

Appendix D. USFWS Biological Assessment

State Route 1 Multi-Asset Roadway Rehabilitation Project



Biological Assessment

Prepared for the U.S. Fish and Wildlife Service

Caltrans District 04

State Route 1
San Mateo County, California
SM-1 PM 27.5/34.8
EA 04-0Q130/ID 04-1800-0053

September 2023

The environmental review, consultation, and any other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 USC 327 and the Memorandum of Understanding dated December 23, 2016, and executed by FHWA and Caltrans.



Biological Assessment

Caltrans District 04

State Route 1 San Mateo County, California

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September 2023

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List of Abbreviated Terms

°F	degrees Fahrenheit
ADA	Americans with Disabilities Act
BA	biological assessment
BMP	best management practice
BSA	biological study area
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
CCC	California Coastal Commission
CCTV	Closed circuit television
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
dB	decibel
DPS	Distinct Population Segments
ESA	environmentally sensitive area
FE	Federally endangered
FESA	Federally Endangered Species Act
FHWA	Federal Highway Administration
FP	Fully protected
FR	Federal Register
FT	Federally threatened
HUC	Hydrologic Unit Code
IPaC	Information Planning and Consultation

MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
PCE	Primary constituent element
PM	Post Mile
Proposed Action	SR 1 Multi Asset Roadway Rehabilitation Project
RWQCB	Regional Water Quality Control Board
SR	State Route
TMS	traffic monitoring stations
TOS	traffic operations system
USACE	United States Army Corps of Engineers
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WOTUS	Waters of the United States

Executive Summary

The California Department of Transportation (Caltrans) proposes the State Route (SR) 1 Multi Asset Roadway Rehabilitation Project (Proposed Action) to rehabilitate the existing pavement, improve existing traffic facilities, install Complete Streets elements, and install traffic operations system (TOS) elements along SR-1 in San Mateo County, California. The Proposed Action will improve ride quality, upgrade the drainage systems, improve roadway safety, enhance pedestrian and bicycle access, and upgrade the traffic system infrastructure for extending the life of roadway. This Biological Assessment was prepared to provide technical information to the United States Fish and Wildlife Service (USFWS) for formal consultation under Section 7 of the Federal Endangered Species Act (FESA).

Federally Listed Species in the Action Area

Caltrans has defined an Action Area in this Biological Assessment for the Proposed Action, and through consultation with Information Planning and Consultation (IPaC), and site-specific field surveys, has identified the following federally listed species regulated by USFWS as having potential to occur in the Action Area and be affected by the Proposed Action:

- California red-legged frog (*Rana draytonii*) – federally threatened
- San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) – federally endangered

Potential Effects on Aquatic Habitats

All potential aquatic habitats in the Action Area for California red-legged frog and San Francisco garter snake are non-breeding aquatic habitat that consist of perennial, intermittent, and ephemeral creeks, instream and seasonal wetlands, and drainage ditches. The Proposed Action is not anticipated to permanently affect aquatic habitats in the Action Area. The Proposed Action would have temporary impacts on less than 0.01 acre of existing non-breeding aquatic habitat that occurs in roadside culverts, drainage ditches, and creeks.

Potential Effects on Upland Habitat

The project area supports upland habitat for the California red-legged frog and San Francisco garter snake, and upland habitat is the same for both species, because both use a similar type of upland habitat. Upland habitat occurs in riparian forest, dense vegetated forest, shrub-type habitats adjacent to the creeks, other non-breeding aquatic habitat, and in grassland/shrub matrix vegetation cover that provides some overhead protection from predators. The Proposed Action is anticipated to have no permanent impacts on upland habitat. Caltrans estimates that the Proposed Action would have 0.05 acres of temporary impacts to upland habitat.

Potential Impacts to Dispersal Habitat

Dispersal habitat for California red-legged frogs and San Francisco garter snakes in the Action Area consists of the various natural habitats and altered habitats that do not contain barriers to dispersal. Grassland, ruderal habitats, poison hemlock and fennel patches, and non-native forested habitats that occur in the Action Area are all considered dispersal habitat. The Proposed Action is anticipated to permanently affect 0.38 acre and temporarily affect 0.43 acre of dispersal habitat. The 0.38 acre of permanent effects on low-quality dispersal habitat along roadside edges would not create new dispersal barriers and would not affect California red-legged frog or San Francisco garter snake dispersal in the Action Area.

Cumulative Impacts

The Proposed Action is not growth-inducing, and is not anticipated to result in an increase in vehicular traffic, any new development, or any associated future increases in lighting, noise, or vibrations. In addition, the Proposed Action would not create any new permanent barriers to species' movement. Therefore, it would not contribute to cumulative effects on any listed, proposed, or candidate species.

Proposed Avoidance, Minimization, and Compensation

Caltrans proposes several general and project-specific avoidance and minimization measures to limit potential temporary and permanent effects on federally listed species and their habitat from the Proposed Action. These measures include preconstruction surveys; onsite biological monitoring; a biological worker awareness education program; avoidance of sensitive biological resources through establishment of environmentally sensitive areas and seasonal work restrictions; and best management practices to protect water quality and minimize erosion. All temporarily disturbed existing habitats, including non-breeding aquatic habitats, upland habitats, and dispersal habitats, will be reseeded, replanted, and restored in-kind and as appropriate. Compensatory mitigation is not proposed, because the permanent effects to habitat areas are considered negligible when considering the landscape of coastal San Mateo County. Additional measures may be determined in consultation with USFWS.

Determinations

For the State Route 1 Multi-Asset Roadway Rehabilitation Project, a may affect, likely to adversely affect determination, was made for the following species:

- California red-legged frog
- San Francisco garter snake

Chapter 1. Introduction

The California Department of Transportation (Caltrans) proposes the State Route (SR) 1 Multi-Asset Roadway Rehabilitation Project (Proposed Action) to rehabilitate the existing pavement, improve existing traffic facilities, install Complete Streets elements, and install traffic operations system (TOS) elements along SR 1 in San Mateo County, California. This Biological Assessment (BA) supersedes the previous BA submitted on July 21, 2022 and subsequent information provided by Caltrans for the Proposed Action.

1.1 Purpose and Need of the Proposed Action

The purpose of the Proposed Action is to preserve and extend the life of the roadway in a condition that requires only minimal maintenance expenditures. The Proposed Action will improve ride quality, upgrade drainage systems, improve roadway safety, enhance pedestrian and bicycle access, and upgrade traffic system infrastructure.

The Proposed Action is needed because the overall condition of the pavement is rated as poor. In addition, highway appurtenances and facilities within Action Area are worn out or functionally obsolete. The current traffic systems (e.g., guard rails, crash cushions, and drainage) are approaching their end of life and need to be upgraded. Complete street elements within the project area, including curb ramps, sidewalk, and crosswalks, need to be upgraded.

1.2 Species and Critical Habitat Assessed

A species list was provided by the United States Fish and Wildlife Service (USFWS) on April 22, 2022, and then updated on January 27, 2023, for the Action Area of this project (Appendix A). Table 1 provides a list of federally threatened, endangered, and proposed species and designated and proposed critical habitats; a description of their habitat; potential to occur in the Action Area; and effects determination for each species.

1.2.1 Threatened and Endangered Species

Of all the species on the Information Planning and Consultation (IPaC) list the following two have a potential to occur in the Action Area and be affected by the proposed action and are considered in this analysis.

- San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) Federally endangered (FE), Fully protected (FP)
- California red-legged frog (*Rana draytonii*) Federally threatened (FT)

Table 1 Federally Threatened, Endangered, and Proposed Species and Designated and Proposed Critical Habitat and Effect Determinations

Species Type	Common Name	Scientific Name	Listing Status	Habitat Description	Presence of Species in Action Area (Yes/No)	Effects Determination
Plant	San Mateo thorn-mint	<i>Acanthomintha duttonii</i>	FE	Chaparral, Valley and foothill Grassland. Blooms April through June. Elevation range 0 to 300 meters.	No. Suitable habitat is present but the nearest California Natural Diversity Database (CNDDDB) occurrence is over 2 miles away. None were observed during botanical surveys.	No effect.
Plant	San Mateo woolly sunflower	<i>Eriophyllum latilobum</i>	FE	Cismontane woodland (often serpentinite, on roadcuts). Blooms: May and June. Elevation range 45 to 150 meters.	No. Outside the elevation range and no suitable habitat; nearest CNDDDB occurrence is over 2 miles away and not observed during botanical surveys.	No effect.
Plant	Marin western flax	<i>Hesperolinon congestum</i>	FT	Chaparral, valley grassland. Blooms April through July. Elevation range 0 to 200 meters.	No. Suitable grassland is present but the nearest CNDDDB occurrence is over 2 miles away. None were observed during botanical surveys.	No effect.
Plant	White-rayed pentachaeta	<i>Pentachaeta bellidiflora</i>	FE	Cismontane woodland, Valley and foothill grassland (often serpentinite). Blooms: March through May. Elevation range 35 to 620 meters.	No. No suitable habitat; nearest CNDDDB occurrence is more than 2 miles away. None were observed during botanical surveys.	No effect.
Plant	Hickman's potentilla	<i>Potentilla hickmanii</i>	FE	Coastal bluff scrub, closed-cone coniferous forest, meadows and seeps (vernally mesic), marshes and swamps (freshwater). Blooms: April through August. Elevation range 10 to 149 meters.	No. Outside the elevation range; nearest CNDDDB occurrence is more than 2 miles away. The habitat at Pilarcitos Creek seems to be unsuitable for this species. None were observed during botanical surveys.	No effect.

Species Type	Common Name	Scientific Name	Listing Status	Habitat Description	Presence of Species in Action Area (Yes/No)	Effects Determination
Bird	Marbled murrelet	<i>Brachyramphus marmoratus</i>	FT	[Nesting Trees] Nests inland from coast in old-growth redwood-dominated forests.	No. No suitable nesting habitat. Surveys indicate that suitable old growth redwood trees, or large redwood trees with suitable platforms for nesting are not present.	No effect.
Bird	Western snowy plover	<i>Charadrius nivosus</i>	FT	Nests on sandy beaches, salt pond levees, and shores of large alkali lakes.	No. None of these nesting habitats are present in the Action Area.	No effect.
Bird	California Ridgway's rail	<i>Rallus obsoletus</i>	FE	Saltwater and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	No. The Action Area is not near San Francisco Bay or saltmarsh habitats.	No effect.
Bird	California least tern	<i>Sterna antillarum browni</i>	FE	Nests along the coast on open beaches from San Francisco Bay south to northern Baja California. Forages in coastal and estuarine waters.	No. The Action Area does not contain any beaches for nesting.	No effect.
Mammal	Salt marsh harvest mouse	<i>Reithrodontomys raviventris</i>	FE	Occurs only in saline emergent wetlands and tributaries of San Francisco Bay. Associated with stands of pickleweed (<i>Salicornia</i>).	No. There is no suitable saline wetland habitat in the Action Area.	No effect.
Reptile	Green sea turtle	<i>Chelonia mydas</i>	FT	Shallow tropical and subtropical waters and coastlines.	No. There is no marine aquatic habitat in the Action Area.	No effect.
Reptile	San Francisco garter snake	<i>Thamnophis sirtalis tetrataenia</i>	FE	Heavily vegetated freshwater wetlands and ponds with available basking habitat. Known range limited to San Mateo and Santa Cruz Counties. Feeds on amphibians such as California red-legged frog.	Yes. Densely vegetated riparian areas and adjacent uplands in the Action Area provide habitat for the species.	May affect, likely to adversely affect.

Species Type	Common Name	Scientific Name	Listing Status	Habitat Description	Presence of Species in Action Area (Yes/No)	Effects Determination
Amphibian	Foothill Yellow Legged Frog (Central Coast DPS)	<i>Rana boylei</i>	FT	Partly shaded, shallow streams & riffles with a rocky substrate in a variety of habitats.	No. The creeks in the BSA lack rocky substrate to be suitable for this species.	No effect
Amphibian	California red-legged frog	<i>Rana draytonii</i>	FT	Dense, emergent, and riparian vegetation associated with deep (0.7 meter), still or slow-moving water.	Yes. Habitat for adults and sub-adults are present in the creeks, pools, and riparian vegetation present in the Action Area. Multiple CNDDDB occurrences within 1 mile of Pilarcitos Creek Bridge.	May affect, likely to adversely affect.
Fish	Tidewater Goby	<i>Eucyclogobius newberryi</i>	FE	Inhabits estuaries of the Pacific Coast in areas of aquatic vegetation.	No. There are no estuaries or suitable habitat for this species.	No effect.
Fish	Delta smelt	<i>Hypomesus transpacificus</i>	FT	Sacramento/San Joaquin Delta, seasonally in Suisun Bay, Carquinez Strait, and San Pablo Bay.	No. The action area is outside the range of this species and there is no suitable habitat.	No effect.

Notes:

BSA = biological study area

CNDDDB = California Natural Diversity Database

DPS = Distinct Population Segments

FE = federal endangered

FT = federal threatened

1.2.2 Critical Habitat

No critical habitat occurs in the Action Area.

1.2.3 Proposed Species

No proposed species are expected to occur in the Action Area.

1.2.4 Proposed Critical Habitat

No critical habitat proposed for listing occurs in the Action Area.

1.3 Authorities and Discretion

On December 23, 2016, the Federal Highway Administration (FHWA) signed the Caltrans 23 United States Code (USC) 327 National Environmental Policy Act (NEPA) Assignment Memorandum of Understanding (MOU) for a term of 5 years. This MOU allows Caltrans to perform federal environmental responsibilities for highway projects in California under NEPA and other federal laws.

The Proposed Action is being proposed, implemented, maintained, and regulated by Caltrans. All activities related to the project take place in the Caltrans right-of-way. Caltrans, as the federal lead agency, has prepared this BA. The BA is also prepared in accordance with 50 Code of Federal Regulations (CFR) 402; legal requirements found in Section 7 (a)(2) of the Federal Endangered Species Act (FESA) (16 USC 1536[c]); and FHWA and Caltrans regulations, policies, and guidance.

1.3.1 Regulatory Requirements

The following federal laws and requirements are potentially applicable to the project in the Action Area:

- Clean Water Act, Sections 404 and 401
- FESA
- Coastal Zone Management Act of 1972
- Migratory Bird Treaty Act
- Executive Order 13112 (Invasive Species)
- Magnuson-Stevens Fishery Conservation and Management Act

In addition to the federal laws and regulations, the following state laws and regulations apply to the Proposed Action:

- California Endangered Species Act (CESA)
- California Fish and Game Code (CFGC) Sections 1600-1607 Lake or Streambed Alteration Agreement
- CFGC Section 2080.1 Incidental Take Permit
- CFGC Sections 5050 Fully Protected Species
- CFGC Section 2050 through 2100, CESA
- Porter-Cologne Water Quality Control Act
- California Coastal Act

1.3.2 Federal Endangered Species Act of 1973

FESA and its subsequent amendments provide guidance for the conservation of endangered and threatened species and the ecosystems on which they depend. FESA provisions protect federally listed threatened and endangered species and their habitats from unlawful take. “Take” under FESA includes activities such as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of the specifically enumerated conduct.” USFWS regulations define harm to mean “an act which actually kills or injures wildlife.” Such an act “may” include “significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering” (50 CFR Section 17.3). Activities that may result in “take” of individuals are regulated by USFWS. USFWS produced an updated list of candidate species on October 25, 1999 (50 CFR Part 17). Candidate species are not afforded any legal protection under FESA; however, candidate species typically receive special attention from federal and state agencies during the environmental review process.

1.4 Consultation History

Caltrans requested technical assistance on the Proposed Action in phone calls to USFWS in July 2021. Caltrans submitted a BA and a request for formal FESA Section 7 consultation on July 21, 2022 to the USFWS for the Proposed Action. Megan Bishop from the USFWS reviewed the BA and sent a request for additional information on August 4, 2022. Caltrans provided a response to the USFWS questions on September 27, 2022. On October 10 and 13, 2022, USFWS requested additional information to follow up on the BA, and to draft a Biological Opinion. Based on the additional information requested by USFWS, Caltrans determined that a new BA was appropriate that will supersede the previously submitted BA.

1.5 Resource Agency Coordination and Professional Contacts

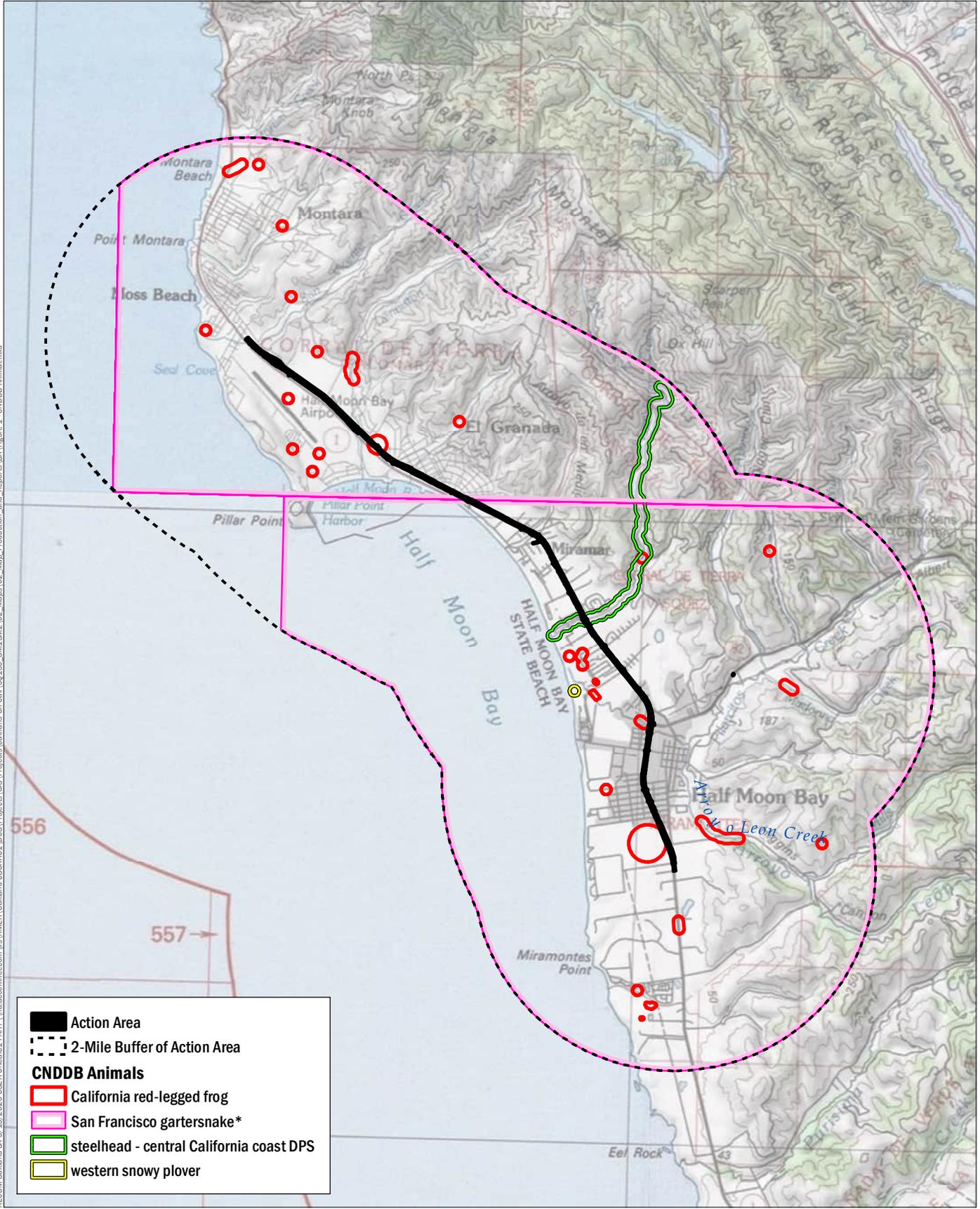
Caltrans requested consultation with the USFWS, and is continuing coordination with submittal of this BA. Caltrans is coordinating with other state and federal regulatory agencies with jurisdiction in the Action Area, including the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife's (CDFW), and agencies with authority to regulate under the California Coastal Act, including the California Coastal Commission (CCC) and Local Coastal Programs administered by the City of Half Moon Bay and San Mateo County.

The San Francisco garter snake is also listed as endangered under CESA, which is described in CFGC Sections 2050 through 2100. In addition to FESA and CESA protections, San Francisco garter snake is also fully protected as designated in CFGC Section 5050. Compliance with CESA requires any potential take of a CESA-listed or -candidate species incidental to otherwise lawful activities to “be minimized and fully mitigated.” Under CFGC, Section 86, “take” means to hunt, pursue, catch, capture, or kill, or to attempt to hunt, pursue, catch, capture, or kill. Fully protected species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research. Under the CFGC Sections, CDFW cannot authorize incidental take for the San Francisco garter snake because it is fully protected. However, on July 10, 2023, Governor Newsom signed Senate Bill 147 (SB 147) into law, amending California’s “fully protected species” statutes. The amendments enacted by the legislature and signed into law by the Governor create a temporary, 10-year permitting regime that allows proponents of a limited, defined set of projects to pursue authorization from the CDFW to proceed even where they could take one or more fully protected species. One of the activities for which project proponents may seek a permit are transportation projects undertaken by a state, regional, or local agency, that does not increase highway or street capacity for automobile or truck travel. The Proposed Action has proposed measures to avoid take, as defined in the CFGC, of individual San Francisco garter snakes. It is important to note that the CFGC definition of take does not include the more sensitive threshold of “harass” that is included in the FESA take definition.

1.6 Study Methods

Caltrans reviewed the following databases to determine the potential presence of listed species and critical habitat in the Action Area for this assessment:

- CDFW’s California Natural Diversity Database (CNDDDB) – a list of known plant and wildlife occurrences within a 2-mile radius around the Action Area (CDFW 2023; see Figure 1 and Figure 2 in this document).



A:\GIS\Projects\Caltrans\GIS\Projects\Caltrans\On-Call\001_30_S\1\SM2_02_Maps\02_Map_Production_and_Reports\BA\Figure_1_CVDDDB_Animal.mxd

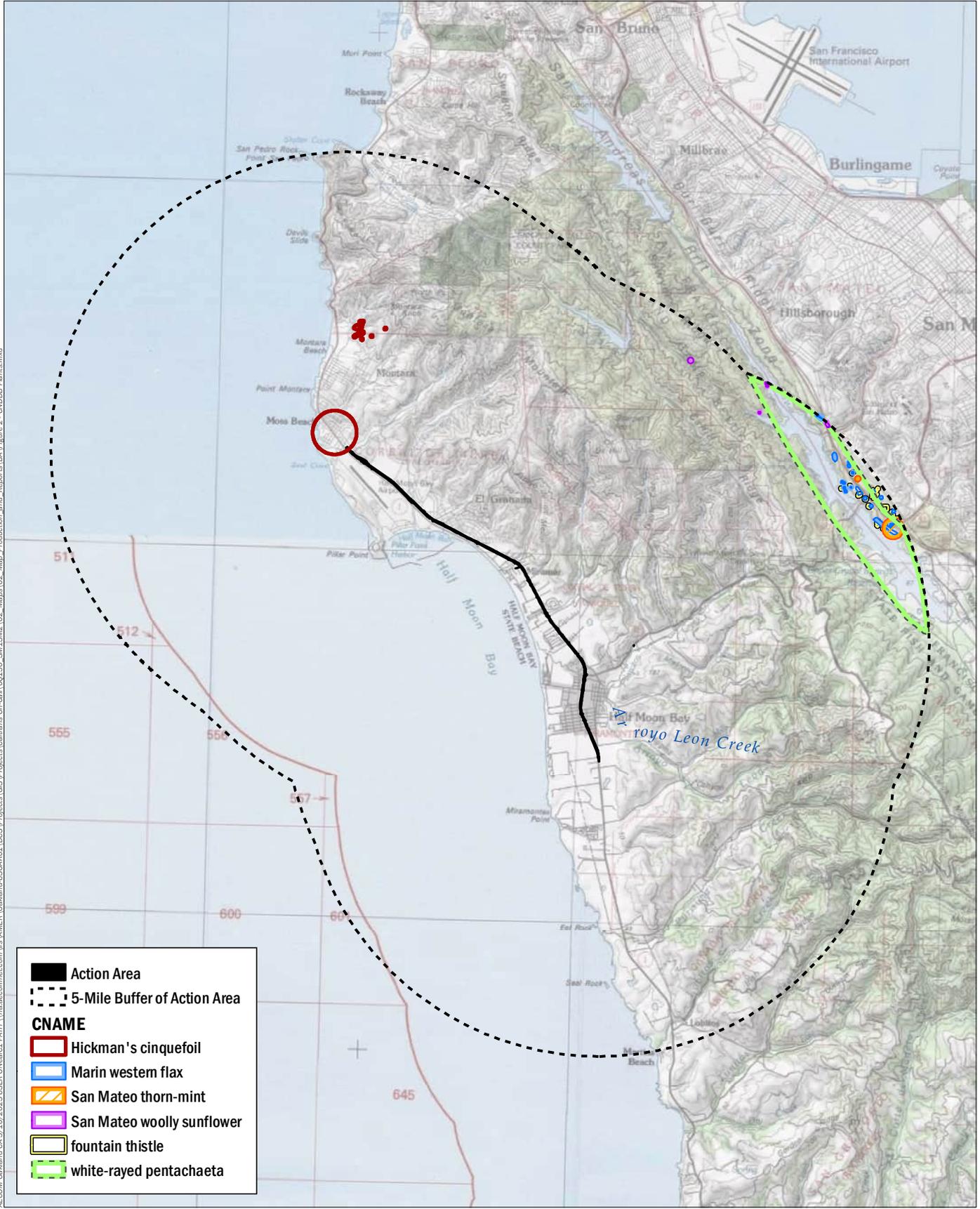
	Action Area
	2-Mile Buffer of Action Area
CNDDDB Animals	
	California red-legged frog
	San Francisco gartersnake*
	steelhead - central California coast DPS
	western snowy plover



*Location data for San Francisco garter snake is suppressed by CDFW

AECOM, 2023
CNDDDB 1, 2023
USGS, 2012

FIGURE 1
 Federal ESA Listed Animal
 Species CNDDDB Occurrences



AECOM, Oakland CA, 3/10/2023 USER: ONeal/CJL PATH: \\na.aecomnet.com\fs\NAMEP_Oakland\USOAK01\DCS\Projects\Caltrans On-Call\00130_S15M2\02_Maps\02_Map_Production_and_Reports\BA\Figure 2 - CNDDDB Plants.mxd

	Action Area
	5-Mile Buffer of Action Area
CNAME	
	Hickman's cinquefoil
	Marin western flax
	San Mateo thorn-mint
	San Mateo woolly sunflower
	fountain thistle
	white-rayed pentachaeta



AECOM, 2023
CNDDDB 1, 2023
USGS, 2012

FIGURE 2
Federal ESA Listed Plant
Species CNDDDB Occurrences

- USFWS IPaC – official species list generated from the Sacramento Fish and Wildlife Office within the Action Area boundaries (Appendix A).

USFWS designated Critical Habitat within 2 miles of the Action Area boundaries (Figure 3).

- Federal Register for selected FESA-listed species, including final rule publications for species listing status and critical habitat.

In preparation for completing this analysis, the life history and distribution of the FESA-listed species determined to be in the Action Area were reviewed. The review included USFWS documents related to each species, including species recovery plans, species 5-year reviews, species profiles, and designation of critical habitat. Additional scientific literature was reviewed describing the FESA-listed species life history, their preferred habitats, their movement patterns, and their populations.

Information regarding the FESA-listed species habitats was used during field surveys to categorize the land cover types in the Action Area as potentially suitable habitat. CNDDDB data and information from the Sacramento Fish and Wildlife Office website were also used for the field surveys.

1.6.1 Personnel and Survey Dates

General reconnaissance-level surveys were conducted in the Action Area for plant communities, wildlife habitats, and general site-specific information to support an evaluation of biological resources. More targeted surveys, including an aquatic resources delineation survey and vegetation mapping, were also performed. Focused botanical surveys took place in spring of 2022. Table 2 provides the dates and times for the specific surveys, and the personnel who conducted them.

Table 2 Survey Type, Date, Personnel

Survey Type	Date	Personnel
Aquatic Resource Delineation Survey	September 7, 8, and 15, 2021	Joe Bandel and Danny Slakey
Vegetation Survey	September 7, 8, and 15, 2021	Joe Bandel and Danny Slakey
Rare Plant Survey 1	March 7 and 8, 2022	Sunshine Lopez, Gabby Reta, and Jessica Chavez
Rare Plant Survey 2	May 9, 10, and 11, 2022	Sunshine Lopez, Danny Slakey, and Isaac Kreger
Rare Plant Survey 3	June 13, 2022	Sunshine Lopez and Isaac Kreger
Ornduff's Meadowfoam Site Visit	April 15, 2022	Danny Slakey and Jessica Chavez

1.6.1.1 Special-Status Plant Surveys

Preliminary database searches, including California Native Plant Society (CNPS) queries, were used to gather background information on the potential for special-status plant species to occur. Although field surveys were conducted to map vegetation, the initial vegetation survey in September 2021 did not correspond to species' blooming periods. For this reason, focused botanical surveys were later conducted in the months of March, May, and June of 2022. Caltrans' final Special-Status Plant Survey Report is provided as Appendix B.

1.6.1.2 Aquatic Resource Delineation Surveys

Caltrans conducted surveys in the field to delineate state and federal jurisdictional waters in the Action Area. Surveys were conducted on September 7, 8, and 15, 2021, by biologists Joe Bandel and Danny Slakey. The riverine aquatic resources were delineated using the USACE guidance *A Guide to Ordinary High Water Mark Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (USACE 2014)—to determine the extent of waters of the U.S. (WOTUS). Potential USACE jurisdictional wetlands were evaluated for the three-parameter definition (hydrophytic vegetation, hydric soils, and wetland hydrology) of a USACE jurisdictional wetland. In addition, wetlands were evaluated to determine whether they meet the CCC definition of a wetland (just one of the three parameters) due to the location's presence in the California Coastal Zone. Caltrans completed an Aquatic Resources Delineation report on August 18, 2022.

1.6.1.3 Special-Status Wildlife Studies

Preliminary technical studies were conducted to evaluate the potential for listed wildlife species to occur in the Action Area. This investigation included review of aerial imagery, CNDDDB searches, USFWS and National Marine Fisheries Service species lists, and other technical reports and resources to characterize the potential for distribution and relative abundance of listed wildlife and associated habitats. Biologists conducted walking surveys in the field to determine the habitat conditions where wetlands and waters could occur in the Action Area, as reported in the Aquatic Resources Delineation Report prepared for the project; and conducted remote satellite imagery surveys to determine special-status wildlife species with potential to occur in the Action Area. Determinations were based on the existence of known occurrences and dates of those occurrences, habitat quality, and proximity to development and highways. Protocol-level surveys for protected species were not conducted.

1.6.2 Limitations and Assumptions that may Influence Results

Some portions of the Action Area were inaccessible during site visits. Heavy traffic on SR 1 and a lack of safe parking prevented access to some areas adjacent to the highway. Any inaccessible areas were closely examined on Google Maps, and a conservative approach was taken when

assuming whether they may provide habitat for special-status species and other sensitive natural resources. No protocol-level wildlife surveys for special-status species were conducted. The presence of California red-legged frog and San Francisco garter snake were inferred due to the presence of nearby riparian and aquatic resources, suitable dispersal habitat, and nearby CNDDDB occurrences. Rare plant surveys were conducted at a reconnaissance level, and protocol-level surveys in accordance with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018); results are presented in Appendix B. At inaccessible locations, the areas were examined later from Google Maps street and aerial views.

Chapter 2. Proposed Agency Action

2.1 Proposed Action Location

The Proposed Action would occur along SR 1 from post mile (PM) 27.5 to PM 34.8 (Figure 4). Figure 5 presents the Action Area for the Proposed Action and is discussed further in Chapter 3 (Section 3.2).

2.2 Description of Proposed Action

The Proposed Action would include pavement rehabilitation; replacing existing drainage inlets, culverts, and dikes; replacing existing guardrails with Midwest guardrail systems; replacing existing crash cushions; upgrading curb ramps; implementing complete street elements; upgrading signal poles; installing conduits; installing traffic operation system elements (intersection cameras, closed-circuit television (CCTV) cameras, and traffic monitoring stations [TMSs]); and relocating and/or replacing utility cabinets. Appendix C provides a mapbook exhibit that summarizes the locations of project elements.

2.3 Deconstruct the Proposed Action

This section describes the detailed activities that would occur as part of the Proposed Action. Construction activities are summarized in Appendix C.

2.3.1 Site Preparation

All environmentally sensitive areas to be avoided by the Proposed Action (including wetlands, waters, riparian habitat, and special-status species habitat) will be delineated and protected with high-visibility construction fencing to be installed prior to construction. Any vegetation obstructing the work area or where excavation is necessary would be trimmed and removed. Construction site best management practices (BMPs) would be implemented, including using a combination of silt fences and fiber rolls along toes of slopes or along edges of staging areas, using erosion control netting (e.g., jute or coir) on sloped areas and installing gravel bags around drainage inlets. K-rails¹ would be installed, and temporary lane closures would be established to create the necessary workspace for construction. Traffic control measures would include use of metal signage, flashing signal lights, and traffic cones.

¹ Concrete k-rail barriers are commonly found on highways and high traffic prone areas. They are made for permanent or semi-permanent applications to serve multiple purposes such as security, traffic diversion, and blocking off access.



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AECOM, 2023
CPAD, 2023

FIGURE 4
 Project Location



FIGURE 5
Project Footprint and Action Area
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AECOM
Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5/34.8
 EA 04-0Q130 / Project ID 0418000053

FIGURE 5
 Project Footprint and Action Area
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AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018



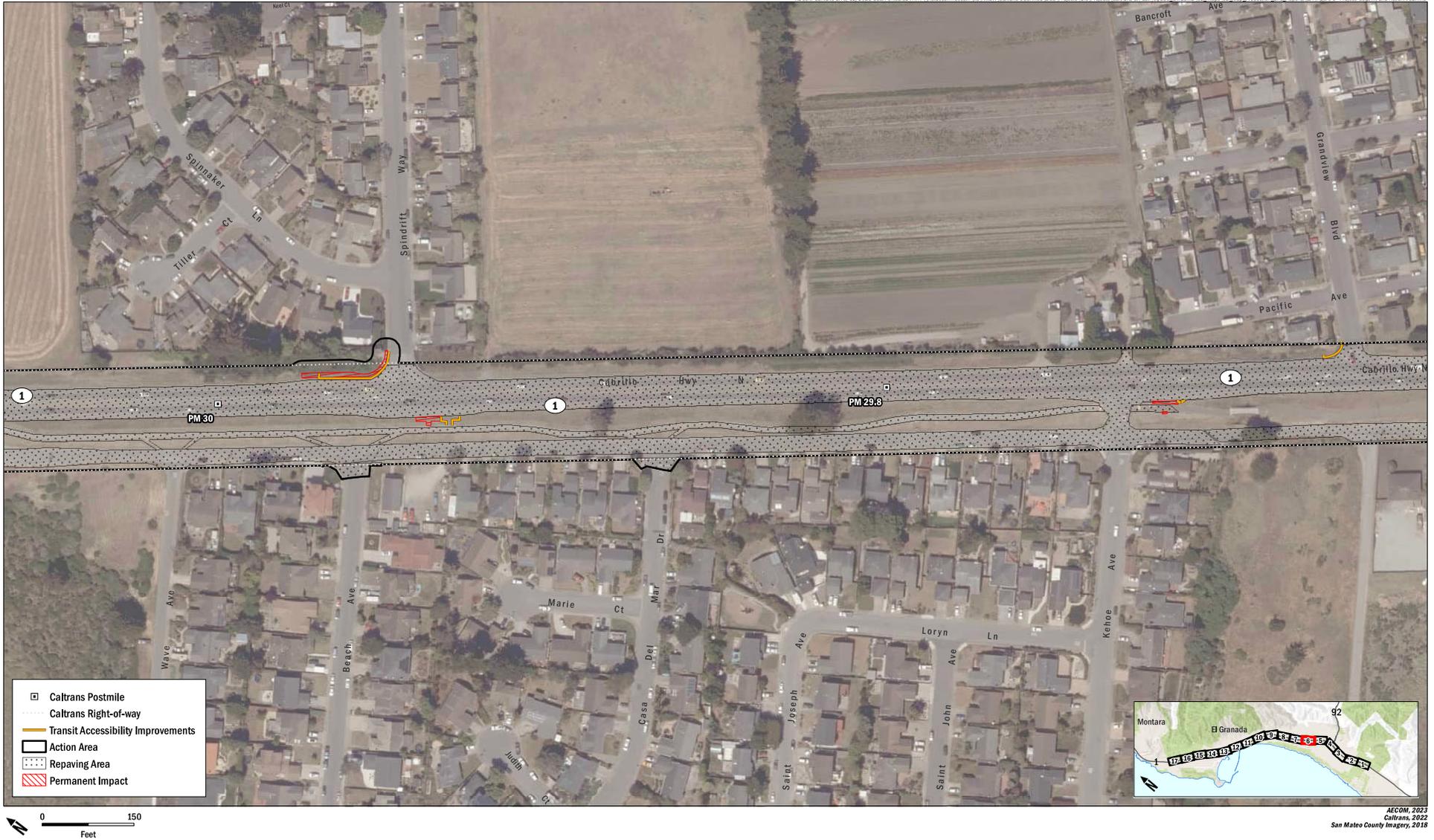
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 San Mateo County Imagery, 2018



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 San Mateo County Imagery, 2018



FIGURE 5
Project Footprint and Action Area
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AECOM
 Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
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FIGURE 5
 Project Footprint and Action Area
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AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018



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Caltrans District 4
State Route 1 Multi-Asset Roadway Rehabilitation Project
San Mateo County, CA
PM 27.5/34.8
EA 04-0Q130 / Project ID 0418000053

AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

FIGURE 5
Project Footprint and Action Area
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AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

FIGURE 5
Project Footprint and Action Area
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AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018

FIGURE 5
 Project Footprint and Action Area
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FIGURE 5
Project Footprint and Action Area
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AECOM
Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5/34.8
 EA 04-0Q130 / Project ID 0418000053



AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018

FIGURE 5
 Project Footprint and Action Area
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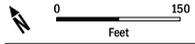
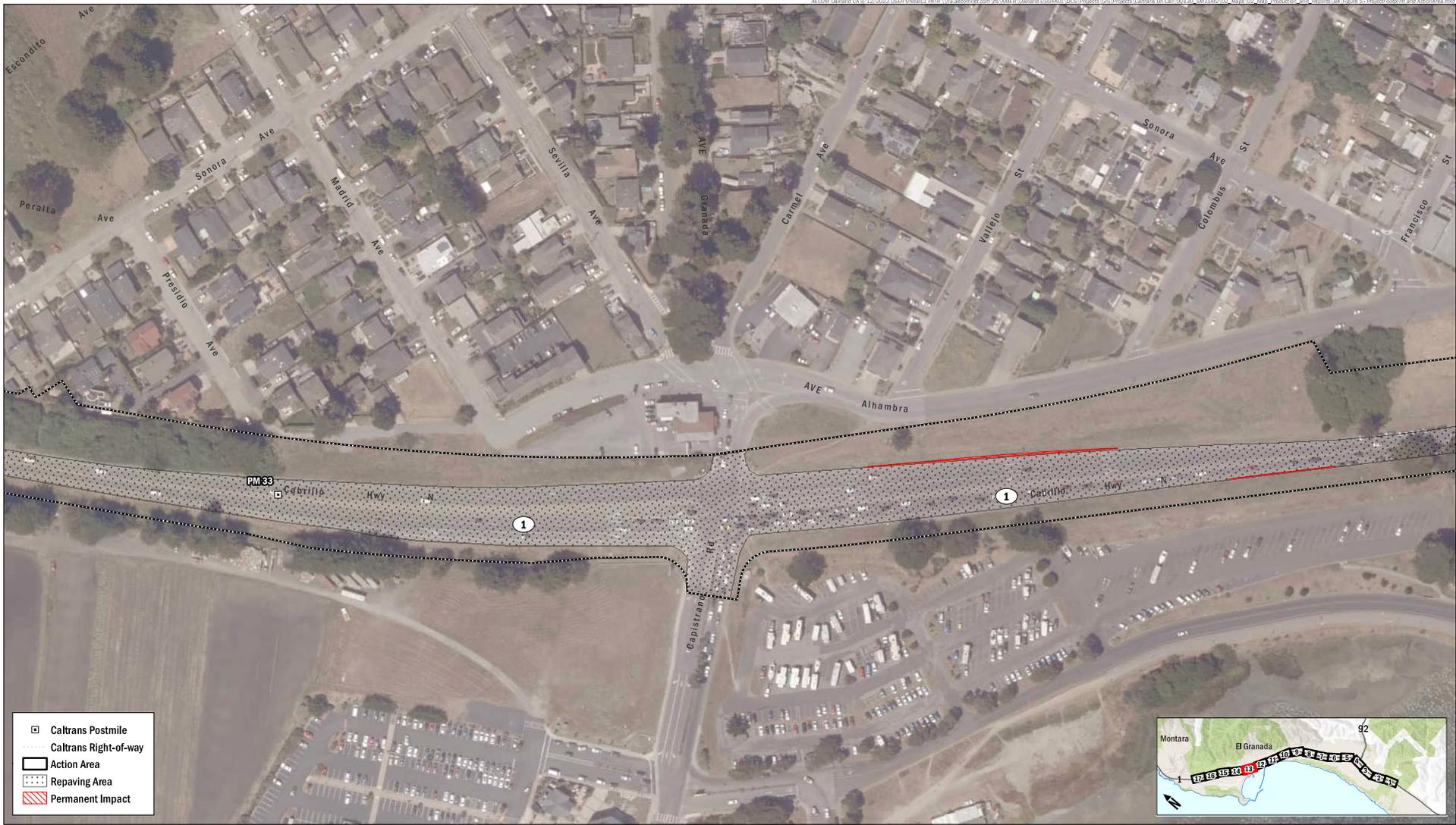
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Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5/34.8
 EA 04-0Q130 / Project ID 0418000053

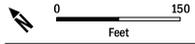
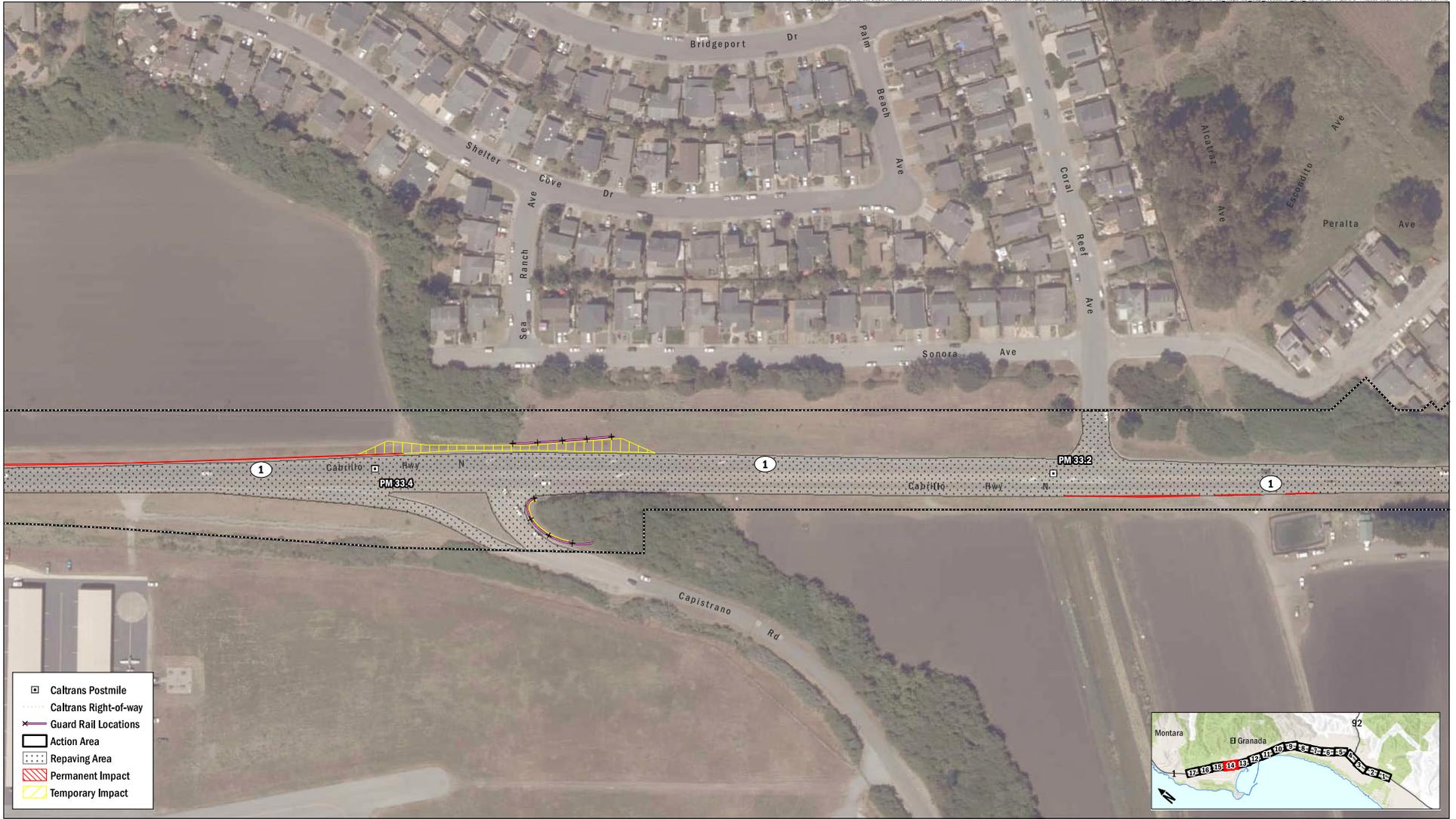


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 Caltrans, 2022
 San Mateo County Imagery, 2018

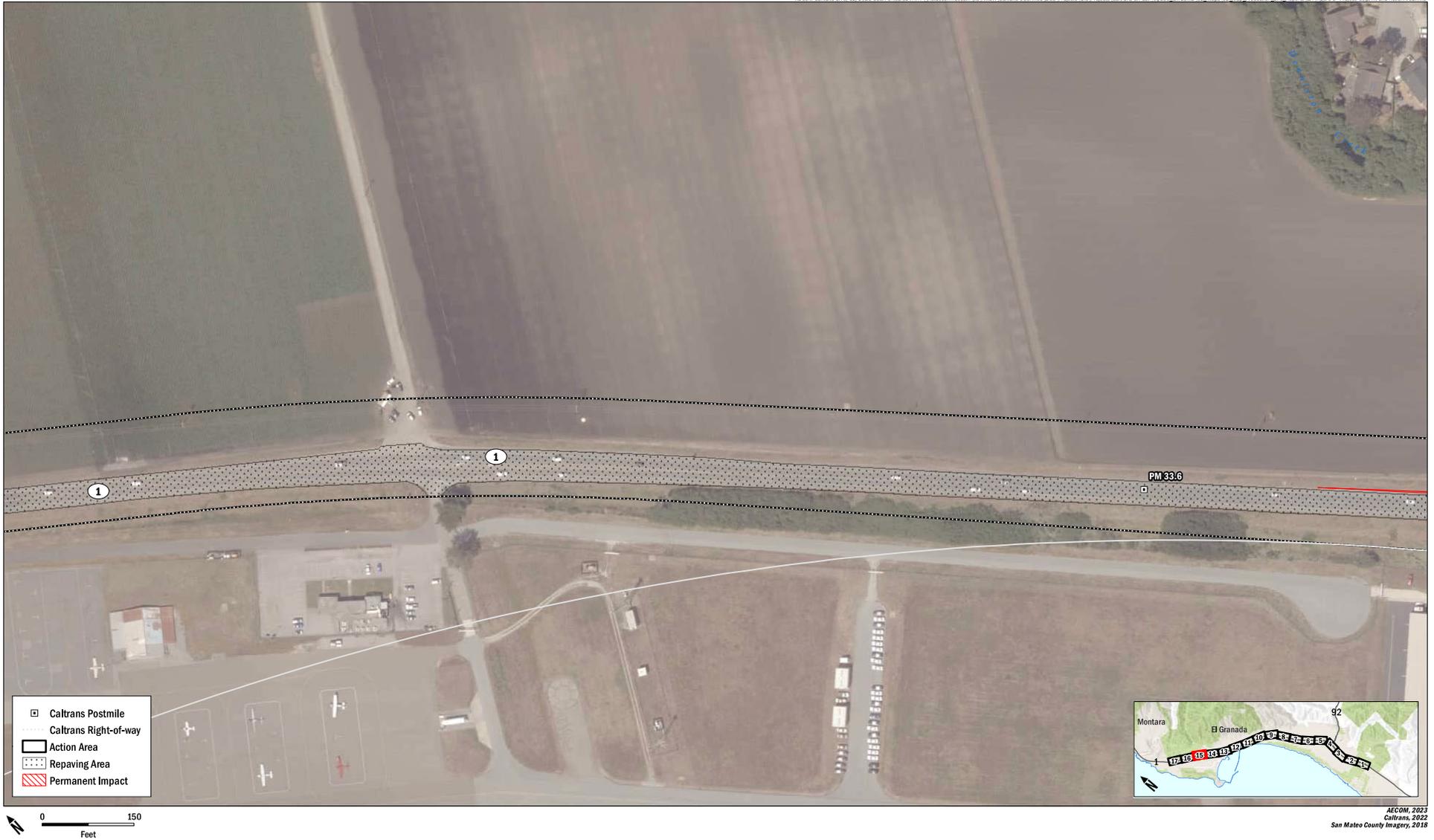
FIGURE 5
 Project Footprint and Action Area
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AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018



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Caltrans, 2022
San Mateo County Imagery, 2018



AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

Caltrans would locate staging for construction in its right-of-way outside of environmentally sensitive areas—or if outside of its right-of-way, in previously disturbed or developed areas. Staging locations would implement all appropriate measures to avoid and minimize impacts to environmental resources to the greatest extent feasible. Staging locations would be determined during the project’s final design phase.

2.3.2 Construction Elements

2.3.2.1 Roadway Rehabilitation

Caltrans proposes a 20-year flexible rehabilitation pavement strategy to address poor pavement conditions. To rehabilitate the roadway, Caltrans would cold plane (mill the roadway surface down to design depths to restore and smooth the roadway conditions) 0.40 foot of existing asphalt concrete pavement, then replace it with a structural section composed of 0.20 foot of gap-graded rubberized hot-mix asphalt, a 0.25-foot hot-mix asphalt and geosynthetic pavement interlayer, and 0.10 foot of hot-mix asphalt. The roadway profile would be raised by about 0.15 foot at project completion. Pavement rehabilitation would occur across the entire project location, and is generally shown in Figure 5, with detailed paving limits shown in Appendix C.

2.3.2.2 Replace Existing Guardrails

Existing guardrails in the Action Area would be removed and replaced with standard Midwest guardrail systems. Vegetation removal to access guardrails may be required, and relatively minor excavation would be necessary during construction to install wood posts. Wood support posts would be installed by post driver to an approximate depth of 4 feet below the ground. Deeper or more robust posts may be recommended to address traffic safety standards at specific locations.

2.3.2.3 Replace Existing Crash Cushions

Existing nonstandard or damaged crash cushions in the Action Area would be replaced at the same locations with new crash cushions that meet current Caltrans standards for design and safety.

2.3.2.4 Upgrade Signal Poles

All nonstandard poles in the Action Area would be replaced. The size of the poles would be determined during the project’s final design phase. Excavation would be required during replacement.

2.3.2.5 Install Conduits and Traffic Operation System Elements

Caltrans would upgrade and install new communication devices, such as CCTV cameras, fixed intersection cameras, and TMSs. Appendix C contains figures that illustrate the proposed locations for these TOS elements. New conduit installation to support these elements would require trenching during installation.

2.3.2.6 Road Shoulder Reworking

Caltrans would rework approximately 2,500 linear feet existing paved shoulders to full depth structure at select locations split across the Action Area to meet roadway design requirements.

2.3.2.7 Replace Existing Drainage Inlets, Culverts, and Dikes

Caltrans' hydraulic engineers have conducted a preliminary review of existing drainage elements and anticipate the following work:

- Replacement of 12-inch-diameter pipes with 18-inch-diameter pipes
- Addition or replacement of flared end sections at ends of pipes as needed
- Cleaning and clearing buried pipe ends to maintain flow pattern
- Repairing or replacing damaged drainage inlets to improve flow into existing culverts
- Regrading certain unlined ditches to maintain original flow pattern
- Cleaning existing drainage facilities

Excavation would be required during culvert replacement work. Typical culvert replacement work would require an excavation width that would be 2 feet wider than the culvert (1 foot on each side); the excavation depth would be same as the depth of the existing culvert; and the excavation length would be about 2 feet longer than the existing culvert. Where culvert headwall installations are required, the length of excavation would increase by a few feet, depending on final headwall design. Caltrans is completing survey work to refine its understanding of existing drainage elements. Appendix C summarizes general locations, and details of drainage improvements.

2.3.2.8 Upgrade Curb Ramps

Existing nonstandard curb ramps within the project limits would be replaced with curb ramps that meet current Caltrans standards, and would be compliant with Americans with Disabilities Act (ADA) requirements. The type and design of curb ramps would be determined based on location-specific conditions during the project's final design phase. Excavation for curb ramps would be necessary during construction.

2.3.2.9 Complete Streets

Sidewalks, curb ramps, and marking would be constructed throughout the Action Area to provide access for pedestrians and cyclists. Locations where Complete Streets elements are proposed are shown in Appendix C. The following street elements would be included as part of the Proposed Action:

- Class II bike lanes with striped buffers would be created on SR 1 in the Action Area.
- Pedestrian facilities would be installed along the western side of SR 1, from Kelly Avenue to San Mateo Road (SR 92).
- Intersection improvements would occur as follows:
 - In general, curve radii would be minimized, and curb extensions would be provided where curb ramp work is proposed to meet ADA requirements.
 - Crosswalks would be striped where the Class I path crosses Seymour Street, Grove Street, Filbert Street, Belleville Boulevard, Grand Boulevard, Kehoe Avenue, Frontage Road, Venice Boulevard, Frenchman's Creek Road, Young Avenue, and Alto Avenue. Corner radius would be reduced, and curb ramps and/or path entrances would be squared up at these locations as appropriate.
 - A fourth crosswalk would be installed across SR 1 at the Kelly Avenue intersection's northern leg, the right-turn slip lanes that exit from and enter northbound SR 1 would be removed, and the intersection would be squared up.
 - The new sidewalk would be squared up on the eastern side of SR 1 and the SR 1/SR 92 intersection. Crosswalks would be installed on all four legs to connect to the sidewalk from Kelly Avenue to SR 92, and/or provide a connection from the eastern side of SR 1 to the segment of the Naomi Partridge Trail that crosses under SR 1 at the Pilarcitos Creek Bridge.
 - The slip lane at the SR 1/SR 92 intersection would be removed to accommodate pedestrian and bicycle crossing, or rectangular rapid flashing beacon and high-visibility crosswalks would be installed.
 - A third crosswalk would be installed at the southern leg of the SR 1/Coronado Street intersection, to minimize crossings to the nearby school. The sidewalk on the western side of SR 1 would be connected to the southwestern corner, to connect with the new crosswalk.
 - New crosswalks would be squared up with and installed on all four legs of the SR 1/Capistrano Road intersection.
- Transit stops would be paved, and new sidewalks would be connected along SR 1.
- Coordination with San Mateo County would occur to complete the medium- to long-term improvements that are proposed in the Caltrans-funded SR 1 Safety and Mobility

Improvement Studies (<http://planning.smcgov.org/highway-1-safety-and-mobility-study>) and the “Connect the Coastside” Comprehensive Transportation Management Plan (<http://www.midcoastcommunitycouncil.org/comp-transp-mgmt-plan/>).

2.3.2.10 Utility Relocation

Existing utilities may need to be relocated during construction. Specific utilities that would need relocation would be determined during the project’s final design phase. Some utilities may require vegetation clearance and excavation during construction. Utility relocation is expected to remain within the Proposed Action footprint.

2.3.2.11 Project Staging

Staging during construction would occur within the Caltrans right-of-way outside of environmentally sensitive areas in urban, rural, or grassland areas. Paved areas for staging include portions of SR 1, maintenance pullouts, and paved trails. Unpaved areas for staging would include landscaped areas and wild oat and annual brome grasslands adjacent to paved intersections of the highway.

Due to existing limited roadway and shoulder widths, the existing use of temporary K-rail, and the presence of overhead utility lines, there may be limitations on the types of equipment and vehicles that can be used during construction. Although staging areas are anticipated, construction work would also be along the outside shoulders. Construction crews would access the construction sites from the existing roadway. During construction of the project, the lane adjacent to the work area would need to be closed. This would require one-way reversing traffic control during working hours, with a temporary K-rail to protect the work area. Existing pullouts would most likely be needed to stockpile construction material and for use as construction staging areas. These plans will be finalized during the detailed design phase.

2.3.3 Site Clean Up and Restoration

All construction-related materials will be removed after completion of construction activities. Temporary staging areas would be cleaned up, and any remaining construction materials would be removed and hauled to an appropriate waste disposal facility. The project footprint would be contained primarily in paved areas and graveled/previously disturbed road shoulders. Vegetation restoration in-kind is anticipated where temporary impacts to existing vegetation would occur for construction access.

Caltrans will restore temporarily disturbed areas to their preconstruction contours and functions to the maximum extent practicable. Exposed slopes and bare ground will be reseeded with native local grasses and shrubs to stabilize and prevent erosion. Currently, the project does not propose to remove any trees; however, should the removal of trees be necessary for access in a work site,

coordination with the appropriate permitting agency will be warranted, and planting may be required. A local hydroseed mix will be proposed in the plans, specifications, and estimates phase.

2.3.4 Construction Scenario Summary

The details described in this section represent the most likely procedure for the construction of the Proposed Action. Construction procedures would continue to be refined during detailed design in coordination with regulatory agencies, if required. Although some details of construction would be left to the discretion of the contractor who is awarded the Proposed Action, every effort has been made to articulate Proposed Action details with the potential to affect the environment.

2.3.5 Project Operation and Maintenance

Establishment of native plants on site in areas that will be temporarily disturbed and subsequently reseeded is expected to occur during the rainy season following construction; typically, from the late fall to spring months. Native grasses and annual plants establish quickly from seed and are expected to produce a high native cover component in disturbed areas by the spring following construction. Any native shrubs included in the seed mix may need to grow for one to several years before reaching maturity. Because of the seasonal nature of plant establishment, all work locations completed in a given year are expected to have their native vegetation reestablished within the same time period.

After completion of the Proposed Action, some ongoing maintenance may be required—for example, if safety barriers are damaged in vehicular accidents. However, because the safety of the roadway would be improved by the Proposed Action, and the new safety barriers would replace outdated designs, it is expected that the Proposed Action will result in an overall reduced need for maintenance activities.

2.3.6 Sequencing and Schedule

Construction is due to begin in 2025. The Proposed Action would occur over approximately 250 working days and is anticipated to be completed across two construction seasons. However, ground-disturbing work would occur and be restored on site within each work season for any work area. Construction activities may occur in both daytime and nighttime hours. Construction completion date is anticipated to be in the year 2026. The phasing and ordering of the different Proposed Action elements are expected to be refined further in later stages of design.

2.3.7 Construction Equipment

Caltrans would use the following equipment for respective operations during construction of the Proposed Action:

1. **Roadway Rehabilitation (Cold plane Roadway and Intersection):** Cold plane milling machine, excavator, bulldozer, haul truck, compactor, roller, asphalt paver, and street sweeper
2. **Replace Existing Guardrails:** Guardrail post driver, truck, and forklift
3. **Replace signal poles and crash cushions:** Drilling machine, excavator, haul truck, concrete mixer truck, and bucket truck
4. **Road shoulder reworking:** Sawcut machine, excavator, haul truck, compactor, asphalt paver, roller, and street sweeper
5. **Replace existing drainage elements:** Excavator, haul truck, concrete mixer truck, and pipe lining machine
6. **Upgrade curb ramps and Complete Streets elements:** Jack hammer, loader, haul truck, and concrete mixer truck
7. **Installing temporary and permanent striping:** Paint line striping motorized machine, thermoplastic marking equipment, and attenuator crash truck
8. **Stage construction:** Construction area signs, portable changeable message signs, temporary railing (Type K), alternative temporary crash cushions, cones, and attenuator crash truck

2.4 Conservation Measures

The general conservation measures listed below will be incorporated into the Proposed Action to reduce potential impacts to sensitive biological resources. The conservation measures will be communicated to the contractor using special provisions included in the contract bid solicitation package.

1. **Worker Environmental Awareness Training:** Construction personnel will attend a mandatory environmental education program delivered by the USFWS-Approved Biological Monitor prior to taking part in site construction, including fence installation and other ground-disturbing and/or vegetation clearing activities. The program will focus on the conservation measures that are relevant to an employee's personal responsibility

and will include an explanation of how to best avoid take of listed species. At a minimum, the training will include a description of the listed species that may occur on site; how they might be encountered in the project construction zone; their status and protection; and the relevant Conservation Measures and Terms and Conditions of the Biological Opinion. A fact sheet conveying this information will be prepared and distributed to all construction and project personnel. Distributed materials will include cards with distinctive photographs of the species, compliance reminders, and relevant contact information. Documentation of the training, including sign-in sheets, will be kept on file and made available to the USFWS on request.

- 2. Environmentally Sensitive Area Fencing:** Prior to the start of construction, environmentally sensitive areas (defined as areas containing sensitive habitats adjacent to or in construction work areas for which physical disturbance is not allowed) will be clearly delineated using temporary high-visibility fencing or temporary reinforced silt fences with high-visibility fabric on top (Type 1). Construction work areas will include the active construction site and all areas providing support for the project, including areas used for vehicle parking, equipment and material storage and staging, and access roads. The fencing will remain in place throughout the duration of construction activities, be inspected regularly, and be fully maintained at all times. The final project plans will show all locations where the fencing will be installed, and will provide installation specifications. The bid solicitation package special provisions will clearly describe acceptable fencing material and prohibited construction-related activities, including vehicle operation, material and equipment storage, access roads, and other surface-disturbing activities in environmentally sensitive areas (ESAs).
- 3. Inclement Weather Restriction:** No work would occur during or within 24 hours following a rain event exceeding 0.2 inch, as forecast by the National Oceanic and Atmospheric Administration National Weather Service for Half Moon Bay, California (C3295) base station. USFWS/approval to continue work during or within 24 hours of a rain event will be considered on a case-by-case basis.
- 4. Staging:** Staging and parking areas will be restricted to designated areas, as specified by the project biologist in coordination with the project engineer.
- 5. Soil Storage:** Imported soil or native topsoil may be stored in a designated location, as specified by the project biologist in coordination with the project engineer, until project completion.
- 6. Vegetation Removal:** Vegetation removal will be limited to the designated work areas needed for access and workspace. Where possible, vegetation removal in temporary work

areas will be cut above soil level to promote vegetative growth of established plants following construction.

- 7. Replant, Reseed, and Restore Disturbed Areas:** Caltrans will restore temporarily disturbed areas to their preconstruction contours and functions to the maximum extent practicable. Exposed slopes and bare ground will be reseeded with native local grasses and shrubs to stabilize and prevent erosion. Where disturbance includes the removal of trees and woody shrubs, coordination with the appropriate permitting agency will be warranted, and planting may be required. A local hydroseed mix will be proposed in the plans, specifications, and estimates phase.
- 8. Migratory Bird Treaty Act:** To minimize and avoid take of birds protected under the Migratory Bird Treaty Act, their nests, and their young, Caltrans will conduct vegetation and tree trimming from October 1 through January 31—before project construction—when possible. This work will be limited to vegetation and trees that are within the project footprint. No grubbing or other ground-disturbing work will occur at this time. On completion of vegetation and tree trimming, Caltrans will install stormwater and erosion control BMPs. During the nesting season (February 15 through September 30), a qualified biologist with appropriate construction and species experience will conduct nest and bird surveys and other wildlife surveys prior to tree removal and applicable pruning. All work will be conducted under an RWQCB-approved Water Pollution Control Plan or Storm Water Pollution Protection Plan. During the nesting season, pre-construction surveys for nesting birds will be conducted by a qualified biologist no more than 72 hours prior to the start of construction activities. If work is to occur within 300 feet of active raptor nests or 50 feet of active other migratory/nongame bird nests, a no-disturbance buffer will be established at a distance sufficient to minimize disturbance, based on the nest location, topography, cover, the species’ sensitivity to disturbance, and the intensity/type of potential disturbance. All clearing and grubbing of woody vegetation will be performed by hand or using light construction equipment, such as backhoes and excavators.
- 9. Pre-Construction Surveys:** Prior to initiation of construction activities that include ground disturbance (including fence installation), pre-construction surveys for special-status plants and animals will be conducted by a biologist/botanist. A USFWS-approved biologist will be required for listed plant and animal species. These surveys will consist of walking the project footprint and adjacent areas that are accessible by foot; the use of binoculars or spotting scopes may be required. The biologist will investigate mammal burrows (for California red-legged frog or other special-status wildlife).

10. Invasive Species Management: To reduce the spread of invasive nonnative plant species and minimize the potential decrease of palatable vegetation for wildlife species, Caltrans will comply with Executive Order 13112. The purpose of this order is to prevent the introduction of invasive species and provide for their control to minimize economic, ecological, and human health impacts. In the event that high- or medium-priority noxious weeds, as defined by the California Department of Food and Agriculture or the California Invasive Plant Council (Cal-IPC), are disturbed or removed during construction-related activities, the contractor will contain the plant material associated with these noxious weeds and will dispose of it in a manner that will not promote the spread of the species. The contractor will be responsible for obtaining all permits, licenses, and environmental clearances for properly disposing materials. Areas subject to noxious weed removal or disturbance will be replanted with fast-growing native grasses or a native erosion control seed mixture. If seeding is not possible, the area will be covered to the extent practicable with heavy black plastic solarization material until completion of construction. All earthmoving equipment, as well as seeding equipment to be used during project construction, will be thoroughly cleaned before arriving on the project site.

11. Implementation of Water Quality/Erosion Control BMPs: Erosion control BMPs will be developed and implemented to minimize any wind- or water-related erosion, in compliance with the requirements of the RWQCB. Protective measures will include, at a minimum, the following:

- a. No discharge of pollutants from vehicle and equipment cleaning will be allowed into any storm drains or watercourses.
- b. Vehicle and equipment fueling and maintenance operations will be kept at least 50 feet away from watercourses, except at established commercial gas stations or established vehicle maintenance facilities.
- c. Concrete wastes will be collected in washouts, and water from curing operations will be collected and disposed. Neither will be allowed into watercourses.
- d. Spill containment kits will be maintained on site at all times during construction operations and/or staging or fueling of equipment.
- e. Dust control measures will include use of water trucks and dust palliatives to control dust in excavation-and-fill areas; covering temporary access road entrances and exits with rock (rocking); and covering temporary stockpiles when weather conditions require.

- f. Coir rolls or straw wattles that do not contain plastic or synthetic monofilament netting will be installed along or at the base of slopes during construction to capture sediment.
- g. Graded areas will be protected from erosion using a combination of silt fences and fiber rolls along toes of slopes or along edges of designated staging areas; erosion control netting (e.g., jute or coir) will be used as appropriate on sloped areas. Erosion control materials that use plastic or synthetic monofilament netting will not be used in the project footprint. This will include products that use photodegradable or biodegradable synthetic netting, which can take several months to decompose. Acceptable materials will include natural fibers, such as jute, coconut, or twine.

12. Construction Site BMPs: The following site restrictions will be implemented to avoid or minimize impacts on special-status species and their habitats:

- a. Routes and boundaries of roadwork will be clearly marked before the start of construction or grading.
- b. All food and food-related trash items will be enclosed in sealed trash containers and will be properly disposed off site.
- c. No pets belonging to project personnel will be allowed anywhere in the project area during construction.
- d. No firearms carried by project personnel will be allowed except for those carried by authorized security personnel or local, state, or federal law enforcement officials.
- e. A spill response plan will be prepared. Hazardous materials (e.g., fuels, oils, or solvents) will be stored in sealable containers in a designated location at least 50 feet from any aquatic features.

13. Speed Reduction: Project-related vehicles will be required to observe a 10-mile-per-hour speed limit in all staging or storage areas.

14. Light Restrictions: Construction personnel will turn portable tower lights on no more than 30 minutes before the beginning of civil twilight, and off no more than 30 minutes after the end of civil sunrise. Portable tower lights will have directional shields attached to them, and personnel will only direct lights downward and toward active construction and staging areas. Lighting per portable tower light will not exceed 2,000 lumens. To the extent practicable, personnel will only use enough coverage to light the work areas.

The measures listed in the following paragraphs would be implemented as part of construction to minimize and/or avoid impacts to special status species and their aquatic habitats in the Action Area.

- 1. Wetlands and Waters Construction Work Windows:** Work in wetlands, waters, and riparian habitat will be limited to June 15 through October 15 to avoid or minimize impacts to WOTUS, Waters of the State, riparian habitat, and special-status species habitat.
- 2. Environmentally Sensitive Areas and Fencing:** Listed species habitat will be delineated as environmentally sensitive areas on contract plans and defined in contract specifications.

Environmentally sensitive areas outside of the proposed work areas will be specifically identified to avoid during construction. Where work must occur in or adjacent to an environmentally sensitive area, an approved biologist with stop-work authority will be present. Caltrans will install fencing to outline and protect environmentally sensitive areas prior to the start of construction. Environmentally sensitive area provisions will be implemented as a first order of work, and will remain in place until all construction activities are completed in the work area.

- 3. Riparian Vegetation Protection:** All riparian habitat in the project area will be delineated as an environmentally sensitive area, and no construction activities will occur outside of the immediate work area in riparian habitat. At the roadway crossings of Denniston, Frenchman's, Arroyo de en Medio Creek, and Pilarcitos Creeks, Caltrans will limit riparian vegetation removal to the immediate work area. Trees or shrub trimming at those locations will be limited to removing only branches that overhang the roadway.

2.4.1 Project Design Modifications for Avoidance and Minimization

Project designers are using mapped biological resources in the Action Area, including the habitats of California red-legged frog and San Francisco garter snakes, to inform the design of the project and avoid resources. Caltrans would be upgrading or replacing existing infrastructure elements where they already exist. New project elements and utilities, within certain constraints, have been designed to minimize and avoid sensitive biological resources including California red-legged frog and San Francisco garter snake upland and non-breeding aquatic habitats.

2.4.2 Species-Specific Conservation Measures – California Red-Legged Frog and San Francisco Garter Snake

1. **Seasonal Avoidance:** Construction activities off paved surfaces in areas of potential California red-legged frog habitat will be performed between June 15 and October 15 to minimize impacts on this species. Designated staging areas may be used outside of this work window once cleared by a USFWS-Approved Biologist or their designee, and fenced, as appropriate.
2. **Exclude Use of Plastic/Synthetic Monofilament Netting:** To avoid entanglement or injury of California red-legged frog or San Francisco garter snake, erosion control materials that use plastic or synthetic monofilament netting will not be used.
3. **Avoidance of Entrapment:** To prevent inadvertent entrapment of animals during construction, all excavated, steep-walled holes or trenches more than 1 foot deep will be covered at the close of each working day with plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks at an angle no greater than 30 degrees. Before such holes or trenches are filled, they must be thoroughly inspected for trapped animals. All replacement pipes, hoses, culverts, or similar structures less than 12 inches in diameter will be closed, capped, or covered on entry to the project site. All similar structures greater than 12 inches must be inspected before they are subsequently moved, capped, and/or buried.
4. **Biological Monitor:** The names and qualifications of proposed biological monitor(s) will be submitted to the USFWS for approval prior to the start of construction. The USFWS-approved biological monitor(s) will keep a copy of the USFWS biological opinion in their possession when on site. Through communication with the resident engineer, the USFWS-approved biological monitor(s) will be on site during all work that could reasonably result in take of California red-legged frog or other special-status species. The USFWS-approved biological monitor(s) will have the authority to stop work that may result in the unauthorized take of special-status species. If the USFWS-approved biological monitor exercises this authority, the USFWS will be notified by telephone and e-mail message within 1 working day.
5. **Pre-Construction/Daily Surveys:** Pre-construction surveys for special-status species will be conducted by the USFWS-approved biological monitor no more than 14 calendar days prior to any initial ground disturbance, and immediately prior to ground-disturbing activities (including vegetation removal and fence installation) in the project footprint. These efforts will consist of walking surveys of the project limits, and if possible, accessible adjacent areas within at least 50 feet of the project limits. The USFWS-

approved biological monitor will investigate potential cover sites when it is feasible and safe to do so. This includes thorough investigation of mammal burrows, rocky outcrops, appropriately sized soil cracks, tree cavities, and debris. Native vertebrates found in the cover sites within the project limits will be documented and relocated to an adequate cover site in the vicinity, with the exception of fully protected species. Safety permitting, the USFWS-approved biological monitor will also survey areas of disturbed soil for signs of California red-legged frog or San Francisco garter snake within 30 minutes following initial disturbance of the given area. The need for further pre-construction surveys will be determined by the Biologist based on site conditions and realized construction timelines.

- 6. Protocol for Species Observation:** The USFWS-approved biological monitor(s) will have the authority to halt work through coordination with the resident engineer if California red-legged frog or San Francisco garter snake are observed in the project footprint. The resident engineer will keep construction activities suspended in a 50-foot radius of the California red-legged frog or San Francisco garter snake in any construction area where the biologist has determined that a potential take of the species could occur. Work will resume after observed listed individuals leave the site voluntarily, the biologist determines that no wildlife is being harassed or harmed by construction activities, or the wildlife is relocated by the biologist to a release site using USFWS-approved handling techniques.
- 7. Handling of California Red-Legged Frog:** If a California red legged frog individual(s) is discovered, the resident engineer and USFWS-approved biological monitor will be immediately informed.

 - If a California red-legged frog gains access to a construction zone, work will be halted immediately within 50 feet until the animal leaves the site or is captured and relocated by the USFWS-approved biological monitor.
 - The USFWS will be notified within 1 working day if a California red-legged frog or San Francisco garter snake is discovered in the construction site.
 - The captured California red-legged frog will be released in appropriate habitat outside of the construction area but near the capture location. The release habitat will be determined by the USFWS-approved biological monitor.
 - The USFWS-approved biological monitor will take precautions to prevent introduction of amphibian diseases in accordance with the Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog (USFWS 2005).

2.5 Compensation

The Proposed Action is expected to have no permanent effects on aquatic non-breeding habitat or upland habitat for either the California red-legged frogs or the San Francisco garter snakes. The Proposed Action would have relatively minimal permanent effects (0.38 acre) on dispersal habitat potentially used by California red-legged frogs and San Francisco garter snake. The dispersal habitats in the Action Area are poor quality and occur along the sides of SR 1. The anticipated permanent effects would not create barriers to dispersal, nor are they expected to affect the movement of individuals in the Action Area. Furthermore, the proposed Conservation Measures for the Proposed Action would avoid and minimize potential effects on dispersal habitat. Temporary loss of habitat will be compensated from the restoration of those areas that will be completed on site within each work season for any work area.

Chapter 3. Environmental Baseline

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the Action Area, without the consequences to the listed species or designated critical habitat caused by the Proposed Action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the Action Area, the anticipated impacts of all proposed federal projects in the Action Area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not in the agency's discretion to modify are part of the environmental baseline (50 CFR Section 402.02).

3.1 Summary of Environmental Baseline

The Action Area consists of the project footprint (permanent or temporary impact areas, including staging and access areas), along with buffer areas (surrounding the project footprint) that construction activities may directly or indirectly impact. The buffer areas were estimated based on the potential for project activities to cause noise, water quality, or geomorphological impacts. The Action Area totals approximately 158.93 acres, and is shown in Figure 5. The general conditions of the Action Area, habitats, and listed species known to occur are presented in this section.

To account for direct and indirect effects of the project to resources outside the project footprint, the Action Area includes a 20-foot buffer around all permanent and temporary impact areas. A 20-foot buffer was chosen to account for the existing baseline of anthropogenic disturbances, traffic, and urban setting where the construction work would be conducted, and the potential of the noise and visual disturbances to exceed background levels. In addition to the 20-foot buffer, all areas in the SR 1 Caltrans right-of-way, which includes significant swaths of land on either side of SR 1, accounts for a large portion of the Action Area. The extension of the Action Area to the Caltrans right-of-way is again to account for potential project-related activities, including access and staging, but also buffers the project footprint in many areas to distances that exceed 20 feet. The existing roadway in the Action Area consists of a conventional highway with one lane in each direction, with 12-foot lanes. SR 1 is subject to heavy traffic, and as a result, there are high levels of noise and vibrational baseline disturbance.

3.2 Description of the Action Area

This section provides a detailed description of the Action Area, including discussion of the physical conditions (climate and topography, soils, and hydrology) as well as biological conditions (natural communities, common wildlife species, and aquatic resources).

The Action Area is in the Santa Cruz Mountains ecological subsection of the Central California Coast Ecological Section (Miles and Goudey 1998). The subsection extends from Pacifica to Santa Cruz along the California coast, and inland to include the western and southwestern parts of the Santa Cruz Mountains. As part of the Santa Cruz Mountains, the region generally experiences a Mediterranean climate, moderated by the Pacific Ocean marine layer that is responsible for the regular fog conditions along the north-central California coast. Cooler temperatures predominate in winter between November and March, and the warmest temperatures typically occur during late summer.

3.2.1 Climate

As part of the Santa Cruz Mountains, the region generally experiences a Mediterranean climate, moderated by the Pacific Ocean marine layer that is responsible for the regular fog conditions along the north-central California coast. Cooler temperatures predominate in winter between November and March, and the warmest temperatures typically occur during late summer.

Westerly precipitation systems deliver rain to the watershed generally between November and April. In contrast, little to no rainfall occurs between late spring through early fall, which is commonly referred to as the dry season. The majority of rain delivered to the watershed falls on west-facing slopes of relatively high relief, where higher elevation areas receive up to 35 inches, and lower areas receive 26 inches (Rantz 1971). Typically, a few large winter storms generate high-flow events and increased sediment input to streams each year.

The highest average temperature in Half Moon Bay is 64.6 degrees Fahrenheit (°F) from May through October, and the lowest average temperature is 42.6°F from November through April. The City of Half Moon Bay is approximately 75 feet above mean sea level.

3.2.2 Hydrology

Situated on the westernmost portion of the San Francisco Peninsula, the Action Area is in the San Francisco Coastal South Hydrologic Unit Code (HUC) 8 Watershed and the San Gregorio Creek-Frontal Pacific Ocean HUC 10 Watershed. The Action Area spans three HUC 12 watersheds: Denniston Creek-Frontal Pacific Ocean, Arroyo Leon, and Purisima Creek-Frontal Ocean. All the creeks in the area drain in a westerly-southwesterly direction, coming from the western slope of the Santa Cruz Mountains. The named drainages that cross the Action Area are

Denniston Creek, Deer Creek, Arroyo de en Medio, Frenchman’s Creek, and Pilarcitos Creek. Of these, Pilarcitos Creek is the largest; the remaining creeks have a watershed size of less than 5 square miles.

Pilarcitos Creek originates on the eastern side of Montara Mountain and flows about 12 miles to the Pacific Ocean at Half Moon Bay. It drains a watershed of approximately 17,900 acres (28 square miles) in San Mateo County. The creek, a source of drinking water for residents of the central coast and San Francisco Bay Area, is diverted at the Pilarcitos Reservoir and Stone Dam complex in the upper watershed. Denniston Creek, Arroyo de en Medio, and Frenchman’s Creek are similar to Pilarcitos Creek in that they all originate from the slopes of Montara Mountain, and eventually flow west to the Pacific Ocean; however, they are not sources of drinking water.

3.2.3 Vegetation

Vegetation was mapped and described based on field surveys at water crossings and areas subject to off-pavement disturbance (

Figure 6). In all other parts of the Action Area, vegetation was mapped using a combination of aerial imagery and street view imagery. Vegetation was mapped to the vegetation alliance level using the CNPS Manual of California Vegetation (CNPS 2021) classification system where possible. For vegetation communities that could be consistently identified to the association level throughout the Action Area, the vegetation association was also recorded in the vegetation habitat descriptions. Protocol botanical surveys were conducted in March, May, and June corresponding with the blooming periods of special status plants that may occur in the Action Area documented in the 2022 Special Status Plant Survey Report (Appendix B). The presence of invasive species, defined as those included on the Cal-IPC (2021) inventory of invasive plants, was noted for vegetation communities on the field surveys. Additional nonnative species that are not ranked by Cal-IPC (2021) but appeared to be problematic invasive species in the Action Area are also discussed in the community descriptions, where applicable. Cal-IPC's (2021) invasive plant rankings are defined as follows:

- High: species with severe ecological impacts
- Moderate: substantial and apparent, but not severe, ecological impacts
- Limited: minor ecological impacts, or impacts for which information is limited
- Watch: at a high risk of becoming invasive in the future

Vegetation communities are described in detail in this section.

Figure 6 includes vegetation mapping completed for the Proposed Action. Vegetation community descriptions include the vegetation alliance name, association name (when a single association from that alliance is present in the Action Area), description of dominant and associated species, and the description of abundant and noteworthy invasive species in the community.

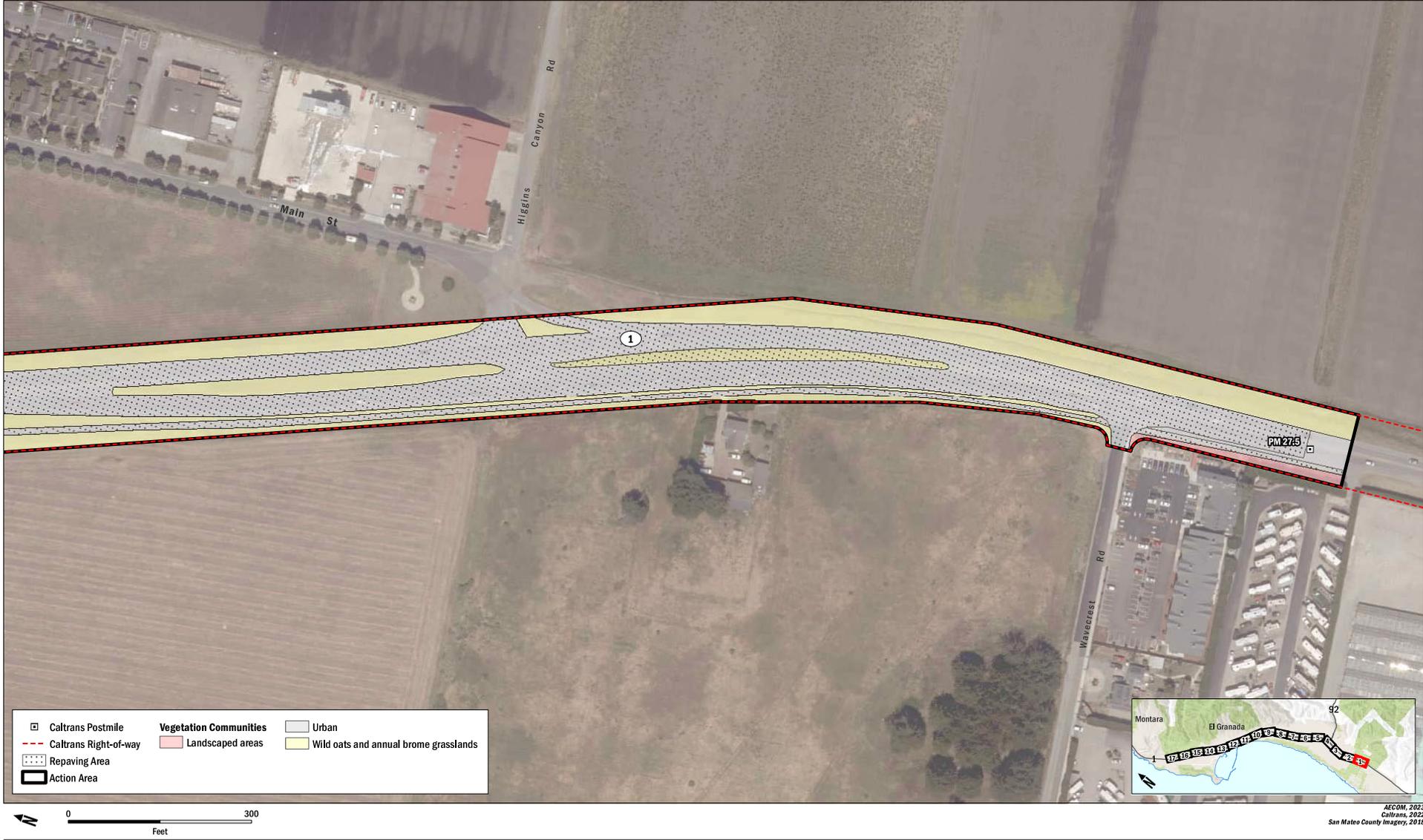




FIGURE 6
 Vegetation Communities and Land Cover
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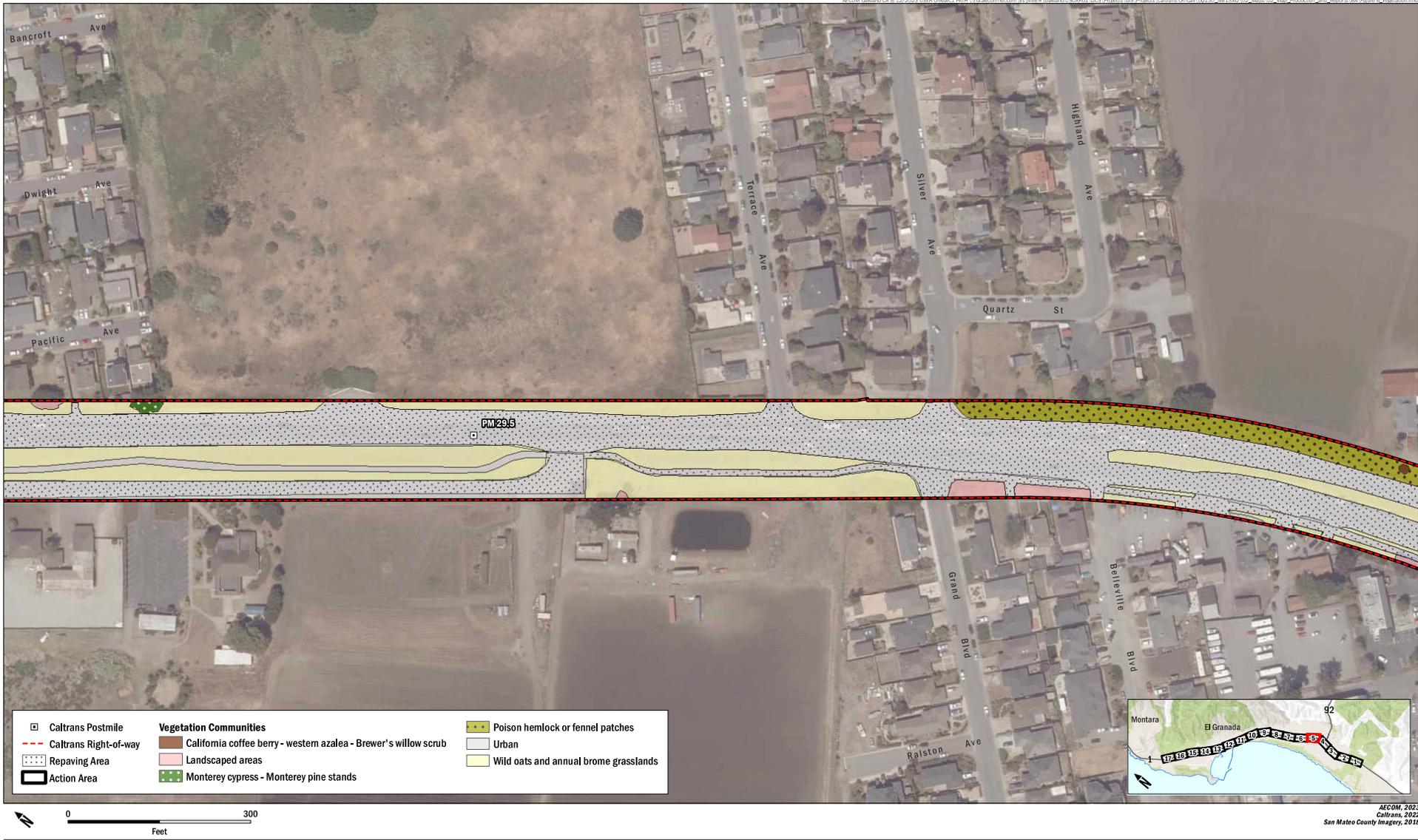
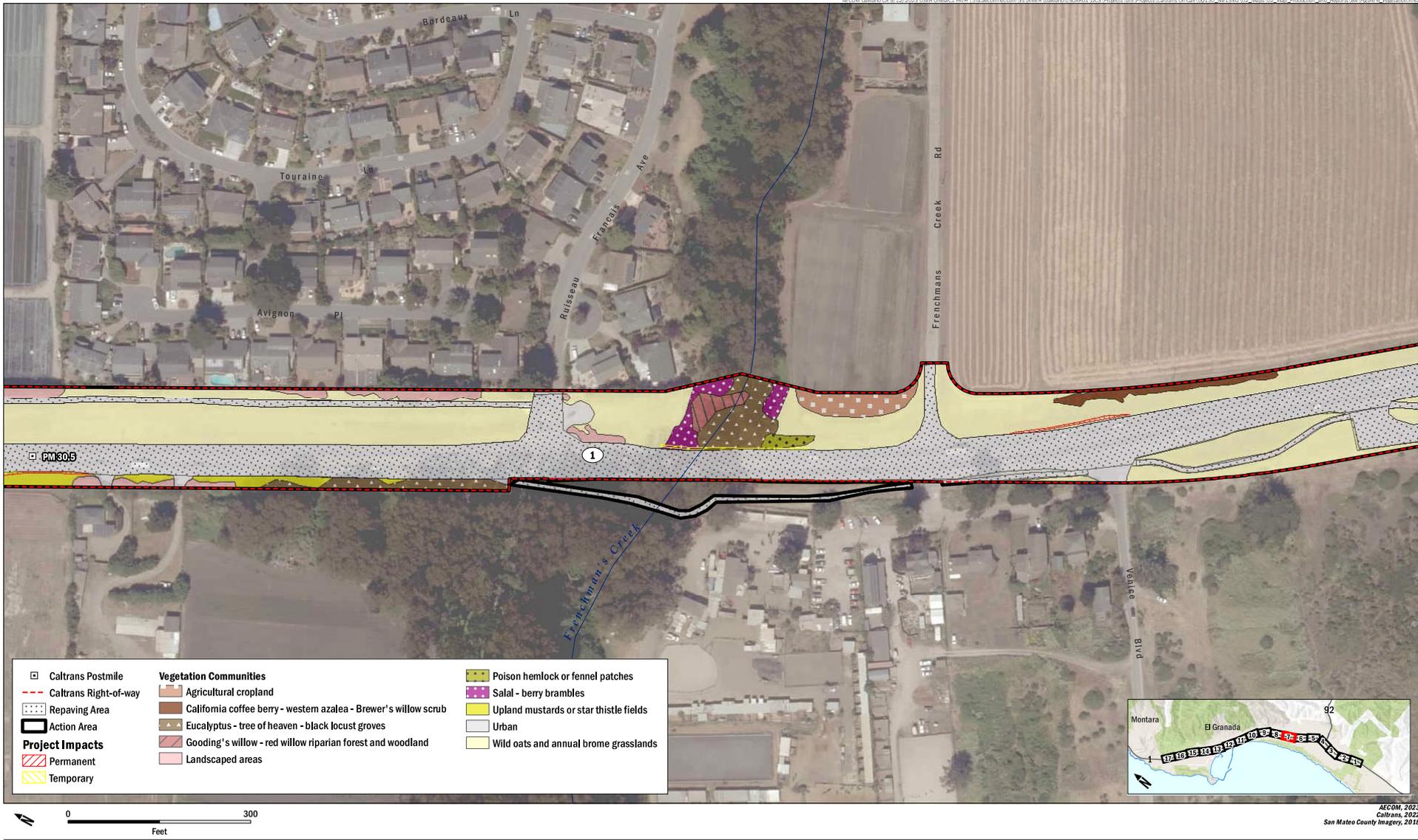
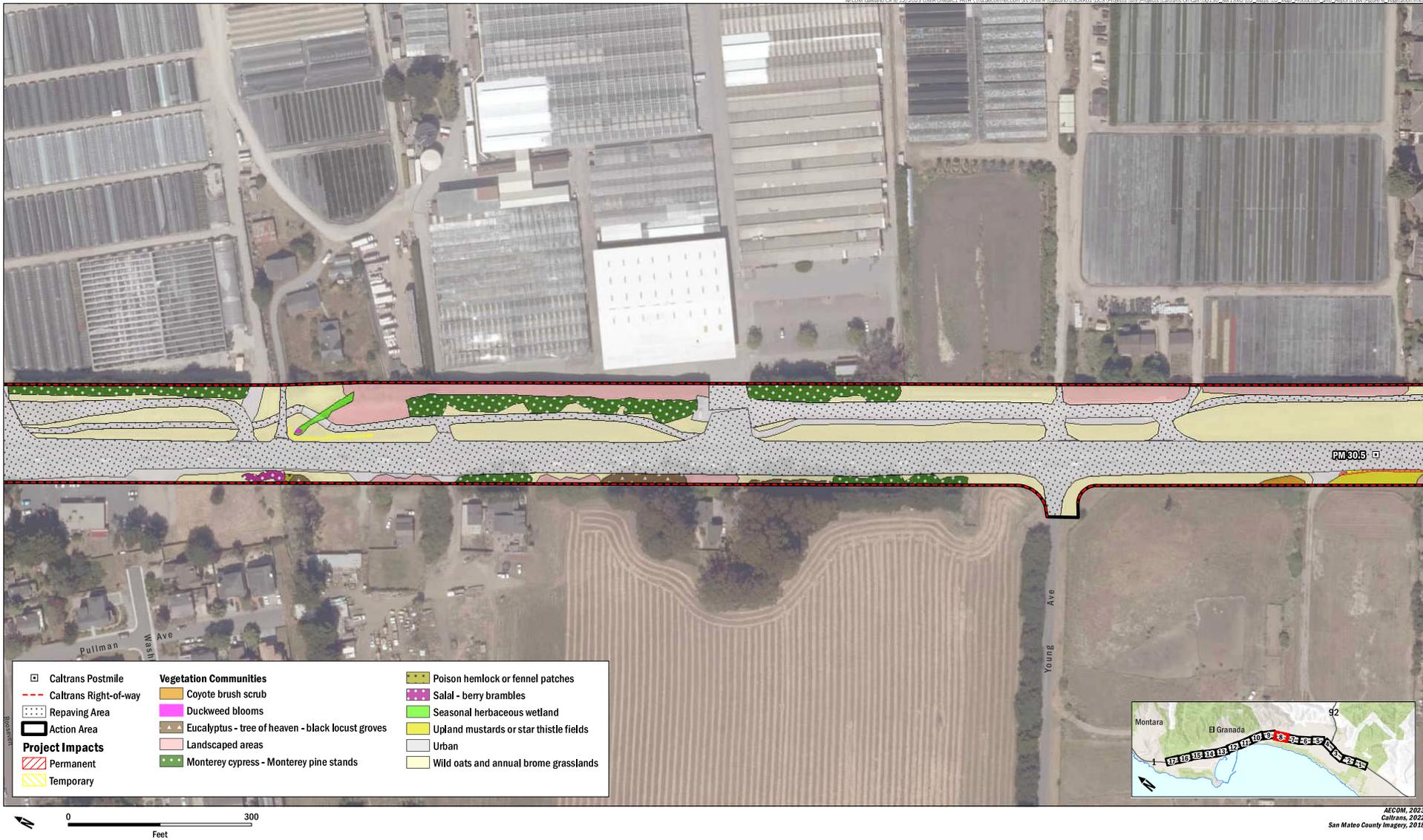


FIGURE 6
 Vegetation Communities and Land Cover
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FIGURE 6
 Vegetation Communities and Land Cover
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AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018

FIGURE 6
 Vegetation Communities and Land Cover
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FIGURE 6
 Vegetation Communities and Land Cover
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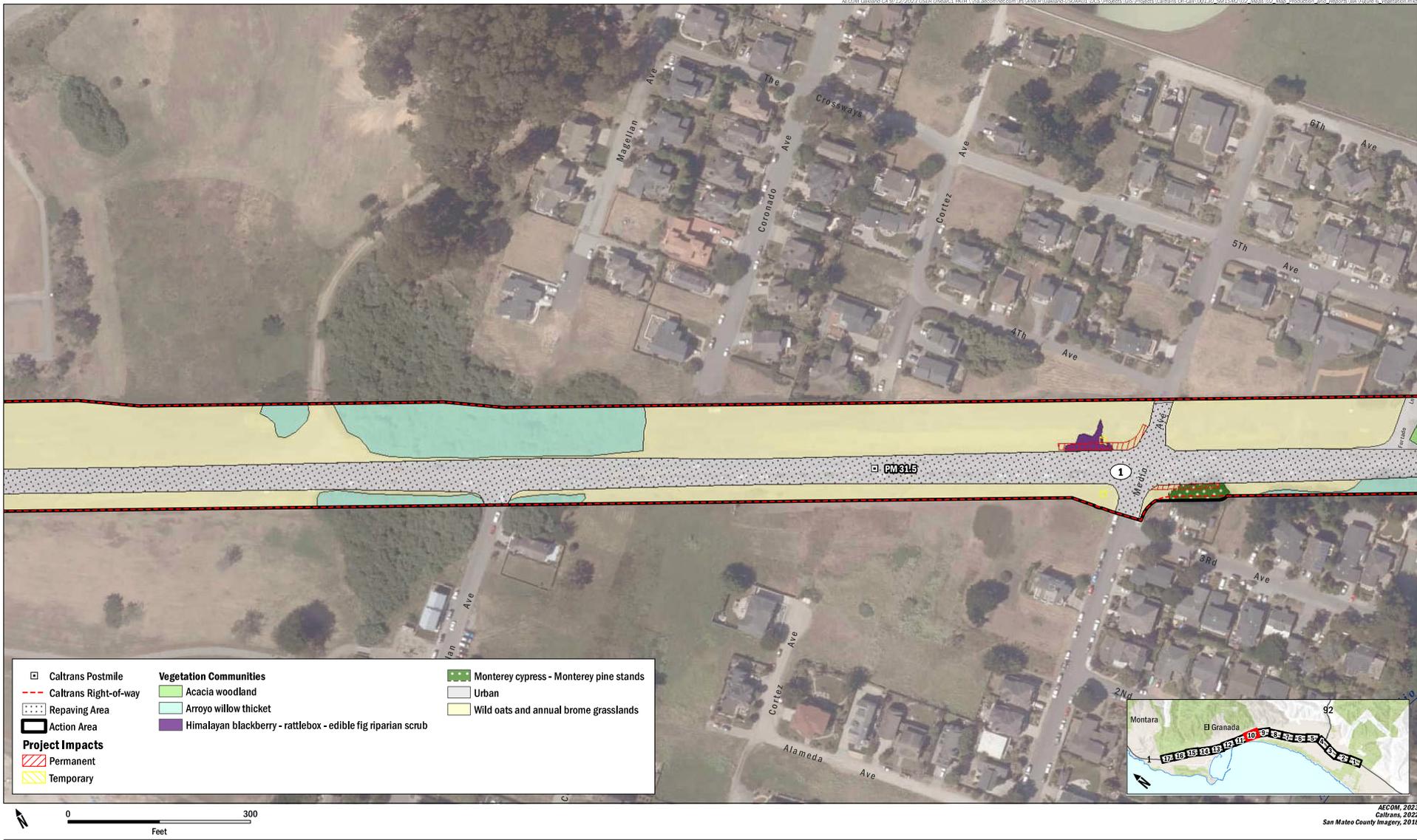


FIGURE 6
 Vegetation Communities and Land Cover
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AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018

FIGURE 6
 Vegetation Communities and Land Cover
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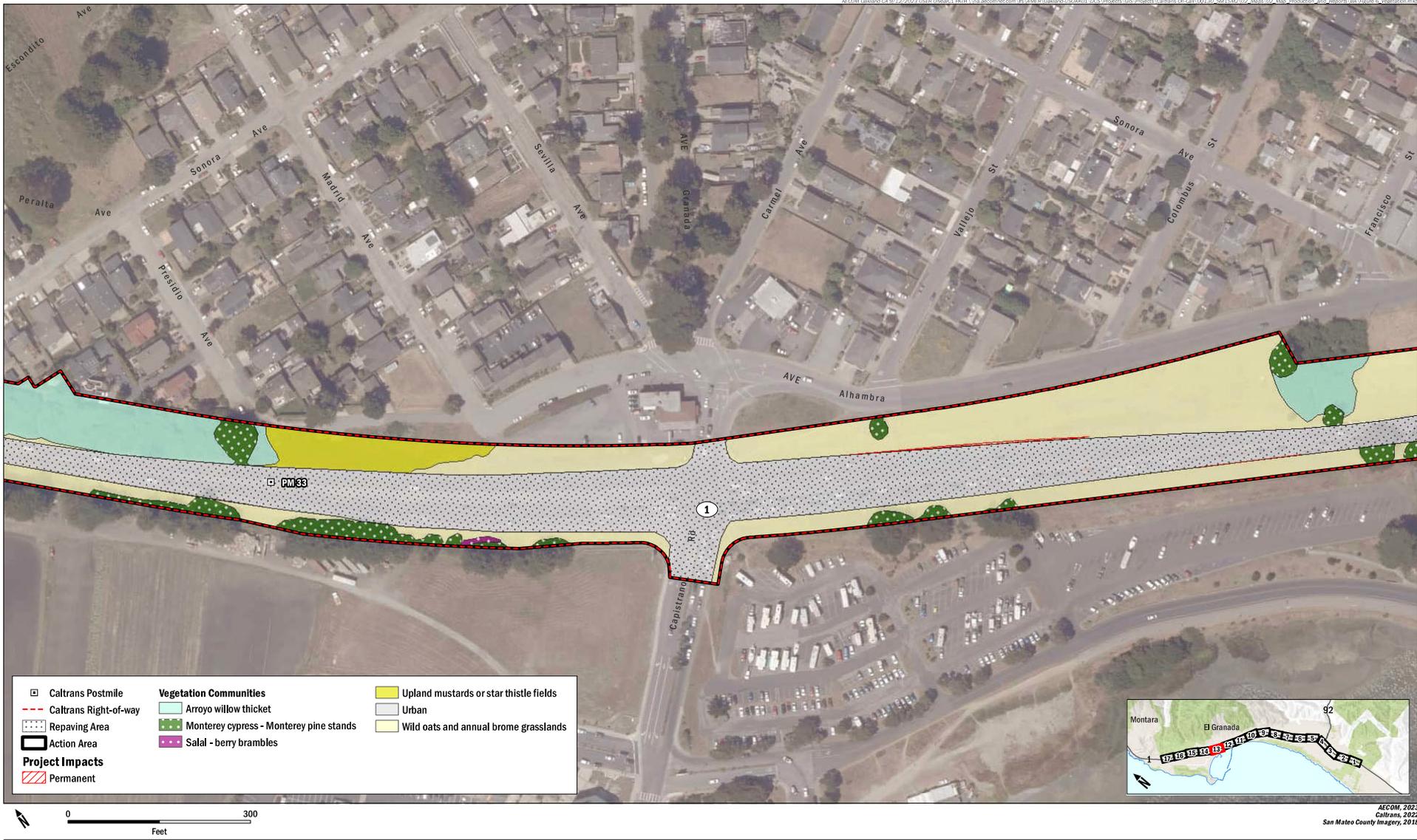


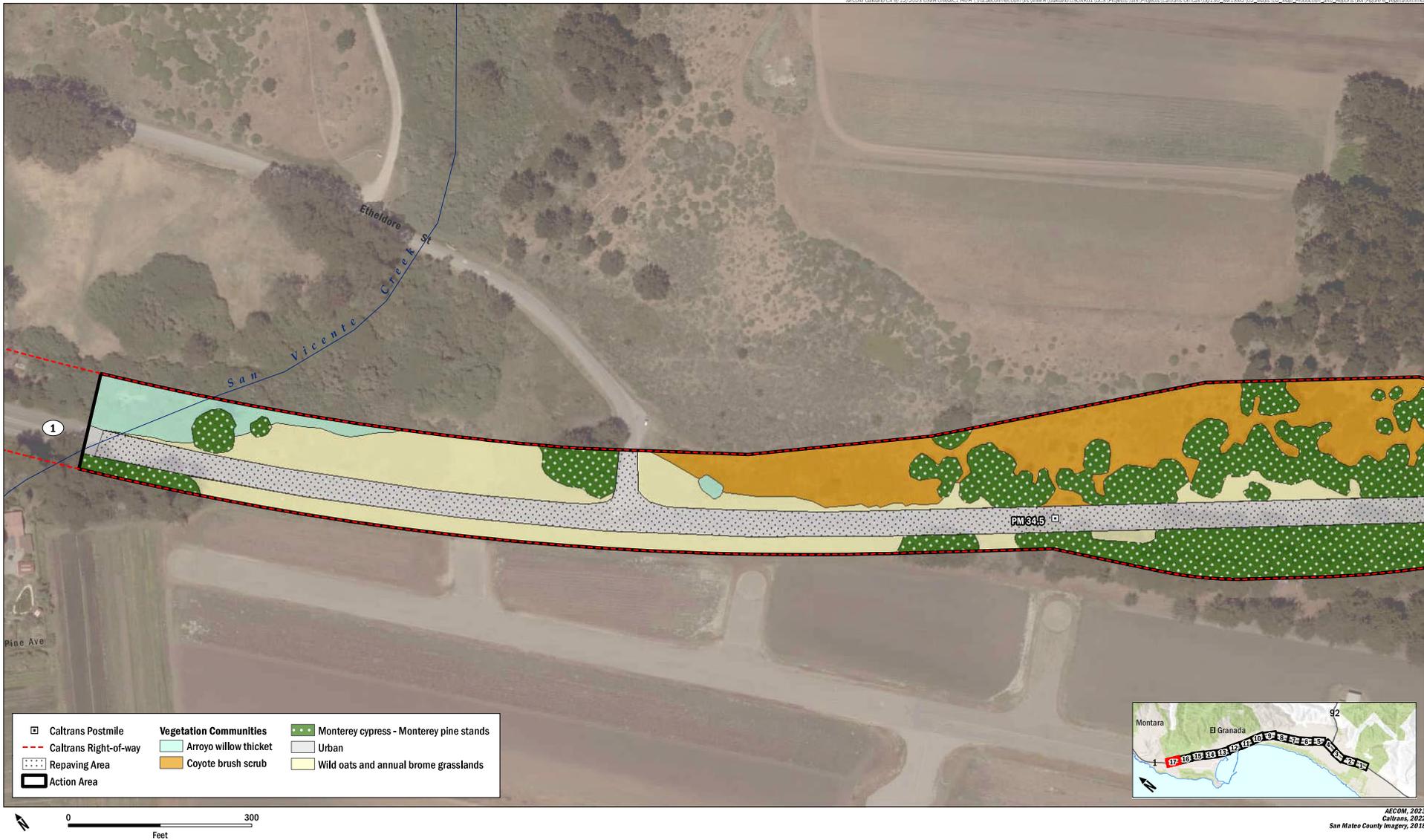
FIGURE 6
 Vegetation Communities and Land Cover
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FIGURE 6
 Vegetation Communities and Land Cover
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FIGURE 6
 Vegetation Communities and Land Cover
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3.2.3.1 Herbaceous Wetland Plant Communities

Duckweed Blooms

Duckweed blooms occur in the Action Area at a single site along northbound SR 1. This area has a small patch of standing water, with cover consisting only of duckweed (*Lemna* sp.). The duckweed was not identified to the species level, but all members of this genus occurring in California are considered native (Calflora 2023). No invasive species are present in this community. The duckweed bloom in the Action Area is surrounded by seasonal herbaceous wetland.

Seasonal Herbaceous Wetland

Seasonal herbaceous wetlands in the Action Area could not be identified to the vegetation alliance level in CNPS (2021) due to this community's poor fit for previously described vegetation alliances. These wetlands have relatively sparse vegetative cover with several co-dominant species, including tall cyperus (*Cyperus eragrostis*), bristly ox-tongue (*Helminthotheca echioides*; Cal-IPC limited), curly dock (*Rumex crispus*; Cal-IPC limited), willow dock (*Rumex transitorius*), and Pacific aster (*Symphotrichum chilense*). Only invasive species ranked as limited by Cal-IPC were observed in this community.

Water Parsley Marsh

Water parsley marsh occurs at a single wetland in the Action Area. This community is dominated by water parsley (*Oenanthe sarmentosa*) and dotted smartweed (*Persicaria punctata*), with few other species present. Invasive plant species present in this community include garden nasturtium (*Tropaeolum majus*) and English ivy (*Hedera helix*; Cal-IPC high). Garden nasturtium is not a Cal-IPC-rated invasive plant, but it can invade shaded or moist areas (Calflora 2023) and is dominant on the edges of this habitat.

Ice Plant Mats

Ice plant mats occur in small patches at several locations in the Action Area. This community is dominated by ice plant (*Carpobrotus edulis*; Cal-IPC high). Few other species occur in this community, with the exception of a few nonnative annual grasses that are also present in the wild oat (*Avena fatua*) and annual brome grasslands community. Although ice plant is an invasive species of concern, this plant is relatively uncommon throughout the Action Area and only forms relatively small patches.

Poison Hemlock or Fennel Patches

Poison hemlock (*Conium maculatum*; Cal-IPC moderate) or fennel patches occur in disturbed areas throughout the Action Area, both in uplands and at the margins of wetlands. Most of this community in the Action Area is dominated by poison hemlock, but there are several patches

that are dominated by fennel (*Foeniculum vulgare*; Cal-IPC moderate). Nonnative annual grasses found in the wild oats and annual brome grasslands community are also present at moderate cover. This community intergrades with the other disturbed herbaceous communities described in this section.

Upland Mustards or Star Thistle Fields

In the Action Area, this community is represented by upland mustards exclusively; no star thistle (*Centaurea* spp.) plants were observed in the Action Area. This community is dominated by black mustard (*Brassica nigra*; Cal-IPC moderate), hoary mustard (*Hirschfeldia incana*; Cal-IPC moderate), and in some areas jointed charlock (*Raphanus sativus*; Cal-IPC limited). This community also has a moderate cover of nonnative annual grasses that are more dominant in the wild oats and annual brome grasslands community. This community intergrades with the other disturbed herbaceous communities described in this section.

Wild Oats and Annual Brome Grasslands

Wild oat and annual brome grasslands are the most common plant community found in the Action Area, occupying the bulk of the land cover in areas lacking trees, shrubs, or pavement. This community is dominated by nonnative grasses, including slender oat (*Avena barbata*; Cal-IPC moderate), rescue grass (*Bromus catharticus*), soft chess (*Bromus hordeaceus*), foxtail chess (*Bromus madritensis*), Italian ryegrass (*Festuca perennis*; Cal-IPC moderate), velvet grass (*Holcus lanatus*; Cal-IPC moderate), kikuyu grass (*Pennisetum clandestinum*; Cal-IPC limited), and Harding grass (*Phalaris aquatica*; Cal-IPC moderate). Several nonnative forbs are also associated with this community, including bristly ox-tongue (Cal-IPC limited), flax (*Linum bienne*), annual mercury (*Mercurialis annua*), ribwort (*Plantago lanceolata*; Cal-IPC limited), and pincushions (*Scabiosa atropurpurea*; Cal-IPC watch). Cover of pincushions is dense in sections of the Action Area, but there are a limited number of records of this species from coastal San Mateo County (Jepson Flora Project 2021). A few native species, such as salt grass (*Distichlis spicata*), willow herb (*Epilobium brachycarpum*), California poppy (*Eschscholzia californica*), and coastal tarweed (*Madia sativa*), are present at low cover in the grasslands. Andean pampas grass (*Cortaderia jubata*; Cal-IPC high) occurs in several small patches throughout the grasslands, but in areas too small to be mapped as a separate vegetation community. The grasslands in the Action Area intergrade with the other disturbed herbaceous communities in the Action Area, and these communities have many of the same invasive species in common.

3.2.3.2 Shrub-Dominated Plant Communities

Arroyo Willow Thickets

Arroyo willow thickets occur in mesic sites throughout the Action Area, including riparian areas and roadside ditches. This community is dominated by arroyo willow (*Salix lasiolepis*) and has a

shrub/vine layer in places that includes California blackberry (*Rubus ursinus*), California coffee berry (*Frangula californica*), coyote brush (*Baccharis pilularis*), American dogwood (*Cornus sericea*), and red elderberry (*Sambucus racemosa*). Understory plants are present mostly on the margins of this community, and include Pacific aster, yarrow (*Achillea millefolium*), mugwort (*Artemisia douglasiana*), coast rush (*Juncus hesperius*), and spreading rush (*Juncus patens*). Arroyo willow thickets in the Action Area generally have a very dense cover of native woody species, with few invasive species present; but on their edges, this community intergrades with grasslands and other disturbed herbaceous communities. The edges of the arroyo willow thickets therefore have a low density of the same invasive species found in the disturbed herbaceous communities, such as poison hemlock, fennel, Andean pampas grass, hoary mustard, black mustard, and nonnative annual grasses.

California Coffee Berry – Western Azalea – Brewer's Willow Scrub

California coffee berry – western azalea – Brewer's willow scrub occurs in only two small patches in the Action Area, and only the California coffee berry association is present in the Action Area. This community is dominated by California coffee berry, with no other shrubs present. There is little to no understory in this community, owing to the very dense cover of California coffee berry shrubs. This community is ranked G3S3, making it a sensitive natural community.

California Sagebrush – (Purple Sage) Scrub

California sagebrush – (purple sage) scrub occurs in a single patch in the Action Area and is represented by the California sagebrush association. This community is dominated by California sagebrush (*Artemisia californica*), with no co-occurring shrubs; it is associated with nonnative annual grasses. No invasive species were identified in this community, although it is expected that some nonnative annual grasses ranked limited or moderate by Cal-IPC (2021) are likely present.

Coyote Brush Scrub

Coyote brush scrub is found in several locations throughout the Action Area. This community is dominated by coyote brush, including both upright (var. *pilularis*) and prostrate (var. *consanguinea*) forms, and is associated with several native shrubs and herbs, including California coffee berry, California blackberry, poison oak (*Toxicodendron diversilobum*), California bee plant (*Scrophularia californica*), Pacific aster, and spreading rush. Most coyote brush scrub vegetation in the Action Area has few invasive species, but some invasive plants are present on its peripheries, particularly poison hemlock (Cal-IPC moderate).

Himalayan Blackberry – Rattlebox – Edible Fig Riparian Scrub

Himalayan blackberry – rattlebox – edible fig riparian scrub occurs in a single patch in a roadside ditch along the northbound side of SR 1, and only the Himalayan blackberry association is present in the Action Area. Although this community is not in a riparian zone, the site is likely more mesic than surrounding grasslands due to its location in a ditch. This community is dominated by Himalayan blackberry (*Rubus armeniacus*; Cal-IPC high) and is associated with coyote brush and nonnative annual grasses. This area is mowed on a regular basis, so the Himalayan blackberry and coyote brush only grow very close to the ground; if mowing were to cease, these plants would likely form a dense thicket in this area. The mowing may help to slow the spread of the invasive Himalayan blackberry—both by preventing seed set and slowing down its spread via vegetative growth.

Poison Oak Scrub

Poison oak scrub occurs in the Action Area only at the location along SR 92. This community is dominated by poison oak and is associated with California blackberry and California bee plant. Although this community has a very high cover of native shrubs, it has a small infestation of Andean pampas grass (Cal-IPC high).

Salal – Berry Brambles

Salal – berry brambles occur in a few patches in the Action Area, at a mesic site along a ditch and in riparian areas; this community is represented by the California blackberry association in the Action Area. Salal – berry brambles in the Action Area are dominated by California blackberry, and are associated with common horsetail (*Equisetum arvense*), stinging nettle (*Urtica dioica*), and Pacific aster. Some nonnative annual grasses are found in this community.

3.2.3.3 Tree-Dominated Plant Communities

Acacia Woodland

Acacia woodlands occur in the Action Area in the riparian zone at Arroyo de en Medio. This community is dominated by a canopy of blackwood acacia (*Acacia melanoxylon*; Cal-IPC limited) and several red elderberry shrubs, with an understory dominated by invasive plants, including garden nasturtium, English ivy (Cal-IPC high), Cape ivy (*Delairea odorata*; Cal-IPC high), and upright veldt grass (*Ehrharta erecta*; Cal-IPC moderate). Some large blue gum (*Eucalyptus globulus*) trees had recently dominated the tree canopy but were cut shortly before the survey, resulting in these areas being mapped as acacia woodlands.

Eucalyptus – Tree of Heaven – Black Locust Groves

Eucalyptus – tree of heaven – black locust groves are found in several riparian and upland areas throughout the Action Area and are represented in the Action Area by the eucalyptus association.

This community is dominated by blue gum (Cal-IPC limited) trees, many of which are mature, large specimens. Smaller trees and shrubs are present below the blue gum canopy, including blackwood acacia and red elderberry. Understories in this community are similar to those found in acacia woodlands, and are dominated by garden nasturtium, English ivy (Cal-IPC high), and Cape ivy (Cal-IPC high), with some upright veldt grass also present.

Goodding's Willow – Red Willow Riparian Woodland and Forest

Goodding's willow – red willow riparian forest and woodland occurs in the Action Area only at Frenchman's Creek, and is represented in the Action Area by the red willow association. This community is dominated by red willow (*Salix laevigata*) and is surrounded by a eucalyptus grove. The understory includes a mix of natives and nonnative species, including red elderberry, California blackberry, stinging nettle, English ivy (Cal-IPC high), and Cape ivy (Cal-IPC high).

Monterey Cypress – Monterey Pine Stands

Monterey cypress – Monterey pine stands occur in upland areas throughout the Action Area. Monterey cypress (*Hesperocyparis macrocarpa*) is the dominant tree in this community, but several Monterey pine (*Pinus radiata*) trees are present in low numbers in parts of the Action Area. Due to the dense canopies of Monterey cypress trees and their tendency to form low-growing branches, this community generally has a very sparse understory, with few species. In areas where the lowest branches have been trimmed, nonnative annual grasses tend to dominate the understory. Monterey cypress and Monterey pine were either planted or naturalized throughout the Action Area because their native ranges are restricted to the vicinity of the Monterey Peninsula.

Red Alder Forest

Red alder forest is found in the Action Area only in the riparian area at Pilarcitos Creek. This community is dominated by red alder (*Alnus rubra*) and is associated with arroyo willow, Pacific willow (*Salix lasiandra*), and California blackberry. Invasive species were not observed in this community but may be present in the understory because this community was only observed from the elevated roadway.

3.2.3.4 Developed Plant Communities and Unvegetated Areas

Agricultural Cropland

Agricultural cropland in the Action Area consists of areas managed for annual herbaceous crops. Those observed at the time of survey include Brussels sprouts (*Brassica oleracea gemmifera*) and field pumpkin (*Cucurbita pepo*), with a sparse cover of nonnative annual grasses in some areas of cropland. Agricultural cropland in the Action Area is known to support a population of Ornduff's meadowfoam (*Limnanthes douglasii* ssp. *ornduffii*) (California Rare Plant Rank 1B.1; CDFW 2023) but would not have been detectable at the time of survey, as discussed in the plant

list results section. Poor drainage of the agricultural croplands in the Action Area may contribute to the mesic conditions associated with Ornduff's meadowfoam.

Landscaped Areas

Landscaped areas in the Action Area include areas dominated by trees, shrubs, and herbaceous plants. This community was mapped in areas dominated by nonnative plants that could not be assigned to another community, as well as in areas dominated by California native plants that were obviously planted and may not be native to the immediate vicinity of the Action Area. Common plants in landscaped areas of the Action Area include silktree (*Albizia julibrissin*), ornamental pines (*Pinus* sp.), prickly pear (*Opuntia ficus-indica*), aloes (*Aloe* sp.), and several natives, including deergrass (*Muhlenbergia rigens*), California lilac (*Ceanothus* sp.), and California fuchsia (*Epilobium canum*). Although landscaped areas are dominated by nonnative species, few of the species in these areas are considered invasive. Some of the common invasive annual grasses and forbs present in the wild oats and annual brome grasslands are present in low densities in landscaped areas.

Urban

Urban land cover in the Action Area consists of paved and graveled roads, riprapped shoreline areas, buildings, and other human-built structures. Few plant species are present in these areas.

3.2.4 Wildlife

Common wildlife species that may occur in or use the habitat in the Action Area include relatively disturbance-tolerant species, such as western fence lizard (*Sceloporus occidentalis*), black phoebe (*Sayornis nigricans*), western scrub jay (*Aphelocoma californica*), American crow (*Corvus brachyrhynchos*), house finch (*Carpodacus mexicanus*), western gull (*Larus occidentalis*), turkey vulture (*Cathartes aura*), white-crowned sparrow (*Zonotrichia leucophrys*), and cliff swallow (*Petrochelidon pyrrhonota*). Mammalian species dispersing or moving through the Action Area may include California ground squirrel (*Otospermophilus beecheyi*), striped skunk (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*), and raccoon (*Procyon lotor*).

3.2.5 Migration Corridors and Habitat Connectivity

Wildlife movement corridors link areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. Urbanization and the resulting fragmentation of open space areas create isolated "islands" of wildlife habitat, forming separated populations. The separated populations without corridors to connect individuals to other populations will often experience reduced genetic diversity, reduced ability to respond to environmental stressors, and be susceptible to population decline. For these reasons, migration corridors for maintaining habitat connectivity are important for California red-legged frog and San Francisco garter snake populations.

There is a considerable amount of existing development in and around the vicinity of the Action Area that substantially affects San Francisco garter snake and California red-legged frog movements, including roadways, housing tracts and complexes, shopping centers, schools, agricultural fields, airports, and drainage facilities. SR 1 in the project area is one lane in each direction, but has substantial traffic particularly during the daylight hours that act as a temporal barrier to the species. Other roadways, buildings, sidewalks, parking lots, and paved trails add a considerable amount of paved surfaces in the vicinity of the Action Area. With this development comes human activity and associated cars, noise, trash, and lighting effects. These factors likely influence the ability of California red-legged frogs and San Francisco garter snakes to move through the Action Area.

The creek corridors in the Action Area (e.g., Pilarcitos Creek, Frenchman's Creek, Arroyo en de Medio, Denniston Creek) can serve as important migration corridors for San Francisco garter snakes and California red-legged frogs. The creek corridors connect aquatic and upland habitats for the species and provide some shelter from the disturbances of the urban environment that surrounds them. However, these corridors are most often narrow, comprised of multiple invasive plants or completely dominated by them, and are frequented by wildlife adapted to urban areas such as skunks, raccoons, and feral cats, which can predate these species. Movement studies of California red-legged frog have shown that the species will make long-distance movements in straight lines without regard to topography or vegetation type (USFWS 2005). Therefore, the riparian corridors are likely better suited for shorter distance movement of frogs to foraging areas or stopover locations along longer distance movement routes. Despite existing constraints on migratory pathways, both California red-legged frogs and San Francisco garter snakes are expected to use the creek corridors if they are dispersing or migrating through the Action Area.

3.3 Habitat Conditions in the Action Area

The primary habitat types suitable for California red-legged frogs are described below, as taken from the description in their designated critical habitat of primary constituent elements (PCEs) or habitats that are essential to the conservation of the species: (1) aquatic breeding habitats, (2) aquatic nonbreeding habitats, (3) upland (refugia) habitat for refuge and foraging, and (4) dispersal habitat (USFWS 2002). Three of the four habitat types are present in the Action Area; aquatic breeding habitat is not present.

- 1. Aquatic Breeding Habitat:** Standing bodies of fresh water (with salinities less than 4.5 parts per thousand), including natural and artificial (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.

- 2. Aquatic Nonbreeding Habitat:** Freshwater pond and stream habitats, as described above, that may not hold water long enough for the species to complete its aquatic life cycle but that provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult California red-legged frogs. Other wetland habitats considered to meet these criteria include, but are not limited to, plunge pools in intermittent creeks, seeps, quiet water refugia in streams during high water flows, and springs of sufficient flow to withstand short-term dry periods.
- 3. Upland Habitat:** Upland areas adjacent to or surrounding breeding and nonbreeding aquatic and riparian habitat up to a distance of 1 mile (1.6 kilometers) in most cases (i.e., depending on surrounding landscape and dispersal barriers) and including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the aquatic, wetland, or riparian habitat. These upland features contribute to the following: (1) filling of aquatic, wetland, or riparian habitats; (2) maintaining suitable periods of pool inundation for larval frogs and their food sources; and (3) providing nonbreeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks, and organic debris (e.g., downed trees, logs), small mammal burrows, or moist leaf litter.
- 4. Dispersal Habitat:** Accessible upland or riparian habitat in and between occupied or previously occupied sites that are within 1 mile (1.6 kilometers) of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats and altered habitats such as agricultural fields that do not contain barriers to dispersal (e.g., heavily traveled roads without bridges or culverts). Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs greater than 50 acres (20 hectares) in size, or other areas that do not contain those features identified as essential to the conservation of the species.

Because suitable San Francisco garter snake habitat is similar to that of the California red-legged frog, these habitat types can also be used to classify their habitat similarly. For instance, both species prefer to forage in and near freshwater aquatic sites usually with emergent and surrounding wetland and/or riparian vegetation. For upland habitat, both species will use grassland/shrub/forest matrices in close proximity to aquatic habitats and prefer burrows, downed wood, leaf litter, or other natural structural elements that they can use for shelter.

Therefore, the habitat for these two species was mapped and considered similarly, based on the three different habitat types present in the Action Area: non-breeding aquatic habitat, upland habitat, and dispersal habitat. Table 3 provides the habitat types in the Action Area, the quantity of the habitat types (in acres), and the quality of those habitat types in the Action Area. Figure 7 depicts the areas of habitat within the Action Area. All unpaved natural vegetation types not categorized as aquatic or upland habitat was considered as dispersal habitat.

Table 3 California Red-Legged Frog and San Francisco Garter Snake Suitable Habitats in the Action Area

Habitat Type	Habitat Quantity	Habitat Quality
Non-breeding aquatic habitat	0.60 acre	Moderate. Shallow waters, mostly shaded and generally adjacent to vegetated corridors; however, impacted by trash, invasive species, pollution and adjacent semi-urban development.
Upland Habitat	20.18 acres	Moderate. Generally consists of riparian corridors, willow thickets, forested areas, shrub/grassland areas with habitat structure near aquatic resources, including downed wood and leaf litter, but also heavily impacted from trash, invasive species, pollution sources, human disturbances, and confined by development. These areas are also mostly confined, but not as fragmented as the dispersal habitat.
Dispersal Habitat	72.20 acres	Poor. Open, fragmented land areas close to roads, trails, and urban setting. The habitat lacks rock outcrops, burrows, downed wood, or other areas for shelter. Areas are exposed to high levels of disturbance, highway and urban pollution, trash, invasive plants, artificial lighting, and compacted soils.

3.4 Status of Federally Listed Species

3.4.1 California Red-Legged Frog

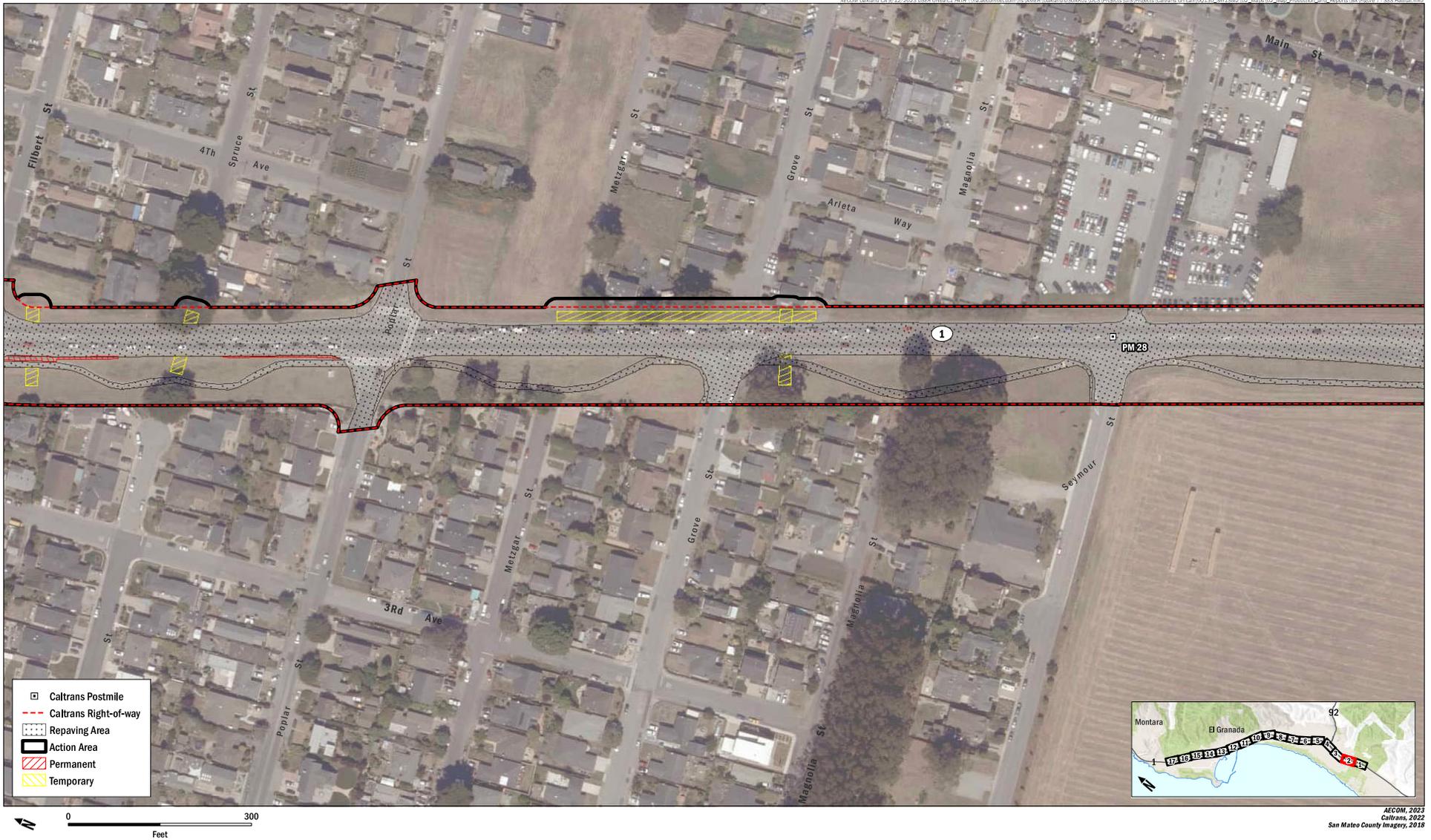
3.4.1.1 Status and Distribution

The California red-legged frog was federally listed as threatened in 1996 (USFWS 1996). Critical habitat for California red-legged frog was originally designated in 2006 and then revised in 2008, 2009 and 2010 (USFWS 2010).

The California red-legged frog was historically distributed throughout much of California, from the western Coast Range Mountains, east across the Central Valley, and continuing to the western side of the Sierra Nevada Mountains. The northern limit of the species' distribution is Mendocino County, and the southern range extends down into Baja California and Mexico. As much as 70 percent of historic California red-legged frog habitat has been developed or otherwise destroyed (Jennings and Hayes 1994; USFWS 2002).



FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
 Page 1 of 17



AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018

FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
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AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018

FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
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AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018



AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

FIGURE 7
Potentially Suitable California Red Legged Frog
and San Francisco Garter Snake Habitat
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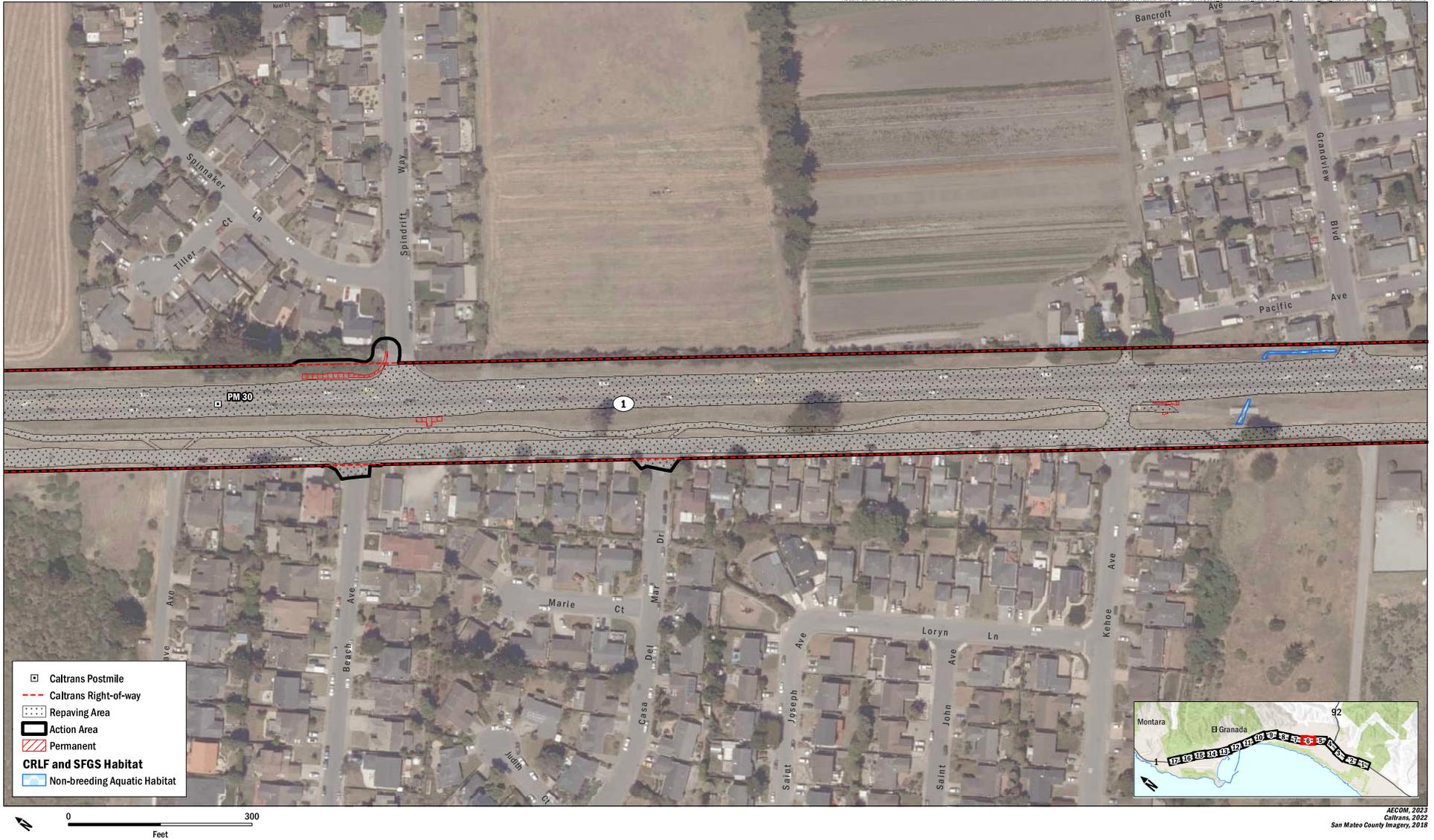


FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
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AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

FIGURE 7
Potentially Suitable California Red Legged Frog
and San Francisco Garter Snake Habitat
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FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
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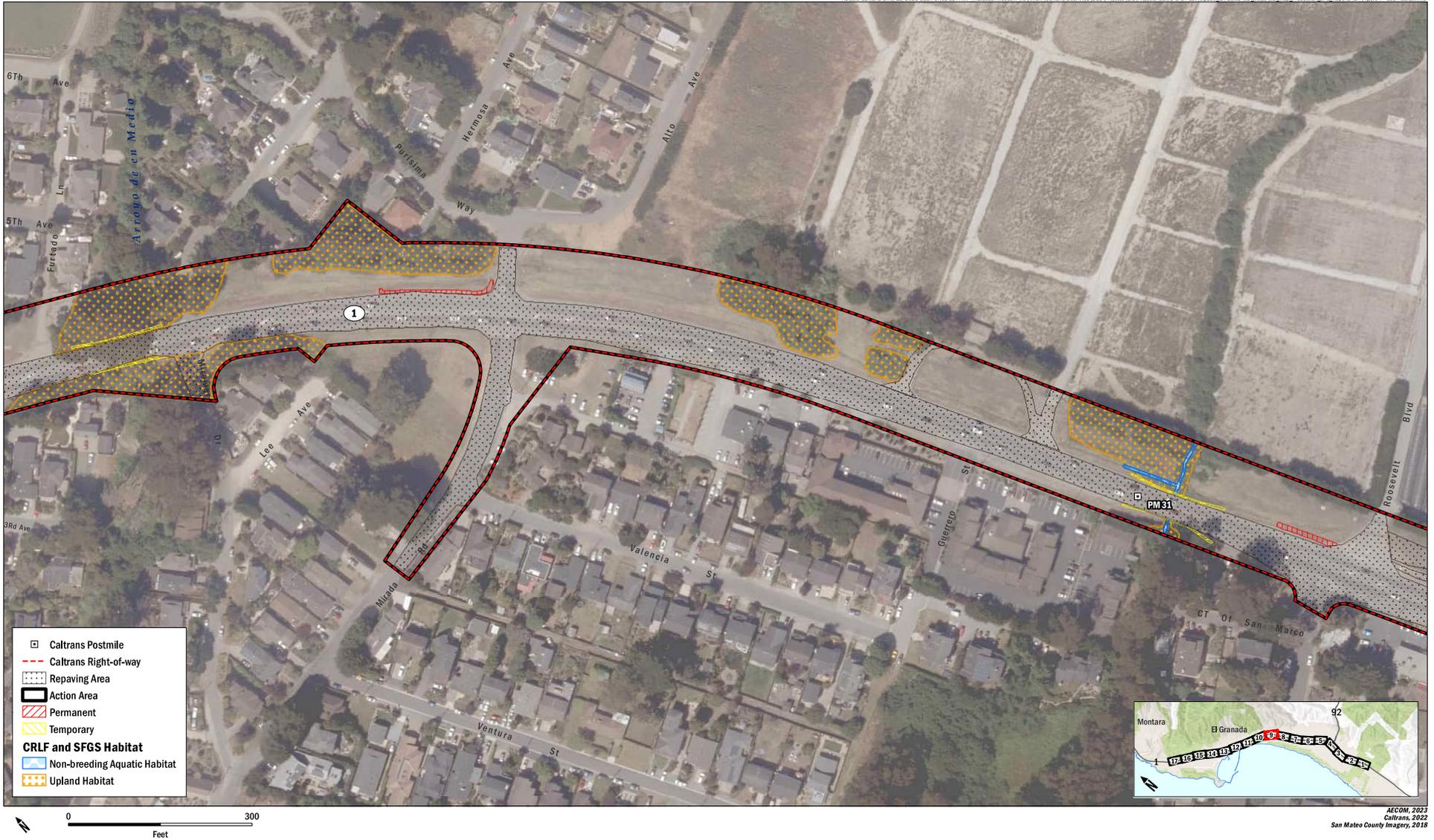
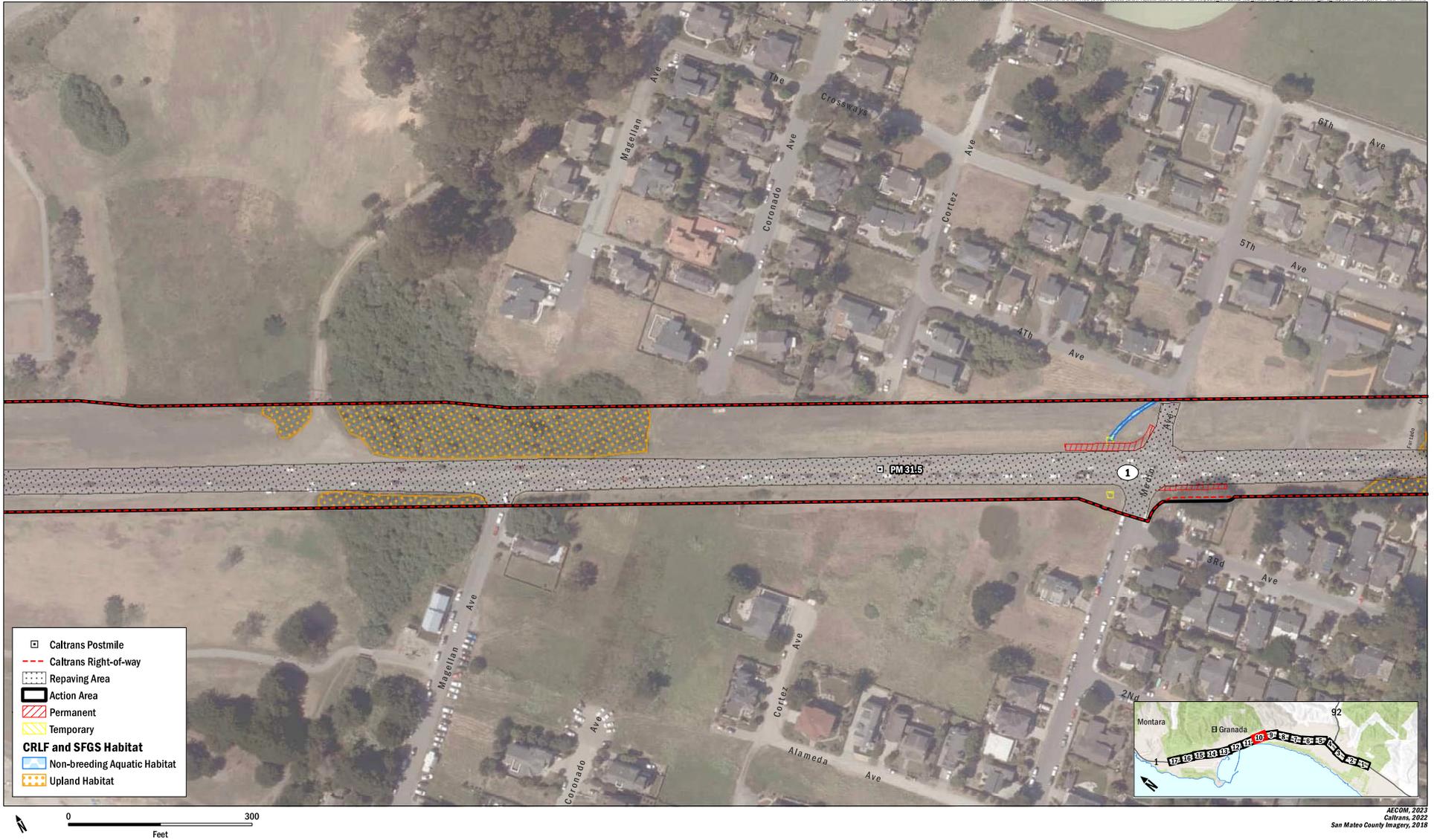


FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
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AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

FIGURE 7
Potentially Suitable California Red Legged Frog
and San Francisco Garter Snake Habitat
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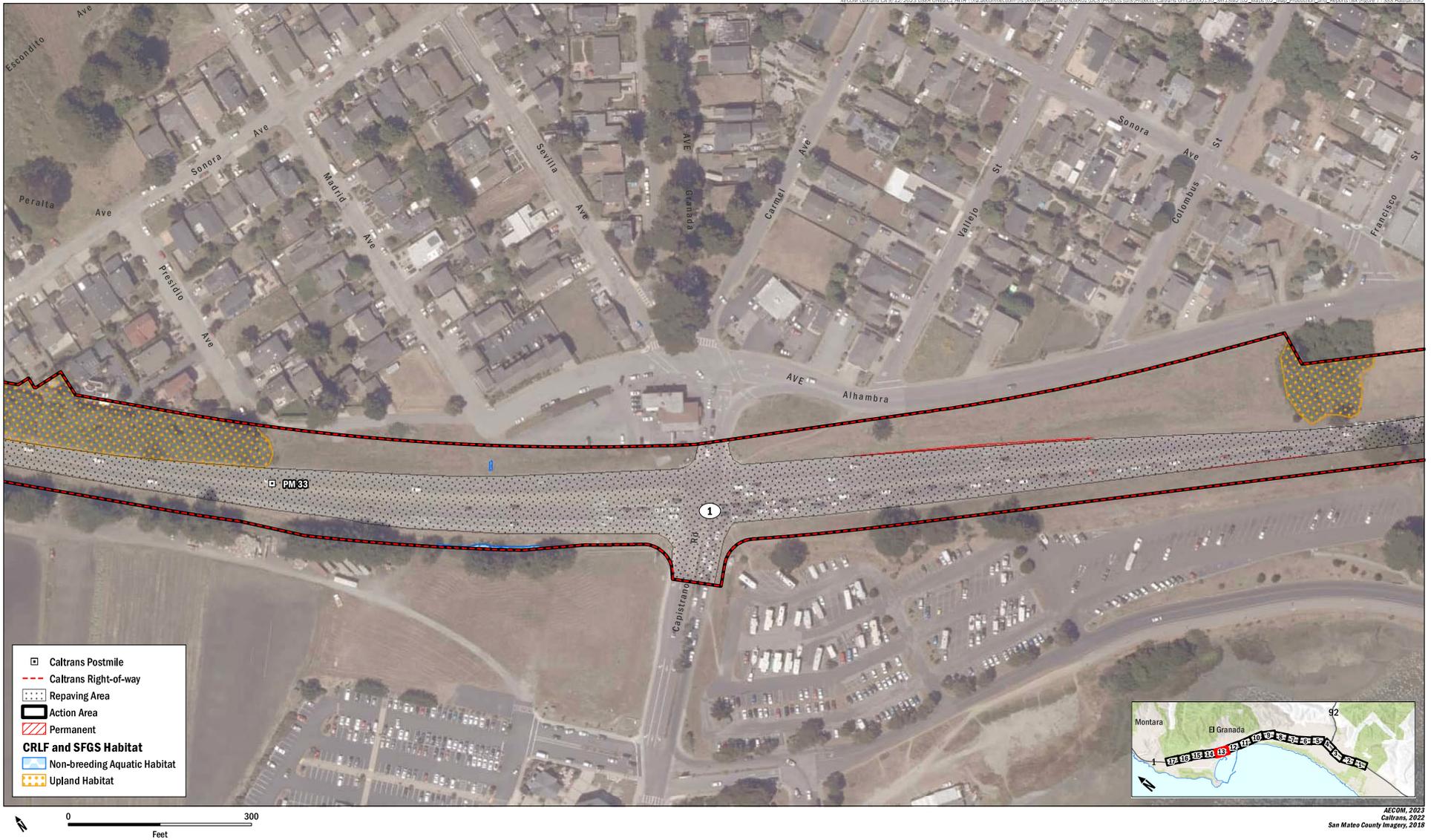


AECOM, 2023
 Caltrans, 2022
 San Mateo County Imagery, 2018

FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
 Page 11 of 17

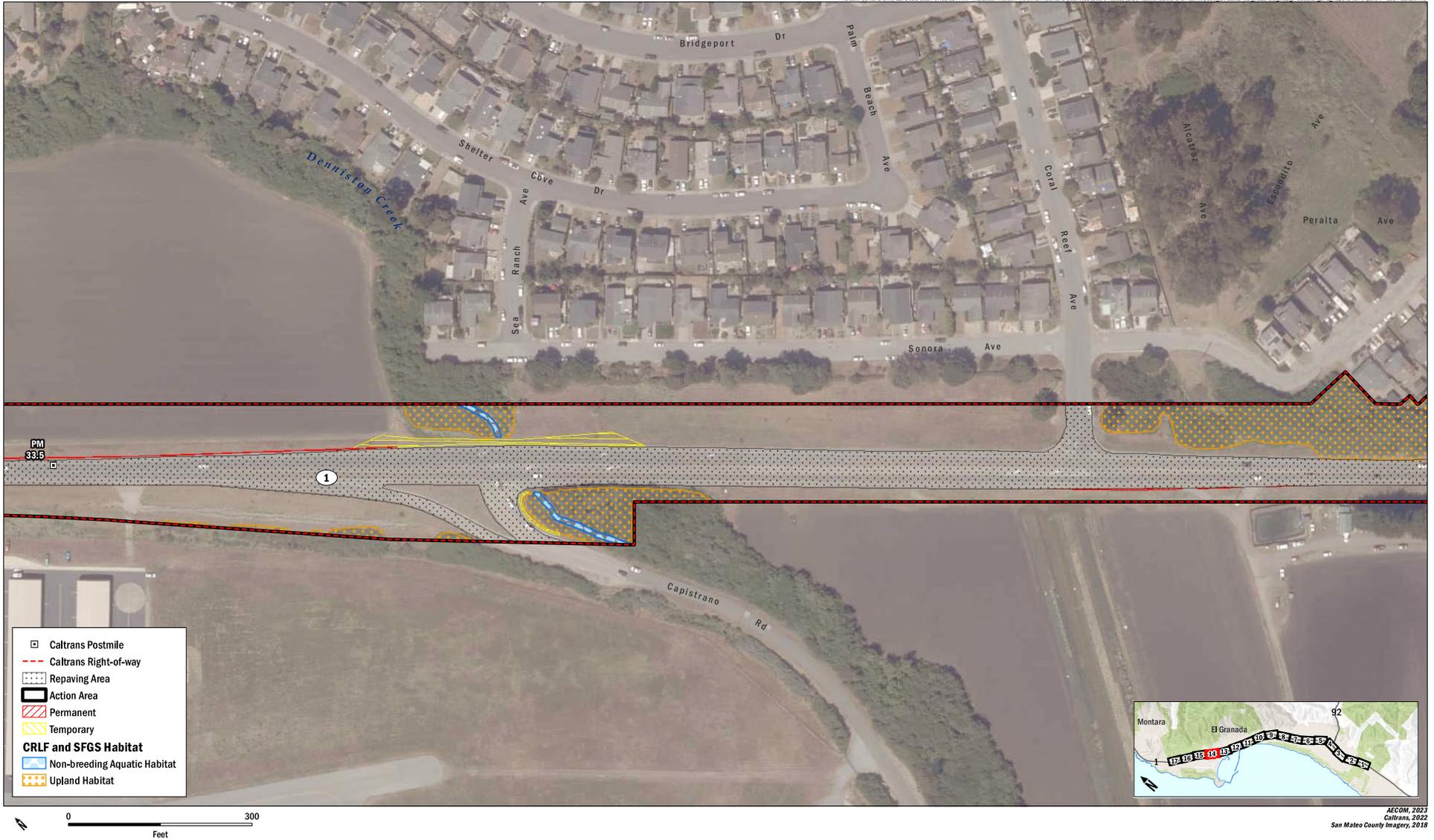


FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
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AECOM
 Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5/34.8
 EA 04-0Q130 / Project ID 0418000053

FIGURE 7
 Potentially Suitable California Red Legged Frog
 and San Francisco Garter Snake Habitat
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AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

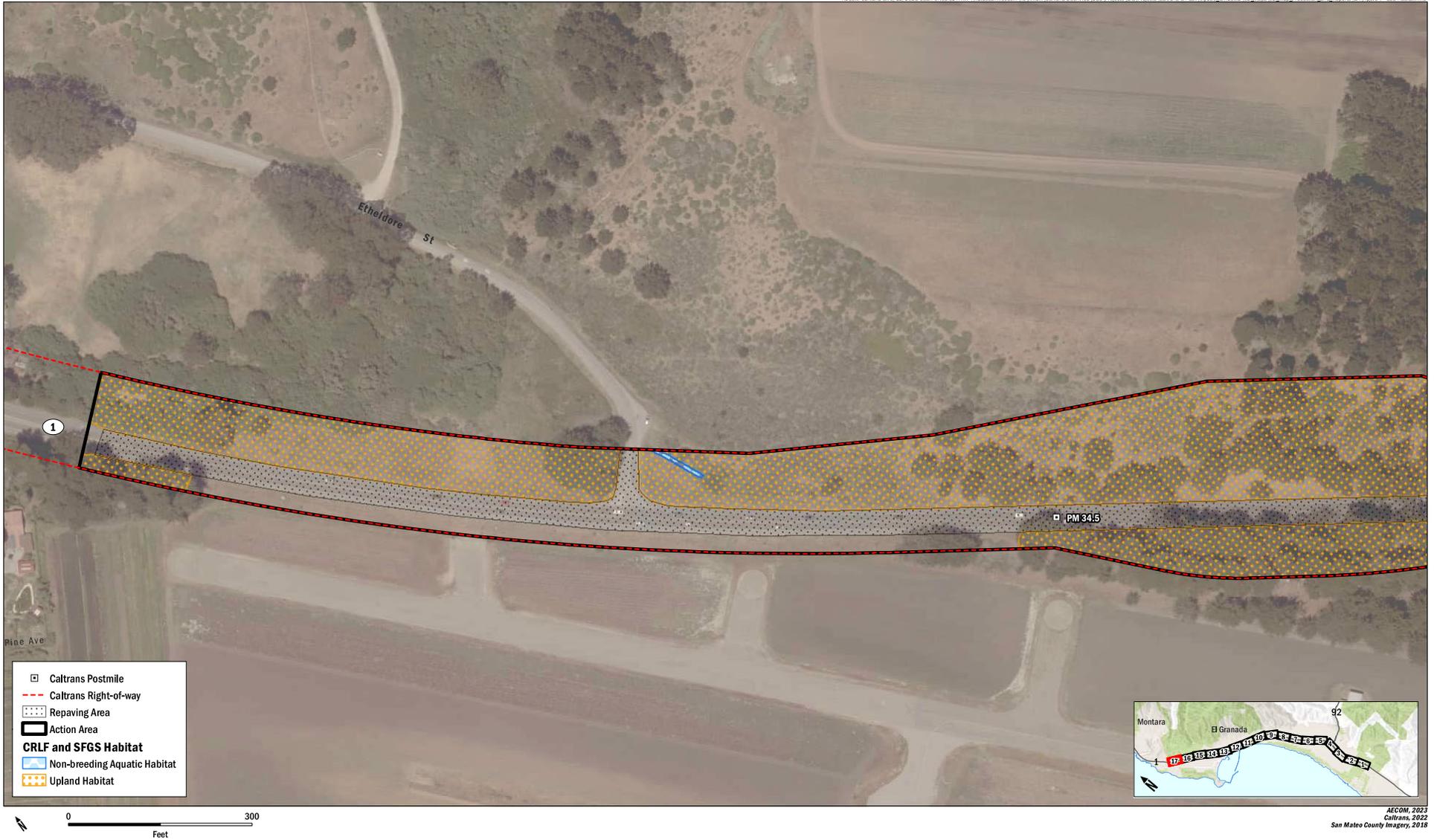
FIGURE 7
Potentially Suitable California Red Legged Frog
and San Francisco Garter Snake Habitat
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AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

FIGURE 7
Potentially Suitable California Red Legged Frog
and San Francisco Garter Snake Habitat
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AECOM, 2023
Caltrans, 2022
San Mateo County Imagery, 2018

FIGURE 7
Potentially Suitable California Red Legged Frog
and San Francisco Garter Snake Habitat
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Habitat loss, the primary threat to the species, has been severe. The California red-legged frog now occupies 28 counties in California, but occurs primarily between Santa Barbara and Marin. Populations are declining due to habitat loss associated with urbanization, agriculture, water management, and flood control activities; and to a lesser degree, mining, livestock grazing, dairy farming, off-road vehicle use, and timber harvesting. California red-legged frog populations are also threatened by diseases, including chytrid fungus, and predation by introduced bullfrogs, crayfish, and fish (USFWS 2002).

3.4.1.2 Habitat Characteristics and Use

California red-legged frogs use a variety of aquatic, riparian, and upland habitats up to an elevation of 4,921 feet (Jennings and Hayes 1994, Bulger et al. 2003, Stebbins 2003). They typically inhabit permanent and semi-permanent water sources (such as streams, lakes, marshes, and natural and artificial ponds), and ephemeral drainages in valley bottoms and foothills.

California red-legged frog breeding occurs between November and April in standing or slow-moving water that is typically at least 2 feet deep (Hayes and Jennings 1988). Aquatic habitat suitable for breeding typically contains shrubby riparian or emergent vegetation such as cattails (*Typha* sp.), tules (*Scirpus* sp.), and overhanging willows (*Salix* spp.) because egg masses are attached to emergent vegetation (Hayes and Jennings 1988). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface of the water, and hatch in 6 to 14 days (Storer 1925, Jennings and Hayes 1994). The fully aquatic larvae require approximately 11 to 20 weeks for development through metamorphosis, and metamorphosed frogs require appropriate upland refugia for aestivation during dry periods.

Refuge for the California red-legged frog includes small mammal burrows, downed logs or vegetation, and dense vegetation/litter layers (USFWS 2002). Non-migrating individuals typically stay within 200 feet of aquatic habitat 90 percent of the time, and have been found to be closely associated with dense cover (e.g., California blackberry [*Rubus ursinus*], poison oak [*Toxicodendron diversilobum*], and coyote bush [*Baccharis pillularis*]) (Bulger et al. 2003). Migrating individuals are known to disperse to streams up to 2 miles from their breeding sites. These migrations are typically made during wet-weather periods and at night (USFWS 2002).

In a study of California red-legged frog terrestrial activity in the Santa Cruz Mountains, Bulger et al. (2003) categorized terrestrial use as migratory and nonmigratory. Nonmigratory activity occurred over one to several days, and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites, and were most often associated with breeding activities. Bulger et al. (2003) reported that nonmigrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time, and were most often associated with dense vegetative cover (e.g., California blackberry, poison oak, and coyote

brush). Migrating frogs were reported to have moved between sites that were separated by map distances of 0.12 to 1.73 miles. The longest reported route traveled was 2.24 miles by an individual moving between two sites 1.73 miles apart.

Federally designated critical habitat for the California red-legged frog consists of four PCEs or habitats that are essential to the conservation of the species: (1) aquatic breeding habitats, (2) aquatic nonbreeding habitats, (3) upland (refugia) habitat for refuge and foraging, and (4) dispersal habitat (USFWS 2002). For purposes of determining suitable habitat for California red-legged frog in the Action Area, the definitions of the four primary PCEs (habitats) are used, despite there not being any designated critical habitat in the Action Area. The four primary PCEs are defined in the following paragraphs:

- 1. Aquatic Breeding Habitat:** Standing bodies of fresh water (with salinities less than 4.5 parts per thousand), including natural and artificial (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.
- 2. Aquatic Nonbreeding Habitat:** Freshwater pond and stream habitats, as described above, that may not hold water long enough for the species to complete its aquatic life cycle but that provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult California red-legged frogs. Other wetland habitats considered to meet these criteria include, but are not limited to, plunge pools in intermittent creeks, seeps, quiet water refugia in streams during high water flows, and springs of sufficient flow to withstand short-term dry periods.
- 3. Upland Habitat:** Upland areas adjacent to or surrounding breeding and nonbreeding aquatic and riparian habitat up to a distance of 1 mile (1.6 kilometers) in most cases (i.e., depending on surrounding landscape and dispersal barriers) and including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the aquatic, wetland, or riparian habitat. These upland features contribute to the following: (1) filling of aquatic, wetland, or riparian habitats; (2) maintaining suitable periods of pool inundation for larval frogs and their food sources; and (3) providing nonbreeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders,

rocks, and organic debris (e.g., downed trees, logs), small mammal burrows, or moist leaf litter.

4. **Dispersal Habitat:** Accessible upland or riparian habitat in and between occupied or previously occupied sites that are within 1 mile (1.6 kilometers) of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats and altered habitats such as agricultural fields that do not contain barriers to dispersal (e.g., heavily traveled roads without bridges or culverts). Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs greater than 50 acres (20 hectares) in size, or other areas that do not contain those features identified as essential to the conservation of the species.

3.4.1.3 Survey Results

Based on a review of the CNDDDB, 16 California red-legged frog occurrences are documented within 2 miles of the project footprint and two of those California red-legged frog occurrences (Occurrence #1648 and #750) are documented in the Action Area. These occurrences are north, south, east, and west of the Action Area. With the exception of the two dead frogs found on SR 1 (Occurrence #1678), all the other 15 occurrences were associated with aquatic habitat such as a pond, a creek, or wetland area, and usually coupled with wetland or riparian vegetation in or adjacent to aquatic habitat.

No protocol-level California red-legged frog surveys were conducted for this project. However, several documented CNDDDB occurrences (e.g., occurrences 1674, 354, 1345, and 242) provide evidence of breeding California red-legged frogs within dispersal distance of the Action Area. Based on the high number of nearby occurrences, the geographic spread of those occurrences, and the presence of suitable breeding habitats in locations within dispersal distance of the Action Area, California red-legged frogs are assumed to be present in the Action Area and surrounding environments.

3.4.1.4 Habitat in the Action Area

Suitable non-breeding aquatic habitat occurs in several perennial and intermittent creeks that cross through the Action Area, including Pilarcitos Creek, Frenchman's Creek, Arroyo de en Medio Creek, and Denniston Creek. Instream or seasonal freshwater wetlands in the Action Area are also potentially suitable non-breeding aquatic habitat for California red-legged frog in the Action Area. These habitats provide freshwater, shelter, foraging, and predator avoidance. Most of the non-breeding aquatic habitat in the Action Area is adjacent to riparian or wetland vegetation that provides cover, foraging, and shelter for the species. None of the aquatic habitats in the Action Area provide the suitable depth (approximately 2.3 feet) for a sufficient period of

time (approximately 20 weeks) to provide breeding habitat for this species. Therefore, all the aquatic habitats in the Action Area are assumed to be non-breeding aquatic habitat for California red-legged frog.

Suitable upland habitat in the Action Area occurs in the riparian forest and dense, vegetated forest and shrub-type habitats adjacent to the creeks and other non-breeding aquatic habitat. The riparian areas had a moister environment, cooler temperatures, shelter, and feeding opportunities for California red-legged frogs. The riparian zones of the creeks also provided structural features in the form of downed logs, organic debris, rocks, moist leaf litter, and vegetative cover. The riparian corridors are essential to maintain the hydrologic and ecological features of the aquatic habitat. Many of the riparian corridors in the Action Area are degraded habitats consisting of many non-native species like blue gum eucalyptus trees, English ivy, cape ivy, and Himalayan blackberry, and are also affected by trash and pollution from the nearby roads and developments.

Dispersal habitat consists of the various natural habitats and altered habitats that do not contain barriers to dispersal. The grassland, ruderal habitats, poison hemlock and fennel patches, and non-native forested habitats are all areas that can serve as dispersal zones for the species. Dispersal habitat can be greatly worsened by barriers such as heavily traveled roads (average of 30 cars per hour from 10:00 p.m. to 4:00 a.m.) with no bridges or culverts; moderate- to high-density urban or industrial developments; and large reservoirs more than 50 acres in size (USFWS 2010). The areas considered for dispersal habitat in the Action Area are poor in quality due to the heavily traveled roads and the moderate- to high-density development. California red-legged frog sometimes make longer distance movements (0.25 to 2 miles) in straight lines without regard to topography or vegetation type. This means that the species is greatly dependent on the presence of suitable dispersal habitat and refugia between breeding and overwintering habitats (USFWS 2005). The dispersal habitat in the Action Area lacks refugia and is virtually nonexistent in small mammal burrows, rock outcrops, downed wood, or a layer of leaf litter for California red-legged frogs to find shelter. The preference for straight line movements will also cause difficulty for frogs to avoid roads and urban development. The lack of shelter in these habitats and the effects of urban development will limit their frequency and duration of use for dispersal in these areas, and as such dispersal habitat is significantly degraded in the Action Area.

3.4.1.5 Status of Designated Critical Habitat in the Action Area for California Red-Legged Frog

There is no federally designated critical habitat exist in the Action Area for this Project. However, SNM-1 Critical Habitat Unit occurs in the mountains east of the Action Area and is about 0.1 mile east of the Action Area near the Half Moon Bay airport. However there will be no effects of the project to SNM-1 Critical Habitat.

3.4.2 San Francisco Garter Snake

3.4.2.1 Status and Distribution

The San Francisco garter snake was federally listed as endangered in March 1967 (USFWS 2020). The species has a limited distribution in portions of San Mateo and Santa Cruz counties. Throughout the historic range of the species, specific significant population remnants of its once more widespread range have been identified. These include the West of Bayshore population (near San Francisco International Airport), the Laguna Salada population (near Mori Point), the San Francisco State Fish and Game Refuge population (near Crystal Springs and San Andreas reservoirs), the Pescadero Marsh population, the Año Nuevo State Reserve population, and the Cascade Ranch population.

3.4.2.2 Habitat Characteristics and Use

In general, the San Francisco garter snake requires open-water habitat—typically ponds and wetlands—surrounded by open grassy uplands with a scrub component, a flora composition consisting of a matrix of coyote brush, wild oat (*Avena fatua*), wild barley (*Hordeum* spp.), and various brome species (*Bromus* spp.) that together provide both cover from predators and permit thermoregulation (USFWS 2006). USFWS recognizes “essential habitat” components deemed critical to sustaining San Francisco garter snake breeding populations. These components include open grassy uplands, freshwater marshlands, emergent vegetation (e.g., cattails, spike rush, water plantain), suitable amphibian prey-base (e.g., California red-legged frogs, Pacific tree frogs), an appropriate grassland/shrub matrix, open waters, shallow shoreline waters, basking habitat (e.g., rocks, alga mats, floating vegetation), southern/western slope exposure, and hibernacula (USFWS 2006).

San Francisco garter snakes are believed to move on average up to 700 feet from pond foraging habitat to upland wintering sites, although some individuals have been observed to move over 1,968 feet (0.37 mile) (USFWS 2006). It has been suggested that longer San Francisco garter snake movements may occur as the snake moves in search of its prey base (USFWS 2006).

Unlike other garter snakes in the San Francisco Bay Area, the San Francisco garter snake does not appear to undergo true hibernation during the winter months, and instead emerges periodically from hibernacula during the winter to bask. Garter snake hibernacula can include small mammal burrows or crevices in rock outcrops. The San Francisco garter snake is most active between spring and fall, with peak activity between March and July, when adults emerge from hibernacula and concentrate around aquatic habitats to mate and forage for food (USFWS 2006).

3.4.2.3 Survey Results

Based on a review of the CNDDDB, three San Francisco garter snake occurrences are documented within 2 miles of the project footprint and none within the Action Area. CDFW generally suppresses location information on San Francisco garter snake to prevent the illegal collection of these animals. In addition to this CNDDDB data, Dr. Samuel McGinnis conducted a San Francisco garter snake study using funnel trap-drift fence units at three sites on Pilarcitos Creek in 1988. During the study, two San Francisco garter snakes were trapped at the Pilarcitos Creek lagoon, and none were found at the other two sites (McGinnis 1988).

No protocol-level San Francisco garter snake surveys were conducted for this project. The CNDDDB occurrences and the study data from McGinnis provide evidence that San Francisco garter snakes have been observed in the vicinity of the Action Area. The evidence of their presence in the past and the presence of marginally suitable habitat in the Action Area, in addition to the presence of California red-legged frogs, a preferred food item of San Francisco garter snakes, leads to the conclusion that San Francisco garter snakes are likely present in the Action Area.

3.4.2.4 Habitat in the Action Area

The aquatic habitat in the Action Area consists of perennial, intermittent, and ephemeral creeks and small instream or seasonal wetlands that lack open water but do support small patches of wetland vegetation. However, these wetland areas are small and lack the open-water habitat this species prefers, making them marginal aquatic habitat for the species. The aquatic habitats in the Action Area may be used by San Francisco garter snakes to forage or move through to more suitable aquatic habitats in the nearby vicinity of the Action Area.

The aquatic habitats are bordered by riparian corridors, willow thickets, and some shrub-type habitats that may be used by San Francisco garter snakes for foraging and shelter. Again, these habitats are narrow corridors that are constrained by development and road structures. Uplands are essential for the survival of San Francisco garter snakes and should consist of a grassland/shrub matrix where there is cover from predators, while allowing for exposed surfaces to facilitate thermoregulation (Barry 1994). Grasslands in the action area are bordered by roads, landscaped areas, Monterey cypress stands, and developed areas. Most of the patches of shrub habitat are small and fragmented near roadways and lack connection to grasslands or other habitats. The grasslands in the Action Area lacked burrows that could provide shelter or winter habitat. However, one section of coyote brush scrub, wild oat, and annual brome grassland and Monterey cypress woodland at the northern end of the Action Area—east of Highway 1 between PM 34.3 and PM 34.6—is potentially suitable upland habitat for the species due to the presence of a shrub/grassland matrix and connection to aquatic habitat in San Vicente Creek.

Dispersal habitat consists of the various natural habitats and altered habitats that do not contain barriers to dispersal. The grassland, ruderal habitats, poison hemlock and fennel patches, and non-native forested habitats are all areas that can serve as dispersal zones for the species. The grassland habitats in the Action Area are small, fragmented, and lack small mammal burrows, downed wood, or cover. The lack of burrows and fragmentation make the grasslands unsuitable as winter retreat habitat. The grasslands are not expected to be used by San Francisco garter snakes for upland habitat, but may be used for dispersal to other habitats in short-duration movements.

Chapter 4. Effects of the Action

Effects of the action are all consequences to listed species or critical habitat that are caused by the Proposed Action, including consequences of other activities that are caused by the Proposed Action. The analysis of effects of the action first identifies stressors from project actions, then exposure to stressors, and finally the response to exposure to stressors to determine consequences. The effects of the action are used to make determinations for each listed species and critical habitat.

4.1 Stressors from the Action

Stressors induce an adverse response in an organism by any physical, chemical, or biological alteration of the environment that can lead to a response from the individual.

Potential stressors to California red-legged frogs and San Francisco garter snakes include direct interaction with construction equipment and vehicles, noise and vibrations, dust, turbidity, removal of vegetation, spread of invasive plant species, and anthropogenic disturbance.

4.1.1 Construction Equipment/Vehicle Interactions

Construction activities have potential to cause take of California red-legged frogs and San Francisco garter snakes by heavy equipment or construction vehicles. Impacts may occur if the California red-legged frog or San Francisco garter snakes are present in the Project footprint during construction. The probability of interactions with construction equipment would be the highest when working in or near non-breeding aquatic habitat and near suitable upland habitat areas. Due to the lack of shelter in the dispersal habitat in the Action Area, there is a low probability for interactions between construction equipment and California red-legged frogs and San Francisco garter snakes in these habitats during construction. Furthermore, the Conservation Measures outlined in Section 2.4 are intended to avoid injury or mortality, including the implementation of worker environmental awareness training, construction work windows, inclement weather restrictions, riparian vegetation and wetland protection, preconstruction surveys, and speed reduction. The conservation measures for construction work windows, the inclement weather restriction, and protecting riparian and wetland vegetation will reduce the chance of encountering listed species.

4.1.2 Noise and Vibration

California red-legged frogs and San Francisco garter snakes may be affected by construction-related noise that would result from several activities and from the use of construction equipment. Jackhammers are the loudest noise source for the Proposed Action.

Noise from this equipment, as measured by the Federal Transit Administration (Hanson et al, 2006), at a distance of 50 feet from the source, is 88 decibels (dB). Noise from jackhammers would be restricted to daytime hours. The most intense noise-generating equipment would also only be used during a portion of the construction period, during demolition of the existing culvert (jackhammer).

Vibration resulting from construction activities has the potential to cause disturbance. Studies have concluded that vibrational energy decreases fairly rapidly over distance from the source of disturbance (Attewell and Farmer 1973). The road prism in the Proposed Action footprint is likely compacted to at least 95 percent per industry standards and would absorb most construction-related vibration.

4.1.3 Dust and Turbidity

Small areas of permanent and temporary ground disturbance can result in increased erosion and dust. Erosion can carry foreign materials and affect the turbidity of receiving water bodies, including wetlands, creeks, ponds, and other areas downstream, including the ocean. Airborne dust from equipment could spread during ground-disturbing activities—particularly if the ground is dry—and can affect the respiratory systems of people and wildlife. Because much of the proposed construction work would occur on pavement, the overall ground disturbance area is reduced. Ground disturbing activities in the Action Area are minimized in the project design, and water quality/erosion control BMPs will be implemented as outlined in Conservation Measure 11 (Section 2.4), which will greatly minimize the impacts. With implementation of this measure, the effects from dust and turbidity are expected to be minimal.

4.1.4 Vegetation Removal

Work on guard rails, sidewalks, conduits, culverts, curb ramps, and the many other activities described would involve some vegetation clearing in areas that already experience ongoing disturbance; mostly grassland and herbaceous vegetation along the highway edge, which is predominately ruderal vegetation on compacted fill associated with the roadway prism. The locations of the impacted areas are in places that provide little to no value as habitat to listed species. These areas are subject to ambient noise, light, and vibration from highway traffic and lacks the vegetation types used by listed species considered in this document. The overall impact on the frog and snake as a result of temporary disturbance is anticipated to be minimal. Furthermore, preconstruction surveys, environmental awareness training, biological monitoring, and all the conservations measures described in Section 2.4 will avoid and minimize potential effects from the Proposed Action.

Proposed vegetation removal would occur along narrow strips at the edges of forested habitats. No tree removal is currently proposed; however, tree trimming is anticipated at Arroyo de en Medio Creek and Frenchman's Creek for access. Conservation Measure 17 limits riparian vegetation removal to the immediate work area, and then only to branches that overhang the roadway.

Due to the minor amount of vegetation to be removed, the abundance of much higher quality habitat in the vicinity, restoration post-construction, and the implementation of several conservation measures designed to avoid and minimize impacts, the vegetation removal activities stressor on the listed species are anticipated to be minor.

4.1.5 Spread of Invasive Plants

Invasive plants are already widespread in the Action Area. Roadside grassland areas contain star thistle, poison hemlock, fennel, bristly ox-tongue, and black mustard. Riparian corridors and forested areas contain blackwood acacia, blue gum, Himalayan blackberry, pampas grass, English ivy, and cape ivy. Shrub-dominated communities have a mix of these invasive species and others like French broom. Overall, the existing vegetation communities in the Action Area are heavily impacted by invasive plants, and likely are continually affected by the proliferation of these species at the expense of native flora.

Temporarily impacted areas of the project will be restored with the planting of native grasses and shrub species. All seed mixes will be comprised of native grasses that are free of invasive species. No trees are currently proposed for removal; however, where disturbance includes the removal of trees and woody shrubs, coordination with the appropriate permitting agency will be warranted, and planting may be required. With implementation of Conservation Measures 6, 7, and 10, which work to reduce vegetation impacts, restore disturbed areas with native species, and manage invasive species, the impacts on the existing plant community regarding invasive plants are likely to be beneficial, but likely would not have much of an effect on baseline conditions.

4.1.6 Anthropogenic Disturbance

Human disturbance from the presence of construction personnel is not anticipated to exceed baseline levels of anthropogenic disturbance for a large duration of the construction schedule. SR-1 is a source of regular human activity from motorists, bicyclists, pedestrians, nature watchers, and others. Nearby shopping centers, commercial areas, residential areas, marinas, trails, pedestrian bridges, airport, and restaurants in the vicinity of the Action Area attract people to the area. The baseline human activity in the area can fluctuate based on the time of day and the time of year, but is generally a consistent and year-round presence.

The presence of construction personnel off-pavement in the footprint would primarily be in the daytime hours, but some work could occur at night that could exceed the existing levels of human activity. For brief periods work at night may exceed the baseline existing levels of human activity, however the expected number of construction personnel would be small and have very minimal effects.

4.2 Exposure to Stressors from the Action

Exposures are defined as the interaction of the species, their resources, and the stressors that result from the project action.

Individual California red-legged frogs or San Francisco garter snakes can be exposed to construction equipment or vehicle interaction if the individuals happen to be in the work areas at the time of construction. Similarly, individual California red-legged frogs or San Francisco garter snakes can be exposed to vegetation removal tools and equipment. Because of these stressors, conservation measures will be implemented that will greatly reduce the exposure by controlling the timing (work windows, inclement weather restriction) or the location (environmentally sensitive area fencing, riparian area protection) of work activities. Conservation Measures will also reduce the exposure by searching for, stopping work, and/or removing individual listed animals from the stressors (i.e., preconstruction surveys, biological monitoring, handling) or making the construction activities safer for wildlife by reducing speeds, using proper erosion control devices, and covering excavations.

Exposures to noise, vibration, dust and turbidity can be greatly reduced by reducing the magnitude of the stressor (i.e., use quieter construction equipment, limit ground disturbance, spray water down on disturbed soil areas, use appropriate erosion control BMPs), and implementation of Conservation Measures. The baseline environmental conditions in the Action Area do expose animals to these stressors from highway and road traffic, pedestrian traffic, maintenance work, and various activities happening in an urban and semi-urban setting. The Proposed Action includes several small areas outside of the existing paved road where construction activities would result in low levels of noise, vibration, dust, or turbidity in low-quality, marginal habitat. The low-level impacts will be further minimized with conservation measures and BMPs that reduces the exposure level of the animals to these stressors to an even lower level.

The Proposed Action would result in a relatively small amount of permanent (0.38 acre) loss of roadside dispersal habitat for California red-legged frogs or San Francisco garter snakes in the Action Area that is not expected affect their ability to disperse or move in the Action Area any greater than baseline conditions. The Proposed Action would result in the temporary loss of 0.43 acre of suitable dispersal habitat within roadside verges. Overall the Proposed Action is not

anticipated to adversely affect species' dispersal behavior because construction would occur outside of the wet season when most dispersal occurs. Temporary loss of aquatic habitat (<0.01 acre) and upland habitat (0.05 acre) could have some effect on individual California red-legged frogs and San Francisco garter snakes in or near these habitats during construction. Conservation measures, including preconstruction surveys, biological monitoring, handling procedures, and others will reduce the potential effects. Further conservation measures including environmentally sensitive area fencing will help ensure that the minimum amount of habitat is affected. The expected level of exposure for the temporary loss of habitat is expected to be minimal, because there is sufficient, higher quality habitat within the surrounding landscape.

4.3 Response to the Exposure

A species response to a stressor can be expressed in several ways. Given the stressors and exposure pathways listed above, responses to the exposure can include both behavioral and physical changes.

Physical responses from being exposed to construction equipment or vehicles include mortality, bodily injury, or destruction of habitat. Physiological responses from being exposed to construction equipment or vehicles include increased heartrate and flight response. Behavioral changes include fleeing, flushing, avoiding, or being startled from the stimulus. As discussed before, the exposure to construction equipment is greatly reduced with seasonal restrictions, preconstruction surveys, biological monitoring, and other conservation measures.

The California red-legged frog and San Francisco garter snake could be exposed to temporary increases in noise, vibration, dust, and turbidity and subsequent increases in heartrate, adverse effects to skin or respiratory systems, ingestion of particulates, or pollution that could degrade existing habitat. The exposure of these animals to these stressors is difficult to predict or quantify, but if they are in the Action Area near construction activities, then they are likely to experience some effect from these stressors. Overall, species exposure to construction induced stressors is anticipated to be low with implementation of avoidance and minimization measures, limited to the immediate work area during construction, and only if species are present.

4.4 Effects of the Action

Effects of the action are all consequences to listed species or critical habitat that are caused by the Proposed Action, including consequences of other activities that are caused by the Proposed Action. A consequence is caused by the Proposed Action if it would not occur but for the Proposed Action, and it is reasonably certain to occur (50 CFR Section 402.17). Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR Section 402.02). The effect of the action is the consequence (behavioral, physical, or physiological) of a response to a stressor.

A conclusion that activities are reasonably certain to occur must be based on clear and substantial information, using the best scientific and commercial data available. Factors to consider whether an activity caused by the Proposed Action is reasonably certain to occur include, but are not limited to past experiences with similar activities that have resulted from actions that are similar in scope, nature, and magnitude to the Proposed Action; existing plans for the activities; or any remaining economic, administrative, and legal requirements necessary for the activity to go forward.

Considerations for determining whether a consequence to the species or critical habitat is not caused by the Proposed Action include, but are not limited to the following: the consequence is so remote in time from the Proposed Action that it is not reasonably certain to occur; or the consequence is so geographically remote from the immediate area involved in the Proposed Action that it is not reasonably certain to occur; or the consequence is only reached through a lengthy causal chain that involves so many steps as to make the consequence not reasonably certain to occur (50 CFR Section 402.17).

When considering the potential consequences of the Proposed Action on California red-legged frogs and San Francisco garter snakes in the Action Area, we considered the potential for exposure of California red-legged frogs and San Francisco garter snakes and the timing of construction activities. The exposure to these stressors is likely low due to the Proposed Action involving several small footprints in disturbed roadside habitat areas. Additionally, stressors have been reduced with the proposed conservation measures. California red-legged frogs and San Francisco garter snakes encounters are expected to be infrequent because work would occur outside of their primary habitat areas and scheduled at times of year when they are least likely to be dispersing through the Action Area. Considering that there is a baseline level of stressors in the environment due to adjacent development and ongoing usage of SR 1, short-term construction activities could result in short-term changes in behavior, minor physiological changes, and some potential for injury or mortality.

The Proposed Action would cause permanent loss of 0.38 acre of dispersal habitat within ruderal and compacted grassland habitat areas along SR 1 for both the red-legged frog and San Francisco garter snake. The Proposed Action would not permanently affect upland habitat or aquatic habitat. The Proposed Action would temporarily affect 0.43 acre of dispersal habitat, 0.05 acre of upland habitat, and less than 0.01 acre of non-breeding aquatic habitat. Caltrans will implement onsite restoration measures at work sites as construction activities progress along the Action Area. Temporarily disturbed ground would be restored at a 1:1 ratio within the same work season when it occurs by replanting and reseeding as described in Conservation Measure 7.

4.5 Cumulative Effects

Cumulative effects include the effects of future state, Tribal, local, or private actions that are reasonably certain to occur in the Action Area described in this BA. Future federal actions that are unrelated to the Proposed Action are not considered in this cumulative effects analysis because those actions will require separate consultation pursuant to Section 7 of FESA.

The Proposed Action provides for needed upgrades to existing transportation infrastructure. The Proposed Action is not growth-inducing, and it is not anticipated to result in an increase in vehicular traffic; any new development; or any associated future increases in lighting, noise, or vibrations. In addition, the Proposed Action will not create any new permanent barriers to species' movement. The Proposed Action will not contribute to cumulative effects on any listed, proposed, or candidate species.

4.6 Discussion Supporting Determination

California red-legged frog and San Francisco garter snake are potentially present in the Action Area during construction activities and could be affected by the Proposed Action. The Proposed Action would cause some permanent loss of dispersal habitat for both species within ruderal and compacted grassland habitat areas intermittently along SR 1. Because the loss of dispersal habitat would be primarily along intermittent slivers of roadside where existing baseline conditions are degraded, effects from this loss would be relatively minimal. Work in suitable upland habitat could result in harassment of individuals from each species, and temporarily restrict or inhibit access to ruderal upland dispersal habitat during construction.

4.7 Determination

For the State Route 1 Multi-Asset Roadway Rehabilitation Project, a may affect, likely to adversely affect, determination was made for the following species:

- California red-legged frog
- San Francisco garter snake

Chapter 5. Literature Cited

- Attewell, Peter B. and Farmer, Ian William. 1973. *Attenuation of Ground Vibrations from Pile Driving*. Journal of Ground Engineering, Volume 6.
- Barry, S. 1994. The Distribution, Habitat, and Evolution of the San Francisco Garter Snake, *Thamnophis sirtalis tetrataenia*. Master's thesis, University of California, Davis.
- Bulger, J.B., N.J. Scott, and R. Seymour. 2003. *Terrestrial activity and conservation of adult California red-legged frogs (Rana aurora draytonii) in coastal forests and grasslands*. Biological Conservation 110:85–95.
- Calflora. 2023. Calflora: *Information on California plants for education, research and conservation, with data contributed by public and private institutions and individuals, including the Consortium of California Herbaria*. Available online at: <https://www.calflora.org/>. Accessed March 2, 2023.
- Cal-IPC (California Invasive Plant Council). 2021. The Cal-IPC Inventory. Available online at: <https://www.cal-ipc.org/plants/inventory/>. Accessed February 28, 2023.
- CDFW (California Department of Fish and Wildlife). 2018. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*. CDFW Nongame Program. Sacramento, California.
- CDFW (California Department of Fish and Wildlife). 2023. *California Natural Diversity Database (CNDDDB). Rarefind, Version 5*. Available online at: <https://wildlife.ca.gov/Data/CNDDDB/Maps-and-Data>. Accessed February 14, 2023.
- CNPS (California Native Plant Society). 2021. *Manual of California Vegetation*. Available online at: <https://vegetation.cnps.org/>.
- Hanson, Carl E., David A. Towers and Lance D. Meister. 2006. *Transit Noise and Vibration Impact Assessment*. U.S. Department of Transportation, Federal Transit Administration, Office of Planning and Environment, 1200 New Jersey Avenue, S.E. Washington, DC 20590.
- Hayes, M.P., and M.R. Jennings. 1988 (July 19–21). *Habitat Correlates of Distribution of the California Red-legged Frog (Rana aurora draytonii) and the Foothill Yellow-Legged Frog (Rana boylei): Implications for Management*. In Proceedings of the Symposium on the Management of Amphibians, Reptiles and Small Mammals in North America, R.C. Szaro, K.E. Severson, and D.R. Patton, technical coordinators. United States Department of Agriculture, Forest Service, General Technical Report (GTR)-166:144-158.

- Jennings, M.R., and M.P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. Final Report to the California Department of Fish and Game. Inland Fisheries Division. Rancho Cordova, California. November 1.
- Jepson Flora Project. 2021. Jepson eFlora. Available online at: <https://ucjeps.berkeley.edu/eflora/>. Accessed October 1, 2021.
- McGinnis, Samuel M. 1988. *The Current Distribution and Habitat Requirements of the San Francisco Garter Snake, *Thamnophis sirtalis tetrataenia* in Coastal San Mateo County*. Prepared for the California Department of Fish and Game in a Final Report of Work conducted under Interagency Agreement C-673, 1984.
- Miles, Scott R., and Charles B. Goudey. 1998. *Ecological Subregions of California*. U.S. Forest Service, Pacific Southwest Region.
- Rantz, S.E. 1971. *Precipitation depth-duration-frequency relations for the San Francisco Bay region, California*, United States Geological Survey, Prof. Paper 750-C, 237-241.
- Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians. 3rd Edition*. New York, NY: Houghton Mifflin Company.
- Storer, T.I. 1925. "A Synopsis of the Amphibia of California." University of California Publications in Zoology, 27: 1-43, 231-245, 330, 331, 336-339. The University of California Press. Berkeley, California.
- USACE (United States Army Corps of Engineers). 2014. *A Guide to Ordinary High Water Mark Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States*.
- USFWS (United States Fish and Wildlife Service). 1996 (May 23). *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-Legged Frog*. Federal Register: Volume 61, Number 101: 25813 25833.
- USFWS (United States Fish and Wildlife Service). 2002 (May 28). *Recovery Plan for the California Red-legged frog (Rana aurora draytonii)*. Region 1, Portland Oregon.
- USFWS (United States Fish and Wildlife Service). 2005. *Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog*.

USFWS (United States Fish and Wildlife Service). 2006. *San Francisco Gartersnake (Thamnophis sirtalis tetrataenia) 5-Year Review: Summary and Evaluation*. Available online at: https://ecos.fws.gov/docs/tess/species_nonpublish/1021.pdf. Accessed February 21, 2023.

USFWS (United States Fish and Wildlife Service). 2010 (March 17). *Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for California Red-Legged Frog; Final Rule*. *Federal Register* 75(51): 12816-12959. Available online at: <https://www.govinfo.gov/content/pkg/FR-2010-03-17/pdf/2010-04656.pdf#page=2>. Accessed February 21, 2023.

USFWS (United States Fish and Wildlife Service). 2020 (May 21). *Species Status Assessment for the San Francisco Gartersnake (Thamnophis sirtalis tetrataenia)*. Available online at: <https://ecos.fws.gov/ServCat/DownloadFile/171618>. Accessed February 21, 2023.

Appendix A USFWS Species List



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To:
Project Code: 2023-0039089
Project Name: SR 1 Multi Asset Roadway Rehabilitation Project

September 14, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2))

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see <https://www.fws.gov/program/migratory-bird-permit/what-we-do>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office

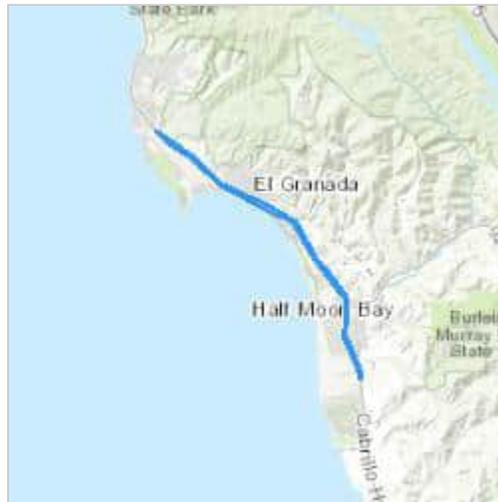
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

PROJECT SUMMARY

Project Code: 2023-0039089
Project Name: SR 1 Multi Asset Roadway Rehabilitation Project
Project Type: Road/Hwy - Maintenance/Modification
Project Description: On State Route 1 in Half Moon Bay, the project proposes to rehabilitate the existing pavement; replace existing drainage inlets, culverts, and dikes; replace existing guardrails with Midwest guardrail systems; replacing existing crash cushions; upgrade curb ramps; implement complete street elements; upgrade signal poles; install conduits; install traffic operation system elements (intersection cameras, closed-circuit television cameras, variable message signs [VMS], vehicle maintenance pullouts, and traffic monitoring stations); relocate and/or replace utility cabinets; and install complete streets elements (e.g., bicycle and pedestrian lanes, intersection improvements, and paved transit stops).

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@37.4834642,-122.44649826194757,14z>



Counties: San Mateo County, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 14 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Salt Marsh Harvest Mouse <i>Reithrodontomys raviventris</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/613	Endangered

BIRDS

NAME	STATUS
California Clapper Rail <i>Rallus longirostris obsoletus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern <i>Sterna antillarum browni</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Marbled Murrelet <i>Brachyramphus marmoratus</i> Population: U.S.A. (CA, OR, WA) There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Western Snowy Plover <i>Charadrius nivosus nivosus</i> Population: Pacific Coast population DPS-U.S.A. (CA, OR, WA), Mexico (within 50 miles of Pacific coast) There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8035	Threatened

REPTILES

NAME	STATUS
Green Sea Turtle <i>Chelonia mydas</i> Population: East Pacific DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6199	Threatened
San Francisco Garter Snake <i>Thamnophis sirtalis tetrataenia</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5956	Endangered

AMPHIBIANS

NAME	STATUS
California Red-legged Frog <i>Rana draytonii</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
Foothill Yellow-legged Frog <i>Rana boylei</i> Population: Central Coast Distinct Population Segment (Central Coast DPS) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5133	Proposed Threatened

FISHES

NAME	STATUS
Tidewater Goby <i>Eucyclogobius newberryi</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/57	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

FLOWERING PLANTS

NAME	STATUS
Hickman's Potentilla <i>Potentilla hickmanii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6343	Endangered
San Mateo Woolly Sunflower <i>Eriophyllum latilobum</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7791	Endangered
White-rayed Pentachaeta <i>Pentachaeta bellidiflora</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7782	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

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LEAD AGENCY CONTACT INFORMATION

Lead Agency: California Department of Transportation District 4

Appendix B Special-Status Plant Survey Report

Special-Status Plant Survey Report



State Route 1 Multi-Asset Roadway Rehabilitation Project

California Department of Transportation, District 4

San Mateo County, California

04-SM-1-PM 27.5/34.8

EA 04-0Q130 / Project ID 04-1800-0053

August 2022



For individuals with sensory disabilities, this document can be made available in Braille, in large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternative formats, please write to Caltrans, Attn: Gregory Pera, Office of Biological Sciences and Permits, 111 Grand Avenue, Oakland, CA 94623-0660; or call (510) 459-1783 (voice); or use the California Relay Service TTY number (800) 735-2929.

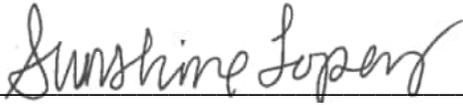
Special-Status Plant Survey Report

State Route 1 Multi-Asset Roadway Rehabilitation Project

San Mateo County, California
04-SM-1-PM 27.5/34.8
EA 04-0Q130 / Project ID 04-1800-0053

August 2022

California Department of Transportation, District 4

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List of Abbreviations

°F	degrees Fahrenheit
BSA	Biological Study Area
Caltrans	California Department of Transportation
CCTV	closed-circuit television
CESA	California Endangered Species Act
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
FESA	federal Endangered Species Act
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
NRCS	Natural Resources Conservation Service
project	SR 1 Multi-Asset Roadway Rehabilitation Project
ROW	right-of-way
State Route	SR
TMS	traffic monitoring system
TOS	traffic operation system
USFWS	United States Fish and Wildlife Service

Chapter 1 Introduction

This report documents the findings of a special-status plant surveys that were conducted for the State Route (SR) 1 multi-asset rehabilitation project (hereafter “project”). Protocol-level special status plant and sensitive natural community surveys were conducted on March 7-8, May 9 and 11, and June 13, 2022. This report summarizes the conditions in the survey area, as well as methods and results of those surveys.

1.1 Project Description

The California Department of Transportation (Caltrans) proposes the SR 1 Multi-Asset Roadway Rehabilitation Project (project) to rehabilitate the existing pavement, improve existing traffic facilities, install complete streets elements, and install traffic operations system (TOS) elements along SR 1 in San Mateo County, California (Figure 1). The proposed project would include pavement rehabilitation; replacing existing drainage inlets, culverts, and dikes; replacing existing guardrails with Midwest guardrail systems; replacing existing crash cushions; upgrading curb ramps; implementing complete street elements; upgrading signal poles; installing conduits; installing traffic operation system elements (intersection cameras, closed-circuit television (CCTV) cameras, and traffic monitoring stations [TMSs]); and relocating and/or replacing utility cabinets.

1.2 Project Footprint and Biological Study Area

The project footprint includes areas expected to be directly disturbed by the project. The biological study area (BSA) includes the project footprint and Caltrans right of way (ROW) and any project features that take place outside the ROW (Figure 2). The BSA is approximately 156 acres and spans 7.3 miles.

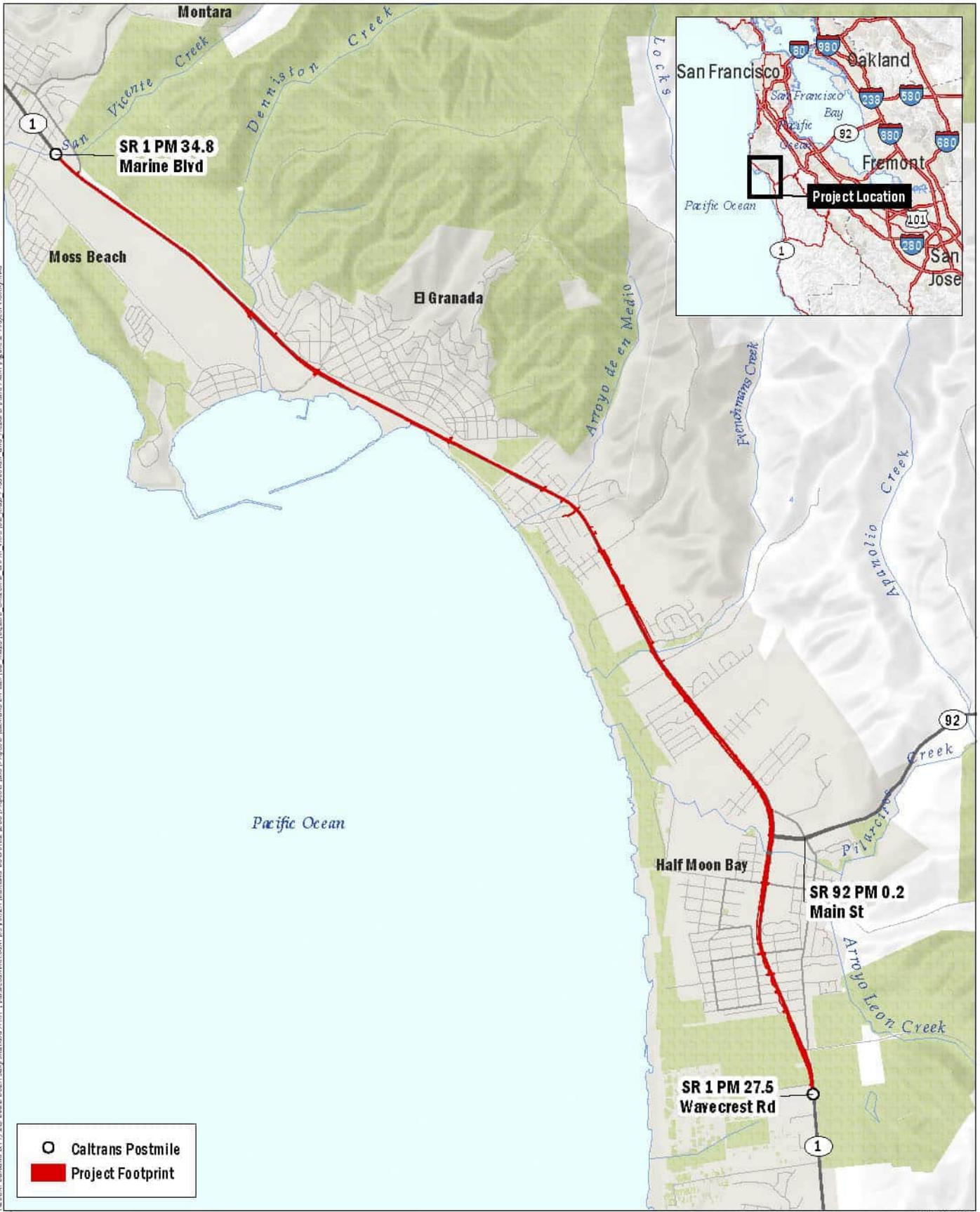


FIGURE 1
 Project Vicinity

1.3 Environmental Setting

This section describes the regional and local environmental setting of the project, including vegetation, climate and hydrology, and soils. Representative photographs of BSA, including ones demonstrating common vegetation communities and project elements to be rehabilitated, are included in Appendix A.

1.3.1 Regional Setting

The project is in the Santa Cruz Mountains ecological subsection of the Central California Coast Ecological Section (Miles and Goudey 1997). The subsection extends from Pacifica to Santa Cruz along the California coast, and inland to include the western and southwestern parts of the Santa Cruz Mountains.

The BSA includes paved and compacted areas of SR 1 and potential habitat directly adjacent to the roadway within Caltrans ROW. The existing roadway in the BSA consists of a conventional highway with one lane in each direction, with 12-foot lanes. SR 1 along this corridor is subject to heavy traffic; as a result, there are high levels of noise and vibrational baseline disturbance.

1.3.2 Project Setting

The project consists of improvements in and north of the City of Half Moon Bay in San Mateo County, California. The project is on SR 1 between PM 27.5 and PM 34.8; and SR 92 at PM 0.2. The BSA consists of the project footprint (permanent or temporary impact areas, including staging and access areas), along with buffer areas (surrounding the project footprint) that construction activities may directly or indirectly impact. The buffer areas were estimated based on the potential for project activities to cause noise, water quality, or geomorphological impacts. The BSA totals approximately 156 acres and is shown in Figure 2.

1.3.2.1 VEGETATION

Table 1 summarizes vegetation communities. Wetland delineation and vegetation mapping surveys were conducted by biologists Danny Slakey and Joe Bandel on September 7, 8, and 15, 2021, along SR 1 in the BSA. All water crossings and areas subject to off-pavement disturbance from the project, as well as the Caltrans ROW were observed visually in foot surveys. Vegetation communities were described in detail in the 0Q130 Vegetation and Floristic Survey and Mapping Results Memo (2021) and are briefly summarized here. Sensitive natural communities are present in the BSA, and are discussed in more detail in Section 3.4

Table 1. Natural Communities Present in the BSA

Community Type	Common Name	Scientific Name	Ranking ^{1,2}
Herbaceous wetland communities	Duckweed blooms	<i>Lemna (minor)</i> and relatives	G5S4?
	Seasonal herbaceous wetland	—	—
	Water parsley marsh	<i>Oenanthe sarmentosa</i>	G4S2?
Herbaceous upland communities	Ice plant mats	<i>Mesembryanthemum</i> spp. – <i>Carpobrotus</i> spp.	GNASNA
	Poison hemlock or fennel patches	<i>Conium maculatum</i> – <i>Foeniculum vulgare</i>	GNASNA
	Upland mustards or star thistle fields	<i>Brassica nigra</i> – <i>Centaurea (solstitialis, melitensis)</i>	GNASNA
	Wild oats and annual brome grasslands	<i>Avena</i> spp. – <i>Bromus</i> spp.	GNASNA
Shrub-dominated communities	Arroyo willow thicket	<i>Salix lasiolepis</i>	G4S4
	California coffee berry – western azalea – Brewer’s willow scrub	<i>Frangula californica</i> – <i>Rhododendron occidentale</i> – <i>Salix breweri</i>	G3S3
	California sagebrush – (purple sage) scrub	<i>Artemisia californica</i> – (<i>Salvia leucophylla</i>)	G5S5
	Coyote brush scrub	<i>Baccharis pilularis</i>	G5S5
	Himalayan blackberry – rattlebox – edible fig riparian scrub	<i>Rubus armeniacus</i> – <i>Sesbania punicea</i> – <i>Ficus carica</i>	GNRSNR
	Poison oak scrub	<i>Toxicodendron diversilobum</i>	G4S4
	Salal – berry brambles	<i>Gaultheria shallon</i> – <i>Rubus (ursinus)</i>	GNRS4
Tree-dominated communities	Acacia woodland ³	<i>Acacia</i> spp. – <i>Grevillea</i> spp. – <i>Leptospermum laevigatum</i> (pending)	—
	Eucalyptus – tree of heaven – black locust groves	<i>Eucalyptus</i> spp. – <i>Ailanthus altissima</i> – <i>Robinia pseudoacacia</i>	GNASNA
	Goodding’s willow – red willow riparian woodland and forest	<i>Salix gooddingii</i> – <i>Salix laevigata</i>	G4S3
	Monterey cypress – Monterey pine stands	<i>Hesperocyparis macrocarpa</i> – <i>Pinus radiata</i>	GNASNA
	Red alder forest	<i>Alnus rubra</i>	G5S4
Developed communities and unvegetated areas	Agricultural cropland	—	—
	Landscaped areas	—	—
	Urban	—	—

Notes:

¹ Community rankings are defined by NatureServe (2022) as follows, with the rankings applying to the community’s status globally (G rank) and within the state of California (S Rank):

- 1: critically imperiled
- 2: imperiled
- 3: vulnerable
- 4: apparently secure
- 5: secure
- NA: not assessed
- NR: not ranked
- ?: inexact numeric rank (not enough information)

Communities with "—" in the Ranking column have no ranking because they are not recognized by CNPS (2022a).

² Communities with S Rankings between S1 and S3 are considered sensitive natural communities.

³ Acacia woodland does not have a G or S ranking because it is pending inclusion in the *Manual of California Vegetation* (CNPS 2022a). It will not be ranked as a sensitive natural community because it is dominated by nonnative species.

The most abundant vegetation communities in the BSA include wild oats and annual brome grasslands, Monterey cypress – Monterey pine stands, and Arroyo willow thickets. Landscaped and urban areas were also common on the southern portion of the BSA where businesses and residences are located. Non-native-dominated vegetation communities such as Eucalyptus – tree of heaven – black locust groves and poison hemlock or fennel patches could be found scattered throughout the BSA.

1.3.2.2 NON-NATIVE INVASIVE PLANTS

Non-native invasive plants are defined as plants that are not native to an environment, and once introduced, they establish, quickly reproduce, spread, and cause harm to the environment, economy, or human health (Cal-IPC 2022). Non-native invasive plants are prevalent throughout the BSA; there are over 50 Cal-IPC listed species that were recorded. Table 2 lists the Cal-IPC ‘high’ species observed in the BSA. Additionally, Cal-IPC-listed plants with lower ratings are prevalent in many communities in the BSA and are denoted in the project plant list (Appendix B).

Table 2. Cal-IPC High-rated Non-Native Invasive Plants in the BSA

Scientific Name	Common Name	Family	Native Status	Cal-IPC Rating ¹
<i>Carpobrotus edulis</i>	iceplant	Aizoaceae	non-native	High
<i>Cortaderia jubata</i>	Andean pampas grass	Poaceae	non-native	High
<i>Delairea odorata</i>	cape ivy	Asteraceae	non-native	High
<i>Genista monspessulana</i>	French broom	Fabaceae	non-native	High
<i>Hedera helix</i>	English ivy	Araliaceae	non-native	High
<i>Rubus armeniacus</i>	Himalayan blackberry	Rosaceae	non-native	High

Notes:

- ¹ Cal-IPC invasive plant rankings are defined as follows:
- High species with severe ecological impacts
 - Moderate substantial and apparent, but not severe, ecological impacts
 - Limited minor ecological impacts, or information on them is limited)
 - Watch at a high risk of becoming invasive in the future

The table above illustrates the abundance of non-native invasive plants in the BSA with potential to cause severe ecological impacts to their surrounding environment. The following non-native vegetation communities were also observed in the BSA: ice plant mats, poison hemlock or fennel patches, upland mustards or star thistle fields, Himalayan blackberry –

rattlebox – edible fig riparian scrub, and Eucalyptus – tree of heaven – black locust groves. Overall, ruderal coverage dominated much of the BSA.

1.3.2.3 CLIMATE AND HYDROLOGY

As part of the Santa Cruz Mountains, the region generally experiences a Mediterranean climate, moderated by the Pacific Ocean marine layer that causes the regular fog conditions along the north-central California coast. Cooler temperatures predominate in winter between November and March, and the warmest temperatures typically occur during late summer.

Westerly precipitation systems deliver rain to the watershed generally between November and April. In contrast, little to no rainfall occurs between late spring through early fall, which is commonly referred to as the dry season. The majority of rain delivered to the watershed falls on west-facing slopes of relatively high relief, where higher elevation areas receive up to 35 inches and lower areas receive 26 inches (Rantz 1971). Typically, a few large winter storms generate high flow events and increased sediment input to streams each year.

The highest average temperature in Half Moon Bay is 64.6 degrees Fahrenheit (°F) from May through October, and the lowest average temperature is 42.6°F from November through April. The City of Half Moon Bay is approximately 75 feet above mean sea level.

Situated on the westernmost portion of the San Francisco Peninsula, the BSA is in the San Francisco Coastal South Hydrologic Unit Code (HUC) 8 Watershed and the San Gregorio Creek-Frontal Pacific Ocean HUC 10 Watershed. The BSA spans three HUC 12 watersheds: Denniston Creek-Frontal Pacific Ocean, Arroyo Leon, and Purisima Creek-Frontal Ocean. All the creeks in the area drain in a west-southwest direction, coming from the western slope of the Santa Cruz Mountains. The named drainages that cross the BSA are Denniston Creek, Deer Creek, Arroyo de en Medio, Frenchman’s Creek, and Pilarcitos Creek. Of these, Pilarcitos Creek is the largest; the remaining creeks have a watershed size of less than 5 square miles.

Pilarcitos Creek originates on the eastern side of Montara Mountain and flows about 12 miles to the Pacific Ocean at Half Moon Bay. It drains a watershed of approximately 17,900 acres (28 square miles) in San Mateo County. The creek, a source of drinking water for residents of the Central Coast and San Francisco Bay Area, is diverted at the Pilarcitos Reservoir and Stone Dam complex in the upper watershed. Denniston Creek, Arroyo de en Medio, and Frenchman’s Creek are similar to Pilarcitos Creek in that they all originate from the slopes of Montara Mountain and eventually flow west to the Pacific Ocean; however, they are not sources of drinking water.

1.3.2.4 SOILS

Soil series in the BSA were identified based on information received from the United States Department of Agriculture (USDA) Natural Resources Conservation Service Web Soil Survey (USDA 2022a) Soil series descriptions were derived from the USDA (2022) *Official Soil Series Descriptions*. Soil composition varies throughout the BSA and is listed below in Table 3 and discussed in detail in the following paragraphs.

Table 3. Mapped Soil Series in Biological Survey Area and Vicinity

Type/Series	Texture	Landscape Position and Parent Material	Drainage and Permeability	Location in BSA
Botella	Loam	Botella series consists of very deep, well drained soils that formed in alluvial material from sedimentary rocks. Botella soils are in valley bottoms and on alluvial fans and have slopes of 0 to 15 percent	Well drained; low to high runoff; moderately slow permeability	SR 92 to Higgins Canyon Rd.
Denison	Loam	Denison series consists of very deep, moderately well drained soils developed from moderately fine textured granitic alluvium. The Denison soils occur on low terraces adjacent to the coast in central California.	Moderately well drained; slow to medium runoff; slow permeability	Northern end of BSA to Arroyo en Medio
Farallone	Loam	Farallone series consists of very deep, well drained soils that formed in alluvial material derived from granitic rocks. Farallone soils are on alluvial plains and valleys and have slopes of 0 to 10 percent.	Well drained; saturated hydraulic conductivity is moderate.	Arroyo en Medio to SR 92
Urban land	NA	Urban land soils can be significantly changed human-transported materials, human-altered materials, or minimally altered or intact "native" soils.	Soils in urban areas exhibit a wide variety of conditions and properties and may have impervious surfaces, such as buildings and pavement.	Scattered throughout BSA
Gullied land	NA	Areas where erosion has cut a network of V-shaped or U-shaped channels deep enough to inhibit or prevent crossing.	Well drained.	Scattered throughout BSA
Watsonville	Loam	Watsonville series consists of deep, somewhat poorly drained soils that formed in alluvium. Watsonville soils are on old coastal terraces and valleys and have slopes of 0 to 50 percent.	Somewhat poorly drained because perched water tables occur during periods of heavy water applications; slow to rapid runoff; very slow permeability.	Higgins Canyon Rd to southern end of BSA

- Botella series soils consist of nearly level to gently sloping, dark-colored, well-drained to imperfectly drained soils on older floodplains where there are deeply entrenched streams. These soils have formed mainly from material washed from sedimentary rocks. In some areas, the material contains small amounts of sediments derived from basic igneous rocks. Botella soils occur throughout San Mateo in small alluvial valleys and on gently sloping benches, terraces, and fans. Most of them occur at elevations ranging from near sea level to a few hundred feet. The surface soil is thick, very dark gray, slightly acid, and strongly granular loam, clay loam, or shaly loam.
- Denison series soils consist of nearly level to sloping, dark-colored, moderately well drained to imperfectly drained soils on low terraces. These soils have formed under grass vegetation from granitic alluvium. They occur along the coast north of Half Moon Bay at elevations ranging from about 10 to 50 feet. They are associated with the Farallone, Miramar, and Elkhorn soils. The surface soil, which is black and medium acid or slightly acid, has a wide range in texture, including coarse sandy loam, loam, and clay loam. The subsoil is also black and exhibits mottling. The subsoil is neutral to slightly acid, heavy sandy clay loam or clay that is extremely hard when dry and has a strong, prismatic structure. Most of the Denison soils are used for growing Brussels sprouts, artichokes, cabbage, and flowers. Small grains and flax also are grown, and in a few places the soils are used for irrigated pasture.
- Farallone series soils consist of well-drained, nearly level to moderately steep soils on recent fans and flood plains. These soils have formed in alluvium that was derived mainly from granitic rocks. The vegetation in uncultivated areas is mainly coyote brush and bush lupines. The Farallone soils are north of Half Moon Bay in narrow valleys that extend into the hills, and on fans that extend outward from these valleys. They are associated with Denison and Miramar soils. The elevation is mostly below 200 feet. The surface soil is a dark-gray granular loamy coarse sand, coarse sandy loam, or loam that is slightly hard when dry. The subsoil in most places is moderately coarse-textured, stratified, slightly hard when dry, and has weak subangular blocky structure. The underlying material, which is many feet thick, consists of massive, stratified layers of sandy loam and coarse sandy loam. The profiles are slightly acid throughout. Most of the Farallone soils are cultivated and are used for flowers, truck crops, and irrigated pasture.
- Gullied land (alluvial soil material) occurs near streams that extend through areas of Botella, Farallone, and Soquel soils. Relief along these streams ranges from gently sloping to sloping. The areas are usually well vegetated by woody plants.

- Urban land soils are soils that have been changed in some way by humans. They are often transported by truck to create the base for roads for transportation projects. They are commonly referred to as “fill.”
- Watsonville series soils have a dense claypan subsoil that is underlain by marine sediments. The soils are moderately well drained to imperfectly drained. They have formed in alluvium that was derived principally from sedimentary rocks and from higher-lying upland soils. The Watsonville soils are on nearly level to steep terraces between Half Moon Bay and the southern tip of San Mateo County. They are generally found within 1 mile of the ocean. The surface layer is dark gray, granular, slightly hard to hard when dry, and medium to strongly acid. The texture of the surface soil is normally sandy loam, loam, or clay loam. The parent material consists of neutral, massive, very hard, somewhat stratified layers of predominantly sandy loam texture. The Watsonville soils are typically used for agriculture.

Chapter 2 Methods

This chapter describes the pre-field data review as well as the field survey methodology.

2.1 Special-Status Plant Species and Sensitive Natural Community Criteria

A plant is considered to have a special status if it meets at least one of the following criteria:

- Listed, proposed for listing, or a candidate for listing as threatened or endangered under the federal Endangered Species Act (FESA)
- Listed or a candidate for listing as threatened or endangered under the California Endangered Species Act (CESA)
- Listed as Rare under the California Native Plant Protection Act
- Ranked by California Native Plant Society (CNPS) as California Rare Plant Rank (CRPR) 1 or 2 in the current online version of its Inventory of Rare and Endangered Plants of California (CNPS 2022a)

Sensitive natural communities also are included as part of special-status plant surveys. Vegetation communities are considered sensitive by the California Department of Fish and Wildlife (CDFW) if they have a State rank of S1–S3.

2.2 Database Searches

Before conducting field surveys, a list of potentially occurring special-status plant species was compiled by searching various databases, including:

- California Natural Diversity Database (CNDDDB) Rarefind (CDFW 2022)
- CNPS Online Inventory of Rare and Endangered Plants of California (CNPS 2022a)
- United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) database of federally endangered and threatened species (USFWS 2022)

An IPaC database search was conducted for the BSA. A CNPS and CNDDDB database search was conducted for the Half Moon Bay and Montara Mountain Quads in the United States Geological Survey quadrangle and the four surrounding quadrangles. The CNDDDB was also used to search for occurrences of special-status plant species within a 5-mile radius of the BSA (Figure 3).

Special-status plant species identified during the database review were considered to have the potential to occur in the project area if their known or expected geographic range includes or abuts the project area, and if suitable habitat is present.

2.3 Survey Methods

botanist Sunshine Lopez, biologist Gabby Reta, and biologist Jessica Chavez conducted the first botanical survey on March 7 and 8, 2022. botanists Sunshine Lopez, Danny Slakey, and Isaac Kreger conducted a second survey on May 9, and 11, 2022. A third late-season survey was conducted by Sunshine Lopez and Isaac Kreger on June 13, 2022. Additionally, Danny Slakey, Jessica Chavez, and some of the Caltrans project development team members, conducted a site visit on April 15, 2022.

Botanical surveys were conducted by walking systematically through the BSA. The survey dates were selected to correspond with likely blooming periods of special-status plants that may occur in the project vicinity, in accordance with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018). The surveys were floristic in nature; all vascular plant species encountered during the surveys were identified to the lowest taxonomic level possible. Vegetation communities also were identified using the *Manual of California Vegetation* (CNPS 2022b). A list of the plant species observed in the BSA is provided in Appendix B. Nomenclature for scientific names used throughout this report follow the Jepson eFlora (Jepson Flora Project 2022).

2.1 Reference Populations

In accordance with standard protocols for surveying special-status plants (CDFW 2018), botanists visited nearby and accessible rare plant reference populations throughout the blooming season. Visiting reference populations verified that the survey was timed to coincide with the blooming periods of rare plants known to occur in the project vicinity.

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Chapter 3 Results

The following sections present the results of the database review, special-status plant species' survey, and habitat assessment. A list of plant species identified during the survey is shown in Appendix B.

3.1 Database Review

The database review identified 63 special-status plant species (as defined in Section 2.1) in the regional project vicinity, of which 49 were considered to have at least a low potential to occur in the BSA, based on the presence of suitable or marginally suitable habitat and the known geographic ranges of these species. Six of these species—San Mateo thorn-mint, (*Acanthomintha duttonii*), Contra Costa goldfields (*Lasthenia conjugens*), San Mateo woolly sunflower (*Eriophyllum latilobum*), Marin western flax (*Hesperolinon congestum*), and Hickman's cinquefoil (*Potentilla hickmanii*)—are federally listed as threatened or endangered. San Mateo thorn-mint, Contra Costa goldfields, San Mateo woolly sunflower, Marin western flax, and Hickman's cinquefoil also are State-listed as threatened or endangered. The remaining 14 species considered to have no potential to occur are found in habitats that are not present in the BSA, the project area is outside the known range of the species, and/or the species was otherwise not likely to occur, as discussed in Appendix C.

3.2 Site Conditions

The project biological study area (BSA) consists of the project footprint (permanent or temporary impact areas, including staging and access areas) along with buffer areas (surrounding the project footprint) that construction activities may directly or indirectly impact. The buffer areas were estimated based on the potential for project activities to cause noise, water quality, or geomorphological impacts. The BSA is approximately 156 acres. The northern half of the BSA consists of culvert repairs, some of which border agricultural fields and a U.S. Army Air Corps base. To the south, the BSA is composed of storm drain locations along SR 1, adjacent to residences and businesses.

All accessible areas of the BSA were assessed by the biologists and botanists on foot for the presence of special-status plant species. Some areas beyond the road edge had to be surveyed from a distance and with binoculars when the lack of a road shoulder and traffic precluded the ability to safely access on foot. Vegetation communities in these areas are listed in Table 1.

3.3 Special-Status Plants

One special-status plant species, Orndorff's meadowfoam (*Limnanthes douglasii* ssp. *ornduffii*) was observed during two of the surveys in 2022. No additional special-status plant species were observed in the BSA. The remaining special status plants with potential to occur in the BSA were determined to be absent from the site. Surveys were conducted during their blooming periods or other periods of the year when they are identifiable (based on reference population results and database review), so they would have been observed in the BSA if present. A discussion of other special status plants' potential to occur in the BSA based on geographic range and habitat suitability it provided in Appendix C.

3.3.1 Ornduff's Meadowfoam (*Limnanthes douglasii* ssp. *ornduffii*)

Ornduff's meadowfoam is an annual herb in the meadowfoam (*Limnaceae*) family, with a CRPR of 1B.1 (CNPS 2022a). This plant grows in meadows and seeps as well as agricultural fields. Ornduff's meadowfoam is endemic to Half Moon Bay, known only from an occurrence in an agricultural field (Occurrence 1; located partially within the BSA) and a nearby occurrence at the Half Moon Bay Airport (Occurrence 2). Additionally, Ornduff's meadowfoam may be dependent on the disturbance associated with the management regime of the agricultural field for its continued survival (Buxton 2013). This plant was found on both sides of SR 1 in the BSA, within and adjacent to a small portion of area mapped in CNDDDB as Occurrence 1. This occurrence grows in saturated soils in narrow ditches of the agricultural field (CDFW 2022), and therefore may depend on poor drainage along SR 1 for its continued survival in this location. A CNDDDB form for this species is included in Appendix D.

During the March 7, 2022, survey, approximately one thousand Ornduff's meadowfoam (*Limnanthes douglasii* ssp. *ornduffii*) flowers were observed at the northern extent of the BSA beside the northbound lane on the eastern side of SR 1 (Figure 4). These plants were growing in a recently tilled agricultural field (see photos in Appendix A). The plants observed in the BSA are part of Occurrence Number 1 as mapped in the CNDDDB (CDFW 2022). This occurrence is the type locality of this species (CDFW 2022). Associated species observed in the spring of 2022 at this location include prostrate knotweed (*Polygonum aviculare* ssp. *depressum*), seep monkeyflower (*Erythranthe guttata*), meadow grass (*Poa annua*), chickweed (*Stellaria media*), and corn spurry (*Spergularia arvensis*). However, vegetation in this agricultural field changes seasonally, and in the fall of 2021, species observed in this location include brussel sprouts (*Brassica oleracea* 'gemmifera'), field pumpkin (*Cucurbita pepo*), and a sparse cover of nonnative annual grasses (AECOM 2022).

Several fruiting Ornduff's meadowfoam individuals were observed across SR 1 from the above-described population on April 15 and May 9, 2022. This population beside the southbound lane on the western side of SR 1 was observed growing within a culvert with mountain bog rush (*Scirpus microcarpus*), coast or bog rush (*Juncus hesperius*), and common horsetail (*Equisetum arvense*).

3.3.2 Special Status Plant Reference Population Results

As part of the special-status plant surveys, botanists visited four special status plant reference populations. Reference population visits serve to validate survey results by determining the phenology of nearby special-status plant populations, as well as to familiarize surveyors with the target species. The results, including the phenology of each species visited, are summarized in Table 4. All special-status plant species visited as part of the reference population survey were blooming, indicating that the survey was well timed.

Table 4. Reference Population Results

Scientific Name	Common Name	Rarity Status ¹	Location	Date	Phenology
<i>Agrostis blasdalei</i> ²	Blasdale's bent grass	CRPR 1B.2	CNDDDB Occurrence 60. Fitzgerald Marine Reserve, 37.529984, -122.517118	5/11/2022	5 plants, 100% vegetative.
<i>Lasthenia californica</i> ssp. <i>macrantha</i>	perennial goldfields	CRPR 1B.2	CNDDDB Occurrence 40. Francis State Beach, 37.466112, -122.446085 Poplar Beach, 37.455695, -122.442450	3/8/2022, 5/11/2022	3/8: ~100 plants, 40% flowering, 60% vegetative 6/13: 4 plants, 100% flowering
<i>Leptosiphon croceus</i>	coast yellow leptosiphon	CRPR 1B.1	CNDDDB Occurrence 2. JV Fitzgerald Marine Reserve, 37.530138, -122.516999	5/11/2022	400 plants, 100% flowering
<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	Choris' popcornflower	CRPR 1B.2	CNDDDB Occurrence 8. Poplar Trail, 37.450886, -122.443100	3/8/2022	250 plants, 100% flowering

Notes:

¹ CRPR – California Rare Plant Rank. CRPRs are defined as:

1B Plants Rare, Threatened, or Endangered in California and Elsewhere

CNPS Threat Ranks:

- .1 Seriously threatened in California
- .2 Moderately threatened in California
- .3 Not very threatened in California

² Blasdale's bentgrass may integrate locally with the common California bentgrass (*Agrostis densiflora*) (Jepson Flora Project 2022), and the plants observed at the reference population appeared to be intermediate between these two taxa.

Sources: CDFW 2022; CNPS 2022a; USFWS 2022

3.4 Sensitive Natural Communities

The following sensitive natural communities were mapped in the BSA. The location of these sensitive natural communities in the BSA is shown in Figure 5.

Water Parsley Marsh

Water parsley marsh occurs at a single wetland in the BSA. This community is dominated by water parsley (*Oenanthe sarmentosa*) and dotted smartweed (*Persicaria punctata*), with few other species present. Invasive plant species present in this community include garden nasturtium (*Tropaeolum majus*) and English ivy (*Hedera helix*; Cal IPC high). Garden nasturtium is not a Cal IPC-rated invasive plant, but it can invade shaded or moist areas (Jepson Flora Project 2022) and is dominant on the edges of this habitat. Water parsley marsh is ranked G4S2?, making it a sensitive natural community.

California Coffee Berry – Western Azalea – Brewer's Willow Scrub

California coffee berry – western azalea – Brewer's willow scrub occurs in only two small patches in the BSA, and only the California coffee berry association is present in the BSA. This community is dominated by California coffee berry, with no other shrubs present. There is little to no understory in this community, owing to the very dense cover of California coffee berry shrubs. This community is ranked G3S3, making it a sensitive natural community.

Goodding's Willow – Red Willow Riparian Woodland and Forest

Goodding's willow – red willow riparian forest and woodland occurs in the BSA only at Frenchman's Creek, and is represented in the BSA by the red willow association. This community is dominated by red willow (*Salix laevigata*) and is surrounded by a eucalyptus grove. The understory includes a mix of natives and nonnative, including red elderberry, California blackberry, stinging nettle, English ivy (Cal IPC high), and Cape ivy (Cal IPC high). This community is ranked G4S3, making it a sensitive natural community.



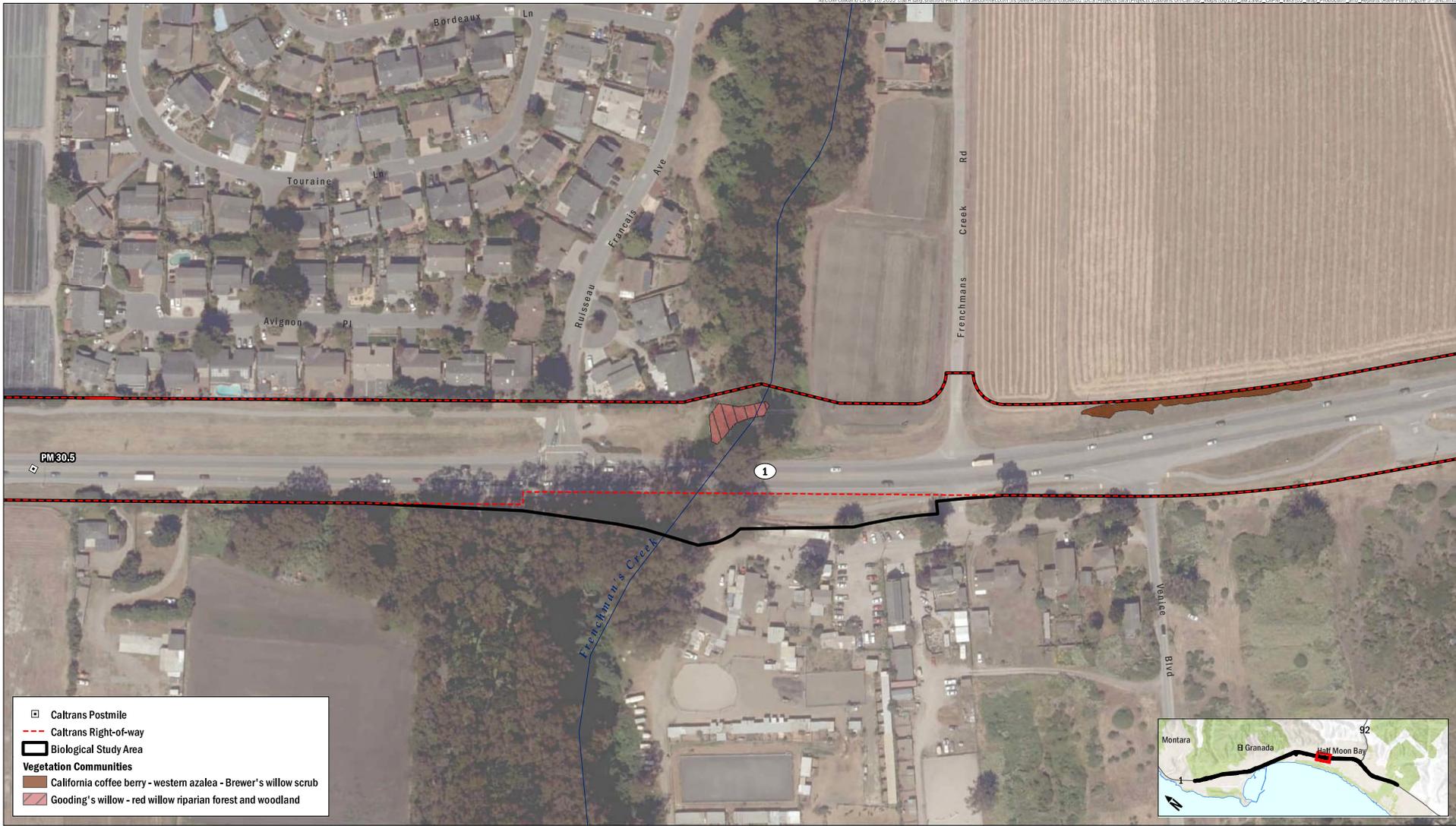
AECOM, 2021
Caltrans, 2021
San Mateo County Imagery, 2018

FIGURE 4
Special Status Plant Survey Results



0 300
Feet

FIGURE 5
 Sensitive Natural Communities in the BSA
 Page 1 of 3



	Caltrans Postmile
	Caltrans Right-of-way
	Biological Study Area
Vegetation Communities	
	California coffee berry - western azalea - Brewer's willow scrub
	Gooding's willow - red willow riparian forest and woodland



AECOM, 2021
Caltrans, 2021
San Mateo County Imagery, 2018



AECOM, 2021
 Caltrans, 2021
 San Mateo County Imagery, 2018

Chapter 4 References

- AECOM 2022. *State Route 1 Multi Asset Roadway Rehabilitation Project Natural Environment Study*. AECOM. Oakland, CA.
- AECOM. 2021. *0Q130 Vegetation and Floristic Survey and Mapping Result*. AECOM. Oakland, CA.
- California Department of Fish and Wildlife (CDFW). 2018. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*. CDFW Nongame Program. Sacramento, CA.
- California Department of Fish and Wildlife. 2022. *California Natural Diversity Database (CNDDDB)*. Rarefind Version 5.1.1, Desktop Commercial Subscription. Biogeographic Data Branch, Sacramento, CA. Available: <https://www.wildlife.ca.gov/Data/CNDDDB/Maps-and-Data>. Accessed August 2022.
- California Invasive Plant Council (Cal-IPC). 2022. *California Invasive Plant Inventory*. Available: <http://cal-ipc.org/paf/>. Accessed February 2022.
- California Native Plant Society (CNPS). 2022a. *California Native Plant Society Electronic Inventory of Rare and Endangered Plants of California*. Eighth edition. Available: <http://www.cnps.org/cnps/rareplants/inventory/index.php>. Accessed August 2022.
- CNPS. 2022b. *A Manual of California Vegetation*. Available: <http://vegetation.cnps.org/>. Accessed July 2022.
- Jepson Flora Project (eds). 2022. *Jepson eFlora*. Available: <https://ucjeps.berkeley.edu/eflora/>. Accessed February 2022.
- Miles, S., and C. Goudey (editors). 1997. *Ecological Subregions of California*. United States Forest Service, Pacific Southwest Division. R5-EM-TP-005. San Francisco, CA.
- Rantz, S.E. 1971. Precipitation depth-duration-frequency relations for the San Francisco Bay region, California, US Geological Survey, Prof. Paper 750 C, 237 241.
- United States Department of Agriculture (USDA). 2022a. *Web Soil Survey 2.0, National Cooperative Soil Survey*. Available: <http://websoilsurvey.nrcs.usda.gov/app/>. Accessed July 2022.
- United States Department of Agriculture (USDA). 2022b. *Official Soil Series Descriptions*. Available. <https://soilseries.sc.egov.usda.gov/>. Accessed July 2022.
- United States Fish and Wildlife Service (USFWS). 2022. *Information for Planning and Consultation*. Available: <https://ecos.fws.gov/ipac/>. Accessed February 2022.
- Western Regional Climate Center (WRCC). 2022. *Western U.S. Climate Summaries for COOP Station 047864, San Mateo, and Station 044660, La Honda*. Available: <https://wrcc.dri.edu>. Accessed July 2022.

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Appendix A Representative Site Photographs



Photo 1. View of a culvert with sedimentation and non-native dominated annual grassland along SR 1.



Photo 2. View of eroding culvert.



Photo 3. View of invasive plants, such as poison hemlock (*Conium maculatum*) and cape ivy (*Delairea odorata*) in the understory of a blue gum (*Eucalyptus globulus*) forest, along Frenchman's Creek.



Photo 4. View of Ornduff's meadowfoam growing in the recently tilled soil.



Photo 5. View of Ornduff's meadowfoam flowering alongside meadow grass.



Photo 6. Ornduff's meadowfoam.



Photo 7. View of Ornduff's meadowfoam location dominated by mountain bog rush along southbound SR 1.



Photo 8. Ornduff's meadowfoam leaves growing beneath mountain bog rush along southbound SR 1.



Photo 9. Wetland along fence beside southbound lane of SR 1 in the northern half of the BSA.



Photo 10. Willow thicket bordered by wild oats and annual brome grasslands.

Appendix B Observed Plant Species

Table B-1. Plant Species Observed

Scientific Name	Common Name	Family	Special Status (CRPR ¹)	Native/ /Cal-IPC Status ²
<i>Acacia melanoxylon</i>	blackwood acacia	Fabaceae		non-native / Limited
<i>Achillea millefolium</i>	yarrow	Asteraceae		native
<i>Aesculus californica</i>	buckeye	Sapindaceae		native
<i>Ailanthus altissima</i>	tree of heaven	Simaroubaceae		non-native / Moderate
<i>Agapanthus africanus</i>	lily of the Nile	Liliaceae		non-native
<i>Agrimonia gryposepala</i>	common agrimony	Rosaceae		native
<i>Albizia julibrissin</i>	silk tree	Fabaceae		non-native
<i>Alnus rubra</i>	red alder	Betulaceae		native
<i>Aloe maculata</i>	soap aloe	Asphodelaceae		non-native
<i>Aloe</i> sp.	unknown aloe	Aspodelaceae		unknown
<i>Amaranthus powellii</i>	Powell's amaranth	Amaranthaceae		native
<i>Amaryllis belladonna</i>	naked lady	Amaryllidaceae		non-native
<i>Apiaceae</i> sp.	unknown Apiaceae	Apiaceae		unknown
<i>Arctotheca prostrata</i>	prostrate cape weed	Asteraceae		non-native / Moderate
<i>Artemisia californica</i>	coastal sage brush	Asteraceae		native
<i>Artemisia douglasiana</i>	California mugwort	Asteraceae		native
<i>Atriplex prostrata</i>	fat-hen	Chenopodiaceae		non-native
<i>Austrocylindropuntia subulata</i>	Eve's pin	Cactaceae		non-native
<i>Avena barbata</i>	slim oat	Poaceae		non-native / Moderate
<i>Baccharis pilularis</i>	coyote brush	Asteraceae		native
<i>Bellardia trixago</i>	Mediterranean linseed	Orobanchaceae		non-native / Moderate
<i>Borago officinalis</i>	common borage	Boraginaceae		non-native
<i>Brachypodium distachyon</i>	purple false brome	Poaceae		non-native / Moderate
<i>Brassica nigra</i>	black mustard	Brassicaceae		non-native / Moderate
<i>Brassica oleracea</i>	cabbage	Brassicaceae		non-native
<i>Brassica rapa</i>	common mustard	Brassicaceae		non-native / Limited
<i>Briza maxima</i>	rattlesnake grass	Poaceae		non-native / Limited
<i>Briza minor</i>	little rattlesnake grass	Poaceae		non-native
<i>Bromus catharticus</i>	rescue grass	Poaceae		non-native
<i>Bromus hordeaceus</i>	soft chess	Poaceae		non-native / Limited
<i>Bromus madritensis</i>	foxtail chess	Poaceae		non-native
<i>Bromus sitchensis</i>	Sitka brome	Poaceae		native

Scientific Name	Common Name	Family	Special Status (CRPR ¹)	Native/ /Ca-IPC Status ²
<i>Bromus sitchensis</i> var. <i>carinatus</i>	California brome	Poaceae		native
<i>Calystegia subacaulis</i>	hill morning glory	Convolvulaceae		native
<i>Capsella bursa-pastoris</i>	shepherd's purse	Brassicaceae		non-native
<i>Cardamine oligosperma</i>	idaho bittercress	Brassicaceae		native
<i>Carduus pycnocephalus</i>	italian thistle	Asteraceae		non-native / Moderate
<i>Carex densa</i>	sedge	Cyperaceae		native
<i>Carex subbracteata</i>	small bract sedge	Cyperaceae		native
<i>Carpobrotus edulis</i>	iceplant	Aizoaceae		non-native / High
<i>Ceanothus</i> sp.	unknown ceanothus	Rhamnaceae		unknown
<i>Centranthus ruber</i>	jupiter's beard	Valerianaceae		non-native
<i>Cerastium glomeratum</i>	large mouse ears	Caryophyllaceae		non-native
<i>Chasmanthe floribunda</i>	chasmanthe	Iridaceae		non-native
<i>Chenopodium album</i>	lambs quarters	Chenopodiaceae		non-native
<i>Cirsium vulgare</i>	bullthistle	Asteraceae		non-native / Moderate
<i>Conium maculatum</i>	poison hemlock	Apiaceae		non-native / Moderate
<i>Convolvulus arvensis</i>	field bindweed	Convolvulaceae		non-native
<i>Cornus sericea</i>	American dogwood	Cornaceae		native
<i>Cortaderia jubata</i>	Andean pampas grass	Poaceae		non-native / High
<i>Cotoneaster franchetii</i>	cotoneaster	Rosaceae		non-native / Moderate
<i>Cotoneaster integerrimus</i>	common cotoneaster	Rosaceae		non-native
<i>Cucurbita pepo</i>	field pumpkin	Cucurbitaceae		non-native
<i>Cynodon dactylon</i>	Bermuda grass	Poaceae		non-native / Moderate
<i>Cynosurus echinatus</i>	dogtail grass	Poaceae		non-native / Moderate
<i>Cyperus eragrostis</i>	tall cyperus	Cyperaceae		native
<i>Dactylis glomerata</i>	orchardgrass	Poaceae		non-native / Limited
<i>Daucus carota</i>	carrot	Apiaceae		non-native
<i>Delairea odorata</i>	cape ivy	Asteraceae		non-native / High
<i>Dipsacus sativus</i>	Indian teasel	Dipsacaceae		non-native / Moderate
<i>Distichlis spicata</i>	salt grass	Poaceae		native
<i>Echeveria</i> sp.	unknown stonecrop	Crassulaceae		unknown
<i>Echinochloa crus-galli</i>	barnyard grass	Poaceae		non-native
<i>Ehrharta erecta</i>	upright veldt grass	Poaceae		non-native / Moderate
<i>Epilobium canum</i>	California fuchsia, zauschneria	Onagraceae		native

Scientific Name	Common Name	Family	Special Status (CRPR ¹)	Native/ /Cal-IPC Status ²
<i>Epilobium brachycarpum</i>	willow herb	Onagraceae		native
<i>Epilobium ciliatum</i>	slender willow herb	Onagraceae		native
<i>Epilobium densiflorum</i>	willow herb	Onagraceae		native
<i>Equisetum arvense</i>	common horsetail	Equisetaceae		native
<i>Erigeron glaucus</i>	seaside daisy	Asteraceae		native
<i>Erigeron sumatrensis</i>	tropical horseweed	Asteraceae		non-native
<i>Erodium cicutarium</i>	coastal heron's bill	Geraniaceae		non-native / Limited
<i>Erodium moschatum</i>	whitestem filaree	Geraniaceae		non-native
<i>Eriophyllum confertiflorum</i>	yellow yarrow	Asteraceae		native
<i>Erythranthe guttata</i>	yellow monkey flower	Phrymaceae		native
<i>Escallonia rubra</i>	red claws	Grossulariaceae		non-native
<i>Eschscholzia californica</i>	California poppy	Papaveraceae		native
<i>Eucalyptus globulus</i>	blue gum	Myrtaceae		non-native / Limited
<i>Euphorbia oblongata</i>	eggleaf spurge	Euphorbiaceae		non-native / Limited
<i>Euphorbia peplus</i>	petty spurge	Euphorbiaceae		non-native
<i>Euthamia occidentalis</i>	western goldenrod	Asteraceae		native
<i>Festuca bromoides</i>	brome fescue	Poaceae		non-native
<i>Festuca idahoensis</i>	blue fescue	Poaceae		native
<i>Festuca perennis</i>	Italian rye grass	Poaceae		non-native / Moderate
<i>Foeniculum vulgare</i>	fennel	Apiaceae		non-native / Moderate
<i>Fragaria chiloensis</i>	beach strawberry	Rosaceae		native
<i>Frangula californica</i>	California coffeeberry	Rhamnaceae		native
<i>Fumaria capreolata</i>	white ramping fumitory	Papaveraceae		non-native
<i>Galium aparine</i>	cleavers	Rubiaceae		native
<i>Genista monspessulana</i>	French broom	Fabaceae		non-native / High
<i>Geranium core-core</i>	Alderney crane's-bill	Geraniaceae		non-native
<i>Geranium dissectum</i>	wild geranium	Geraniaceae		non-native / Limited
<i>Geranium robertianum</i>	Robert's geranium	Geraniaceae		non-native
<i>Glebionis coronaria</i>	crown daisy	Asteraceae		non-native / Limited
<i>Grewia occidentalis</i>	lavender star flower	Malvaceae		non-native
<i>Grindelia stricta</i> var. <i>platyphylla</i>	gumplant	Asteraceae		native
<i>Hedera helix</i>	English ivy	Araliaceae		non-native / High
<i>Helianthus annuus</i>	hairy leaved sunflower	Asteraceae		native
<i>Helminthotheca echioides</i>	bristly ox-tongue	Asteraceae		non-native / Limited

Scientific Name	Common Name	Family	Special Status (CRPR ¹)	Native/ /Cal-IPC Status ²
<i>Hesperocyparis macrocarpa</i> ³	Monterey cypress	Cupressaceae	1B.2	native
<i>Heterotheca grandiflora</i>	telegraph weed	Asteraceae		native
<i>Hirschfeldia incana</i>	mustard	Brassicaceae		non-native / Moderate
<i>Holcus lanatus</i>	common velvetgrass	Poaceae		non-native / Moderate
<i>Hordeum brachyantherum</i>	meadow barley	Poaceae		native
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	barley	Poaceae		non-native
<i>Horkelia</i> sp.	unknown cinquefoil	Rosaceae		unknown
<i>Hypochaeris radicata</i>	hairy cats ear	Asteraceae		non-native / Moderate
<i>Ipomoea purpurea</i>	common morning glory	Convolvulaceae		non-native
<i>Jasminum officinale</i>	common jasmine	Oleaceae		non-native
<i>Juncus bufonius</i>	common toad rush	Juncaceae		native
<i>Juncus hesperius</i>	coast or bog rush	Juncaceae		native
<i>Juncus patens</i>	rush	Juncaceae		native
<i>Kickxia elatine</i>	sharp leaved fluellin	Plantaginaceae		non-native
<i>Lactuca saligna</i>	willow lettuce	Asteraceae		non-native
<i>Lactuca serriola</i>	prickly lettuce	Asteraceae		non-native
<i>Lavandula angustifolia</i>	lavender	Lamiaceae		non-native
<i>Lemna minor</i>	smaller duckweed	Araceae		native
<i>Lepidium didymum</i>	lesser swine cress	Brassicaceae		non-native
<i>Leptospermum laevigatum</i>	Australian tea tree	Myrtaceae		non-native
<i>Ligustrum lucidum</i>	glossy privet	Oleaceae		non-native / Limited
<i>Linum bienne</i>	flax	Linaceae		non-native
<i>Limnanthes douglasii</i> ssp. <i>ornduffii</i>	Ornduff's meadowfoam	Limnanthaceae	1B.1	native
<i>Lobularia maritima</i>	sweet alyssum	Brassicaceae		non-native / Limited
<i>Lonicera japonica</i>	Japanese honeysuckle	Caprifoliaceae		non-native
<i>Lotus corniculatus</i>	bird's foot trefoil	Fabaceae		non-native
<i>Lupinus arboreus</i>	coastal bush lupine	Fabaceae		native
<i>Lupinus succulentus</i>	arroyo lupine	Fabaceae		native
<i>Lysimachia arvensis</i>	scarlet pimpernel	Myrsinaceae		non-native
<i>Lythrum hyssopifolia</i>	hyssop loosestrife	Lythraceae		non-native
<i>Madia gracilis</i>	gumweed	Asteraceae		native
<i>Madia sativa</i>	coastal tarweed	Asteraceae		native
<i>Malva</i> sp.	unknown mallow	Malvaceae		unknown
<i>Marah fabacea</i>	California man-root	Cucurbitaceae		native
<i>Matricaria discoidea</i>	pineapple weed	Asteraceae		native

Scientific Name	Common Name	Family	Special Status (CRPR ¹)	Native/ /Cal-IPC Status ²
<i>Medicago polymorpha</i>	California burclover	Fabaceae		non-native / Limited
<i>Melilotus indicus</i>	annual yellow sweetclover	Fabaceae		non-native
<i>Mercurialis annua</i>	annual mercury	Euphorbiaceae		non-native
<i>Muhlenbergia rigens</i>	deergass	Poaceae		native
<i>Myoporum laetum</i>	ngaio tree	Scrophulariaceae		non-native / Moderate
<i>Nasturtium officinale</i>	watercress	Brassicaceae		native
<i>Navarretia squarrosa</i>	skunkweed	Polemoniaceae		native
<i>Oenanthe sarmentosa</i>	water parsley	Apiaceae		native
<i>Oenothera elata</i> ssp. <i>hookeri</i>	evening primrose	Onagraceae		native
<i>Oenothera speciosa</i>	Mexican evening primrose	Onagraceae		non-native
<i>Olea europaea</i>	olive	Oleaceae		non-native / Limited
<i>Opuntia ficus-indica</i>	tuna	Cactaceae		non-native
<i>Oxalis corniculata</i>	creeping wood sorrel	Oxalidaceae		non-native
<i>Oxalis pes-caprae</i>	bermuda buttercup	Oxalidaceae		non-native / Moderate
<i>Parietaria judaica</i>	spreading pellitory	Urticaceae		non-native
<i>Passiflora incarnata</i>	purple passionflower			non-native
<i>Pennisetum clandestinum</i>	kikuyu grass	Poaceae		non-native / Limited
<i>Persicaria punctata</i>	dotted smartweed	Polygonaceae		native
<i>Phacelia malvifolia</i>	stinging phacelia	Boraginaceae		native
<i>Phachelia</i> sp.	unknown phacelia	Boraginaceae		unknown
<i>Phalaris aquatica</i>	Harding grass	Poaceae		non-native / Moderate
<i>Pinus radiata</i> ³	Monterey pine	Pinaceae	1B.1	native
<i>Pinus</i> sp.	unknown pine	Pinaceae		unknown
<i>Pittosporum eugeniooides</i>	lemonwood	Pittosporaceae		non-native
<i>Plantago coronopus</i>	cut leaf plantain	Plantaginaceae		non-native
<i>Plantago lanceolata</i>	ribwort	Plantaginaceae		non-native / Limited
<i>Platanus racemosa</i>	California sycamore	Platanaceae		native
<i>Poa annua</i>	annual blue grass	Poaceae		non-native
<i>Polygonum aviculare</i> ssp. <i>depressum</i>	prostrate knotweed	Polygonaceae		non-native
<i>Polypogon monspeliensis</i>	annual beard grass	Poaceae		non-native / Limited
<i>Populus trichocarpa</i>	black cottonwood	Salicaceae		native
<i>Potentilla anserina</i>	silver weed cinquefoil	Rosaceae		native
<i>Prunus lusitanica</i>	Portuguese laurel	Rosaceae		non-native

Scientific Name	Common Name	Family	Special Status (CRPR ¹)	Native/ /Cal-IPC Status ²
<i>Pseudognaphalium luteoalbum</i>	Jersey cudweed	Asteraceae		non-native
<i>Pyrus calleryana</i>	callery pear	Rosaceae		non-native / Watch
<i>Ranunculus</i> sp.	unknown buttercup	Ranunculaceae		unknown
<i>Raphanus sativus</i>	jointed charlock	Brassicaceae		non-native / Limited
<i>Rhododendron ferrugineum</i>	alpenrose	Ericaceae		non-native
<i>Rosa californica</i>	California wild rose	Rosaceae		native
<i>Rosa multiflora</i>	multiflora rose	Rosaceae		non-native
<i>Rosa</i> sp.	unknown rose	Rosaceae		unknown
<i>Rosmarinus officinalis</i>	rosemary	Lamiaceae		non-native
<i>Rubus armeniacus</i>	Himalayan blackberry	Rosaceae		non-native / High
<i>Rubus ursinus</i>	California blackberry	Rosaceae		native
<i>Rumex crispus</i>	curly dock	Polygonaceae		non-native / Limited
<i>Rumex acetosella</i>	sheep sorrel	Polygonaceae		non-native / Moderate
<i>Rumex transitorius</i>	willow dock	Polygonaceae		native
<i>Salix laevigata</i>	polished willow	Salicaceae		native
<i>Salix lasiandra</i>	pacific willow	Salicaceae		native
<i>Salix lasiolepis</i>	arroyo willow	Salicaceae		native
<i>Salvia officinalis</i>	common sage	Lamiaceae		non-native
<i>Sambucus nigra</i> ssp. <i>caerulea</i>	blue elderberry	Adoxaceae		native
<i>Sambucus racemosa</i>	red elderberry	Adoxaceae		native
<i>Scabiosa atropurpurea</i>	pincushions	Dipsacaceae		non-native / Watch
<i>Scabiosa columbaria</i>	small scabiose	Caprifoliaceae		non-native
<i>Scirpus microcarpus</i>	mountain bog bulrush	Cyperaceae		native
<i>Scrophularia californica</i>	California bee plant	Scrophulariaceae		native
<i>Senecio vulgaris</i>	common groundsel	Asteraceae		non-native
<i>Silene gallica</i>	common catchfly	Caryophyllaceae		non-native
<i>Silybum marianum</i>	milk thistle	Asteraceae		non-native
<i>Solanum americanum</i>	white nightshade	Solanaceae		native
<i>Solanum</i> sp.	unknown nightshade	Solanaceae		unknown
<i>Sonchus asper</i>	spiny sowthistle	Asteraceae		non-native
<i>Sonchus oleraceus</i>	sow thistle	Asteraceae		non-native
<i>Spergula arvensis</i>	corn spurry	Caryophyllaceae		non-native
<i>Stachys bullata</i>	southern hedge nettle	Lamiaceae		native
<i>Stachys</i> sp.	unknown hedge nettle	Lamiaceae		unknown
<i>Stellaria media</i>	chickweed	Caryophyllaceae		non-native

Scientific Name	Common Name	Family	Special Status (CRPR ¹)	Native/ /Cal-IPC Status ²
<i>Symphotrichum chilense</i>	pacific aster	Asteraceae		native
<i>Tanacetum parthenium</i>	feverfew	Asteraceae		non-native
<i>Taraxacum officinale</i>	red seeded dandelion	Asteraceae		non-native
<i>Toxicodendron diversilobum</i>	poison oak	Anacardiaceae		native
<i>Tragopogon porrifolius</i>	salsify	Asteraceae		non-native
<i>Trifolium angustifolium</i>	narrow leaved clover	Fabaceae		non-native
<i>Trifolium campestre</i>	hop clover	Fabaceae		non-native
<i>Trifolium hirtum</i>	rose clover	Fabaceae		non-native / Limited
<i>Trifolium incarnatum</i>	crimson clover	Fabaceae		non-native
<i>Trifolium repens</i>	white clover	Fabaceae		non-native
<i>Triticum aestivum</i>	common wheat	Poaceae		non-native
<i>Tropaeolum majus</i>	garden nasturtium	Tropaeolaceae		non-native
<i>Urospermum picroides</i>	bristly tail seed	Asteraceae		non-native
<i>Urtica dioica</i>	stinging nettle	Urticaceae		native
<i>Veronica</i> sp.	unknown veronica	Plantaginaceae		unknown
<i>Vicia sativa</i>	spring vetch	Fabaceae		non-native
<i>Vicia tetrasperma</i>	four seeded vetch	Fabaceae		non-native
<i>Vinca major</i>	vinca	Apocynaceae		non-native / Moderate
<i>Viola pedunculata</i>	california golden violet	Violaceae		native
<i>Viola</i> sp.	Unknown violet	Violaceae		unknown
<i>Woodwardia fimbriata</i>	western chain fern	Blechnaceae		native
<i>Zantedeschia aethiopica</i>	callalily	Araceae		non-native / Limited

Notes:

¹ CNPS California Rare Plant Ranks (CRPRs) are defined as:

1B Plants Rare, Threatened, or Endangered in California and Elsewhere

CNPS Threat Ranks:

.1 Seriously threatened in California

.2 Moderately threatened in California

² Cal-IPC invasive plant rankings are defined as follows:

High species with severe ecological impacts

Moderate substantial and apparent, but not severe, ecological impacts

Limited minor ecological impacts, or information on them is limited)

Watch at a high risk of becoming invasive in the future

³ Monterey cypress and Monterey pine are considered special status species in their native ranges within or near the Monterey Peninsula, but that designation does not apply in the BSA, located approximately 65 miles north of their native ranges.

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Appendix C Special-Status Plant Species' Potential to Occur in the BSA

Table C-1. Special-Status Plant Species' Potential to Occur in the BSA¹

Scientific Name	Common Name	Habitat	Special Status (Federal, State, CRPR) ²	Blooming Period	Potential to Occur
<i>Acanthomintha duttonii</i>	San Mateo thorn-mint	Chaparral, Valley and foothill grassland	FE, CE, 1B.1	Apr-Jun	Moderate. There is potentially suitable grassland habitat present in the BSA. There are 5 CNDDDB occurrences located less than 10 miles from the BSA.
<i>Agrostis blasdalei</i>	Blasdale's bent grass	Coastal bluff scrub, Coastal dunes, Coastal prairie	1B.2	May-Jul	High. There is potentially suitable coastal bluff scrub adjacent to the BSA. There is one CNDDDB occurrence from 2015 is less than a mile from the BSA.
<i>Allium peninsulare</i> var. <i>franciscanum</i>	Franciscan onion	Cismontane woodland, Valley and foothill grassland	1B.2	(Apr)May-Jun	High. Potentially suitable grassland habitat is present in the BSA, no volcanic or serpentine soils. There are 17 nearby CNDDDB occurrences located less than 10 miles from the BSA, 6 occurrences are from 2015 and 2017.
<i>Amsinckia lunaris</i>	bent-flowered fiddleneck	Cismontane woodland, Coastal bluff scrub, Valley and foothill grassland	1B.2	Mar-Jun	High. There is potentially suitable grassland habitat present in the BSA. There are 5 CNDDDB occurrences within 10 miles of the BSA, one occurrence from 2018 is less than 5 miles from the BSA.
<i>Arctostaphylos andersonii</i>	Anderson's manzanita	Broadleafed upland forest, Chaparral, North Coast coniferous forest	1B.2	Nov-May	Low. There is potentially suitable non-native coniferous forest present in BSA. There is one CNDDDB occurrence 8 miles from the BSA from 2013.
<i>Arctostaphylos franciscana</i>	Franciscan manzanita	Coastal scrub	FE, 1B.1	Feb-Apr	None. There is potentially suitable coastal scrub habitat present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Arctostaphylos imbricata</i>	San Bruno Mountain manzanita	Chaparral, Coastal scrub	CE, 1B.1	Feb-May	None. There is potentially suitable coastal scrub habitat present in the BSA. There are no CNDDDB occurrences recorded within 10 miles of the BSA.
<i>Arctostaphylos montana</i> ssp. <i>ravenii</i>	Presidio manzanita	Chaparral, Coastal prairie, Coastal scrub	FE, CE, 1B.1	Feb-Mar	None. There is potentially suitable coastal scrub habitat is present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Arctostaphylos montaraensis</i>	Montara manzanita	Chaparral, Coastal scrub	1B.2	Jan-Mar	High. There is potentially suitable coastal scrub habitat present in the BSA. There are 3 CNDDDB occurrences located less than 4 miles from the BSA, one occurrence is from 2014.

Scientific Name	Common Name	Habitat	Special Status (Federal, State, CRPR) ²	Blooming Period	Potential to Occur
<i>Arctostaphylos pacifica</i>	Pacific manzanita	Chaparral, Coastal scrub	CE, 1B.1	Feb-Apr	Low. There is potentially suitable coastal scrub habitat present in the BSA. There are no CNDDDB occurrences within 10 miles of the BSA.
<i>Arctostaphylos regismontana</i>	Kings Mountain manzanita	Broadleafed upland forest, Chaparral, North Coast coniferous forest	1B.2	Dec-Apr	High. There is potentially suitable non-native coniferous forest present in BSA. There are 14 CNDDDB occurrences located less than 10 miles from the BSA.
<i>Astragalus pycnostachyus</i> var. <i>pycnostachyus</i>	coastal marsh milk-vetch	Coastal dunes, Coastal scrub, Marshes and swamps	1B.2	(Apr)Jun-Oct	High. There is potentially suitable coastal scrub habitat present in the BSA, there may be ephemeral wetlands and drainages present. There are 6 CNDDDB occurrences within 10 miles of the BSA, only one of which is a historic occurrence.
<i>Astragalus tener</i> var. <i>tener</i>	alkali milk-vetch	Playas, Valley and foothill grassland, Vernal pools	1B.2	Mar-Jun	None. There is potentially suitable grassland habitat present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Carex comosa</i>	bristly sedge	Coastal prairie, Marshes and swamps, Valley and foothill grassland	2B.1	May-Sep	Low. There is potentially suitable grassland habitat present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Centromadia parryi</i> ssp. <i>parryi</i>	pappose tarplant	Chaparral, Coastal prairie, Marshes and swamps, Meadows and seeps, Valley and foothill grassland	1B.2	May-Nov	Moderate. There is potentially suitable grassland habitat present in the BSA. There are 2 CNDDDB occurrences located less than 6 miles from the BSA.
<i>Chloropyron maritimum</i> ssp. <i>palustre</i>	Point Reyes salty bird's-beak	Marshes and swamps	1B.2	Jun-Oct	None. No habitat is present in the BSA. One historical CNDDDB occurrence recorded within 9 miles of the BSA.
<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	San Francisco Bay spineflower	Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub	1B.2	Apr-Jul(Aug)	Low. There is potentially suitable coastal scrub and prairie habitat present in the BSA. One CNDDDB occurrence recorded within 5 miles of the BSA.
<i>Chorizanthe robusta</i> var. <i>robusta</i>	robust spineflower	Chaparral, Cismontane woodland, Coastal dunes, Coastal scrub	FE, 1B.1	Apr-Sep	None. There is potentially suitable coastal scrub habitat present in the BSA. One historical CNDDDB occurrence recorded within 8 miles of the BSA.
<i>Cirsium andrewsii</i>	Franciscan thistle	Broadleafed upland forest, Coastal bluff scrub, Coastal prairie, Coastal scrub	1B.2	Mar-Jul	Moderate. There is potentially suitable coastal prairie and scrub habitat is present in the BSA. There are 2 CNDDDB occurrences located less than 4 miles from the BSA.

Scientific Name	Common Name	Habitat	Special Status (Federal, State, CRPR) ²	Blooming Period	Potential to Occur
<i>Cirsium fontinale</i> var. <i>fontinale</i>	fountain thistle	Chaparral, Cismontane woodland, Meadows and seeps, Valley and foothill grassland	FE, CE, 1B.1	(Apr)May-Oct	None. There is potentially suitable chaparral and grassland habitat present in the BSA. There are 5 nearby CNDDDB occurrences located less than 10 miles from the BSA. However, this plant is known to only occur on the banks of Crystal Spring Reservoir.
<i>Cirsium occidentale</i> var. <i>compactum</i>	compact cobwebby thistle	Chaparral, Coastal dunes, Coastal prairie, Coastal scrub	1B.2	Apr-Jun	Low. There is potentially suitable coastal scrub habitat present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Collinsia corymbosa</i>	round-headed Chinese-houses	Coastal dunes	1B.2	Apr-Jun	None. No coastal dune habitat is present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Collinsia multicolor</i>	San Francisco collinsia	Closed-cone coniferous forest, Coastal scrub	1B.2	(Feb)Mar-May	High. There is potentially suitable coastal scrub habitat present in the BSA. There are 12 CNDDDB occurrences within 10 miles of the BSA, 8 are from 2014-2017.
<i>Dirca occidentalis</i>	western leatherwood	Broadleafed upland forest, Chaparral, Cismontane woodland, Closed-cone coniferous forest, North Coast coniferous forest, Riparian forest, Riparian woodland	1B.2	Jan-Mar(Apr)	High. There is potentially suitable riparian woodland habitat present in the BSA. There are 12 CNDDDB occurrences within 10 miles of the BSA, 10 were recorded in 2021.
<i>Eriophyllum latilobum</i>	San Mateo woolly sunflower	Cismontane woodland, Coastal scrub, Lower montane coniferous forest	FE, CE, 1B.1	May-Jun	High. There is potentially suitable coastal scrub habitat present in the BSA. There are 6 nearby CNDDDB occurrences located less than 6 miles from the BSA, 4 of them from 2015-2017.
<i>Eryngium jepsonii</i>	Jepson's coyote-thistle	Valley and foothill grassland, Vernal pools	1B.2	Apr-Aug	Low. There is potentially suitable grassland habitat present in the BSA. There are no nearby CNDDDB occurrences within 10 miles of the BSA.
<i>Fissidens pauperculus</i>	minute pocket moss	North Coast coniferous forest	1B.2		None. There is no suitable habitat present in the BSA. There are no CNDDDB occurrences within 10 miles of the BSA.
<i>Fritillaria biflora</i> var. <i>ineziana</i>	Hillsborough chocolate lily	Cismontane woodland, Valley and foothill grassland	1B.1	Mar-Apr	Moderate. There is potentially suitable grassland habitat present in the BSA. There are 2 CNDDDB occurrences nearby, one occurrence is dated from 2016 and located less than 3 miles from the BSA.

Scientific Name	Common Name	Habitat	Special Status (Federal, State, CRPR) ²	Blooming Period	Potential to Occur
<i>Fritillaria liliacea</i>	fragrant fritillary	Cismontane woodland, Coastal prairie, Coastal scrub, Valley and foothill grassland	1B.2	Feb-Apr	Moderate. There is potentially suitable coastal prairie and scrub habitat present in the BSA. There are 7 nearby CNDDDB occurrences located less than 10 miles from the BSA.
<i>Gilia capitata</i> ssp. <i>chamissonis</i>	blue coast gilia	Coastal dunes, Coastal scrub	1B.1	Apr-Jul	Low. There is potentially suitable coastal scrub habitat present in the BSA. There are no CNDDDB occurrences within 10 miles of the BSA.
<i>Gilia millefoliata</i>	dark-eyed gilia	Coastal dunes	1B.2	Apr-Jul	None. There is no suitable habitat present in the BSA. There are no CNDDDB occurrences within 10 miles of the BSA.
<i>Helianthella castanea</i>	Diablo helianthella	Broadleafed upland forest, Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland, Valley and foothill grassland	1B.2	Mar-Jun	None. There is potentially suitable coastal scrub and grassland habitat present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Hemizonia congesta</i> ssp. <i>congesta</i>	congested-headed hayfield tarplant	Valley and foothill grassland	1B.2	Apr-Nov	Low. There is potentially suitable grassland habitat present in the BSA. There is one historic CNDDDB occurrence located 7 miles from the BSA.
<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i>	short-leaved evax	Coastal bluff scrub, Coastal dunes, Coastal prairie	1B.2	Mar-Jun	Low. There is potentially suitable coastal prairie habitat present in the BSA. One CNDDDB occurrence recorded in 1970 within 5 miles of the BSA.
<i>Hesperolinon congestum</i>	Marin western flax	Chaparral, Valley and foothill grassland	FT, CT, 1B.1	Apr-Jul	High. There is potentially suitable grassland habitat present in the BSA. There are 10 CNDDDB occurrences located less than 10 miles from the BSA.
<i>Heteranthera dubia</i>	water star-grass	Marshes and swamps	2B.2	Jul-Oct	None. There is no habitat present in the BSA. There are no CNDDDB occurrences within 10 miles of the BSA.
<i>Horkelia cuneata</i> var. <i>sericea</i>	Kellogg's horkelia	Chaparral, Closed-cone coniferous forest, Coastal dunes, Coastal scrub	1B.1	Apr-Sep	Moderate. There is potentially suitable coastal scrub habitat present in the BSA. There are 3 nearby CNDDDB occurrences, one is from 2000 and located less than a mile from the BSA.

Scientific Name	Common Name	Habitat	Special Status (Federal, State, CRPR) ²	Blooming Period	Potential to Occur
<i>Horkelia marinensis</i>	Point Reyes horkelia	Coastal dunes, Coastal prairie, Coastal scrub	1B.2	May-Sep	Low. There is potentially suitable coastal scrub and prairie habitat present in the BSA. There are 2 CNDDDB records within 8 miles of the BSA, one of which is a historical record.
<i>Hypogymnia schizidiata</i>	island tube lichen	Chaparral, Closed-cone coniferous forest	1B.3		Low. There is potentially suitable closed-cone coniferous forest habitat present in the BSA. There is one CNDDDB occurrence within 10 miles of the BSA.
<i>Lasthenia californica</i> ssp. <i>macrantha</i>	perennial goldfields	Coastal bluff scrub, Coastal dunes, Coastal scrub	1B.2	Jan-Nov	Low. This plant can be found on the immediate coast in coastal bluff scrub, which is close to the BSA. There is one CNDDDB record within 10 miles of the BSA.
<i>Layia carnosa</i>	beach layia	Coastal dunes, Coastal scrub	FT, CE, 1B.1	Mar-Jul	None. There is potentially suitable coastal scrub habitat present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Leptosiphon croceus</i>	coast yellow leptosiphon	Coastal bluff scrub, Coastal prairie	CE, 1B.1	Apr-Jun	High. There is potentially suitable coastal prairie habitat present in the BSA. One CNDDDB occurrence is from 2016 and located less than a mile from the BSA.
<i>Leptosiphon rosaceus</i>	rose leptosiphon	Coastal bluff scrub	1B.1	Apr-Jul	High. There is coastal bluff scrub habitat close to the BSA. There are 3 CNDDDB occurrences located less than 6 miles from the BSA, one occurrence is from 2014 and located less than a mile from the BSA.
<i>Lessingia arachnoidea</i>	Crystal Springs lessingia	Cismontane woodland, Coastal scrub, Valley and foothill grassland	1B.2	Jul-Oct	High. There is potentially suitable coastal scrub and grassland habitat present in BSA. There are 8 nearby CNDDDB occurrences from 2000-2014 and located less than 10 miles from the BSA.
<i>Lessingia germanorum</i>	San Francisco lessingia	Coastal scrub	FE, CE, 1B.1	(Jun)Jul-Nov	Low. There is potentially suitable coastal scrub habitat present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Limnanthes douglasii</i> ssp. <i>ornduffii</i>	Ornduff's meadowfoam	Meadows and seeps	1B.1	Nov-May	High. There are potentially suitable seeps present in the BSA, known CNDDDB occurrence near the BSA. There are two CNDDDB occurrences from 2011 located less than a mile from the BSA.

Scientific Name	Common Name	Habitat	Special Status (Federal, State, CRPR) ²	Blooming Period	Potential to Occur
<i>Malacothamnus arcuatus</i>	arcuate bush-mallow	Chaparral, Cismontane woodland	1B.2	Apr-Sep	Low. There is no suitable habitat present in the BSA. There are 9 nearby CNDDDB occurrences within ten miles of the BSA, six occurrences are dated from 2000-2007.
<i>Microseris paludosa</i>	marsh microseris	Cismontane woodland, Closed-cone coniferous forest, Coastal scrub, Valley and foothill grassland	1B.2	Apr-Jun(Jul)	Low. There is potentially suitable coastal scrub and grassland habitat present in the BSA. There are no CNDDDB occurrence within 10 miles of the BSA.
<i>Monardella sinuata</i> ssp. <i>nigrescens</i>	northern curly-leaved monardella	Chaparral, Coastal dunes, Coastal scrub, Lower montane coniferous forest	1B.2	(Apr)May-Jul(Aug-Sep)	Low. There is potentially suitable coastal scrub habitat present in the BSA. There are no CNDDDB occurrence within 10 miles of the BSA.
<i>Monolopia gracilens</i>	woodland woollythreads	Broadleafed upland forest, Chaparral, Cismontane woodland, North Coast coniferous forest, Valley and foothill grassland	1B.2	(Feb)Mar-Jul	Moderate. There is potentially suitable coniferous forest and grassland habitat present in the BSA. There are 5 CNDDDB occurrences recorded less than 8 miles from the BSA.
<i>Pentachaeta bellidiflora</i>	white-rayed pentachaeta	Cismontane woodland, Valley and foothill grassland	FE, CE, 1B.1	Mar-May	Low. There is potentially suitable grassland habitat present in the BSA. There are 2 nearby CNDDDB occurrences recorded less than 7 miles from the BSA.
<i>Plagiobothrys chorisianus</i> var. <i>chorisianus</i>	Choris' popcornflower	Chaparral, Coastal prairie, Coastal scrub	1B.2	Mar-Jun	High. There is potentially suitable coastal prairie and scrub habitat present in BSA. There are 13 CNDDDB occurrences within ten miles of the BSA, 3 of which are less than a mile from the BSA and are from 2015-2016.
<i>Polemonium carneum</i>	Oregon polemonium	Coastal prairie, Coastal scrub, Lower montane coniferous forest	2B.2	Apr-Sep	Low. There is potentially suitable non-native coniferous forest present in the BSA. There is one historic CNDDDB occurrence located less than 4 miles from the BSA.
<i>Potentilla hickmanii</i>	Hickman's cinquefoil	Closed-cone coniferous forest, Coastal bluff scrub, Marshes and swamps, Meadows and seeps	FE, CE, 1B.1	Apr-Aug	High. There are potentially suitable seeps present in the BSA. There are 2 CNDDDB occurrences near the BSA, one is from 2019 and located less than a mile from the BSA.

Scientific Name	Common Name	Habitat	Special Status (Federal, State, CRPR) ²	Blooming Period	Potential to Occur
<i>Sanicula maritima</i>	adobe sanicle	Chaparral, Coastal prairie, Meadows and seeps, Valley and foothill grassland	CR, 1B.1	Feb-May	Low. There is potentially suitable coastal prairie, and grassland habitat present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Senecio aphanactis</i>	chaparral ragwort	Chaparral, Cismontane woodland, Coastal scrub	2B.2	Jan-Apr(May)	Low. There is potentially suitable coastal scrub habitat present in the BSA, there is one CNDDDB occurrence from 1973 located 6 miles from the BSA.
<i>Silene scouleri ssp. scouleri</i>	Scouler's catchfly	Coastal bluff scrub, Coastal prairie, Valley and foothill grassland	2B.2	(Mar-May)Jun-Aug(Sep)	Low. There is potentially suitable grassland habitat present in the BSA. There are 2 nearby CNDDDB occurrences, one is six miles from the BSA.
<i>Silene verecunda ssp. verecunda</i>	San Francisco campion	Chaparral, Coastal bluff scrub, Coastal prairie, Coastal scrub, Valley and foothill grassland	1B.2	(Feb)Mar-Jul(Aug)	Moderate. There is potentially suitable coastal prairie and scrub habitat present in the BSA. There are 3 CNDDDB occurrences located less than 8 miles from the BSA, most recent is from 2007.
<i>Suaeda californica</i>	California seablite	Marshes and swamps	FE, 1B.1	Jul-Oct	None. No habitat is present in the BSA. There are no CNDDDB recorded within 10 miles of the BSA.
<i>Trifolium amoenum</i>	two-fork clover	Coastal bluff scrub, Valley and foothill grassland	FE, 1B.1	Apr-Jun	Low. There is potentially suitable grassland habitat present in BSA. There is one historic CNDDDB occurrence located less than 9 miles from the BSA.
<i>Trifolium hydrophilum</i>	saline clover	Marshes and swamps, Valley and foothill grassland, Vernal pools	1B.2	Apr-Jun	Low. There is potentially suitable grassland habitat present in the BSA. There is one historical CNDDDB occurrence located less than 10 miles from the BSA.
<i>Triphysaria floribunda</i>	San Francisco owl's-clover	Coastal prairie, Coastal scrub, Valley and foothill grassland	1B.2	Apr-Jun	Moderate. There is potentially suitable coastal scrub and grassland habitat present in the BSA. There are 8 CNDDDB occurrences located less than 10 miles from the BSA.
<i>Triquetrella californica</i>	coastal triquetrella	Coastal bluff scrub, Coastal scrub	1B.2		Low. There is potentially suitable coastal scrub present in the BSA. There are no CNDDDB occurrences within 10 miles of the BSA.
Notes ¹ Sources for all plant data and assessment of potential to occur: CDFW 2022, CNPS 2022a, USFWS 2022 ² Special statuses are defined as follows: CE – State Endangered CR – State Rare Species CT – State Threatened FE – Federal Endangered Species FT – Federally Threatened			CNPS California Rare Plant Rank (CRPR): 1B Plants Rare, Threatened, or Endangered in California and Elsewhere 2B Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere CRPR Threat Ranks: .1 Seriously threatened in California .2 Moderately threatened in California .3 Not very threatened in California		

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Appendix D CNDDDB Form

Appendix C Project Element Figures



FIGURE 2-2

*Roadway Rehabilitation and
Guard Rail Replacement Locations*

Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5/34.8
 EA 04-0Q130 / Project ID 0418000053



FIGURE 2-3

Closed Caption Television Camera Locations

Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5348
 EA 04-0Q130 / Project ID 041800053



FIGURE 2-4

Fixed Intersection Camera Locations

Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5/34.8
 EA 04-0Q130 / Project ID 0418000053



FIGURE 2-5

Traffic Management System Locations

Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5/34.8
 EA 04-0Q130 / Project ID 0418000053



FIGURE 2-6

Drainage System Improvement Locations

Caltrans District 4
 State Route 1 Multi-Asset Roadway Rehabilitation Project
 San Mateo County, CA
 PM 27.5/34.8
 EA 04-0Q130 / Project ID 0418000053

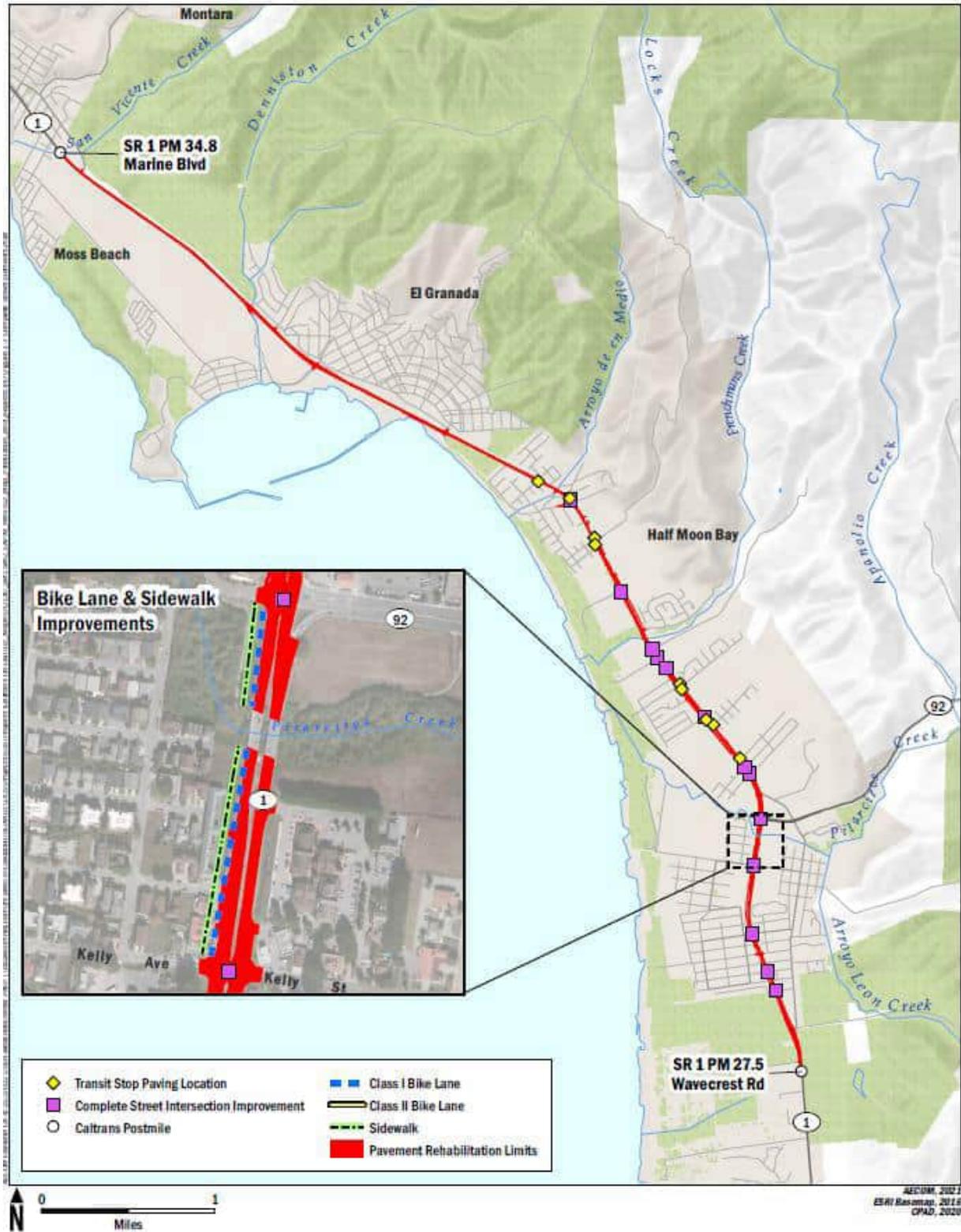


FIGURE 2-7

Bicycle, Pedestrian and Complete Street Improvement Locations

Caltrans District 4
State Route 1 Multi-Asset Roadway Rehabilitation Project
San Mateo County, CA
PM 27.504.8
EA 04-0Q130 / Project ID 041800053