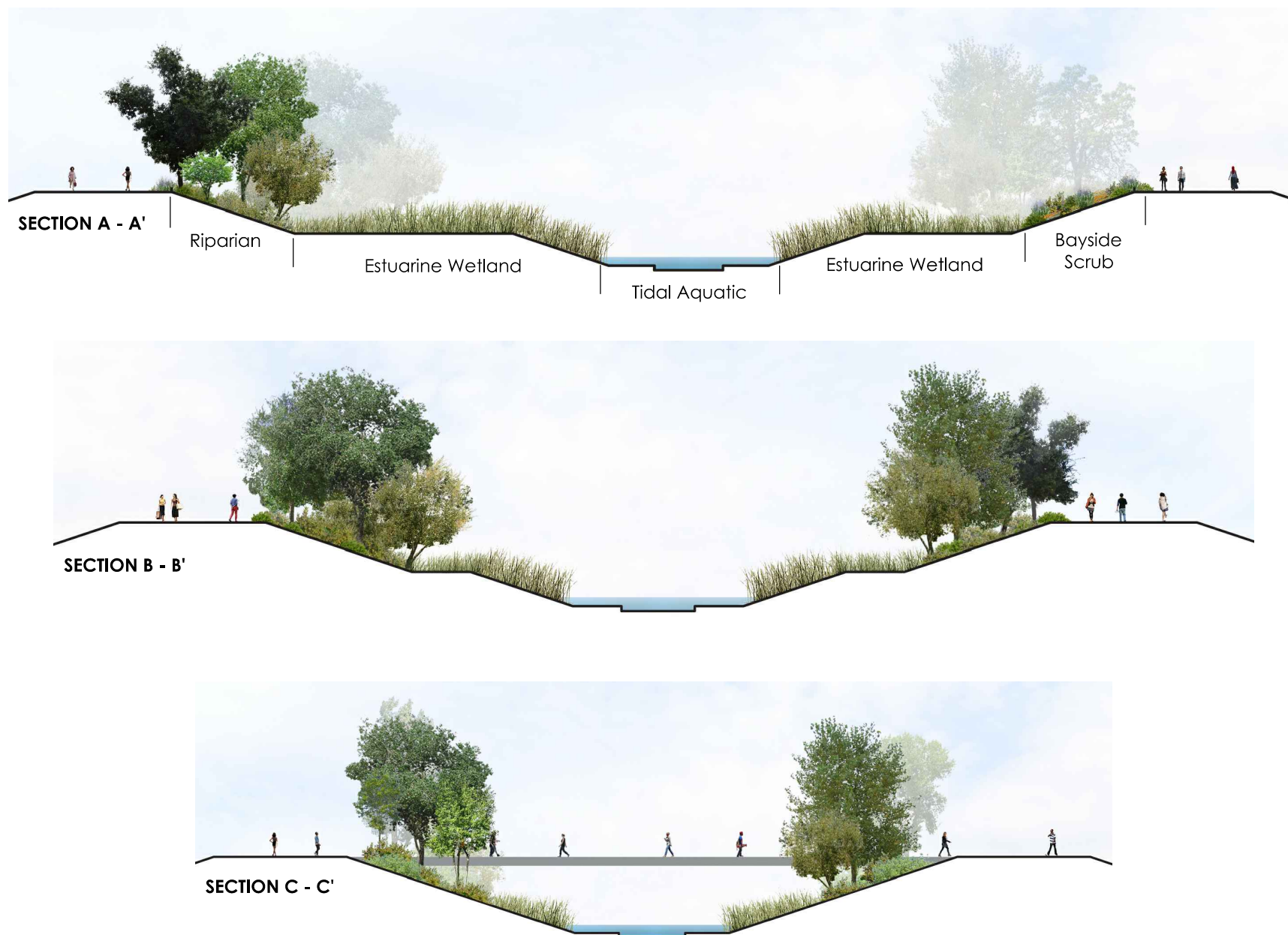


N:\Projects\3400\3475-01\SA\Reports\MM\Fig 5 Hab Miti and Enhancement Areas.mxd





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**H.T. HARVEY & ASSOCIATES**

Ecological Consultants

**Figure 6. Conceptual Cross Sections**

Google West Channel Enhancement Project - Mitigation and Monitoring Plan (3475-54)

August 2019



### 3.3 Basis of Design

As part of its Flood Protection Project, Valley Water plans to increase the flood conveyance capacity of the Sunnyvale West Channel, including through the project reach. The Flood Protection Project includes increasing the height of existing levees and installing new floodwalls atop the levees. Within the project reach, Google proposes to widen the channel and to construct raised and widened earthen levees to provide a carrying capacity equivalent to Valley Water's Sunnyvale West Channel design. The project will limit the use of concrete levee walls to small areas of headwall/floodwall construction associated with the culvert extension at West Caribbean Drive and to conform to upstream Valley Water floodwalls.

The project design incorporates setting back and widening the levees and raising the top of bank elevation to create a low-flow storm drain channel with adjacent, broadened floodplains set at elevations below the high-tide line. These floodplains will be subject to regular tidal inundation to facilitate colonization with estuarine wetland species. It is anticipated that robust populations of estuarine plants located downstream of the project reach will provide adequate seed sources that will be introduced to the site with daily tides and facilitate passive restoration of estuarine wetlands across the floodplains. In order to further facilitate revegetation of the floodplains, pockets of appropriate estuarine wetland species will be planted in strategic locations to provide onsite seed/propagule sources. The levee slopes will be constructed with an earthen core that meets all regulatory agency requirements for structural stability. The outer 3 feet of the inboard levee slopes will be constructed with horticulturally suitable soils to support establishment of mixed riparian and bayside scrub habitats. The placement of the horticulturally suitable soil will be designed in consultation with a qualified geotechnical engineer to ensure stability. While only a relatively small area of vegetated, stable riparian habitat is required for project mitigation the entire surface area of the inboard levee slopes will be planted with a mosaic of four native plant palettes. At the lower elevations (high-tide line to approximately mid-slope), patches of willow-cottonwood riparian forest and mesic bayside scrub will be planted. At the upper elevations (approximately mid-slope to top of bank), oak riparian forest will be interspersed with dry bayside scrub. The patches of willow-cottonwood and oak riparian forest will be intermingled and discontinuous to create canopy gaps and provide view corridors into and across the project reach.

#### 3.3.1 Habitat Types

##### 3.3.1.1 Estuarine Wetlands

The project reach will include 2.30 ac of estuarine wetland habitat, to be established across the surface of tidally inundated floodplains located along both sides of the storm drain channel. The total wetland acreage will be increased by 2.14 acres compared to existing conditions.

##### 3.3.1.2 Tidal Aquatic (Other Waters)

The project reach will include 0.54 ac of tidal aquatic habitat (other waters), occurring over approximately 1,325 ln ft of the storm drain channel. This represents a 26 ln ft increase of the storm drain channel and a 0.19 ac

decrease of tidal aquatic habitat compared to existing conditions. However, the decrease in tidal aquatic habitat will be compensated by providing new jurisdictional estuarine wetland habitat.

### 3.3.1.3 Riparian

The project reach will include 1.80 ac of mixed riparian habitat on the inboard side of the reconstructed levee slopes. This total includes the required 0.46 ac of mitigation area and an additional 1.34 ac of riparian habitat creation. The entire 1.80 ac area will be maintained by Google for habitat and aesthetic values, but the 1.34 ac of creation is not required or included as part of the project's mitigation obligation.

## 3.4 Topography and Hydrology

The project reach will include levee reconstruction that will raise the levee-top elevations and have top of bank to top of bank widths between 127 and 187 feet, compared to Valley Water's design width of 52 to 65 feet in adjacent reaches. The channel will be slightly realigned, with an increase in total linear footage through the reach, but the invert elevations will conform to the existing invert elevation, estimated to be the long term sedimentation level. The project reach is designed to convey the design 100-year discharge and will be of sufficient height to contain the design event based on a coincident 1% high-tide elevation of 10 feet NAVD88 with 2 feet of sea level rise and at least 4 feet of freeboard. Transition zones are included at the upstream and downstream ends of the project reach to reduce hydraulic losses and minimize sediment accumulation within the active channel. Further details are provided in the *West Channel Enhancement for Google Hydraulic Basis of Design* (Schaaf & Wheeler 2019a).

## 3.5 Vegetation

The project design focuses on creating appropriate floodplain elevations to facilitate passive recruitment as the dominant mode of plant establishment within the created and restored estuarine wetlands. Adjacent, upstream and downstream reaches of the storm drain channel provide an abundant source of wetland plant seed. It is anticipated that passive recruitment will be sufficient to rapidly establish a wetland plant community, with vegetative cover expanding over time. The design grades of the floodplain surface range from approximately 1 ft below mean tidal level (MTL) up to approximately 1 ft above MHW. This tidal range captures the extent of the natural elevational gradient of estuarine wetland habitat and was designed to facilitate natural recolonization with the target wetland species. In addition, pockets of native wetland plants (California bulrush and alkali bulrush) will be strategically installed on the floodplain to provide onsite seed/propagule sources and to augment the aesthetic of the project reach during the plant recruitment and establishment period. Both species will be planted near the upper edge of their known tidal elevation ranges to facilitate establishment under limited inundation stress and allow natural expansion into lower elevations as site conditions equilibrate.

In the riparian areas, which extend from the inboard toe of each levee slope up to the top of bank, a mosaic of four distinct native plant palettes will be installed from container stock (see Section 4.5). In addition to the container stock, a native grass and forb seed mix will be applied across the slopes.

### 3.6 Wildlife

Riparian ecosystems support some of the highest wildlife species diversity and abundance in North America, and are particularly important in the western portion of the continent (Poff et al. 2011). For example, riparian zones in many areas of the western United States comprise less than 1% of the total land area, yet these areas are used by more species of breeding birds than any other habitat in North America (Knopf et al. 1988 as cited in Fischer 2000). Riparian zones provide valuable habitat and resources to a rich diversity of fish and wildlife, including a number of species dependent on riparian habitat. For example, resident and migratory birds use riparian areas for breeding, nesting, and foraging, while providing refuge and foraging for mammals, reptiles and amphibians. Riparian habitats also provide critical elements for fish habitat, including shading the channel, large woody debris to form pools, and floodplain habitat for rearing, spawning, and resources (Opperman and Merenlender 2011).

Unfortunately, riparian ecosystems are one of the most heavily degraded ecosystems, as is the current case with the Sunnyvale West Channel. Vast amounts of this important habitat have been lost to development through the construction of dams, river and stream channelization, grazing, agriculture, cities, urban landscaping, invasive species, and other anthropogenic activities over the past several hundred years of human expansion in North America. For example, around 95% of the riparian habitat in the Sacramento Valley has been lost (Gardali et al. 2004) and such amounts of loss are common throughout the West (Poff et al. 2011). In a study of the effects of urbanization on riparian habitats in Silicon Valley, Rottenborn (1999) found that bird species richness and density decreased as the volume of native riparian decreased. In Silicon Valley, riparian corridors along the Guadalupe River in San Jose have shrunk from vast riparian willow complexes over 0.5 kilometer wide, to a strip between ~20-50 meters wide in most places (Beller et al. 2010). Thus, the vast majority of this valuable habitat has been lost both regionally and locally, which emphasizes the importance of riparian habitat conservation and restoration.

This project will increase the habitat value of this reach of the Sunnyvale West Channel substantially relative to existing conditions, and contribute to the ongoing restoration of native habitat (including riparian habitat) that is occurring in the South Bay, which will result in a local and a cumulative benefit to the suite of species that utilizes this habitat. In particular note, Neotropical migrants that utilize riparian habitats for breeding, migratory stopovers, and wintering will benefit from the project mitigation. Neotropical migrants are showing significant declines and thus are of conservation concern in general.

The net increase in riparian habitat will also help special-status species known to occur, or likely to occur, on the project site following project completion. Migrant yellow warblers will benefit from the additional native riparian habitat. Nesting and resident San Francisco common yellowthroats will benefit from the additional willow and estuarine wetland habitats, and the Alameda song sparrow will benefit from the additional tidal aquatic and estuarine wetland habitats. Although the northern harrier, American peregrine falcon, and white-tailed kite are not anticipated to nest on the project site, the potential for an increased prey base associated with

the additional native vegetation may provide some benefit to these species. Western pond turtles would benefit from the increased vegetation providing cover from predators.

As discussed earlier, the site provides only marginal habitat for burrowing owls. None are known to nest along the Sunnyvale West Channel, and although owls could occasionally forage or roost there, none have been recorded along the project reach (they occur primarily downstream from the site, on the old Sunnyvale Landfill). The addition of riparian vegetation along the levee will decrease the likelihood that burrowing owls would forage or roost on the site given their affinity for open areas free of tall vegetation. However, given that this species is not currently expected to use the site regularly, an increase in riparian vegetation would not substantively affect this species. The additional vegetation and increased ecological functions and values associated with the project may increase the potential prey base for owls in the area due to increased prey productivity.

### **3.7 Mitigation Site Location and Ownership Status**

The mitigation site is located within the project footprint on Valley Water lands, as well as on adjacent parcels owned by Google (Assessor's Parcel Numbers 110-26-027, 110-26-031, 110-26-023, and 110-26-025). All required mitigation will be implemented within the bed and banks of the reconstructed levees and storm drain channel on these properties.

### **3.8 Time Lapse**

Tidal aquatic habitat will be established immediately following removal of dewatering infrastructure. Estuarine wetland habitat is expected to become established within 2 to 3 growing seasons. Vegetative cover on stable riparian slopes will become established after 1 growing season.



## Section 4.0 Implementation Plan

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### 4.1 Wildlife Avoidance and Minimization Measures

All required pre-construction wildlife surveys and avoidance and minimization measures will be implemented per the project's permits.

### 4.2 Mitigation Construction Schedule

Construction is expected to begin in 2020 with landside elements, including installation of the temporary bridge over the channel. The first activities to impact regulated habitats specific to the channel enhancement would be vegetation removal prior to the nesting bird season prior to February 1, 2021. Construction would then be completed over the next 2 years (2021-2022). The storm drain channel will be excavated and contoured, and the bridges and culvert extension will be built during the first in-channel construction season from April 15 – October 15, 2021. Finish grading, completions of floodwalls, and other final improvements such as the installation of irrigation and plantings would occur during the second in-channel construction season, anticipated in April 15 – October 15, 2022.

Ground-disturbing work within jurisdictional habitat areas will occur in the dry season (i.e., between April 15 and October 15). Additionally, once the new topography of the project reach is established, this temporal restriction will extend to all areas within the new top of bank. Work in areas outside the current and proposed top of bank may take place in the wet season and use the temporary bridge during the construction period.

During construction, the project reach will be dewatered via temporary coffer dams located above and below the site and an enclosed pipe to convey flow through the project reach. Rough grading will include reconstructing the storm drain channel with broadened floodplains and constructing larger levees. Following rough grading, bridge abutments and decks will be constructed. Finish grading will include establishing final grades within the channel and floodplains and preparing the levee slopes for planting, including placement of horticulturally suitable topsoil. Planting of wetland pockets will occur immediately prior to removing dewatering infrastructure. Installation of riparian plants is anticipated to occur in late fall following completion of construction. The order of events for mitigation implementation is roughly as follows:

1. Remove in-channel vegetation prior to first construction season.
2. Install erosion control measures and channel dewatering.
3. Clearing and grubbing of project reach.
4. Rough grading and construction of new levees.
5. Construction of bridge abutments and decks.

6. Remove channel dewatering infrastructure and install temporary erosion control measures at end of first construction season.
7. Reinstall channel dewatering infrastructure at beginning of second construction season.
8. Final grading, completion of floodwall construction, and soil preparation.
9. Install wetland plantings.
10. Remove dewatering infrastructure.
11. Installation of irrigation lines and planting basins in riparian areas.
12. Apply native seed in riparian areas.
13. Install container plants in riparian areas.
14. Prepare biological as-built report.

### **4.3 Implementation Monitoring**

A qualified biologist/ecologist will monitor mitigation implementation to ensure that the site is installed as described in this plan.

### **4.4 Site Preparation**

#### **4.4.1 Vegetation Removal**

Delays in construction could jeopardize the ability of the project to complete rough/mass grading of the channel during the first construction season. Therefore, due to the density of existing emergent wetland vegetation throughout the channel enhancement reach, the project proposes to remove channel vegetation outside the nesting bird season, prior to February 1, 2021, in preparation for year 1 construction. Vegetation will be cut at the mudline at low tide using hand tools and removed from the channel. Because substantial disturbance of the channel bottom is not anticipated, no measures such as turbidity curtains will be necessary. The in-channel vegetation will then be maintained at a very low height unsuitable for nesting birds until April 15, 2021 in preparation for year 1 dewatering activities. Due to mass grading of the channel during year 1, the channel is likely to remain unvegetated or very sparsely vegetated during the winter of 2021-2022 in between the two in-channel construction seasons. However, if this is not the case and suitable substrate for nesting birds develops quickly during the 2021-2022 winter, vegetation removal would again be necessary prior to February 1, 2022 and then maintained until April 2022 in anticipation of dewatering activities for year 2.

Installation of the temporary bridge will be necessary in 2020, the year prior to commencing instream earthwork, to facilitate movement of construction vehicles and pedestrians associated with landward construction activities. Installation of the temporary bridge will not result in any impacts to waters of the U.S.

#### 4.4.2 Erosion Control

Temporary silt fencing, wattles, and/or suitable alternatives will be installed on or within the project boundary (outboard of new levees) to ensure that sediment is contained within the project footprint during construction. No erosion control infrastructure will be installed within the inboard slopes of new or existing levees because this entire area will be subject to grading. Dust suppression will be achieved and maintained during all earthmoving activities by using water trucks, as required. Standard construction site best management practices (BMPs) will be implemented to protect offsite areas and waterways; these BMPs will include the use of exit grids and street sweepers at project site ingress/egress points.

#### 4.4.3 Channel Dewatering

The project reach will be dewatered to maintain the work area as water-free as possible during construction. A conceptual dewatering plan has been prepared that addresses the placement of cofferdams, cofferdam construction, BMPs to avoid discharge of sediment into waters of the United States/state, construction phasing and timing, placement of a water diversion pipe that will maintain upstream flow into the lower reaches of the storm drain channel, and the removal of the water diversion equipment after construction ends (Schaaf & Wheeler 2019b).

Channel dewatering will create a dewatered work area through the entire length of the project reach. An earthen coffer or aqua dam will be installed at the upstream limits of construction. The coffer dam will span the full width of the channel and convey all surface flows from the creek into a 28-inch-diameter, fused high-density polyethylene (HDPE) pipe. Alternatively, multiple pipes may be used that provide the equivalent carrying capacity as a single 28-inch pipe. The HDPE pipe(s) will carry the collected water approximately 1,300 ft through the project reach and the culvert beneath West Caribbean Drive. The pipe will discharge below an aqua dam to be installed on the downstream side of West Caribbean Drive. Suitable erosion protection will be installed at the discharge point. If gravity is not effective in conveying water due to tidal influence, pumps will be used as necessary. Detailed information is provided in the *Dewatering Plan for the Google West Channel Enhancement* (Schaaf & Wheeler 2019b).

#### 4.4.4 Grading and Soil Preparation

The project design includes setting back the levees to allow grading of a new storm drain channel and establishing adjacent floodplains at elevations ranging from approximately 1 ft below MTL up to approximately 1 ft above MHW to facilitate colonization of the floodplains with the target estuarine wetland plant community. Figure 7 provides a plan view of the landform grading. It is anticipated that cutting to the finish grade will expose suitable soil conditions that will not require any additional treatment or amendments and will support both actively planted and naturally recruited estuarine wetland species. However, a project specific site management plan will be prepared that outlines the protocol to ensure floodplain soils meet appropriate requirements for soil and sediment characteristics for areas subject to tidal inundation. The levees will be constructed to meet geotechnical stability requirements and will include placement of a stable 3 ft deep zone of horticulturally suitable soil as the final series of lifts across the inboard levee slopes to facilitate long-term

establishment of the riparian plantings. The project's construction documents will provide detailed drawings and specifications for the grading and soil preparation. The levees will be constructed to meet geotechnical stability requirements and will include placement of a stable 3 ft deep zone of horticulturally suitable soil as the final series of lifts across the inboard levee slopes to facilitate long-term establishment of the riparian plantings. The project's construction documents will provide detailed drawings and specifications for the grading and soil preparation.

## 4.5 Planting and Seeding Plan

### 4.5.1 Overview

The project design includes relying primarily on passive revegetation of the estuarine wetland areas and utilizing native seed from adjacent reaches that will be naturally dispersed to the site from upstream storm drain flows and from downstream through tidal action. However, revegetation of the floodplains will also be supplemented by installing pockets of native wetland plants. Supplemental plantings will be installed after all mitigation site construction is complete and immediately prior to removing dewatering infrastructure. The two most common species anticipated to colonize the floodplains include California bulrush and alkali bulrush. Planting pockets will be planted with these two species from 1-gallon container stock. Both species will be installed near the upper edge of the known tidal elevation ranges to allow establishment under limited inundation stress. Figure 5 provides a conceptual plan view of the likely locations and sizes of the planting pockets. Within each pocket, plants will be installed in clusters spaced approximately 20 ft apart that contain 8–12 individuals.

On the inboard levee slopes, a combination of native riparian and bayside scrub container plants and a native grass and forb mix will be used to achieve a vegetated condition suitable to prevent excessive erosion and provide high quality riparian habitat. Plant palettes for the levee slope riparian areas are provided in Table 4. The exact proportions and locations of each species will be provided in the detailed construction documents. The native riparian seed mix to be used for all riparian areas is provided in Table 5.





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**Table 4. Native Riparian Woody Plant Palettes**

Riparian Habitat Type	Stature	Scientific Name	Common Name
Willow-Cottonwood Riparian Forest	Understory	<i>Baccharis douglasii</i>	Marsh baccharis
		<i>Ribes sanguineum</i>	Flowering currant
		<i>Rosa californica</i>	California rose
	Trees	<i>Rubus ursinus</i>	California blackberry
		<i>Populus fremontii</i>	Fremont cottonwood
		<i>Salix lasiolepis</i>	Arroyo willow
		<i>Sambucus nigra</i>	Elderberry
Oak Riparian Forest	Understory	<i>Ceanothus thyrsiflorus</i>	Blue blossom ceanothus
		<i>Frangula californica</i>	Coffeeberry
		<i>Heteromeles arbutifolia</i>	Toyon
		<i>Monardella villosa</i>	Coyote mint
		<i>Ribes sanguineum</i>	Flowering currant
		<i>Rosa californica</i>	California rose
	Trees	<i>Salvia mellifera</i>	Black sage
		<i>Acer negundo</i>	Boxelder
		<i>Aesculus californica</i>	California buckeye
		<i>Populus fremontii</i>	Fremont cottonwood
		<i>Sambucus nigra</i>	Elderberry
		<i>Quercus agrifolia</i>	Coast live oak
		<i>Quercus lobata</i>	Valley oak
Mesic Bayside Scrub		<i>Asclepias fascicularis</i>	Narrow leaf milkweed
		<i>Baccharis glutinosa</i>	Marsh baccharis
		<i>Ribes sanguineum</i>	Flowering currant
		<i>Rosa californica</i>	California rose
		<i>Rubus ursinus</i>	California blackberry
Dry Bayside Scrub		<i>Asclepias californica</i>	California milkweed
		<i>Asclepias fascicularis</i>	Narrow leaf milkweed
		<i>Epilobium canum</i>	California fuchsia
		<i>Eriophyllum confertiflorum</i>	Golden yarrow
		<i>Monardella villosa</i>	Coyote mint
		<i>Salvia clevelandii</i>	Cleveland sage
		<i>Salvia spathacea</i>	Hummingbird sage

**Table 5. Native Riparian Seed Mix**

Scientific Name	Common Name	PLS <sup>1</sup> /Acre
<i>Achillea millefolium</i>	Yarrow	0.5
<i>Acemisson glaber</i>	Deerweed	1
<i>Artemisia douglasiana</i>	Mugwort	0.5
<i>Bromus carinatus</i>	California brome	5
<i>Clarkia rubicunda</i>	Farewell to spring	1
<i>Elymus glaucus</i>	Blue wildrye	5
<i>Elymus triticoides</i>	Creeping wildrye	5
<i>Eriogonum fasciculatum</i>	California buckwheat	1.5
<i>Eschscholzia californica</i>	California poppy	2
<i>Festuca microstachys</i>	Three weeks fescue	4
<i>Festuca rubra</i>	Red fescue	3
<i>Hordeum brachyantherum</i>	Meadow barley	5
<i>Layia platyglossa</i>	Tidy tips	2
<i>Lupinus succulentus</i>	Arroyo lupine	3
<i>Nemophila menziesii</i>	Baby blue eyes	1
<i>Stipa pulchra</i>	Purple needle grass	5
<i>Symphotrichum chilense</i>	Pacific aster	0.25
<b>Total</b>		<b>44.75</b>

<sup>1</sup> PLS = pure live seed

#### 4.5.1.1 Plant Procurement

Locally appropriate plants will be sourced for the project. When possible, plant propagules will be collected from within Santa Clara County or adjacent counties and contract grown for the project. Container plants will be sourced from nursery stock grown in accordance with established *Phytophthora* prevention BMPs to prevent the introduction of contaminated plant material at the project site. The Working Group for *Phytophthoras* in Native Habitats provides a set of applicable guidelines (WGPNH 2016). Willow cuttings, if used, will be harvested from nearby riparian habitats along similar bayside stream corridors.

#### 4.5.2 Container Plant Installation

##### 4.5.2.1 Estuarine Wetlands

Wetland container stock will be installed directly into design grade soils. Planting holes will be hand excavated to approximately twice the diameter of the root ball. Container stock will be installed with the top of the rootball at grade and excavated soil will be used to backfill around each planting. Immediately prior to installing each container stock plant, the root mass will be inspected, and any matted, dead, diseased, broken, twisted, or circling roots will be pruned. No mulch or constructed irrigation basins will be used in this area.

#### **4.5.2.2 Riparian**

Planting basin locations and dimensions will be determined as part of development of the project's detailed construction documents. Planting basins will be constructed to accommodate installation of the varying container sizes with a raised berm, approximately 4 inches high, on the downslope side to concentrate irrigation water and prevent washout. Soil amendments may be included, if determined to be necessary, and suitable topsoil may be placed as the final lift of levee construction. Immediately prior to installing each container stock plant, the root mass will be inspected, and any matted, dead, diseased, broken, twisted, or circling roots will be pruned. Following plant installation, 3 inches of wood chip mulch will be applied within each planting basin. Mulch will be pulled 2–3 inches away from plant stems to prevent rot. All container plants will be irrigated immediately following installation.

#### **4.5.3 Irrigation**

No irrigation will be provided to the estuarine wetland areas. A temporary drip or bubbler irrigation system will be constructed to provide water to riparian plantings during a 3–5 year plant establishment period. The type and location of irrigation infrastructure will be shown in the project's construction documents. The irrigation system will be designed to deliver approximately 10 gallons of water to each planting basin. The frequency and duration of irrigation events will be determined in consultation with a qualified restoration ecologist and applied in a manner to promote deep root development.

#### **4.5.4 Herbivory Protection**

It is anticipated that herbivory protection will not be necessary at the site. However, if there is substantial herbivory of the estuarine wetland areas from waterfowl, adaptive measures may be taken to protect the establishing plants. These measures would be presented to the regulatory agencies for approval prior to implementation.

### **4.6 Biological As-Built Report**

Within 8 weeks of the completion of the last phase of mitigation site installation, a biological as-built report will be prepared and submitted to the USACE, RWQCB, and CDFW. The biological as-built report provides a description of the biological conditions of the mitigation site immediately following installation relative to the conceptual design presented in this MMP. The intent of the biological as-built report is to document substantive biological deviations from the permitted design for regulatory agency consideration and to serve as the baseline condition for future analysis/comparison of the site to performance and final success criteria. The report does not provide detailed as-built conditions of the engineered site infrastructure, such as bridges, and does not replace either the construction as-built drawings or the construction record drawings typically prepared by the contractor, project owner, or owner's representative.



## Section 5.0 Maintenance Plan

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### 5.1 Overview

This section outlines the maintenance required at the mitigation site to facilitate meeting the project's annual performance and final success criteria. Maintenance actions performed in the riparian areas to promote woody plant establishment are to be performed 'at-will' and are considered outside the scope of this MMP.

### 5.2 Maintenance Schedule

Maintenance within the mitigation site will occur at least 4 times per year, based on quarterly site inspections and recommendations to be provided by a qualified restoration ecologist. Additional maintenance may be required based on specific circumstances, such as heavy precipitation events, fire, and vandalism. Maintenance activities will occur throughout the 5-year monitoring period.

### 5.3 Tidal Aquatic Habitat and Estuarine Wetlands

Mitigation maintenance measures within the tidal aquatic habitat and estuarine wetlands will consist of, trash and debris removal, and natural recruit protection/avoidance.

#### 5.3.1 Trash and Debris Removal

Because the project reach is tidally influenced and receives runoff from a highly urbanized watershed, the presence of inorganic trash and debris cannot be completely eliminated. Any substantial accumulations of inorganic trash and debris that occur within the tidal aquatic habitat or estuarine wetlands during the monitoring period will be removed. All removed material will be disposed of appropriately at an off-site location.

#### 5.3.2 Natural Recruit Protection/Avoidance

Any naturally recruiting native plants observed within the estuarine wetlands will be identified and protected. Passive recruitment of estuarine wetland species across the floodplains is anticipated to be the primary method by which the habitat will establish. Therefore, the protection and avoidance of naturally recruited native species is a high priority.

### 5.4 Riparian

The project is not specifically required to provide riparian habitat that includes native woody species. Although the project design includes the establishment of a mosaic of riparian vegetation across the inboard levee slopes, the maintenance measures required to facilitate achievement of the mitigation obligations in this MMP (i.e., 0.46 ac of stable, vegetated riparian levee slopes as shown on Figure 5) are limited to erosion protection, invasive weed control, and trash and debris removal.

### **5.4.1 Erosion Protection**

The inboard levee slopes will be visually inspected for signs of erosion, which could include: rilling, slumping, gully formation, or other indicators of soil loss. If soil erosion or bank instability is observed, appropriate remedial actions will be developed to stabilize levee slope soils and prevent further soil losses. Remedial actions will minimize disturbance to planting basins and installed plants. Treatments may include: installing wattles perpendicular to the levee slope, broadcast or hydro-seeding with an approved native seed mix, and minor soil movement (e.g., raking the soil surface, repairing irrigation basins). Treated areas will be mapped, monitored, and documented in annual monitoring reports.

### **5.4.2 Invasive Weed Control**

If the riparian mitigation areas are observed to support more than 5% absolute invasive plant cover during the monitoring period, invasive weed control measures will be implemented. Invasive plants are considered to be species identified by California Invasive Plant Council (Cal-IPC) as having a “high” invasive potential (Cal-IPC 2018). Control of invasive species may include manual removal efforts or the use of an herbicide approved by the U.S. Environmental Protection Agency for aquatic use. If an herbicide is used, it will be based on a recommendation from a certified pest advisor and applied by a licensed herbicide applicator.

### **5.4.3 Trash and Debris Removal**

Any substantial accumulations of inorganic trash and debris that occur on the levee slopes during the monitoring period will be removed during scheduled maintenance activities. All removed materials will be disposed of appropriately at an off-site location.

## Section 6.0 Monitoring Plan

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### 6.1 Overview

This MMP defines the objective, measurable success criteria that will be used to determine if the mitigation site is on a trajectory towards meeting long-term habitat goals. Monitoring data collected by a qualified restoration ecologist will be used to evaluate the success of the mitigation site relative to the project's success criteria. Monitoring will be conducted annually over a 5-year period. Information obtained through the monitoring program will provide feedback to direct necessary maintenance and help ensure successful habitat establishment. The intermediary performance criteria have been established to serve as references to inform site management and ensure that the final success criteria are met. It will not be considered a site failure if individual performance criteria are not met. Site success will be determined by meeting or exceeding final success criteria. If the final success criteria are not met, Google or its representative will consult with the regulatory agencies to identify appropriate remedial measures.

#### 6.1.1 Long-Term Habitat Goals and Success Criteria

The long-term habitat goals of this MMP are to fully compensate for all impacts on jurisdictional areas associated with the construction of the proposed project and secondarily to provide supplemental mitigation for impacts associated with Valley Water's Flood Protection Project.

This MMP presents objective performance and final success criteria for measuring progress toward the long-term habitat goals. At maturity, the project reach will support tidal aquatic habitat within the storm drain channel, estuarine wetland habitat across the floodplains, and stable, vegetated riparian levee slopes. The target habitats will be considered to be on a successful restoration trajectory when monitoring (as described in this section) demonstrates that final success criteria have been met. It is anticipated that the mitigation site conditions (i.e., hydrology, soils, and geomorphology) and planned maintenance will support the rapid establishment of the target habitats.

#### 6.1.2 Monitoring Schedule and Process

The mitigation site will be monitored annually by a qualified biologist/ecologist over a 5-year period. Monitoring data will be collected and compared to the performance and success criteria to determine whether the mitigation site is performing adequately. Monitoring data will also inform maintenance actions and potential remedial measures needed to ensure the success of the mitigation.

Google will use the Year 5 final success criteria and an overall assessment of site performance by a qualified restoration ecologist to determine compliance with mitigation requirements and inform the regulatory agencies. If the final success criteria have not been met by Year 5, the regulatory agencies will be informed of the likely causes and proposed remedial actions, if warranted. If remedial actions are determined to be necessary, they

will be implemented following approval from the regulatory agencies and monitoring will continue until the final success criteria have been met.

## 6.2 Monitoring Performance and Success Criteria

The annual performance and final success criteria for the habitat mitigation areas are presented in Table 6. Each monitoring metric is explained in further detail in the following sections.

**Table 6. Annual Performance and Final Success Criteria**

Monitoring Metric	Year 1	Year 2	Year 3	Year 5
Estuarine Wetland				
% Wetland Plant Cover	N/A	≥10%	≥15%	≥25%
Acreage of Jurisdictional Tidal Aquatic and Estuarine Wetlands				0.99
Riparian Levee Slopes				
% Plant Cover	N/A	30%	50%	75%
Soil Stability	See description below			
Acreage of Vegetated Stable Riparian Levee Slopes				0.46

### 6.2.1 Performance and Final Success Criteria

#### 6.2.1.1 Estuarine Wetland—Percent Wetland Plant Cover

The absolute percent cover of planted and naturally recruited wetland plant species will be assessed in Years 1–5. There is no cover criterion in Year 1. Percent wetland plant cover shall show an increasing trend, as shown in Table 6 and meet the final success criterion of 25% cover in Year 5.

#### 6.2.1.2 Tidal Aquatic and Estuarine Wetland—Acreage

In Year 5, 0.99 ac of jurisdictional tidal aquatic and estuarine wetland habitats will be provided to fully compensate for project impacts. Additional jurisdictional estuarine wetland habitat within the project reach will be documented at this time and may be provided as mitigation for Valley Water’s Flood Protection Project, to be negotiated separately.

#### 6.2.1.3 Riparian Levee Slopes—Percent Plant Cover and Soil Stability

The absolute percent cover of seeded, planted, and naturally recruited plant species on the levee slopes will be assessed in Years 1–5. There is no cover criterion in Year 1. Percent plant cover will show an increasing trend (Table 6), meet the final success criterion of 75% cover in Year 5, and be adequate to support a stable soil surface without any signs of substantial erosion. Substantial erosion would include rilling or gullyng that directly deposits sediment onto the floodplains or into the storm drain channel.



#### 6.2.1.4 Riparian—Acreage

In Year 5, 0.46 ac of vegetated, stable riparian levee slopes will be provided as project mitigation. Although the entire levee slope is required to be stable, the project mitigation requirement is only 0.46 ac of riparian habitat (as described in Section 3.1 and shown on Figure 5) to compensate for impacts on ruderal riparian habitat. The area provided for this mitigation will be documented in the biological as-built report.

### 6.3 Monitoring Methods and Schedule

Monitoring will be conducted in Years 1–5 and results will be compiled in a report for submittal to the regulatory agencies by December 31 of each reporting year. Specific monitoring tasks are described below.

#### 6.3.1 Percent Wetland Plant Cover

The absolute percent cover of wetland plant species across the wetland areas will be assessed annually near the peak of the growing season (i.e., from May through July) by a qualified restoration ecologist. These cover assessments will involve a combination of direct observations, ground-level photodocumentation, high-resolution aerial imagery, or satellite imagery. If aerial or satellite imagery is used, it will be supplemented with sufficient ground-level observations to facilitate the identification of plant species.

#### 6.3.2 Riparian Levee Percent Plant Cover and Soil Stability

Ground-level visual inspections of the levee slopes will be performed quarterly by a qualified restoration ecologist as part of planned maintenance inspections, and following any large storm events that could destabilize the soil surface. The absolute percent cover of vegetation will be visually assessed and recorded, and documented with photographs. If any indicators of considerable soil loss are observed, their locations and extents will be recorded and the appropriate remedial actions will be prepared in consultation with a qualified engineer; these proposed actions will be provided to regulatory agencies for approval prior to implementation. Indicators of substantial soil instability will include, but are not limited to, rills, gullies, and/or slumps that directly deposit sediment on the floodplains or into the storm drain channel. All significant soil loss, as well as any implemented remedial actions, will be documented in annual monitoring reports.

#### 6.3.3 Acreage of Jurisdictional Tidal Aquatic and Estuarine Wetlands

A formal delineation of tidal aquatic and estuarine wetland habitats will be completed in Year 5 in accordance with the guidelines outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE 2010). Habitat acreages will be calculated from the Year 5 delineation and those acreages will be compared to the final success criteria. Habitat acreage in excess of the mitigation requirements may be provided as mitigation for Valley Water's Flood Protection Project.

#### **6.3.4 Photodocumentation**

Photodocumentation of the mitigation site will be conducted following installation (part of the biological as-built report) and in Years 1–5 during maintenance inspections and annual monitoring events. Photographs will also be taken to record any event that may substantially affect the success of the mitigation, such as flood, fire, or vandalism. The locations of photodocumentation points will be selected following mitigation implementation and will be identified in the biological as-built report.

#### **6.3.5 Site Maintenance**

Maintenance inspections will be performed at least four times per year (quarterly) in Years 1–5. A qualified restoration ecologist will inspect the site to ensure that maintenance activities are biologically appropriate and providing the best opportunity for the site to meet performance criteria. The restoration ecologist will assess the need for invasive weed control, erosion control measures, and trash and debris removal. The restoration ecologist will prepare a memorandum with recommended maintenance activities following each inspection. If remedial erosion control measures are needed, the memorandum presenting these measures will be submitted to the regulatory agencies for approval prior to implementation.

### **6.4 Reporting**

An annual monitoring report will be submitted to the regulatory agencies (i.e., USACE, CDFW, and RQWCB) by December 31 of each monitoring year. The report will include a description of the monitoring methods, a discussion of monitoring results, and a list of any management recommendations. Maps showing monitoring locations and copies of photodocumentation will be included in each report. Field data sheets will be available for review upon request.

Annual monitoring reports will be prepared in the following format:

1. Report Summary
2. Introduction
3. Methods
4. Results
5. Discussion
6. Management Recommendations
7. References
8. Appendices

## 6.5 Completion of Mitigation

At a minimum, monitoring will be conducted over a 5-year period. If the mitigation site successfully achieves the final success criteria, the Year 5 report will document completion of the project. If remedial measures were implemented and additional monitoring and reporting were required in order to meet the final success criteria, then Google will submit a letter to the regulatory agencies with the final monitoring report requesting final “sign-off” on the project.

## 6.6 Contingencies and Remedial Actions

If the failure to meet annual performance criteria or other site conditions indicate that the site will not meet final success criteria or the final success criteria are not met in Year 5, Google will prepare an analysis of the cause(s) of failure and propose remedial actions to the regulatory agencies. Google will provide funding for the planning, implementation, and monitoring of any remedial actions determined to be necessary to meet the mitigation goals. Additionally, if during the maintenance period, significant and prolonged flooding event(s) adversely affect the establishment of estuarine wetland vegetation, then an adaptive management plan will be submitted to the regulatory agencies for review. This plan will describe the impact(s) on the project and detail any planned remedial action(s). The plan will also present modified annual performance and final success criteria, if necessary.

## 6.7 Statement of Financial Commitment

Google is financially responsible for the successful implementation of this MMP. This financial responsibility extends to the long-term monitoring described herein, as well as to any proposed remedial actions.

## Section 7.0 References

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## Appendix A. Photodocumentation

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Photo 1. Project Reach Facing South (Upstream) from West Caribbean Drive



Photo 2. Culvert Opening at Downstream End of Project Reach, at West Caribbean Drive





Photo 3. Project Reach as Seen from the Existing East Levee Adjacent to Caspian Court, Facing North



Photo 4. Project Reach as Seen from the Existing West Levee Adjacent to West Caribbean Drive, Facing South