APPENDIX A

Habitat Maintenance and Monitoring Plan

H. T. HARVEY & ASSOCIATES

Ecological Consultants

Guadalupe Channel Erosion Control Project
Habitat Maintenance and Monitoring Plan

Project #2440-02

Prepared for:

City of Brisbane, California

Prime consultant:
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April 24, 2019

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Section 1.0 Introduction

This habitat maintenance and monitoring plan (MMP) was prepared by H. T. Harvey & Associates in accordance with current guidelines from the U.S. Army Corps of Engineers (USACE) South Pacific Division (USACE 2015) and supports the following City of Brisbane (City) permit applications for the Guadalupe Channel Erosion Control Project (Project).

- Regional Water Quality Control Board (RWQCB) Clean Water Act Section 401 Certification
- U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 Nationwide Permit
- San Francisco Bay Conservation and Development Commission (BCDC) New Project Permit
- California Department of Fish and Wildlife (CDFW) Service Streambed Alteration Agreement
- U.S. Fish and Wildlife Service (USFWS) Federal Endangered Species Act Section 7 Consultation

This introduction identifies the responsible parties for Clean Water Act permitting, summarizes the project, its impacts, and the proposed habitat creation being planned as part of the project. This MMP then provides details how habitats under of the jurisdiction of the RWQCB, USACE, BCDC, and CDFW will be created, maintained, and monitored, along with standards for success and the required course of action if the project's habitat creation goals are not achieved.

1.1 Responsible Parties

1.1.1 Applicant/Permittee

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1.2 Project Habitat Impacts and Creation Overview

The Project is located along Guadalupe Channel in the City of Brisbane, San Mateo County, California. The purpose of the project is to stabilize and prevent erosion in approximately 400 linear feet of the Guadalupe Channel located between Tunnel Avenue and the intersection of Bayshore Boulevard and Valley Drive (Figure 1). In the existing condition, the Guadalupe Channel banks are incised and large, decadent non-native tree limbs overhang the channel bank. The project will grade back the incised channel banks and install erosion control features to protect the Guadalupe Channel from the possibility of large, woody, non-native vegetation falling into the channel, obstructing flow, and exposing the existing earthen channel slopes to further erosion (H. T. Harvey & Associates 2018). A secondary goal of the project is to improve the function of the jurisdictional habitats in the proejct area for wildlife and water quality.

Project work will result in permanent impacts to tidal aquatic habitat (i.e., other waters) and northern coastal salt marsh habitat (i.e., wetlands) within the jurisdiction of USACE, RWQCB, CDFW, and BCDC. The project will also permanatly imapact riparian habitats under the jurisdiction of RWQCB and CDFW; specifically, ruderal California annual grassland located below the top of bank and non-native ornamental woodland riparian trees.

The City proposes to create jurisdictional habitats on-site concurrently with the project's grading and erosion control work. Specifically, the City proposes to increase the acreage of tidal aquatic, northern coastal salt marsh (salt marsh), and tidal marsh-upland transition zone (transition zone) habitats located below the top of bank in the project area. The city will also establish native riparian trees and shrubs below and above the top of bank along Guadalupe Channel in the project area to replace the portion of non-native trees that will be removed from within the jurisdictional ornamental woodland (riparian) habitat. The salt marsh, transition zone, and oak woodland habitats will be revegetated using a combination of seeding and planting in the fall and winter immediately following completion of earthwork. All project work is expected to occur during the period of June 15 to October 15, 2020 with the exception of native container plant installation which will occur after the onset of the rainy season.

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Figure 1. Project Vicinity
Guadalupe Channel Erosion Control Project
Maintenance and Monitoring Plan (2440-02)
April 2019

Section 2.0 Jurisdictional Habitat Impact Areas

This section describes and quantifies the project's impacts on habitats under the jurisdiction of USACE, RWQCB, BCDC, and CDFW. Project impacts and the proposed habitat creation activities are summarized in Table 1. The locations of impacted habitats are shown on Figure 2. The minimum proposed area of habitat creation is shown in Table 1. The proposed replacement ratios for tree and shrub impacts are provided in Table 2. The project impacts and proposed habitat creation activities are discussed further in sections 2 and 3, respectively.

2.1 Project Impacts

2.1.1 Project Description

The project will grade the Guadalupe Channel bed and banks, install geoweb for erosion control below the top and bank, then backfill the geoweb and revegetate the project area. Construction will begin with vegetation clearing and grubbing within the impact areas shown on Figure 2. A small steel sheet pile retaining wall on the northern bank of the Guadalupe Channel will also be removed. Next, the Guadalupe channel slopes, which have been incised to near vertical in some locations, will be graded to a 2:1 slope ratio (i.e., 2 feet in horizontal distance for every 1 foot in vertical distance) except for the northern slope immediately east of the culvert outfall where the sheet pile retaining wall is removed. There, a benched geoweb retaining wall (geoweb retaining wall) with a 1:1 slope ratio will be installed (Figure 3). During grading, most of the channel slopes will be cut back, but some fill will also be required to create topographically smooth channel banks, which is necessary for geoweb installation (Figure 4).

In conjunction with the grading work, sediment will be excavated from the bottom of Guadalupe Channel to prepare the channel subgrade for geoweb installation. Sediment will also be excavated from a concrete-lined box culvert beneath Bayshore Boulevard, and from an upstream concrete collection basin (Figure 2). Water flows within the Guadalupe Channel will be temporarily diverted using a coffer dam to allow access to Guadalupe Channel, the culvert, and the sediment collection basin.

A geoweb will then be placed on the 2:1 channel slopes of the Guadalupe Channel starting at the top of bank[1] and across the channel bottom subgrade. The geoweb is a 6 inch deep plastic reinforcing web with approximately 9 inch by 9 inch openings filled with soil or rock that will blanket the ground surface to prevent erosion, while allowing water infiltration and vegetation growth. On the channel banks above mean high water[2] (MHW), the geoweb will be backfilled with excavated and salvaged on-site soil to allow tidal marsh and upland vegetation to establish and root into the channel slopes. Rock will be used to fill the geoweb on the channel slopes below MHW down to the toe of slope in the channel to prevent erosion and earthen scour. The geoweb

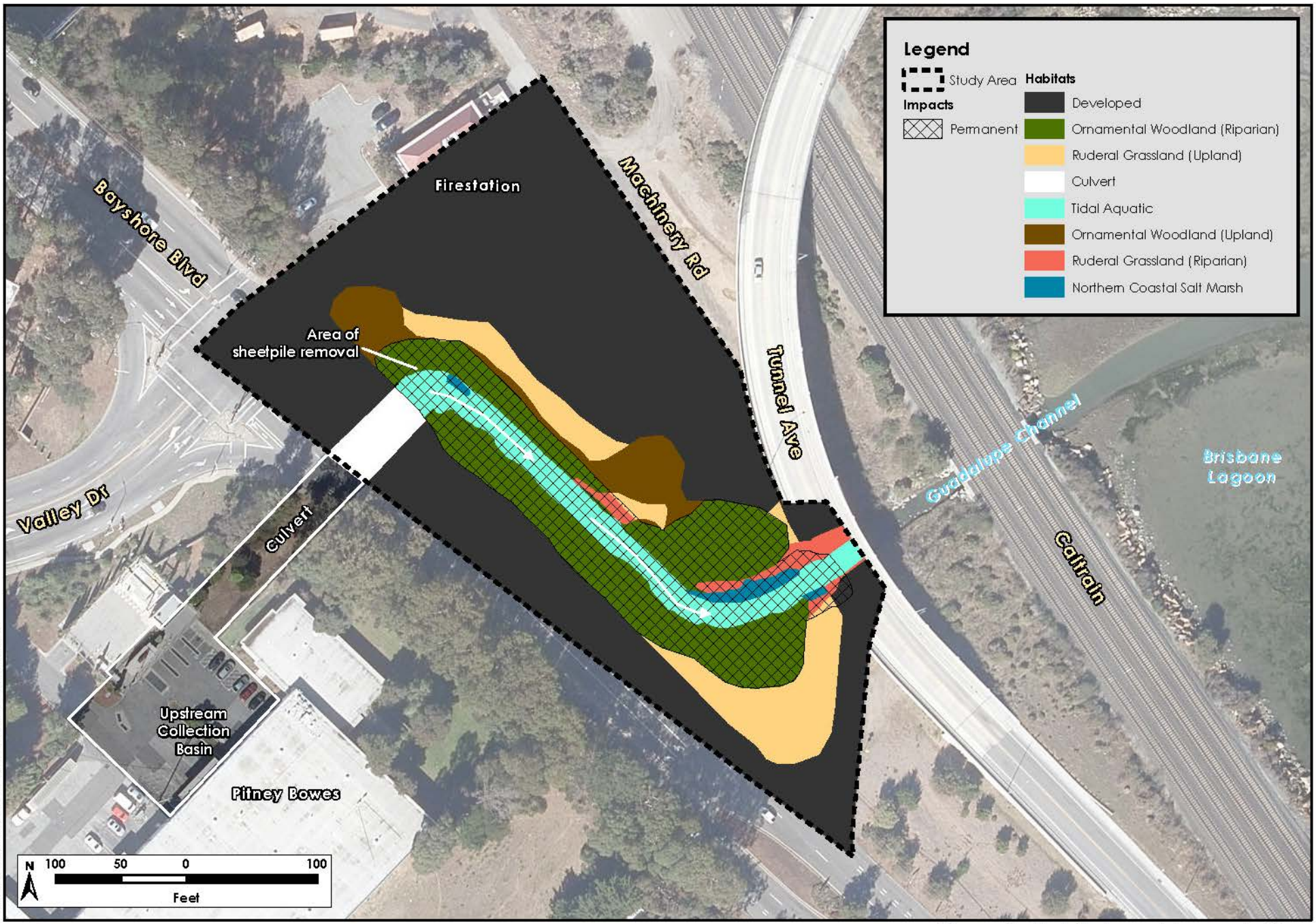
[1] Top of bank is situated at approximately 10.7 feet NAVD88
[2] Mean High Water (MHW) is situated at approximately 5.2 feet NAVD88 in the project area.

in the channel bottom will be backfilled with salvaged on-site soil. Then, an additional 1.1 foot deep layer of salvaged on-site soil will be placed above the geoweb on the channel bottom to establish an earthen channel bottom.

Following soil excavation and salvage, channel grading and geoweb application, the channel side slopes and riparian impact area above the top of bank will be revegetated with native plants, as described in Section 3.

Table 1. Jurisdictional Habitat Impacts and Proposed Habitat Creation

Permitting Agency	Habitat Type Impacted	Project Impacts	Proposed Minimum Habitat Creation to Impact Ratio	Proposed Minimum Habitat Creation Area
USACE and BCDC	Northern coastal salt marsh	Permanent loss of 0.02 acres (via channel grading)	2:1	Creation of at least 0.04 acres of northern coastal salt marsh on graded channel banks above mean high water (MHW)
	Tidal Aquatic	Permanent loss of 0.18 acres (via channel grading and installation of rock slope protection on banks below high tide line (HTL))	1.1:1	Creation of 0.19 acres of tidal aquatic habitat below HTL
RWQCB and CDFW	Northern coastal salt marsh	Permanent loss of 0.02 acres (via channel slope grading)	2:1	Creation of at least 0.04 acres of northern coastal salt marsh on graded channel banks above MHW
	Tidal Aquatic	Permanent loss of 0.18 acres (via channel grading and installation of rock slope protection on banks below HTL)	1.1:1	Creation of 0.19 acres of tidal aquatic habitat below HTL
	Riparian Ornamental Woodland	Removal of 74 primarily non-native riparian trees and shrubs located above and below the top of bank	See Table 2	Establishment of at least 69 native riparian trees and shrubs located above and below the top of bank
	Riparian California Annual Grassland	Permanent loss of 0.03 acres below top of bank (via channel slope grading)	2:1	Creation of at least 0.06 acres of salt marsh-upland transition zone habitat below top of bank on graded channel banks



N:\Projects\2440-02\Reports\MMP\Fig 2 Habitats and Impacts Map.mxd

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Figure 2. Habitats and Impacts Map

Guadalupe Channel Erosion Control Project Maintenance and Monitoring Plan (2440-02)
April 2019

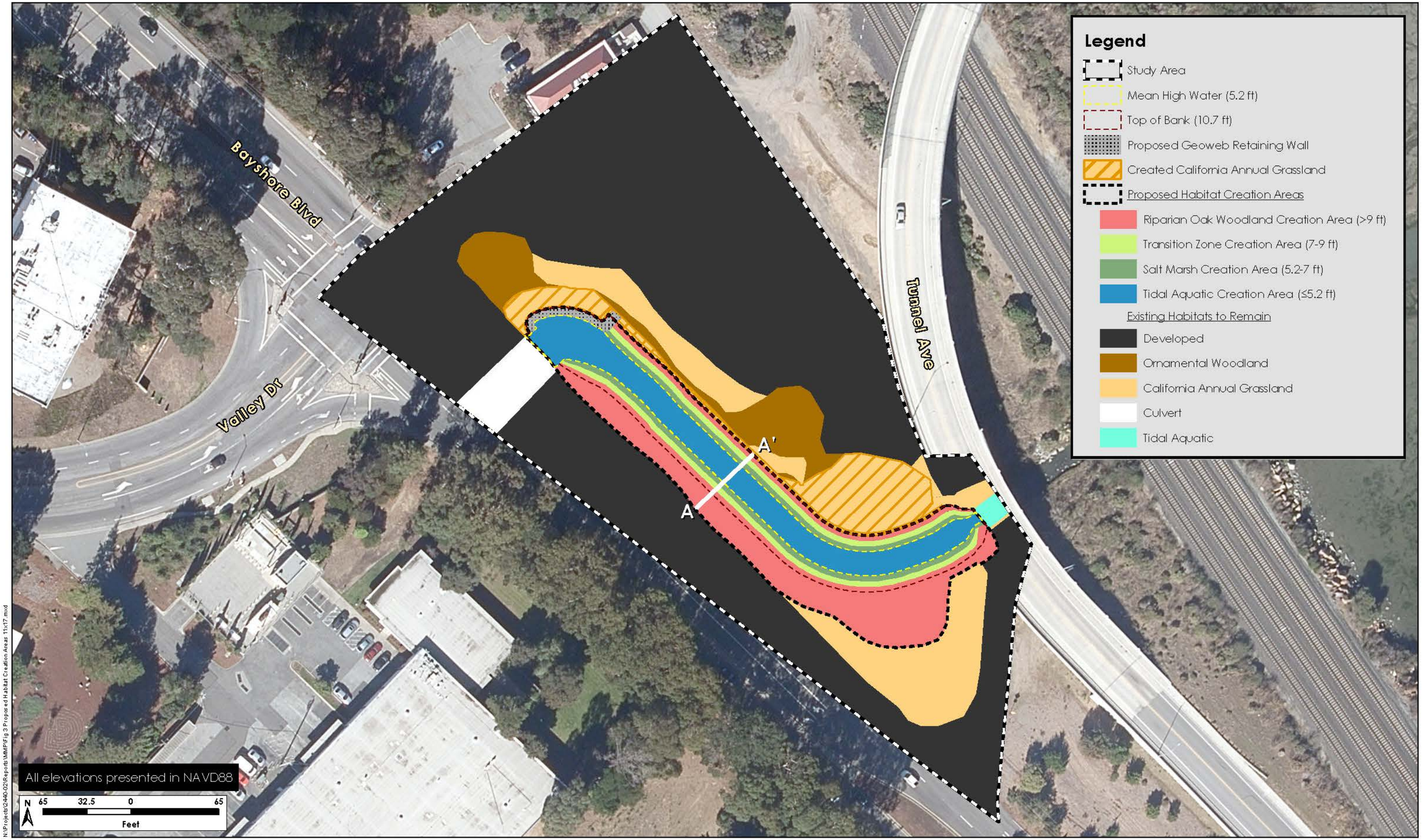

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Figure 3. Proposed Habitat Creation Areas
Guadalupe Channel Erosion Control Project Maintenance and Monitoring Plan (2440-02)
April 2019

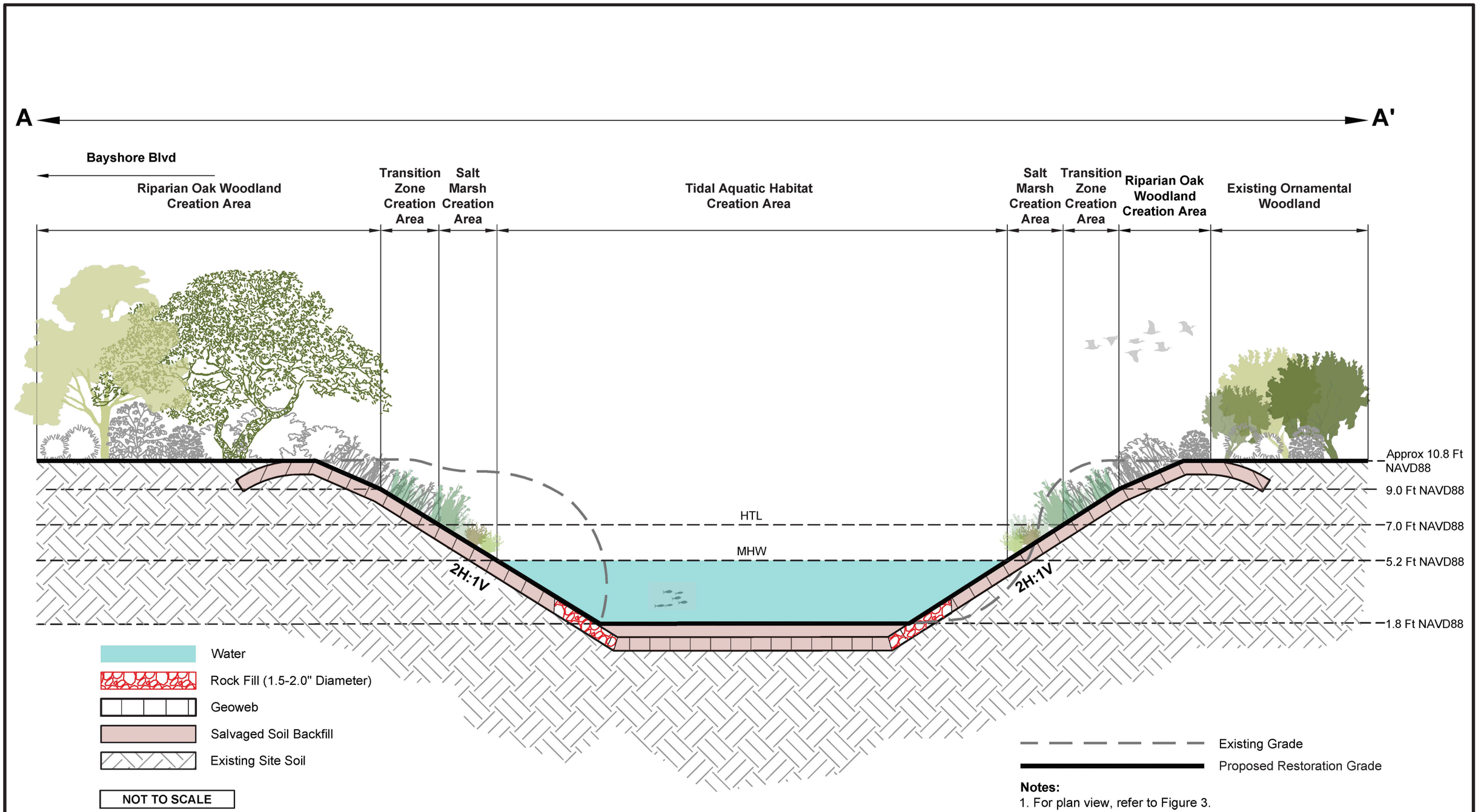

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Figure 4. Habitat Creation Areas-Cross Section
Guadalupe Channel Erosion Control Project Maintenance and Monitoring Plan (2440-02)
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Table 2. Proposed Tree and Shrub Replacement Ratios

Size of Removed Tree (inches diameter at 2 feet above ground surface)	Native Tree (replacement to loss)	Non-native Tree (replacement to loss)	Non-native Invasive Tree (replacement to loss)
< 6	1:1 (2:1 for oaks)	0.5:1	0
6 - 11	2:1 (4:1 for oaks)	1:1	0.5:1
12 - 17	3:1 (6:1 for oaks)	2:1	0.5:1
> 17	5:1 (10:1 for oaks)	2:1	0.5:1

2.1.2 Permanent Impacts

2.1.2.1 Tidal Aquatic Habitat

Tidal aquatic habitat is located below MHW along Guadalupe Channel. Permanent impacts will occur on tidal aquatic habitat through channel grading and installation of the geoweb (Table 1). After geoweb installation, 1.5-2 inch diameter rock will be installed in the geoweb and geoweb retaining wall cells below MHW. Salvaged soils from the project area will be placed over the geoweb in the channel invert so the channel bottom remains earthen. By decreasing the slope of the channel banks, grading will expand the area of tidal aquatic habitat (Table 1). Aquatic habitat conditions within the channel will return to pre-project or better condition shortly after tidal flows resume. Additionally, water quality within the tidal aquatic habitat will be improved through reduced erosion owing to the reduction in bank slope, the geoweb and rock slope protection, and active revegetation of dense cover above MHW.

2.1.2.2 Northern Coastal Salt Marsh

Salt marsh habitat will be impacted through vegetation removal, grading, and geoweb placement (Table 1; Figure 2). However, because the banks will be laid back to a 2:1 slope rather than the near vertical existing slope and because tidal marsh will be able to establish within the geoweb cells, the project will restore a greater area of salt marsh following channel grading, as described in Section 3.

2.1.2.3 Riparian California Annual Grassland

Ruderal California annual grassland located below the top of bank will be impacted through vegetation removal, grading, and geoweb placement (Table 1). This area will be restored as a transition zone habitat and planted with native forbs, grasses, and sub-shrubs, as described in Section 3.

2.1.2.4 Ornamental Woodland Riparian

Approximately 0.64 acres of riparian ornamental woodland, including canopy that overhangs the area beyond top of bank, will be impacted through vegetation removal, grading, and geoweb placement (H. T. Harvey & Associates 2018). The riparian ornamental woodland is dominated by non-native and invasive, non-native trees. Table 3 lists the species, number, and size class of trees that will be removed by the project.

2.2 Temporary Impacts

Aside from dewatering of the Guadalupe Channel, no temporary impacts to jurisdictional habitats are anticipated. All impacts are considered permanent, as described in the section above.

Table 3. Trees to be Removed and Replaced by the Project

Common Name	Species Name	Size Class	Number of Trees Removed	Invasive, Non-native, or Native	Replacement Ratio (number replacement trees: number impacted trees)	Native Tree and/or Shrub Replacement Requirement
Lollipop tree	*Myoporum laetum*	<6 inches	1	Moderate invasive	0:1	0
Lollipop tree	*Myoporum laetum*	> 6 inches	28	Moderate invasive	0.5:1	14
Blue gum	*Eucalyptus globulus*	< 6 inches	2	Non-native	0.5:1	1
Blue gum	*Eucalyptus globulus*	6 – 11 inches	2	Non-native	1:1	2
Blue gum	*Eucalyptus globulus*	> 11 inches	9	Non-native	2:1	18
California buckeye	*Aesculus californicus*	6 – 11 inches	3	Native	2:1	6
Ornamental conifer		12 – 17 inches	1	Non-native	2:1	2
Blackwood acacia	*Acacia melanoxylon*	< 6 inches	5	Invasive	0:1	0
Blackwood acacia	*Acacia melanoxylon*	> 6 inches	12	Invasive	0.5:1	6
Privet	*Ligustrum sp.*	6 – 11 inches	2	Non-native	1:1	2
Mexican fan palm	*Washingtonia robusta*	> 18 inches	1	Non-native	2:1	2
Coast live oak	*Quercus agrifolia*	6 – 11 inches	1	Native	4:1	4
Coast live oak	*Quercus agrifolia*	12 – 17 inches	1	Native	6:1	6
Toyon	*Heteromeles arbutifolia*	12 – 17 inches	1	Native	3:1	3
Cotoneaster	*Cotoneaster sp.*	< 6 inches	5	Non-native	0.5:1	3
		Totals	**74**			**69**

2.3 Existing Conditions in Impact Areas

2.3.1 Hydrology and Topography

The Guadalupe Channel is an eastward-flowing tidally-influenced stream located within the Guadalupe Valley Watershed. The Guadalupe Channel is fed by runoff from San Bruno Mountain (H. T. Harvey & Associates 2018). Guadalupe Channel is tidally connected to San Francisco Bay via Brisbane Lagoon. Tides at the project site are muted relative to San Francisco Bay because the tidal flushing of Brisbane Lagoon is muted via culverts passing under Highway 101 between Brisbane Lagoon and San Francisco Bay. On October 4, 2018, an H. T. Harvey & Associates restoration ecologist measured the elevation of tidal marsh vegetation at the project site and estimated that MHW at the project site is approximately 5.2 feet NAVD88. Soil is sufficiently wetted upslope via tides and freshwater input to allow tidal marsh to extend to approximately 7.0 feet NAVD88 in Guadalupe Channel, which is the approximate elevation of the high tide line observed of October 4, 2018 (Figure 4).

The project area has relatively flat topography immediately adjacent to Guadalupe Channel. Elevations in the project area range from approximately 2 feet NAVD88 in the channel bottom to about 11 feet NAVD88 at the top of bank. Between Bayshore Boulevard and Machinery Road bridge, the Guadalupe Channel banks are steep and unreinforced except for sheet piles that form the left bank along the bend at the north end of the project area, just east of Bayshore Boulevard.

2.3.2 Soils

Soils on the site were analyzed via County soil survey maps. The soils in the project area are mapped as Urban land-Orthents, reclaimed complex, 0 to 2 percent slopes. Urban land and orthents soils are defined as well drained mixed alluvium that are nonsaline and consist mostly of urban land soil composition. The typical soil prolife is variable texture soil from 0-3 feet below ground surface and silty clay from 3-5 feet below ground surface (Natural Resources Conservation Service Web Soil Survey 2019). A cursory soils investigation by an H. T. Harvey & Associates restoration ecologist on October 4, 2018 found that the soil in the riparian area is compacted in the upper 2 feet.

2.3.3 Vegetation

The salt marsh in the study area is limited to the slopes of Guadalupe Channel, between MHW and the high tide line, where wetting of the root zone occurs on a regular basis via tidal action. The horizontal width of this zone is narrow, ranging from approximately 4-8 feet wide in the higher quality habitat near Machinery Way, and transitioning to small discontinuous patches upstream along the eastern bank (Figure 2). This habitat is dominated by pickleweed, with lesser but still significant amounts of alkali heath (*Frankenia salina*) and invasive Russian thistle (*Salsola soda*). No vegetation is present in the Guadalupe Channel below MHW.

The ornamental woodland is most dense along the west side of Guadalupe Channel. The habitat is dominated by non-native ornamental species, including lollypop tree (*Myoporum laetum*), blue gum (*Eucalyptus globulus*), and

blackwood acacia (*Acacia melanoxylon*). The understory is sparse and is almost exclusively English ivy (*Hedera helix*). The California Invasive Plant County (Cal-IPC) ranks English ivy as being highly invasive. It ranks lollypop tree as moderately invasive, with blue gum and blackwood acacia given a limited rating. A small component of native tree and shrub species do occur in the ornamental forest (less than 1% of habitat area), and include coast live oak (*Quercus agrifolia*), toyon (*Heteromeles arbutifolia*), and California buckeye (*Aesculus californica*).

Ruderal (i.e., disturbed) California annual grassland habitat occurs along below the top of bank (Figure 2) and consists primarily of wild oat (*Avena fatua*), ripgut brome (*Bromus diandrus*), and hairy vetch (*Vicia villosa*). This habitat is substantially manipulated and in many areas is covered in a dense layer of mulch.

2.3.4 Wildlife

Guadalupe Channel does not provide high-quality habitat for any state or federally listed species, nor are any such species expected to use the channel frequently or in large numbers, if at all. Ostensibly suitable foraging habitat for the federally endangered Central California Coast steelhead (*Oncorhynchus mykiss*) and the California state endangered longfin smelt (*Spirinchus thaleichthys*) is present in the channel; however, neither species is expected to occur except as occasional, infrequent strays, and there is no spawning habitat for either species in the channel or upstream of the channel.

Generalist species such as the mallard (*Anas platyrhynchos*), great blue heron (*Ardea herodias*), California towhee (*Melozone crissalis*), black phoebe (*Sayornis nigricans*), and common raven (*Corvus corax*) may use the salt marsh habitat present along Guadalupe Channel. The California vole (*Microtus californicus*), often the most common small mammal species found in salt marshes in the region, may occur, and the western harvest mouse (*Reithrodontomys megalotis*) and deer mouse (*Peromyscus maniculatus*) may also be present. In addition, the belted kingfisher (*Megaceryle alcyon*) and generalist wading birds such as great blue herons, great egrets (*Ardea alba*), and snowy egrets (*Egretta thula*) may forage for fish and other prey in the Guadalupe Channel. Ducks, including the mallard, may also forage on aquatic invertebrates and aquatic plants in this habitat. Black phoebes forage along the banks of the channel; old, unoccupied phoebe nests were discovered during the reconnaissance survey on the Caltrain bridge just downstream of the study area, as well as just inside one of the Guadalupe Channel tunnels under Bayshore Boulevard. The Pacific treefrog (*Hyliola regilla*) and western toad (*Anaxyrus boreas*) may also occur in less brackish portions of the channel.

Few species of reptiles and amphibians occur in the California annual grassland below the top of bank due to its disturbed nature and low habitat heterogeneity. Nevertheless, reptiles such as the western fence lizard (*Sceloporus occidentalis*) and gopher snake (*Pituophis melanoleucus*) occur in this habitat type. Smaller amphibians such as the Pacific treefrog, which require freshwater marshes to breed in, are expected to occur in the study area and could use this habitat. Small mammals expected to be present include the native western harvest mouse and nonnative house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), and black rat (*Rattus rattus*). Small burrowing mammals, such as the Botta's pocket gopher (*Thomomys bottae*) and California ground squirrel

(*Spermophilus beecheyi*), may also be present, and larger mammals, such as the striped skunk (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*), and raccoon (*Procyon lotor*) are likely to occur here.

The riparian woodland provides foraging habitat for chestnut-backed chickadees (*Poecile rufescens*), hooded orioles (*Icterus cucullatus*), and yellow-rumped warblers (*Setophaga coronata*), and foraging and nesting habitat for Anna's hummingbirds (*Calypte anna*). The low structural diversity of the woodland within the study area (i.e., the absence of dense understory and sub-canopy vegetation) and the paucity of native vegetation limits the likelihood that it might be used by riparian-obligate species. Nevertheless, a number of more ubiquitous wildlife species inhabit this woodland, including mammals such as the raccoon and striped skunk. Raptors, such as red-tailed hawks (*Buteo jamaicensis*) and red-shouldered hawks (*Buteo lineatus*), may nest in these ornamental woodlands.

Section 3.0 Wetland and Riparian Habitat Creation Approach

3.1 Overview of Proposed Habitat Creation for Project Impacts

The package of habitat creation activities described in this MMP was developed to compensate for permanent impacts to jurisdictional habitats resulting from the project as summarized in Table 1.

3.1.1 Permanent Impacts

The project will permanently convert the earthen side slopes in Guadalupe Channel below MHW (aquatic habitat) to rock lined channel aquatic habitat. The Guadalupe Channel invert (channel bottom) below the toe of slope will remain earthen, while the toe of slope below MHW will consist of rock. The city proposes to mitigate this permanent impact through on-site tidal aquatic habitat creation by enlarging and re-grading the impacted channel. The project will increase the area of aquatic habitat in the channel (Table 1) by laying back channel banks. It will also reduce potential for continued erosion by installing geoweb on the channel banks, filling the geoweb with rock below MHW, and revegetating the channel side slopes above MHW. The project will substantially improve the quality and native diversity of vegetated habitat upslope of the channel, which will improve the quality of the habitat for wildlife.

Grading will impact small areas of salt marsh and California annual grassland below the top of slope (Table 1). To offset this loss, the city will restore a greater area of salt marsh and transition zone than was impacted. The restored salt marsh will have increased plant species diversity and will be more stable than the current habitat, which is tenuously established on the steep, incised channel banks. Above the tidal marsh, the transition zone will have increase native species diversity and provide greater foraging opportunities for wildlife than the existing California annual grassland. The city proposes to monitor the tidal marsh, transition zone and aquatic habitat for a period of 5 years to document its establishment.

The project will also result in the permanent loss of non-native ornamental woodland riparian habitat. The city proposes to mitigate for this loss concurrently with project impacts through on-site creation of riparian oak woodland habitat located above and below the top of bank in the project area. The city proposes to replace the non-native canopy with native riparian shrubs and trees based on the ratios in Table 2 and provide monitoring for 10 years after installation to demonstrate that the habitat establishes sufficient canopy cover.

3.2 Basis of Design

The following section explains the goals, location, and rationale for the types of the proposed habitat creation.

3.2.1 Habitat Creation Goals

The goal of the habitat creation package is to establish a combination of the following habitat types:

- Tidal aquatic habitat with an earthen channel bottom and stable channel banks
- Salt marsh habitat dominated by native salt marsh vegetation
- Transition zone habitat dominated by non-invasive grasses, forbs and subshrubs
- Riparian oak woodland habitat dominated by native trees and shrubs

These created habitats will be self-sustainable without human intervention following attainment of the success criteria set forth in Section 6 below. The locations of the proposed habitat creation areas are provided in Figures 3 and 4. The proposed mosaic of habitats will greatly increase the abundance and diversity of native plant species in the project area and enhance foraging habitat for native wildlife. The stabilized channel banks will improve water quality by reducing sediment inputs.

3.2.2 Tidal Aquatic Habitat Creation Area

The goal of the tidal aquatic habitat creation area (Figures 3 and 4) is to provide improved water quality within the Guadalupe Channel through bank stabilization, by reduction of bank slope, and establishment of native riparian vegetation above MHW. To achieve these goals, the geoweb on the channel side slopes below MHW will be backfilled with small rock to stabilize the soil along the channel banks and prevent erosion and sedimentation into the channel. The channel invert will remain earthen. Conditions within the channel will return to pre-project or better condition shortly after reintroduction of tidal action.

3.2.3 Salt Marsh Creation Area

Salt marsh will be established from MHW up to the high tide line where the geoweb is backfilled with salvaged soil and regular tidal inundation occurs (Figures 3 and 4). The goal in the salt marsh creation area is to rapidly establish moderately dense cover of native tidal marsh plant species common in San Francisco Bay. The created salt marsh will provide a more contiguous and wider band of habitat along the channel than the existing condition. In addition, the created marsh will be bordered upslope by a vegetated transition zone which is currently devoid of transition zone habitat. This will substantially improve the ecological function of the salt marsh in the project area by virtue of expanding the extent of salt marsh, by improving upslope vegetation cover and hence stream bank stability and water quality, and will provide greater wildlife habitat value.

3.2.4 Transition Zone Creation Area

For the purpose of this report, the term "transition zone" refers to the vegetation zone of transition from tidal salt marsh to upland riparian vegetation. The transition zone will be established from the high tide line up to the riparian oak woodland creation area (two vertical feet). The goal for the transition zone creation area is to establish a dense transition zone dominated by salt tolerant native rhizomatous grasses, forbs, and subshrubs. Non-native salt tolerant grasses and forbs are expected to persist as well. This habitat will create a vegetated buffer and high tide refuge for wildlife species that utilize the marsh, increase plant diversity, and increase foraging opportunities for wildlife, including for insect pollinators, relative to the existing condition.

3.2.5 Riparian Oak Woodland Creation Area

The impacted non-native canopy will be replaced with a native riparian tree and shrub canopy using at the replacement quantity per Table 3. The riparian planting area will begin approximately 2 feet above the high tide line to avoid placing plantings in areas that may be occasionally inundated with saline tidal water during winter high stream flow events (Figures 3 and 4). Inflexible shrubs and trees planted below the top of bank would increase the potential for debris snags and flooding in the channel. Therefore, flexible, native woody shrubs will be established below the top of bank to provide a contiguous canopy with trees and shrubs above the top of bank. Above the top of bank, a mixture of native trees and shrubs will be planted. Native grasses and forbs will be seeded in the understory of the riparian oak woodland creation area, but non-native annual grassland is expected to persist in the understory in the long term. The goal for the riparian habitat is to, over time, provide a diverse, native, multistoried tree and shrub canopy. Achievement of this goal will substantially improve the ecological function of the riparian area and provide greater wildlife habitat value in synergy with the improvements to stream bank stability and water quality. While some temporal riparian habitat loss will occur in the time period between the impact of grading activities and the maturation of created riparian oak woodland habitat, the increase in ecological function of the system provided by the creation will offset the effects of the temporal impacts.

3.3 Projected Conditions in the Habitat Creation Areas

3.3.1 Topography and Hydrology

The slope of the Guadalupe channel will be converted from incised, steep banks, to a 2:1 slope, as shown in Figure 4. The created salt marsh will be sustained by regular tidal events and occasional high flow channel events. Overall, hydrology in the salt marsh and aquatic habitats will be comparable to the pre-construction condition. Transition zone vegetation will be sustained by incidental precipitation and occasional high flood flow events. Following cessation of irrigation, incidental precipitation and possibly occasional periods of elevated winter groundwater will provide the soil moisture needed to sustain the riparian oak woodland habitat.

3.3.2 Soils

The habitat creation areas will be constructed with onsite soil material, with the exception of the tidal channel from MHW to the toe of slope, which will be small rock. In upland areas where the grading plan requires fill, soil will be derived from on-site soil excavated from above the high tide line. In the created channel, soil placed in the invert will be derived either from existing wetland surface soil located below MHW, or will meet the RWQCB's standards for placement in wetlands (RWQCB 2000). After channel grading and prior to placement of the geoweb, soil on the channel side slopes above MHW will be decompacted to a depth of 1 foot and, if necessary, amended to achieve minimum horticultural requirements for percent organic matter, pH and calcium to magnesium ratio. Similarly, soils above the top of bank will be decompacted to a depth of 1.5 feet and, if necessary, amended to achieve minimum horticultural requirements.

3.3.3 Wildlife

Wildlife species using the project area are expected to benefit from the creation of the northern coastal salt marsh, tidal aquatic habitat, riparian oak woodland, and a transition zone between the northern coastal salt marsh and the riparian oak woodland.

The project will replace the existing approximately 0.02 acres of northern coastal salt marsh habitat with approximately 0.07 ac of northern coastal salt marsh habitat that will be of higher quality than the existing habitat. The created salt marsh, although still small, will provide a more contiguous band of habitat along the channel than currently exists, and will be bordered upslope by a native dominated ecotone (transition zone) where currently none is present. This will substantially improve the ecological function of the salt marsh in the project area by virtue of expanding the extent of salt marsh, by improving upslope vegetation cover and hence stream bank stability and water quality, and will provide greater wildlife habitat value. While no special status wildlife species are expected to use the existing or created salt marsh habitat, more common wildlife species known to occur in the adjacent habitats are expected to benefit from the creation of this habitat; these include the black phoebe, mallard, snowy egret, great egret, and great blue heron..

The creation of the tidal aquatic habitat in the channel itself is expected to benefit common wildlife species that may currently use the channel. Bank stabilization, reduction in soil erosion and sedimentation, and improved water quality are expected to greatly improve the quality of the tidal aquatic habitat. Fish species that may occur in the channel will likely benefit from the improved habitat quality present in the channel following creation. Other species expected to benefit from channel creation include birds such as the black phoebe, which is known to forage along the channel and to nest in the project area, as well as the great egret, snowy egret, great blue heron, mallard, and belted kingfisher. Amphibians such as the Pacific treefrog and western toad are also expected to benefit from the less brackish portions of the created channel.

Conversion of the existing riparian woodland into an riparian oak woodland is also expected to benefit wildlife. Cedar wawxwings and American robins, among other wildlife, will benefit from the establishment of blue elderberry (*Sambucus nigra*), California blackberry (*Rubus ursinus*), thimbleberry (*Rubus parviflorus*), and toyon. Coast live oaks provide food, in the form of acorns for species such as California scrub-jays (*Aphelocoma californica*), and cover and foraging habitat for other wildlife, such as chestnut-backed chickadee, western screech-owl (*Megascops kennicottii*), Townsend's warbler (*Setophaga townsendii*), yellow-rumped warbler (*Setophaga coronata*), northern flicker (*Colpates auratus*), and bushtit (*Psaltriparus minimus*). Western fence lizards will also likely benefit from the creation of additional foraging habitat. The value of this woodland is expected to increase as it matures, and becomesa structurally diverse native woodland that can provide higher quality habitat for native wildlife than currently exists in the non-native dominated riparian woodland.

Finally, the transition zone that will be created between the northern coastal salt marsh and the riparian oak woodland will also provide habitat for common wildlife species that are expected to occur in the created northern coastal salt marsh and the adjacent oak wooland.

Section 4.0 Habitat Creation Work Plan

This section describes the proposed habitat creation work plan required to achieve the target habitat conditions described in Section 3.

4.1 Topsoil Handling Plan

The project's grading plan calls for channel banks and areas above the top of bank to be both excavated and filled to reach the desired grade. In addition, horticulturally suitable soil will be needed to fill the upper 6 inches of the geoweb cells on the channel side slopes above MHW. Fill soil will be generated onsite from grading work. To ensure that the topsoils constructed in tidal marsh, transition zone, and riparian oak woodland creation areas are horticulturally suitable for planting, a topsoil handling plan will be prepared, approved by a qualified soils restoration ecologist and integrated into the project's earthwork construction requirements.

The topsoil handling plan will be prepared to match horticulturally suitable areas of excavated soils to areas needing topsoil fill and to recommend amendments, if needed. The topsoil handling plan will be based upon topsoil sampling and testing results and will exclude material that has excess gravel, rock or substantial horticultural suitibliy issues. The topsoil handling plan will also determine whether amendments for organic matter, pH, or calcium to magnesium ratio in the upper 1.5 feet are necessary to sustain the habitat creation plantings. Soil treatments, including screening topsoil to reduce gravel/rock content, and horticultural amendments for the project's native plant palette will be specified. The upper 1.5 feet of onsite soil (i.e., topsoil) will be sampled and tested prior to grading to inform preparation of the topsoil handling plan. The goal of the topsoil plan will be to achieve the horticultural soil properties in Table 4 in the upper 1.5 feet of the habitat creation areas above MHW.

Table 4. Target Soil Horticultural Properties in the Upper 1.5 Feet of the Salt Marsh, Transition Zone, and Riparian Oak Woodland Habitat Creation Areas

Constituent	Test Method	Minimum	Maximum
Clay (0-0.002 mm)	USDA round hole sieves and hydrometer procedure	10%	55%
Slit (0.002-0.05 mm)	USDA round hole sieves and hydrometer procedure	10%	80%
Sand (0.05-2.0 mm)	USDA round hole sieves and hydrometer procedure	10%	70%
Gravel (2-12mm)	USDA round hole sieves and hydrometer procedure	0%	10%
Rock (up to 1 inch diameter)	USDA round hole sieves and hydrometer procedure	0%	10%
Organic matter (by weight of soil)	Dichromate reduction using Walkley Black method	2%	5%
Electrical conductivity[1]	Saturation extract method using Wheatstone Bridge method	0	3.0 dS/m @ 25 degrees
pH	Soil paste method and pH meter	6.5	8.0

Constituent	Test Method	Minimum	Maximum
Calcium to magnesium ratio	1N sodium chloride extract and measure via atomic absorption	3:1	NA
Sodium adsorption ratio	Calculate from soil extract values for calcium, magnesium, and sodium	0	15
Boron	Saturation extract method using ICP	NA	<2 ppm

[1] In the salt marsh, electrical conductivity, boron and percent clay may exceed these limits with review and approval from the monitoring restoration ecologist.

The soil handling plan will also determine the soil handling approach so that channel invert soil is derived from below the high tide line. If the soil in the channel invert must be derived from on-site upland soil, it will be tested for chemical contaminants to ensure it meets the RWQCB contaminant screening criteria for wetland surface material to protect aquatic life in RWQCB 2000.

4.2 Tidal Aquatic Habitat Creation Area

4.2.1 Target Habitat

The target habitat in the tidal aquatic habitat creation area is a stable tidal channel with an earthen channel bottom and slopes that are resistant to erosion.

4.2.2 Channel Design

The geoweb in the tidal channel from MHW to the toe of slope will be backfilled with rock 1.5-2 inches in diameter. Below the toe of slope the geoweb in the channel invert will be backfilled with soil. An additional 1.1 feet of of soil will be placed over the backfilled geoweb in the channel bottom. After fill placement, the elevation of the channel bottom will be 1.8 feet NAVD88.

4.3 Salt Marsh Creation Area

4.3.1 Target Habitat

The target habitat in the salt marsh creation area is dense perennial pickleweed (*Salicornia pacifica*) interspersed with a diverse range of common native salt marsh plants that thrive between MHW and the high tide line in the tidal marsh around Brisbane Lagoon and the San Francisco Bay.

4.3.2 Soil Preparation

The Guadalupe Channel side slopes above MHW will be decompacted to a depth of 12 inches prior to geoweb installation. The upper 12 inches of soil below the geoweb will be amended if needed to improve horticultural soil conditions as described in section 4.1. Following goeweb placement, the geoweb cells (6 inches deep) will be backfilled with horticulturally suitable soil that has a similar texture as the upper 12 inches below the geoweb.

4.3.3 Planting

Following soil preparation and backfill of the geoweb, the salt marsh creation area will be established by densely planting tidal marsh container plants into the soil-filled geoweb cells. Plants will be installed across a two foot vertical range from MHW to the approximate high tide line (Figure 4). Planted species will include the common marsh plants listed in Table 5. The goal of the planting spacing in Table 5 is to install 1 plant in each geoweb cell.

Table 5. Salt Marsh Creation Area Planting Palette

Scientific Name	Common Name	Percent Composition	Planting Spacing	Container Size[1]
Distichlis spicata	saltgrass	10	9 inches	TB2
Frankenia salina	alkali heath	10	9 inches	TB2
Grindelia stricta	marsh gumplant	10	9 inches	D40
Jaumea carnosa	marsh jaumea	5	9 inches	TB2
Limonium californicum	marsh rosemary	5	9 inches	TB2
Salicornia pacifia	perennial pickleweed	60	9 inches	D16

[1] For explanation of container sizes see The Watershed Nursery: https://www.watershednursery.com/nursery/container-explanation/

4.4 Transition Zone Creation Area

4.4.1 Target Habitat

The target habitat in the transition zone creation area is dense native and non-native grass, forb and sub-shrub cover to form a vegetated buffer between the salt marsh and the riparian oak woodland habitats.

4.4.2 Soil Preparation

The transition zone creation area will be prepared as described for the salt marsh creation area.

4.4.3 Planting and Seeding

The transition zone creation area will be established using a combination of seeding and planting. In the two vertical feet above the salt marsh, the salt-tolerant forbs, grasses, and subshrubs in Table 6 will be planted in each geoweb cell. To create conditions for strong competition with non-native upland weeds, the transition zone will be seeded using the seed mix in Table 7.

Table 6. Transition Zone Creation Area Planting Palette

Scientific Name	Common Name	Percent Composition	Planting Spacing	Container Size[1]
Ambrosia psilostachya	western ragweed	10	9 inches	D16
Baccharis glutinosa	marsh baccharis	10	9 inches	D16
Distichlis spicata	saltgrass	20	9 inches	D16

Scientific Name	Common Name	Percent Composition	Planting Spacing	Container Size[1]
Elymus triticoides	creeping wildrye	20	9 inches	SC
Euthamia occidentalis	goldenrod	10	9 inches	D16
Grindelia stricta	marsh gumplant	20	9 inches	D40
Symphyotrichum chilense	Pacific aster	10	9 inches	D16

[1] For explanation of container sizes see The Watershed Nursery: https://www.watershednursery.com/nursery/container-explanation/

Table 7. Transition Zone and Riparian Oak Woodland Creation Area Seed Mix

Botanical Name	Common Name
Achillea millefolium	Yarrow
Ambrosia psilostachya	Western ragweed
Artemisia douglasiana	Mugwort
Baccharis glutinosa	Marsh baccharis
Bromus carinatus	California brome
Elymus glaucus	Blue wildrye
Elymus triticoides	Creeping wildrye
Euthamia occidentalis	Western goldenrod
Festuca microstachys	Small fescue
Festuca rubra var. *molate*	Red molate fescue
Grindelia stricta	Marsh gumplant
Hordeum brachyantherum var. *salt*	Meadow barley
Lupinus bicolor	Miniature lupine
Stipa pulchra	Purple needlegrass

4.5 Riparian Oak Woodland Creation Area

4.5.1 Target Habitat

The target habitat in the riparian oak woodland creation area is a dense, multistory canopy of native trees and shrubs with a native and non-native herbaceous vegetation understory. To reduce the risk of flooding and to prevent large woody debris from entering the channel in future years, a planting palette of flexible shrubs will be used below the top of bank. A mixture of trees and shrubs will be established above the top of bank.

4.5.2 Soil Preparation

The riparian oak woodland riparian area below the top of bank will be prepared as described for the salt marsh and transition zone creation areas. Above the top of bank (where no geogrid will be installed), the riparian oak woodland creation area will be decompacted to a depth of 18 inches. The upper 12 inches of the soil profile above the top of bank will then be amended if needed to improve soil fertility as described in section 4.1.

4.5.3 Planting

The riparian oak woodland creation area will be established using a combination of seeding and planting. In the two vertical feet below the top of bank, the flexible shrubs in Table 8 will be planted into soil filled geoweb cells. All species in Table 8 will be planted above the top of bank (Figures 3 and 4). After container plant installation, the native grasses and forbs in Table 7 will be seeded. As the proposed creation area is in a urban area with little expected deer herbivory, the plantings will be installed without herbivore protection cages.

Table 8. Riparian Oak Woodland Creation Area Planting Palette

Scientific Name	Common Name	Percent Composition	Planting Spacing	Flexible Shrub?
Aesculus californica	buckeye	10%	12 feet	No
Fremontadendron californicum	flannel bush	5%	12 feet	No
Heteromeles arbutifolia	toyon	10%	12 feet	No
Quercus agrifolia	coast live oak	30%	16 feet	No
Rosa californica	California rose	10%	6 feet	Yes
Rubus parviflorus	thimbleberry	5%	6 feet	Yes
Rubus ursinus	California blackberry	10%	6 feet	Yes
Sambucus nigra	Blue elderberry	10%	12 feet	No
Symphocarpus albus	snowberry	10%	6 feet	Yes

4.6 Native Plant and Seed Progagule Sourcing

Native plant propagules for revegetation likely have higher survival and growth rates when sourced from populations that occur in similar soil and climatic conditions to that at the revegetation site. Therefore, this project's propagules for container plants and seeding will be derived from local populations as described below.

4.6.1 Container Plants

Container plants will be contract-grown by a native plant nursery from propagules collected from plant populations growing in San Mateo County. This will require establishment of a nursery contract at least 16 months prior to the target date for plant installation. For example, if plants are planned for installation in November-December 2020, then a nursery contract sould be established by July 2019. The native plant nursery selected for this contract will implement best management practices (BMPs) for to minimize *Phytophthora* spp., pathogens in container plants in accordance with *Guidelines to Minimize Phytophthora Pathogens in Restoration Nurseries* (Working Group for Phytophthoras in Native Habitats. 2016).

4.6.2 Seed

Seed for hydroseeding of the transition zone will be derived from plant populations growing in any of the San Francisco Bay Area Counties. If multiple sources of seed are commercially available for a given species, seed

sources will be preferentially selected from ecologically similar habitats as close to the revegetation site as possible.

4.7 Habitat Creation Construction Schedule

Habiat construction will take place in accordance with the following schedule (Table 9):

Table 9. Habitat Construction Schedule

Habiat Creation Area	Timing	Rationale
Guadalupe Channel grading and soil preparation in the habitat creation areas	Prior to October 15	Prior to the start of the rainy season
Seeding in the salt marsh, transition zone, and riparian oak woodland creation areas	August 15 to October 15	Within 2 months of the start of the rainy season
Container plant installation in the salt marsh, transition zone, and riparian oak woodland creation areas	December 15 – January 15	In the early part of the rainy season and after seed set.

4.8 Avoidance and Minimization Measures for Regulated Habitats and Special-Status Species during Construction

The proposed habitat creation areas will be established as a part of the project analyzed in the project's California Environmental Quality Act document and forthcoming regulatory agency permits. Therefore, the avoidance and minimization measures in the project's CEQA document and forthcoming permits will be implemented during construction of the habitat creation areas and no additional avoidance and minimization measures are needed.

4.9 Implementation Monitoring and Biological As-Built Report

A qualified restoration ecologist will monitor creation implementation to ensure that the site is installed as described in this plan. Observations will be summarized in a biological as-built report and submitted to the project permitting agencies within 90 days of completion of construction.

Section 5.0 Vegetation Maintenance Plan

5.1 Overview and Schedule

The salt marsh, transition zone, and riparian planting and seeding areas will require vegetatation maintenance for 5 years after installation to establish and become self-sustaining. Salt marsh and transition zone vegetation maintenance will include replanting of transition zone and salt marsh plants in year 1, irrigation of transition zone plantings during years 1 and 2, and weed control during the first 5 years. Riparian maintenance will include dead plant replacement, weed control, and irrigation for the first 5 years. Regular monitoring visits will be conducted per the Monitoring Plan (Section 7) by a restoration ecologist, in order to provide feedback to guide maintenance activities.

5.2 Dead Plant Replacement

During the first year, all dead tidal marsh and transition zone container plantings will be replaced. During the first 3 years, all dead riparian oak woodland tree and shrub plantings will be replaced. This will facilitate rapid establishment of the target vegetated habitats.

5.3 Weed Control

Invasive plant species are defined as species rated by the California Invasive Plant Council (Cal-IPC) as having a "high" ecological impact in the most current version of *California Invasive Plant Inventory* (Cal-IPC 2018). These species, and any other non-native species that the monitoring restoration ecologist deems a threat to attaining the habitat goals, will be controlled throughout the mitigaion site and kept below 5% cover during the 5-year maintenance period. Control methods will consist of manual removal by hand pulling, string trimming, and herbicide application, if necessary. If herbicides are used, the maintenance contractor will obtain and follow recommendations from a certified pest control advisor and use only herbicides that are registered for use near aquatic environments. Measures will be taken during all invasive plant control activities to protect preexisting, planted, and naturally recruited native plant species.

5.4 Irrigation

An irrigation system will be installed or hand watering will be used to provide regular irrigation to facilitate successful establishment of the riparian and transition zone plantings. If an irrigation system is installed, it will be regularly maintained during the 5-year maintenance period. Any component of the system not functioning properly will be subsequently repaired as part of regular site maintenance.

The riparian oak plantings will require irrigation during the first 3 years of the plant establishment period. The irrigation frequency should be gradually reduced during the 3 years to encourage plant acclimation to the site's natural moisture regime. In Year 1, the plantings in this area will be irrigated approximately 2 to 4 times/month

over the period March through October, with each irrigation session providing sufficient water (5 to 10 gallons/plant) to encourage vigorous root growth deep into the soil profile. The irrigation schedule in Year 2 will be based on the overall health and vigor of the plants, but should be substantially less (i.e., one to 2 times/month) compared to Year 1. Further reduction (zero to one time/month) in watering frequency should occur in Year 3. The irrigation schedule can be adjusted to reflect seasonal differences in weather patterns to ensure vigorous growth during the summer, especially during times of drought.

The transition zone enhancement area plantings will be irrigated for 2 years following installation. In Year 1, the plantings will be irrigated with enough regularity (approximately 2–4 times per month), from March through October, to keep the soil within the plant-rooting zone moist. The irrigation schedule in Year 2 will be based on the water requirements of the plants and is anticipated to be substantially less (approximately 1–2 times per month).

The irrigation schedule will be modified based on climatic conditions and plant performance to ensure vigorous plant growth during the summer months and/or times of drought, with input from the monitoring restoration ecologist.

5.5 Trash/Debris Removal

During the 5-year maintenance period, any trash in the habitat creation areas will be removed when maintenance activities are performed.

Section 6.0 Site Protection Instrument

The habitat creation areas will be constructed on land owned by the city. The city will preserve the habitat creation areas in perpetuity in accordance with the habitat goals set forth in this document unless permission is granted for a change in land use by the project permitting agencies.

Section 7.0 Monitoring Plan

7.1 Overview and Schedule

A restoration ecologist will conduct the monitoring and reporting. This monitoring plan defines the objective, measurable performance and final success criteria that will be used to determine if the habitat creation areas are on a trajectory toward establishing the habitat types and accomplishing the target habitat goals described above in section 3. This section also describes the monitoring methods to quantify the various metrics for comparison to the performance and final success criteria.

The tidal aquatic, salt marsh, and transition zone creation areas (Figure 3) will be monitored annually for 5 years. The riparian oak woodland creation area (Figure 3) will be monitored for 10 years; this area requires a longer monitoring period because the growth rate of the target vegetation is substantially slower than the salt marsh and transition zone. Monitoring in the habitat creation areas will take place toward the end of the growing season for the respective target habitats (July- September). The first annual monitoring event will occur during the first full growing season following site grading and plant installation.

7.2 Long-Term Habitat Goals and Habitat Success Criteria

Performance criteria apply in Years 1 – 4 for the tidal aquatic, salt marsh, and transition zone creation areas and through Year 9 for the riparian oak woodland creation area. They are interim targets that provide quantitative indicators of the trajectory of habitat establishment and inform maintenance measures prior to the final monitoring year. However, failure to meet performance criteria does not necessarily indicate failure of the habitat creation area and will not result in an extended monitoring period.

Achievement of the final success criteria is required in the final monitoring year to demonstrate that the site is on a trajectory towards achieving the project's long-term habitat goals. The final monitoring year for the tidal aquatic, salt marsh, and transition zone creation areas is Year 5. The final monitoring years for the riparian oak woodland creation area is Year 10. Failure to meet the final success criteria will require the permittee to consult with the permitting agencies to identify appropriate remedial or continued monitoring measures acceptable to the agencies.

7.2.1 Final Success Criteria

This section describes the final success criteria for the habitat creation areas.

7.2.1.1 Tidal Aquatic Creation Area

A primary goal of the project is to reduce ongoing sedimentation into Guadalupe Channel resulting from active channel bank erosion. Therefore, the tidal aquatic habitat creation area will meet the following final success criterion after 5 growing seasons:

- At least 0.19 acres of jurisdictionl wetland are established in the project area.
- No substantial active erosion that would adversely affect water quality, such as rills greater than 0.5 foot width and/or depth below the top of bank, or distortion of the geoweb by more that one foot from its installed location, or damage that breaks to integrity of more than two adjacent geoweb cells at a location where erosion is observed.

7.2.1.2 Salt Marsh Creation Area

- At least 0.04 acres of jurisdictionl wetland are established in the project area.
- The salt marsh creation area will have an average percent cover of at least 60% provided by native wetland plants. Wetland plants consist of species rated as "obligate wetland", "facultative wetland", or "facultative" by the most recent USACE National Wetland Plant List.
- The salt marsh creation area will have an average percent cover of no more than 5% provided by invasive plant species. Invasive plant species are those rated with a "high" ecosystem impact by the California Invasive Plant Council.

7.2.1.3 Transition Zone Creation Area

- The transition zone creation area will have an average percent cover of at least 70% provided by non-invasive plant species.
- The transition zone creation area will have an average percent cover of no more than 5% provided by invasive plant species.

7.2.1.4 Riparian Oak Woodland Creation Area

- The riparian oak woodland creation area will have an average percent cover of at least 40% in Year 10 provided by native tree and shrub species.

7.2.2 Performance Criteria

This section describes the performance criteria for the habitat creation areas.

7.2.2.1 Tidal Aquatic Creation Area

- No substantial active erosion that would adversely affect water quality, such as rilling below the top of bank or channel bank scour beneath the geoweb.

7.2.2.2 Salt Marsh Creation Area

- The average percent cover of native wetland vegetation will exhibit an increasing trend on a trajectory toward meeting the final success criterion of 60% cover.

- The average percent cover of vegetation will be less than 5% provided by invasive plant species.

7.2.2.3 Transition Zone Creation Area

- The average percent cover of non-invasive vegetation will exhibit an increasing trend on a trajectory toward meeting the final success criterion of 70% cover.
- The average percent cover of vegetation will be less than 5% provided by invasive plant species.

7.2.2.4 Riparian Oak Woodland Creation Area

- The riparian oak woodland creation area will exhibit an increasing trend on a trajectory toward meeting the final success criterion of at least 40% cover in Year 10 provided by native tree and shrub species.

7.3 Monitoring Methods

Field surveys will be carried out annually in Years 1-5 to monitor the tidal aquatic, salt marsh, and transition zone creation areas. Field surveys will be carried out annually in Years 1-6, Year 8 and Year 10 in the riparian oak woodland creation area. The following sections describe the monitoring methods that will be used to determine whether the habitat creation areas are meeting the success criteria in section 7.2.

7.3.1 Tidal Aquatic Creation Area

The following monitoring methods will be used in the tidal aquatic creation area.

- A restoration ecologist will inspect the habitat creation area below the top of bank during a lower low tide. Any areas of substantial erosion (as defined above) on the channel banks will be noted on a site map and photographed for inclusion in the annual monitoring report.

7.3.2 Salt Marsh Creation Area

The following monitoring methods will be used in the salt marsh creation area.

- Foliar cover of vegetation within the salt marsh creation area will be sampled using the quadrat method (Bonham 1989) at random point locations. Locations will be sampled using a 1-meter quadrat. Percent cover of each plant species within each quadrat will be determined using a visual assessment of species and cover by a qualified biologist. Identification of plant species will follow Baldwin et al. (2012). The number of samples will be determined by the point at which additional samples do not substantially change the average non-invasive vegetation cover (Kershaw 1973). Initially, a minimum of 3.0% of the surface area of the salt marsh creation area will be sampled (6 quadrats) stratified acoss the two channel banks. The average percent cover of non-invasive, wetland vegetation will be calculated and compared to the performance and final success criteria. The average percent cover of invasive vegetation will be calculated separately and compared to the performance and final success criteria.

- **Wetland Delineation.** Beginning in Year 3, the aquatic and salt marsh habitat creation areas will be examined to determine if it meets the technical criteria for wetland vegetation, soils, and hydrology according to the USACE Wetland Delineation Manual (Environmental Training Laboratory 1987). It is expected that the site will develop sufficient wetland characteristics to be classified as jurisdictional Waters of the United States. Delineation of the site's jurisdictional Waters will continue annually until the final success criteria are met or contingency measures are accepted by the agencies.
- The above maintenance subsection calls for all dead plantings to be replaced in Year 1. Therefore, the number of geoweb cells lacking a living plant in the transition zone creation area will be counted. These findings will be used to inform replacement plant recommendations with the goal of installing a replacement plant in each empty geoweb cell in Year 1.

7.3.3 Transition Zone Creation Area

The following monitoring methods will be used in the transition zone creation area.

- Foliar cover of vegetation within the transition zone creation area will be sampled using the quadrat method as described above for the salt marsh creation area. Initially, a minimum of 3.0% of the surface area of the transition zone creation area will be sampled (8 quadrats) stratified acoss the two channel banks. The average percent cover of non-invasive vegetation will be calculated and compared to the performance and final success criteria. The average percent cover of invasive vegetation will be calculated separately and compared to the performance and final success criteria.
- The above maintenance subsection calls for all dead plantings to be replaced in Year 1. Therefore, the number of geoweb cells lacking a living plant in the transition zone creation area will be counted. These findings will be used to inform replacement plant recommendations with the goal of installing a replacement plant in each empty geoweb cell in Year 1.

7.3.4 Riparian Oak Woodland Creation Area

The following monitoring methods will be used in the riparian oak woodland creation area:

- Percent cover will be determined using the line-intercept method after Bonham (1989). Fixed-length, permanent transects will be established and marked with metal T-posts. Random, or stratified random, transect locations will be established in Year 1. The number of transects will be determined based on the variability of the site's vegetative cover, which itself will be determined by evaluating the average cover value obtained over increasing numbers of transects. The number of transects used will be the point where additional samples do not substantially change the average cover value obtained (Kershaw 1973). The average percent cover of native woody riparian species (by species and for all species combined) will be calculated among the fixed length transects. The results will be compared to the percent cover performance and final success criteria described above.

- The above maintenance subsection calls for all dead plantings to be replaced in Years 1, 2 and 3. Therefore, the percent survival of plantings will be measured in the riparian oak woodland creation area during monitoring Years 1, 2 and 3 via a total count of all live plants compared to the quantities installed. These findings will be used to inform replacement plant recommendations. Percent survival will be calculated by species as follows:

  Percent Survival of Species A = (number of individuals of species A alive during monitoring period / total number of species A alive at installation) * 100.

7.3.5 Site Maintenance

All habitat creation areas will be inspected for maintenance needs 3 times per year in Years 1–5 and annually in Years 6, 8, and 10 within the riparian oak woodland. Qualitative assessments of the site will be made during these site visits that will be used to inform maintenance recommendations. Assessment of the following factors will be made during maintenance monitoring site visits:

- Vegetation establishment with special attention paid to areas lacking vegetation
- Mortality/loss of installed plants
- Invasion of the habitat creation areas by invasive or non-native weeds
- Accumulation of trash or incidences of vandalism
- Erosion

7.3.6 Photodocumentation

Photographs will be taken from fixed photodocumentation points during each annual monitoring event. Photodocumentation points will be established during the first year of monitoring.

7.4 Reporting

An Annual Monitoring Report will be submitted to the permitting agencies by February 1 following each monitoring year. Monitoring Reports will present the findings of the annual field surveys relative to the performance standards in the monitoring plan described above. Monitoring Reports will include the following elements:

- Introduction
- Methods
- Results and Discussion: a summary of findings and, if necessary, a discussion of problems with achieving performance standards

- Management recommendations for corrective measures (if necessary)
- Photodocumentation

7.5 Completion of Monitoring

Monitoring will be conducted over a minimum of 5 years for the tidal aquatic, salt marsh, and transition zone creation areas. If the monitoring restoration ecologist determines that the habitat creation areas have met the final success criteria, the Year 5 report will document completion of the project for those areas. Monitoring will be conducted over a minimum of 10 years for the ripairian oak woodland creation area. If the monitoring restoration ecologist determines that the riparian oak woodland creation area has met the final success criteria, the Year 10 report will document completion of the project.

If remedial measures were implemented, as described in Section 8 below, and additional monitoring and reporting was required by the permitting agencies in order to meet the final success criteria, then the city will submit a letter to the permitting agencies with the final monitoring report requesting final "sign-off" on the project.

Section 8.0 Adaptive Management Plan

If assessment of annual performance criteria indicate that the site will not meet final success criteria or the final success criteria are not met, the City will prepare an analysis of the cause(s) of failure and propose remedial actions to the permitting agencies. The city will provide funding for the planning, implementation, and monitoring of any remedial actions determined to be necessary to meet the habitat creation goals and final success criteria.

Section 9.0 References

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[NRCS] Natural Resources Conservation Service. 2019. Web Soil Survey. U. S. Department of Agriculture. http://websoilsurvey.nrcs.usda.gov. Accessed March 1, 2019.

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APPENDIX B

California Emissions Estimator Model

Brisbane

Bay Area AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.14	Acre	1.14	49,658.40	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Subtype: lot is vacant

Construction Phase - Construciton time is 4 months

Off-road Equipment - Project wll not use cranes, forklifts, welders, generator sets in this phase.

Off-road Equipment -

Trips and VMT - .

Demolition -

Grading -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	200.00	11.00
tblGrading	MaterialExported	0.00	250.00
tblGrading	MaterialExported	0.00	466.00
tblGrading	MaterialImported	0.00	190.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	2.1718	26.6701	15.0089	0.0409	6.0552	1.1532	6.9037	3.0298	1.0768	3.8114	0.0000	4,200.3463	4,200.3463	0.6643	0.0000	4,216.9534
Maximum	**2.1718**	**26.6701**	**15.0089**	**0.0409**	**6.0552**	**1.1532**	**6.9037**	**3.0298**	**1.0768**	**3.8114**	**0.0000**	**4,200.3463**	**4,200.3463**	**0.6643**	**0.0000**	**4,216.9534**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	2.1718	26.6701	15.0089	0.0409	6.0552	1.1532	6.9037	3.0298	1.0768	3.8114	0.0000	4,200.3463	4,200.3463	0.6643	0.0000	4,216.9534
Maximum	**2.1718**	**26.6701**	**15.0089**	**0.0409**	**6.0552**	**1.1532**	**6.9037**	**3.0298**	**1.0768**	**3.8114**	**0.0000**	**4,200.3463**	**4,200.3463**	**0.6643**	**0.0000**	**4,216.9534**

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

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.5700e-003	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.5000e-004	2.5000e-004	0.0000		2.7000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0505	0.1985	0.4988	1.5200e-003	0.1177	1.8300e-003	0.1195	0.0315	1.7300e-003	0.0332		152.8919	152.8919	6.1500e-003		153.0457
Total	**0.0531**	**0.1985**	**0.4989**	**1.5200e-003**	**0.1177**	**1.8300e-003**	**0.1195**	**0.0315**	**1.7300e-003**	**0.0332**		**152.8921**	**152.8921**	**6.1500e-003**	**0.0000**	**153.0459**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.5700e-003	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.5000e-004	2.5000e-004	0.0000		2.7000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0505	0.1985	0.4988	1.5200e-003	0.1177	1.8300e-003	0.1195	0.0315	1.7300e-003	0.0332		152.8919	152.8919	6.1500e-003		153.0457
Total	**0.0531**	**0.1985**	**0.4989**	**1.5200e-003**	**0.1177**	**1.8300e-003**	**0.1195**	**0.0315**	**1.7300e-003**	**0.0332**		**152.8921**	**152.8921**	**6.1500e-003**	**0.0000**	**153.0459**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/15/2020	7/9/2020	5	2	
2	Demolition	Demolition	7/13/2020	7/18/2020	5	20	
3	Grading	Grading	7/21/2020	10/15/2020	5	4	
4	Construction	Building Construction	10/1/2020	10/15/2020	5	11	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

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

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Construction	Cement and Mortar Mixers	1	6.00	9	0.56
Construction	Cranes	0	6.00	231	0.29
Construction	Cranes	0	6.00	231	0.29
Construction	Forklifts	0	6.00	89	0.20
Construction	Generator Sets	0	8.00	84	0.74
Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Construction	Welders	0	8.00	46	0.45
Construction	Welders	0	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	58.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	5	13.00	0.00	1.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	55.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Construction	2	21.00	8.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.8259	0.0000	5.8259	2.9577	0.0000	2.9577			0.0000			0.0000
Off-Road	1.6299	18.3464	7.7093	0.0172		0.8210	0.8210		0.7553	0.7553		1,667.4119	1,667.4119	0.5393		1,680.8937
Total	**1.6299**	**18.3464**	**7.7093**	**0.0172**	**5.8259**	**0.8210**	**6.6469**	**2.9577**	**0.7553**	**3.7130**		**1,667.4119**	**1,667.4119**	**0.5393**		**1,680.8937**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2393	8.3069	1.6509	0.0231	0.1636	0.0272	0.1907	0.0546	0.0260	0.0806		2,467.2723	2,467.2723	0.1234		2,470.3579
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0278	0.0168	0.2146	6.6000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		65.6621	65.6621	1.5800e-003		65.7017
Total	**0.2671**	**8.3237**	**1.8656**	**0.0237**	**0.2293**	**0.0276**	**0.2569**	**0.0721**	**0.0264**	**0.0984**		**2,532.9344**	**2,532.9344**	**0.1250**		**2,536.0596**

3.2 Site Preparation - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.8259	0.0000	5.8259	2.9577	0.0000	2.9577			0.0000			0.0000
Off-Road	1.6299	18.3464	7.7093	0.0172		0.8210	0.8210		0.7553	0.7553	0.0000	1,667.4119	1,667.4119	0.5393		1,680.8937
Total	**1.6299**	**18.3464**	**7.7093**	**0.0172**	**5.8259**	**0.8210**	**6.6469**	**2.9577**	**0.7553**	**3.7130**	**0.0000**	**1,667.4119**	**1,667.4119**	**0.5393**		**1,680.8937**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.2393	8.3069	1.6509	0.0231	0.1636	0.0272	0.1907	0.0546	0.0260	0.0806		2,467.2723	2,467.2723	0.1234		2,470.3579
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0278	0.0168	0.2146	6.6000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		65.6621	65.6621	1.5800e-003		65.7017
Total	**0.2671**	**8.3237**	**1.8656**	**0.0237**	**0.2293**	**0.0276**	**0.2569**	**0.0721**	**0.0264**	**0.0984**		**2,532.9344**	**2,532.9344**	**0.1250**		**2,536.0596**

3.3 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.4900e-003	0.0000	7.4900e-003	1.1300e-003	0.0000	1.1300e-003			0.0000			0.0000
Off-Road	2.1262	20.9463	14.6573	0.0241		1.1525	1.1525		1.0761	1.0761		2,322.3127	2,322.3127	0.5970		2,337.2363
Total	**2.1262**	**20.9463**	**14.6573**	**0.0241**	**7.4900e-003**	**1.1525**	**1.1600**	**1.1300e-003**	**1.0761**	**1.0773**		**2,322.3127**	**2,322.3127**	**0.5970**		**2,337.2363**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.1000e-004	0.0143	2.8500e-003	4.0000e-005	2.8600e-003	5.0000e-005	2.9000e-003	7.3000e-004	4.0000e-005	7.7000e-004		4.2539	4.2539	2.1000e-004		4.2592
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0452	0.0274	0.3488	1.0700e-003	0.1068	6.9000e-004	0.1075	0.0283	6.4000e-004	0.0290		106.7010	106.7010	2.5700e-003		106.7652
Total	**0.0456**	**0.0417**	**0.3517**	**1.1100e-003**	**0.1097**	**7.4000e-004**	**0.1104**	**0.0291**	**6.8000e-004**	**0.0297**		**110.9549**	**110.9549**	**2.7800e-003**		**111.0245**

3.3 Demolition - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.4900e-003	0.0000	7.4900e-003	1.1300e-003	0.0000	1.1300e-003			0.0000			0.0000
Off-Road	2.1262	20.9463	14.6573	0.0241		1.1525	1.1525		1.0761	1.0761	0.0000	2,322.3127	2,322.3127	0.5970		2,337.2363
Total	**2.1262**	**20.9463**	**14.6573**	**0.0241**	**7.4900e-003**	**1.1525**	**1.1600**	**1.1300e-003**	**1.0761**	**1.0773**	**0.0000**	**2,322.3127**	**2,322.3127**	**0.5970**		**2,337.2363**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.1000e-004	0.0143	2.8500e-003	4.0000e-005	2.8600e-003	5.0000e-005	2.9000e-003	7.3000e-004	4.0000e-005	7.7000e-004		4.2539	4.2539	2.1000e-004		4.2592
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0452	0.0274	0.3488	1.0700e-003	0.1068	6.9000e-004	0.1075	0.0283	6.4000e-004	0.0290		106.7010	106.7010	2.5700e-003		106.7652
Total	**0.0456**	**0.0417**	**0.3517**	**1.1100e-003**	**0.1097**	**7.4000e-004**	**0.1104**	**0.0291**	**6.8000e-004**	**0.0297**		**110.9549**	**110.9549**	**2.7800e-003**		**111.0245**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9267	0.0000	4.9267	2.5275	0.0000	2.5275			0.0000			0.0000
Off-Road	1.3498	15.0854	6.4543	0.0141		0.6844	0.6844		0.6296	0.6296		1,365.7183	1,365.7183	0.4417		1,376.7609
Total	**1.3498**	**15.0854**	**6.4543**	**0.0141**	**4.9267**	**0.6844**	**5.6111**	**2.5275**	**0.6296**	**3.1571**		**1,365.7183**	**1,365.7183**	**0.4417**		**1,376.7609**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1135	3.9386	0.7828	0.0109	0.0700	0.0129	0.0828	0.0240	0.0123	0.0364		1,169.8274	1,169.8274	0.0585		1,171.2904
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0278	0.0168	0.2146	6.6000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		65.6621	65.6621	1.5800e-003		65.7017
Total	**0.1413**	**3.9554**	**0.9974**	**0.0116**	**0.1357**	**0.0133**	**0.1490**	**0.0415**	**0.0127**	**0.0542**		**1,235.4895**	**1,235.4895**	**0.0601**		**1,236.9921**

3.4 Grading - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9267	0.0000	4.9267	2.5275	0.0000	2.5275			0.0000			0.0000
Off-Road	1.3498	15.0854	6.4543	0.0141		0.6844	0.6844		0.6296	0.6296	0.0000	1,365.7183	1,365.7183	0.4417		1,376.7609
Total	**1.3498**	**15.0854**	**6.4543**	**0.0141**	**4.9267**	**0.6844**	**5.6111**	**2.5275**	**0.6296**	**3.1571**	**0.0000**	**1,365.7183**	**1,365.7183**	**0.4417**		**1,376.7609**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1135	3.9386	0.7828	0.0109	0.0700	0.0129	0.0828	0.0240	0.0123	0.0364		1,169.8274	1,169.8274	0.0585		1,171.2904
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0278	0.0168	0.2146	6.6000e-004	0.0657	4.3000e-004	0.0661	0.0174	3.9000e-004	0.0178		65.6621	65.6621	1.5800e-003		65.7017
Total	**0.1413**	**3.9554**	**0.9974**	**0.0116**	**0.1357**	**0.0133**	**0.1490**	**0.0415**	**0.0127**	**0.0542**		**1,235.4895**	**1,235.4895**	**0.0601**		**1,236.9921**

3.5 Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2012	1.8550	1.9411	2.8600e-003		0.1106	0.1106		0.1026	0.1026		263.4636	263.4636	0.0769		265.3859
Total	**0.2012**	**1.8550**	**1.9411**	**2.8600e-003**		**0.1106**	**0.1106**		**0.1026**	**0.1026**		**263.4636**	**263.4636**	**0.0769**		**265.3859**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0303	0.9117	0.2175	2.2000e-003	0.0542	4.4700e-003	0.0586	0.0156	4.2800e-003	0.0199		233.3664	233.3664	0.0115		233.6537
Worker	0.0730	0.0442	0.5634	1.7300e-003	0.1725	1.1200e-003	0.1736	0.0458	1.0300e-003	0.0468		172.3631	172.3631	4.1500e-003		172.4669
Total	**0.1033**	**0.9559**	**0.7809**	**3.9300e-003**	**0.2267**	**5.5900e-003**	**0.2323**	**0.0614**	**5.3100e-003**	**0.0667**		**405.7295**	**405.7295**	**0.0156**		**406.1207**

3.5 Construction - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2012	1.8550	1.9411	2.8600e-003		0.1106	0.1106		0.1026	0.1026	0.0000	263.4636	263.4636	0.0769		265.3859
Total	**0.2012**	**1.8550**	**1.9411**	**2.8600e-003**		**0.1106**	**0.1106**		**0.1026**	**0.1026**	**0.0000**	**263.4636**	**263.4636**	**0.0769**		**265.3859**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0303	0.9117	0.2175	2.2000e-003	0.0542	4.4700e-003	0.0586	0.0156	4.2800e-003	0.0199		233.3664	233.3664	0.0115		233.6537
Worker	0.0730	0.0442	0.5634	1.7300e-003	0.1725	1.1200e-003	0.1736	0.0458	1.0300e-003	0.0468		172.3631	172.3631	4.1500e-003		172.4669
Total	**0.1033**	**0.9559**	**0.7809**	**3.9300e-003**	**0.2267**	**5.5900e-003**	**0.2323**	**0.0614**	**5.3100e-003**	**0.0667**		**405.7295**	**405.7295**	**0.0156**		**406.1207**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0505	0.1985	0.4988	1.5200e-003	0.1177	1.8300e-003	0.1195	0.0315	1.7300e-003	0.0332		152.8919	152.8919	6.1500e-003		153.0457
Unmitigated	0.0505	0.1985	0.4988	1.5200e-003	0.1177	1.8300e-003	0.1195	0.0315	1.7300e-003	0.0332		152.8919	152.8919	6.1500e-003		153.0457

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	2.15	25.94	19.08	17,015	17,015
Total	2.15	25.94	19.08	17,015	17,015

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.570523	0.041853	0.194077	0.115893	0.018544	0.005373	0.016909	0.024079	0.002502	0.002562	0.005975	0.000872	0.000837

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

5.2 Energy by Land Use - NaturalGas

Unmitigated

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

Mitigated

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

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.5700e-003	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.5000e-004	2.5000e-004	0.0000		2.7000e-004
Unmitigated	2.5700e-003	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.5000e-004	2.5000e-004	0.0000		2.7000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5600e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.5000e-004	2.5000e-004	0.0000		2.7000e-004
Total	**2.5700e-003**	**0.0000**	**1.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.5000e-004**	**2.5000e-004**	**0.0000**		**2.7000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.5600e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.5000e-004	2.5000e-004	0.0000		2.7000e-004
Total	**2.5700e-003**	**0.0000**	**1.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.5000e-004**	**2.5000e-004**	**0.0000**		**2.7000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX C

Biological Resources Report

H. T. HARVEY & ASSOCIATES

Ecological Consultants

Guadalupe Channel Erosion Control Project
Biological Resources Report

Project #2440-02

Prepared for:

Harvey Oslick
Wood Rogers Inc.
3301 C Street, Bldg. 100-B
Sacramento, CA 95816

Prepared by:

H. T. Harvey & Associates

December 17, 2018

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Section 1. Introduction

1.1 Project Location

The Guadalupe Channel Erosion Control Project (project) is located along Guadalupe Channel in the City of Brisbane (city), San Mateo County, California (Figure 1). The site includes the portion of Guadalupe Channel situated between the Machinery Road bridge, just upstream of the Tunnel Avenue Bridge, and the drainage basin, located adjacent to the city's sanitary sewer pump station. Brisbane Lagoon is located immediately east of the study area and is connected to the San Francisco Bay via two tunnels. The study area encompasses 3.55 acres (ac) and is within the *San Francisco South, California* U.S. Geological Survey (USGS) 7.5-minute quadrangle (Figure 2).

1.2 Project Description

The Guadalupe Channel Erosion Control Project (project) proposes bank stabilization and erosion-control improvements to the open channel portions of the Guadalupe Channel. These improvements would protect approximately 400 linear feet of watercourse channel between a culvert beneath the Bayshore Boulevard/Valley Drive intersection and the Machinery Road bridge structure immediately south of the Brisbane Fire Department Station at 3445 Bayshore Boulevard.

The Guadalupe Channel is an eastward-flowing stream under the City's jurisdiction. This feature is located within the Guadalupe Valley Watershed, an approximately 1,700-ac basin that drains runoff eastward from San Bruno Mountain into the Brisbane Lagoon (PG&E 2002). The Guadalupe Channel's tributary sources (i.e., unnamed creeks and drainages) originate on the northeast slope of San Bruno Mountain, west of the Brisbane City limits within the San Bruno Mountain State and County Park (Oakland Museum of California 2007). Upon exiting San Bruno Mountain's steep eastern-facing hillsides, the Guadalupe Channel travels east and underground through the heavily developed Guadalupe Valley, where it continues to collect runoff from unnamed drainages on the northern and southern slopes of the Guadalupe Valley.

The Guadalupe Channel emerges from below ground (daylights) east of Bayshore Boulevard within the project site limits. From east of a culvert beneath Bayshore Boulevard, the Guadalupe Channel travels beneath the Machinery Road bridge structure and the Caltrain tracks before draining into the Brisbane Lagoon. Between Bayshore Boulevard and the Machinery Road bridge structure, the Guadalupe Channel banks are steep and unreinforced except for sheet piles that form the left bank along the bend just east of Bayshore Boulevard. Tidal water levels and the steepness of the incision also prevent vegetation from stabilizing the lower portion of the channel. Moderately high flow velocities through the Guadalupe Channel can cut and erode the non-reinforced channel sides, especially where they are not protected by vegetation or exposed by vegetation that falls into the steep, heavily incised watercourse. Flow velocities of approximately seven feet per second can

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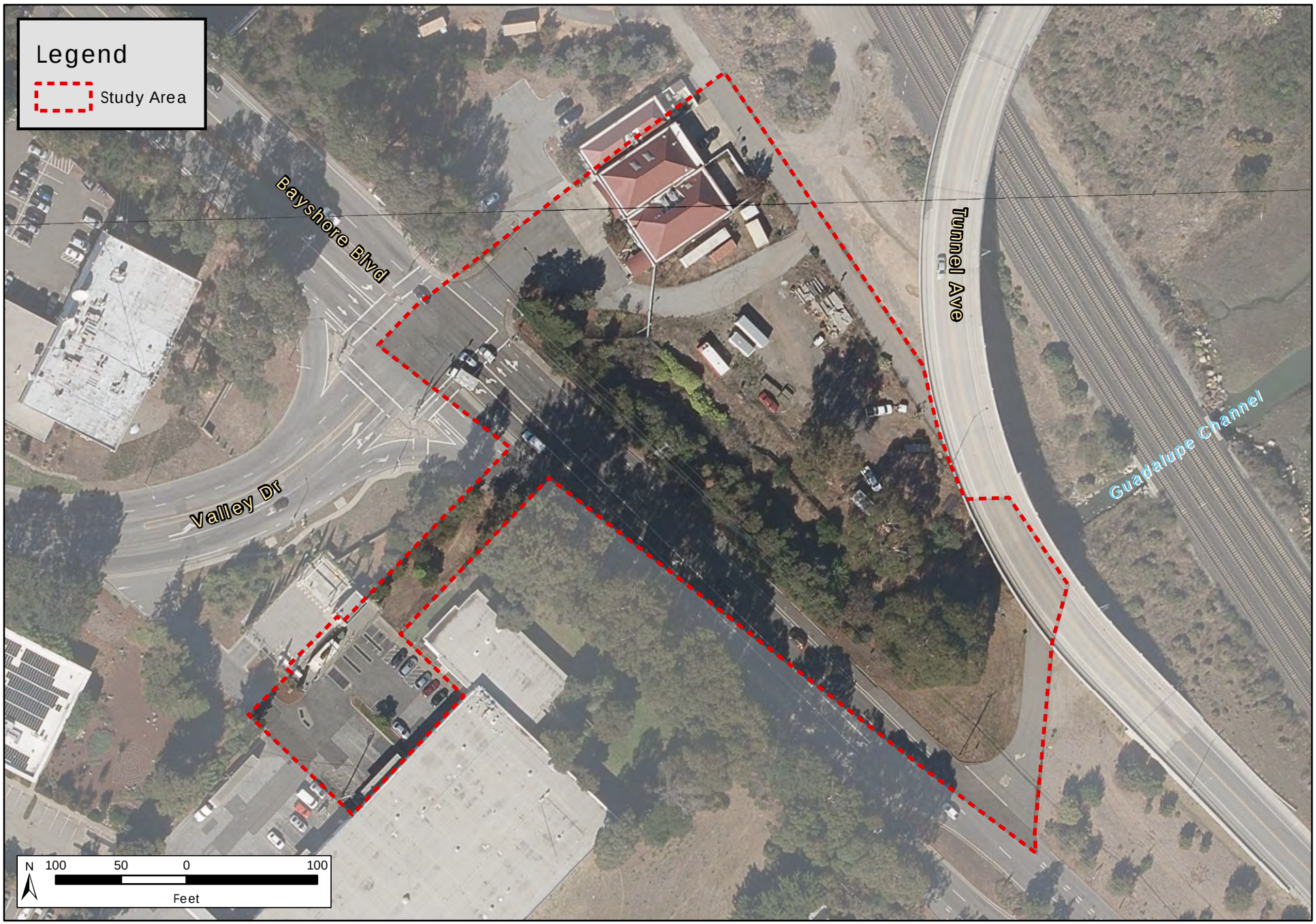
H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1. Vicinity **Map**

Guadalupe Channel Erosion Control Project Biological Resources Report (2440-02)

December 2018



N:\Projects\2440-02\Reports\BRR\Fig 2 Study Area.mxd

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Figure 2. Study Area
Guadalupe Channel Erosion Control Project Biological Resources Report (2440-02)
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occur in this portion of Guadalupe Channel, with even higher velocities during high-flow/low tide conditions. The channel is currently heavily wooded with non-native trees, many of which are mature to decadent and may fall or drop large limbs into the channel.

This project represents a preventive measure to protect against the possibility of large, woody, non-native vegetation falling into the Guadalupe Channel, which could obstruct flow and expose slopes to erosion. Bank grading would flatten the sides of the channel, which have been incised to near vertical in some locations. Most channel slopes would be regraded to a 2:1 slope ratio (i.e., 2 ft in horizontal distance for every 1 ft in vertical distance), except for the northern slope immediately east of the Bayshore Boulevard outfall structure. Although this section would achieve a 1:1 slope ratio, benched retaining walls would be provided to minimize slope hazards. Installation of a geo-cell web below the top of bank (approximately 10.7 ft NAVD88) would occur on all exposed slopes after grading. The geo-cell is a 6 inch deep plastic reinforcing web with approximately 9 inch by 9 inch openings that blankets the ground surface to prevent erosion, allow water saturation, and provide exposed ground to allow vegetation growth. This material would be backfilled with suitable soil above local mean high water (MHW; approximately 5.2 ft NAV88) to allow tidal marsh and upland vegetation to establish in the earthen gaps in the geo-web and root into the channel slopes. Two inch rock would be used to fill the geo-cells below MHW, with earthen fill over the rock-lined channel invert.

The geo-web would reinforce portions of the channel that support vegetation and resist erosion where vegetation does not establish in the tidal zone. The salt marsh area between MHW and approximately mean higher high water (MHHW) will be planted with native forb and grasses salt marsh species including saltgrass (*Distichlis spicata*) and perennial pickleweed (*Salicornia pacifica*), marsh jaumea (*Jaumea carnosa*), alkali heath (*Frankenia salina*), and Pacific cordgrass (*Spartina foliosa*). From the MHHW elevation to just above the high tide line, a ecotone transitional community is proposed, including the native shrub species marsh gumplant (*Grindelia stricta*) along with salt-tolerant forbs and grasses such as saltgrass, marsh baccharis (*Baccharis glutinosa*), creeping wild-rye (*Elymus triticoides*), goldenrod (*Euthamia occidentalis*), and western ragweed (*Ambrosia psilostachya*). This will create a much more diverse and ecologically appropriate transition habitat between the salt marsh and the upper riparian banks. The area from upper edge of the transition zone and the top of bank will be subject to occasional flooding and high storm flows, and to prevent flooding issues and large woody debris from entering the channel in future years, a planting plalette of flexible shrubs will be used. These include native shrubs such as snowberry (*Symphocarpus albus*), California rose (*Rosa californica*), thimbleberry (*Rubus parviflorus*), and California blackberry (*Rubus ursinus*). Finally, the area at and above top of bank will be planted with native riparian trees such as coast live oak (*Quercus agrifolia*), box elder (*Acer negundo*), and buckeye (*Aesculus californica*).. All areas in the riparian revegetation area will also be seeded with a native seed mix. Trees to be removed will be replaced by native trees and shrub per Table 1, below. Under this replacement requirement, 69 native replacement trees and shrubs will be established within the channel banks.

Table 1. Replacement Tree and Shrub Replacement Ratios Proposed by the Project

Size of Removed Tree (inches diameter at 2 feet above ground surface)	Native Tree (replacement to loss)	Non-native Tree (replacement to loss)	Non-native Invasive Tree (replacement to loss)
< 6	1:1 (2:1 for oaks)	0.5:1	0
6 - 11	2:1 (4:1 for oaks)	1:1	0.5:1
12 - 17	3:1 (6:1 for oaks)	2:1	0.5:1
> 17	5:1 (10:1 for oaks)	2:1	0.5:1

The plantings will be subject to a 10-year Monitoring and Maintenance Plan (MMP) that prescribes annual monitoring actions and will require specific success criteria for planting survivorship, restored marsh area created, and presence of invasive species. Success criteria will include a requirement that at least 69 of the native tree and shrub plantings survive by year 5 or replanting will be required, the restored marsh area will extend to at least 0.04 acres, and no more than 5% invasive species by cover will occur in the replanted area. Maintenance actions may be required to control weeds or replant vegetation to meet these success criteria.

All project work is expected to occur during the period of June 15 to October 15 with the exception of native container plant installation which would occur after the onset of the rainy season. Project construction would be initiated in summer 2020 and would last approximately four months. Construction would begin with vegetation clearing, grubbing, and removal of a small steel sheet pile retaining wall on the northern bank of the Guadalupe Channel immediately downstream of the Bayshore Boulevard outfall structure. Construction would continue with bank grading and installation of the geo-cell web. Material would be dredged from the bottom of Guadalupe Channel to establish the subgrade below the geo-cell system. This phase of project construction would also include the removal of approximately 640 cubic yards of sediment from the culvert beneath Bayshore Boulevard. The project would also remove sediment from an existing collection basin upstream of the culvert. Access to the culvert, sediment collection basin, and Guadalupe Channel banks would require temporarily diverting water flows within the Guadalupe Channel. All disturbed areas that can support vegetation would be revegetated with native plantings at the outset of construction activities.

The total disturbed area would be approximately 50,000 square feet. Removal of the steel sheet pile retaining wall downstream of the Bayshore Boulevard outfall structure would extend 10 feet below ground surface, which represents the maximum construction depth. Ground clearing, grading, and other construction activities would not exceed this depth. Some of the material produced from regrading and sediment removal activities will be balanced on site, with the remainder trucked to a permitted disposal facility. During project activities approximately 650 cubic yards (cyds) of soil will be off-hauled, with approximately 400 cyds of soil exported during site preparation and the 250 cyds exported during site grading. Approximately 190 cyds of rock will be imported during site grading. Project operation would entail routine inspection and maintenance of the Guadalupe Channel, and watering of the new vegetation.

The purpose of this report is to describe the biological resources present in the project area, as well as the potential impacts of the recontouring of the channel on biological resources. Where necessary, this report also describes measures necessary to reduce impacts to less-than-significant levels under the California Environmental Quality Act (CEQA).

Section 2. Methods

2.1 Background Review

Prior to conducting field work, H. T. Harvey & Associates ecologists reviewed aerial images (Google Inc. 2018) 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 2018); and other relevant scientific literature and technical databases for information on biological resources in the project area. 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 *San Francisco South, California* 7.5-minute USGS quadrangle and surrounding six quadrangles (*Point Bonita, San Francisco North, Oakland West, Hunters Point, Montara Mountain,* and *San Mateo*, *California*). Quadrangle-level results are not always maintained for CRPR 3 and 4 species, so we also conducted a search of the CNPS Inventory records for these species occurring in San Mateo County (CNPS 2018). In addition, we queried the CNDDB (2018) for natural communities of special concern that occur in the project region. For the purposes of this report, the "project vicinity" encompasses a 5-mile (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 plant ecologist Matthew Mosher, B.S., on July 10 and 17, 2018. An additional visit was conducted by H. T. Harvey & Associates wildlife ecologist Craig Fosdick, M.S., on September 11, 2018. The purpose of these surveys was to provide a project-specific impact assessment for the proposed grading and restoration of the Guadalupe 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. In addition, focused surveys for evidence of active or old raptor nests, bat roosting habitat, and nests of the San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*), a California species of special concern, were conducted on September 11, 2018. Finally, H. T. Harvey & Associates restoration ecologists Gavin Archbald, M.S., and Max Busnardo, M.S., visited the site on October 4, 2018 to assess the potential for on-site restoration of impacted habitats. During the visit, the elevational range of tidal marsh vegetation in the study area was measured using a laser level relative to a known topographic benchmark elevation.

Section 3. Regulatory Setting

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: The entirety of Guadalupe Channel up to the OHW mark would be claimed as waters of the U.S by the USACE. Additionally, the northern coastal salt marsh, which occurs along the borders of the channel near the west end of the study area, would also be claimed by USACE. A formal wetland delineation has been prepared and will be submitted to the USACE to verify the exact extent of any jurisdictional waters and wetlands. Placement of fill within waters of the U.S. associated with the project will require a Section 404 permit from the USACE.

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: The entirety of Guadalupe Channel within the study area is subject to the ebb and flow of the tide, and would be considered current Section 10 waters up to the MHW elevation (approximately 5.2 ft NAVD88). To authorize the work within Guadalupe Channel, a Letter of Permission will be required from the USACE.

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: No suitable habitat for any federally listed plant species occurs in the study area. Thus, no federally listed plant species will be impacted by the project. With the exception of the Central California Coast steelhead (*Oncorhynchus mykiss*), suitable habitat for federally listed animal species does not exist in the study area. The Central California Coast steelhead may occasionally stray into the study area, but is not expected to spawn there or to occur frequently or in large numbers. This species is discussed in more detail in Appendix C.

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: A number of fish species regulated by NMFS according to the Coastal Pelagic, Pacific Groundfish, and Groundfish Fisheries Management Plans (FMPs) occur in tidal habitats in San Francisco Bay, including open water portions of San Francisco Bay immediately adjacent to Brisbane Lagoon (NMFS 2018). While the Guadalupe Channel itself is not specifically identified as EFH under any of these three FMPs, Brisbane Lagoon is classified as EFH, and NMFS may also regard the Guadalupe Channel below MHW as EFH (NMFS 2018). The Brisbane Lagoon is connected to the adjacent San Francisco Bay by the Brisbane Tubes, two concrete culverts that establish connectivity between the waters of the San Francisco Bay and the Brisbane Lagoon and ultimately, the Guadalupe Channel.

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.

Project Applicability: All native bird species that occur in the study area are protected under the MBTA.

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: Guadalupe Channel, the northern coastal salt marsh along its border, as well as the riparian forest within the channel banks, would be claimed as waters of the State by the RWQCB. A formal wetland delineation has been prepared for the project to verify the exact extent of any jurisdictional waters. Such areas would fall under jurisdiction of the San Francisco RWQCB, and a Section 401 Water Quality Certification will be required for the project.

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. Suitable habitat for one state listed animal species, the longfin smelt (*Spirinchus thaleichthys*), occurs in the study area. Longfin smelt may occasionally stray into the study area, but are not expected to spawn there or to occur frequently or in large numbers. This species is discussed in more detail in Appendix C.

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 2017). 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.

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 (CNDDB 2018). Further, the CDFW ranks sensitive vegetation alliances based on their global (G) and state (S) rankings analogous to those provided in the CNDDB. 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 (CDFG 2010a).

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 Brisbane. 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: Guadalupe Channel and the underground culvert feeding it are a downstream continuation of streams conveying waters from San Bruno Mountain. As such, the channel and the underground culvert are considered part of a river or stream and likely to be regulated by the CDFW under

California Fish and Game Code Section 1603. Impacts to these features would thus require notification to CDFW to obtain an LSAA. 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.

3.3 Local

3.3.1 The McAteer-Petris Act

In response to uncoordinated and indiscriminate filling of the Bay, the California legislature passed the McAteer-Petris Act in 1965, establishing the San Francisco Bay Conservation and Development Commission (BCDC) as the management and regulatory agency for the San Francisco Bay and Delta. A permit must be obtained from the BCDC for shoreline projects; dredge and fill activities in the Bay or certain tributaries, salt ponds, or managed wetlands; and Suisun Marsh projects. The limits of BCDC jurisdiction are defined in the *Bay Plan* (BCDC 2012), and include a 100-ft wide band along the shoreline of the Bay. The "shoreline" is defined as all areas that are subject to tidal action from the south end of the Bay to the Golden Gate (Point Bonita-Point Lobos), and to the Sacramento River line (a line between Stake Point and Simmons Point, extended northeasterly to the mouth of Marshall Cut). In addition, the BCDC will take jurisdiction over the marshlands lying between mean high tide and up to 5 ft above mean sea level (MSL), where marsh vegetation is present; tidelands (land lying between mean high tide and mean low tide); and submerged lands (land lying below mean low tide). In relation to salt ponds, the BCDC will claim "salt ponds consisting of all areas which have been diked off from the Bay and have been used during the three years immediately preceding 1969 for the solar evaporation of Bay water in the course of salt production" (BCDC 2012).

Project Applicability: Because tidal marshlands occur on the study area, the Bay Shoreline would be located along either the landward edge of tidal marshland vegetation or at 5 ft above MSL, whichever occurs first. In areas with no tidal marshland vegetation, the line is set at MHW. A 100-ft area extending laterally landward of this Bay Shoreline would be jurisdictional as Shoreline Band. MHW was estimated in the field to coincide with the lower limit of marsh vegetation at 5.23 feet NAVD88. The Bay Shoreline at this site therefore is at MHW where no marsh occurs and at the upper edge of marsh vegetation where it is present. Therefore, a BCDC permit would be required for the activities proposed as part of the project.

3.3.2 City of Brisbane Municipal Code

The City of Brisbane Municipal Code contains all ordinances for Brisbane. Title 12, Streets, Sidewalks, and Public Places, includes regulations relevant to biological resources in the study area as discussed below.

Tree Regulations. Municipal Code Section 12.12, Tree Regulations, establishes regulations for the protected trees, defined in section 12.12.020 as:

1. Any California bay (*Umbellularia californica*), coast live oak (*Quercus agrifolia*), or California buckeye (*Aesculus californica*) having a main stem or trunk which measures thirty (30) inches or greater in circumference at a height of twenty-four (24) inches above natural grade.
2. Any species of native or nonnative tree, in addition to those identified in subsection (1) above, designated as a protected tree on recommendation of the parks and recreation commission as adopted by resolution of the city council, based upon its finding and determination that such species uniquely contributes to the scenic beauty of the city or provides special benefits to the natural environment or wildlife.
3. Any tree designated as a protected tree by resolution of the city council.
4. Any tree, regardless of size, originally required by the city to be planted as a condition for the granting of a permit, license, or other approval, or any tree that existed at the time of the granting of such permit, license, or other approval and required by the city to be preserved as part of such approval.
5. Any tree, regardless of size, required by the city to be planted as a replacement for an unlawfully removed tree.
6. Any tree, regardless of size, planted or maintained by the city.
7. Any street tree which is not otherwise described in subsections (1) through (6) above, having a main stem or trunk which measures thirty (30) inches or greater in circumference at a height of twenty-four (24) inches above natural grade.
8. Where three (3) or more trees of any one or more species, each having a main stem or trunk which measures thirty (30) inches or greater in circumference at a height of twenty-four (24) inches above natural grade, are proposed to be removed at the same time from the same property or from contiguous properties under common ownership, such trees shall collectively be regarded as a protected tree.

Additionally, section 12.12.404 defines the permit requirements and exceptions for tree removal:

Permit Requirement. Except as otherwise provided in subsection B of this section, it is unlawful for any person to destroy, remove, or severely trim, or cause to be destroyed, removed, or severely trimmed:

1. Any protected tree; or
2. Any other tree having a main stem or trunk which measures thirty (30) inches or greater in circumference at a height of twenty-four (24) inches above natural grade, without first having obtained a permit to do so pursuant to this chapter. This requirement shall apply to every owner or occupant of real property within the city, and to every person responsible for destroying, removing, or severely trimming a tree for which a tree removal permit is required under this chapter, regardless of whether such person is engaged in a tree removal business.

B. Exceptions. The permit requirement set forth in subsection A of this section shall not apply to any of the following:

1. Emergencies. If the condition of a protected tree presents an immediate hazard to life or property, it may be removed without a permit on order of the city manager, the city engineer, the planning director, the chief of police, or the fire chief.
2. City Employees. This chapter shall not apply to the removal of any trees on city-owned property by city employees or any person retained by the city for the purpose of removing such trees.
3. Public Utilities. Public utilities subject to the jurisdiction of the State Public Utilities Commission may without a permit take such action as may be necessary to comply with the safety regulations of the commission and as may be necessary to remove a direct and immediate hazard to their facilities within the public utility lands or easement areas in which the same may be located.
4. Project Approval. Where removal of a protected tree has been authorized as part of a development approval granted by the city, no permit shall be required under this chapter for removal of such tree.

Project Applicability: While trees which meet the definition of protected trees are present in the study area, the project meets the definition for Exception 2: *City Employees*, thus a permit would not be required for the removal of any protected trees as a result of this project.

3.3.3 Brisbane General Plan

The City of Brisbane General Plan includes policies and programs relevant to the environmental factors potentially affected by the proposed project, including the following:

- *Policy 130:* Conserve water resources in the natural environment.
  - *Program 130a:* As an ongoing part of land use planning and CEQA analysis, determine whether proposals could affect water resources.
  - *Program 130b:* Require, as appropriate, project analysis of drainage, siltation, and impacts on vegetation and water quality.
- *Policy 130.*1: The City requires restoration of wetland losses. The determination of which land areas are wetlands will be done by those Federal and State agencies having jurisdiction. The City, however, is especially concerned with those wetlands surrounding the perimeter of the Brisbane Lagoon, the Bay shoreline, the Levinson Marsh and the Quarry sediment ponds. The ratios of restoration may exceed the regulatory agencies' mitigation minimums.
- *Policy 130.*2: Consider wetland restoration as part of a flood control project.
- *Policy 131:* Emphasize the conservation of water quality and riparian and other water-related vegetation, especially that which provides habitat for native species, in planning and maintenance efforts.
- *Policy 133*. Reduce the amount of sediment entering waterways.
  - *Program 133a:* Participate in programs to improve water quality in the Lagoon and the Bay.

- *Program 133b*: Require all development, especially that involving grading, to exercise strict controls over sediment.

- *Policy 134*: Reduce the amount of pollutants entering waterways.
  - *Program 134a*: Cooperate with the Water Quality Control Board and County Department of Environmental Health and participate in the NPDES Program to monitor and regulate point and non-point discharges.
  - Program 134c: Encourage wetlands restoration projects to remove or fix toxicants and reduce siltation.
  - Program 134d: Utilize wetlands restoration projects to remove or fix toxicants and reduce siltation where appropriate.

Project Applicability: The project is located within the Brisbane General Plan area and would need to conform to all applicable requirements. The project will include restoration of tidal marsh to compensate for impacts to wetlands, incorporates measures to prevent impacts to water quality within the channel and the lagoon, and will reduce siltation.

Section 4. Environmental Setting

4.1 General Project Area Description

The 3.55-ac study area is located within the *San Francisco South*, *California* 7.5-minute USGS quadrangle. The study area has relatively flat topography immediately adjacent to the channel. The Guadalupe Channel itself flows east to west, and is fed by Guadalupe Valley Creek, which is located underground immediately upstream of the project but originates to the west on San Bruno Mountain in Devil's Arroyo. The study area is bordered on its west and south by Bayshore Boulevard and Machinery Road, with commercial structures along the west side of the Bayshore Boulevard. This commercial zone eventually gives way to residential development, which continues up the eastern flank of San Bruno Mountain. Immediately to the north is the Brisbane Fire Department. At the eastern edge of the study area, the Guadalupe Channel flows into the Brisbane Lagoon, which is separated from the San Francisco Bay by the U.S. Highway 101 causeway.

Elevations in the study area range from approximately 4 ft to 18 ft above sea level. The soil units in the study area include: (1) Urban land and (2) Urban land-Orthents, reclaimed complex, 0 to 2 percent slopes. Urban land and Orthents soils are defined as well drained mixed alluvium that are nonsaline and consist mostly of urban land soil composition (SCS 1991).

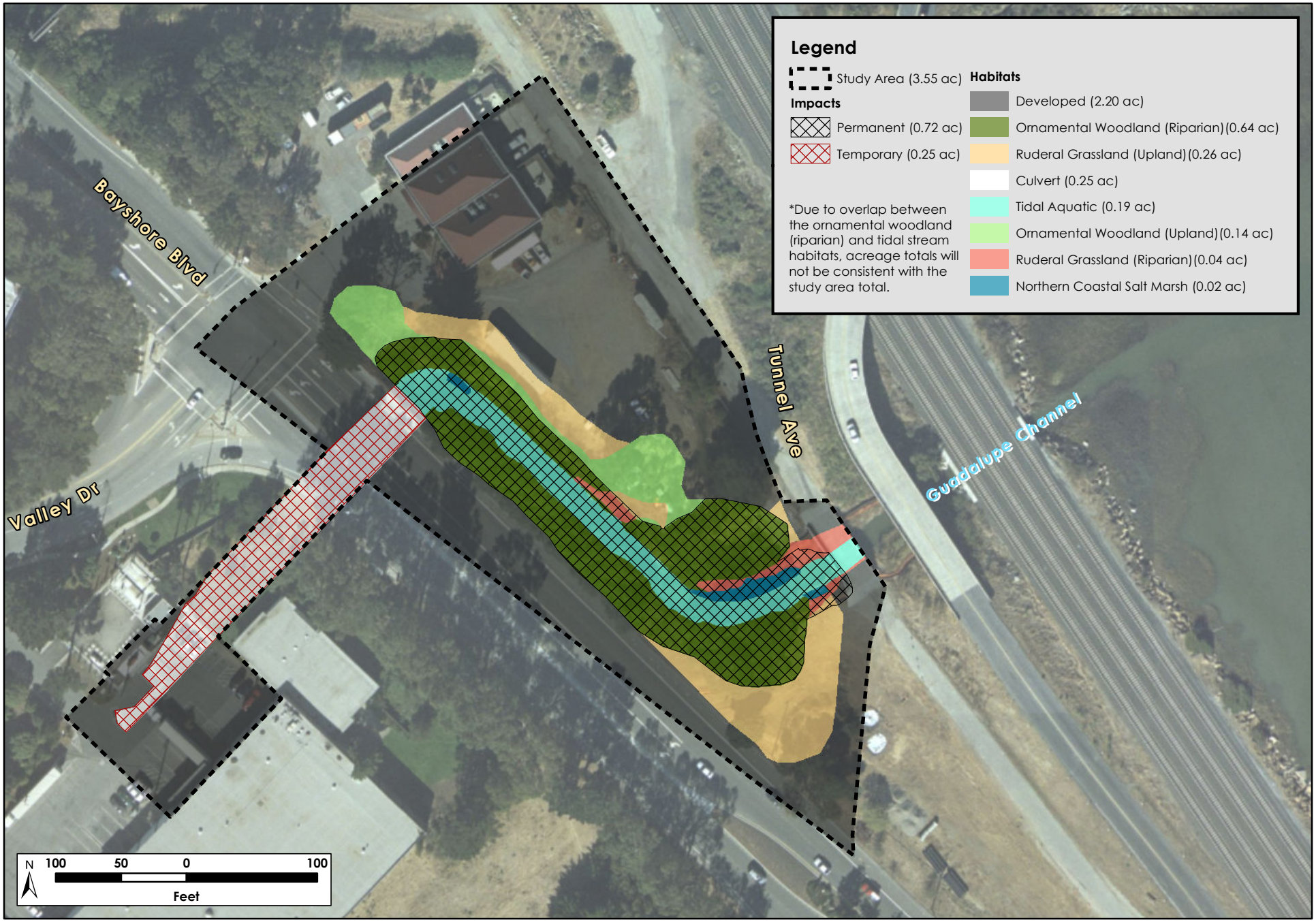
4.2 Biotic Habitats

Reconnaissance-level surveys identified eight habitat types/land uses in the study area: developed (2.20 ac), ornamental woodland (riparian) (0.64 ac), ruderal grassland (upland) (0.26 ac), culvert (0.25 ac), tidal aquatic (0.19 ac), ornamental woodland (upland) (0.14 ac), ruderal grassland (riparian) (0.04 ac), and northern coastal salt marsh (0.02 ac) (Figure 3). These habitats are described in detail below. Plant species observed during the reconnaissance survey are listed in Appendix A.

Photo 1. Developed habitat along Guadalupe Channel.

4.2.1 Developed

Vegetation. The developed habitat type occurs around the edges of the study area and includes Bayshore Boulevard along the southwestern edge of the study area, Machinery Way to the south and east, and the Brisbane Fire Station to the north (Photo 1).



N:\Projects\2440-02\Reports\BRR\Fig 3 Habitats and Impacts Map.mxd

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 3. Habitats and Impacts Map

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A large area covered in mulch also occurs in the southern corner of the study area. Due to the minimal (less than 5%) vegetative cover, compacted soils, and mulch covering, this area is included in the developed habitat type.

Wildlife. The wildlife most often associated with developed areas are those that are tolerant of periodic human disturbances, including introduced species such as the European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), and black rat (*Rattus rattus*). Numerous common, native species are also able to utilize these habitats, including the western fence lizard (*Sceloporus occidentalis*), striped skunk (*Mephitis mephitis*), and birds such as the American crow (*Corvus brachyrhynchos*), Anna's hummingbird (*Calypte anna*), California towhee (*Melozone crissalis*), bushtit (*Psaltriparus minimus*), and California scrub-jay (*Aphelocoma californica*), all of which were observed in the study area during the reconnaissance survey.

4.2.2 Ornamental Woodland (Riparian)

Vegetation. Ornamental woodland is most dense along the west side of Guadalupe Channel where it forms the riparian canopy of the channel (Photo 2). This habitat type is dominated by escaped non-native ornamental species, including lollypop tree (*Myoporum laetum*), blue gum (*Eucalyptus globulus*), and blackwood acacia (*Acacia melanoxylon*). The understory here is sparse owing to the dense canopy cover, and is almost exclusively English ivy (*Hedera helix*). The California Invasive Plant County (Cal-IPC) ranks English ivy as being highly invasive. It ranks lollypop tree as moderately invasive, with blue gum and blackwood acacia given a limited rating. A small component of native tree and shrub species do occur in the ornamental forest (less than 1% of habitat), and include coast live oak (*Quercus agrifolia*), toyon (*Heteromeles arbutifolia*), and California buckeye (*Aesculus californica*).

Photo 2. Ornamental woodland provides riparian habitat along Guadalupe Channel.

Wildlife. Riparian woodlands in California generally support exceptionally rich animal communities and contribute disproportionately to landscape-level species diversity. However, the woodland in the study area is of relatively low quality because it is composed primarily of introduced tree species. Eucalyptus trees provide foraging habitat for chestnut-backed chickadees (*Poecile rufescens*), hooded orioles (*Icterus cucullatus*), and yellow-rumped warblers (*Setophaga coronata*), and foraging and nesting habitat for Anna's hummingbirds. The low structural diversity of the woodland within the study area (i.e., the absence of dense understory and sub-canopy vegetation) and the paucity of native vegetation limits the likelihood that it might be used by riparian-obligate species. Nevertheless, a number of more ubiquitous

wildlife species inhabit this woodland, including mammals such as the raccoon (*Procyon lotor*) and striped skunk, which are likely to use the woodland within the study area as foraging habitat and a movement corridor.

Raptors, such as red-tailed hawks (*Buteo jamaicensis*) and red-shouldered hawks (*Buteo lineatus*), may nest in ornamental woodlands, especially those with eucalyptus trees, provided the trees are mature enough and have sufficient structural complexity to support their large stick nests. Trees within the study area provide suitable habitat for nesting raptors, but no evidence of previous raptor use of the site (i.e., large stick nests) was detected within the study area during the reconnaissance survey. However, an inactive raptor nest was detected in a pine (*Pinus* sp.) tree approximately 75 ft from the west edge of the study area, along the west side of Bayshore Boulevard. An examination of trees and structures in the study area also failed to find any large cavities that might provide suitable bat roosting habitat. Therefore, large roosting or maternity colonies of bats are not expected to occur in the study area.

4.2.3 Ruderal Grassland (Upland)

Vegetation. Ruderal (i.e., disturbed) California annual grassland habitat occurs along the eastern stream bank of the study area, and along the western bank near the eastern end of the study area at Machinery Road (Photo 3). Both plant diversity and vegetative cover was low in this habitat type, with the species composition predominately consisting of non-native grasses and forbs including wild oat (*Avena* sp.), ripgut brome (*Bromus diandrus*), and hairy vetch (*Vicia villosa*). This habitat was also significantly manipulated, with many areas covered in a dense layer of mulch.

Photo 3. Ruderal annual grassland, both upland and riparian, occurs alongside the tidal stream outside the northern coastal salt marsh.

Wildlife. Wildlife use of California annual grasslands in the study area is limited by frequent human disturbance, an abundance of non-native and invasive species, and isolation of the grassland habitat remnants from more extensive grasslands. As a result, wildlife species associated with extensive grasslands, such as the grasshopper sparrow (*Ammodramus savannarum*) and western meadowlark (*Sturnella neglecta*), are absent from the small patches of grassland in the study area. Most of the bird species using this habitat during the breeding season nest in nearby landscaped areas, using the California annual grassland only for foraging. Such species include the mourning dove (*Zenaida macroura*), lesser goldfinch (*Spinus psaltria*), dark-eyed junco (*Junco hyemalis*), American crow, and Brewer's blackbird (*Euphagus cyanocephalus*). Similarly, a few species nesting on nearby buildings, such as the cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (*Hirundo rustica*), rock pigeon, black phoebe (*Sayornis nigricans*), and European starling,

also forage on or over the California annual grassland habitat. Several other species of birds use the grassland during the nonbreeding season. These species, which include the golden-crowned sparrow (*Zonotrichia atricapilla*) and white-crowned sparrow (*Zonotrichia leucophrys*), forage on the ground or in herbaceous vegetation, primarily for seeds.

Few species of reptiles and amphibians occur in the California annual grassland in the study area due to its disturbed nature and low habitat heterogeneity. Nevertheless, reptiles such as the western fence lizard and gopher snake (*Pituophis melanoleucus*) occur in this habitat type. Smaller amphibians such as the Pacific treefrog (*Hyliola regilla*), which require freshwater marshes to breed in, are expected to occur in the study area or project vicinity, as there is freshwater habitat located 0.2 mi north of the study area, in drainage ditches along an abandoned railroad right-of-way. Small mammals expected to be present include the native western harvest mouse (*Reithrodontomys megalotis*) and nonnative house mouse, Norway rat, and black rat. Small burrowing mammals, such as the Botta's pocket gopher (*Thomomys bottae*) and California ground squirrel (*Spermophilus beecheyi*), may also be present, and larger mammals, such as the striped skunk, Virginia opossum (*Didelphis virginiana*), and raccoon are likely to occur here.

4.2.4 Culvert

Vegetation. The culverts in the study area consists of two large concrete box culverts which are devoid of vegetation (Photo 4). The culverts run from the western, upstream end of Guadalupe Channel underground for approximately 250 feet to a collection basin adjacent to the city's sanitary sewer pump station. Additionally, multiple underground storm drains empty into this culvert, which carries water from ephemeral streams originating on San Bruno Mountain to the Bay.

Photo 4. Concrete box culvert

Wildlife. Few wildlife species are expected to occur in or on the two large concrete box culverts. These culverts do not contain any vegetation, which reduces their attractiveness to wildlife. Nevertheless, the culverts do contain water, so it is possible, although perhaps not likely, that small fish may occur in at least the eastern end of the culverts. Moreover, black phoebes occur in the box culverts; a previously used but unoccupied black phoebe nest was detected just inside one of the two box culverts on the September 11 wildlife reconnaissance survey. No swallow nests were detected on either culvert during the September 11 wildlife reconnaissance survey, and no crevices within the culvert provide suitable roost sites for bats.

4.2.5 Tidal Aquatic

Photo 5. Tidal aquatic habitat in the eastern end of the study area.

Vegetation. Within the study area, Guadalupe Channel can be characterized as tidal aquatic habitat with both freshwater and brackish inputs (Photo 5). The tidal action in the channel is slightly restricted by the U.S. Highway 101 causeway culverts muting tidal action in Brisbane Lagoon. Guadalupe Channel originates on San Bruno Mountain as Guadalupe Creek, at approximately 200 ft elevation. From here, Guadalupe Creek flows eastward, predominately though a system of underground pipes and ditches before reemerging from the box culverts at Guadalupe Channel. From there, the tidal stream flows into Brisbane Lagoon which is connected to the San Francisco Bay. An obvious high tide line was observed on the vegetation along the banks of Guadalupe Channel, along with halophytes such as pickleweed (*Salicornia pacifica*) and alkali heath.

Wildlife. The belted kingfisher (*Megaceryle alcyon*) and generalist wading birds such as great blue herons (*Ardea herodias*), great egrets (*Ardea alba*), and snowy egrets (*Egretta thula*) may forage for fish and other prey in the channel. Ducks, including the mallard (*Anas platyrhynchos*), may also forage on aquatic invertebrates and aquatic plants in this habitat. Black phoebes forage along the banks of the channel; old, unoccupied phoebe nests were discovered during the reconnaissance survey on the Caltrain bridge just downstream of the study area, as well as just inside one of the Guadalupe Channel tunnels under Bayshore Boulevard. The Pacific treefrog and western toad (*Anaxyrus boreas*) may also occur in less brackish portions of the channel.

No fish were observed in the tidal aquatic habitat during the reconnaissance survey on September 11, 2018. However, numerous fish species are known to occur in Brisbane Lagoon, such as the introduced striped bass (*Morone saxatilis*), brown smoothhound shark (*Mustelus henlei*), staghorn sculpin (*Leptocottus armatus*), rubberlip seapearch (*Rhacochilus toxotes*), California halibut (*Paralichthys californicus*), white sturgeon (*Acipenser transmontanus*), and leopard shark (*Triakis semifasciata*), among others. Thus, small individuals of those species capable of tolerating muted tidal waters (brackish water), could occur in the tidal channel in the study area.

4.2.6 Ornamental Woodland (Upland)

Vegetation. The vegetation of the ornamental woodlands in the uplands of the study area is similar in composition to the adjacent riparian areas, mostly consisting of mature blue gum trees. This area is

differentiated from the riparian zone in that the vegetation is rooted above top of bank, is not contiguous with the canopy of the riparian area, and does not contribute allochthonous input to Guadalupe Channel.

Wildlife. The wildlife that occurs in the ornamental woodlands in the uplands of the study area is essentially the same as the wildlife community that occupies the ornamental woodlands in the riparian zone of the study area. Species that occur in this vegetation community include generalist species, especially those that are not associated with sensitive habitat types. Species associated with ornamental woodlands in the uplands of the study area include bird species such as chestnut-backed chickadees, Anna's hummingbirds, hooded orioles and yellow-rumped warblers, and mammal species such as raccoon and striped skunk.

4.2.7 Ruderal Grassland (Riparian)

Vegetation. The vegetation composition of the riparian ruderal grassland is identical to the adjacent upland ruderal grassland, discussed above. Riparian ruderal grassland occurs in the study area below the top of bank and above the high tide line of Guadalupe Channel.

Wildlife. The wildlife community that occurs in the ruderal riparian grassland is essentially the same as the wildlife community that occurs in the ruderal grassland. Western fence lizards, gopher snakes, California ground squirrels, and Botta's pocket gopher may all occur here.

4.2.8 Northern Coastal Salt Marsh

Vegetation. The northern coastal salt marsh in the study area is limited to the fringes of Guadalupe Channel, between the MHW and the high tide line where saturation of the root zone occurs on a regular basis (Photo 6). The width of this zone is narrow—approximately 8 ft in the higher quality habitat near Machinery Way, and transitioning to small discontinuous patches along the eastern bank further west. This habitat is dominated by pickleweed, with lesser but still significant amounts of alkali heath (*Frankenia salina*) and alkali Russian thistle (*Salsola soda*).

Photo 6. Northern coastal salt marsh dominated by pickleweed along Guadalupe Channel.

Wildlife. Coastal salt marsh typically supports a diversity of common species of amphibians, reptiles, birds, and mammals. However, there is a very limited amount of salt marsh habitat present in the study area. Moreover, there is very little coastal salt marsh habitat within 700 ft of the study area, occurring primarily in

the northwest corner of Brisbane Lagoon. The very limited extent of coastal salt marsh habitat limits its value to marsh-dependent animal species. Some bird species that are typically associated with coastal salt marsh, such as the green-winged teal (*Anas crecca*), northern pintail (*Anas acuta*), gadwall (*Anas strepera*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), least sandpiper (*Calidris minutilla*), and great egret (*Ardea alba*) are unlikely to occur within the study area, primarily because of the limited extent of the habitat, although they are likely to occur in Brisbane Lagoon; both least sandpiper and great egret were observed in the Lagoon during the reconnaissance survey. More generalist species such as the mallard, great blue heron, California towhee, black phoebe, and common raven (*Corvus corax*) are likely to use the coastal salt marsh habitat present in the study area. The California vole (*Microtus californicus*), often the most common small mammal species found in salt marshes in the region, may occur in this habitat in the study area, and the western harvest mouse and deer mouse (*Peromyscus maniculatus*) may also be present. The California Ridgway's rail (*Rallus obsoletus obsoletus*), federally and state listed as endangered, typically nests in broad marshes with well-developed tidal channels, conditions that are absent from both the study area and the downstream Brisbane Lagoon, approximately 700 ft from the study area. Thus, it is not expected to occur in the study area.

Section 5. Special-Status Species and Sensitive Habitats

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 CNDDB records of special-status plant species in the general vicinity of the study area and Figure 5 depicts CNDDB records of special-status animal species. These generalized maps show areas where special-status species are known to occur or have occurred historically.

Legend

Study Area

5-mile Radius

CNDDB Records

Plants

Specific Location

Approximate Location

General Area

San Francisco gumplant
coastal triquetrella
San Francisco collinsia
blue coast gilia
San Francisco campion
fragrant fritillary
dark-eyed gilia
alkali milk-vetch
adobe sanicle
San Francisco owl's-clover
San Francisco Bay spineflower
coastal triquetrella
chaparral ragwort
Presidio manzanita
Franciscan manzanita
round-headed Chinese-houses
San Francisco lessingia
water star-grass
bristly sedge
congested-headed hayfield tarplant
Franciscan thistle
northern curly-leaved monardella
Kellogg's horkelia
beach layia
rose leptosiphon
compact cobwebby thistle
robust spineflower
short-leaved evax
Scouler's catchfly
bent-flowered fiddleneck
dark-eyed gilia
Pacific manzanita
Choris' popcornflower
two-fork clover
Point Reyes horkelia
white-rayed pentachaeta
western leatherwood
pappose tarplant
rose leptosiphon
arcuate bush-mallow
Franciscan onion
Marin knotweed dark-eyed gilia
California seablite
Diablo helianthella
Hunters Point
John McLaren Park
McLaren Park
Lake Merced
Daly City
Broadmoor
Brisbane
Guadalupe Valley
Visitacion Point
Woodlawn Cemetery
Holy Cross Cemetery
Gellert Park
Skyline College
South San Francisco
San Bruno
Point Park
Point San Bruno
San Francisco Int'l Airport
Millegrd Ridge
California Golf Club of SF
Colma Creek
PACIFIC OCEAN

N 1.1 0.55 0 1.1
Miles

N:\Projects\2440-02\Reports\BRR\Fig 4 Special Status Plant Species.mxd

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 4. Special-Status Plant Species
Guadalupe Channel Erosion Control Project (2440-02)
December 2018

Legend

- Study Area
- 5-mile Radius

CNDDB Records

Wildlife

- Specific Location
- Approximate Location
- General Area

Note: CTS = California Tiger Salamander, CRFL = California Red-legged Frog

PACIFIC OCEAN

American badger
bumblebee scarab beetle
bank swallow
western bumble bee
Mission blue butterfly
western bumble bee
Townsend's big-eared bat
Bay checkerspot butterfly
San Francisco forktail damselfly
Bay checkerspot butterfly
western bumble bee
western pond turtle
Opler's longhorn moth
San Francisco Bay Area leaf-cutter bee
western bumble bee
Tomales isopod
tidewater goby
bank swallow
California black rail
CRLF
obscure bumble bee
hardhead
bank swallow
saltmarsh common yellowthroat
sandy beach tiger beetle
Mission blue butterfly
hoary bat
callippe silverspot butterfly
obscure bumble bee
Mission blue butterfly
hoary bat
Mission blue butterfly
callippe silverspot butterfly
California Ridgway's rail
San Francisco forktail damselfly
Mission blue butterfly
western bumble bee
Mission blue butterfly
San Bruno elfin butterfly
Stage's dufourine bee
incredible harvestman
callippe silverspot butterfly
Mission blue butterfly
Bay checkerspot butterfly
Bay checkerspot butterfly
callippe silverspot butterfly
Mission blue butterfly
North American porcupine
callippe silverspot butterfly
Mission blue butterfly
Alameda song sparrow
Tomales isopod
western bumble bee
San Bruno elfin butterfly
Mission blue butterfly
Mission blue butterfly
CRLF
CRLF
San Bruno elfin butterfly
hoary bat
CRLF
bumblebee scarab beetle
Mission blue butterfly
CRLF
CRLF
saltmarsh common yellowthroat
obscure bumble bee
big free-tailed bat
western bumble bee
Myrtle's silverspot butterfly
CRLF
CRLF
saltmarsh common yellowthroat
fringed myotis
CRLF
California black rail
California Ridgway's rail
longfin smelt
California Ridgway's rail
hoary bat
Mission blue butterfly
callippe silverspot butterfly
California Ridgway's rail
California Ridgway's rail
Alameda song sparrow
hoary bat
CRLF
San Francisco forktail damselfly
CRLF
CRLF
pallid bat
longfin smelt

N 1.1 0.55 0 1.1
Miles

N:\Projects\2440-02\Reports\BRR\Fig 5 Special Status Animal Species.mxd

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 5. Special-Status Animal Species
Guadalupe Channel Erosion Control Project (2440-02)
December 2018

5.1 Special-Status Plant Species

The CNPS (2018) and CNDDB (2018) identify 102 special-status plant species as potentially occurring in at least one of the nine USGS quadrangles containing or surrounding the study area for CRPR 1 or 2 species, or in Santa Mateo County for CRPR 3 and 4 species. All of those potentially occurring special-status plant species were determined to be absent from the study area for at least one of the following reasons: (1) lack of suitable/high quality habitat types; (2) absence of specific microhabitat or edaphic requirements, such as serpentine soils; (3) the elevation range of the species is outside of the range on the study area; (4) the species is considered extirpated. Additionally, the entire site is highly disturbed and surrounded by development. The project vicinity historically consisted of a large wetland complex until it was drained and filled, as such, the soils here are highly manipulated and lack a native soil profile. Most of the areas lacking canopy have been covered in mulch and only support non-native vegetation, and the ornamental woodland is dense and understory vegetation is largely absent. The only native vegetation type, northern coastal salt marsh, is significantly degraded in quality, small in extent, and patchy and discontinuous along Guadalupe Channel. Additionally, the site was surveyed by a qualified botanist during the blooming period of most northern coastal salt marsh-adapted CRPR plants (July 10 and 17, 2018), and no special status marsh plants were detected. The ornamental woodland lacks any understory beyond thick leaf litter and eucalyptus bark and invasive English ivy, and is also entirely unsuitable for any CRPR species that can occur in riparian or woodland habitats in the project vicinity. Therefore, due to the lack of suitable habitat, there is no potential for special-status plant species to occur in the study area and surveys are not warranted. Appendix B lists the species identified in the CNPS and CNDDB searches that were considered for potential occurrence.

5.2 Special-Status Animal Species

The legal status and likelihood of occurrence in the study area of special-status animal species known to occur, or potentially occurring, in the project region are presented in Table 2. Most of the special-status species listed in Table 2 are not expected to occur in the study area because it lacks suitable habitat, is outside the known range of the species, and/or is isolated from the nearest known extant populations by development or otherwise unsuitable habitat. Special-status animal species that were determined to be absent from the study area for these reasons include the Mission blue butterfly (*Icaricia icarioides missionensis*), San Bruno elfin butterfly (*Callophrys mossii bayensis*), callippe silverspot butterfly (*Speyeria callippe callippe*), Bay checkerspot butterfly (*Euphydryas editha bayensis*), green sturgeon (*Acipenser medirostris*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), western pond turtle (*Actinemys marmorata*), California Ridgway's rail, California black rail (*Laterallus jamaicensis coturniculus*), western snowy plover (*Charadrius alexandrinus nivosus*), California least tern (*Sterna antillarum browni*), black skimmer (*Rynchops niger*), burrowing owl (*Athene cunicularia*), salt marsh harvest mouse (*Reithrodontomys raviventris*), American badger (*Taxidea taxus*), and salt marsh wandering shrew (*Sorex vagrans halicoetes*).

Animal species that could occur in the study area, but are expected to occur only as a visitor, migrant, or transient, and are not expected to reside or breed, to occur in large numbers, or otherwise to make substantial

use of the study area include the longfin smelt, Central California coast steelhead, white-tailed kite (*Elanus leucurus*), loggerhead shrike (*Lanius ludovicianus*), San Francisco common yellowthroat (*Geothlypis trichas sinuosa*), Alameda song sparrow (*Melospiza melodia pusillula*), Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*), and pallid bat (*Antrozous pallidus*). These species are described in more detail in Appendix C.

Table 2. Special-Status Animal Species, Their Status, and Potential Occurrence in the Study Area

Name	*Status	Habitat	Potential for Occurrence in the Study Area
Federal or State Endangered, Rare, or Threatened Species			
Mission blue butterfly (*Icaricia icarioides missionensis*)	FE	Coastal chaparral and coastal grasslands. Larval host plants are *Lupinus* spp.	**Absent.** Remaining populations of the Mission blue butterfly are found in only a few locations around the San Francisco Bay area, including the Skyline ridges and San Bruno Mountain in San Mateo County. No suitable habitat or host plants are present in the study area. Determined to be absent.
San Bruno Elfin Butterfly (*Callophrys mossii bayensis*)	FE	Coastal mountains near San Francisco Bay in the fog-belt of steep, north-facing slopes. Larval food plant is *Sedum spathulifolium*.	**Absent.** No suitable habitat or host plants are present in the study area. Determined to be absent.
Callippe silverspot butterfly (*Speyeria callippe callippe*)	FE	Grasslands of the northern San Francisco Bay region. Larval host plant is *Viola pedunculata*.	**Absent.** All known populations of this species are currently restricted to San Bruno Mountain, Milagra Ridge, the San Francisco Peninsula Watershed, and Montara Mountain. No suitable habitat or host plants are present in the study area. Determined to be absent.
Bay checkerspot butterfly (*Euphydryas editha bayensis*)	FT	Native grasslands on serpentine soils. Larval host plants are *Plantago erecta* and/or *Castilleja* sp.	**Absent.** Serpentine soils and the associated host plants do not occur in the study area. Determined to be absent.

Name	*Status	Habitat	Potential for Occurrence in the Study Area
Green sturgeon (*Acipenser medirostris*)	FT, CSSC	Spawns in large river systems such as the Sacramento River; forages in nearshore oceanic waters, bays, and estuaries.	**Absent.** No suitable spawning habitat is present in the study area, and the species is not known to spawn anywhere in the south San Francisco Bay area. Green sturgeon may forage infrequently, and in low numbers, in the San Francisco Bay approximately 0.5 mi east of the study area, and the culverts under the Sierra Point Parkway and U.S. Hwy 101 provide an aquatic connection between the Bay and Brisbane Lagoon. However, the Guadalupe Channel is not deep enough to provide suitable habitat for green sturgeon. Determined to be absent.
Central California coast steelhead (*Oncorhynchus mykiss*)	FT	Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats.	**Absent as Breeder.** No suitable spawning habitat is present in or upstream from the study area, and the species is not known to spawn in the site vicinity. The culverts under the Sierra Point Parkway and U.S. Hwy 101 provide an aquatic connection between the Bay and the study area, which provides a pathway for the occasional stray steelhead to wander into the study area. However, due to the marginal conditions in this narrow, shallow channel even for foraging steelhead, this species is expected to occur in the study area infrequently and in low numbers, if it occurs there at all.
Longfin smelt (*Spirinchus thaleichthys*)	ST, FC	Coastal waters; Cool bays and estuaries; spawns in rivers and bays; euryhaline.	**Absent as Breeder.** Species may be present in the tidal reaches of sloughs in the South Bay, and stray individuals could occur within the reach of the Guadalupe Channel in the study area, which is tidally influenced. However, no suitable spawning habitat is present, and due to the marginal conditions in this narrow, shallow channel even for foraging smelt, individuals are expected to occur in the study area infrequently and in small numbers (if at all), and only from late fall to early spring**.**

Name	*Status	Habitat	Potential for Occurrence in the Study Area
California tiger salamander (*Ambystoma californiense*)	FT, ST	Vernal or temporary pools in annual grasslands or open woodlands.	**Absent.** Southeastern San Mateo County represents the northernmost limit of the species' range on the San Francisco peninsula, and no suitable habitat is present in the study area. The closest occurrence in the project vicinity is at Lake Lagunita on the Stanford campus, which is approximately 20 mi south of the study area (CNDDB 2018). Determined to be absent.
San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)	FE, SE	Prefer densely vegetated freshwater habitats. May use upland burrows for aestivation.	**Absent.** This species is not expected to be present in the study area because it occurs in freshwater, not brackish water, and because its preferred prey species, the California red-legged frog, is absent from the study area and the vicinity. Although the study area is located near the known range of the species, there are no known recent records of the species in the project vicinity, and the study area is isolated from known extant populations by extensive urban development and two major multilane divided highways. Determined to be absent.
California red-legged frog (*Rana draytonii*)	FT, CSSC	Streams, freshwater pools, and ponds with emergent or overhanging vegetation.	**Absent.** No suitable breeding habitat is present in the study area and there is no habitat connectivity with known populations (CNDDB 2018). The most recent record of the species in the project vicinity is from 1991 near Lomita Park, over 4.4 mi to the south of the study area (CNDDB 2018). Further, this species has been extirpated from the project vicinity due to development, the alteration of hydrology of its aquatic habitats, and the introduction of non-native predators such as non-native fishes and bullfrogs (*Lithobates catesbeianus*). Determined to be absent.

Name	*Status	Habitat	Potential for Occurrence in the Study Area
California Ridgway's rail (*Rallus obsoletus obsoletus*)	FE, SE, SP	Salt marshes characterized by large extents of saltmarsh cordgrass (*Spartina* spp.) or pickleweed (*Salicornia* spp.), with well-developed tidal channels.	**Absent.** No suitable marsh habitat for this species exists in the study area or within 700 ft of the study area. The species is known to occur at Heron's Head Park 3.6 mi northeast of the study area, as well as at various locations around San Francisco International Airport, approximately 2.75 mi south-southeast of the study area (Cornell Lab of Ornithology 2018). Although there is a small patch of salt marsh habitat present in the study area, it is too small to provide suitable habitat for the Ridgway's rail. Pickleweed occurs within 700 ft of the study area, at the northwest corner of Brisbane Lagoon, and adjacent to a tidal channel, however, this patch of pickleweed is isolated from any other suitable habitat, and is not tall enough for Ridgway's rail. Determined to be absent.
California black rail (*Laterallus jamaicensis coturniculus*)	ST, SP	Breeds in fresh, brackish, and tidal salt marsh.	**Absent.** No suitable marsh habitat for this species exists on the study area or in the vicinity. The salt marsh habitat that is present is too small in size to support this species. This species is known to occur in South Bay marshes, primarily south of the San Mateo Bridge, SR-92 (Cornell Lab of Ornithology 2018). Determined to be absent.
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT, CSSC	Sandy beaches on marine and estuarine shores and salt pans in Bay saline managed ponds.	**Absent.** No suitable nesting or foraging habitat is present in the study area, although the species does occur infrequently in the vicinity as a migrant. Determined to be absent.
California least tern (*Sterna antillarum browni*)	FE, SE, SP	Nests along the coast on bare or sparsely vegetated, flat substrates. In the South Bay, nests in salt pans and on an old airport runway. Forages for fish in open waters.	**Absent**. Suitable nesting habitat for the California least tern is not present in the study area. Least terns have been recorded in the project vicinity infrequently during migration (Cornell Lab of Ornithology 2018). However, least terns are not expected to forage in the study area due to the lack of any open water habitats supporting fish, although they could occur in the adjacent Brisbane Lagoon. Determined to be absent.

Name	*Status	Habitat	Potential for Occurrence in the Study Area
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	FE, SE, SP	Salt marsh habitat dominated by common pickleweed or alkali bulrush.	**Absent.** Salt marsh habitat in the study area is not suitable for this species due to its isolation from other marsh habitats and limited extent. Further**,** the salt marsh harvest mouse is not known to occur north of the San Mateo Bridge, SR-92 (CNDDB 2018), which is 10.5 mi to the south of the study area. Determined to be absent.
California Species of Special Concern			
Western pond turtle (*Actinemys marmorata*)	CSSC	Permanent or nearly permanent water in a variety of habitats.	**Absent.** No suitable freshwater aquatic habitat is present in the study area and there are no records from the vicinity (CNDDB 2018). Determined to be absent.
Black skimmer (*Rynchops niger*)	CSSC (nesting)	Nests on sparsely vegetated beaches, isolated islands, and levees.	**Absent.** No suitable nesting or foraging habitat is present in the study area. Determined to be absent.
Burrowing owl (*Athene cunicularia*)	CSSC	Nests and roosts in open grasslands and ruderal habitats with suitable burrows, usually those made by California ground squirrels (*Spermophilus beecheyi*).	**Absent.** Burrowing owls are not known to breed in the study area vicinity (CNDDB 2018), and the study area lacks suitable burrowing owl roosting or nesting habitat (i.e., open grasslands with ground squirrel burrows). Thus, the species is not expected to occur in the study area. Determined to be absent.
Loggerhead shrike (*Lanius ludovicianus*)	CSSC (nesting)	Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats.	**Absent as Breeder.** No suitable nesting habitat for this species occurs in the study area or project vicinity. However, individuals may occasionally occur in the study area during migration.
San Francisco common yellowthroat (*Geothlypis trichas sinuosa*)	CSSC (nesting)	Nests in herbaceous vegetation, usually in wetlands or moist floodplains.	**Absent as Breeder.** No suitable nesting habitat for this species occurs in the study area or project vicinity. The lack of extensive northern coastal salt marsh habitat precludes this species presence as a nesting species. This species may occur as an occasional visitor when dispersing, but is determined to be absent as a breeder.

Name	*Status	Habitat	Potential for Occurrence in the Study Area
Alameda song sparrow (*Melospiza melodia pusillula*)	CSSC (nesting)	Nests in salt marsh, primarily in marsh gumplant and cordgrass along channels.	**Absent as Breeder.** No suitable nesting habitat for this species occurs in the study area or project vicinity. The lack of extensive northern coastal salt marsh habitat precludes this species' presence as a nesting species. This species may occur as an occasional visitor when dispersing, but is determined to be absent as a breeder.
Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*)	CSSC (nesting)	Nests in pickleweed dominant salt marsh, adjacent ruderal habitat, moist grasslands, and, rarely, drier grasslands.	**Absent as Breeder.** No suitable nesting habitat for this species occurs in the study area. The lack of extensive northern coastal salt marsh habitat precludes this species presence as a nesting species. This species may occur as an occasional visitor when dispersing, but is determined to be absent as a breeder.
Salt marsh wandering shrew (*Sorex vagrans halicoetes*)	CSSC	Medium to high marsh 6 to 8 ft above sea level with abundant driftwood and common pickleweed.	**Absent.** Salt marsh habitat in the study area is not suitable for this species due to its isolation from other marsh habitats and limited extent. Determined to be absent.
Pallid bat (*Antrozous pallidus*)	CSSC	Forages over many habitats; roosts in caves, rock outcrops, buildings, and hollow trees.	**Absent as Breeder.** Historically, pallid bats were likely present in a number of locations throughout the project region, but their populations have declined in recent decades. This species has been extirpated as a breeder from urban areas close to the Bay, including the study area. No suitable roosting habitat is present in the study area and no known maternity colonies are present on or adjacent to the site. There is a low probability that the species occurs in the project vicinity at all due to urbanization; however, individuals from more remote colonies could potentially forage over the study area on rare occasions.

Name	*Status	Habitat	Potential for Occurrence in the Study Area
American badger (*Taxidea taxus*)	CSSC	Burrows in grasslands and occasionally in infrequently disked agricultural areas.	**Absent.** No suitable habitat is present in the study area, and badgers are not known to occur in the region due to the lack of extensive grasslands and agricultural areas with friable soils, which are needed for digging burrows. Determined to be absent.
California Fully Protected Species			
White-tailed kite (*Elanus leucurus*)	SP	Nests in trees and forages in extensive grasslands or marshes.	**Absent as Breeder.** No suitable nesting habitat for the white-tailed kite is found in the study area, though the species could possibly nest not far outside the study area. The California annual grasslands and mosaic of marsh habitats in the study area provide suitable foraging habitat for the species. This species may occur as a forager in the project vicinity.

Special-Status Species Code Designations

FE = Federally listed Endangered

FT = Federally listed Threatened

FC = Federal Candidate for listing

SE = State listed Endangered

ST = State listed Threatened

SC = State Candidate for listing

CSSC = California Species of Special Concern

SP = State Fully Protected Species

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 2018). Global rankings (G) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas state (S) rankings reflect the condition of a habitat within California. Natural communities are defined using NatureServe's standard heritage program methodology as follows (CDFG 2007):

G1/S1: Less than 6 viable occurrences or less than 2,000 ac.

G2/S2: Between 6 and 20 occurrences or 2,000 to 10,000 ac.

G3/S3: Between 21 and 100 occurrences or 10,000 to 50,000 ac.

G4/S4: The community is apparently secure, but factors and threats exist to cause some concern.

G5/S4: The community is demonstrably secure to ineradicable due to being common throughout the world (for global rank) or the state of California (for state rank).

State rankings are further described by the following threat code extensions:

S1.1: Very threatened

S1.2: Threatened

S1.3: No current threats

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. If an alliance is marked G1-G3, all the vegetation associations within it will also be of high priority. The CDFW provides the Vegetation Classification and Mapping Program's (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2018).

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 (CNDDB 2018) identified four sensitive habitats as occurring within the seven USGS quadrangles containing or surrounding the study area:

serpentine bunchgrass (Rank G2/S2.2), northern maritime chaparral (G1/S1.2), valley needlegrass grassland (G3/S3/1) 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 needlegrass grassland is characterized by a dominance of native needlegrass species (*Stipa* sp.), and no needlegrass species were observed in the study area. Northern maritime chaparral consists predominantly of dense evergreen shrubs such as manzanita (*Arctostaphylos* sp.), chamise (*Adenostoma fasciculatum*), or ceanothus (*Ceanothus* sp.). None of the aforementioned species were observed in the study area. 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 as discontinuous patches along Guadalupe Channel in the study area.

Sensitive Vegetation Alliances. All northern coastal salt marsh in the study area qualifies as a *Sarcocornia pacifica* (*Salicornia depressa*) (Pickleweed mats) Alliance. This alliance is ranked as G4/S3, meaning there are greater than 100 viable occurrences worldwide and/or more than 12,950 hectares, and there are 21-100 viable occurrences statewide and/or more than 2,590-12,950 hectares (Sawyer et al. 2009). As a G4 alliance, the vegetation is considered "*secure, but factors and threats exist to cause some concern.*" Thus the northern coastal salt marsh in the study area qualifies as a sensitive vegetation alliance (CDFW 2018).

Sensitive Habitats (Waters of the U.S./State). The northern coastal salt marsh and tidal aquatic habitat 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.

Riparian. Though comprised largely of ruderal grassland and non-native ornamental woodland, the riparian banks and the habitat they support would be considered jurisdictional by the CDFW and the RWQCB. Riparian habitat extends to the outer edge of the canopy of trees rooted below top of bank of the channel. Any impacts to this habitat (as well as to the tidal aquatic and northern coastal salt marsh habitats in the channel below the riparian banks) would require a Section 401 Water Quality Certification/Waste Discharge Requirement from RWQCB and a Lake and Streambed Alteration agreement from CDFW.

5.4 Non-Native and Invasive Species

Several non-native, invasive plant species occur in the study area. Of these, lollypop tree ('moderately invasive') is the most ubiquitous, consisting of the majority of the riparian woodland on the west side of the study area. Additional Cal-IPC 'moderate' and 'highly' invasive species occur throughout the study area in limited number and extent. These include alkali Russian thistle, Himalayan blackberry (*Rubus armeniacus*), jubata grass (*Cortaderia jubata*), and English ivy.

Section 6. Impacts and Mitigation Measures

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 federally protected wetlands as defined by Section 404 of the Clean Water Act"

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"

Following is a brief summary of potential project impacts on biological resources.

6.1 Impacts on Special-Status Species: 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)

6.1.1 Impacts on the Longfin Smelt, Central California Coast Steelhead, and EFH (Less than Significant)

In the absence of avoidance, minimization, and mitigation measures, the project could potentially have impacts on the longfin smelt (a state listed species and a federal candidate), and the Central California Coast steelhead (federally threatened) (see Table 1 above), as well as on the EFH present in the Guadalupe Channel or in Brisbane Lagoon. Although neither smelt or steelhead are expected to occur in the tidal channel except as stray and occasional wanderers, both may occur in the adjacent Brisbane Lagoon, located approximately 280 ft downstream from the edge of the impacts to the tidal aquatic habitat located within the project footprint (Figure 3).

All project activities are currently proposed for the dry season, June 15 to October 15, with the exception of native container plant installation, which would occur after the onset of the rainy season. Because longfin smelt wander away from spawning areas (which are absent from the project vicinity) primarily during winter, and steelhead are unlikely to be in the Bay near the project during the June 15 – October 15 period, these species are unlikely to be present in Guadalupe Channel during in-channel work activities. Neither species is expected to occur in the study area except as occasional strays, and because spawning and juvenile rearing are not expected to occur in the study area, habitat impacts would be limited primarily to a decrease in the availability of escape cover until the marsh vegetation is restored, the loss of refugia during high flows, and a loss of substrate used for foraging. The project would impact approximately 0.18 acre of tidal aquatic habitat in which these species could potentially occur (see Figure 3). However, regrading of the banks, removal of sediment, and installation of geo-cell webbing and two-inch rock, along with the subsequent proposed planting of native marsh species, shrubs, and herbaceous vegetation within the banks, would eliminate or reduce existing erosion and improve the long-term channel slope stability, thereby reducing the potential for additional or new erosion from this site in the future. Thus, the project could have a long-term beneficial impact on native fish and the occasional smelt and steelhead that might wander into the channel.

Project development also has the potential to cause indirect impacts on wetlands and aquatic habitats due to changes in water quality. However, construction projects in California causing land disturbances that are equal to 1 ac or greater must comply with State requirements to control the 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). Prior to the start of construction/demolition, a Notice of Intent must be filed with the State Water Board describing the project. A Storm Water Pollution Prevention Plan (SWPPP) must be developed and maintained during the project and it must include the use of Best Management Practices (BMPs) to protect water quality until the site is stabilized. 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 San Mateo 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. Thus, the project incorporates measures to minimize impacts on water quality, and water-quality effects on fish and their habitats would therefore be less than significant.

Nevertheless, in the event that individual steelhead or longfin smelt were present within the work area when construction of the coffer dam or dewatering occurs, these fish could be injured or killed as a result of stranding, or during efforts to relocate them out of the coffer dam. These fish are rare enough that loss of even single individuals could potentially be considered a significant impact. Therefore, implementation of Mitigation Measure BIO-1, as described below, to exclude fish from the project site and ensure that no fish are injured or killed would be necessary to reduce impacts on these two fish species to less-than-significant levels.

Mitigation Measure BIO-1. Fish Exclusion. Prior to dewatering activities in Guadalupe Channel, qualified biologists will use nets to exclude fish from the construction area. During the low end of a falling tide, a block net will be placed at the upper end of the reach to be dewatered. Subsequently, qualified biologists will walk from the upper to lower end of the reach with a net stretched across the channel to encourage fish to move out of the construction area. When the lower end of the construction area is reached, a second block net will be installed to isolate the construction reach. This procedure will be repeated a minimum of three times per dewatered tidal reach to ensure that no fish, including steelhead or longfin smelt, remain within the construction area. Mesh size shall not exceed 9.5 mm to ensure that longfin smelt, as well as all other native fish that may be present in the channel, are adequately excluded from this area. These nets will be maintained in place until the coffer dam has been constructed to isolate the in-channel work area from areas in which fish occur.

6.1.2 Impacts on the White-tailed Kite and Other Nesting Birds (Less than Significant)

The white-tailed kite (a fully protected species) may occur in the study area when foraging, and although there is no suitable nesting habitat for this species in the study area, it may nest close enough close enough to be affected by project activities. Similarly, numerous common bird species may nest in the study area or close enough to be affected by project activities. Heavy ground disturbance, noise, and vibrations caused by project activities in the study area could disturb foraging or roosting individual white-tailed kites, as well as other

individual birds of other species, causing them to move away from work areas. Tree and vegetation removal, as well as regrading of Guadalupe Channel, along with other work activities, may result in the removal of active nests of common bird species, or the disturbance of nests adjacent to the study area, possibly to the point of abandonment of active nests with eggs or nestlings. Although adult birds are not expected to be killed or injured, as they could easily fly from the work site prior to such effects occurring, eggs or young in nests could be destroyed. In addition, project activities causing a substantial increase in noise, movement of equipment, or human presence near active nests could result in the abandonment of nests, and possibly the loss of eggs or young as a result.

However, based on our site observations, the areal extent of the study area, and known breeding densities of these species, no more than one pair of white-tailed kites is expected to nest adjacent to the study area. Further, no more than three to five pairs of any other common bird species is expected to nest on or adjacent to the study area. Although there are four bridges located within 250 ft of the study area that could potentially provide nesting habitat for colonially nesting swallow species, such as the cliff swallow, no old cliff swallow nests were observed on any of these bridges during the reconnaissance survey by Mr. Fosdick on September 11, 2018. Therefore, because of the relatively low number of pairs of common, non-special status bird species in the study area or immediately adjacent areas, any loss of individual nests or disturbance of individual birds would represent a very small fraction of their regional populations and would not rise to the CEQA standard of having a *substantial* adverse effect.

Likewise, the loss of white-tailed kite reproductive effort potentially resulting from project development would represent a very small fraction of the regional population of the white-tailed kite, and would not rise to the CEQA standard of having a *substantial* adverse effect. The project would result in permanent impacts on approximately 0.69 ac of white-tailed kite habitat in the project footprint (Figure 3). This acreage includes permanent impacts to 0.64 ac of ornamental woodland (riparian), all of which is proposed to be removed, as well as permanent impacts to 0.03 ac of ruderal grassland (riparian), and 0.02 ac of northern coastal salt marsh. However, these impacts would be offset by the planting of native riparian trees such as coast live oak (*Quercus agrifolia*), box elder (*Acer negundo*), and buckeye (*Aesculus californica*), all of which would be planted, along with native shrubs and herbaceous vegetation above the top of bank, where project activities result in vegetation removal.

Impacts on nesting and foraging birds would be less than significant. However, all native bird species, including white-tailed kites, are protected from direct take by federal and state statutes (see Sections 3.1.5 and 3.2.4). Therefore, we recommend that the measures described in Section 6.4 below be implemented to ensure that project activities comply with the MBTA and California Fish and Game Code and avoid impacts to nesting birds.

6.1.3 Impacts on Nonbreeding Special-Status Birds and Mammals (Less than Significant)

In addition the longfin smelt and Central California Coast steelhead discussed above, the project could potentially impact several special-status bird and mammal species that do not breed on the project site but that could potentially occur as nonbreeders. These include several bird species (loggerhead shrike, San Francisco common yellowthroat, Alameda song sparrow, and Bryant's savannah sparrow) as well as the pallid bat. While these species could occur on the project site as dispersing and/or wandering individuals, and could forage on the project site, no suitable nesting habitat for any of these bird species, or roosting habitat for pallid bats, exists on the site. Therefore, while heavy ground disturbance, tree and vegetation removal, noise, and vibrations caused by project activities in the study area could disturb individuals of these species, no individuals would be injured or killed, as they could easily fly away from disturbances in the work site. Similarly, the loss of any foraging habitat that may exist on the project site represents a small proportion of the suitable habitat available on a regional scale, and because habitat on the site is of generally low quality, few individuals of these species would use the site. Therefore, any project impacts on habitat that may be used by these species for foraging would not be important to regional populations. Disturbance of individual pallid bats, loggerhead shrikes, San Francisco common yellowthroats, Alameda song sparrows, and Bryant's savannah sparrows, and impacts to potential foraging habitat used by nonbreeding individuals of these species, would be less than significant.

6.2 Impacts on Sensitive Communities: 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

The CDFW defines sensitive natural communities and vegetation alliances using NatureServe's standard heritage program methodology (CDFW 2018), as described above in Section 4.3. Project impacts on CDFW sensitive natural communities, vegetation alliances/associations, or any such community identified in local or regional plans, policies, and regulations, were considered and evaluated. 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. Table 3 lists the acreage of impacts to all habitats within the project footprint.

Table 3. Impacts on Habitats in the Project Footprint

Habitat	Permanent Impacts (acres)	Temporary Impacts (acres)
Culvert	0	0.25
Developed	0.02	0
Northern Coastal Salt Marsh	0.02	0
Ornamental Woodland (Riparian)	0.64	0
Ornamental Woodland (Upland)	0	0

Habitat	Permanent Impacts (acres)	Temporary Impacts (acres)
Ruderal Grassland (Riparian)	0.03	0
Ruderal Grassland (Upland)	0	0
Tidal Aquatic	0.18	0
Totals	**0.90**	**0.25**

For the purposes of this discussion, potential impacts on tidal aquatic and northern coastal salt marsh habitat are not analyzed because these communities are addressed under Section 6.3, Impacts on Jurisdictional Waters.

6.2.1 Impacts on Riparian Woodland and Grassland Habitats (Less than Significant)

Riparian habitats are unique areas that surround river and stream banks and contribute disproportionately high habitat values and functions for their limited surface area. Specially-adapted plants that may tolerate repeated flooding or that rely on a high water table often occur in these areas, but even when it supports primarily upland species, this vegetation is important for stabilizing the banks, reducing soil erosion, and maintaining water quality within the stream channel, and the amount and type of vegetation present can have effects on water temperature and therefore aquatic habitat within the stream. Riparian corridor vegetation also provides specialized habitat for wildlife, including shade, breeding areas, and food sources. Riparian habitats are uncommon within the larger landscape, and especially restricted in highly urbanized areas. Riparian areas are considered sensitive habitats by the CDFW and are regulated as such under Section 1600 of the California Fish and Game Code.

Riparian habitat is present in the study area in the form of the ornamental forest and ruderal grassland below top of bank which occurs alongside Guadalupe Channel. Approximately 0.64 acres of riparian ornamental woodland (including canopy that overhangs the area beyond top of bank) and 0.03 acres of ruderal grassland riparian will be directly impacted through vegetation removal, grading activities, and geoweb placement that are necessary to re-contour and stabilize the Guadalupe Channel. As discussed in section 4.2.5, the current riparian habitat is dominated by invasive non-native trees such as lollypop tree, blue gum, and blackwood acacia, and ruderal grasses in the areas without tree cover. Table 4 lists the number of trees to be removed by the project.

Table 4. Trees to be Removed and Replaced by the Project

Tree Species	Size Class	Number of Trees Removed	Invasive, Non-native, or Native	Replacement Ratio	Replacement Requirement
Lollipop tree	<6 inches	1	Moderate invasive	0:1	0
Lollipop tree	> 6 inches	28	Moderate invasive	0.5:1	14

Tree Species	Size Class	Number of Trees Removed	Invasive, Non-native, or Native	Replacement Ratio	Replacement Requirement
Eucalyptus	< 6 inches	2	Non-native	0.5:1	1
Eucalyptus	6 – 11 inches	2	Non-native	1:1	2
Eucalyptus	> 11 inches	9	Non-native	2:1	18
California buckeye	6 – 11 inches	3	Native	2:1	6
Ornamental conifer	12 – 17 inches	1	Non-native	2:1	2
Blackwood acacia	< 6 inches	5	Invasive	0:1	0
Blackwood acacia	> 6 inches	12	Invasive	0.5:1	6
Privet	6 – 11 inches	2	Non-native	1:1	2
Mexican fan palm	> 18 inches	1	Non-native	2:1	2
Coast live oak	6 – 11 inches	1	Native	4:1	4
Coast live oak	12 – 17 inches	1	Native	6:1	6
Toyon	12 – 17 inches	1	Native	3:1	3
Cotoneaster	< 6 inches	5	Non-native	0.5:1	3
	Totals	**74**			**69**

While this habitat currently provides some ecological value, the planned channel restoration will replace the entirety of the existing non-native canopy with a native riparian tree and shrub canopy with at least 69 successful replacement shrubs and trees after 10 years. This will substantially improve the ecological function of the riparian area, with improvements to stream bank stability and water quality, as well as providing greater wildlife habitat value. While some temporal impacts will occur in the time period between the impact of grading activities and the completion/maturation of restoration actions, the increase in ecological function of the system provided by the restoration will be sufficient to mitigate for the effects of the temporal impacts. Thus, no offsite compensatory mitigation is proposed, and impacts are considered less than significant.

6.2.2 Impacts Caused by Non-Native and Invasive Species (Less than Significant with Mitigation)

Several non-native, invasive plant species occur in the natural habitats located throughout the study area. Invasive species can spread quickly and can be difficult to eradicate. Many non-native, invasive plant species

produce seeds that germinate readily following disturbance. Further, 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 trampling, equipment staging, and vegetation removal are all factors that would contribute to disturbance. Areas of disturbance could serve as the source for promoting the spread of non-native species, which could degrade the ecological values of wetland habitat and adversely affect native plants and wildlife that occur there. 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, such as lollypop tree and alkali Russian thistle. 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, which will include success criteria limiting the cover of weed species within the channel and will include maintenance weed removal, if needed, for at least five years post-construction. In addition, implementation of the following mitigation measure will reduce potential weed-related impacts on sensitive habitats and the species they support to a less-than-significant level.

Mitigation Measure C. Reseeding of Disturbed Areas. All disturbed upland and riparian soils will be stabilized and planted with a native seed mix from seed sourced from local genotypes following construction. All straw used as erosion control materials for the project will be certified weed-free. The removed vegetation, much of which is invasive, will be collected and completely removed from the project site. This material will be disposed of in a legally operating landfill so that propagules are not spread to other areas. All equipment used to remove project vegetation will be washed prior to being used on another project site.

6.3 Impacts on Jurisdictional Waters: Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (Less than Significant)

Wetlands are considered sensitive environmental resources protected at federal, state, and local levels. They provide unique habitat functions and values for wildlife, and provide habitat for plant species adapted to wetland hydrology. Throughout California, the quality and quantity of wetlands has dramatically declined owing to the construction of dams, dikes, and levees, as well as because of water diversions, the filling of wetlands for development, and the overall degradation of water quality by inputs of runoff from agricultural, urban, and infrastructure development, as well as other sources. Wetlands are relatively scarce regionally, and even small wetland areas make disproportionate contributions to water quality, groundwater recharge, watershed function, and wildlife habitat in the region. Thus, any permanent loss or temporary disturbance of wetland habitat because of the project would be considered significant under CEQA (Criterion G).

6.3.1 Impacts to Northern Coastal Salt Marsh and Tidal Aquatic

Northern coastal salt marsh habitat is currently present in small discontinuous patches along the Guadalupe Channel (Figure 3). As discussed in section 4.2.8, the existing salt marsh is dominated by perennial pickleweed and occurs in locations where non-vertical channel slopes between approximately MHW and MHHW are exposed to sufficient sunlight to support tidal vegetation. Approximately 0.02 acres of northern coastal salt marsh habitat will be temporarily removed to allow channel grading. However, because the banks will be laid back to a 2:1 slope rather than the near vertical existing slope at the MHW – MHHW area, the project will restore approximately 0.07 acres of improved, higher quality salt marsh following channel grading. The restored salt marsh will provide a more contiguous band of habitat along the channel than the existing condition and will be bordered upslope by a native dominated ecotone where currently none is present. This will substantially improve the ecological function of the salt marsh in the project area by virtue of expanding the extent of salt marsh, by improving upslope vegetation cover and hence stream bank stability and water quality, and will provide greater wildlife habitat value. While some temporal impacts will occur in the form of the time period between the impact of grading activates and the completion of restoration actions, the increase in ecological function of the system provided by the restoration will be sufficient to mitigate for the effects of the temporary temporal impacts. Thus, no offsite compensatory mitigation is proposed, and impacts are considered less than significant.

Permanent impacts will also occur on tidal aquatic habitat through grading of the stream channel (0.18 ac total, 0.17 ac below MHW). The channel will be temporarily dewatered while grading, geo-mat web installation, rock installation below MHW, and soil backfilling of the channel invert occur. Although the sides of the channel from the channel bottom to MHW will now be covered in rock, this area is currently unvegetated, so no vegetation or wetlands will be lost. Grading will lay back the channel banks, and will expand the area of the tidal aquatic habitat below MHW within the impact area to encompass 0.18 ac (0.19 ac below the expected HTL elevation). Conditions within the channel will return to pre-project or better condition shortly after flows are resumed. Additionally, water quality within the tidal aquatic habitat will be improved through the bank stabilization provided by the reduction of bank slope and establishment of native riparian vegetation. This will serve to stabilize the soil along the channel banks, preventing further erosion and sedimentation in the channel which commonly occurs in its current state. Given the limited time frame where dewatering will occur, the increase in jurisdictional habitat acreage and marsh habitat quality, and the improvements to bank stability and sedimentation reduction, and with implementation of BMPs from the General Construction Permit and project SWPPP as discussed above in Section 6.1.1, these impacts are considered less than significant.

6.4 **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)

For many species, the landscape is a mosaic of suitable and unsuitable habitat types. Environmental corridors are segments of land that provide a link between these different habitats while also providing cover. Development that fragments natural habitats (i.e., breaks them into smaller, disjunct pieces) can have a twofold impact on wildlife: first, as habitat patches become smaller they are unable to support as many individuals (patch size); and second, the area between habitat patches may be unsuitable for wildlife species to traverse (connectivity).

The study area is centered on an existing tidal channel and associated riparian corridor. In a more natural landscape, these features might function as environmental corridors for wildlife. However, the channel is underground upstream from the project site, so the reach within the project site does not represent a movement pathway for species moving between upper portions of the watershed and Brisbane Lagoon or San Francisco Bay. Although some wildlife use habitats in the project area when moving through the landscape, these habitats do not provide high-quality resources that animals would depend upon during such movements. Although proposed work activities will result in short-term disturbance of these habitats, animals currently moving through the project area would be able to circumvent the construction area and find suitable alternative habitats for use during their movements. Therefore, the project will not result in a substantial impact on movement of wildlife. Furthermore, the relatively low-quality habitats on the site are not used for breeding by large numbers of any animal species, and therefore, the project will not substantially impact any wildlife nursery sites. Impacts of the project on wildlife movement and nursery areas will be less than significant.

However, disturbance related to construction activities during the bird breeding season (February 1 through August 31, for most species) could result in the incidental loss of eggs or nestlings, either directly through the destruction or disturbance of active nests or indirectly by causing the abandonment of nests located near the Guadalupe Channel and the study area. Although the number of nests that could be impacted would not rise to the CEQA standard of having a substantial adverse effect, and these impacts would not constitute a significant impact on these species or their habitats under CEQA, all native bird species are protected from direct take by federal and state statutes (see Sections 3.1.5 and 3.2.4). Therefore, we recommend that the following measures be implemented to ensure that project activities comply with the MBTA and California Fish and Game Code:

6.4.1.1 Recommended Avoidance and Minimization Measures for Nesting Birds

Measure BIRD-1. Avoidance. To the extent feasible, construction activities should be scheduled to avoid the nesting season. If construction activities are scheduled to take place outside the nesting season, all impacts on nesting birds protected under the MBTA and California Fish and Game Code will be avoided. The nesting season for most birds in San Mateo County extends from February 1 through August 31.

Measure BIRD-2. Preconstruction/Pre-disturbance Surveys. If it is not possible to schedule construction activities between September 1 and January 31 then preconstruction 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 construction activities. During this survey, the ornithologist will inspect all trees and other potential nesting habitats (e.g., trees, shrubs, ruderal grasslands, buildings) in and immediately adjacent to the impact areas for nests.

Measure BIRD-3 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 ft for raptors and 100 ft 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 BIRD-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 prevent the potential delay of the project due to the presence of active nests in these substrates.

6.5 Impacts due to Conflicts with Local Policies: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Less than Significant)

6.5.1 City of Brisbane Municipal Code, Protected Trees (Less than Significant)

Per the City of Brisbane Municipal Code section 12.12, Tree Regulations, permits are required for the removal of the protected trees which occur in the study area. The removal or pruning of trees protected by the City of Brisbane municipal code is considered potentially significant under CEQA (Criterion I). However, an exemption is provided for removal of protected trees on city property for city employees or their agents. Therefore, any potential impacts related to conflict with local policies or ordinances regarding protected trees would be less than significant.

6.5.2 Impacts Related to Compliance with General Plan Policy (Less than Significant)

General Plan Policies 130, 131, 133, and 134 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 130 aims to conserve water resources, and includes use of CEQA analysis to determine effects of water resources, vegetation, and water quality. This report serves an analysis to determine the effects of the proposed project on the aforementioned resources. This policy also requires restoration of wetland losses. As discussed above in section 6.3, 0.02 ac of northern coastal salt marsh will be permanently impacted.

However, the project will restore 0.07 ac of northern coastal salt marsh habitat, which exceeds a 3-to-1 restoration ratio.

- Policy 131 emphasizes the conservation of water quality and riparian vegetation, particularly that which provides habitat for native species. As discussed above in section 6.2.1, the proposed project would permanently impact 0.51 ac of predominately non-native riparian habitat. This habitat would be replaced with 0.51 ac of native riparian vegetation, which will provide high quality habitat for native wildlife species, and improve water quality by controlling runoff and reducing sedimentation.
- Policy 133 aims to reduce the amount of sediment entering waters. As discussed in section 6.3, as well as directly above, the proposed project would help reduce sedimentation through stabilization of the banks of Guadalupe Creek and well as establishing native vegetation which would help control urban runoff entering the channel.
- Policy 134 aims to reduce the amount of pollutants entering waterways. As discussed above, the project would attenuate urban runoff into Guadalupe Channel, thereby reducing the amount of pollutants entering waterways.

Therefore, the proposed project would comply with all relevant City of Brisbane general plan policies.

6.6 Impact 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 plans.

6.7 Cumulative Impacts

Cumulative impacts arise due to the linking of impacts from past, current, and reasonably foreseeable future projects in the region. 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.

Future development activities in the City of Brisbane 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 might include office/retail/commercial development, mixed use, and residential projects that could adversely affect these species, such as the possible future redevelopment of the former Union Pacific Railroad Bayshore Yard, as well as any potential restoration projects that could benefit these species.

However, the City of Brisbane 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 project would implement several BMPs and mitigation measures to reduce impacts on both common and special-status species, as described above. Thus, provided that this project successfully incorporates the mitigation measures described in this biological resources report, the project will not contribute to substantial cumulative effects on biological resources.

Section 7. References

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Appendix A. Plants Observed

Family	Scientific Name	Common Name
Araliaceae	*Hedera helix*	English ivy
Arecaceae	*Washingtonia robusta*	Mexican fan palm
Asteraceae	*Baccharis pilularis*	coyote brush
Brassicaeae	*Brassica nigra*	black mustard
Chenopdiaceae	*Atriplex prostrata*	fat-fen
Chenopodiaceae	*Salicornia pacifica*	pickleweed
Chenopodiaceae	*Salsola soda*	alkali Russian thistle
Fabaceae	*Acacia melanoxylon*	blackwood acacia
Fabaceae	*Vicia villosa*	hairy vetch
Fagaceae	*Quercus agrifolia*	coast live oak
Frankeniaceae	*Frankenia salina*	alkali heath
Myrtaceae	*Eucalyptus globulus*	gum tree
Oleaceae	*Ligustrum* sp.	privet
Poaceae	*Avena* sp.	Wild oats
Poaceae	*Bromus diandrus*	ripgut brome
Poaceae	*Cortaderia jubata*	Jubata grass
Poaceae	*Cortaderia selloana*	pampas grass
Poaceae	*Distichlis spicata*	salt grass
Rosaceae	*Cotoneaster* sp.	cotoneaster
Rosaceae	*Heteromeles arbutifolia*	toyon
Rosaceae	*Rubus armeniacus*	Himalayan blackberry
Sapindaceae	*Aesculus californica*	buckeye
Scrophulariaceae	*Myoporum laetum*	lollypop tree

Appendix B. Special-Status Plants Considered for Potential Occurrence

Common Name	Scientific Name
adobe sanicle	*Sanicula maritima*
alkali milk-vetch	*Astragalus tener* var. *tener*
arcuate bush-mallow	*Malacothamnus arcuatus*
beach layia	*Layia carnosa*
bent-flowered fiddleneck	*Amsinckia lunaris*
Blasdale's bent grass	*Agrostis blasdalei*
blue coast gilia	*Gilia capitata* ssp. *chamissonis*
branching beach aster	*Corethrogyne leucophylla*
Brewer's calandrinia	*Calandrinia breweri*
bristly leptosiphon	*Leptosiphon acicularis*
bristly sedge	*Carex comosa*
California androsace	*Androsace elongata* ssp. *acuta*
California bottle-brush grass	*Elymus californicus*
California seablite	*Suaeda californica*
chaparral ragwort	*Senecio aphanactis*
Choris' popcornflower	*Plagiobothrys chorisianus* var. *chorisianus*
clustered lady's-slipper	*Cypripedium fasciculatum*
coast iris	*Iris longipetala*
coast rockcress	*Arabis blepharophylla*
coast yellow leptosiphon	*Leptosiphon croceus*
coastal bluff morning-glory	*Calystegia purpurata* ssp. *saxicola*
coastal marsh milk-vetch	*Astragalus pycnostachyus* var. *pycnostachyus*
compact cobwebby thistle	*Cirsium occidentale* var. *compactum*
congested-headed hayfield tarplant	*Hemizonia congesta* ssp. *congesta*
Crystal Springs fountain thistle	*Cirsium fontinale* var. *fontinale*
Crystal Springs lessingia	*Lessingia arachnoidea*
dark-eyed gilia	*Gilia millefoliata*

Common Name	Scientific Name
Diablo helianthella	*Helianthella castanea*
elongate copper moss	*Mielichhoferia elongata*
fragrant fritillary	*Fritillaria liliacea*
Franciscan manzanita	*Arctostaphylos franciscana*
Franciscan onion	*Allium peninsulare* var. *franciscanum*
Franciscan thistle	*Cirsium andrewsii*
Gairdner's yampah	*Perideridia gairdneri* ssp. *gairdneri*
hairless popcornflower	*Plagiobothrys glaber*
harlequin lotus	*Hosackia gracilis*
Hickman's cinquefoil	*Potentilla hickmanii*
Hickman's popcornflower	*Plagiobothrys chorisianus* var. *hickmanii*
Hillsborough chocolate lily	*Fritillaria biflora* var. *ineziana*
Hoffmann's sanicle	*Sanicula hoffmannii*
johnny-nip	*Castilleja ambigua* var. *ambigua*
Kellogg's horkelia	*Horkelia cuneata* var. *sericea*
Kings Mountain manzanita	*Arctostaphylos regismontana*
large-flowered leptosiphon	*Leptosiphon grandiflorus*
Lobb's aquatic buttercup	*Ranunculus lobbii*
Marin checker lily	*Fritillaria lanceolata* var. *tristulis*
Marin knotweed	*Polygonum marinense*
Marin western flax	*Hesperolinon congestum*
marsh horsetail	*Equisetum palustre*
marsh microseris	*Microseris paludosa*
marsh sandwort	*Arenaria paludicola*
marsh zigadenus	*Toxicoscordion fontanum*
Methuselah's beard lichen	*Usnea longissima*
Michael's rein orchid	*Piperia michaelii*
Montara manzanita	*Arctostaphylos montaraensis*
mountain lady's-slipper	*Cypripedium montanum*
Mt. Tamalpais thistle	*Cirsium hydrophilum* var. *vaseyi*

Common Name	Scientific Name
northern curly-leaved monardella	*Monardella sinuata* ssp. *nigrescens*
northern meadow sedge	*Carex praticola*
Oakland star-tulip	*Calochortus umbellatus*
ocean bluff milk-vetch	*Astragalus nuttallii* var. *nuttallii*
Oregon polemonium	*Polemonium carneum*
Ornduff's meadowfoam	*Limnanthes douglasii* ssp. *ornduffii*
oval-leaved viburnum	*Viburnum ellipticum*
Pacific manzanita	*Arctostaphylos pacifica*
pappose tarplant	*Centromadia parryi* ssp. *parryi*
perennial goldfields	*Lasthenia californica* ssp. *macrantha*
pink star-tulip	*Calochortus uniflorus*
Point Reyes horkelia	*Horkelia marinensis*
Point Reyes salty bird's-beak	*Chloropyron maritimum* ssp. *palustre*
Presidio clarkia	*Clarkia franciscana*
Presidio manzanita	*Arctostaphylos montana* ssp. *ravenii*
robust spineflower	*Chorizanthe robusta* var. *robusta*
rose leptosiphon	*Leptosiphon rosaceus*
round-headed Chinese-houses	*Collinsia corymbosa*
saline clover	*Trifolium hydrophilum*
San Bruno Mountain manzanita	*Arctostaphylos imbricata*
San Francisco Bay spineflower	*Chorizanthe cuspidata* var. *cuspidata*
San Francisco campion	*Silene verecunda* ssp. *verecunda*
San Francisco collinsia	*Collinsia multicolor*
San Francisco gumplant	*Grindelia hirsutula* var. *maritima*
San Francisco lessingia	*Lessingia germanorum*
San Francisco owl's-clover	*Triphysaria floribunda*
San Francisco popcornflower	*Plagiobothrys diffusus*
San Francisco wallflower	*Erysimum franciscanum*
San Joaquin spearscale	*Extriplex joaquinana*
San Mateo thorn-mint	*Acanthomintha duttonii*

Common Name	Scientific Name
San Mateo tree lupine	*Lupinus arboreus* var. *eximius*
San Mateo woolly sunflower	*Eriophyllum latilobum*

Appendix C. Detailed Descriptions of Special-Status Animal Species Potentially Occurring in the Study Area

Longfin Smelt (*Spirinchus thaleichthys*) Federal status: Proposed Endangered; State status: Threatened. The longfin smelt was declared a threatened species under the CESA in March 2009 and has been petitioned for listing as endangered under the FESA (USFWS 2008). This southernmost population of longfin smelt is found as far north as Prince William Sound, Alaska, and occurs in the San Francisco Bay. Longfin smelt are adapted to a wide range of salinities and occupy different portions of the Bay throughout the year. The majority of adults are found in the Central Bay, San Pablo Bay, and Suisun Bay in the summer but move upstream in early fall. Adults are most widespread in the winter and spring, when there distribution extends from the South Bay through the Delta, with the greatest concentrations in San Pablo Bay, Suisun Bay, and the West Delta (Rosenfield 2009). Spawning in the Bay is thought to occur mainly below Medford Island in the San Joaquin River and below Rio Vista on the Sacramento River, while the lower end of spawning habitat seems to be upper Suisun Bay around Pittsburg and Montezuma Slough, in Suisun Marsh (Larson et al. 1983 as cited in Moyle 2002, Wang 1986).

Distribution of larvae is strongly influenced by freshwater outflow to the Delta (Baxter 1999 and Dege and Brown 2004 as cited in Robinson and Greenfield 2011). In dry years, larvae are concentrated primarily in the West Delta and Suisun Bay, and in wet years, larvae are found throughout the San Francisco Estuary, including the South Bay, with the greatest concentrations in San Pablo and Suisun Bay early in the season and into the Central Bay later in the season (Rosenfield 2009). Juveniles occupy the entire upper estuary through the Central Bay during their first summer, moving throughout the estuary by the following winter (CDFG 2009).

Longfin smelt spawning in the Bay is thought to occur mainly below Medford Island in the San Joaquin River and below Rio Vista on the Sacramento River, while the lower end of spawning habitat seems to be upper Suisun Bay around Pittsburg and Montezuma Slough, in Suisun Marsh (Larson et al. 1983 as cited in Moyle 2002, Wang 1986). However, larvae occur throughout the South Bay (Rosenfield 2010). Adult distribution is the most widespread in the winter and spring, extending from the South Bay through the Delta, but information on adult use and distribution in tributaries feeding into the South Bay is very limited (Rosenfield 2010). This species may be present in the tidal reaches of sloughs in the South Bay, and stray individuals could occur within the reach of the Guadalupe Channel in the study area, which is tidally influenced. However, no suitable spawning habitat is present, and due to the marginal conditions in this narrow, shallow channel even for foraging smelt, individuals are expected to occur in the study area infrequently and in small numbers (if at all), and only from late fall to early spring.

Central California Coast Steelhead (*Oncorhynchus mykiss*). Federal status: Threatened; State status: None. The NMFS has categorized steelhead into distinct population segments (DPS). The Central California Coast DPS consists of all runs from the Russian River in Sonoma County south to Aptos Creek in Santa Cruz County, including all steelhead spawning in streams that flow into the San Francisco Bay. In 1997, the NMFS

published a final rule to list the Central California Coast DPS as threatened under the FESA (NMFS 1997). Critical habitat for this DPS was designated on 2 September 2005 (NMFS 2005). Designated critical habitat for Central California Coast steelhead includes all river reaches and estuarine areas accessible to listed steelhead in csoastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays (NMFS 2000, 2005).

The steelhead is an anadromous form of rainbow trout that migrates upstream from the ocean to spawn in late fall or early winter, when flows are sufficient to allow them to reach suitable habitat in far upstream areas. In the South Bay, adults typically migrate to spawning areas from late December through early April, and both adults and smolts migrate downstream from February through May. Steelhead typically spawn in gravel substrates located in clear, cool, perennial sections of relatively undisturbed streams, with dense canopy cover that provides shade, woody debris, and organic matter. Steelhead usually cannot survive long in pools or streams with water temperatures above 70°F, however, they can use warmer habitats if adequate food is available.

In San Mateo County, steelhead are known to spawn in coastal streams, including Pilarcitos Creek, San Gregorio Creek, Pescadero Creek, San Francisquito Creek, San Mateo Creek and Butano Creek (Spence et al. 2008, CEMAR 2008). Designated critical habitat for Central California Coast steelhead includes all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays (NMFS 2000, 2005). However, there is no suitable spawning habitat is present in the study area and the species is not known to spawn in the San Francisco Bay; moreover, spawning habitat is not known to occur upstream of the study area. The culverts under the Sierra Point Parkway and U.S. 101 provide an aquatic connection between the Bay and the study area, which provides a pathway for the occasional stray steelhead which could wander into the study area.

Loggerhead Shrike (*Lanius ludovicianus*). Federal status: None; State status: Species of Special Concern (Nesting). The loggerhead shrike is a predatory songbird associated with open habitats interspersed with shrubs, trees, poles, fences, or other perches from which it can hunt. Nests are built in densely foliated shrubs or trees, often containing thorns, which offer protection from predators and on which prey items are impaled. The breeding season for loggerhead shrikes may begin as early as mid-February and lasts through July (Yosef 1996). Grassland, ruderal, and marsh habitats provide suitable nesting and foraging habitat for this species. However, the loggerhead shrike is a rare breeder and declining breeder in the project vicinity, with the few known recent nesting records all being from the San Francisco Bay lowlands (SAS 2001, Cornell Lab of Ornithology 2018). It thus occurs primarily as a migrant and wintering visitor along the coastal and San Francisco Bay lowlands. No suitable nesting habitat for this species occurs in the study area or project vicinity, and there are no recent records of this species from the study area or vicinity (CNDDB 2018, Cornell Lab of Ornithology 2018). Shrikes are absent as a breeder in the study area, but may occur as an occasional migrant.

San Francisco Common Yellowthroat (*Geothlypis trichas sinuosa*). Federal status: None; State status: Species of Special Concern. The San Francisco common yellowthroat inhabits emergent vegetation and breeds in fresh and brackish marshes and moist floodplain vegetation. The common yellowthroat uses 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, cattails, willows, and other emergent vegetation (Nur et al. 1997, Gardali and Evens 2008). Ideal habitat, however, has extensive, thick riparian, marsh, or herbaceous floodplain vegetation in perpetually moist areas, where populations of brown-headed cowbirds are low (Menges 1998). The San Francisco common yellowthroat breeds primarily in fresh and brackish marshes, although it nests in salt marsh habitats that support tall vegetation (Guzy and Ritchison 1999). This subspecies builds open-cup nests, low in the vegetation, and nests from mid-March through late July (Guzy and Ritchison 1999, Gardali and Evens 2008). In San Mateo County, this species is a locally common breeder in taller salt, brackish, and freshwater marsh habitat, in moist coastal scrub, and in riparian habitat dominated by willows and herbaceous vegetation. No suitable nesting habitat for this species occurs in the study area or project vicinity. The lack of extensive northern coastal salt marsh habitat precludes this species presence as a nesting species, although it may occur as an occasional visitor during dispersal events.

Alameda Song Sparrow (*Melospiza melodia pusillula*). Federal status: None; State status: Species of Special Concern. The Alameda song sparrow is one of three subspecies of song sparrow that breed only in salt marsh habitats in the San Francisco Bay area (Chan and Spautz 2008). Prime habitat for the Alameda song sparrow consists of large areas of tidally influenced salt marsh, dominated by cordgrass and gumplant and intersected by tidal sloughs, offering dense vegetative cover and singing perches. Although the *pusillula* subspecies (the "species" of special concern) 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). Song sparrows nest as early as March, but peak nesting activity probably occurs in May and June. In the Program Area, the Alameda song sparrow occurs only in salt marshes along San Francisco Bay (Chan and Spautz 2008). The Alameda song sparrow is not expected to occur in the study area as a breeder, but may occur during dispersal events.

Bryant's Savannah Sparrow (*Passerculus sandwichensis alaudinus*). Federal status: None; State status: Species of Special Concern. Bryant's savannah sparrow is one of four subspecies of savannah sparrow that breed in California. The *alaudinus* subspecies occurs primarily in coastal and bayshore areas, from Humboldt Bay to Morro Bay, and is found year-round in low-elevation, tidally influenced habitat, specifically pickleweed-dominated salt marshes, and in grasslands and ruderal areas. Along the edge of the Bay, levee tops with short vegetative growth and levee banks with high pickleweed are the preferred nesting habitat of this sparrow (Fitton 2008). This species also nests in extensive grasslands in coastal areas and in the interior of the Santa Cruz Mountains (SAS 2001). No suitable nesting habitat for the Bryant's savannah species occurs in the study area. The lack of extensive northern coastal salt marsh habitat precludes this species presence as a nesting species, although it may occur as an occasional visitor during dispersal events.

White-tailed Kite (*Elanus leucurus*). Federal status: None; State status: Fully Protected. 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. 1990b, 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 nesting substrates (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). Marshes and grasslands throughout San Mateo County provide suitable breeding and/or foraging habitat for the white-tailed kite, with breeding occurring primarily in the southwestern-most portion of San Mateo County and along the Bay, but well south of the study area (SAS 2001). No suitable nesting habitat for the white-tailed kite is found in the study area. However, an unused raptor nests was detected just outside the study area during the reconnaissance survey. The California annual grasslands and mosaic of marsh habitats in the study area provide suitable foraging habitat for the species. At most, one nesting pair of this species would be present in the study area and vicinity.

Pallid Bat (*Antrozous pallidus*). Federal status: None; State status: Species of Special Concern. Pallid bats are most commonly found in oak savannah and in open dry habitats with rocky areas, trees, buildings, or bridge structures that are used for roosting (Zeiner et al. 1990a; Ferguson and Azerrad 2004). Coastal colonies commonly roost in deep crevices in rocky outcroppings, in buildings, under bridges, and in the crevices, hollows, and exfoliating bark of trees. Night roosts often occur in open buildings, porches, garages, highway bridges, and mines. Colonies can range in size from a few individuals to over a hundred (Barbour and Davis 1969), and they usually consist of at least 20 individuals (Wilson and Ruff 1999). Pallid bats typically winter in canyon bottoms and riparian areas. After mating during the late fall and winter, females leave to form maternity colonies, often on ridge tops or other warmer locales (Johnston et al. 2006). Pallid bat roosts are very susceptible to human disturbance. The pallid bat occurs sporadically throughout open areas and along roads of the Pacific coastal regions and the Santa Cruz Mountains within San Mateo County. This species is not expected to occur on the flat bayside lands of the eastern portion of the San Mateo County but likely occurs occasionally at the edges of developed areas in the foothills immediately west of the low elevation bayside areas. Historically, pallid bats were likely present in a number of locations throughout the project region, but their populations have declined in recent decades. This species has been extirpated as a breeder from urban areas close to the Bay, including the study area. No suitable roosting habitat is present in the study area and no known maternity colonies are present on or adjacent to the site. There is a low probability that the species occurs in the project vicinity at all due to urbanization; however, individuals from more remote colonies could potentially forage on or over the study area on rare occasions.

APPENDIX D

California Historical Resources Information System Records Search

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
DEL NORTE
HUMBOLDT
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLATA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://www.sonoma.edu/nwic

NWIC Billing Worksheet

IC File Number: 18-0382

Client Name: Rebecca Fleischer Phone: (510) 285-6759

Affiliation: CirclePoint Email: r.fleischer@circlepoint.com

Proj Name/Number: Brisbane Guadalupe Channel Erosion Control Project, Brisbane, CA

Date Request Rec'd: 8/22/2018 Date of Response: 9/5/2018

Check In:		Check Out:		Check In:	Check Out:
In-person Time:			Hour(s):		$ 0.00
Staff Time:			Hour(s):	1.5	$ 225.00
Shape Files:			Number:		$ 0.00
Custom Map Features:			Number:		$ 0.00
Digital Database Record:			Number of Row(s):		$ 0.00
Quads:			Number:		$ 0.00
Address-mapped Flat Fee:					$ 0.00
Hard Copy (Xerox/Computer) Pages:			Page(s):		$ 0.00
Labor Charge:			Hour(s):		$ 0.00
PDF Pages:			Page(s):		$ 0.00
PDF Flat Fee:					**$** 0.00
Other:	Non-Confidential Ext. Search				$ 0.00
				Subtotal	$ **225.00**
Multi-Day Start:		Multi-Day End:			$ 0.00

Rapid response surcharge of 50% of total cost: $ 0.00

Total: $ **225.00**

Information Center Staff: Jill Guldenbrein

Sonoma State University Customer ID: 1001140

Sonoma State University Invoice No.:

CHRIS Access and Use Agreement No.:

This is not an invoice. Sonoma State University will send separate invoice.

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

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NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLATA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
150 Professional Center Drive, Suite E
Rohnert Park, California 94928-3609
Tel: 707.588.8455
nwic@sonoma.edu
http://www.sonoma.edu/nwic

ACCESS AGREEMENT SHORT FORM

File Number: 18-0382

I, the the undersigned, have been granted access to historical resources information on file at the Northwest Information Center of the Califronia Historical Resources Information System.

I understand that any CHRIS Confidential Information I receive shall not be disclosed to individuals who do not qualify for access to such information, as specified in Section III(A-E) of the CHRIS Information Center Rules of Operation Manual, or in publicly distributed documents without written consent of the Information Center Coordinator.

I agree to submit historical Resource Records and Reports based in part on the CHRIS information released under this Access Agreement to the Information Center within sixy (60) calendar days of completion.

I agree to pay for CHRIS services provided under this Access Agreement within sixty (60) calendar days of receipt of billing.

I understand that failure to comply with this Access Agreement shall be grounds for denial of access to CHRIS Information.

Print Name: Rebecca Fleischer Date: 9/5/2018

Signature:

Affiliation CirclePoint

Address: City/State/ZIP:

Billing Address (if different from above):

Special Billing Information

Telephone: (510) 285-6759 Email: r.fleischer@circlepoint.com

Purpose of Access:

Reference (project name or number, title of study, and street address if applicable):

Brisbane Guadalupe Channel Erosion Control Project, Brisbane, CA

County: SMA USGS 7.5' Quad: San Francisco South

Sonoma State University Customer ID: 1001140

Sonoma State University Invoice No.:

Total Cost: 225

This is not an invoice. Sonoma State University will send separate Invoice

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM

ALAMEDA
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http://www.sonoma.edu/nwic

September 5, 2018 NWIC File No.: 18-0382

Rebecca Fleischer
Circlepoint
200 Webster Street, Suite 200
Oakland, CA 94607

Re: Record search results for the proposed Brisbane Guadalupe Channel Erosion Control Project, Brisbane, CA.

Project Description: The City of Brisbane plans to implement erosion control measures between Bayshore Boulevard near Valley Drive and the Machinery Road Bridge to prevent deterioration of the channel banks. The project would involve removing existing vegetation surrounding the channel and installing a pervious cellular system (Geoweb) designed to stabilize soil. The Geoweb will be placed on top of a geotextile above the native soils of grading and secured to the Guadalupe Channel's banks using anchors.

Dear Ms. Rebecca Fleischer:

Per your request received by our office on August 22, 2018, a records search was conducted for the above referenced project by reviewing pertinent Northwest Information Center (NWIC) base maps that reference cultural resources records and reports, historic-period maps, and literature for San Mateo County. Please note that use of the term cultural resources includes both archaeological resources and historical buildings and/or structures.

Review of this information indicates that there has been three cultural resource studies that include portions of the Brisbane Guadalupe Channel Erosion Control project area. Study # 35247 (Busby 2004) covers approximately 25% of the project area. Study # 27930 (Brown et al 2003) covers approximately 10% of the project area, and Study # 3075 (Hall 1979) covers approximately 100% of the Brisbane Guadalupe Channel Erosion Control project area. This project area contains no recorded archaeological resources. The State Office of Historic Preservation Historic Property Directory (OHP HPD) (which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places) lists no recorded buildings or structures within or adjacent to

the proposed project area. In addition to these inventories, the NWIC base maps show no recorded buildings or structures within the proposed project area.

At the time of Euroamerican contact the Native Americans that lived in the area were speakers of the Ramaytush language, part of the Costanoan language family (Levy 1978: 485). There are no Native American resources in or adjacent to the proposed project area referenced in the ethnographic literature.

Based on an evaluation of the environmental setting and features associated with known sites, Native American resources in this part of San Mateo County have been found in areas marginal to the San Francisco Bayshore and inland near creeks, as well as upland areas. The Brisbane Guadalupe Channel Erosion Control project area contains an area of artificial fill and bay mud located within former bay waters located approximately one hundred forty meters east of the historic margins of the bayshore. Given the dissimilarity of one or more of these environmental factors, there is a low potential for unrecorded Native American resources in the proposed Brisbane Guadalupe Channel Erosion Control project area.

Review of historical literature and maps indicated the possibility of historic-period activity within the project area. The 1939 San Mateo USGS 15-minute topographic quadrangle depicts a building within the Brisbane Guadalupe Channel Erosion Control project area. With this in mind, there is a moderate potential for unrecorded historic-period archaeological resources in the proposed Brisbane Guadalupe Channel Erosion Control project area.

The 1956 (photorevised 1980) San Francisco South USGS 7.5-minute topographic quadrangle fails to depict any buildings or structures within the Brisbane Guadalupe Channel Erosion Control project area; therefore, there is a low possibility of identifying any buildings or structures 45 years or older within the project area.

RECOMMENDATIONS:

1) Due to the negative findings of the previous studies (Busby 2004, Brown et al 2003, Hall 1979) that included the area of historic sensitivity, there is a low possibility of identifying Native American and a low possibility of finding historic-period archaeological resources and further study is not recommended at this time.

2) If archaeological resources are encountered **during construction,** work should be temporarily halted in the vicinity of the discovered materials and workers should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources. Native American resources include chert or obsidian flakes, projectile points, mortars, and pestles; and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic-period resources include stone or adobe foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

3) It is recommended that any identified cultural resources be recorded on DPR 523 historic resource recordation forms, available online from the Office of Historic Preservation's website: http://ohp.parks.ca.gov/default.asp?page_id=1069

4) We recommend the lead agency contact the local Native American tribe(s) regarding traditional, cultural, and religious heritage values. For a complete listing of tribes in the vicinity of the project, please contact the Native American Heritage Commission at 916/373-3710.

5) If the proposed project area contains buildings or structures that meet the minimum age requirement, prior to commencement of project activities, it is recommended that this resource be assessed by a professional familiar with the architecture and history of San Mateo County. Please refer to the list of consultants who meet the Secretary of Interior's Standards at http://www.chrisinfo.org.

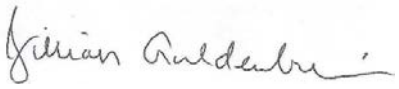
6) Review for possible historic-period buildings or structures has included only those sources listed in the attached bibliography and should not be considered comprehensive.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the California Historical Resources Information System (CHRIS) Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

Thank you for using our services. Please contact this office if you have any questions, (707) 588-8455.

Sincerely,



Jillian Guldenbrein
Researcher

LITERATURE REVIEWED

In addition to archaeological maps and site records on file at the Northwest Information Center of the Historical Resources Information System, the following literature was reviewed:

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**Note that the Office of Historic Preservation's *Historic Properties Directory* includes National Register, State Registered Landmarks, California Points of Historical Interest, and the California Register of Historical Resources as well as Certified Local Government surveys that have undergone Section 106 review.

APPENDIX E

NAHC Sacred Lands File Request Results

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

August 23, 2018

Alex Casbara

Circle Point

Sent by Email: a.casbara@circlepoint.com

Re: Brisbane Guadalupe Channel Erosion Control Project, San Mateo County

Dear Mr. Casbara,

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not preclude the presence of cultural resources in any project area. Other sources for cultural resources should also be contacted for information regarding known and/or recorded sites.

Enclosed is a list of Native Americans tribes who may have knowledge of cultural resources in the project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these tribes, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at 916-573-1033 or frank.lienert@nahc.ca.gov.

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

Native American Heritage Commission
Native American Contacts
August 23, 2018

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This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed Brisbane Guadalupe Channel Erosion Control Project, San Mateo County