Appendix A. Scoping Summary

Introduction

The Santa Clara Valley Water District (Valley Water) is proposing to implement the Coyote Creek Flood Protection Project (CCFPP or project), which would entail installation of flood risk reduction improvements to reduce flooding in urban areas along approximately 9 miles of Coyote Creek in the City of San José, Santa Clara County, California. The CCFPP would include approximately 18,083 linear feet of floodwalls, passive barriers, berms, and other improvements along four reaches of Coyote Creek (Reaches 4, 6, 7, and 8) between Montague Expressway and Tully Road.

Construction of the CCFPP is anticipated to begin in 2025 and be completed by 2027. In addition to constructing the primary flood risk reduction elements (floodwalls, passive barriers, and berms), the project would demolish structures such as fences and retaining walls within the project footprint; install sheet pile walls; construct appurtenant structures, including flood gates, flood doors, drains, and other features; trim or remove trees; and establish construction access and staging near construction sites. Following construction, routine maintenance activities such as trash and debris removal, vegetation management, graffiti removal, and periodic visual inspection and repair of the completed elements would occur as needed, as well as activities related to Valley Water's Stream Maintenance Program to ensure that the completed project continues to function as designed to protect homes and businesses against a flood event approximately equivalent to the February 2017 flood event or approximately a 20-year flood event. The Coyote Creek reaches included in the CCFPP are under the jurisdiction of Valley Water, and the Valley Water is the Lead Agency for the project under the California Environmental Quality Act (CEQA).

Notice of Preparation

The Notice of Preparation (NOP) was prepared by Valley Water pursuant to the CEQA, to notify interested parties that it will be preparing an Environmental Impact Report (EIR) to evaluate potential environmental impacts of the project.

The NOP (Attachment 1) contains a description of the project, a map of the project location and the area, a description of the relationship between the project and other Valley Water activities, and a summary of the probable environmental effects of the project to be addressed in the EIR. The NOP provided the public and resource agencies with the opportunity to review the project and to provide comments or concerns on the scope and content of the environmental review document, including the range of actions, the alternatives, the mitigation measures, and the significant effects to be analyzed in depth in the EIR.

On November 22, 2023, the NOP was mailed to interested parties, including local, state, and federal agencies, the State Clearinghouse, and news publications. Copies of the NOP were made available for public review at the at the County Clerk's office, Valley Water Headquarters Building located at 5700 Almaden Expressway, San Jose, CA 95118, and on Valley Water's website (https://www.valleywater.org/public-review-documents.)

Scoping Period

The 30-day scoping period for the project, which began with the distribution of the NOP on November 22, 2023, remained open through December 22, 2023. During the scoping period, Valley Water held a public scoping meeting in the Franklin McKinley School District (Boardroom), on December 6th at 6:30 p.m. to 8:00 p.m.

Valley Water mailed an invitation to the scoping meeting to area residents, local, state, and federal agencies, and stakeholders. Additionally, the invitation was also posted on their website (https://www.valleywater.org/project-updates/creek-river-projects/E1-coyote-creek-flood-protection) (Attachment 2).

An ad for the meeting (Attachment 3) was also placed in two newspapers on the following days:

- San Jose Mercury News, November 22, 2023
- Vietnam Daily News, November22, 2023
- El Observador, November 24, 2023
- The Metro, November 29, 2023

At the scoping meeting, Valley Water staff and consultants gave a presentation on the project (Attachment 4), went over the environmental review process, and outlined the proposed schedule for the project. Following the presentation, meeting participants were invited to ask questions and give comments, which were recorded.

Comments

As mentioned above, Valley Water received comments on the project during the December 6th, 2023, scoping meeting. Attendees had questions regarding several issues, including: recreational impacts at local parks, agency review, tree removal, biological resources, the public involvement process, and construction impacts. The full list of comments from the meeting is attached to this memo (Attachment 5).

Valley Water also received four unique comment letters from state and local agencies during the comment period. The four letters are attached to this memo (Attachment 6), but the following table provides a succinct summary of the agency comments and issues.

Agency	Comments
California Department of Fish and Wildlife	• The CEQA Guidelines (§§15124 and 15378) require that the draft EIR incorporate a full project description that contains sufficient information to evaluate and review the project's environmental impact. • The project location covers a geographic area within Santa Clara County, where various special-status species, nesting birds, and rare plants may occur. CDFW recommends mitigation measures to help reduce potential impacts. • The project occurs within Santa Clara County and activities may affect aquatic features and associated riparian habitat or other sensitive natural communities. CDFW recommends potentially feasible mitigation measures to help reduce potential impacts. • The project could result in potential impacts to Crotch's bumble bee. CDFW recommends potentially feasible mitigation measures to help reduce potential impacts. • The project, along with FERC Ordered Compliance Project Coyote Creek Flood Management Measures Project (CCFMMP) and other future larger-scale projects such as further flood protection projects, maintenance projects, other capital projects etc. could further impact a variety of habitat types and species. CDFW recommends that the draft EIR should specify activities to be conducted under the CCFPP and those under the CCFMMP in Reaches 5 to 7, especially with the overlap in activities in reaches 6 and 7. Additionally, appropriate mitigation measures should be implemented.

Agency	Comments
California Department of Transportation	• Impacts to the floodplain must be documented and mitigated. Please provide floodplain analysis report. • Please ensure that any increase in storm water runoff to State Drainage Systems or Facilities be treated, contained on project site, and metered to preconstruction levels. • Potential impacts to the State ROW from project-related temporary access points should be analyzed and significant impacts should be mitigated. • Project work that requires movement of oversized or excessive load vehicles on State roadways requires a transportation permit issued by Caltrans. • Coordination may be required to develop a Transportation Management Plan to reduce construction traffic impacts to the State Transportation Network. • If any Caltrans facilitates are impacted by the project, these facilities must meet American Disabilities Act Standards after project completion. Additionally, the project must maintain bicycle and pedestrian access during construction. • Any work or temporary traffic control that encroaches onto Caltrans ROW required an encroachment permit.
Native American Heritage Commission	• NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the project as early as possible. • NAHC listed the CEQA requirements as required by AB 52, as well as requirements to local governments as part of SB 18. • NAHC recommends contacting the appropriate regional California Historical Research Information System (CHRIS) Center for an archaeological records search. • If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey. • Contact NAHC for a Sacred Lands File search and Native American Tribal Consultation list. • Include mitigation for the identification and evaluation of inadvertently discovered archaeological resources, provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans, and provisions for the treatment and disposition of inadvertently discovered Native American human remains.
California Regional Water Quality Control Board, San Francisco Bay Region	• If the project includes construction or replacement of impervious surfaces, the EIR should include a post-construction stormwater management plan to describe how the project would meet the Municipal Regional Stormwater NPDES Permit (Order No. R2-2022-0018; NPDES Permit No. CAS612008).

The next formal opportunity for public comments will be associated with the release of the Draft Environmental Impact Report, expected to be available for public review by mid-2024.

Contents of this Report

This Scoping Report contains documents pertinent to the scoping process. The following items are included:

Attachment 1: Notice of Preparation

Attachment 2: Invitation to Scoping Meeting

Attachment 3: Newspaper Announcement for the Scoping Meeting

Attachment 4: Scoping Meeting Presentation

Attachment 5: Scoping Meeting Comments

Attachment 6: Copies of all Comments Received by Valley Water

Attachment 1 – Notice of Preparation

NOTICE OF PREPARATION AND SCOPING MEETING

Subject: Notice of Preparation of a Draft Environmental Impact Report
Project Title: Coyote Creek Flood Protection Project
Project Location: San Jose, Santa Clara County, California.
Date: Wednesday, December 6, 2023

The Santa Clara Valley Water District (Valley Water) is the Lead Agency and will prepare an Environmental Impact Report (EIR) for the proposed Coyote Creek Flood Protection Project (CCFPP, project, or proposed project) described below. Responsible and trustee agencies and other interested agencies, organizations, and individuals are invited to provide written comments on the scope and content of the Draft EIR.

The project description, location, and the potential environmental effects are described in this Notice of Preparation. An Initial Study was not prepared.

Due to the time limits mandated by State law, your response must be provided at the earliest possible date but **not later than 30 days after receipt of this notice**. Please include your name and contact information to receive further information on this project or to allow Valley Water to reach you if there are questions on your comments.

A scoping meeting will be held at **6:30 p.m. on Wednesday, December 6, 2023**, at Franklin McKinley School District (Boardroom), 645 Wool Creek Dr., San Jose, and online via Zoom at: https://valleywater.zoom.us/j/86495914100. Meeting ID: 864 9591 4100. Call in: (669) 900-9128. One tap mobile: +16699009128,,86495914100# US (San Jose).

Please send your comments to:

Attention: Andrew Martin, Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 630-2160
Email: CCFPPcomments@valleywater.org
Subject Line: CCFPP Scoping Comments

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Rick L. Callender, Esq.
Chief Executive Officer

11/15/2023
Date

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NOTICE OF PREPARATION AND SCOPING MEETING (cont.)

DRAFT ENVIRONMENTAL IMPACT REPORT COYOTE CREEK FLOOD PROTECTION PROJECT

INTRODUCTION

This notice announces that a draft Environmental Impact Report (EIR) will be prepared for the Coyote Creek Flood Protection Project (CCFPP, project, or proposed project). As the lead agency responsible for compliance with the California Environmental Quality Act (CEQA),[1] the Santa Clara Valley Water District (Valley Water) has determined that the proposed project may have a significant impact on the physical environment and has decided to prepare an EIR to provide an opportunity for public disclosure and public participation in the planning and decision-making process. The EIR will identify and evaluate possible environmental impacts of the proposed project on the environment, identify significant impacts, and identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts. An analysis of alternatives to the proposed project will also be included in the EIR.

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

PROJECT OVERVIEW

Valley Water is proposing the CCFPP, which would entail installation of flood risk reduction improvements to reduce flooding in urban areas along approximately 9 miles of Coyote Creek between Montague Expressway and Tully Road in the City of San Jose (City), Santa Clara County, California (**Figure 1**, see attachments).

Valley Water is preparing an EIR for the CCFPP in compliance with CEQA, as described in this NOP. The EIR will evaluate potential environmental effects of the CCFPP including construction as well as operations and maintenance of the project. The EIR will evaluate the potential direct, indirect, and cumulative impacts of the proposed project; identify mitigation measures that are feasible to lessen or avoid potentially significant impacts; and identify alternatives that may lessen one or more potentially significant impacts of the proposed project. The project background, objectives, location and setting, and project description are provided below.

Background

Coyote Creek originates in Henry Coe State Park and surrounding hills in the Diablo Range Mountains. It flows approximately 62 miles north into the San Francisco Bay through the cities of Morgan Hill, San Jose, and Milpitas, as well as unincorporated areas of Santa Clara County.

In response to flooding events on Coyote Creek, Valley Water developed the Mid-Coyote Creek Project in the early 2000s with the goal of providing 100-year flood protection per Federal Emergency Management Agency standards for homes, schools, businesses, and highways along Coyote Creek from Montague Expressway to Interstate (I)-280.[2] Valley Water completed studies and held public meetings to develop a range of alternatives for the project. However, the project was placed on hold

[1] Public Resources Code Section 21000 et seq. and CCR Title 14 Code of Regulations Section 15000 et seq.
[2] The 100-year flood is the flood event having a 1% chance of being equaled or exceeded in any given year.

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several times due to the uncertainty of the impacts of other Valley Water projects on this project as well as the lack of necessary funding.

Winter storms in 2017 caused significant flooding events and on February 21, 2017, Coyote Creek overtopped its banks at several locations between Montague Expressway and Tully Road resulting in flooding that caused evacuations and property damage. In response to the flooding, the Board accelerated the Mid-Coyote Creek Project, modified project goals, and revised the proposed level of protection from a 100-year flood to the February 2017 flood event, which is approximately equivalent to the 20-year flood event. The Board also extended the project upstream to Tully Road, directing staff to move forward with the planning, design, and construction of the project, which was renamed as the CCFPP.

Subsequently, in February 2020, a portion of the elements of the original CCFPP were accelerated as part of the Federal Energy Regulatory Commission (FERC)-ordered Compliance Project (referred to as FOCP) related to Anderson Dam. These prioritized elements of the original CCFPP, referred to as the Coyote Creek Flood Management Measures Project (CCFMMP), are now a separate and independent project. The CCFMMP consists of seven spans of floodwalls (approximately 8,654 linear feet) that would be constructed along Reaches 5 to 7 of Coyote Creek between Old Oakland Road to I-280. The CCFMMP is statutorily exempt from CEQA pursuant to CEQA Guidelines Section 15269(c) because it is an emergency project being carried out under the FOCP to reduce the risk of flooding associated with earthquake-induced dam failure.[3] As of the date of this NOP, construction has commenced on the CCFMMP and is anticipated to be complete in approximately 1 year.

The remainder of the original CCFPP elements that were not included in the CCFMMP are still known as the CCFPP. The reduced-scope CCFPP project is the focus of this NOP and the forthcoming Draft EIR. Although the CCFMMP and CCFPP are independent, implementation of CCFMMP has been considered in the design of CCFPP, and collectively both projects provide risk reduction from Montague Expressway to Tully Road up to the flood levels that occurred in February 2017, equivalent to approximately a 20-year event (i.e., 5% flood) (**Figure 2)**.

Project Objectives

The primary objective of the project is to reduce the risk of flooding to homes, schools, businesses, and transportation infrastructure along Coyote Creek between Montague Expressway to Tully Road from a flood event equivalent to the February 21, 2017, flood (approximately a 20-year flood event). Additional objectives of the project include minimization of impacts to existing and planned recreation facilities and minimization of future operations and maintenance activities.

Project Location and Setting

The project area is within San Jose, Santa Clara County, California (**Figure 3)** and comprises approximately 9 miles of Coyote Creek, from the downstream face of Montague Expressway bridge to the upstream face of the Tully Road bridge. Coyote Creek is comprised of five reaches between Montague Expressway and Tully Road, with Reach 4 at the northern end of the project area (downstream) and Reach 8 at the southern end (upstream). Proposed project elements would be constructed within four of the five reaches (Reaches 4, 6, 7, and 8) which are defined as follows: Reach 4, Montague Expressway to Old Oakland Road; Reach 6, Mabury Road to East Santa Clara Street; Reach 7, East Santa Clara Street to I-280; and Reach 8, I-280 to Tully Road.[4]

[3] Notice of Exemption filed July 28, 2020 (State Clearinghouse Number 2020070520).
[4] Note that CCFMMP elements will be constructed within Reach 5 (San Jose Municipal Golf Course to Mabury Road), as well as within Reaches 6 and 7.

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Major roads and highways within the project area include U.S. Highway 101, I-280 and I-880. Two main tributaries drain into Coyote Creek within the limits of the project area – Upper Penitencia Creek and Lower Silver Creek. Parks and open spaces adjacent to Coyote Creek within the extent of the project area include Watson Park, Roosevelt Park, William Street Park, Selma Olinder Park, Coyote Meadows, Rocksprings Park, and Kelley Park.

Adjacent land uses within the project area by reach include the following: Reach 4, primarily commercial and industrial; Reach 6, mixed uses including industrial, public critical facility (City of San Jose Mabury Service Yard), open space, schools, and residential; Reach 7, primarily residential with a substantial portion that includes City of San Jose parkland and the Naglee Park historical residential neighborhood; and Reach 8, mixed uses including residential, park, industrial, and public utility.

Project Description

The proposed project entails the construction, operation, and maintenance of flood risk reduction improvements at specific locations where water could overflow from the Coyote Creek channel during the approximately 5% flood (20-year event) between Montague Expressway to Tully Road.

The proposed flood risk reduction improvements are comprised of project elements including, but not limited to, floodwalls, passive barriers, and earthen berms, which are described below. These flood risk reduction improvements are proposed to be installed where flood flows are predicted to overtop Coyote Creek, expanding beyond the creek channel, based on observed flows during the February 2017 flood event and hydrological modeling of channel conditions. The improvements would be generally set back beyond the top of creek bank.

Approximately 18,083 linear feet of improvements are proposed to be constructed along portions of Reaches 4, 6, 7, and 8 at specific project sites as shown in **Figures 4 to 7**. The general locations and features of project elements are shown in **Table 1**. The primary types of project elements are further described below.

- **Floodwalls**: New vertical floodwalls would be installed on parcels adjacent to Coyote Creek to contain and redirect flood flows. Floodwalls would consist of a concrete footing or steel or concrete pile base buried below the ground surface with a vertical concrete or steel wall extending above the ground surface.

- **Passive Barriers**: Passive barriers are automatic flood barrier systems that remain hidden below the ground until flood conditions trigger deployment, creating a barrier wall. Unlike floodwalls, passive barriers allow for access through an area when they are not deployed. Passive barriers would be installed across roadways and within or adjacent to parks.

- **Berms**: Berms are ridges or embankments that contain and redirect flood flows. Berms would be constructed of compacted earthen material and planted with native vegetation.

In addition, the project includes planting native trees and landscaping on parcels within the project area. If adequate land does not exist for such plantings within the project area, then off-site locations may be considered elsewhere in the Coyote Creek watershed.

Valley Water would acquire temporary easements for construction as well as permanent easements and/or fee title for operations and maintenance within limited areas along and surrounding project elements. Construction of the proposed project is anticipated to begin in 2025 and proceed over approximately two years. Construction staging and access as well as haul routes would be located near the project sites. Demolition of structures that are within the project footprint, including fences and

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retaining walls, would be required. Sheet pile cutoff walls would be installed to impede groundwater flows beneath project elements, as needed. Appurtenances including flood gates, flood doors, drains, and other features would be constructed as part of the project elements. Utilities that extend within the project areas, such as water, sewer, electrical, and telecommunications, would be protected in place and avoided where feasible. However, where avoidance is not feasible, utilities would be relocated. Tree trimming or removal could also be required for installation of the project elements and construction access improvements would be installed as needed.

Operations and maintenance activities would entail routine maintenance activities as needed including trash and debris removal, vegetation management (e.g., mowing and vegetation removal on berms), and graffiti removal. For areas of the creek where Valley Water has land rights, routine maintenance activities would occur under the District's Stream Maintenance Program (SMP), an ongoing countywide program that provides maintenance standards and guides maintenance activities for Valley Water to meet designated flood risk reduction mandates throughout Santa Clara County. In addition, the newly installed floodwalls, passive barriers, and berms would be visually inspected on a periodic basis (one to two times per year) and would be repaired as needed.

As part of project construction and operation, Valley Water would implement selected Best Management Practices (BMPs) from its BMP Handbook. BMPs are routine measures Valley Water implements on its projects to reduce environmental impacts.

Table 1: **Proposed Project Elements by Reach**

Type	Location	Approximate Length (linear feet)	Approximate Maximum Height (feet above ground)
Reach 4			
Passive Barrier and Flood Wall	Roadway at west bank of the Charcot Avenue bridge	167	5
Passive Barrier and Flood Wall	Roadway at east bank of the Charcot Avenue bridge	119	6
Floodwall	West bank south of Charcot Avenue bridge and passive barrier	642	3
Floodwall	West bank north of Charcot Avenue bridge and passive barrier	628	5
Floodwall	East bank south of Charcot Avenue bridge and passive barrier	553	5
Floodwall	East bank north of Charcot Avenue bridge and passive barrier	987	5.5
Floodwall	West bank north of East Brokaw Road under Interstate 880	366	3
Reach 6			
Floodwall	East bank adjacent to the City of San Jose Mabury Service Yard	1,206	10
Floodwall	South of U.S. Highway 101 (along upstream face)	407	7
Passive barrier	Watson Park: across Jackson Street	53	8
Vegetated berm	Watson Park: at the park adjacent to Jackson Street	104	8
Floodwall and Passive Barrier	Watson Park: western edge adjacent to residences	1,241	7

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Type	Location	Approximate Length (linear feet)	Approximate Maximum Height (feet above ground)
Floodwall	Watson Park: northern side of Empire Gardens Elementary School	214	5
Floodwall	Western edge of Kellogg Company	967	7
Floodwall	East bank at Parkside Terrace Apartments	723	5
Floodwall	Walls around existing utility box, adjacent to south corner of Watson Park Soccer Field next to bike racks	79	8
Floodwall	South of East Julian Street, between North 20th Street and west bank of Coyote Creek	445	3
Floodwall	North of East Santa Clara Street, between North 18th Street and west bank of Coyote Creek	367	2
Floodwall	Above west bank of Coyote Creek and adjacent to Parkside Terrace Apartments	500	4
Reach 7			
Floodwall	West of properties on Brookwood Avenue	75	2
Passive barrier and Floodwall	William Street Park along East William Street and South 16th Street	1,351	7
Floodwall	West and South of Selma Olinder Elementary School	1,098	6
Floodwall	West of properties on Brookwood Avenue	335	11
Passive barrier	Eastern edge of Selma Olinder Park along Woodborough Drive	1,675	7
Reach 8			
Floodwall	West bank north of Keyes Street	348	6
Floodwall	Edge of Rock Springs Park	1,616	5
Berm and Floodwall	East of Bevin Brook Drive	1,251	3
Floodwall	East bank north of Tully Road	566	8
	Approximate Total Length of Improvements:	**18,083**	**--**

Notes: All references to "bank" refer to the banks of Coyote Creek.
[1] Walls would be designed to the design water surface elevation, and therefore, the wall heights would vary based on the topography.

TOPICS TO BE ANALYZED IN THE EIR

Pursuant to CEQA Guidelines Section 15063(a), Valley Water has determined that an EIR is necessary based on the proposed project's potential to result in significant impacts on the environment and an Initial Study will not be prepared. The EIR will serve to further assess the proposed project's effects on the environment, identify significant impacts, and identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts. An analysis of alternatives to the proposed project will also be included in the EIR.

Consistent with Appendix G of the CEQA Guidelines, resource topics to be analyzed in the EIR include, but are not necessarily limited to, the topics below:

- **Aesthetics**: Temporary changes in scenic vistas and resources from public viewing areas of the

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creek during construction and potential long-term changes from flood risk reduction improvements, potential conflicts with local policies on scenic quality, and potential impacts from nighttime lighting during construction.

- **Air Quality**: Temporary, short-term increases in criteria pollutant emissions associated with construction activities and emissions related to operations and maintenance that could conflict with air quality plans and expose people to pollutants and odors.

- **Biological Resources**: Short-term effects on terrestrial and aquatic habitats, including riparian habitat, and special-status species associated with construction activities, and long-term effects of tree removal and flood risk reduction improvements adjacent to Coyote Creek.

- **Cultural Resources**: Potential disturbance or destruction of known or unknown historic architectural or archaeological resources during construction.

- **Geology, Soils, and Paleontology**: Temporary and short-term increases in erosion during construction, potential disturbance or destruction of known or unknown paleontological resources during construction, and potential long-term impacts on erosion within the creek.

- **Greenhouse Gas Emissions**: Temporary, short-term increases in greenhouse gas emissions associated with construction activities and emissions related to operations and maintenance.
- **Hazards and Hazardous Materials**: Potential introduction of hazardous materials into the environment and exposure of construction workers or the public to hazardous materials during construction and operation and maintenance activities.

- **Hydrology and Water Quality**: Potential short- and long-term transport of sediments and/or pollutants into water courses and potential effects on flood flows and conveyance.

- **Land Use and Planning**: Potential conflicts with land use plans and zoning designations or physically divide an established community.

- **Noise and Vibration**: Temporary and short-term increases during construction or permanent increases during operations in noise and vibration levels.

- **Recreation**: A temporary increase in use of neighboring recreational facilities during construction or permanent loss of recreational facilities that could cause an increase in the use of existing neighborhood parks or recreational facilities, resulting in a substantial physical deterioration of the parks or facilities.

- **Transportation**: Temporary and short-term lane closures and disruption of emergency access by haul truck traffic during construction and short-term and long-term generation of vehicle trips.

- **Tribal Cultural Resources**: Potential disturbance or destruction of known Tribal cultural resources during construction.

- **Utilities and Service Systems**: Temporary and short-term disruption of utilities within construction zones that require utility relocation.

The EIR will also address cumulative impacts, growth-inducing impacts, and other issues required by CEQA. In addition, the EIR will propose feasible mitigation measures to reduce significant impacts and

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examine a reasonable range of alternatives to the proposed project, including the CEQA-mandated No Project Alternative. Responses received to this NOP may modify or add to the preliminary assessment topics to be addressed in the EIR (listed above).

ENVIRONMENTAL REVIEW PROCEDURES

This NOP initiates the CEQA process through which Valley Water will refine the range of issues and project alternatives to be addressed in the draft EIR. Comments are invited on the scope and content of issues to be included in the EIR.

Please submit any comments within 30 days of receipt of this notice to Andrew Martin, Valley Water's environmental planner for the CCFPP, at the Santa Clara Valley Water District (see *Contact Information* below). In conjunction with the 30-day review period for the NOP, Valley Water will hold a scoping meeting to provide an additional opportunity to learn about the project, ask questions, and provide comments about the scope and content of the information to be addressed in the draft EIR. The scoping meeting will be held at 6:30 pm on Wednesday, Dec. 6, at Franklin McKinley School District (Boardroom), 645 Wool Creek Dr., San Jose., and online via Zoom at: https://valleywater.zoom.us/j/86495914100. Meeting ID: 864 9591 4100. Call in: (669) 900-9128. One tap mobile: +16699009128,,86495914100# US (San Jose).

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

Once the Draft EIR is completed, it will be made available for a 45-day public review and comment period. Copies of the Draft EIR will be sent directly to responsible agencies, trustee agencies, and commenters on the NOP and will also be made available to the public at several locations, including Valley Water headquarters and public libraries in the area. The Draft EIR and information about availability of the Draft EIR will also be posted on Valley Water's website: https://www.valleywater.org/project-updates/creek-river-projects/E1-coyote-creek-flood-protection.

CONTACT INFORMATION

For further information, contact the following:

Andrew Martin, Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614
(408) 630-2160
Email: CCFPPcomments@valleywater.org
Subject Line: CCFPP Scoping Comments

Additional information relevant to the project and the draft EIR can also be found at https://www.valleywater.org/project-updates/creek-river-projects/E1-coyote-creek-flood-protection.

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ATTACHMENTS (FIGURES)

Figure 1. Regional Location
Figure 2. Location of CCFPP Reaches Relative to CCFMMP Reaches
Figure 3. Overview of Proposed Project
Figure 4. Proposed Project - Reach 4
Figure 5. Proposed Project - Reach 6
Figure 6. Proposed Project - Reach 7
Figure 7. Proposed Project - Reach 8

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Figure 1. Regional Location

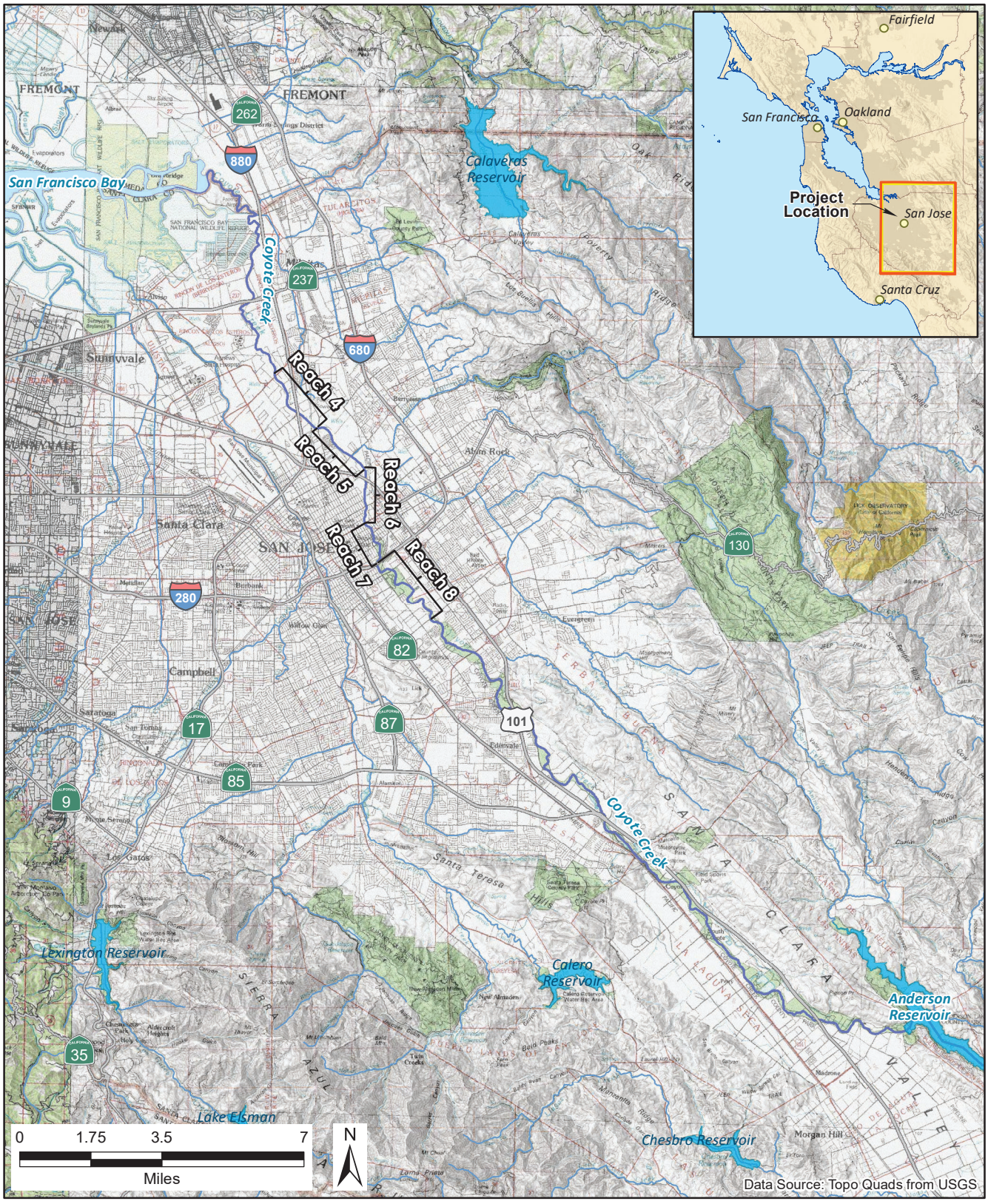


Figure Source: GEI Consultants, Inc. 2023.

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Figure 2. Location of CCFPP Reaches Relative to CCFMMP Reaches



Figure Source: GEI Consultants, Inc. 2023.

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Figure 3. Overview of Proposed Project

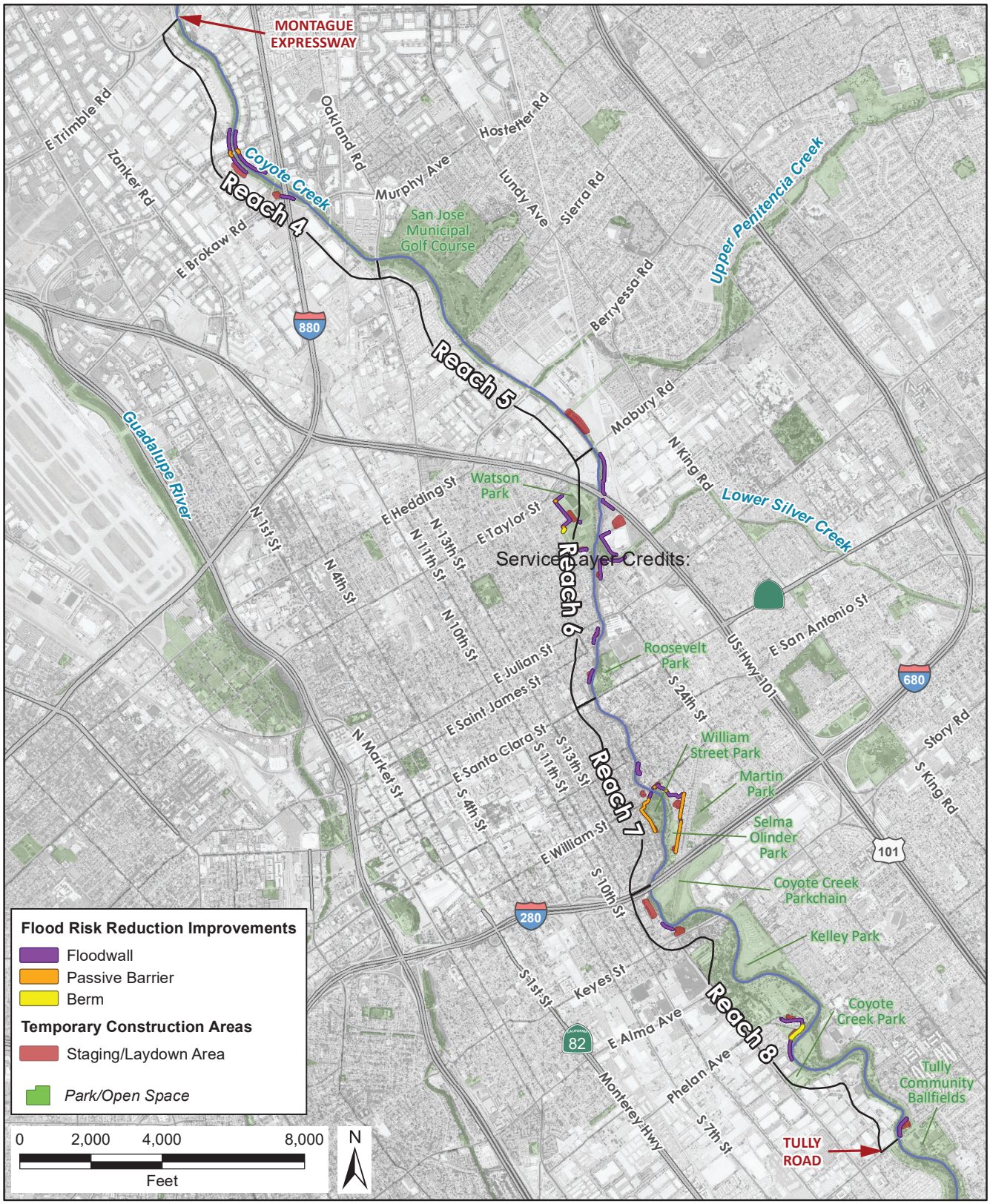


Figure Source: GEI Consultants, Inc. 2023.

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Figure 4. Proposed Project - Reach 4

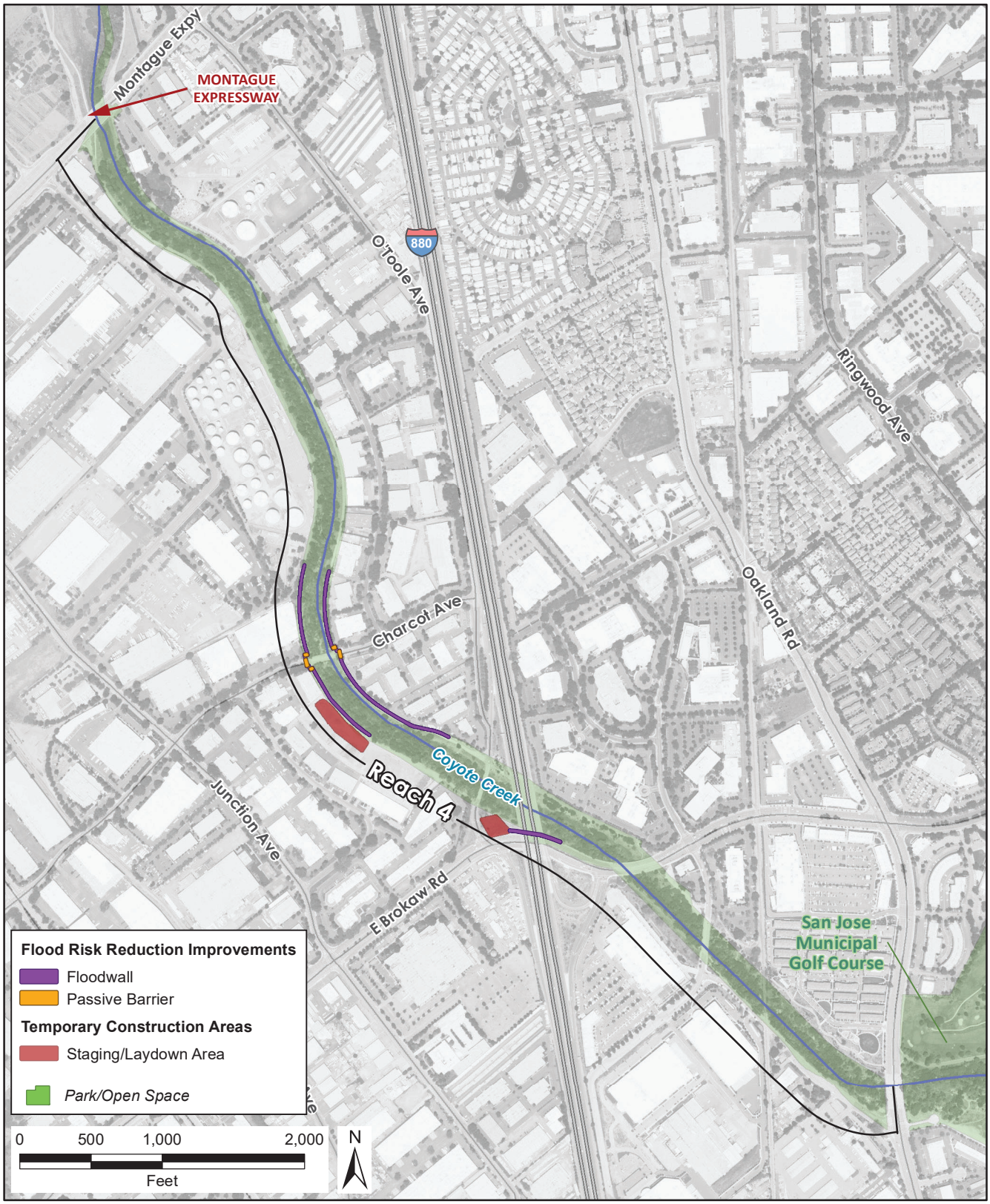


Figure Source: GEI Consultants, Inc. 2023.

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Figure 5. Proposed Project - Reach 6

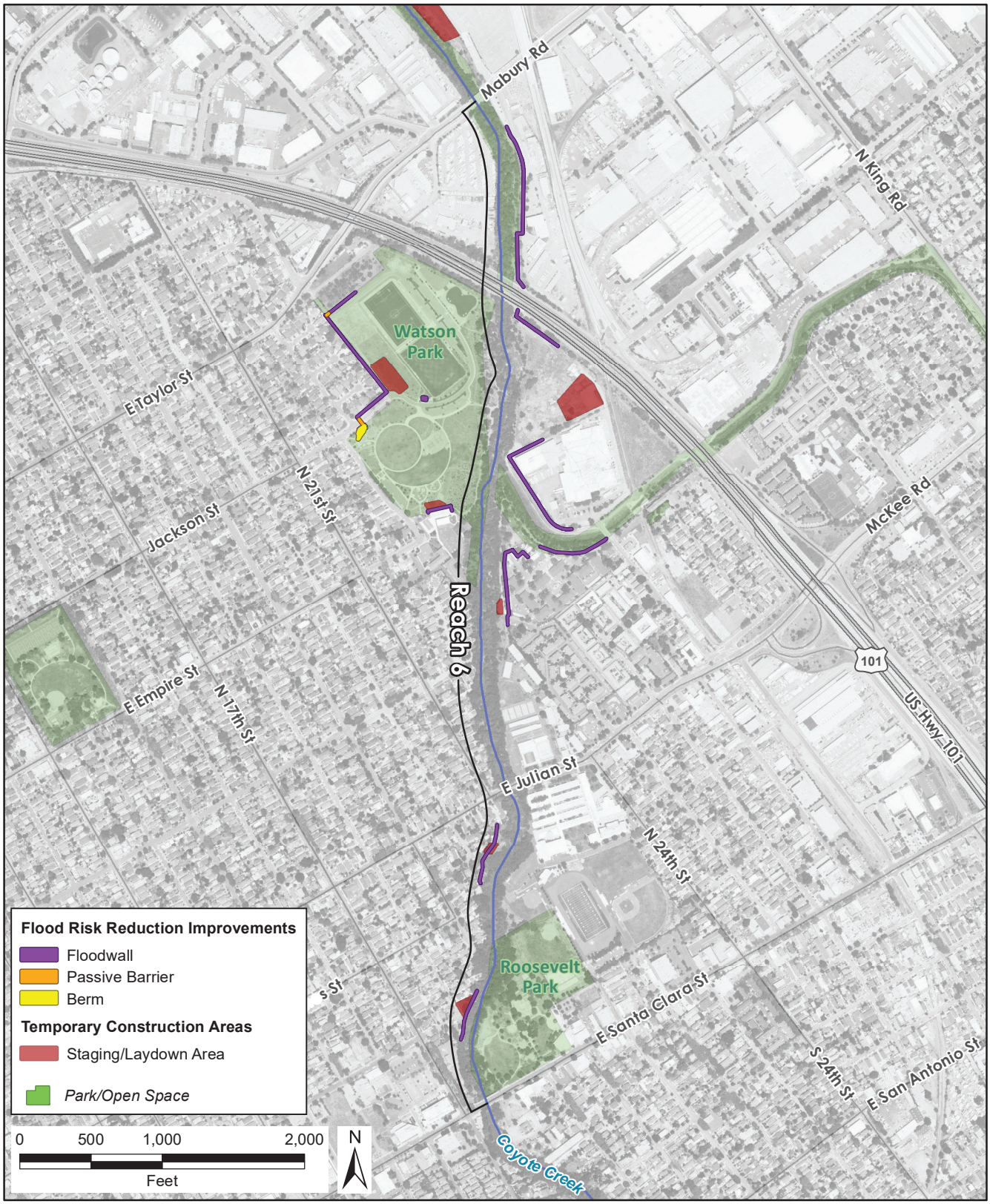


Figure Source: GEI Consultants, Inc. 2023.

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Figure 6. Proposed Project - Reach 7

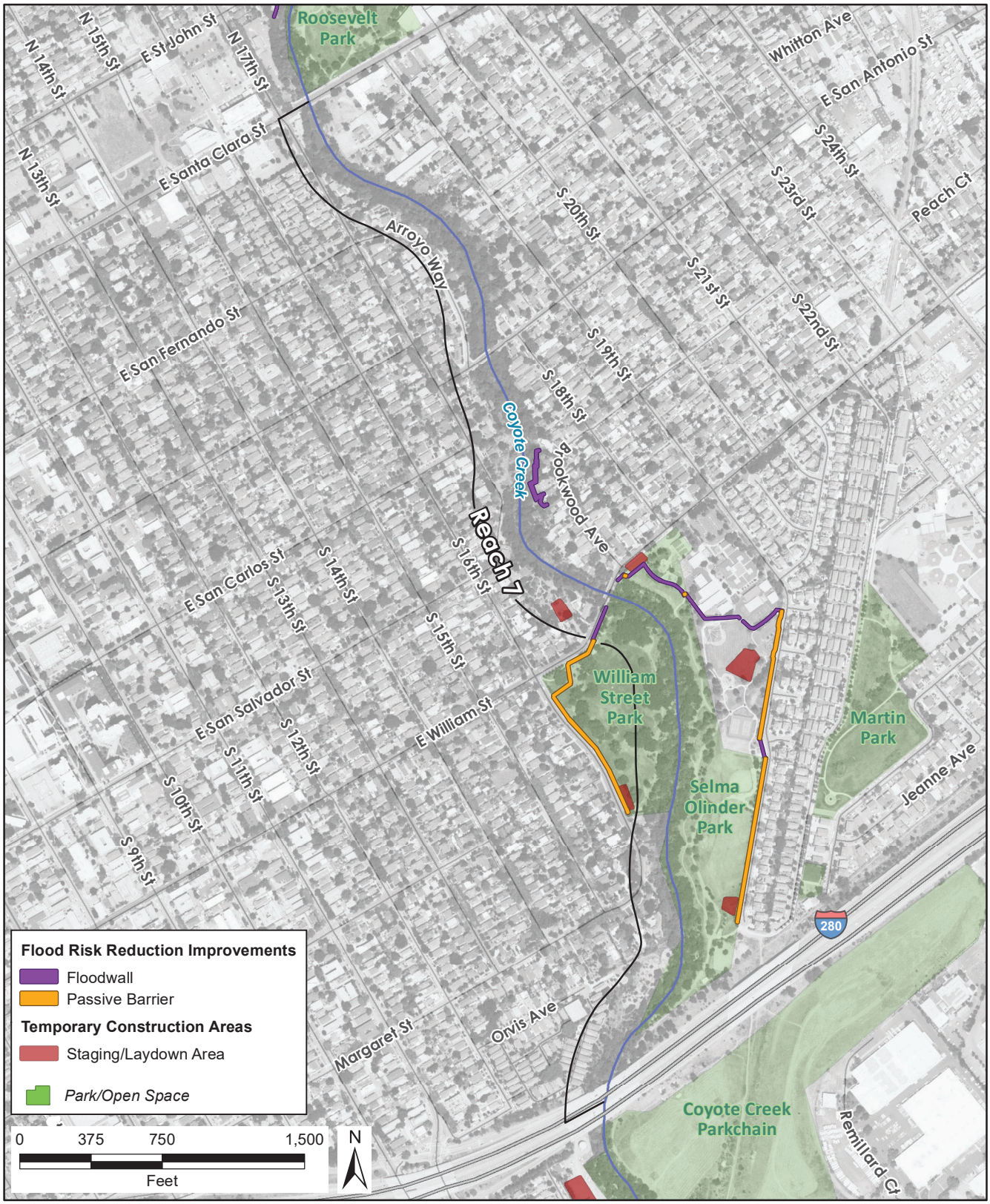


Figure Source: GEI Consultants, Inc. 2023.

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Figure 7. Proposed Project - Reach 8



Figure Source: GEI Consultants, Inc. 2023.

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Attachment 2 – Invitation to Scoping Meeting



Aerial view of Coyote Creek at the base of Selma Olinder Park near Interstate 280.

About Valley Water

Valley Water manages an integrated water resources system that includes the supply of clean, safe water, flood protection and stream stewardship on behalf of Santa Clara County's 2 million residents. As the flood protection authority for Santa Clara County, Valley Water annually prepares creeks for winter rains through levee maintenance, sediment removal, bank repair and vegetation management.

Valley Water has invested more than $1 billion in flood protection efforts to protect nearly 100,000 parcels, with many more projects planned. Under its Stream Maintenance Program, Valley Water also repairs damages to creeks to reduce the risk of flooding and keep our communities safe.

For more information please contact **Jose Villarreal** at **408-630-2879** or ***Jvillarreal@valleywater.org***.

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YOUR TAX DOLLARS AT WORK

Valley Water

Safe, Clean Water and Natural Flood Protection

Santa Clara Valley Water District
5750 Almaden Expressway
San José, CA 95118-3686
valleywater.org

Envíe un correo electrónico a ***Translations@valleywater.org*** si tiene preguntas sobre este documento.
Vui lòng liên hệ với ***Translations@valleywater.org*** nếu bạn có thắc mắc về tài liệu này.
如果您对此文件有任何疑问，请联系 ***Translations@valleywater.org*** 。

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REUNIÓN PÚBLICA

Proyecto de protección contra Inundaciones del Arroyo Coyote: Reunión de Aviso de Preparación y Alcance

PRIORITY E Provide Flood Protection to Homes, Businesses, Schools, Streets, and Highways.
PROJECT E1

¡Está comenzando la revisión ambiental para el Proyecto de Protección contra Inundaciones del Arroyo Coyote!

Lo invitamos a la reunión de Aviso de Preparación (NOP) y Alcance sobre el Informe de Impacto Ambiental (EIR) para el proyecto de protección contra inundaciones del Arroyo Coyote (CCFPP). Los participantes de la reunión se informarán sobre el proyecto, y se les dará la oportunidad de brindar comentarios por escrito o realizar preguntas sobre el alcance y el contenido de la información, que se abordará en el borrador del EIR futuro. Sus comentarios permitirán identificar y evaluar los efectos ambientales potenciales del proyecto, medidas de mitigación posibles y las alternativas que pueden disminuir uno o más impactos potencialmente significativos.

Como agencia líder en la preparación de un EIR según la Ley de Calidad Ambiental de California (California Environmental Quality Act), Valley Water publicó este NOP, que está disponible en línea en (***valleywater.org/public-review-documents***), durante un período de revisión pública de 30 días.

El CCFPP incluye la instalación de mejoras para reducir el riesgo de inundaciones en áreas a lo largo de aproximadamente nueve millas del Arroyo Coyote entre Montague Expressway y Tully Road en San Jose.

Cómo presentar comentarios

Valley Water solicita que todos los comentarios se envíen por escrito hasta el 20 de diciembre de 2023 y se envíen a ***CCFPPcomments@valleywater***.org o a través del correo postal ai:

Andrew Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

Comentarios de alcance del CCFPP

El Aviso de Preparación de un borrador y el subsecuente Informe de Impacto Ambiental está disponible en ***https://delivr.com/2nyrr***.

Valley Water espera su asistencia en persona o de forma remota.

CUÁNDO:
Miércoles 6 de diciembre de 2023
De 6:30 p. m. a 8:00 p. m.

DÓNDE:
Franklin McKinley School District (Boardroom)
645 Wool Creek Dr., San Jose

ZOOM:
https://valleywater.zoom.us/j/86495914100
Llame al: (669) 900-9128
ID del webinario: 864 9591 4100



PUBLIC MEETING

Coyote Creek Flood Protection Project Notice of Preparation and Scoping Meeting

PRIORITY E Provide Flood Protection to Homes, Businesses, Schools, Streets, and Highways.
PROJECT E1

Valley Water

The environmental review for the Coyote Creek Flood Protection Project is starting!

You are invited to the Notice of Preparation (NOP) and Scoping Meeting on the Environmental Impact Report (EIR) for the Coyote Creek Flood Protection Project (CCFPP). Meeting participants will learn about the project and be given the opportunity to provide written comments or ask questions about the scope and content of the information, which will be addressed in the future Draft EIR. Your feedback will help identify and evaluate the project's potential environmental effects, feasible mitigation measures and alternatives that may lessen one or more potentially significant impacts.

As the lead agency for preparing an EIR per the California Environmental Quality Act, Valley Water published this NOP, which is available online (***valleywater.org/public-review-documents***), for a 30-day public review period.

The CCFPP includes installing flood risk reduction improvements in areas along approximately nine miles of Coyote Creek between Montague Expressway and Tully Road in San José.

How to Submit Comments

Valley Water requests that all comments be submitted in writing by **December 22, 2023**, and sent to ***CCFPPcomments@valleywater.org*** or via mail to:

Andrew Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

CCFPP Scoping Comments

The Notice of Preparation of a Draft Subsequent Environmental Impact Report is available at ***https://delivr.com/2nyrr***.

Valley Water hopes you'll join us in person or remotely.

WHEN:
Wednesday, December 6, 2023
6:30 p.m. – 8:00 p.m.

WHERE:
Franklin McKinley School District (Boardroom)
645 Wool Creek Dr., San Jose

ZOOM:
https://valleywater.zoom.us/j/86495914100
Call in: (669) 900-9128
Webinar ID: 864 9591 4100

CUỘC HỌP CÔNG KHAI

Dự Án Phòng Chống Lũ Lụt Lạch Coyote: Cuộc Họp Xác Định Phạm Vi và Thông Báo Về Công Tác Chuẩn Bị

PRIORITY E Provide Flood Protection to Homes, Businesses, Schools, Streets, and Highways.
PROJECT E1

Quá trình đánh giá môi trường cho Dự Án Phòng Chống Lũ Lụt Lạch Coyote đang bắt đầu!

Quý vị được mời tham dự Cuộc Họp Xác Định Phạm Vi và Thông Báo Về Công Tác Chuẩn Bị (NOP) đối với Báo Cáo Tác Động Môi Trường (EIR) cho Dự Án Phòng Chống Lũ Lụt Lạch Coyote (CCFPP). Những người tham gia cuộc họp sẽ tìm hiểu về dự án và có cơ hội đưa ra nhận xét bằng văn bản hoặc đặt câu hỏi về phạm vi và nội dung của thông tin, những vấn đề này sẽ được đề cập trong Dự Thảo EIR trong tương lai. Phản hồi của quý vị sẽ giúp xác định và đánh giá các tác động môi trường tiềm ẩn của dự án, các biện pháp giảm thiểu khả thi và các giải pháp thay thế có thể làm giảm một hoặc nhiều tác động tiềm ẩn đáng kể.

Với tư cách là cơ quan chủ trì chuẩn bị EIR theo Đạo Luật Chất Lượng Môi Trường California, Valley Water đã xuất bản NOP này, có sẵn trực tuyến (***valleywater.org/public-review-documents***), trong khoảng thời gian đánh giá công khai kéo dài 30 ngày.

CCFPP bao gồm việc lắp đặt các biện pháp cải thiện giúp giảm nguy cơ lũ lụt tại các khu vực dọc theo khoảng 9 dặm của Lạch Coyote từ Montague Expressway đến Tully Road ở San José.

Cách Gửi Nhận Xét

Valley Water yêu cầu tất cả các nhận xét phải được gửi bằng văn bản trước ngày 20 tháng 12 năm 2023 và gửi tới ***CCFPPcomments@valleywater.org*** hoặc qua đường bưu điện tới:

Andrew Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

Nhận Xét Về Việc Xác Định Phạm Vi CCFPP

Thông Báo Về Công Tác Chuẩn Bị Bản Thảo Tiếp Theo của Báo Cáo Tác Động Môi Trường có sẵn tại ***https://delivr.com/2nyrr***.

Valley Water hy vọng quý vị sẽ tham gia với chúng tôi trực tiếp hoặc từ xa.

THỜI GIAN:
Thứ Tư, ngày 6 tháng 12 năm 2023
6:30 chiều – 8:00 tối

ĐỊA ĐIỂM:
Franklin McKinley School District (Boardroom)
645 Wool Creek Dr., San Jose

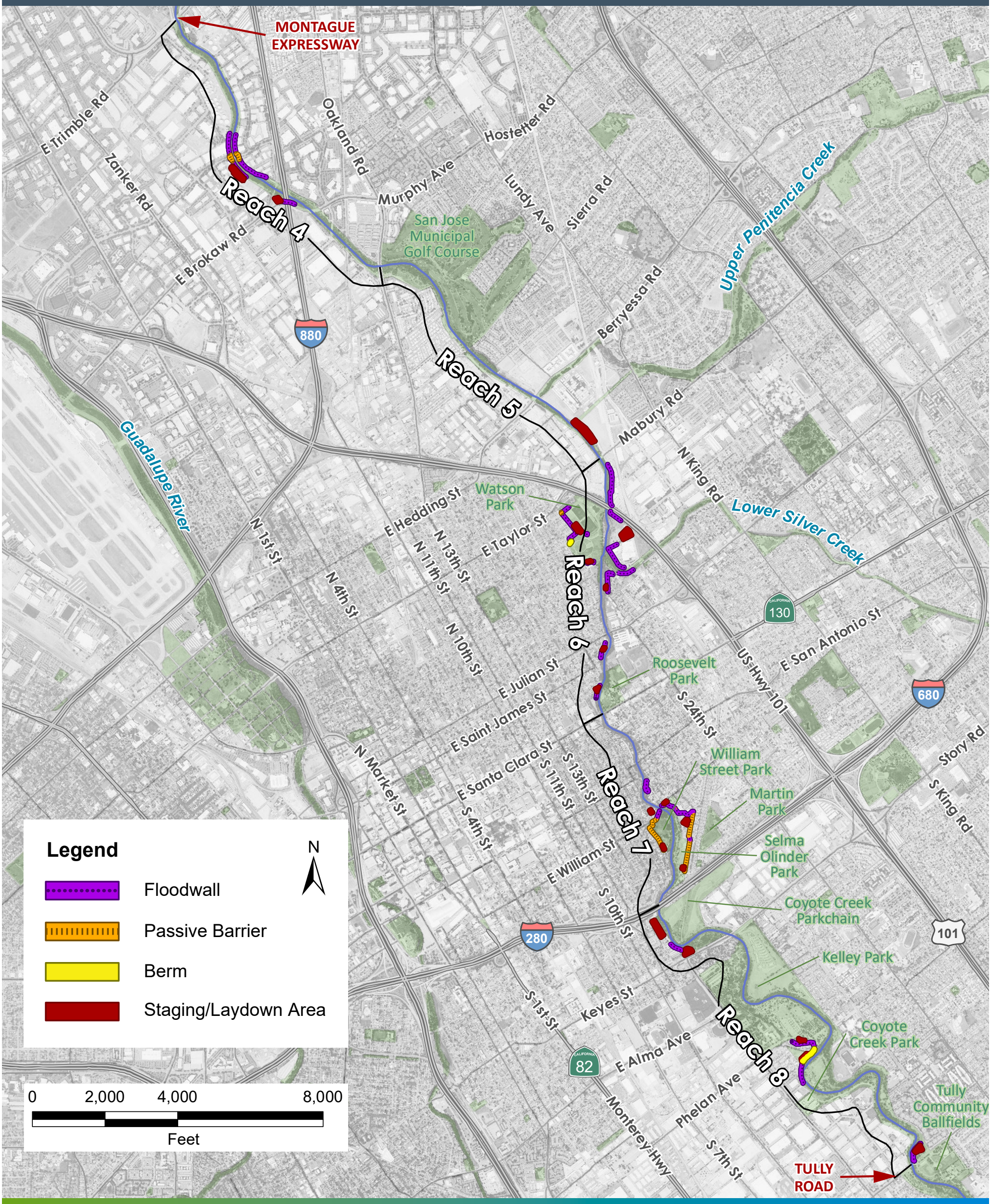
ZOOM:
https://valleywater.zoom.us/j/86495914100
Lệnh gọi: (669) 900-9128
Mã số hội thảo: 864 9591 4100

Proposed Flood Risk Reduction Measures and Locations

Medidas y ubicaciones propuestas para la reducción del riesgo de inundaciones

Các Biện Pháp Giảm Nguy Cơ Lũ Lụt Được Đề Xuất và Địa Điểm

Valley Water



CONTACT US

For more information, please contact Neighborhood Liaison **Jose Villarreal** at **408-630-2879** or by email at ***JVillarreal@valleywater.org***. To learn more about the Coyote Creek Flood Protection Project or to view project materials, please visit the project webpage at ***https://delivr.com/249wu*** or scan the QR code on the right.

Để biết thêm thông tin, vui lòng liên hệ Người Liên Hệ của Khu Dân Cư Jose Villarreal theo số **408-630-2879** hoặc qua email theo địa chỉ ***JVillarreal@valleywater.org***.

Para obtener más información, comuníquese con el enlace del vecindario Jose Villarreal al **408-630-2879** o por correo electrónico a ***JVillarreal@valleywater.org***.

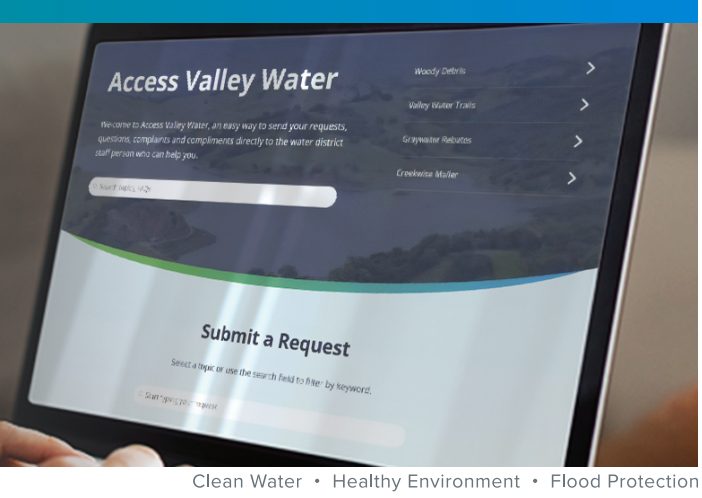
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Attachment 3 –Newspaper Announcement for the Scoping Meeting

Public Notice

Notice of Preparation (NOP) and Environmental Scoping Meeting for Environmental Impact Report (EIR)

Topic: **Coyote Creek Flood Protection Project**

Who: **Valley Water (Santa Clara Valley Water District)**

What: **Notice of Preparation / Environmental Scoping Meeting for Environmental Impact Report**

When: **Wednesday, December 6, 2023 at 6:30 p.m.**

Where: **Franklin McKinley School District (Boardroom), 645 Wool Creek Dr., San Jose, and online via Zoom at *https://valleywater.zoom.us/j/86495914100*. Meeting ID: 864 9591 4100. Call in: 669-900-9128.**

Project Description: Valley Water is proposing to implement the Coyote Creek Flood Protection Project (CCFPP), which would entail installation of flood risk reduction improvements to reduce flooding in urban areas along approximately 9 miles of Coyote Creek in the City of San José, Santa Clara County, California. The CCFPP would include approximately 18,083 linear feet of floodwalls, passive barriers, berms, and other improvements along four reaches of Coyote Creek (Reaches 4, 6, 7, and 8) between Montague Expressway and Tully Road.

Construction of the CCFPP is anticipated to begin in 2025 and be completed by 2027. In addition to constructing the primary flood risk reduction elements (floodwalls, passive barriers, and berms), the project would demolish structures such as fences and retaining walls within the project footprint; install sheet pile walls; construct appurtenant structures, including flood gates, flood doors, drains, and other features; trim or remove trees; and establish construction access and staging near construction sites. Following construction, routine maintenance activities such as trash and debris removal, vegetation management, graffiti removal, and periodic visual inspection and repair of the completed elements would occur as needed, as well as activities related to Valley Water's Stream Maintenance Program to ensure that the completed project continues to function as designed to protect homes and businesses against a flood event approximately equivalent to the February 2017 flood event or approximately a 20-year flood event.

Because the CCFPP may result in significant impacts on the environment, Valley Water, acting as the CEQA lead agency for the project, has determined that an EIR is required to satisfy the requirements of CEQA. The purpose of the EIR process is to provide the public with an opportunity to consider the proposed project. The EIR will identify the project objectives and elements, analyze potential impacts from those elements; and develop potential measures to minimize, avoid, or mitigate significant adverse effects on environmental resources.

Valley Water will prepare a Draft EIR, which will assess the project's potential to cause significant impacts on the environment. Specifically, the Draft EIR will analyze the project's reasonably foreseeable direct, indirect, and cumulative impacts (in combination with other past, present, and planned projects) and will focus on the environmental resources specified in CEQA Guidelines as detailed in the attached NOP, including, but not limited to, the following: Air Quality; Biological Resources; Cultural Resources; Geology, Soils, and Paleontology; Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality; Land Use and Planning; Noise and Vibration; Recreation; Transportation; Tribal Cultural Resources; and Utilities and Service Systems. The Draft EIR will also identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts, where appropriate.

A Notice of Preparation (NOP) has been prepared and will be circulated to local, state, and federal agencies responsible for project approval or permitting for a 30-day review period to define the scope and content of the Draft EIR. The NOP, which is required by the State's CEQA Guidelines (CCR §15082), contains a brief description of the project, including its goals and objectives, potential environmental impacts, and the resulting need for an EIR. It also discusses the process that will be used to determine the scope of analysis in the EIR and provides an overview of the opportunities for public participation in the review of the EIR, along with contact information. Copies of the NOP are available for review from 8 a.m. to 5 p.m. weekdays at Valley Water Headquarters Building, 5700 Almaden Expressway, San Jose, CA 95118, starting November 22, 2023. The NOP can also be viewed online at *https://www.valleywater.org/public-review-documents*.

Valley Water will hold an Environmental Scoping Meeting at 6:30 p.m. on Wednesday, Dec. 6, at Franklin McKinley School District (Boardroom), 645 Wool Creek Dr., San Jose. The meeting will also be broadcast live online via Zoom at *https://valleywater.zoom.us/j/86495914100* (Meeting ID: 864 9591 4100; Call in: 669-900-9128). The meeting will provide an opportunity to learn about the project, ask questions, and give comments about the scope and content of the information to be addressed in the EIR. If you are not able to attend the scoping meeting but would like to provide written comments for consideration in the EIR, please send comments no later than December 22, 2023, to:

- By postal mail: Andrew Martin, Environmental Planner, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, CA 95118
- By email: CCFPPcomments@valleywater.org. Comments provided by email should include the commenter's name and mailing address in the email's body and include "Coyote Creek Flood Protection Project" in the subject line.

For more information, contact Andrew Martin, Environmental Planner at 408-630-2160.

Attachment 4 – Scoping Meeting Presentation

Zoom Webinar Instructions

Join Computer Audio

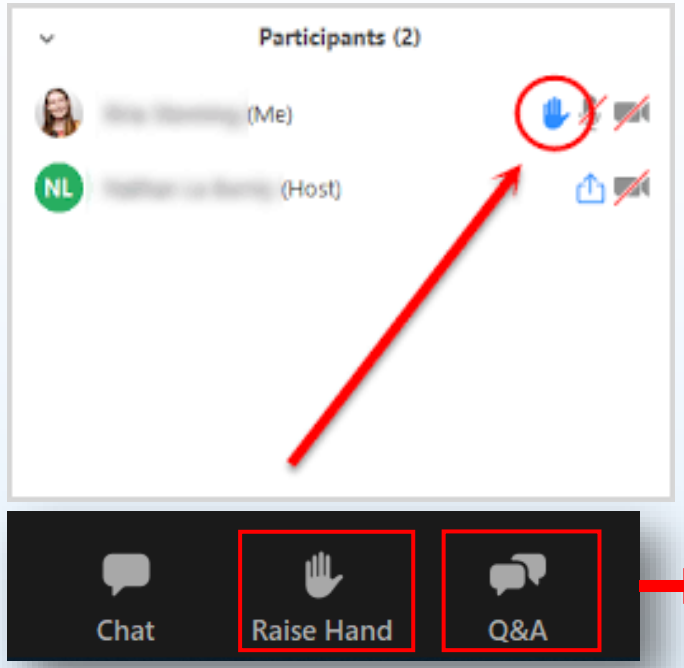


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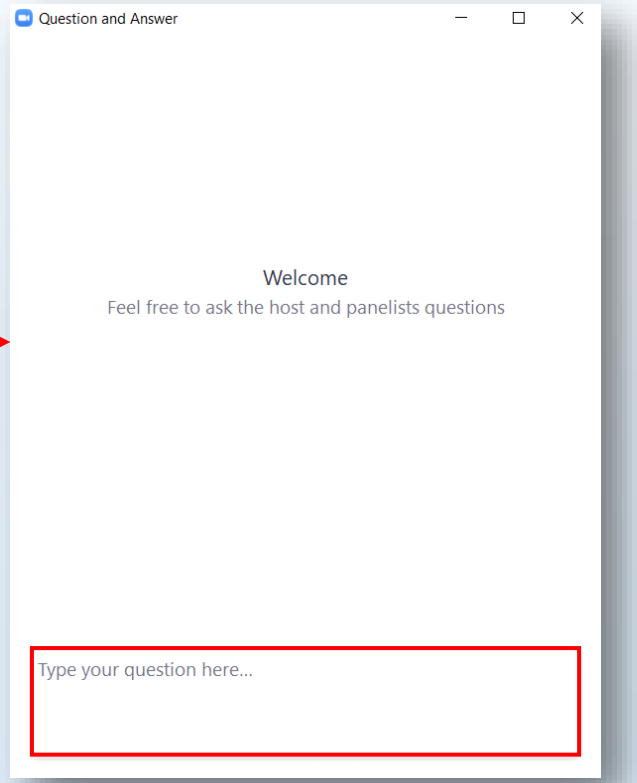
- Check your invite/email for call-in number and meeting ID
- Dial call-in number: **1-669-900-9128**
- Enter webinar ID then #.

Ask a Question

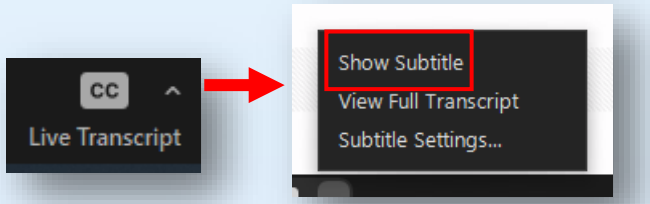
After we enable your mic, you have to unmute yourself before you verbally ask your question.



If only on phone:
*Press *9 to raise your hand if*
*Press *6 to mute/unmute yourself.*



Enable Closed Captions/ Live Transcript





Valley Water

Clean Water • Healthy Environment • Flood Protection



Coyote Creek Flood Protection Project

Public Scoping Meeting – December 6, 2023

Presented by:
Andrew Martin - Environmental Planner
Robert Yamane - Senior Engineer

Valley Water

Presentation Overview

- Meeting Purpose and Objectives
- Project Overview
- Project Location
- Project Elements
- Environmental Impact Report (EIR) and Scoping Process
- EIR Schedule and Next Steps
- How to Submit Comments



Meeting Objectives

- Overview of the Coyote Creek Flood Protection project (CCFPP) and its history
- The California Environmental Quality Act (CEQA) scoping process and the range of environmental issues that will be considered in the EIR
- Receive public comments on the scope of environmental issues that should be addressed in the EIR



Project Overview

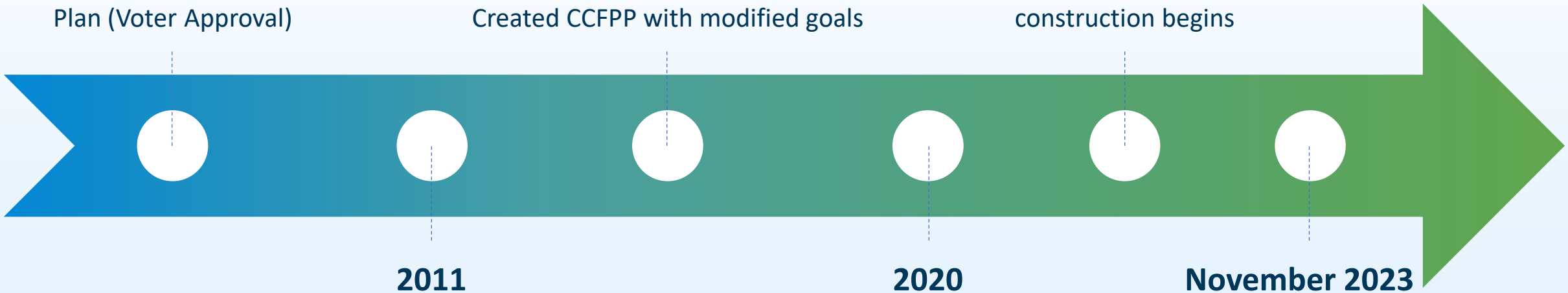
CCFPP Purpose

- Reduce the risk of flooding to homes, schools, businesses, and transportation infrastructure
- Protect from a flood event equivalent to the one that occurred on February 21, 2017
- The project site is located between Montague Expressway to Tully Road in San José



Project Overview

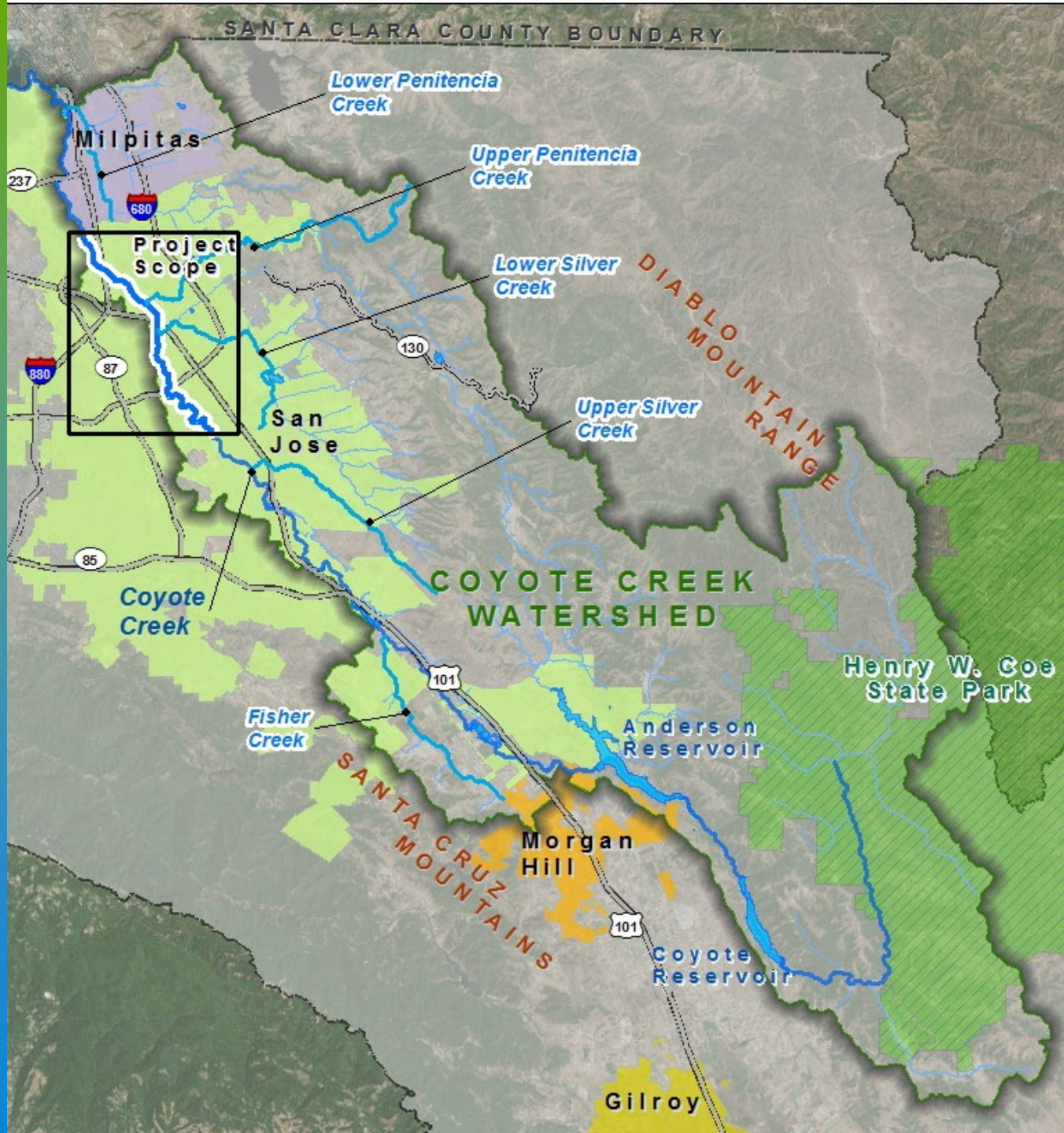
Background



Project Overview

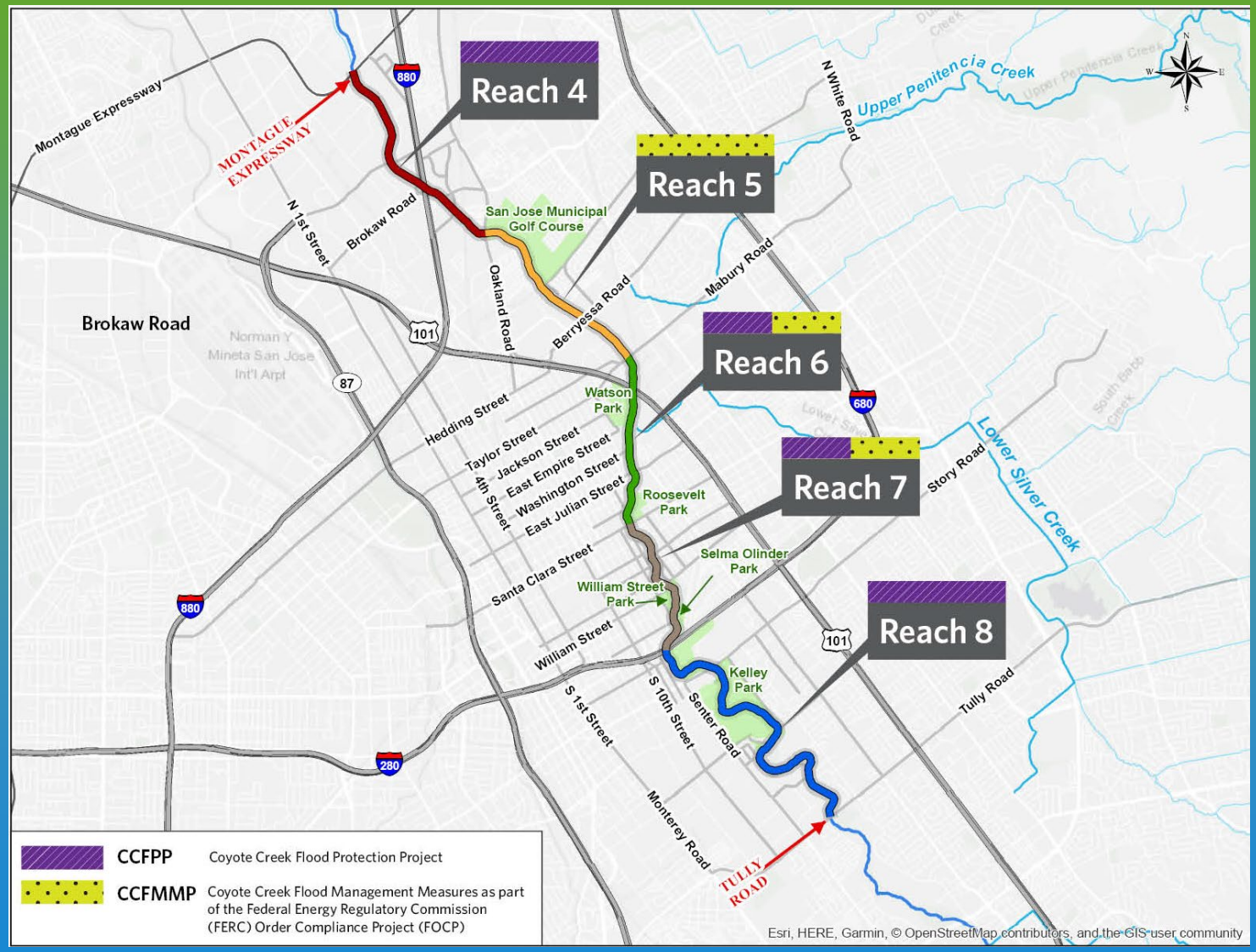
Coyote Creek Reaches 4 – 8

- North End Reach 4:
  Montague Expressway
- South End Reach 8:
  Tully Road



Project Location
CCFPP and CCFMMP

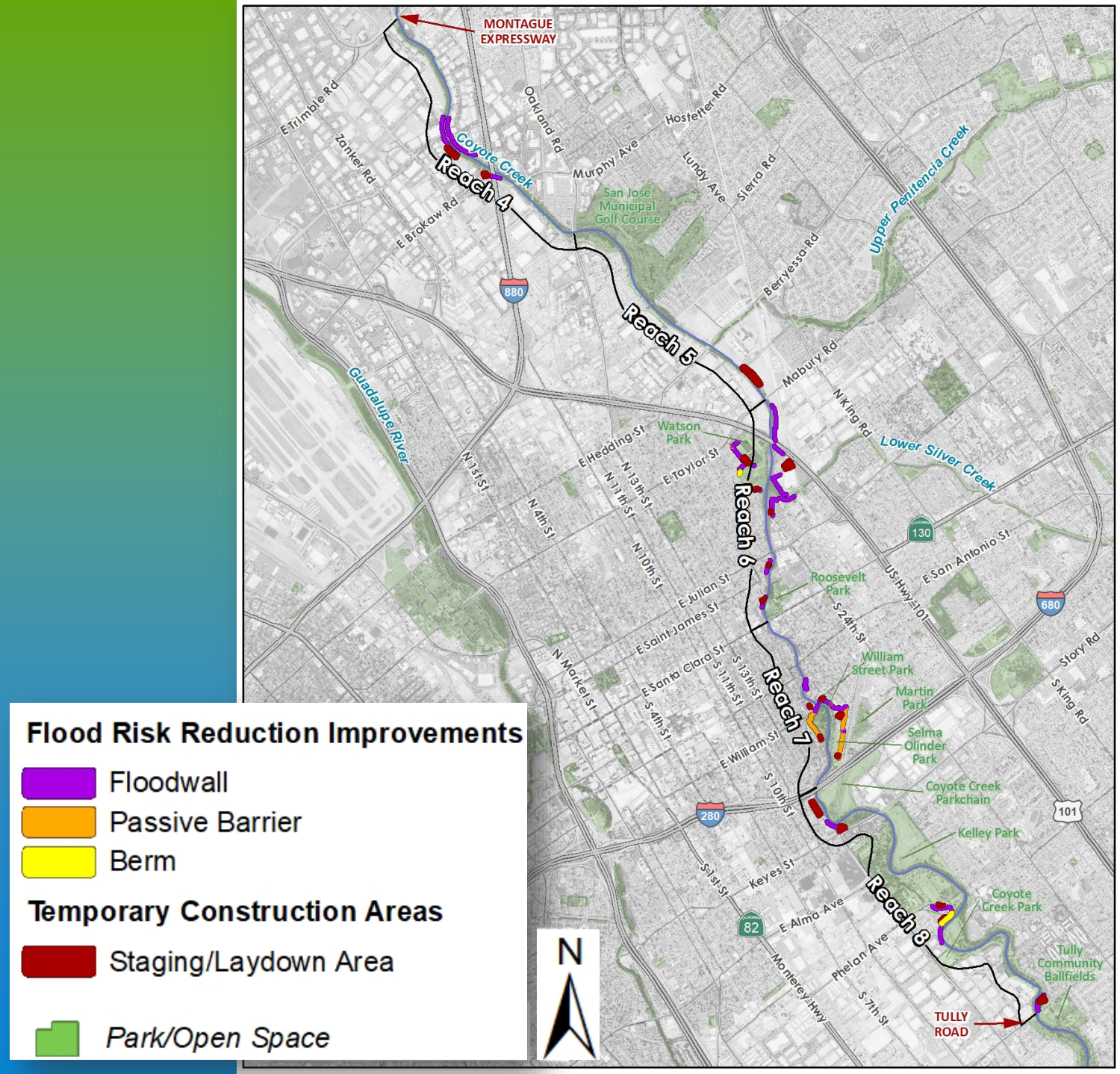
- Coyote Creek Flood Protection Project – Reaches 4, 6, 7, and 8
- Coyote Creek Flood Management Measures Project– Reaches 5, 6, and 7



Proposed Flood Risk Reduction Measures and Locations

Coyote Creek Reaches 4 – 8

- North End Reach 4: Montague Expressway
- South End Reach 8: Tully Road



Project Elements

Flood Risk Reduction Improvements

- Floodwalls
  - Vertical walls that contain and redirect flood flows
  - Sheet pile floodwalls with cut off walls below ground
  - Or reinforced concrete floodwalls
- Passive Barriers
  - Hidden below the ground until flood conditions trigger deployment
- Berms
  - Ridges or embankments that contain and redirect flood flows



Project Elements

Passive Barriers

- Watson Park and other locations
- Automatically rise from the ground during flood events
- Embedded in the ground when not deployed, providing a level surface for other uses (e.g., roadways, sidewalks)
- Heights range from 5 to 8 feet above the ground surface when deployed





Project Elements

Construction and Maintenance

- Construction
  - Constructed over 2 years
  - Prioritize protecting utilities in place
  - Tree removal and trimming required
- Maintenance
  - Conducted under Valley Water's Stream Maintenance Program



EIR and Scoping Process

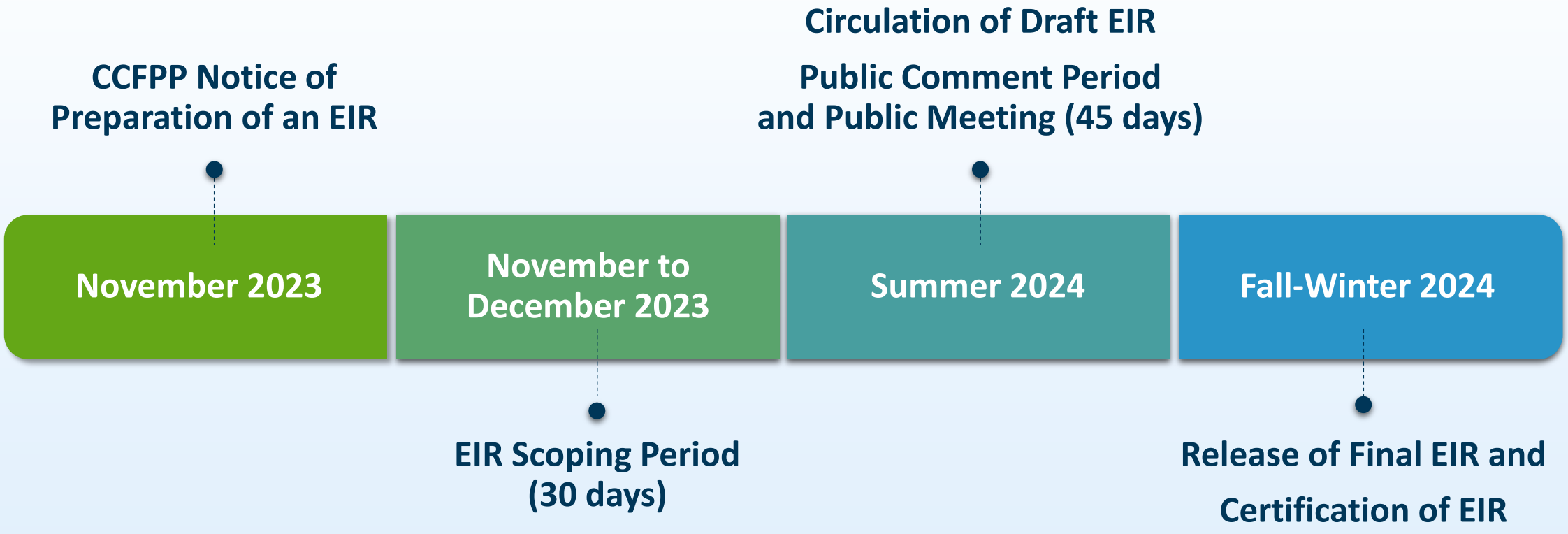
Overview

- CEQA Triggered By Discretionary Action of Lead Agency
- CEQA Purpose
  - Provide information to public and decision makers of potential impacts of a project and how they can be avoided or reduced
- Public Outreach Process
  - Integrate public review into key milestones of the process



EIR and Scoping Process

Overview



EIR and Scoping Process

Purpose

- Obtain input on environmental concerns to ensure the EIR addresses those impacts
  - Public
  - Agencies
  - Interest groups (non-profits, tribes, etc.)
- Identify resource topics and issues that will be analyzed in the EIR



EIR and Scoping Process

Key Topics to be Addressed in EIR

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Soils, and Paleontology
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems

EIR and Scoping Process

Short-Term or Construction-Related Impacts

Key Issues

- Noise
  - Temporary noise generation and vibrations from equipment
- Air Quality and Greenhouse Gases
  - Temporary emissions from equipment and dust from ground disturbance
- Biological Resources
  - Temporary effects on habitats and special-status species from equipment and ground disturbance
- Hazardous Materials
  - Disturbance of hazardous materials during ground-disturbing activities
- Recreation
  - Temporary disruption of access and recreational opportunities
  - Temporary increase in the use of other neighboring recreation facilities

EIR and Scoping Process

Long-Term or Permanent Impacts

Key Issues

- Aesthetics
  - Changes in scenic resources from public viewing areas of Coyote Creek
  - Potential conflicts with local policies on scenic quality
- Biological Resources
  - Tree removal and effects adjacent to Coyote Creek
- Geology, Soils, and Paleontology
  - Changes to erosion/scour within Coyote Creek
- Hydrology and Water quality
  - Transport of sediment and/or pollutants into water courses
  - Effects on flood flows and conveyance

How To Comment

Recommendations for Effective Commenting

- Comment on the scope of the EIR
  - Identify environmental resources of concern
  - Specify potential impacts from the project that you are concerned about
  - Suggest mitigation measures that could reduce potential impacts





How to Comment

By mail:

Andrew Martin, Planner
Valley Water
5750 Almaden Expressway
San José, CA 95118

By email:

CCFPPcomments@valleywater.org
Subject Line: “**CCFPP Scoping Comments**”

Scoping comments are due by December 22, 2023

Updates Available Online

SCAN THE QR CODE:

Or visit this website:
delivr.com/2dvgj

END OF PRESENTATION

Questions & Answers





Valley Water

Clean Water • Healthy Environment • Flood Protection

Attachment 5 – Scoping Meeting Comments

Summary of Coyote Creek Public Scoping Meeting Oral Comments (12/6/2023)

(Jose, VW) - What are some of the regulatory agencies that will review the document and what are their roles with this project?

> Answer: Tree removal and trimming will be required and include coordination with regulatory agencies. Some of the agencies that will be coordinated with include the USACE and CDFW.

(Joan Rivas-Cosby) - Are you able to address which measures will be used in each reach?

> Answer: Elements of flood control, passive barriers, sheet piles, earthen berms. They are highlighted on the map on the project page.

(Sheila McGann-Tiedt) - William Street Park has major events (i.e. Bark in the Park, Fourth of July and Pastries in the Park), how can the City of San Jose coordinate with Valley Water?

> Answer: We will be coordinating closely with the City of San Jose to work around these events.

(Jose, VW) - What project elements will occur around parks?

> Answer: Most elements are passive barriers around the park to keep recreational access open when no flooding is occurring.

(Jose, VW) - If I'm getting ready to submit my comments and I'm not sure, who should I call?

> Answer: Jose (environmental liaison) and Andrew.

(Jose, VW) - How are residents to know what to expect during construction?

> Answer: As part of the construction, we will use Next Door and other public outreach platforms to inform neighbors. Additionally, if construction is intensive, we will go door to door to hand out notices. We will also have public meetings and you are able to contact your public directors as needed. We will also do a pre-construction meeting in neighborhoods right before the start of construction. This information can be found on the project webpage as well.

(Katja Irvin) - What will be done to mitigate tree removals?

> Answer: VW is considering mitigating for the trees with an offsite mitigation approach. We will also get permits from the City of San Jose and follow all of their requirements. The strategy is continuing to be formulated.

(Sheila McGann-Tiedt) - What steps are being taken to avoid disturbing birds during construction primarily in February to Fall?

> Answer: Nesting bird surveys with qualified biologists, if there is a nesting bird onsite then a buffer zone is established unless the fledgling leaves the site.

Attachment 6 – Copies of all Comments Received by Valley Water

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State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
(707) 428-2002
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

January 11, 2024

Andrew Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3686
Ccfppcomments@valleywater.org

Subject: Coyote Creek Flood Protection Project, Notice of Preparation of a Draft Environmental Impact Report, SCH No. 2023110513, Santa Clara County

Dear Andrew Martin:

The California Department of Fish and Wildlife (CDFW) received a Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) from the Santa Clara Valley Water District (Valley Water) for the Coyote Creek Flood Protection Project (Project or CCFPP) pursuant the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.; hereafter CEQA; Cal. Code Regs., § 15000 et seq.; hereafter CEQA Guidelines).

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under Fish and Game Code. In an email from you on November 22, 2023, CDFW received an extension to the deadline to provide comments from December 22, 2023 to January 15, 2024.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all people of the state. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a)). CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802). Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a **Responsible Agency** under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381). CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As

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proposed, for example, the Project may be subject to CDFW's Lake and Streambed Alteration (LSA) regulatory authority. (Fish & G. Code, § 1600 et seq.). Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by state law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

PROJECT DESCRIPTION SUMMARY

Proponent: Valley Water

Objective: The proposed Project entails installation of flood risk reduction improvements along approximately nine miles of Coyote Creek to reduce flooding in urban areas. The primary objective of the proposed Project is to provide 20-year flood protection to homes, schools, businesses, and transportation infrastructure along Coyote Creek. Additional objectives of the Project include minimizing impacts to existing and planned recreation facilities and minimizing the need for future maintenance and operations. Proposed Project elements include, but are not limited to, construction of floodwalls, passive barriers, and earthen berms.

Location: The Project area is within the City of San Jose in Santa Clara County and comprises approximately nine miles of Coyote Creek from downstream of the Montague Expressway bridge to the upstream face of the Tully Road bridge. Coyote Creek is comprised of five reaches between Montague Expressway and Tully Road and proposed Project elements would be constructed within four of the five reaches (Reaches 4, 6, 7 and 8). Approximately 18,083 linear feet of improvements are proposed to be constructed along portions of these reaches at specific Project sites.

Timeframe: The Project intends to begin in 2025 and will take approximately 2 years to complete.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist Valley Water in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct, and indirect impacts on fish and wildlife (biological) resources. Based on the potential for the Project to have a significant impact on biological resources, CDFW concludes that a draft EIR is appropriate for the Project.

I. Project Description

COMMENT #1: The CEQA Guidelines (§§15124 and 15378) require that the draft EIR incorporate a full Project description that contains sufficient information to evaluate and review the Project's environmental impact.

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Issue: Without a clear and concise description of the Project and potential foreseeable phases of the Project, it is challenging for CDFW to provide sufficient review of the NOP, assess all potential impacts of the Project, and provide adequate mitigation measures to offset the impacts. Temporary or permanent impacts from Project staging and construction and maintenance of flood protection infrastructure may cause increased turbidity, increased contaminants, disturbance or mortality of terrestrial and semi-aquatic species, loss of aquatic and terrestrial habitat, and disturbance to nesting birds and roosting bats.

Recommendation 1: The draft EIR should include a detailed description of each type or category of Project activities, including approximate number of projects per year, construction schedule, equipment, crew sizes, and operational features of the Project, including level of anticipated human presence (describe seasonal or daily peaks in activity, if relevant), artificial lighting/light reflection, noise, traffic generation, activities in stream and riparian habitats, and other features, in order for CDFW to evaluate and assess impacts that may occur from Project activities.

Recommendation 2: The Project is currently covered under the Santa Clara Valley Habitat Conservation Plan and Natural Community Conservation Plan (Habitat Plan), implemented by the Santa Clara Valley Habitat Agency. The Habitat Plan is currently undergoing a major amendment, expected to be finalized by 2025, to expand its coverage area as well as add covered wildlife species. As a co-Permittee of the Habitat Plan, Valley Water should discuss any additional wildlife species coverage of the Project under the future Habitat Plan amendment.

II. Environmental Setting

COMMENT #1: The Project location covers a geographic area within Santa Clara County, where various special-status species, nesting birds, and rare plants may occur.

Issue: Special-status species, nesting birds, and rare plants may occur within the Project area and without appropriate mitigation measures, the Project could potentially have a significant impact on these species. Special-status species that may be present within the Project area, include, but is not limited to, those listed below:

- White-tailed kite *(Elanus leucurus*) - State Fully Protected
- Tricolored blackbird (*Agelaius tricolor*) - State Threatened
- Western burrowing owl (*Athene cunicularia*) - State Species of Special Concern
- Northwestern pond turtle (*Actinemys marmorata*) - State Species of Special Concern and Federally Threatened

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- Central California Coast steelhead (*Oncorhynchus mykiss*) - Federally Threatened
- Central Valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*) - State Species of Special Concern
- Pacific lamprey (*Entosphenus tridentatus*) – State Species of Special Concern
- California red-legged frog (*Rana draytonii*) - Federally Threatened and State Species of Special Concern
- California tiger salamander (*Ambystoma californiense*) – State Threatened, Federally Threatened
- Pallid bat (*Antrozous pallidus*) - State Species of Special Concern
- Townsend's big eared bat (*Corynorhinus townsendii*) – State Species of Special Concern
- Yellow rail (*Coturnicops noveboracensis*) - State Species of Special Concern
- American badger (*Taxidea taxus*) – State Species of Special Concern
- California legless lizard (*Aniella* ssp.) – State Species of Special Concern
- San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) – State Species of Special Concern
- Least Bell's vireo (*Vireo bellii pusillus*) – State Endangered, Federally Endangered
- Northern Harrier (*Circus hudsonius*) – State Species of Special Concern
- Foothill yellow-legged frog Central Coast DPS (*Rana boylii*) – State Endangered, Federally Endangered
- Crotch's bumble bee (*Bombus crotchii*) – State Candidate as Endangered
- Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) - California Rare Plant Rank 1B.2
- Robust spineflower (*Chorizanthe robusta* var. *robusta*) – California Rare Plant rank 1B.1, Federally Endangered

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The proposed Project includes activities for flood protection such as installing floodwalls, passive barriers and berms which may cause negative environmental impacts to aquatic, semiaquatic, and terrestrial species, and their habitats. Without appropriate avoidance measures for special-status species, potentially significant impacts associated with Project activities may include reduced reproductive success; reduced health and vigor; nest abandonment; loss of nest trees, and/or loss of foraging habitat that would reduce nesting success (loss or reduced health or vigor of eggs or young); burrow/den collapse; crushing as a result of burrow collapse; inadvertent entrapment or entrainment; impingement; strandings; habitat loss; introduction of non-native species; turbidity; introduction of debris and/or deleterious materials into stream habitats; and direct mortality. Unauthorized take of species listed as threatened, endangered or candidate species for listing pursuant to CESA or the Native Plant Protection Act is a violation of Fish and Game Code.

Recommended Potentially Feasible Mitigation Measures

CDFW recommends that the draft EIR include the following mitigation measures to reduce impacts to less-than-significant levels:

Mitigation Measure #1: Habitat Assessment

A qualified biologist should conduct a habitat assessment in advance of Project implementation, to determine if the Project site or its vicinity contains suitable habitat for special-status species. For species in which habitat corridors are crucial, the habitat assessment should include review of habitat available within the specific Project location and adjacent habitats. If the Project may result in fragmentation of habitat, Project design(s) should be altered to prevent this fragmentation. If fragmentation cannot be avoided, structures should be designed to allow wildlife movement.

Mitigation Measure #2: Special-Status Plant Surveys

The Project area should be surveyed for special-status plant species, including those with a California Rare Plant Rank (http://www.cnps.org/cnps/rareplants/inventory/), by a qualified biologist following protocol-level surveys. Protocol-level surveys, which are intended to maximize detectability, may include identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period. Please refer to CDFW protocols for surveying and evaluating impacts to rare plants, and survey report requirements, available at: https://wildlife.ca.gov/Conservation/Plants.

Mitigation Measure #3: Special-Status Wildlife Species Surveys and Bird Nest Surveys

The Project area should be surveyed for special-status wildlife species by a qualified biologist following protocol-level surveys. Protocol-level surveys are intended to

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maximize detectability. In the absence of protocol-level surveys being performed, focused surveys for special-status wildlife species presence, nests, or indicators of presence (e.g., bat guano and acoustic surveys) should be conducted. Survey and monitoring protocols and guidelines are available at: https://wildlife.ca.gov/Conservation/Survey-Protocols.

If Project activities are to take place during the avian nesting season, CDFW recommends protocol-level surveys following established methodologies (e.g., point counts, area searches, etc.) be conducted within the Project area by a qualified biologist throughout the nesting season. These surveys should cover a sufficient area where suitable nesting habitat is present as well as an appropriate buffer surrounding nesting habitat. Surveys should be conducted prior to the start of any work that could result in loss of habitat or disturbance to nesting birds. As part of protocol-level surveys, pre-construction surveys should include a minimum of two surveys for active nests with the first survey conducted no more than seven days prior to the start of Project activities, and the second survey conducted 48 hours prior to the start of Project activities.

Mitigation Measure #4: Impact Analysis

The draft EIR should include complete descriptions of permanent and temporary impacts to both aquatic and terrestrial species and their habitats associated with staging, construction in and around stream and riparian habitat, ground disturbance, noise, lighting, reflection, air pollution, traffic, and/or human presence. The draft EIR should also include appropriate and effective mitigation measures to completely avoid impacts to special-status species and other native plant and wildlife species and natural communities. If complete avoidance is not feasible, the draft EIR should include minimization measures, and compensatory mitigation to offset all potential impacts.

Mitigation Measure #5: Special-Status Plant Avoidance

Special-status plant species should be avoided through delineation and establishment of a no-disturbance buffer of at least 50 feet from the outer edge of the plant population or specific habitat type required by special-status plant species.

Mitigation Measure #6: Special-Status Wildlife Species and Nesting Bird Avoidance

If special-status wildlife species such as small mammals, amphibians or reptiles are found, work activities should stop, and the individual should be allowed to leave the site through its own volition. If Species of Special Concern wildlife species or active bird nests are found within or adjacent to the Project site, the qualified biologist should establish a no-disturbance buffer appropriate for the species and conduct on-site monitoring during all Project-related activities. For nesting birds, the qualified biologist should increase the buffer if the birds are showing signs of unusual or distressed behavior such as defensive flights/vocalizations, standing up from a brooding position,

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or flying away from the nest. Buffers should be maintained until the eggs have hatched and young have fledged and are completely independent of the nest or roost site.

Mitigation Measure #7: State-listed Species Take Authorization

If state-listed species that are not covered species under the Habitat Plan are identified during surveys and full avoidance of take is not feasible, Valley Water should consult with CDFW and obtain take authorization through issuance of an Incidental Take Permit (ITP).

Mitigation Measure #8: Federally listed Species Consultation

CDFW recommends consulting with the U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) if the Project will impact federally listed species. Consultation with the USFWS and NMFS in order to comply with the federal Endangered Species Act (ESA) is advised well in advance of Project implementation.

COMMENT #2: The Project occurs within Santa Clara County and activities may affect aquatic features and associated riparian habitat or other sensitive natural communities.

Issue: The Project area contains water features subject to CDFW's LSA authority, pursuant to Fish and Game Code § 1600 et seq. Project activities could result in temporary or permanent impacts to these features due to the construction of floodwalls, berms, and barriers. The Project may involve stream and ground-disturbing activities resulting in a substantial change of material from the bed, bank, or channel; and deposition of debris, waste, sediment, or other materials into water features causing water pollution that is deleterious to fish and wildlife. Project activities may also result in impacts to freshwater marsh, wetland, and riparian habitats.

Recommended Potentially Feasible Mitigation Measures

Mitigation Measure #1: Habitat Assessment

A qualified biologist should conduct a habitat assessment in advance of Project implementation, to determine if the Project area or its immediate vicinity supports freshwater marsh, wetland, and/or riparian communities. This survey should include, but not be limited to, sensitive habitats associated with rivers, creeks or streams, ponds and drainages.

Mitigation Measure #2: Notification of Lake and Streambed Alteration

Fish and Game Code §1602 requires an entity to notify CDFW prior to commencing any activity that may (a) substantially divert or obstruct the natural flow of any river, stream, or lake; (b) substantially change or use any material from the bed, bank, or channel of

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any river, stream, or lake: (c) deposit debris, waste or other materials that could pass into any river, stream, or lake. “Any river, stream, or lake” includes those that are ephemeral or intermittent, as well as those that are perennial in nature. CDFW is required to comply with CEQA in the issuance of an LSA Agreement. For additional information, please see https://www.wildlife.ca.gov/Conservation/LSA. For additional information on notification requirements in CDFW’s Region 3 (Santa Clara County), please contact our staff in the LSA Program by electronic mail at R3LSA@wildlife.ca.gov.

COMMENT #3: Potential Impacts to Crotch’s bumble bee

Issue: Project activities, such as vegetation removal or ground-disturbing activities could result in permanent and/or temporary loss of floral resources for Crotch’s bumble bee and other native pollinator species, loss of bumble bee nesting habitat, crushing, or filling of active bumble bee colonies and hibernating cavities, and reduced reproductive success. Bumble bees are critically important because they pollinate a wide range of plants over the lifecycles of their colonies, which typically live longer than most native solitary bee species. Unauthorized take of Crotch’s bumble bee pursuant to CESA is a violation of California Fish and Game Code section 2080 et seq.

Recommendation: Crotch’s bumble bee is being considered as a Covered Species under the Habitat Plan amendment. As a co-permittee of the Habitat Plan, Valley Water could therefore, receive take authorization for Crotch’s bumble bee under CESA for the Project. Given that the amendment is only expected to be finalized by 2025, the draft EIR should clarify if Project activities expected to result in take of Crotch’s bumble bee would be initiated prior to finalization of the Habitat Plan amendment. If Project activities may commence prior to coverage under the Habitat Plan, the draft EIR should include measures to avoid take of Crotch’s bumble bee or specify that Valley Water will obtain an ITP prior to commencement of any Project-related construction activities that cannot avoid take.

Recommended Potentially Feasible Mitigation Measures

CDFW recommends that the draft EIR include the following mitigation measures to reduce impacts to less-than-significant levels:

Mitigation Measure #1: A habitat assessment should be conducted within areas of all Project components by a qualified entomologist knowledgeable with the life history and ecological requirements of Crotch’s bumble bee. The habitat assessment should include all suitable nesting, overwintering, and foraging habitats within the Project area and surrounding areas. Potential nest habitat (February through October) could include that of other *Bombus* species such as bare ground, thatched grasses, abandoned rodent burrows or bird nests, brush piles, rock piles, and fallen logs. Overwintering habitat

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(November through January) could include that of other *Bombus* species such as soft and disturbed soil or under leaf litter or other debris. The habitat assessment should be conducted during the peak bloom period for floral resources on which Crotch's bumble bee feed. Further guidance on habitat surveys can be found within Survey Considerations for California Endangered Species (CESA) Candidate Bumble Bee Species (https://wildlife.ca.gov/Conservation/CESA).

The results of the assessment should be discussed in the draft EIR, and mitigation measures should be developed and included in the draft EIR to avoid or minimize impacts of the proposed Project to the Crotch's bumble bee and/or the species' habitats.

Mitigation Measure #2: Survey Plan Surveys should be conducted by a qualified entomologist familiar with the behavior and life history of Crotch's bumble bee. The survey plan should be submitted to CDFW for review and approval. If CESA candidate bumble bees will be captured or handled, surveyors should obtain any necessary handling permits such as a 2081(a) Memorandum of Understanding from CDFW. Surveys should be conducted during the colony active period or gyne flight season (generally, April 1 to October 31). The survey should occur at least two hours after sunrise (greater than 60°F and less than 90°F with no rain) or two hours before sunset and the survey area should include all suitable habitat within each of the Project component areas and a surrounding 100-foot buffer area. The survey duration should be appropriate to the size of the Project site and buffer area based on the metric of a minimum of one person hour of searching per three acres of suitable habitat; this will be an approximately 0.5-hour survey for an average sized Project site. Bumble bees move nests sites each year, therefore, surveys should be conducted each year that Project work activities will occur. Further guidance on presence surveys can be found within Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species (https://wildlife.ca.gov/Conservation/CESA).

III. Closely Related Past, Present, and Reasonably Foreseeable Probable Future Projects

COMMENT #1: Valley Water is a water district that implements and plans various projects within Santa Clara County.

Issue: The CCFPP is being proposed along Coyote Creek with several locations within Reaches 6 and 7 overlapping with the FERC Ordered Compliance Project Coyote Creek Flood Management Measures Project (CCFMMP) which is currently under construction and is subject to a statutory exemption under CEQA as an emergency (CEQA Guidelines Section 15269(c)). Activities under CCFMMP include installing seven spans of floodwalls in Reaches 5 to 7. Reaches 5 to 7 are directly upstream of Reach 4 and therefore, potential water quality impacts may directly affect water quality in Reach

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4 and further downstream in Coyote Creek. The Project also plans to implement repair and maintenance activities. The Project, along with CCFMMP and other future larger-scale projects such as further flood protection projects, maintenance projects, other capital projects etc. could further impact a variety of habitat types and species. Implementing both small and large-scale construction, repair and maintenance projects will or may result in impacts such as noise, groundwork, sediment, and deleterious material entering the stream, erosion, and other loss or modification of habitat that could significantly impact native species and their habitats.

Recommendation 1: Although considered independent projects, the draft EIR should specify activities to be conducted under the CCFPP and those under the CCFMMP in Reaches 5 to 7, especially with the overlap in activities in Reaches 6 and 7. The draft EIR should clearly describe the timing of construction activities in Reaches 5 to 7 to determine any temporal overlap between the two projects. The draft EIR should determine the significance of each cumulative impact and assess the significance of the Project's contribution to the impact (CEQA Guidelines § 15355). Although a project's impacts may be less-than-significant individually, its contributions to a cumulative impact may be considerable; a contribution to a significant cumulative impact, e.g., reduction of habitat for a special-status species should be considered cumulatively considerable. The draft EIR should also identify reasonably foreseeable future projects within the Project area and disclose any cumulative impacts associated with these projects.

Recommendation 2: The draft EIR should include appropriate mitigation measures to be implemented for Project activities, as well as specify mitigation for cumulative impacts from the CCFMMP and future maintenance activities. Because some reaches overlap, the Project should clearly differentiate between proposed compensatory mitigation for impacts of the Project and compensatory mitigation planned for the CCFMMP.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. [Pub. Resources Code, § 21003, subd. (e)]. Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNDDB field survey form can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Submitting-Data. The types of information reported to CNDDB can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

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ENVIRONMENTAL DOCUMENT FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of environmental document filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the environmental document filing fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089).

CONCLUSION

CDFW appreciates the opportunity to comment on the NOP to assist Valley Water in identifying and mitigating Project impacts on biological resources.

Questions regarding this letter or further coordination should be directed Alexandra Anstett, Environmental Scientist, at (707) 815-6427 or at Alexandra.Anstett@wildlife.ca.gov; or Brenda Blinn, Senior Environmental Scientist (Supervisory), at (707) 339-0334 or at Brenda.Blinn@widlife.ca.gov.

Sincerely,

DocuSigned by:
Erin Chappell
B77E9A6211EF486...

Erin Chappell
Regional Manager
Bay Delta Region

REFERENCE

California Department of Fish and Wildlife. 2018. Elk Conservation and Management Plan. California Department of Fish and Wildlife. December 2018.

ec: Office of Planning and Research, State Clearinghouse (SCH No. 2023110513)

California Department of Fish and Wildlife
Craig Weightman - Craig.Weightman@wildlife.ca.gov
Mayra Molina - Mayra.Molina@wildlife.ca.gov

San Francisco Regional Water Quality Control Board
Susan Glendening - Susan.Glendening@waterboards.ca.gov

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Santa Clara Valley Habitat Agency
Edmund Sullivan - Edmund.Sullivan@scv-habitatagency.org

California Department of Transportation

DISTRICT 4
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December 20, 2023

SCH #: 2023110513
GTS #: 04-SCL-2023-01244
GTS ID: 31411
Co/Rt/Pm: SC/VAR/VAR

Andrew Martin, Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

Re: Coyote Creek Flood Protection Project – Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR)

Dear Andrew Martin:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the Coyote Creek Flood Protection Project. We are committed to ensuring that impacts to the State's multimodal transportation system and to our natural environment are identified and mitigated to support a safe, sustainable, integrated and efficient transportation system.

The Local Development Review (LDR) Program reviews land use projects and plans to ensure consistency with our mission and state planning priorities. The following comments are based on our review of the November 2023 Draft NOP.

Project Understanding
The proposed project will demolish structures such as fences and retaining walls within the project footprint and construct approximately 18,083 linear feet of floodwalls, passive barriers, berms, and other improvements along Coyote Creek between Montague Expressway and Tully Road. The project notes several areas that intersect with Caltrans Right of Way (ROW).

Hydrology
Any floodplain impacts must be documented and mitigated, please provide floodplain analysis report. Any additional floodplain impacts on existing adjacent properties must be explained. Please ensure that any increase in storm water runoff to State Drainage Systems or Facilities be treated, contained on project site, and metered to preconstruction levels.

Construction-Related Impacts
Potential impacts to the State ROW from project-related temporary access points should be analyzed. Mitigation for significant impacts due to construction and noise should be identified. Project work that requires movement of oversized or excessive load vehicles on State roadways requires a transportation permit that is issued by Caltrans. To apply, please visit Caltrans Transportation Permits *(link)*.

Prior to construction, coordination may be required with Caltrans to develop a Transportation Management Plan (TMP) to reduce construction traffic impacts to the State Transportation Network (STN).

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

Equitable Access
If any Caltrans facilities are impacted by the project, those facilities must meet American Disabilities Act (ADA) Standards after project completion. As well, the project must maintain bicycle and pedestrian access during construction. These access considerations support Caltrans' equity mission to provide a safe, sustainable, and equitable transportation network for all users.

Encroachment Permit
Please be advised that any permanent work or temporary traffic control that encroaches onto Caltrans' ROW requires a Caltrans-issued encroachment permit. The checklist TR-0416 *(link)* is used to determine the appropriate Caltrans review process for encroachment projects. To obtain more information and download the permit application, please visit Caltrans Encroachment Permits *(link)*.

As part of the encroachment permit submittal process, you may be asked by the Office of Encroachment Permits to submit a completed encroachment permit application package, digital set of plans clearly delineating Caltrans' ROW, digital copy of signed, dated and stamped (include stamp expiration date) traffic control plans, this comment letter, your response to the comment letter, and where applicable, the following items: new or amended Maintenance Agreement (MA), approved Design Standard Decision Document (DSDD), approved encroachment exception request, and/or airspace lease agreement. Your application package may be emailed to D4Permits@dot.ca.gov.

Thank you again for including Caltrans in the environmental review process. Should you have any questions regarding this letter, please contact Marley Mathews, Transportation Planner, via LDR-D4@dot.ca.gov. For future early coordination opportunities or project referrals, please contact LDR-D4@dot.ca.gov.

Sincerely,

YUNSHENG LUO
Branch Chief, Local Development Review
Office of Regional and Community Planning

c: State Clearinghouse

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nahc@nahc.ca.gov
NAHC.ca.gov

November 21, 2023

Andrew Martin
Santa Clara Valley Water District (Valley Water)
5750 Almaden Expressway
San Jose, CA 95118

Re: 2023110513, Coyote Creek Flood Protection Project, Santa Clara County

Dear Mr. Martin:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

a. A brief description of the project.

b. The lead agency contact information.

c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).

d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

a. Alternatives to the project.

b. Recommended mitigation measures.

c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

a. Type of environmental review necessary.

b. Significance of the tribal cultural resources.

c. Significance of the project's impacts on tribal cultural resources.

d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

a. Whether the proposed project has a significant impact on an identified tribal cultural resource.

b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (https://ohp.parks.ca.gov/?page_id=30331) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
    b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Cody.Campagne@nahc.ca.gov.

Sincerely,

Cody Campagne

Cody Campagne
Cultural Resources Analyst

cc: State Clearinghouse

Andrew Martin

From: Glendening, Susan@Waterboards <susan.glendening@waterboards.ca.gov>
Sent: Thursday, December 21, 2023 1:49 PM
To: CCFPPcomments
Cc: OPR State Clearinghouse; Elizabeth.Morrison; Andrew Martin
Subject: San Francisco Bay Water Board comments on Coyote Creek Flood Protection Project (SCH No. 2023110513)

***** This email originated from outside of Valley Water. Do not click links or open attachments unless you recognize the sender and know the content is safe. *****

Dear Mr. Martin:

Thank you for the opportunity to comment on the environmental impact report (EIR) notice of preparation for the Coyote Creek Flood Protection Project (CCFPP) (State Clearinghouse No. 2023110513) that Valley Water is preparing pursuant to California Environmental Quality Act.

Please note that if the project includes construction or replacement of impervious surfaces (including gravel roads), the EIR should include a post-construction stormwater management plan to describe how the project would meet the Municipal Regional Stormwater NPDES Permit ("Municipal Regional Permit" or MRP) (Order No. R2-2022-0018; NPDES Permit No. CAS612008), Provision C.3 requirements, and should address the following issues (at a minimum).

- The post-construction stormwater management plan should show the stormwater runoff sources, pathways, and amounts, and should include nature-based stormwater capture and detention, retention, and/or treatment units that are appropriately designed and sized for flow-based, volume-based, or a combination of flow- and volume-based units pursuant to MRP Provision C.3. Please include maps, diagrams, worksheets to show calculations, and narrative text to describe the plan.

- The post-construction stormwater management plan should be developed to address stormwater runoff of the impervious surfaces in both this project (the CCFPP) and the Coyote Creek Flood Management Measures Project (CCFMMP) currently under construction for the Federal Energy Regulatory Commission Order Compliance Project (which is a prerequisite project for construction of the Anderson Dam seismic retrofit project). This combined plan is necessary for Valley Water to meet the State Water Resources Control Board (State Board) Deputy Director's conditional approval of the CCFMMP (Letter dated November 10, 2022). The conditional approval allowed Valley Water to proceed with CCFMMP construction and to consolidate post-construction stormwater management requirements for the CCFMMP with those of the CCFPP. The following excerpt from State Board's approval letter shows the State Board's requirement (in this excerpt, "Flood Management Plan" refers to the CCFMMP, and "Flood Protection Plan" refers to the CCFPP):

    - "Within three years of completing construction of the impervious surfaces required by the Flood Management Plan, Valley Water shall, as part of Flood Protection Project, construct stormwater capture and treatment units to mitigate the impacts of the impervious surfaces installed as part of the Flood Management Plan. The Executive Officer of the San Francisco Regional Water Board may extend this timeline upon receipt of sufficient information supporting such a request."

- We recommend Valley Water develop a post-construction stormwater management plan early in the design phase of CCFPP to meet the MRP criteria for both the CCFPP and the CFMMP. To that end, we encourage Valley Water to work with partners with the City of San José and private landowners, as well as the owners of schools and parks, to evaluate whether there are opportunities for stormwater units to be constructed in areas up-gradient to the project study area boundaries if other landowners have shared goals such as: meeting MRP C.3

requirements; learning opportunities; and stormwater reuse for park enhancements. Such multi-partner approaches that may have multiple benefits could align with Valley Water's One Water goals.

We look forward to working with you on this project.
Please reach out to me if you have any questions about our comments or other issues for the project.

Regards,
Susan

Susan Glendening
Environmental Scientist / she, her
SF Bay Water Board & SF Estuary Partnership
Mail: 1515 Clay Street, Ste. 1400, Oakland, CA 94612
Email: susan.glendening@waterboards.ca.gov
Phone: (510) 622-2462

From: Valley Water <neighborhoodrelations+valleywater.org@ccsend.com>
Sent: Monday, November 27, 2023 3:01 PM
To: Glendening, Susan@Waterboards <susan.glendening@waterboards.ca.gov>
Subject: Reminder: Coyote Creek Flood Protection Project Public Meeting

EXTERNAL:

Notice of Preparation and Scoping Meeting on the Environmental Impact Report for the Coyote Creek Flood Protection Project

Dear Neighbor,

Valley Water is making good progress on the Coyote Creek Flood Protection Project. The next step is to get your comments during the 30-day environmental review phase, so we would like to invite you to the Notice of Preparation (NOP) and Scoping Meeting on the Environmental Impact Report (EIR) for the Coyote Creek Flood Protection Project (CCFPP). The CCFPP includes installing flood risk reduction improvements along approximately nine miles of Coyote Creek between Montague Expressway and Tully Road in San José.

This EIR will include the remaining sections of the creek not currently in construction. Meeting participants will learn about the project, environmental review process, and be given the opportunity to provide written comments or ask questions about the scope and content of the information, which will be addressed in the Draft EIR.

The meeting is taking place on December 6, 2023, at 6:30 to 8:00 p.m. at:
Franklin McKinley School District (boardroom)
546 Wool Creek Drive
San Jose, CA 95112
You can also participate via Zoom: https://valleywater.zoom.us/j/86495914100
Call in: (669) 900-9128
Webinar ID: 864 9591 4100

Your feedback will help identify and evaluate the project's potential environmental effects, feasible mitigation measures, and alternatives that may lessen one or more potentially significant impacts.

Valley Water published the NOP online (*https://delivr.com/2nyrr*) for a 30-day public review period. Comments must be submitted in writing by December 22, 2023, via email to CCFPPcomments@valleywater.org or via mail to:

Andrew Martin
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

Please see the below map (click to enlarge) for details on the flood risk reduction measures. To learn more about the Coyote Creek Flood Protection Project, please visit www.valleywater.org/coyote-creek.
We look forward to your participation.
Valley Water

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

Unsubscribe susan.glendening@waterboards.ca.gov

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Appendix B. Valley Water Best Management Practices

Appendix B1 – Best Management Practices Handbook

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BEST MANAGEMENT PRACTICES HANDBOOK

SANTA CLARA VALLEY WATER DISTRICT COMPREHENSIVE LIST

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Table 2 - Santa Clara Valley Water District BMP Suite List 7

Purpose

The Best Management Practices Handbook (Handbook) provides a list of Santa Clara Valley Water District (District) Best Management Practices (BMPs), intended to be incorporated into projects or activities. It aids in accomplishment of the stewardship component of the District Ends Policies by incorporating the basic principle of avoiding or minimizing the potential to impact the environment negatively in projects and activities.

Process

The Handbook is a controlled ISO document. It is a technical guidance document (W751M01) under ISO 14001 Environmental Management System Environmental Planning Q520D01 designed to ensure that the District meets its responsibilities under the California Environmental Quality Act (CEQA).[1] Work Instruction *W520M03 Section 3 – Mitigation, Monitoring and Reporting Programs* describes the standard policies for environmental review process used to apply these BMPs to projects and activities, consistent with CEQA Guidelines §15097(e).

The handbook is an electronic repository of information that allows staff to access and incorporate standardized BMPs, as/if appropriate, into CEQA documents efficiently, BMPs are incorporated into project design or activity implementation during an analytical process to identify and avoid or minimize project impacts for a particular project. They can be included as a component of the project description for projects at all levels of review, including categorical and/or statutory exemptions. The BMPs are selected by an Environmental Planner, with assistance from other project team members, (including Biologists, as well as design-, construction-, and maintenance engineers), to identify the appropriate BMPs for the proposed work activities. Thus, they only become official for the project after the CEQA document for that project has been certified or approved.

For projects or activities where implementation of BMPs would not suffice to avoid or minimize the impacts to a level below that of significance, a higher level of environmental evaluation would be required, leading to a higher level of documentation (e.g., MND or EIR). In instances where a project requires additional avoidance or minimization measures not included in this handbook, such practices and/or measures would be evaluated appropriately during the environmental review process and incorporated as project-specific mitigation measures and, potentially, be incorporated in a future revision of the Handbook.

Organization

For ease in application, the BMPs have been organized into the standard environmental factors found in the Initial Study Checklist, which is consistent with the CEQA Guidelines.[2] This supports the 'activities and impacts matrix' (AIM) approach contained in *W520M03 Section 3 – Mitigation, Monitoring and Reporting Program.* Generally, these practices are either structural treatments (e.g., devices) or non-structural behaviors, methods, actions, procedures, or other management practices that have been shown to avoid or minimize potential adverse environmental effects.

The Handbook also includes sets of BMPs grouped together to address more commonly conducted activities such as bank protection; storm water management; discharge activities; grading and excavation; pesticide use; sediment removal and storage; vegetation management; and, well and exploratory boring construction-, modification-, and destruction operations. These '*BMP Suites*' make it easier for environmental planners to include the applicable BMPs consistently in a project's environmental document. When using a set of activity-based BMPs, individual practices should be reviewed to ensure its applicability.

---

[1] Public Resources Code Section 21000 *et seq.*

[2] Title 14 Code of Regulations Section 15000 *et seq.* Appendix G

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Limitations

Under no circumstances should the entire contents of the Handbook be included as supporting information in an Initial Determination Memorandum (IDM), or in a project's design (i.e., plans and specifications) to circumvent an analysis of impacts from project activities. The consideration of the suitability of *individual* BMPs, to avoid or minimize the significance of impacts, is central to the environmental review process.

Furthermore, since BMPs are District standard operating procedures, and are not project-specific, they are not mitigations and are not to be used as a substitute for proper environmental evaluation and mitigation.

The BMPs reflect how the District currently conducts business. They are updated as new methods or industry standards are identified that provide an opportunity to further improve upon our practice of environmental stewardship, while maintaining a high level of service to the public. Thus, these BMPs are a guideline and not a substitute for analytical decision-making on how to avoid and minimize impacts.

QEMS Elements

Reference Documents:

See page 32 for a listing of both external and internal references

Requirements:

ISO 9001

7.5.1 Control of Production and Service Provision

ISO 14001

4.4.6 Operational Control

Quality Records:

None

Change History:

DATE	REVISION	COMMENTS
11/2006	A	Converted Watershed QEMS WW75109 into W751M01
1/2009	B	BMP updated
03/22/10	C	The Process Owner was changed from Debra Caldon to Jennifer Castillo
08/31/10	D	Stakeholder working group (WG) made some final changes including: Bill Smith, David Dunlap, Jamie McLeod and Janell Hillman and Jennifer Castillo. Prior to the WG, the document was sent for review by biologists, environmental planners and vegetation specialists.
01/24/11	E	Added QEMS Elements (Reference documents, Requirements, Quality Records. Added references to CEQA, Q520D01, & Q751D02 on last page. Changed BI-7 Avoid Secondary Poisoning from Rodenticide Use to inspect on a weekly basis instead of the fifth day.
01/08/14	F	Updated BMPs based on updated Stream Maintenance Program and other standard practices incorporated into District projects and activities.
9/15/14	G	Removed BMPs BI-3, -8, -10, -11; CU-2; WQ-4, -7, -8, -11, -14, -17, -18; NO-1, -2; and TR-2 from version F of Handbook. Modified BMPs BI-6 and CU-1 from version F of Handbook. Revised document number to the new QEMS numbering convention (previously identified as W751M01)

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Table 1 - Comprehensive BMP List

BMP #	BMP Name
Air Quality	
AQ-1	Use Dust Control Measures
AQ-2	Avoid Stockpiling Odorous Materials
Biological Resources	
BI-1	Avoid Relocating Mitten Crabs
BI-2	Minimize Impacts to Steelhead
BI-3	Remove Temporary Fills
BI-4	Minimize Adverse Effects of Pesticides on Non-target Species
BI-5	Avoid Impacts to Nesting Migratory Birds
BI-6	Avoid Impacts to Nesting Migratory Birds from Pending Construction
BI-7	Minimize Impacts to Vegetation from Survey Work
BI-8	Choose Local Ecotypes Of Native Plants and Appropriate Erosion-Control Seed Mixes
BI-9	Restore Riffle/Pool Configuration of Channel Bottom
BI-10	Avoid Animal Entry and Entrapment
BI-11	Minimize Predator-Attraction
Cultural Resources	
CU-1	Accidental Discovery of Archaeological Artifacts or Burial Finds
Hazards & Hazardous Materials	
HM-1	Comply with All Pesticide Application Restrictions and Policies
HM-2	Minimize Use of Pesticides
HM-3	Post Areas Where Pesticides Will Be Used
HM-4	Comply with All Pesticide Usage Requirements
HM-5	Comply with Restrictions on Herbicide Use in Upland Areas
HM-6	Comply with Restrictions on Herbicide Use in Aquatic Areas
HM-7	Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8	Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9	Ensure Proper Hazardous Materials Management
HM-10	Utilize Spill Prevention Measures
HM-11	Ensure Worker Safety in Areas with High Mercury Levels
HM-12	Incorporate Fire Prevention Measures
HM-13	Avoid Impacts from Naturally Occurring Asbestos
Hydrology/Water Quality	
WQ-1	Conduct Work from Top of Bank
WQ-2	Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3	Limit Impact of Pump and Generator Operation and Maintenance
WQ-4	Limit Impacts From Staging and Stockpiling Materials
WQ-5	Stabilize Construction Entrances and Exits
WQ-6	Limit Impact of Concrete Near Waterways
WQ-7	Isolate Work in Tidal Areas With Use of Coffer Dam
WQ-8	Minimize Hardscape in Bank Protection Design
WQ-9	Use Seeding for Erosion Control, Weed Suppression, and Site Improvement

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BMP #	BMP Name
WQ-10	Prevent Scour Downstream of Sediment Removal
WQ-11	Maintain Clean Conditions at Work Sites
WQ-12	Manage Well or Exploratory Boring Materials
WQ-13	Protect Groundwater from Contaminates Via Wells or Exploratory Borings
WQ-14	Backfill Completed Exploratory Borings
WQ-15	Prevent Water Pollution
WQ-16	Prevent Stormwater Pollution
WQ-17	Manage Sanitary and Septic Waste
Transportation/Traffic	
TR-1	Use Suitable Public Safety Measures

Table 2 -Santa Clara Valley Water District BMP Suite List

BMP Suite
Bank Protection BMP Suite
Stormwater Management BMP Suite
Discharge Activities BMP Suite
Grading and Excavation BMP Suite
Sediment Removal and Storage BMP Suite
Vegetation Management and Removal BMP Suite
Well and Exploratory Boring Construction, Modification, or Destruction BMP Suite

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Air Quality

AQ-1 **Use Dust Control Measures**	The following Bay Area Air Quality Management District (BAAQMD) Dust Control Measures will be implemented: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day; 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered; 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited; 4. Water used to wash the various exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, etc.) will not be allowed to enter waterways; 5. All vehicle speeds on unpaved roads shall be limited to 15 mph; 6. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used; 7. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations), and this requirement shall be clearly communicated to construction workers (such as verbiage in contracts and clear signage at all access points); 8. All construction equipment shall be maintained and properly tuned in accordance with manufacturer‘s specifications, and all equipment shall be checked by a certified visible emissions evaluator; 9. Correct tire inflation shall be maintained in accordance with manufacturer‘s specifications on wheeled equipment and vehicles to prevent excessive rolling resistance; and, 10. Post a publicly visible sign with a telephone number and contact person at the lead agency to address dust complaints; any complaints shall be responded to and take corrective action within 48 hours. In addition, a BAAQMD telephone number with any applicable regulations will be included.
AQ-2 **Avoid Stockpiling Odorous Materials**	Materials with decaying organic material, or other potentially odorous materials, will be handled in a manner that avoids impacting residential areas and other sensitive receptors, including: 1. Avoid stockpiling potentially odorous materials within 1,000 feet of residential areas or other odor sensitive land uses; and 2. Odorous stockpiles will be disposed of at an appropriate landfill.

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Biological Resources

BMPs for biological resources are designed to minimize impacts to sensitive resources, including special status and listed species, and sensitive natural communities and habitats. Sensitive species and habitats may be directly or indirectly affected by project activities such as excavation, fill, vegetation management including pruning or removal, alteration of hydrological regime, etc. Impacts to species and natural communities are regulated by agencies such as the California Department of Fish and Wildlife (CDFW), the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the Bay Conservation and Development Commission, as well as corresponding laws such as the State and Federal Endangered Species Acts, the Migratory Bird Treaty Act, the Clean Water Act, the Fish and Game Code, the Native Plant Protection Act, and the California Environmental Quality Act**.** In addition, the California Native Plant Society publishes a rarity listing status for plants that is used by CDFW and is required for review under CEQA.

BI-1 **Avoid Relocating Mitten Crabs**	Sediment potentially containing Chinese Mitten Crabs will not be transported between San Francisco Bay Watersheds and Monterey Bay Watersheds, specifically: 1. Sediment removed from the San Francisco Bay watersheds will not be transported south of Coyote Creek Golf Drive in south San Jose, and the intersection of McKean and Casa Loma Roads; and, 2. Earth moving equipment used in the San Francisco Bay watershed will be cleaned before being moved to, and used in, the Pajaro Watershed.
BI-2 **Minimize Impacts to Steelhead**	Minimize potential impacts to salmonids by avoiding routine use of vehicles and equipment in salmonid streams between January 1 and June 15.
BI-3 Remove Temporary Fill	Temporary fill materials, such as for diversion structures or cofferdams, will be removed upon finishing the work or as appropriate. The creek channels and banks will be re-contoured to match pre-construction conditions to the extent possible. Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the preconstruction conditions as closely as possible, within the finished channel topography.

Biological Resources

BI-4 **Minimize Adverse Effects of Pesticides on Non-target Species**	"Pesticides" refers to any herbicide, insecticide, rodenticide, algaecide, fungicide, or any combination of substances intended to prevent, destroy, or repel any pest. Pesticides will be handled, stored, transported, and used in compliance with any established directions and in a manner that minimizes negative environmental effects on non-target species and sensitive habitats. The proposed project plan for handling, storing, transporting and using pesticides must be reviewed and approved by <u>both</u> of the following subject matter experts: 1. District's Pest Control Advisor (a State-certified Qualified Applicator) – the plan will be reviewed, and modified as deemed appropriate, for compliance with: District policy, label restrictions and any advisories published by the California Department of Pesticide Regulation, the Santa Clara County Division of Agriculture, and the U.S. EPA bulletin *Protecting Endangered Species, Interim Measures for Use of Pesticides in Santa Clara County* (USEPA 2000). 2. Qualified District Biologist (as defined in EMAP-30264) – the plan will be reviewed, and modified as deemed appropriate, for compliance with: District policy, approved environmental review documents, project permits, and avoidance of all known listed (Threatened or Endangered) and sensitive species. Information sources for determination of all known locations of species that may be harmed by pesticides include the District's GIS system and California Natural Diversity Database (CNDDB). Either the District's Pest Control Advisor or the Qualified District Biologist may modify the proposed pesticide plan, such as establishing buffer areas or prohibiting the use of pesticides outright, based on site-specific data, current regulatory requirements, and District policy. The purchase of all pesticides must be approved by the District's Pest Control Advisor to ensure compliance with the District's *Control and Oversight of Pesticide Use* policy and appropriate regulatory agency reporting requirements.
BI-5 **Avoid Impacts to Nesting Migratory Birds**	Nesting birds are protected by state and federal laws. The District will protect nesting birds and their nests from abandonment, loss, damage, or destruction. Nesting bird surveys will be performed by a qualified biologist prior to any activity that could result in the abandonment, loss, damage, or destruction of birds, bird nests, or nesting migratory birds. Inactive bird nests may be removed with the exception of raptor nests. Birds, nests with eggs, or nests with hatchlings will be left undisturbed.
BI-6 **Avoid Impacts to Nesting Migratory Birds from Pending Construction**	Nesting exclusion devices may be installed to prevent potential establishment or occurrence of nests in areas where construction activities would occur. All nesting exclusion devices will be maintained throughout the nesting season or until completion of work in an area makes the devices unnecessary. All exclusion devices will be removed and disposed of when work in the area is complete.

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Biological Resources

BI-7 **Minimize Impacts to Vegetation from Survey Work**	Survey cross-sections will be moved, within acceptable tolerances, to avoid cutting dense riparian vegetation and minimize cutting of woody vegetation, taking advantage of natural breaks in foliage. If the cross-section cannot be moved within the established acceptable tolerances to avoid impacts to dense riparian or woody vegetation, the survey section will be abandoned.
BI-8 **Choose Local Ecotypes Of Native Plants and Appropriate Erosion-Control Seed Mixes**	Whenever native species are prescribed for installation the following steps will be taken by a qualified biologist or vegetation specialist: 1. Evaluate whether the plant species currently grows wild in Santa Clara County; and, 2. If so, the qualified biologist or vegetation specialist will determine if any need to be local natives, i.e. grown from propagules collected in the same or adjacent watershed, and as close to the project site as feasible. Also, consult a qualified biologist or vegetation specialist to determine which seeding option is ecologically appropriate and effective, specifically: 1. For areas that are disturbed, an erosion control seed mix may be used consistent with the SCVWD *Guidelines and Standards for Land Use Near Streams, Design Guide 5, 'Temporary Erosion Control Options.'* 2. In areas with remnant native plants, the qualified biologist or vegetation specialist may choose an abiotic application instead, such as an erosion control blanket or seedless hydro-mulch and tackifier to facilitate passive revegetation of local native species. 3. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable. 4. If a gravel or wood mulch has been used to prevent soil compaction, this material may be left in place [if ecologically appropriate] instead of seeding. Seed selection shall be ecologically appropriate as determined by a qualified biologist, per *Guidelines and Standards for Land Use Near Streams, Design Guide 2: Use of Local Native Species*.
BI-9 **Restore Riffle/Pool Configuration of Channel Bottom**	The channel bottom shall be re-graded at the end of the work project to as close to original conditions as possible. In salmonid streams, restore pool and riffle configurations to emulate pre-project instream conditions, taking into account channel morphological features (i.e. slope), which affects riffle/pool sequence.

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Biological Resources

BI-10 **Avoid Animal Entry and Entrapment**	All pipes, hoses, or similar structures less than 12 inches diameter will be closed or covered to prevent animal entry. All construction pipes, culverts, or similar structures, greater than 2-inches diameter, stored at a construction site overnight, will be inspected thoroughly for wildlife by a qualified biologist or properly trained construction personnel before the pipe is buried, capped, used, or moved. If inspection indicates presence of sensitive or state- or federally-listed species inside stored materials or equipment, work on those materials will cease until a qualified biologist determines the appropriate course of action. To prevent entrapment of animals, all excavations, steep-walled holes or trenches more than 6-inches deep will be secured against animal entry at the close of each day. Any of the following measures may be employed, depending on the size of the hole and method feasibility: 1. Hole to be securely covered (no gaps) with plywood, or similar materials, at the close of each working day, or any time the opening will be left unattended for more than one hour; or 2. In the absence of covers, the excavation will be provided with escape ramps constructed of earth or untreated wood, sloped no steeper than 2:1, and located no farther than 15 feet apart; or 3. In situations where escape ramps are infeasible, the hole or trench will be surrounded by filter fabric fencing or a similar barrier with the bottom edge buried to prevent entry.
BI-11 **Minimize Predator-Attraction**	Remove trash daily from the worksite to avoid attracting potential predators to the site.

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Cultural Resources

CU-1 **Accidental Discovery of Archaeological Artifacts or Burial Remains**	If historical or unique archaeological artifacts are accidentally discovered during construction, work in affected areas will be restricted or stopped until proper protocols are met. Work at the location of the find will halt immediately within 30 feet of the find. A "no work" zone shall be established utilizing appropriate flagging to delineate the boundary of this zone. A Consulting Archaeologist will visit the discovery site as soon as practicable for identification and evaluation pursuant to Section 21083.2 of the Public Resources Code and Section 15126.4 of the California Code of Regulations. If the archaeologist determines that the artifact is not significant, construction may resume. If the archaeologist determines that the artifact is significant, the archaeologist will determine if the artifact can be avoided and, if so, will detail avoidance procedures. If the artifact cannot be avoided, the archaeologist will develop within 48 hours an Action Plan which will include provisions to minimize impacts and, if required, a Data Recovery Plan for recovery of artifacts in accordance with Public Resources Code Section 21083.2 and Section 15126.4 of the CEQA Guidelines. If burial finds are accidentally discovered during construction, work in affected areas will be restricted or stopped until proper protocols are met. Upon discovering any burial site as evidenced by human skeletal remains, the County Coroner will be immediately notified and the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent. No further excavation or disturbance within 30 feet of the site or any nearby area reasonably suspected to overlie adjacent remains may be made except as authorized by the County Coroner, California Native American Heritage Commission, and/or the County Coordinator of Indian Affairs.

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Hazards & Hazardous Materials

The District's projects and operations often require exposure to, and the use of, potentially hazardous materials. The BMPs listed in this section reflect the District's standard procedures for their handling and use. Pesticides are one tool for pest control on district properties and facilities. The most common pesticide use is herbicide application to manage vegetation. Insecticides and rodenticides are used infrequently and in small quantities. All BMPs associated with pesticide use comply with, Q751D02, *Control and Oversight of Pesticide Use***.** ISO document **Q751D02** defines District policies and procedures for pesticide use and reporting. The policies and procedures specified therein apply to all District-owned or operated facilities, as well as to pesticide use by staff, contractors, permittees, and suppliers. It is the District policy to minimize the environmental risk, and exposure, resulting from its pesticide use, by employing alternatives to the maximum extent practicable. To assure avoidance and minimization of impacts from the use of pesticides, all proposed pesticide applications must be reviewed by the District's Pest Control Adviser, who is responsible for coordinating, reviewing, tracking, documenting and reporting pest control practices at the District.

HM-1 **Comply with All Pesticide Application Restrictions and Policies**	Pesticide products are to be used only after an assessment has been made regarding environmental, economic, and public health aspects of each of the alternatives by the District's Pest Control Advisor (PCA). All pesticide use will be consistent with approved product specifications. Applications will be made by, or under the direct supervision of, State Certified applicators under the direction of, or in a manner approved by the PCA. Refer to Q751D02, *Control and Oversight of Pesticide Use*.
HM-2 **Minimize Use of Pesticides**	In all cases, where some form of pest control is deemed necessary by the PCA; evaluate alternative pest control methods and pesticides. Refer to Q751D02: *Control and Oversight of Pesticide Use*.
HM-3 **Post Areas Where Pesticides Will Be Used**	Posting of areas where pesticides are to be used shall be performed in compliance with Q751D02: *Control and Oversight of Pesticide Use.* Posting shall be performed in compliance with the label requirements of the product being applied. In addition, the District shall provide posting for **any** products applied in areas used by the public for recreational purposes, and areas readily accessible to the public, regardless of whether the label requires such notification (the posting method may be modified to avoid destruction of bait stations or scattering of rodenticide), including: 1. Sign postings shall notify staff and the general public of the date and time of application; the product's active ingredients, and common name; and, the time of allowable re-entry into the treated area. 2. A District staff contact phone number shall be posted on the sign. 3. Signs shall not be removed until after the end of the specified re-entry interval. 4. Right-to-know literature on the product shall be made available upon request to anyone in the area. 5. Notification will take into account neighbors with specific needs prior to treatment of an adjacent area to ensure such needs are met. Such requests are maintained by the District under Q751D02.

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Hazards & Hazardous Materials

HM-4 **Comply with All Pesticide Usage Requirements**	All projects that propose ongoing use of pesticides will comply with all provisions of Q751D02: *Control and Oversight of Pesticide Use*, including, but not necessarily limited to the following: 1. All pest control methods will be performed only after a written Pest Control Recommendation for use has been prepared by the District's PCA in accordance with requirements of the California Food and Agricultural Code. 2. F751D01 – *Pest Control Recommendation & Spray Operators Report* will be completed for each pesticide application.
HM-5 **Comply with Restrictions on Herbicide Use in Upland Areas**	Consistent with provisions of Q751D02: *Control and Oversight of Pesticide Use,* application of pre emergence (residual) herbicides to upland areas will not be made within 72 hours of predicted significant rainfall. Predicted significant rainfall for the purposes of this BMP will be described as local rainfall greater than 0.5 inch in a 24-hour period with greater than a 50% probability of precipitation according to the National Weather Service.
HM-6 **Comply with Restrictions on Herbicide Use in Aquatic Areas**	Consistent with provisions of Q751D02: *Control and Oversight of Pesticide Use,* only herbicides and surfactants registered for aquatic use will be applied within the banks of channels within 20 feet of any water present. Furthermore, aquatic herbicide use will be limited to June 15th through October 31st with an extension through December 31 or until the first occurrence of any of the following conditions; whichever happens first: 1. local rainfall greater than 0.5 inches is forecasted within a 24-hour period from planned application events according to the National Weather Service; or 2. when steelhead begin upmigrating and spawning in the 14 steelhead creeks, as determined by a qualified biologist (typically in November/December). If rain is forecast then application of aquatic herbicide will be rescheduled.
HM-7 **Restrict Vehicle and Equipment Cleaning to Appropriate Locations**	Vehicles and equipment may be washed only at approved areas. No washing of vehicles or equipment will occur at job sites.

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Hazards & Hazardous Materials

HM-8 **Ensure Proper Vehicle and Equipment Fueling and Maintenance**	No fueling or servicing will be done in a waterway or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators). 1. For stationary equipment that must be fueled or serviced on-site, containment will be provided in such a manner that any accidental spill will not be able to come in direct contact with soil, surface water, or the storm drainage system. 2. All fueling or servicing done at the job site will provide containment to the degree that any spill will be unable to enter any waterway or damage riparian vegetation. 3. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented. 4. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work. Maintenance, repairs, or other necessary actions will be taken to prevent or repair leaks, prior to use. 5. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be done in a channel or flood plain.
HM-9 **Ensure Proper Hazardous Materials Management**	Measures will be implemented to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means. 1. Prior to entering the work site, all field personnel will know how to respond when toxic materials are discovered. 2. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage. 3. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system. 4. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. 5. Quantities of toxic materials, such as equipment fuels and lubricants, will be stored with secondary containment that is capable of containing 110% of the primary container(s). 6. The discharge of any hazardous or non-hazardous waste as defined in Division 2, Subdivision 1, Chapter 2 of the California Code of Regulations will be conducted in accordance with applicable State and federal regulations. 7. In the event of any hazardous material emergencies or spills, personnel will call the Chemical Emergencies/Spills Hotline at 1-800-510-5151.

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Hazards & Hazardous Materials

HM-10 **Utilize Spill Prevention Measures**	Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water following these measures: 1. Field personnel will be appropriately trained in spill prevention, hazardous material control, and clean up of accidental spills; 2. Equipment and materials for cleanup of spills will be available on site, and spills and leaks will be cleaned up immediately and disposed of according to applicable regulatory requirements; 3. Field personnel will ensure that hazardous materials are properly handled and natural resources are protected by all reasonable means; 4. Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations), and all field personnel will be advised of these locations; and, 5. The work site will be routinely inspected to verify that spill prevention and response measures are properly implemented and maintained.
HM-11 **Ensure Worker Safety in Areas with High Mercury Levels**	To ensure worker safety is protected in areas with elevated mercury concentrations in exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the California Division of Occupational Safety and Health (Cal/OSHA).
HM-12 **Incorporate Fire Prevention Measures**	1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors. 2. During the high fire danger period (April 1–December 1), work crews will have appropriate fire suppression equipment available at the work site. 3. An extinguisher shall be available at the project site at all times when welding or other repair activities that can generate sparks (such as metal grinding) is occurring. 4. Smoking shall be prohibited except in designated staging areas and at least 20 feet from any combustible chemicals or vegetation.
HM-13 **Avoid Impacts from Naturally Occurring Asbestos**	The District will comply with and implement BAAQMD dust control measures and notification requirements when working in serpentine soils.

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Hydrology/Water Quality

The District's projects and operations often pose situations that warrant standard measures to avoid or minimize impacts to water quality. As of this Handbook revision (G), the following best management practices represent measures currently used by the District; however, since many of these measures are based on industry standards for stormwater management maintained by the California Stormwater Quality Association (**CASQA**), the selection of appropriate BMPs from this list **must be verified** by comparison with the most current standards found on the CASQA website.

WQ-1 **Conduct Work from Top of Bank**	For work activities that will occur in the channel, work will be conducted from the top of the bank if access is available and there are flows in the channel.
WQ-2 **Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms**	Field personnel will use the appropriate equipment for the job that minimizes disturbance to the stream bottom. Appropriately tired vehicles, either tracked or wheeled, will be used depending on the situation. Tracked vehicles (bulldozers, loaders) may cause scarification. Wheeled vehicles may cause compaction. Heavy equipment will not operate in the live stream.
WQ-3 **Limit Impact of Pump and Generator Operation and Maintenance**	Pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species. 1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dry-back or washout conditions. 2. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. 3. Pump intakes will be screened to prevent uptake of fish and other vertebrates. Pumps in steelhead creeks will be screened according to NMFS criteria. 4. Sufficient back-up pumps and generators will be onsite to replace defective or damaged pumps and generators.

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Hydrology/Water Quality

WQ-4 **Limit Impacts From Staging and Stockpiling Materials**	1. To protect on-site vegetation and water quality, staging areas should occur on access roads, surface streets, or other disturbed areas that are already compacted and only support ruderal vegetation. Similarly, all equipment and materials (e.g., road rock and project spoil) will be contained within the existing service roads, paved roads, or other pre-determined staging areas. 2. Building materials and other project-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains. 3. No runoff from the staging areas may be allowed to enter water ways, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, swale, hay wattles or bales, silt screens). 4. The discharge of decant water to water ways from any on-site temporary sediment stockpile or storage areas is prohibited. 5. During the wet season, no stockpiled soils will remain exposed, unless surrounded by properly installed and maintained silt fencing or other means of erosion control. During the dry season; exposed, dry stockpiles will be watered, enclosed, covered, or sprayed with non-toxic soil stabilizers.
WQ-5 **Stabilize Construction Entrances and Exits**	Measures will be implemented to minimize soil from being tracked onto streets near work sites: 1. Methods used to prevent mud from being tracked out of work sites onto roadways include installing a layer of geotextile mat, followed by a 4-inch thick layer of 1 to 3-inch diameter gravel on unsurfaced access roads. 2. Access will be provided as close to the work area as possible, using existing ramps where available and planning work site access so as to minimize disturbance to the water body bed and banks, and the surrounding land uses.

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Hydrology/Water Quality

WQ-6 **Limit Impact of Concrete Near Waterways**	Concrete that has not been cured is alkaline and can increase the pH of the water; fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of four weeks after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet sacked concrete will not be allowed to enter a live stream. 2. Poured concrete will be excluded from the wetted channel for a period of four weeks after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles.
WQ-7 **Isolate Work in Tidal Areas With Use of Coffer Dam**	For work in tidal areas, It is preferable to isolate one side of the channel with a cofferdam and allow flows to continue on the other side of the creek. If downstream flows cannot be diverted around the project site, the creek waters will be transmitted around the site through cofferdam bypass pipes. By isolating the work area from tidal flows, water quality impacts are minimized. 1. Installation of coffer dams will begin at low tide. 2. Waters discharged through tidal coffer dam bypass pipes will not exceed 10 percent in areas where natural turbidity is greater than 50 NTU over the background levels of the tidal waters into which they are discharged. 3. Coffer dams in tidal areas may be made from earthen or gravel material. If earth is used, the downstream and upstream faces will be covered by a protected covering (e.g., plastic or fabric) and anchored to minimize erosion. 4. Cofferdams and bypass pipes will be removed as soon as possible but no more than 72 hours after work is completed. Flows will be restored at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat.
WQ-8 **Minimize Hardscape in Bank Protection Design**	Bank repair techniques appropriate to a given site based on hydraulic and other site conditions will be selected. 1. Biotechnical repair methods include construction with living materials; willow wattling; erosion control blankets; brush matting; and, installation of root wads and boulders in banks. 2. The repair will be designed and installed so that it will be self-sustaining and use vegetation that adds structural integrity to the stream bank.

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Hydrology/Water Quality

WQ-9 **Use Seeding for Erosion Control, Weed Suppression, and Site Improvement**	Disturbed areas shall be seeded with native seed as soon as is appropriate after activities are complete. An erosion control seed mix will be applied to exposed soils down to the ordinary high water mark in streams. 1. The seed mix should consist of California native grasses, (for example *Hordeum brachyantherum*; *Elymus glaucus*; and annual *Vulpia microstachyes*) or annual, sterile hybrid seed mix (e.g., *Regreen*™, a wheat x wheatgrass hybrid). 2. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable, or have other appropriate erosion control measures in place.
WQ-10 **Prevent Scour Downstream of Sediment Removal**	After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the work area is smooth, and continuous between the maintained and non-maintained areas, and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.
WQ-11 **Maintain Clean Conditions at Work Sites**	The work site, areas adjacent to the work site, and access roads will be maintained in an orderly condition, free and clear from debris and discarded materials on a daily basis. Personnel will not sweep, grade, or flush surplus materials, rubbish, debris, or dust into storm drains or waterways. For activities that last more than one day, materials or equipment left on the site overnight will be stored as inconspicuously as possible, and will be neatly arranged. Any materials and equipment left on the site overnight will be stored to avoid erosion, leaks, or other potential impacts to water quality Upon completion of work, all building materials, debris, unused materials, concrete forms, and other construction-related materials will be removed from the work site.
WQ-12 **Manage Well or Exploratory Boring Materials**	All materials or waters generated during drilling, well or exploratory boring construction, well development, pump testing, or other activities associated with wells or exploratory borings, will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case will these materials and/or waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways. Such materials/waters must not be allowed to move off the property where the work is being completed.
WQ-13 **Protect Groundwater from Contaminates Via Wells or Exploratory Borings**	Any substances or materials that may degrade groundwater quality will not be allowed to enter any well or boring. Lubricants used on drill bits, drill pipe, or tremie pipe will not be comprised of oily or greasy substances or other materials that may degrade groundwater quality. Well openings or entrances will be sealed or secured in such a way as to prevent the introduction of contaminants.
WQ-14 **Backfill Completed**	All borings should be backfilled within 24 hours of termination of testing. Borings will not be left in such a condition as to allow for the introduction of surface waters or foreign materials into them. Borings will be secured such that they do not endanger

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Exploratory Borings	public health. All borings must be properly destroyed by backfilling with acceptable sealing materials. Acceptable sealing materials are: 1. 27 sack neat cement (four 94-pound bags/55-gallon drum), 2. 10 sack cement sand grout, or 3. hydrated high solids 20 percent bentonite slurry. No soil cuttings may be used for backfilling boreholes. No bentonite chips or pellets may be used to backfill borings. Free fall of sealing material will not be allowed if greater than 30 feet or if more than 3 feet of standing water exists in borehole. A tremie pipe must be used to place the cement sealing material if exploratory boring is over 30 feet deep or if more than 3 feet of standing water exists in borehole. Exploratory borings located in Geologic Setting Zone 4 (bedrock) may be backfilled with borehole cuttings from total depth of the boring up to a depth of 50 feet from the surface grade. The top 50 feet of the borehole must be backfilled with above described sealing materials.
WQ-15 **Prevent Water Pollution**	Oily, greasy, or sediment laden substances or other material that originate from the project operations and may degrade the quality of surface water or adversely affect aquatic life, fish, or wildlife will not be allowed to enter, or be placed where they may later enter, any waterway. The project will not increase the turbidity of any watercourse flowing past the construction site by taking all necessary precautions to limit the increase in turbidity as follows: 1. where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases will not exceed 5 percent; 2. where natural turbidity is greater than 50 NTU, increases will not exceed 10 percent; 3. where the receiving water body is a dry creek bed or storm drain, waters in excess of 50 NTU will not be discharged from the project. Water turbidity changes will be monitored. The discharge water measurements will be made at the point where the discharge water exits the water control system for tidal sites and 100 feet downstream of the discharge point for non-tidal sites. Natural watercourse turbidity measurements will be made in the receiving water 100 feet upstream of the discharge site. Natural watercourse turbidity measurements will be made prior to initiation of project discharges, preferably at least 2 days prior to commencement of operations.
WQ-16 **Prevent Stormwater Pollution**	To prevent stormwater pollution, the applicable measures from the following list will be implemented: 1. Soils exposed due to project activities will be seeded and stabilized using hydroseeding, straw placement, mulching, and/or erosion control fabric. These measures will be implemented such that the site is stabilized and water quality protected prior to significant rainfall. In creeks, the channel bed and areas below the Ordinary High Water Mark are exempt from this BMP.

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	2. The preference for erosion control fabrics will be to consist of natural fibers; however, steeper slopes and areas that are highly erodible may require more structured erosion control methods. No non-porous fabric will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application. 3. Erosion control measures will be installed according to manufacturer's specifications. 4. To prevent stormwater pollution, the appropriate measures from, but not limited to, the following list will be implemented: • Silt Fences • Straw Bale Barriers • Brush or Rock Filters • Storm Drain Inlet Protection • Sediment Traps or Sediment Basins • Erosion Control Blankets and/or Mats • Soil Stabilization (i.e. tackified straw with seed, jute or geotextile blankets, etc.) • Straw mulch. 5. All temporary construction-related erosion control methods shall be removed at the completion of the project (e.g. silt fences). 6. Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed no longer than 300 feet, with at least an equal amount of open area prior to another linear installation.
WQ-17 **Manage Sanitary and Septic Waste**	Temporary sanitary facilities will be located on jobs that last multiple days, in compliance with California Division of Occupational Safety and Health (Cal/OSHA) regulation 8 California Code of Regulations 1526. All temporary sanitary facilities will be located where overflow or spillage will not enter a watercourse directly (overbank) or indirectly (through a storm drain).

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Transportation/Traffic

TR-1 **Incorporate Public Safety Measures**	Fences, barriers, lights, flagging, guards, and signs will be installed as determined appropriate by the public agency having jurisdiction, to give adequate warning to the public of the construction and of any dangerous condition to be encountered as a result thereof.

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Bank Protection BMP Suite

AQ-1 Use Dust Control Measures
BI-1 Avoid Relocating Mitten Crabs
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
CU-1 Accidental Discovery of Archaeological Artifacts or Burial Finds
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
HM-12 Incorporate Fire Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-4 Limit Impacts from Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-6 Limit Impact of Concrete Near Waterways
WQ-7 Isolate Work in Tidal Areas with Use of Coffer Dam
WQ-8 Minimize Hardscape in Bank Protection Design
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-10 Prevent Scour Downstream of Sediment Removal
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Stormwater Management BMP Suite

AQ-1 Use Dust Control Measures
BI-3 Remove Temporary Fills
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-4 Limit Impacts From Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-6 Limit Impact of Concrete Near Waterways
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WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste

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Discharge Activities BMP Suite

BI-2 Minimize Impacts to Steelhead
BI-5 Avoid Impacts to Nesting Migratory Birds
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
WQ-3 Limit Impact of Pump and Generator Operation and Maintenance
WQ-5 Stabilize Construction Entrances and Exits
WQ-7 Isolate Work in Tidal Areas With Use of Coffer Dam
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WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Grading and Excavation BMP Suite

AQ-1 Use Dust Control Measures
AQ-2 Avoid Stockpiling Odorous Materials
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
CU-1 Accidental Discovery of Archaeological Artifacts or Burial Finds
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
HM-12 Incorporate Fire Prevention Measures
WQ-1 Conduct Work from Top of Bank
WQ-2 Evaluate Use of Wheel and Track Mounted Vehicles in Stream Bottoms
WQ-4 Limit Impacts From Staging and Stockpiling Materials
WQ-5 Stabilize Construction Entrances and Exits
WQ-7 Isolate Work in Tidal Areas With Use of Coffer Dam
WQ-9 Use Seeding for Erosion Control, Weed Suppression, and Site Improvement
WQ-11 Maintain Clean Conditions at Work Sites
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Sediment Removal and Storage BMP Suite

AQ-1 Use Dust Control Measures
AQ-2 Avoid Stockpiling Potentially Odorous Materials
BI-1 Avoid Relocating Mitten Crabs
BI-2 Minimize Impacts to Steelhead
BI-3 Remove Temporary Fills
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-11 Ensure Worker Safety in Areas with High Mercury Levels
WQ-1 Conduct Work from Top of Bank
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WQ-15 Prevent Water Pollution
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WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Vegetation Management and Removal BMP Suite

BI-2 Minimize Impacts to Steelhead
BI-4 Minimize Adverse Effects of Pesticides on Non-target Species
BI-5 Avoid Impacts to Nesting Migratory Birds
BI-6 Avoid Impacts to Nesting Migratory Birds from Pending Construction
BI-7 Minimize Impacts to Vegetation from Survey Work
HM-7 Restrict Vehicle and Equipment Cleaning to Appropriate Locations
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
WQ-1 Conduct Work from Top of Bank
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WQ-17 Manage Sanitary and Septic Waste
TR-1 Use Suitable Public Safety Measures

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Well and Exploratory Boring Construction, Modification, or Destruction BMP Suite

AQ-1 Use Dust Control Measures
BI-5 Avoid Impacts to Nesting Migratory Birds
HM-9 Clean Vehicles and Equipment
HM-8 Ensure Proper Vehicle and Equipment Fueling and Maintenance
HM-9 Ensure Proper Hazardous Materials Management
HM-10 Utilize Spill Prevention Measures
HM-12 Incorporate Fire Prevention Measures
WQ-4 Limit Impacts from Staging and Stockpiling Materials
WQ-11 Maintain Clean Conditions at Work Sites
WQ-12 Manage Well or Exploratory Boring Materials
WQ-13 Protect Groundwater from Contaminates Via Wells or Exploratory Borings
WQ-14 Backfill Completed Exploratory Borings
WQ-15 Prevent Water Pollution
WQ-16 Prevent Stormwater Pollution
WQ-17 Manage Sanitary and Septic Waste
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TR-1 Use Suitable Public Safety Measures

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Appendix B2 - Valley Water Steam Maintenance Program Manual – 2019 to 2023

Santa Clara Valley Water District

Stream Maintenance Program Manual

2019 - 2023





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GLOSSARY

GLOSSARY OF SIGNIFICANT TERMS

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ACRONYMS

1B	California Native Plant Society List 1B
A1	Alviso Salt Pond A1
A12	Alviso Salt Pond A12
A16	Alviso Salt Pond A16
A2W	Alviso Salt Pond A2W
A7	Alviso Salt Pond A7
A8	Alviso Salt Pond A8
AB1	Alviso Salt Pond AB1
AB2	Alviso Salt Pond AB2
ACB	Articulated Concrete Blocks
ACHP	Advisory Council on Historic Preservation
AIS	Aerial Information Systems
ANI	Management of Animal Conflicts Best Management Practice
ANSI	American National Standards Institute
ASR	Annual Summary Report
BA	Biological Assessment
BANK/BANK_X	Bank Protection Best Management Practice
BCDC	Bay Conservation and Development Commission
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CAS#	Chemical Abstracts Service
CC /CCC	Central Coast/Central California Coast
CCM	Cellular Concrete Mats
CCR	California Clapper Rail
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Pesticide Regulation
CEO	Chief Executive Officer
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CIP	Capital Improvement Project
Cm	Centimeter
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CSSC	California Species of Special Concern
CWA	Clean Water Act
DBH	Diameter at Breast Height
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	Environmental Protection Agency

Acronyms

ESA	Endangered Species Act
F&G	Fish and Game
FE	Federal Endangered
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FMA	Five-Year Mitigation Area
FMP	Fisheries Management Plan
FONSI	Finding of No Significant Impact
FP	Fully Protected
Fps	Feet per second
FSEIR	Final Subsequent Environmental Impact Report
FT	Federal Threatened
FWCA	Fish and Wildlife Coordination Act
GEN	Pre-project Planning and General Best Management Practice
GIS	Geographic Information System
HMMP	Habitat Mitigation and Monitoring Plan
HM-X	Pesticide Best Management Practice
HWY	Highway
IAWG	Interagency Working Group
IECA	International Erosion Control Association
IPMP	Invasive Plant Management Program
ISA	International Society of Arboriculture
ITP	Incidental Take Permit
Lbs	Pounds
LOS	Level of Service
LTMS	Long-Term Management Strategy
LWD	Large Woody Debris
MBTA	Migratory Bird Treaty Act
MG	Maintenance Guideline
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MRP	Municipal Regional NPDES Permit
MSA	Magnuson-Stevens Fishery Conservation and Management Act
N/A	Not Applicable
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPW	Notice of Proposed Work
NRHP	National Record of Historic Places
OHG	Overhanging Growth
OHW	Ordinary High Water
OHWM	Ordinary High Water Mark
PBO	Programmatic Biological Opinion
pH	Hydrogen Concentration

Acronyms

PMA	Previously Mitigated Area
QEMS	Quality Environmental Management System
RCD	Resource Conservation District
RD	Road
REVEG-X	Revegetation Best Management Practice
RGP	Regional General Permit
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SC	State Candidate
SCCC	South Central California Coast
SCV	Santa Clara Valley
SCWA	Sonoma County Water Agency
SDR	Sediment Deposition Reaches
SE	State Endangered
SED / SED-X	Sediment Removal Best Management Practice
SF	San Francisco
SFEIR	Subsequent Final Environmental Impact Report
SMHM	Salt Marsh Harvest Mouse
SMP	Stream Maintenance Program
SMP-1	Stream Maintenance Program 2002-2013
SMP-2	Stream Maintenance Program 2014-2023
SP	State Protected
SPD	Standard Operating Procedures for Determination (of Mitigation Ratios, ACOE)
Sq ft	Square feet
SR	State Rare
SRA	Shaded Riverine Aquatic
Ssp	Subspecies
ST	State Threatened
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
UC	University of California
UPRR	Union Pacific Railroad
US	United States
USACE/ACOE	U.S. Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTC	United Technologies
Valley Water	Santa Clara Valley Water District
Var	Variety
VEG-X	Vegetation Best Management Practice
VHP	Valley Habitat Plan
WDR	Waste Discharge Requirements
WPCP	Water Pollution Control Plant

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CHAPTER 1. INTRODUCTION

More than 800 miles of creeks and streams flow through Santa Clara County. Of these, about 275 miles of channels are managed by the Santa Clara Valley Water District (Valley Water/water district). The water district's Stream Maintenance Program (SMP) uses a balanced approach to effectively and efficiently maintain these waterways for flood protection, while anticipating, avoiding or minimizing impacts on the environment.

Valley Water is the largest multi-purpose water supply, watershed stewardship and flood management special district in California. The Valley Water serves nearly two million people in Santa Clara County by providing a reliable and safe supply of water; enhancing streams and watersheds through creek restoration and habitat protection; providing flood protection for homes, schools and businesses; and partnering with other agencies to provide trails, parks and open space for community recreation. Valley Water's mission is to:

Provide Silicon Valley with safe, clean water
for a healthy life, environment, and economy.

Valley Water's multiple purposes enable it to use a comprehensive regional approach to water resources management and environmental protection.

Ends Policies are established by the Board of Directors to guide the CEO and staff in achieving Valley Water's mission. Maintenance of the creeks under the SMP is an integral part of this mission, which combines work needed for comprehensive and efficient management within the context of environmental requirements.

E-3 Natural Flood Protection: There is a healthy and safe environment for residents, businesses, and visitors, as well as for future generations.

Goal 3.1 Natural flood protection for residents, businesses and visitors.

Objective 3.1.1 Balance environmental quality and protection from flooding in a cost-effective manner.

Objective 3.1.2 Preserve flood conveyance capacity.

E-4 Water Resources Stewardship: There is water resources stewardship to protect and enhance watersheds and natural resources and to improve the quality of life in Santa Clara County.

Goal 4.1 Healthy creek and bay ecosystems.

Objective 4.1.1 Balance water supply, flood protection and environmental stewardship functions.

Objective 4.1.2 Improve watersheds, streams, and natural resources.

Objective 4.1.3 Promote awareness of creek and bay ecosystem functions.

Goal 4.2 Clean, safe water in creeks and bay.

Objective 4.2.1 Preserve or improve surface and ground water quality for beneficial uses.

Objective 4.2.2 Promote awareness of water quality and stream stewardship.

Goal 4.3 Improved quality of life in Santa Clara County through trails, open space and water resources management.

Objective 4.3.1 Support additional trails, parks and open space along creeks and in the watersheds when reasonable and appropriate.

Objective 4.3.2 Reduce greenhouse gas emissions when reasonable and appropriate.

Valley Water Ends Policies and Board Appointed Officer Interpretations are periodically reviewed and updated. Please check the Valley Water website for the most current Governance Policies.

Initially developed in 2001 to define and improve management and maintenance of Valley Water's flood protection channels and streams, the SMP guides the organization in avoiding and minimizing environmental impacts for routine creek maintenance activities. The program also establishes the organizational framework for overseeing these activities in compliance with the terms and conditions of applicable regulatory permits. The SMP is flexible, subject to periodic revisions that reflect improved understanding of resource conditions, maintenance technologies and management practices. This introductory chapter describes the SMP background, goals, objectives, principles, program area and general activities.

ABOUT THIS MANUAL

Valley Water updates the SMP Manual periodically in collaboration with state and federal permitting agencies to address permit renewals, environmental conditions or changing maintenance needs. This updated 2019-2023 SMP Manual addresses the second 10-year period of the SMP (from 2014 through 2023) and wholly replaces the previous Program Manual and supporting documents. It is intended for use by Valley Water maintenance staff, engineers and resource managers, as well as by environmental regulatory agency staff and other watershed stakeholders. The manual defines the overall maintenance program and describes authorized maintenance activities to be conducted as permitted by the relevant regulatory agencies. It also describes the SMP's regulatory framework, annual maintenance planning

process, impact avoidance measures, best management practices (BMPs), mitigation approaches, work locations and monitoring requirements.

SMP permits should be consulted for additional information with regard to agency-specific requirements, particularly those that pertain to notification and compensatory mitigation requirements, including mitigation monitoring, success criteria and reporting. The initial SMP and Final Environmental Impact Report were certified in 2001 (2001 FEIR) and used a 20-year planning horizon to evaluate cumulative impacts. The evaluation of SMP environmental impacts for the second 10-year period was addressed through a Final Subsequent Environmental Impact Report (FSEIR), developed in compliance with the California Environmental Quality Act (CEQA) and certified by the Valley Water Board in 2012.

The updated SMP manual is comprised of 12 Chapters, as follows:

Chapter 1. Introduction

This chapter provides the reader with an overview of the SMP Program, the policies and goals it has been developed to support and a brief description of the geographic and general applicability of the program.

Chapter 2. Environmental Agencies and Regulatory Framework

This chapter describes the relevant regulations and permit processes that Valley Water will use to obtain SMP authorization from various federal, state and regional environmental agencies.

Chapter 3. Maintenance Planning and Impact Avoidance

This chapter describes how measures to avoid and reduce impacts are incorporated into Valley Water practices.

Chapter 4. Vegetation Management

This chapter describes Valley Water's integrated vegetation management approach. This approach ensures that the most effective technique is used in a manner that minimizes impacts to the environment while meeting flood protection, fire safety, maintenance access, infrastructure protection and other legal requirements.

Chapter 5. Sediment Removal

This chapter provides information on the mechanical removal of accumulated sediment from creek channels, including triggers, assessment, requirements, access and BMPs.

Chapter 6. Bank Stabilization

This chapter provides information on SMP-permitted work to repair and stabilize eroding channel banks and levees to prevent bank failure, reduce instream sedimentation, protect water quality and protect riparian habitat.

Chapter 7. Management of Animal Conflicts

This chapter provides details on work activities, work sequencing, methodologies, requirements and BMPs with regard to animal conflict management.

Chapter 8. Minor Maintenance Activities

This chapter describes a set of routine, small-scale activities that have limited environmental impacts.

Chapter 9. Large Woody Debris

This chapter describes Valley Water work to manage large woody debris (LWD). Sections include the tiered management process, work activities, requirements and BMPs.

Chapter 10. Mitigation Program

This chapter describes the regulations and practices Valley Water follows, including mitigation, to address and mitigate unavoidable SMP-related impacts to the environment.

Chapter 11. Mitigation Monitoring

This chapter describes monitoring requirements for mitigation approaches covered under Chapter 10.

Chapter 12. Program Management and Reporting

This chapter provides information on the SMP management and reporting process, including its annual planning process and work cycle; pre-work-season Notice of Proposed Work (NPW); post-work-season Annual Summary Report (ASR); data management system; and additional SMP-2 planning and subsequent permit renewal process.

In addition, separate attachments provide in-depth information on:

Attachment A. Best Management Practices
Attachment B. Previously Mitigated Areas: Mitigation Provided Under SMP-1
Attachment C. Special-status plants and special-status fish and wildlife
Attachment D. Bank Stabilization
Attachment E. Water Quality Monitoring Plan

Attachment F. Sediment Characterization Plan
Attachment G. Steelhead Impact Minimization Measures
Attachment H. Fish Ladder Inspection Form
Attachment I. Compensatory Mitigation Plan

1.1 SMP GOALS AND OBJECTIVES

1.1.1 Program Goals

The SMP authorizes routine work needed to preserve flood conveyance capacity. The SMP integrates the guiding principle of resource management protection directly into its activities. Program elements are designed to avoid, minimize or mitigate potential impacts in balance with the need to conduct work in streams to carry out Valley Water's mission.

SMP activities are designed to meet two primary goals:

1. Maintain the flow conveyance capacity of Valley Water channels and facilities, and

2. Maintain the structural and functional integrity of Valley Water facilities.

Valley Water aims to maintain the flow conveyance capacity of a channel, creek or other flood management facility to the designed conveyance capacity. In the event a facility does not have a designed capacity or the designed capacity is unknown or uncertain, Valley Water will maintain the channel, creek or facility to an appropriate capacity to reduce the risk of flooding. Section 3.6, Maintenance Guidelines, provides additional information about the criteria and thresholds used to determine when maintenance is necessary.

1.1.2 Program Objectives

The following objectives will be used to meet SMP goals:

1. Remove sediment for flow conveyance and safety while maintaining the habitat functions of creek systems;

2. Manage vegetation for flow conveyance and safety while maintaining the habitat functions of creeks, channels and other Valley Water facilities, and to allow levee inspections and maintenance access;

3. Stabilize stream and channel beds and banks to protect existing infrastructure, maintain public safety, reduce sediment loading, protect water quality and protect habitat values; and

4. Avoid, minimize or mitigate impacts on the environment by identifying when maintenance work is necessary and incorporating stream stewardship measures to further reduce potential impacts and enhance conditions where possible.

1.2 PROGRAM PRINCIPLES

SMP principles aim to protect natural resources to the maximum extent feasible during all work conducted under the SMP. Program-specific BMPs have been developed to implement these principles and are provided in Attachment A. SMP principles may also be used to identify and prioritize work activities and guide maintenance work decisions. In addition, SMP principles are framed to address program objectives and comply with Valley Water's Ends Policies.

Principle 1: Valley Water will implement all SMP activities according to the methods and protocols described in the 2019-2023 SMP Manual, 2012 FSEIR, SMP-2 permits and other SMP-supporting documentation.

Principle 2: Valley Water will make decisions regarding the necessity of sediment removal and vegetation management activities to restore established or calculated channel flow capacities. Maintenance Guidelines (Section 3.6) will be used to direct sediment removal and vegetation management activities according to specific thresholds and criteria described in the activity chapters. Where Maintenance Guidelines have not yet been updated or developed, sediment and vegetation management activities will follow the criteria and thresholds identified in Section 3.6.2 Evaluation Procedure where Maintenance Guidelines do not exist.

Principle 3: Valley Water will implement measures to avoid or minimize impacts on natural resources, including native species and their habitats.

Principle 4: Valley Water will perform all maintenance activities in a manner that minimizes impacts on the natural flora, fauna and aquatic resources while meeting SMP objectives.

1.3 PROGRAM OVERVIEW

1.3.1 Program Area

The SMP area includes the portions of Santa Clara County below the 1,000-foot elevation contour, as shown in Figure 1-1. The program area includes streams within the Santa Clara and Pajaro basins. Municipalities within the SMP area that contain Valley Water-owned or maintained channels include the cities of Campbell, Cupertino, Gilroy, Los Altos, Milpitas, Morgan Hill, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale, and the towns of Los Altos Hills and Los Gatos. Valley Water generally does not provide maintenance on private property where no easement exists, unless otherwise authorized.

1.3.2 General Applicability

The SMP applies to all of the water district's routine stream maintenance activities, which are grouped into the following five categories:

- Vegetation management

- Sediment removal
- Bank stabilization
- Management of animal conflicts
- Minor maintenance

Routine stream maintenance is defined as Valley Water's generally anticipated and expected annual work activities, as described in this manual and the 2012 FSEIR. As further described in Chapter 3, routine stream maintenance includes activities and procedures that are conducted to Valley Water's standards, performed regularly and often repeatedly. Routine maintenance activities may occur within the SMP area (Figure 1-1) below the 1,000-foot elevation contour and along approximately 800 miles of creek and related facilities. Activities are generally limited to locations where Valley Water has land rights or approximately 275 miles of creek. Routine activities may include a wide variety work, based on annual rainfall, stream flow and growth of vegetation. Infrequently, maintenance activities may occur on sites where Valley Water has no fee or easement, permit requirement or other agreement.

A Valley Water team with expertise in creek conveyance requirements developed maintenance activity projections for the 2002–2012 and 2014–2023 program periods. The projections estimate activity types, frequency and work site locations and sizes. The 2014–2023 projections were used as a basis to evaluate potential environmental impacts for 2014–2023 SMP-permitted activities. Chapter 2, Environmental Agencies and Regulatory Framework, describes the SMP's regulatory framework and permitting requirements in detail.

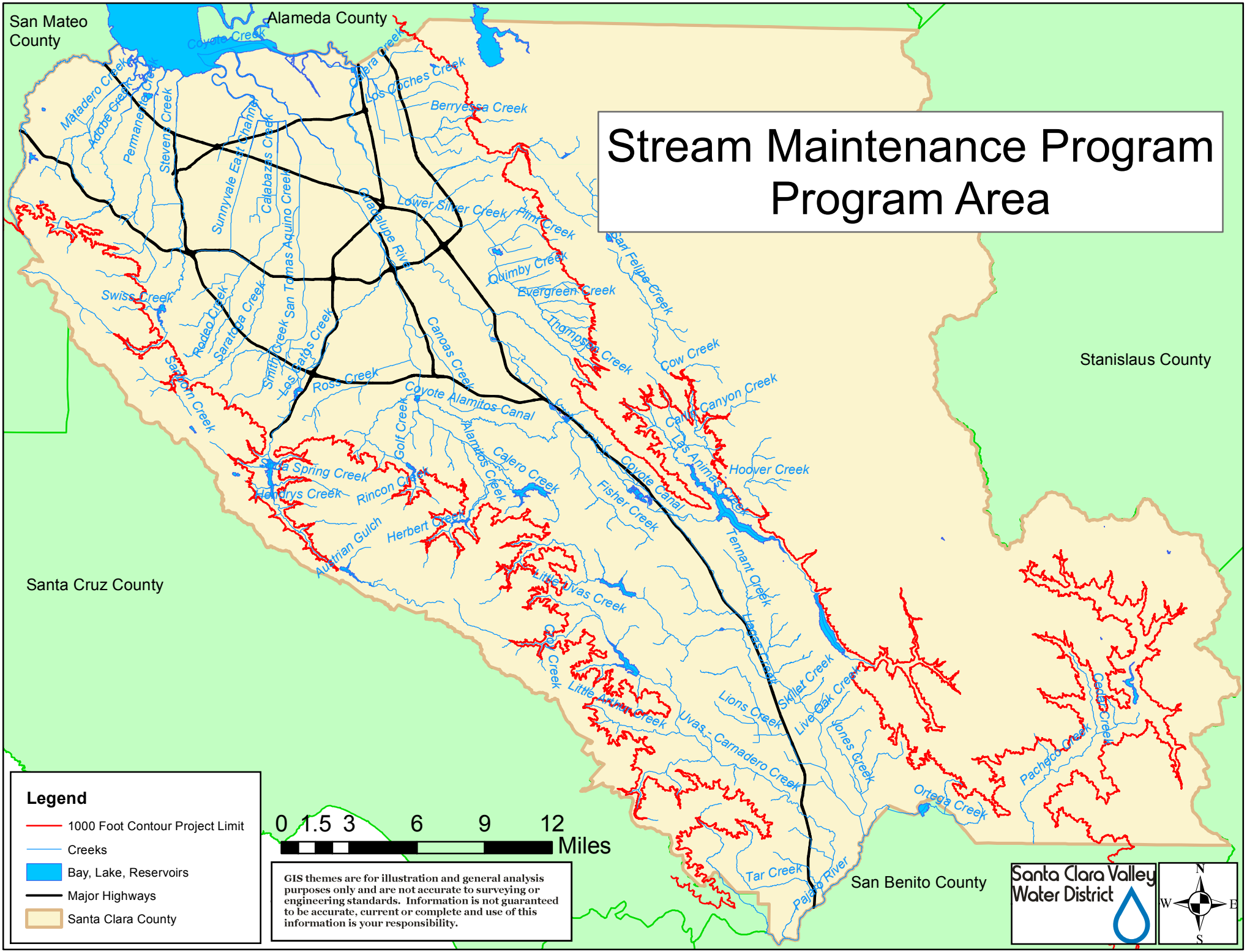


Figure 1-1. Stream Maintenance Program: Program Area

1.3.3 Stream Maintenance Activity Descriptions

Vegetation Management

Vegetation management is intended to maintain the flow conveyance, flood management and fire safety of Valley Water's channels and lands. Vegetation management includes trimming, thinning, or removing vegetation that causes flow blockages, traps debris, or significantly increases hydraulic roughness, thereby reducing channel conveyance capacity. Vegetation management also reduces fuel loads to achieve fire safety, preserves levee integrity, and provides access to Valley Water facilities. Vegetation management may also be done for ecological health and stewardship. Vegetation management methods include pruning, hand or mechanical vegetation removal, tree removal (< 12" dbh), herbicide application, mowing and grazing.

Sediment Removal

Sediment removal is the act of mechanically removing sediment that has deposited within a channel. Sediment removal is required when accumulated sediment reduces a channel's flow conveyance capacity, prevents facilities or appurtenant structures from functioning as intended, or impedes fish passage and access to fish ladders. Sediment is removed to assist a channel to convey flow and minimize the flood hazard in accordance with the existing channel design (where available). Sediment removal under the SMP does not include increasing a channel's flow conveyance capacity beyond the maintenance baseline.

Bank Stabilization

Stabilizing and repairing eroding stream channel banks and levees is a common SMP activity. Although bank stabilization is routine, specific work locations are never predictable. Therefore, this type of maintenance is not a projected work activity, like sediment removal or vegetation management. Rather, bank stabilization maintenance needs are assessed annually on an as-needed basis. Bank stabilization can be performed in any creek where Valley Water owns fee title or easement, where required by permits or agreements unless specifically excluded by the SMP. The water district has made a commitment to limit the use of impervious hardscape materials for bank repair activities.

Management of Animal Conflicts

Valley Water manages animal damage and conflicts in its channels. Animals may damage Valley Water facilities by burrowing into levees or channel banks, foraging at mitigation sites, and/or interfering with work activities. To avoid compromising Valley Water facilities and to reduce conflicts with species living in or present at sites where work is necessary, management of animal conflicts may be undertaken.

Minor Maintenance

Minor maintenance includes fence repairs, access road maintenance, sediment removal of 25 cubic yards or less, and other minor maintenance activities that are necessary to maintain Valley Water facilities. Minor maintenance is not projected and may occur anywhere in the SMP program area. Minor maintenance activities may not result in removal of more than 0.4 acres or 17,424 square feet of wetland or riparian vegetation annually, in all watersheds combined.

1.3.4 General Exclusions

The SMP does not include the following stream maintenance activities:

1. Emergency repair work;

2. Maintenance work that would increase the flow conveyance or water supply capacity of a facility beyond the designed conveyance channel capacity (as-built design);

3. Maintenance work in stream reaches that are above the 1,000-foot elevation contour (areas typically above reservoirs);

4. Maintenance work for dams, reservoirs, and other water supply facilities, such as canals, pipelines outside of stream corridors, groundwater percolation ponds, and instream summer dams;

5. Installation of new or major modification of fish ladders;

6. Maintenance work conducted on private property by owners or other agencies;

7. Maintenance work performed by other agencies;

8. Maintenance work for Capital Improvement Projects or large construction projects (e.g., projects outside the scope of SMP per-project limits); and

9. Area-wide, intensive maintenance, or rehabilitation of large (greater than 0.05 acre) areas, implemented as part of capital improvement projects that have persisted beyond the establishment period (period of time until a plant is self-sustaining).

1.3.5 Work Windows

Seasonal restrictions and work windows provide resource protections for SMP work activities. In general, the available work window for in-channel vegetation, herbicide application, sediment removal and bank stabilization occurs between June 15 and October 15 each year. Under certain conditions, and depending on the activity type, Valley Water may extend the maintenance period past October 15. In Chapter 3, Section 3.4, Work Windows, provides a more complete description of maintenance work windows and allowable extensions.

1.3.6 Program Mitigation

An ongoing mitigation program addresses environmental impacts under the SMP. Chapter 3, Maintenance Planning and Impact Avoidance, describes the SMP's impact avoidance and minimization approaches. Chapter 10, Program Mitigation, describes the SMP's mitigation. During the SMP's first decade (2002–2012), Valley Water undertook several land acquisition and restoration projects to provide mitigation for several projected SMP activities. Mitigation has been provided for sediment removal and vegetation management activities that were projected in the 2001 SMP and were evaluated in the 2001 FEIR. Chapter 10 and Attachment B describe the SMP's mitigation measures, including mitigation requirements for the first decade, 2002-2012, and how those mitigation requirements were addressed. Chapter 10 also describes Valley Water's overall mitigation approach, regulatory guidance and current updates to the mitigation measures. Agency-specific mitigation requirements are described in the SMP permits. These permits should be consulted for additional information regarding agency-specific requirements pertaining to compensatory mitigation requirements, including mitigation monitoring, success criteria and reporting.

1.3.7 Ongoing Maintenance of Capital Improvement Projects

Large construction projects and Capital Improvement Projects (CIPs) are not considered routine stream maintenance activities and are not included in the SMP. Large construction projects include projects outside the scope of SMP per-project limits for each work activity, unless a waiver request is approved by the permitting agencies. Future Capital Improvement Projects will need to analyze and account for their construction and any long-term operations and maintenance (O&M) impacts under their own environmental review process. The CIP environmental review analysis can include a discussion of anticipated operations and maintenance activities that have already been mitigated under SMP-1. These Previously Mitigated Areas are specific to the work location and channel cross section, work activity type, work acreage and scope of work. Previously Mitigated work type and areas that would be needed in future CIPs may continue to be performed under the SMP.

The analysis of long-term maintenance for a Capital Improvement Project is expected to follow a systematic process, including evaluating maintenance requirements and determining whether the SMP will provide needed maintenance. However, SMP covered activities performed for future CIPs that are not in a Previously Mitigated Area will incur mitigation and will create an unplanned work load for Operations and Maintenance personnel. Operations and maintenance activities required for a CIP that are not described in the SMP must obtain full long-term permitting through their own permitting process. Similarly, work activities that are included in the SMP but for an area that did not exist in the SMP FEIR analysis, e.g. a widened channel that increased Waters of the State or U.S., should also be included in the CIP's long-term permitting process.

1.3.8 Channel Types and Ownership

Channel Types

Channels within the SMP area are classified according to three general types: (1) Modified Channel, (2) Modified Channel with Ecological Value, and (3) Unmodified Channel. The location of these channel types within each major watershed is shown in Figures 1-2 through 1-6. Photos showing examples of the channel types are seen in Figures 1-7 through 1-9.

Modified Channel: In general, a Modified Channel type includes channels that have been substantially altered from historical conditions. Some modified channels have had Capital Improvement Projects, while others were constructed in conjunction with land development projects or to maximize developable land adjacent to a creek. Most modified channels have established flood flow conveyance criteria and will be maintained to those criteria. However, other channels clearly have been modified over time but not necessarily to an engineered design with established flood flow conveyance criteria.

Modified channels typically include realigned, straightened, improved or hardened reaches that have been designed to maximize the efficient flow of water to minimize erosion and flooding. These channels generally are grass-lined or concrete-lined (bed or bank) and may include a low-flow channel. These channels may have the potential for some environmental enhancement but are differentiated from the Modified Channel with Ecological Values type that have existing and often diverse ecological values.

Note: A concrete channel bed in a steelhead, fall-run Chinook, or green sturgeon (the latter in San Francisco Bay tidal areas only) creek would be considered a Modified Channel—not a Modified Channel with Ecological Value—due to the disconnection for fish from a natural channel bed.

Modified Channel with Ecological Values: A Modified Channel with Ecological Values includes channels significantly altered from historical conditions but with features such as closed canopy riparian woodland, and/or known to support special-status species. Some of these channels have had completed capital improvement projects, while others have had some level of construction that did not eliminate all the ecological values. In other cases, the reconfigured channel has returned to a more natural state over time.

Some of these channels have established flood flow conveyance criteria and are maintained to that criteria. These channels include realigned, straightened, improved or hardened reaches, designed to move flood flows with minimal erosion. Modified channels with ecological value include creeks identified as supporting steelhead, fall-run Chinook and green sturgeon (the latter in San Francisco Bay tidal areas only, of which 14 are present); having earthen beds; or provide features such as closed riparian woodland canopy and/or known to support special-status species. Modified channels with ecological values may or may not have concrete banks, but may not have concrete beds.

Unmodified Channel: An Unmodified Channel type is defined as creeks that generally are unchanged from historic conditions. Unmodified channels may have small areas of modification, including bridges, outfalls, culverts, gauges, or other appurtenant structures. Unmodified channels usually are located in areas without other types of flood protection measures and generally occur in the foothills or higher elevations of the SMP area.

Channel Ownership

Valley Water generally performs work where it owns property in fee title, has an easement, or has maintenance obligations pursuant to effective licenses and agreements. The Board of Directors may also approve work on private property for flood protection purposes, in response to emergencies, or other unusual circumstances.

Because of the skill and knowledge necessary to maintain creek system function, Valley Water must occasionally work on private property for flood-related public safety purposes. For the 2014 SMP Update (SMP-2), Valley Water also anticipated stream maintenance activities at sites where no in fee title or easement property rights exist, but where it is determined that maintenance needs may occur over the life of the SMP. In these cases, Valley Water may acquire new property rights through purchase of in fee title or easements to meet SMP goals and objectives, provide creek access and prevent encroachment of development into floodplains.

1.3.9 Work on Non-District Owned Property

Valley Water owns approximately one-third of the land within and along Santa Clara County creeks. Under the SMP, Valley Water performs maintenance and property management activities on completed flood protection projects and on other lands where the water district has ownership, easements or where required by effective permits or agreements. The property management activities, commonly referenced as maintenance, may be performed for safety, water quality, erosion repair and fire suppression purposes.

While other public owners do exist, there are thousands of private property owners. Property owners have a duty to maintain their property in a reasonably safe condition and in a manner that does not interfere with a neighbors' ability to enjoy their property. Many activities proposed below the top of bank and within the riparian corridor are subject to review and permitting by local, state and federal regulatory agencies prior to performing the work, a process often challenging for property owners.

It is important to the water district that property owners act as good stewards of creek areas within and adjacent to their properties. The water district has created several fact sheets with information to help property owners care for these areas. The water district periodically assesses types of assistance and potential partnerships that could be provided for flood protection purposes to non-Valley Water property owners.

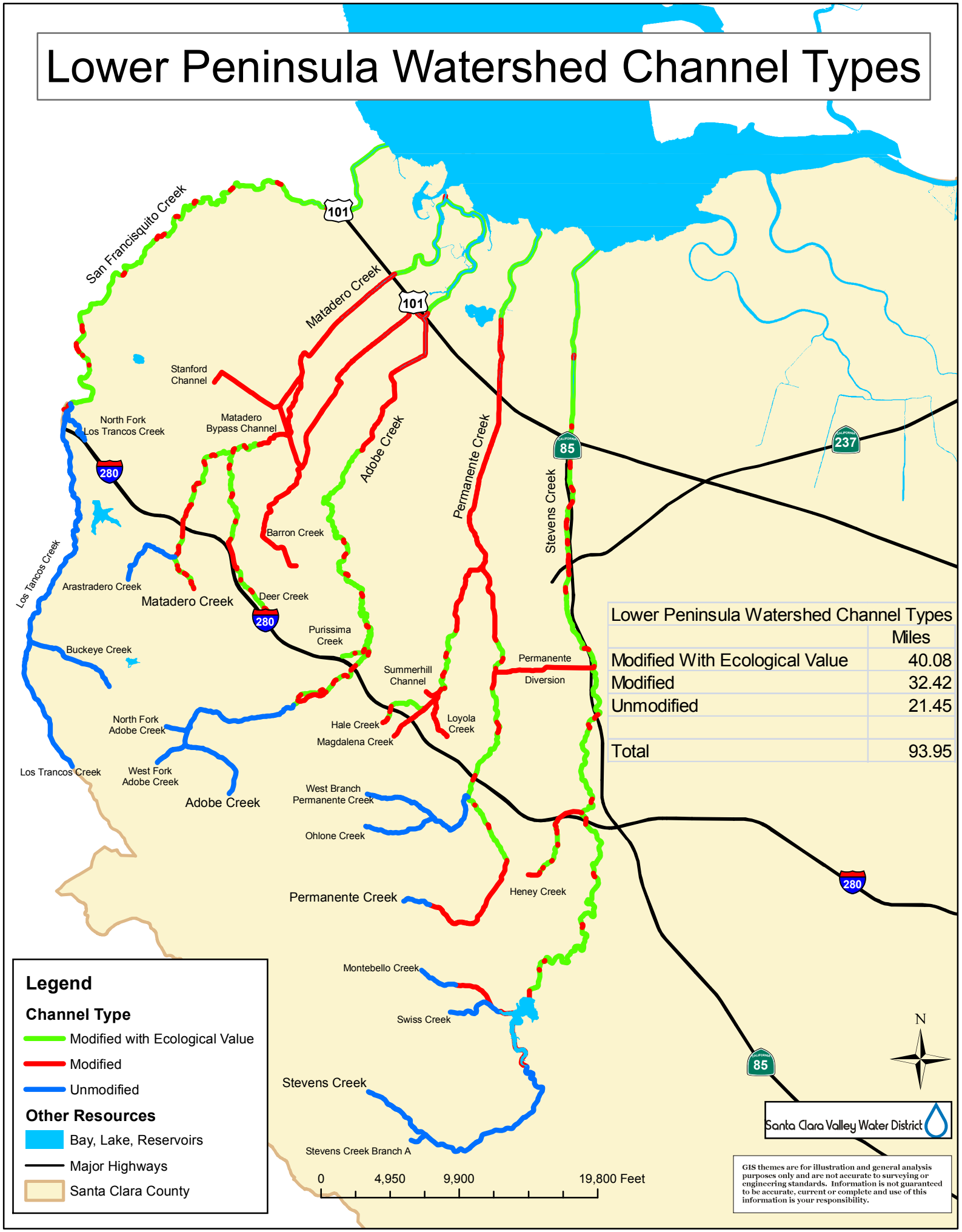


Figure 1-2. Lower Peninsula Watershed Channel Types

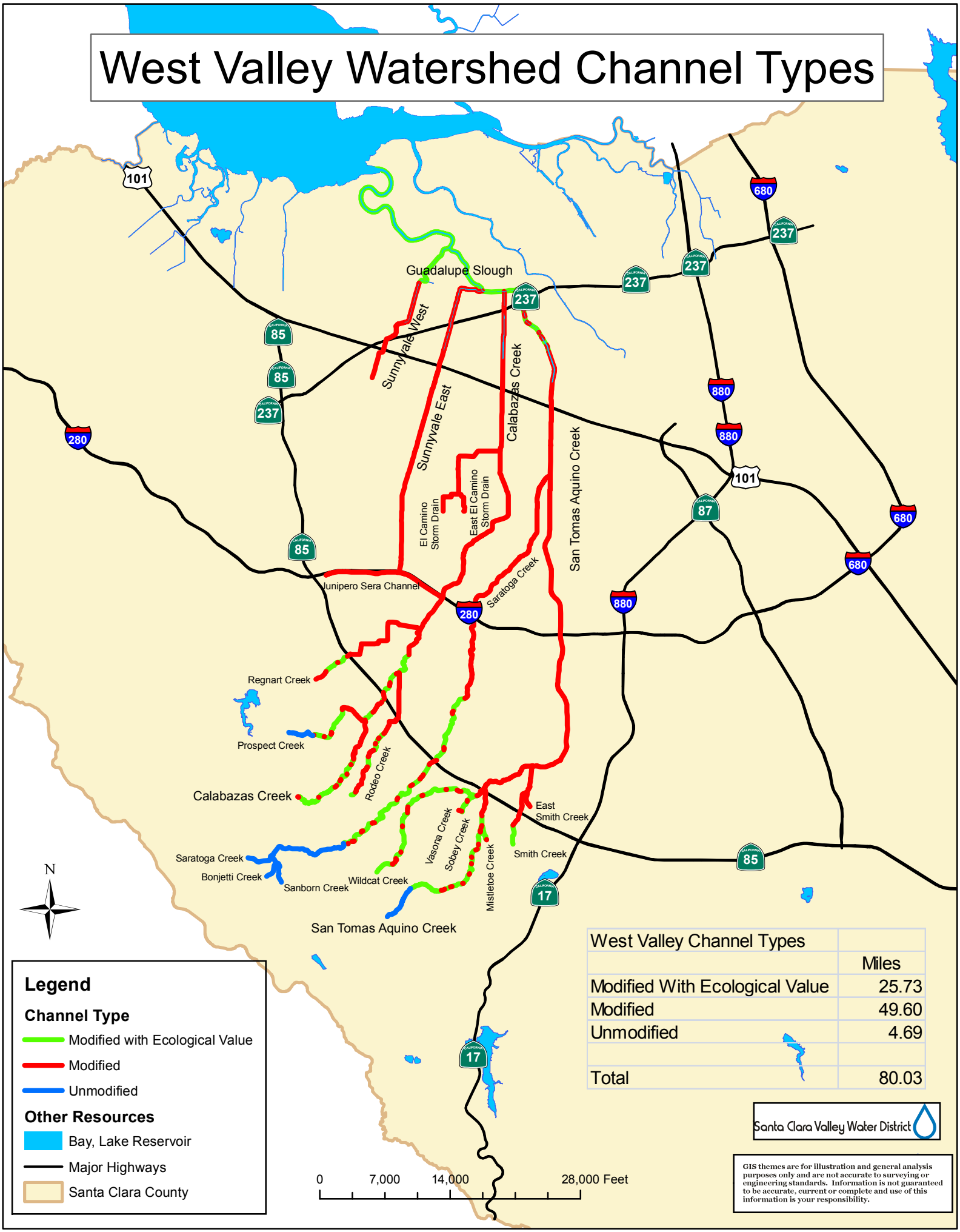


Figure 1-3. West Valley Watershed Channel Types

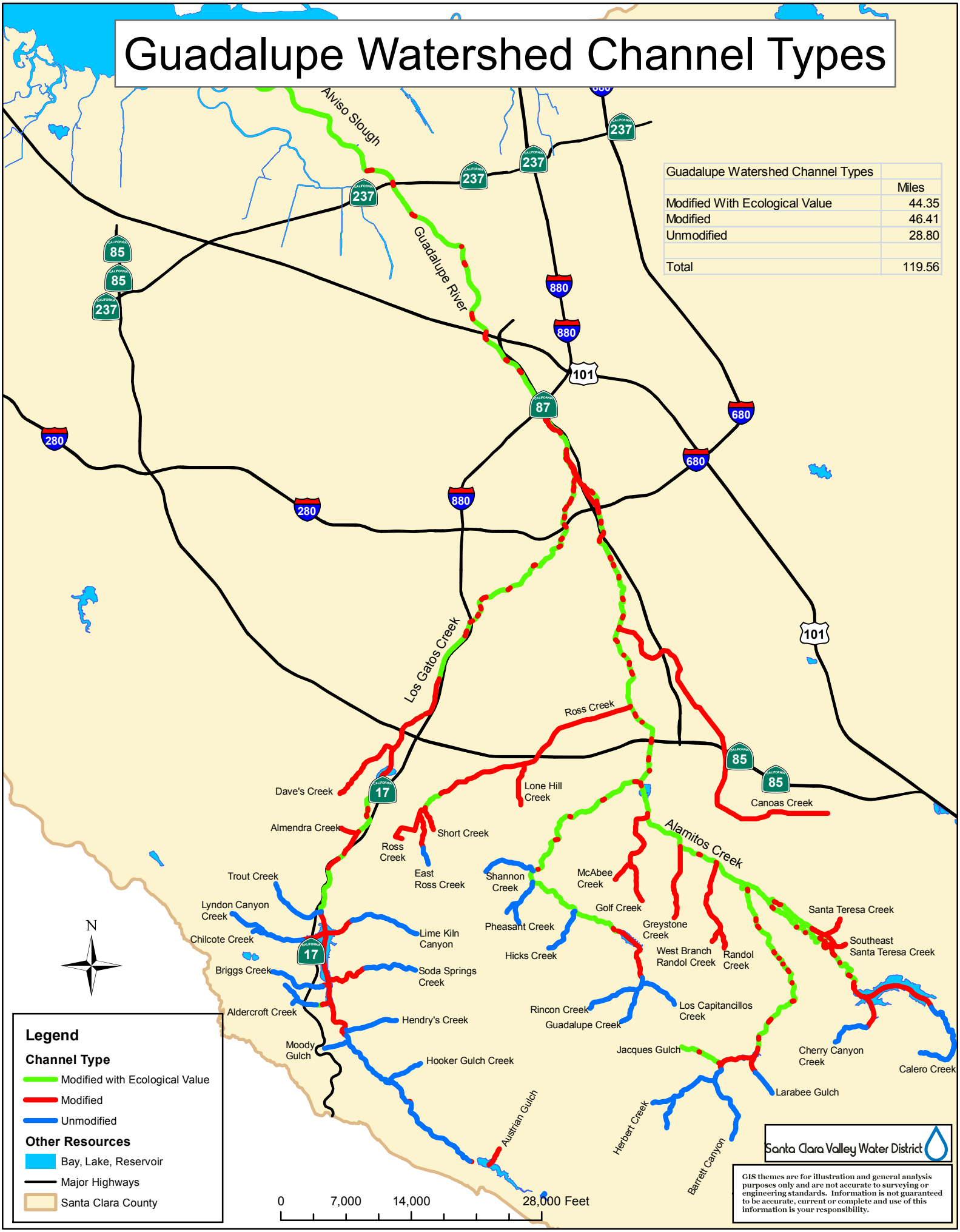
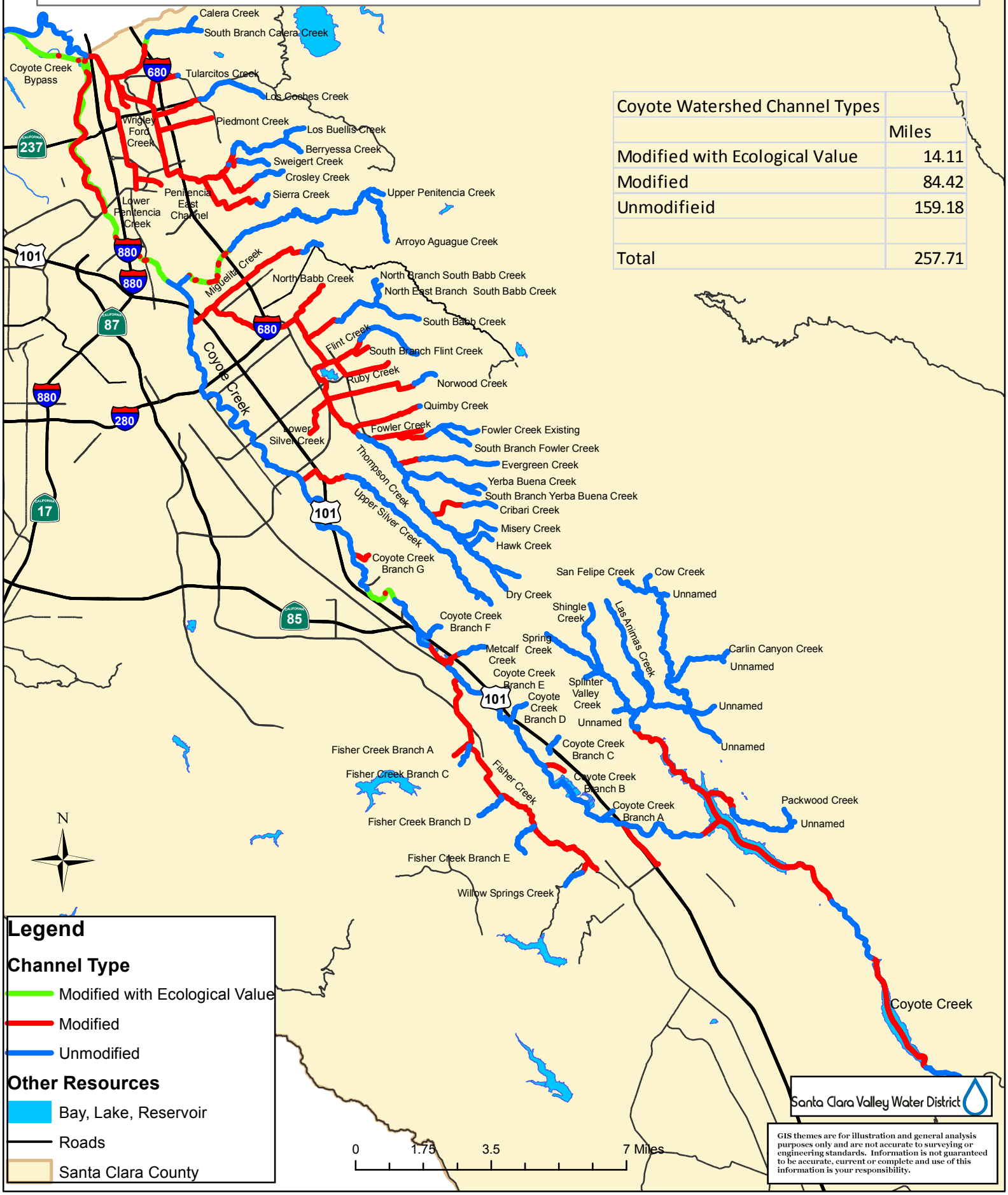


Figure 1-4. Guadalupe Watershed Channel Types

Coyote Watershed Channel Types



Coyote Watershed Channel Types	
	Miles
Modified with Ecological Value	14.11
Modified	84.42
Unmodifieid	159.18
Total	257.71

Figure 1-5. Coyote Watershed Channel Types

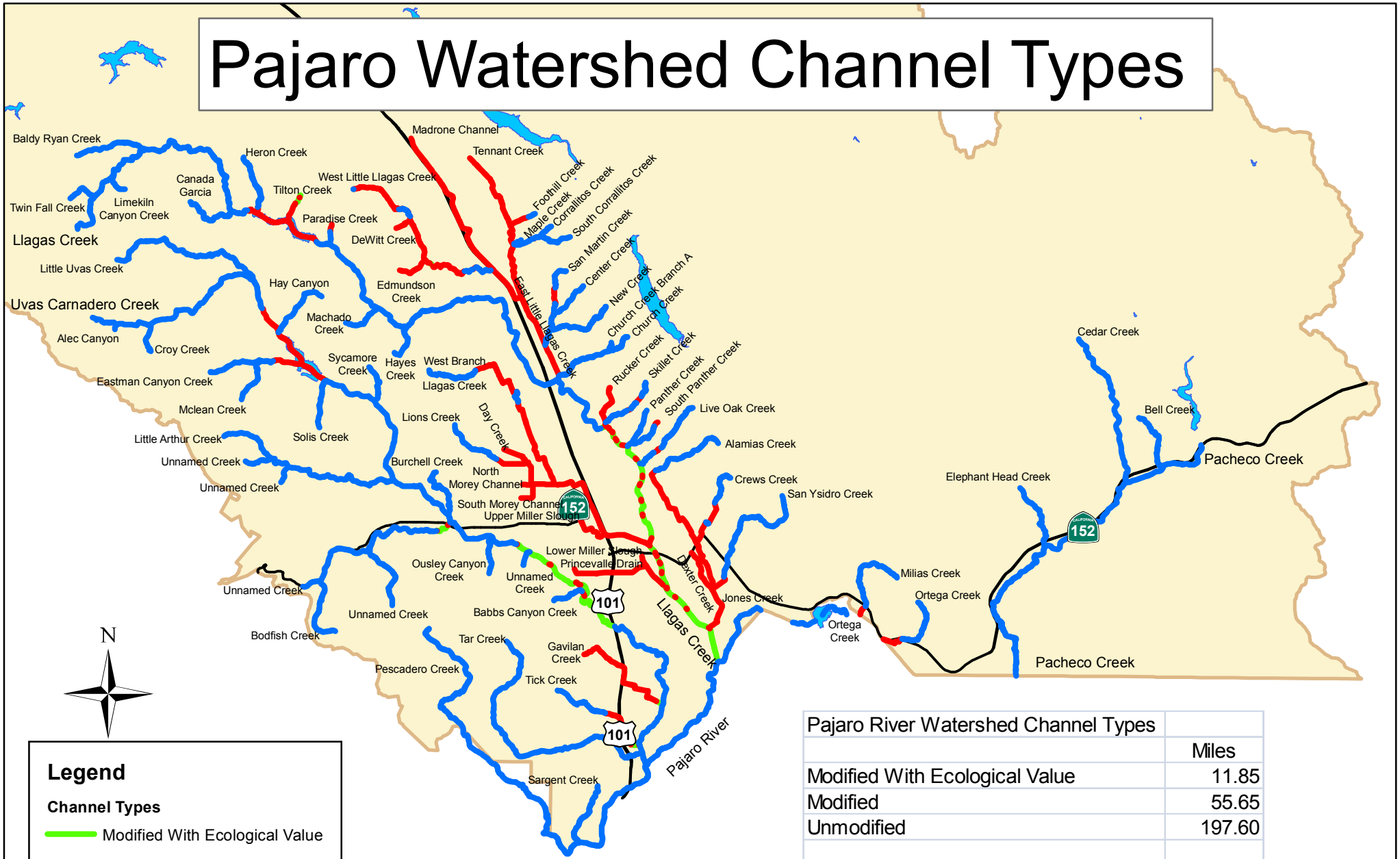


Figure 1-6. Pajaro Watershed Channel Types



Photo 1. Adobe Creek at Station 219+16.



Photo 2. Lions Creek at Station 10+50.



Photo 3. Matadero Creek at Station 121+08.



Photo 4. Ross Creek at Station 205+46.



Photo 5. San Tomas Creek at Station 174+17.



Photo 6. Sunnyvale East Channel at Station 156+28.

Figure 1-7
Representative Modified Channels



Photo 1. Adobe Creek at Station 257+05.



Photo 2. Coyote Creek at Station 1525+50.



Photo 3. Guadalupe River at Station 708+00.



Photo 4. San Francisquito Creek at Station 31+02.



Photo 5. Smith Creek at Station 71+25.



Photo 6. Uvas Creek at Station 461+40.

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Figure 1-8
Representative Modified Channels with Ecological Value



Photo 1. San Tomas Creek at Station 820+00.



Photo 2. San Tomas Creek at Station 823+00.



Photo 3. Stevens Creek at Station 931+46.



Photo 4. Stevens Creek at Station 943+62.



Photo 5. Uvas Creek at Station 327+00.



Photo 6. Llagas Creek at Station 521+75.

Figure 1-9
Representative Unmodified Channels

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CHAPTER 2. ENVIRONMENTAL AGENCIES AND REGULATORY FRAMEWORK

2.1 PURPOSE

This chapter describes the relevant regulations and permit processes that Valley Water uses to obtain SMP authorization from various federal, state and regional environmental agencies. Agencies with regulatory authority over the SMP include the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (USEPA), California Regional Water Quality Control Boards (RWQCBs: Region 2–San Francisco Bay and Region 3–Central Coast), California Department of Fish and Wildlife (CDFW) and the San Francisco Bay Conservation and Development Commission (BCDC). This chapter also describes SMP compliance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). The subsections below address each agency, their regulatory authority and their permitting processes for the SMP.

2.2 U.S. ARMY CORPS OF ENGINEERS (USACE)

2.2.1 Clean Water Act Section 404

Section 404 of the Clean Water Act (CWA) prohibits the discharge of dredged and fill materials into waters of the United States, including wetlands, without prior USACE authorization. “Discharge of dredged material” and “discharge of fill material” are defined in Title 33, Section 323.2 of the Code of Federal Regulations (33 CFR Section 323.2). “Waters of the United States,” including “wetlands,” are defined in 33 CFR Section 328.3.

Wetlands

USACE regulates wetlands, defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. USACE jurisdiction extends to the limits of wetlands, which are delineated following the methodologies outlined in USACE’s 1987 Wetland Delineation Manual and its 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. In the Program area, wetlands (including both tidal and non-tidal wetlands) are present in many areas where SMP activities may occur.

Non-Wetland Waters of the United States

In non-tidal waters without wetlands present, USACE jurisdiction extends to the ordinary high water mark (OHW/OHWM); when non-isolated wetlands are present, the jurisdiction extends beyond the OHW to the boundary of those wetlands. In tidal waters, USACE’s limits of jurisdiction extend landward to the high tide line. In the Program area, non-tidal, non-wetland waters include rivers, creeks, some ditches, ponds and lakes; tidal non-wetland waters include tidal portions of creeks as well as sloughs and tidal ponds.

Non-Regulable Discharges of Dredge Material

Incidental fallback is defined as the redeposit of small volumes of dredged material that is incidental to excavation activity in waters of the U.S. when such material falls back to substantially the same place as the initial removal. Examples of incidental fallback include soil that is disturbed when dirt is shoveled and the back-spill that comes off a bucket when such small volume of soil or dirt falls into substantially the same place from which it was initially removed (66 FR 4575) (amending 33 CFR 323.2(d)(2)(ii), and 40 CFR 232.2(2)(ii)). For instance, when using a clamshell dredge, some small portion of the sediment collected by the clamshell falls out of the clamshell and becomes deposited within Waters of the U.S. Incidental fallback is not considered a regulated discharge of dredge material under the CWA.

As a result, the incidental fallback associated with excavating sediment from the channel using long-reach excavators or other similar equipment located from a top-of-bank location or within the channel would not be regulated by USACE under CWA Section 404. Projects that involve stockpiling of excavated sediments within Waters of the U.S., or use of equipment that moves dredge material from one place to another within Waters of the U.S. prior to removal of the dredge material (for instance, a bulldozer), would be subject to regulation under CWA Section 404. Dewatering activities and temporary access road construction activities associated with sediment removal would also require authorization.

2.2.2 Rivers and Harbors Act Section 10

Section 10 of the federal Rivers and Harbors Act of 1899 prohibits obstruction or alteration of navigable waters of the United States without prior USACE authorization. Within the Program area, Section 10 jurisdictional waters include all tidally influenced portions (up to the mean high water line) of Guadalupe, Coyote and Alviso sloughs and the lower reaches of Permanente, Stevens, San Tomas Aquino, Calabazas, San Francisquito, Coyote and Lower Penitencia creeks, Sunnyvale East and West channels, and the Guadalupe River.

2.2.3 Regional General Permit

USACE will develop a Regional General Permit (RGP) for the SMP, under the authority of CWA Section 404 (33 U.S. Code [USC] Section 1344) and the Rivers and Harbors Act of 1899 Section 10 (33 USC Section 403), in accordance with provisions of “Regulatory Programs of the Corps of Engineers,” 33 CFR Section 323.2(h) for activities that are substantially similar in nature and cause only minimal individual and cumulative environmental impacts. The RGP will be valid for five years from the date of issuance and may be renewed at USACE’s discretion. Because the current SMP 2013 Manual Update is written for a 10-year period through 2024, pending Valley Water’s compliance during the five-year permit term, USACE is expected to renew the RGP for a second five-year term.

Compliance with additional regulations, including but not limited to the following, will be required by USACE before its issuance of the RGP:

- Endangered Species Act (ESA)
- Fish and Wildlife Coordination Act (FWCA)
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act (BGEPA)
- Magnuson–Stevens Fishery Conservation and Management Act (MSA) for Essential Fish Habitat (EFH)
- Section 106 of the National Historic Preservation Act (NHPA)
- Section 401 of the CWA
- National Environmental Policy Act (NEPA)

USACE will initiate the ESA and MSA consultations as part of the RGP permit process. ESA compliance will be achieved through Section 7 consultations requested by USACE, with USFWS and NMFS (as described in Section 2.1.5, Federal Endangered Species Act–Section 7 Consultation). FWCA compliance will be achieved through a FWCA report prepared by USFWS. MSA compliance will be achieved through an EFH consultation requested by USACE which is typically conducted concurrently with the ESA Section 7 consultation. EFH conservation recommendations may be incorporated by USACE as RGP special conditions that will be provided in NMFS's EFH consultation response. NHPA compliance will be achieved through adherence to BMPs GEN-40 and -41 (as described in Section 2.1.4, National Historic Preservation Act Section 106). CWA Section 401 compliance will be through programmatic 401 Water Quality Certifications from the RWQCBs (as described in Section 2.5.2, Clean Water Act Section 401). NEPA compliance will be achieved by USACE's preparation of an Environmental Assessment (EA) as part of the RGP process; a finding of No Significant Impact (FONSI) is anticipated.

2008 Mitigation Rule

In 2008, USEPA and USACE issued the Compensatory Mitigation for Losses of Aquatic Resources, Final Rule, commonly referred to as the 2008 Mitigation Rule (2008 USACE 33 CFR, Parts 325 and 332 (2008); and EPA 40 CFR Part 230 (2008)). The 2008 Mitigation Rule adopted standards to improve the planning, implementation, and management of compensatory mitigation projects by emphasizing a watershed approach in selecting compensatory mitigation project locations; requiring measurable, enforceable ecological performance standards and regular monitoring; stipulating timing requirements for mitigation project implementation; and specifying the components of a complete compensatory mitigation plan (including assurances of long-term protection of compensation sites, financial assurances, and identification of the parties responsible for specific project tasks).

The 2008 Mitigation Rule advised that compensatory mitigation projects (i.e., permittee-responsible compensatory mitigation, mitigation banks, and in-lieu fee mitigation) require written mitigation plans with the following components: objectives, site selection criteria, site protection instruments (e.g., conservation easements), baseline information (for impact and compensation sites), credit determination methodology, a mitigation work plan, a maintenance plan, ecological performance standards, monitoring requirements, a long-term management plan, an adaptive management plan, and financial assurances. Valley Water will provide compensatory mitigation for impacts to waters of the U.S. in accordance with the 2008 Mitigation Rule, as described in Chapter 10, Program Mitigation. Corps-specific mitigation requirements will be described in the RGP special conditions. The RGP should be consulted for additional information regarding Corps-specific requirements pertaining to compensatory mitigation, including mitigation monitoring, success criteria, and reporting.

The methods of compensation are defined below according to the 2008 Mitigation Rule:

Preservation: the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources.

Enhancement: the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). (No increase in aquatic resource area.)

Rehabilitation: the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. (No increase in aquatic resource area, but increase in function.)

Establishment (creation): the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. (Increase in aquatic resource area and function.)

Re-establishment: Returning the natural/historic functions. Gain in resource area and function.

The 2008 Mitigation Rule identifies a hierarchy of preferred mitigation approaches, as follows (Sec. 332.3):

- Mitigation Bank Credits: When using this approach, the highest preference is for established banks already in place that can provide mitigation prior to when the activity is permitted, and prior to foreseeable impacts.

- In-Lieu Fee Program Credits: Under this approach, the applicant makes a payment to a third-party program that will conduct wetland, stream, or other aquatic resource rehabilitation, creation, enhancement, or preservation activities.

- Permittee-Responsible Mitigation Using a Watershed Approach: Where permitted impacts are not in the service area of an approved mitigation bank or in-lieu fee program that has the appropriate type and number of resource credits available, permittee- responsible mitigation is the only option. The watershed

approach (Sec 332.(3)(c)) strategically selects compensatory mitigation sites to improve the quality and quantity of aquatic resources within the watershed where impacts occur. The watershed approach considers the importance of resource types, landscape position and functions in the watershed, locational factors such as hydrology and surrounding land use, and historic conditions to provide a suite of functions that are typically provided by the affected aquatic resource.

- Permittee-Responsible Mitigation Using On-Site and In-Kind Mitigation: In cases where a watershed approach is not practicable, the USACE district engineer should consider opportunities to off-set anticipated aquatic resource impacts by requiring on-site and in- kind compensatory mitigation.

- Permittee-Responsible Mitigation Using Off-Site and/or Out-of-Kind Mitigation: Where the above compensatory mitigation opportunities are not practicable, are unlikely to compensate for the permitted impacts, or will be incompatible with the proposed project, and a practicable off-site and/or out-of-kind mitigation opportunity is identified that has a greater likelihood for off-setting the permitted impacts, or is environmentally preferable, the USACE district engineer should require that this alternative compensatory mitigation be provided.

These approaches may be prioritized based on specific project, resource and permit conditions. While there is a sequential preference as shown in the order above, the top-listed approaches are not requirements and all are available for implementation.

Staff reviewed, considered and applied the 2008 rule in developing the SMP-2 mitigation program. The updated SMP program includes the following approaches: permittee-responsible mitigation using on-site and in-kind mitigation; permittee-responsible off-site and/or out-of-kind mitigation; permittee-responsible mitigation using a watershed approach; and a single-user mitigation bank specifically for the SMP.

Under USACE permit conditions, the mitigation may have an additional requirement if consolidated (i.e., programmatic) off-site mitigation is sought. Namely, the use of off-site programmatic mitigation for bank stabilization projects (that can't be mitigated on-site) will require the single-user umbrella mitigation banking structure, as described above, to facilitate the mitigation for USACE approval. However, this banking requirement can be avoided if the following mitigation approaches are followed:

- On-site mitigation is used to satisfy the mitigation requirements, including the use of plantings for hybrid bank treatments with rock at their base; or

- Project-specific off-site mitigation is identified and pursued. This off-site mitigation will be directly applied to the specific bank stabilization project. If pursued, project specific off-site mitigation will be individually tracked and reported as described in Chapters 11 and 12. Because the mitigation area required for bank stabilization projects may be relatively small for individual projects, it may be prudent to seek to combine project specific off-site mitigation sites. Such combinations, or "pooling" of off-site mitigation for more than one

bank stabilization project would be coordinated with USACE staff and reviewed/approved by USACE staff prior to implementation.

2.2.4 National Historic Preservation Act Section 106

Section 106 of the NHPA of 1966, as amended, requires federal agencies to take into account the effects of their undertakings on cultural resources, including historic properties and historic and prehistoric archaeological sites. The NHPA authorizes the Secretary of the Interior to expand and maintain a National Record of Historic Places (NRHP). The Secretary of the Interior established an Advisory Council on Historic Preservation (ACHP) as an independent federal entity. Section 106 of the NHPA requires federal agencies to give the ACHP a reasonable opportunity to comment on an undertaking before licensing or approving the expenditure of funds on any undertaking that may affect properties listed, or that are eligible for listing, in the NRHP. Section 106 also requires federal agencies to coordinate with the State Historic Preservation Officer in the state where the proposed action will take place.

When issuing an RGP to Valley Water to discharge fill into waters of the U.S. under authority of CWA 404, USACE must comply with Section 106 of the NHPA, as an RGP would be an undertaking by USACE as defined under Interim Guidance for Implementing Title 33, CFR Part 325, Appendix C, and under Title 36, CFR Part 800.16(y). Title 33, CFR Part 325, Appendix C establishes the procedures to be followed by USACE to fulfill NHPA requirements.

All earth-disturbing activities, such as bank stabilization and sediment removal activities that are conducted under the SMP within USACE jurisdiction, will require compliance with Section 106 of the NHPA. USACE will ensure that Valley Water meets its compliance requirements by conditioning the RGP to require the implementation of the relevant cultural resource avoidance measures and BMPs listed in Appendix A, Stream Maintenance Program Best Management Practices. BMPs GEN-40 Discovery of Cultural Remains or Historic or Paleontological Artifacts and GEN-41 Review of Projects with Native Soil include several measures to avoid and minimize potential impacts to cultural and paleontological resources. These BMPs describe the protocol for notification and response actions if cultural resources are encountered.

2.2.5 Federal Endangered Species Act – Section 7 Consultation

The federal ESA was enacted in 1973 to protect plant and wildlife species as determined by USFWS or NMFS to be at risk of extinction. Species are protected through listing under the ESA as either threatened or endangered. An endangered species is at risk of extinction throughout all or a significant portion of its range (ESA Section 3[6]). A threatened species is likely to become endangered within the foreseeable future (ESA Section 3[19]). NMFS is responsible for protection of ESA-listed marine species and anadromous fishes; USFWS is responsible for all other ESA-listed species and critical habitat.

The table of special-status plants and special-status fish and wildlife that may occur in the Program area, including those that are recognized by federal and state agencies as threatened or endangered, is in Attachment C.

ESA Section 9 prohibits the take of any fish or wildlife species listed under the ESA as endangered. Take of threatened species also is prohibited under ESA Section 9, unless otherwise authorized by federal regulations. "Take," as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." "Harm" is defined as "any act that kills or injures the species, including significant habitat modification." In addition, ESA Section 9 prohibits the "removal or reduction to possession" of any listed plant species "under federal jurisdiction" (i.e., on federal land).

The ESA includes three mechanisms that provide exceptions to the ESA Section 9 take prohibitions: ESA Section 7 consultation, ESA Section 10, and issuing ESA Section 4(d) rules. ESA Section 7 consultation is most relevant to SMP activities because it allows for take coverage of federal actions. Section 7 is the mechanism by which incidental take coverage may be obtained to conduct SMP activities. ESA Section 7 provides a means for authorizing take of threatened and endangered species by federal agencies under certain circumstances. It applies to actions that are conducted, permitted or funded by a federal agency.

Under ESA Section 7, for any projects within USACE jurisdiction, USACE will consult with USFWS and NMFS to ensure that the proposed federal action (which in the case of the SMP is USACE's issuance of the RGP) will not jeopardize the continued existence of endangered or threatened species or result in adverse modification of designated critical habitat. Because the SMP may affect listed species and designated critical habitat, Valley Water prepared Biological Assessments (BAs) for USFWS and NMFS, for distribution to those agencies by USACE, that evaluated the nature and magnitude of the expected effects. In response, USFWS and NMFS issued a Programmatic Biological Opinion and Biological Opinion (PBO/BO).

2.3 U.S. FISH AND WILDLIFE SERVICE

2.3.1 Migratory Bird Treaty Act

The MBTA (16 USC 703-712), administered by USFWS, implements four treaties between the United States and Canada, Mexico, Japan and Russia, respectively, to manage and conserve migratory birds that cross national borders. The MBTA makes it unlawful in any manner, unless expressly authorized by permit pursuant to federal regulations, to pursue, hunt, take, capture, kill, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export at any time, or in any manner, any migratory bird, or any part, nest, or egg of any such bird. The definition of "take" is defined as any act to "pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect." Under the California Fish and Game Code (F&G Code), such actions that result in direct loss of birds, nests, or eggs, including nest abandonment or failure, are considered take. A list

of migratory birds protected under the MBTA is available in 50 CFR Section 10 and 21. On December 8, 2004, the U.S. Congress passed the Migratory Bird Treaty Reform Act (Division E, Title I, Section 143 of the Consolidated Appropriations Act, 2005, PL 108–447), which excludes all migratory birds that are non-native or have been introduced by humans to the U.S. or its territories. It defines a native migratory bird as a species present within the U.S. and its territories as a result of natural biological or ecological processes. USFWS published a list of the bird species excluded from the MBTA on March 15, 2005 (70 Federal Register 12710). The most recent revision of the list of migratory birds covered by the MBTA went into effect on December 2, 2013 (FWS Revised List of Migratory Birds, 78 Fed. Reg. 65,844 (November 1, 2013).

All native bird species occurring in the Program area are protected by the MBTA. SMP activities, such as vegetation management, may require the removal of vegetation at work sites where migratory birds are nesting. To comply with the MBTA, Valley Water will implement BMPs that require pre-activity surveys before any breeding-season maintenance activities. These BMPs will be implemented during SMP activities to avoid take of migratory birds.

2.3.2 Bald and Golden Eagle Protection Act (BGEPA)

The Bald and Golden Eagle Protection Act of 1940 protects eagles from commercial exploitation and safeguards their continued survival in the United States. This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. USFWS, which enforces the BGEPA, can issue permits for the take of eagles under limited circumstances. However, no such permit will be needed for SMP activities, which will avoid any such impacts through implementation of BMPs involving pre-construction surveys for nesting birds, including eagles, and implementation of measures to protect any nesting eagles from disturbance.

2.3.3 Federal Endangered Species Act (FESA)

As described in Section 2.1.5, Federal Endangered Species Act – Section 7 Consultation, the FESA protects plant and wildlife species determined by USFWS or NMFS to be at risk of extinction. USFWS is responsible for protection of listed plants and wildlife other than marine species and anadromous fishes, which are protected by NMFS.

Listed Species

The following federally threatened, endangered, proposed, and candidate species that are protected by USFWS have been determined to occur or potentially occur in the Program area:

- Coyote ceanothus (*Ceanothus ferrisiae*), listed as Endangered
- Metcalf Canyon jewel-flower (*Streptanthus albidus* ssp. *albidus*), listed as Endangered

- Santa Clara Valley dudleya (*Dudleya setchellii*), listed as Endangered
- Tiburon paintbrush (*Castilleja affinis* ssp. *neglecta*), listed as Endangered
- Bay checkerspot butterfly (*Euphydryas editha bayensis*), listed as Threatened
- California red-legged frog (*Rana draytonii*), listed as Threatened
- California tiger salamander (*Ambystoma californiense*), listed as Threatened
- Ridgway' rail *(Rallus obsoletus)* listed as Endangered
- California condor (*Gymnogyps californianus*), listed as Endangered
- California least tern (*Sterna antillarum browni*), listed as Endangered
- Least Bell's vireo (*Vireo bellii pusillus*), listed as Endangered
- Western snowy plover (*Charadrius alexandrinus nivosus*), listed as Threatened
- Salt marsh harvest mouse (*Reithrodontomys raviventris*), listed as Endangered
- San Joaquin kit fox (*Vulpes macrotis mutica*), listed as Endangered

These species are described in greater detail in Attachment C.

Critical Habitat

USFWS has designated critical habitat within the Program area for three species: the Bay checkerspot butterfly, California red-legged frog and California tiger salamander.

As described in Section 2.1.5, Federal Endangered Species Act – Section 7 Consultation, USACE consults with USFWS concerning potential effects of SMP activities on the listed species and designated critical habitat listed above, including preparation of a Biological Assessment (BA) describing these effects. USFWS then issues a Programmatic Biological Opinion (PBO) for the SMP. Under the PBO, USFWS issues appendage letters and associated Incidental Take Statements for the projects proposed annually.

2.4 NATIONAL MARINE FISHERIES SERVICE (NMFS)

2.4.1 Federal Endangered Species Act

As described in Section 2.1.5, Federal Endangered Species Act – Section 7 Consultation, the FESA protects plant and wildlife species determined by USFWS or NMFS to be at risk of extinction. NMFS is responsible for protection of federally-listed marine species and anadromous fishes.

Listed Species

The following federally threatened, endangered, proposed, and candidate species that are protected by NMFS have been determined to occur or potentially occur in the Program area:

- Steelhead (*Oncorhynchus mykiss*), Central California Coast distinct population segment (CCC steelhead), listed as Threatened
- Steelhead, South-Central California Coast distinct population segment (SCCC steelhead), listed as Threatened
- Green sturgeon (*Acipenser medirostris*) southern distinct population segment (southern green sturgeon), listed as Threatened

These species are described in greater detail in Attachment C.

Critical Habitat

NMFS has designated critical habitat within the Program area for CCC steelhead, SCCC steelhead, and southern green sturgeon.

As described in Section 2.1.5, Federal Endangered Species Act – Section 7 Consultation, USACE consults with NMFS concerning potential effects of SMP activities on the listed species and designated critical habitat listed above, including preparation of a BA describing these effects. NMFS then issues a Biological Opinion that includes a statement allowing incidental take of these listed species during SMP activities.

2.4.2 The Magnuson-Stevens Fishery Conservation and Management Act (MSA)

The MSA establishes a national program to manage and conserve the fisheries of the United States through the development of federal Fishery Management Plans (FMPs), and the federal regulation of domestic fisheries under those FMPs, within the 200-mile U.S. Exclusive Economic Zone (16 USC Section 1801 et seq.). To ensure that habitat considerations receive increased attention for the conservation and management of fishery resources, the amended MSA requires each existing, and any new, FMP to "describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under Section 1855(b)(1)(A) of this title, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat." (16 USC Section 1853[a][7]).

Essential Fish Habitat (EFH) is defined in the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC Section 1802[10]). The components of this definition are interpreted in 50 CFR Section 600.10 as follows: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary"

means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

Pursuant to the MSA, each federal agency is mandated to consult with NMFS with respect to any action authorized, funded, or undertaken, or proposed to be, by any such agency that may adversely affect any EFH under this Act (16 USC Section 1855[b][2]). Furthermore, when NMFS receives information from a Fishery Management Council, or federal or state agency, or determines from other sources that an action authorized, funded, or undertaken, or proposed to be, by any federal or state agency will adversely affect any EFH identified under the MSA, NMFS has an obligation to recommend to such agency measures that can be taken to conserve EFH.

Regarding EFH in the Program area, maintenance activities in tidal waters, and in non-tidal waters where Chinook salmon (*Oncorhynchus tshawytscha*) occurs, may affect EFH. The only fish species subject to an FMP that occurs in non-tidal waters of the Program area with any regularity is Chinook salmon, which is regulated by the Pacific Fishery Management Council's Salmon FMP. Both Coyote Creek and the San Francisco Bay are officially listed as EFH for this species (Pacific Fishery Management Council 1999). Chinook salmon also occurs in the Guadalupe watershed. Within the Guadalupe watershed, Chinook salmon spawning has been observed in Los Gatos Creek, Alamitos Creek, and the mainstem Guadalupe River. NMFS considers any habitat used by Chinook salmon in the South Bay (i.e., tidal waters and non-tidal waters in the Coyote Creek and Guadalupe River watersheds that are accessible to Chinook salmon) as EFH.

A number of fish species regulated by the Coastal Pelagic Species and Pacific Groundfish Fisheries Management Plans, such as the leopard shark (*Triakis semifasciata*), English sole (*Parophrys vetulus*), starry flounder (*Platichthys stellatus*) and big skate (*Raja binoculata*), occur in the tidal habitats of the South San Francisco Bay and occasionally disperse upstream into the reaches of Alviso Slough, Coyote Slough, San Francisquito Creek, San Tomas Aquino Creek and other tidal creeks in the Program area. Species such as the northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*) and jack mackerel (*Trachurus symmetricus*) also occur in the South Bay; these species are less likely to occur in the uppermost tidal reaches of sloughs where SMP activities will take place, but small numbers potentially can occur there. Thus, NMFS considers these tidal waters to be EFH for these FMPs as well.

Under the MSA, USACE will consult with NMFS regarding the effects of the proposed federal action (which in the case of the SMP is USACE's issuance of the RGP) on the EFH of these FMP-managed species. NMFS will then provide recommendations for conservation of EFH during SMP activities.

2.5 U.S. ENVIRONMENTAL PROTECTION AGENCY

USEPA is the overall administering agency for the CWA, and jointly administers CWA Section 404 together with USACE. Under a Memorandum of Agreement (MOA) between USEPA and the Department of Defense, USACE was given sole responsibility for making final permit decisions pursuant to Section 404 and, "conducts jurisdictional

delineations associated with the day-to-day administration of the Section 404 program" (USDA 1996). USEPA retains the authority to enforce compliance with Section 404 and maintains the power to overrule USACE decisions on the issuance or denial of permits (USEPA 1995). If a dispute occurs about whether an area can be regulated, USEPA has the ultimate authority to determine the actual geographic scope of waters of the United States subject to jurisdiction under all sections of the CWA, including the Section 404 regulatory program (USDA 1996).

USEPA will not be issuing permits for the SMP, but it will have a coordination and oversight role with the applicable federal agencies and will also will provide Valley Water with guidance on implementing the SMP.

2.6 REGIONAL WATER QUALITY CONTROL BOARDS

2.6.1 The Porter-Cologne Water Quality Control Act

California's Porter-Cologne Water Quality Control Act (Porter-Cologne Act) was enacted in 1969. Together with the federal CWA, it provides regulatory guidance to protect water quality and water resources. The Porter-Cologne Act established the State Water Resources Control Board (SWRCB) and divided California into nine regions, each overseen by a Regional Water Quality Control Board (RWQCB). The Porter-Cologne Act established regulatory authority over "waters of the State," which are defined as "any surface water or groundwater, including saline waters, within the boundaries of the State" (California Water Code, Division 7, Section 13050). More specifically, the SWRCB and its nine RWQCBs have jurisdiction over the bed and banks of a stream channel, its riparian corridor, and its beneficial uses.

The Porter-Cologne Act also assigns responsibility for implementing CWA Sections 303, 401 and 402 to the SWRCB and RWQCBs. Under Section 303, the RWQCBs, in conjunction with USEPA, are responsible for developing and implementing Total Maximum Daily Loads (TMDLs) to address water quality impairments.

The Porter-Cologne Act requires the development and periodic review of water quality control plans (basin plans) for the protection of water quality in each of California's nine regions. A basin plan is unique to each region and must identify beneficial uses, establish water quality objectives for the reasonable protection of the beneficial uses, and establish a program of implementation for achieving the water quality objectives. To keep current, basin plans must be updated every three years. The basin plans also must comply with Section 303 of the federal CWA, which requires states to establish their own water quality standards. Basin plans provide the technical basis for the RWQCBs to determine waste discharge requirements (WDRs), take enforcement actions and evaluate grant proposals.

As described in Section 2.5.2, CWA Section 401, regulatory compliance for projects occurring within waters of the U.S. is met through Water Quality Certification, granted by the RWQCBs. For projects occurring within Porter-Cologne Act jurisdiction (i.e., state jurisdiction) but outside waters of the U.S. (in streams this is the area above the ordinary high water mark, or "isolated" waters such as wetlands), WDRs or Waiver of WDRs are

required. WDRs are issued by the RWQCB that has jurisdiction over the region in which the project will occur.

The San Francisco Bay and Central Coast RWQCBs (Regions 2 and 3, respectively) have jurisdictional authority to implement the Porter-Cologne Act in Santa Clara County; the San Francisco Bay RWQCB oversees watersheds draining to the San Francisco Bay, and the Central Coast RWQCB oversees watersheds draining to the Pajaro River and then to Monterey Bay. All waters of the U.S. in the Program area also are waters of the State and thus are subject to RWQCB jurisdiction under the Porter-Cologne Act. SMP compliance with the Porter-Cologne Act will occur via WDRs and will be combined with CWA Section 401 Water Quality Certification, as described in Section 2.6.2.

The Regional Water Quality Control Boards have established basin plans for the San Francisco Bay and Monterey Bay watersheds. These plans identify beneficial uses, including water quality standards for the watersheds. In considering mitigation for impacts to wetlands, the RWQCB follows the California Wetlands Conservation Policy (Executive Order W-59-93). The objectives of this policy include:

1. To ensure no overall net loss and long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property.

2. To reduce procedural complexity in the administration of State and Federal wetlands conservation programs.

3. To encourage partnerships to make restoration, landowner incentive programs, and cooperative planning efforts the primary focus of wetlands conservation.

2.6.2 Clean Water Act Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of dredged and fill materials into surface waters of the United States (including wetlands) must obtain Section 401 Water Quality Certification so that any such discharge will comply with the applicable provisions of the CWA, including Sections 301, 302, 303, 306, and 307, and state water quality standards. Section 401 Water Quality Certification is issued by the state in which the discharge will originate; or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge will originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a CWA Section 404 permit) also must comply with CWA Section 401. The goal of CWA Section 401 is for states (and tribes) to comment on any federal license or permit that may result in any discharge into the navigable waters, by issuing a certification that the discharge will not violate water quality standards, including the state-specific (or tribe-specific) standards.

Valley Water has worked with representatives from the San Francisco Bay and Central Coast RWQCBs to develop a compliance approach for CWA Section 401, and will apply

for Section 401 Water Quality Certification for SMP activities affecting waters of the U.S. within the jurisdiction of each of these RWQCBs.

2.6.3 Clean Water Act Section 402

CWA Section 402 regulates point and non-point source discharges to surface waters (other than dredge or fill material) through the National Pollutant Discharge Elimination System (NPDES), administered by the USEPA. The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits (for discharges to waters of the U.S.). This regulation is implemented at the state level and generally applies to construction, industrial, and municipal stormwater discharges, and residual discharges from pesticide application.

2.6.4 Municipal Regional Stormwater NPDES Permit

As part of the NPDES, municipalities are required to maintain NPDES permits for their stormwater discharges. The municipalities, in turn, require that individual projects within their jurisdiction comply with the requirements of these permits. The Municipal Regional Stormwater NPDES permit (Order R2-2009-0074, NPDES Permit No. CAS612008) covers municipal stormwater discharges from the majority of Bay Area counties and cities. The permit applies to Santa Clara County and to the following cities and agencies within the county that have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program: the cities of Campbell, Cupertino, Los Altos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale; the towns of Los Altos Hills and Los Gatos; and Valley Water. The SMP will continue to comply with the requirements detailed in this NPDES permit, including water quality monitoring and pesticide toxicity control.

2.6.5 General NPDES Aquatic Pesticide Use Permit

The SWRCB recently renewed a General NPDES permit for the regulation of residual aquatic pesticide discharges to waters of the U.S. from algae and aquatic weed control applications. This General NPDES permit only authorizes the discharge of the following aquatic pesticides: 2,4-D, acrolein, copper, diquat, endothall, fluridone, glyphosate, imazamox, imazapyr, nonyphenol, penoxsulam, sodium carbonate peroxyhydrate, and triclopyr-based algaecides and aquatic herbicides. Aquatic pesticides that are applied to waters of the U.S. in accordance with Federal Insecticide, Fungicide, and Rodenticide Act label requirements are not considered pollutants. However, pesticides or by-products that persist in or leave the treatment area after a specified treatment period are considered pollutants and require coverage under this General Permit.

Key requirements of the General Permit include the following.

- Compliance with the requirements of California Toxics Rule (40 CFR Part 131) and the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SWRCB 2005);

- Compliance with other applicable receiving water limitations and with effluent limitations;
- Issuance of a license to the permittee by the California Department of Pesticide Regulation; or, the permittee must work under the supervision of someone who is licensed if the aquatic pesticide is considered a restricted material;
- Preparation of, and adherence to, an Aquatic Pesticide Application Plan;
- Compliance with specific monitoring and reporting requirements of the permit;
- Adherence to all label instructions and terms of any applicable use permits;
- Maintenance of a Pesticide Application Log; and
- Compliance with Public Notice Requirements.

To obtain coverage under this General Permit, a discharger must submit a completed notice of intent, a vicinity map and the first annual fee to the appropriate RWQCB. These items constitute a complete application package, the submittal of which authorizes the discharge of pollutants associated with the application of aquatic pesticides in compliance with the General Permit.

All aquatic pesticides applied by Valley Water under the General NPDES permit are done in accordance with the permit requirements.

2.6.6 Clean Water Act Section 303 and the Total Maximum Daily Load Program

Under CWA Section 303(d), states are required to identify “impaired water bodies” (those that do not meet established water quality standards), identify the pollutants causing impairment; establish priority rankings for waters on the list; and develop a schedule for development of control plans to improve water quality. Each RWQCB must update the Section 303(d) list every two years. Water bodies on the list have no further assimilative capacity for the identified pollutant, and the Section 303(d) list identifies priorities to develop pollution control plans for each listed water body and pollutant. The pollution control plans triggered by the CWA Section 303(d) List are Total Maximum Daily Loads, or TMDLs.

CWA Section 303 is overseen by USEPA and is administered by the SWRCB and its nine RWQCBs. Once a TMDL is developed and approved by USEPA, the SWRCB, and the relevant RWQCB, the implementation plan (if included in the TMDL) can be enacted. The San Francisco Bay and Central Coast RWQCBs have prepared, or are in the process of preparing, TMDLs applicable to water bodies in Santa Clara County. USEPA has approved the following TMDLs that currently are implemented by the San Francisco Bay RWQCB: Guadalupe River Watershed Mercury, San Francisco Bay Mercury, San Francisco Bay Polychlorinated Biphenyls, and Urban Creeks Pesticide Toxicity. Additionally, the San Francisco Bay RWQCB is currently developing a TMDL for sediment impairment in San Francisquito Creek, selenium in Permanente Creek, and toxicity in Stevens Creek. USEPA-approved TMDLs within those portions of Santa Clara

County under the jurisdiction of the Central Coast RWQCB include: Pajaro River Fecal Coliform (including Pajaro River, San Benito River, Llagas Creek, and Tequisquita Slough); Pajaro River Sediment (including San Benito River, Llagas Creek, and Rider Creek); and Pajaro River Nitrate (including Llagas Creek).

The SMP will continue to comply with the requirements detailed in adopted TMDLs, including water quality monitoring and pollutant control.

2.7 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW)

2.7.1 California Endangered Species Act

The California Endangered Species Act (CESA) is defined in Section 2080 et seq. of the F&G Code. CESA was originally enacted in 1970 to designate wildlife, fish and plants as "endangered" or "rare." In 1984, CESA was amended and species were reclassified as "endangered" or "threatened." As of January 1985, all "rare" wildlife species were reclassified as "threatened" and the term "rare" was dropped from the code. For plants, the classification of "rare" was maintained for those listed under the California Native Plant Protection Act (Sections 1900-1913); however, those plants are subject only to the protections of that Act and not to CESA.

CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates and plants, and their habitats that are threatened with extinction, and those experiencing a significant decline which, if not halted, will lead to a threatened or endangered designation, will be protected or preserved. CESA sets forth procedures by which individuals, organizations or CDFW can submit petitions to the Fish and Game Commission, requesting that a species, subspecies or variety of plant or wildlife be added to, deleted from, or changed in status on the state lists of threatened or endangered species.

Like the federal ESA, CESA also allows for incidental take of listed species. Take is defined under the F&G Code Section 86 as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." The incidental take permit process is outlined in CESA (F&G Code Section 2081). CESA (F&G Code Section 2081[b]) provides a means by which agencies or individuals may obtain authorization for incidental take of state-listed species. Take must be incidental to, and not the purpose of, an otherwise lawful activity. Requirements for an F&G Code Section 2081(b) permit include: the identification of impacts on listed species; development of mitigation measures that minimize and fully mitigate impacts; development of a monitoring plan; and assurance of funding to implement mitigation and monitoring.

State-listed and candidate species potentially occurring in the Program area include the longfin smelt (*Spirinchus thaleichthys*), California tiger salamander, bank swallow (*Riparia riparia*), California condor, bald eagle (*Haliaeetus leucocephalus*), Swainson's hawk (*Buteo swainsoni*), Ridgway's rail (*Rallus obsoletus)*, California black rail (*Laterallus jamaicensis coturniculus*), California least tern, least Bell's vireo, salt marsh harvest mouse, Townsend's big-eared bat (Corynorhinus townsendii and San Joaquin kit fox. Take of most of these species will be avoided, either because SMP activities will not

occur in locations or in ways in which take can occur, or in the case of fully-protected species such as the Ridgway's rail *(Rallus obsoletus)*, California black rail, California condor, bald eagle, and salt marsh harvest mouse, because of implementation of BMPs to avoid take.

2.7.2 Lake and Streambed Alteration Program

California's Lake and Streambed Alteration Program is regulated under Section 1600 et seq. of the F&G Code. Under the F&G Code Section 1602, CDFW regulates projects that affect the flow, channel, or banks of rivers, streams and lakes. F&G Code Section 1602 requires state or local governmental agencies, public utilities, and private individuals to notify and enter into a streambed or lakebed alteration agreement with CDFW before construction of a project that will:

- Substantially divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake;
- Substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or
- Result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

F&G Code Section 1602 generally applies to any work undertaken in-channel and within and/or associated riparian habitat of a river, stream, or lake. F&G Code Section 1602 typically does not apply to drainages that lack a defined bed and banks, such as swales, or to wetlands, such as vernal pools.

CDFW has regulatory jurisdiction over the bed, bank, or channel of a stream, lake, or pond, as stated in F&G Code Sections 1600-1616. Under F&G Code Section 1602, CDFW administers the Lake and Streambed Alteration Program and may issue a Streambed Alteration Agreement (SAA) for projects within their jurisdiction. SAAs typically are issued through an application process (submittal of a notification package) and include restrictions on construction periods and locations, and avoidance, minimization, and mitigation measures for potential impacts on habitat associated with waters of the State. Because CDFW has discretionary approval authority, it is a responsible agency under CEQA (see further discussion in Section 2.10, CEQA). As such, projects must fully comply with CEQA before CDFW can finalize an SAA. Note that such CEQA compliance has been completed for the SMP through the SMP 2012 FSEIR.

All creeks, lakes, and ponds in the Program area, as well as associated riparian vegetation, are subject to CDFW jurisdiction under F&G Code Sections 1600-1616.

Protection of Birds

F&G Code Section 3503 prohibits the take, possession or needless destruction of the nests or eggs of any bird. F&G Code Section 3503.5 makes it unlawful to take, possess or destroy any bird, nests or eggs of birds of prey (new world vultures, hawks, eagles, ospreys and falcons, and owls). Species protected by the MBTA may not be taken or possessed except as provided by rules and regulations adopted by the Secretary of the Interior in compliance with the MBTA (CDFW Code Section 3513). Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by CDFW.

Nearly all native bird species occurring in the Program area are protected by the F&G Code. SMP activities, such as vegetation management, may require the removal of vegetation where migratory birds are nesting. Compliance with the F&G Code will be met through implementation of the BMPs requiring pre-activity surveys before any breeding-season maintenance activities, implemented before SMP activities so that take of migratory birds is avoided.

2.7.3 Native Plant Protection Act

The Native Plant Protection Act (Fish and Game Code Section 1900 et seq), enacted in 1977, is a state law that prohibits take of endangered or rare native plants (with some exceptions).

CDFW works in collaboration with the California Native Plant Society and with botanical experts throughout the state to maintain an Inventory of Rare and Endangered Plants, and the similar Special Vascular Plants, Bryophytes, and Lichens List. Species on these lists may meet the CEQA definition of rare or endangered. As the trustee agency for the wildlife of California, which includes plants, ecological communities and the habitat upon which they depend, CDFW advises public agencies during the CEQA process to help ensure that the actions they approve do not significantly impact such resources. CDFW often advises that plant species with an appropriate California Rare Plant Rank in the Inventory be properly analyzed by the lead agency during project review to ensure compliance with CEQA.

Attachment C lists native, special-status plant species occurring or potentially occurring in the Program area. These species were fully considered during CEQA review of the SMP 2013 Manual Update, and measures to avoid, minimize, and mitigate impacts to these species were included in the SMP 2012 FSEIR.

2.7.4 Fully Protected Species

California Fish and Game Code Sections 3511, 4700, 5050 and 5515 prohibit the take of species listed within these sections of the code except under provisions of an approved Natural Communities Conservation Plan or for necessary scientific research, including actions to recover the species. Take may be authorized for scientific research only after a notice has been published in the California Regulatory Notice Register. Scientific

research does not include actions taken as part of a mitigation project as defined by the CEQA.

Fully protected species within the SMP Project Area are the: American Peregrine Falcon, Brown Pelican, California Black Rail, Ridgway's rail *(Rallus obsoletus)*, California Condor, California Least Tern, Golden Eagle, Southern Bald Eagle, White Tailed Kite, Trumpeter Swan, Greater Sandhill Crane, Ring-tailed Cat and the Salt Marsh Harvest Mouse.

2.8 SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION (BCDC)

BCDC has regulatory responsibility over development in the San Francisco Bay and along the Bay's nine-county shoreline. BCDC works with its federal, state and local partners in the Long-Term Management Strategy (LTMS) for the Placement of Dredged Material in the San Francisco Bay Region, to manage dredging and disposal activities in the Bay Area. Formed in 1990, the LTMS Program is a collaborative partnership that involves regulatory agencies, resource agencies and stakeholders who work together to maximize beneficial reuse of dredged material and minimize disposal in the Bay. (BCDC 2007)

2.8.1 McAteer-Petris Act

The McAteer-Petris Act was enacted in 1965 to promote responsible planning and regulation of the San Francisco Bay. This law created BCDC, which is responsible for enforcing it. The McAteer-Petris Act requires that "maximum feasible public access, consistent with a project be included as part of each project to be approved by the BCDC." BCDC jurisdiction in the San Francisco Bay Area extends over the Bay, up to mean high tide and to five feet above mean sea level in marshes; and over a 100-foot shoreline band inland from the line of mean high tide or the line five feet above mean sea level adjacent to marshes. BCDC also has salt pond jurisdiction, which consists of all areas diked off from the Bay and used between August 1966 and August 1969 for the solar evaporation of Bay water in the course of salt production.

Within the Program area, any maintenance activities that are conducted within tidal waters of the South San Francisco Bay or areas determined to be within the shoreline band may require a permit from the BCDC.

Valley Water is authorized to perform stream maintenance activities under BCDC Permit No. M77-113, which expired on December 31, 2019. Valley Water will be requesting an extension of four years from BCDC (or issuance of a new permit), through 2023. The purpose of this four-year extension will be to align the permit timeline with the timelines of SMP permits issued by other state and federal agencies. Having the same permit coverage timeline for the SMP will assist with interagency collaboration and Valley Water reporting. Valley Water is in compliance with conditions of the BCDC Permit. All currently authorized maintenance activities will be conducted under the same protocols and locations. Similarly, Valley Water will continue to comply with all mitigation, monitoring and reporting requirements included in the existing permit.

2.9 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

NEPA requires federal agencies to include in their decision-making process appropriate and careful consideration of all environmental effects of a proposed action and of possible alternatives. Documentation of the environmental impact analysis and efforts to avoid or minimize the adverse effects of proposed actions must be made available for public notice and review. This analysis is documented in either an EA with a FONSI or an EA with a finding that preparation of an EIS is required. NEPA compliance will be achieved for the SMP by USACE through preparation of an EA as part of the RGP process. Issuance of a FONSI is anticipated.

2.10 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

CEQA (Public Resource Code Section 21000 et seq.) is the cornerstone of environmental law and policy in California. CEQA requires public agencies to assess and publicly disclose the environmental implications of proposed actions through the preparation of appropriate documents. The primary objectives of CEQA include:

- Ensuring that the potential environmental impacts of SMPs are disclosed to decision makers and the public;
- Ensuring that environmental damage is avoided, reduced, or compensated for by the implementation of carefully designed mitigation measures;
- Making the public aware of the reasons for an agency's approval of a project with significant, unavoidable, and unmitigable environmental impacts;
- Fostering cooperation between agencies in the review of projects; and
- Enhancing public involvement in the planning and review of projects that may impact local communities and their natural environment.

CEQA applies to discretionary activities proposed, implemented, or approved by California public agencies, including state, regional, county, and local agencies. The public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect on the environment is the lead agency for CEQA compliance, and this agency is responsible for preparing the environmental documentation for the SMP.

For the SMP, the water district served as lead agency for the preparation of the FSEIR (certified by Valley Water in January 2012) that evaluated the environmental impacts of SMP activities.

CHAPTER 3. MAINTENANCE PLANNING AND IMPACT AVOIDANCE

This chapter describes how measures to avoid and reduce impacts are incorporated into Valley Water practices. Effective planning requires a clear understanding of the site location and the extent and nature of specific maintenance work activities. It also requires knowledge of the stream system's natural and aquatic resources. Understanding these resources, their locations and how they interact informs an approach to avoid, minimize and mitigate environmental impacts when routine maintenance activities take place.

3.1 PROGRAM ENVIRONMENTAL PRINCIPLES

A key policy established by Valley Water's Board of Directors specifically addresses the need to minimize environmental impacts: "*A net positive impact on the environment is important in support of the District mission and is reflected in all that we do*."

Reflecting this policy, the SMP developed the following maintenance principles:

1. Avoid unnecessary intervention. Maintenance should only be done when it is determined to be necessary and appropriate to maintain conveyance, maintain the structural integrity of stream banks and beds, or to ecologically improve watershed ecosystems, streams, and/or other natural resources.

2. Consider the ecological system and its processes, including adjacent land uses, when determining maintenance necessity. If maintenance is necessary, then, before selecting sediment, vegetation or bank stabilization treatments, work to understand the channel system and its formative processes to know why the reach is functioning as it is. Established maintenance guidelines (MGs) are a method to document and centralize applicable information to be used to guide appropriate maintenance activities. Where channels are bordered by developed land uses, flood protection requirements may limit stream management options. Maintenance activities will not increase the level of flood protection provided to surrounding lands as defined by as-built information for the reach, or increase the dimensions of an unmodified channel.

3. Seek maintenance solutions that minimize the impacts on the environment. Implementing best management practices (BMPs), work windows, and work activity program requirements and incorporating geomorphic approaches when possible, can assist in minimizing impacts.

4. Integrate maintenance activities towards sustainability to reduce frequency of maintenance. The approach for channel maintenance should integrate effective activities that, in time, will reduce the overall need for continued maintenance support.

These maintenance principles collectively guide the SMP's integrated maintenance approach, while taking into consideration a variety of parameters including existing conditions, flood protection, natural processes and ecological health.

3.2 MAINTENANCE PLANNING

Maintenance planning and prioritization is based on the results of watershed field inspections and the requests for services through Valley Water's tracking system. Valley Water staff conduct annual inspections of channels to identify bank erosion, levee erosion, levee damage from animals, in-channel blockages (debris, large woody debris [LWD], downed trees), sediment deposition, excessive bed scour and in-channel vegetation growth that may impede flow conveyance. Inspection staff conduct a visual assessment of the channels. Potential deficiencies are documented and photos are taken of the sites. Information gathered during the inspections is forwarded to technical staff for quantitative analysis and assessment, which may include the collection of survey data and hydraulic modeling. Requests for services are generated by internal staff or external entities and often identify specific issues or concerns. These requests are sent to individual watershed staff and are followed up with a field inspection to determine the actual need for work and what allowable activity could resolve the described issue.

Maintenance planning relies on data from the as-built plans, MG's and associated flow data including cross-sections, where they exist. In addition, data from Valley Water hydraulic models and the corresponding GIS flooding and facility data are used. These documents provide channel dimensions and type (e.g. natural, concrete, levee) on a reach-by-reach basis, as well as dimensions and types of other in-channel features such as culverts and bridges.

Valley Water's annual stream maintenance planning, implementation and reporting process occurs in three phases: (1) Notice of Proposed Work (NPW) development and notification, (2) implementation of annual routine stream maintenance work, and (3) submittal of an Annual Summary Report (ASR). Once a maintenance activity has been identified, Valley Water staff determine what the requirements are for reporting the proposed activity to regulatory agencies. Proposals for certain activities must be submitted to and approved by appropriate regulatory agencies as part of the NPW process. For information concerning the annual notification and reporting cycles, including a detailed description of NPW and ASR requirements, please reference Chapter 12 of this manual.

3.3 WORK APPROACH IN SENSITIVE HABITATS

While Valley Water manages Santa Clara County streams for flood protection, it is also legally required to conduct work with consideration of the ecological values in these channels and facilities, including some channels that support resources considered particularly sensitive.

"Sensitive habitats," for the purposes of this document, are defined as channels that:

- Support federal or state-listed threatened or endangered species;
- Support State species of special concern and their habitats;

- Are designated as Critical Habitat under FESA;
- Are designated as special status natural communities; and/or
- Are designated as special aquatic sites as defined by USACE (e.g., wetlands, riffle and pool complexes, etc.).

Special status natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to the environmental effects of projects. These communities may or may not contain special status species or their habitat. The most current version of CDFW's *List of Natural Communities* indicates which natural communities are of special status under the current state of the California classification. (https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities)

Valley Water uses a comprehensive approach to identify and manage work in sensitive habitats. This approach may include the following activities:

- Annual training of maintenance staff.
- Use of avoidance and minimization measures.
- Implementation of BMPs.
- Review of NPW and Minor Maintenance activities by a qualified biologist to identify potential impacts to sensitive species and suitable habitats and provide avoidance and minimization recommendations.

Each year Valley Water conducts BMP and resource protection requirement training for the field operations units' staff. Training is also provided to contractors and other water district staff that may be working on an SMP project. The field operations units conduct tailgate safety training where new information on sensitive resources may be discussed. Where sensitive resources are present on or adjacent to a work site, maintenance crews are trained on site-specific requirements. This on-site training may include identification of species and protected resources; creation and implementation of buffer zone locations and sizes; and procedures to follow when work may proceed within the buffer zones.

Avoidance and minimization measures are the set of practices that the SMP uses to avoid and/or minimize the potential for impacts to sensitive species and habitats. Avoidance and minimization measures include work windows and BMPs. SMP avoidance and mitigation measures are discussed in greater detail under Sections 3.4 and 3.5.

Valley Water employs procedures to determine how and when maintenance will occur in sensitive habitats, identifying appropriate BMPs to avoid and minimize habitat and species impacts, and to determine mitigation requirements. Procedures used to approach work in sensitive areas are as follows:

1. For the upcoming maintenance year, Valley Water identifies maintenance needs, activities and locations that may occur in sensitive habitat.

2. Prior to initiation of the work activity, a Valley Water biologist familiar with the life history requirements of the listed species will conduct an evaluation. This assessment may include review of aerial photography, GIS-based review of habitat mapping or species distribution, specific field surveys and any other information pertinent to the site or species information.

3. When a Valley Water biologist identifies sensitive resources in the work area, the limits of the affected resources may be mapped or delineated in the field. For each activity, a Valley Water biologist identifies the BMPs or other recommendations to be implemented to avoid and minimize impacts, based on the sensitive habitats/species that may be present. The maintenance supervisor then ensures that the recommendation or BMPs are implemented before and during the maintenance activity.

3.4 WORK WINDOWS

Work windows are used to minimize and/or avoid potential impacts to protected species and habitats. Additional SMP parameters are included in the specific work activity chapters. The following series of tables presents the work windows for various locations and maintenance activities. Figures 3-1 and 3-2 provide maps of creeks that support the fish identified in the tables below. In-channel is the up to the bankfull elevation or below the Ordinary High Water Mark/Mean High Water Mark (OHWM/MHWM) within a creek or slough.

In addition to the work windows and BMP’s, the following work practices apply:

- All maintenance vehicles shall stay on the maintenance roads when the soil is damp to avoid and minimize disturbed soil conditions within the channel bed and bank.

- Valley Water will have erosion and sediment control materials available and on-site after October 1 at each maintenance site that does not have post-construction erosion and sediment control measures in place.

TABLE 3-1
In-Channel (Below OHW) Work Window for Creeks That Support Sensitive Fish Species

Work Activity	June 15–Oct 15	Oct 15–Oct 31 No work once significant rainfall occurs (0.5" within 24-hr within watershed)[1]	Nov 1–Dec 31 No work once significant rainfall occurs (0.5" within 24-hr within watershed)[1]	Year Round, except where mechanized equipment crosses a creek or water quality is otherwise affected
In-channel hand pruning In-channel hand removal (including tree removal) and stump treatment	X	X	X	
Herbicide	X[2]	X[2]	X[2]	
Sediment Removal[3]	X	X, if at least 50% complete on October 15		
Bank Stabilization[3]	X	X, if at least 50% complete on October 15		
Concrete Removal / Bank Rehabilitation Mitigation	X	X		
Encampment Cleanup Mitigation				X[4]
Minor Maintenance				X
Management of Animal Conflict – Burrow Filling				X[4]
Large Woody Debris				X[4]

X = work is allowed
Sensitive fish = anadromous salmonids, and green sturgeon and longfin smelt in San Francisco Bay tidal areas.
Note: All SMP activities that require dewatering of areas within anadromous salmonid streams would be restricted to the period between June 15 and October 31.

[1] After October 1, 72-hour look-ahead weather forecasts from the National Weather Service (or other qualified local vendor) are consulted to prepare for possible winterization measures. If a significant rainfall is forecast within the coming 72-hr window, maintenance work that may result in sediment runoff to the stream shall be stopped to allow adequate time to complete erosion control measures. Winterization materials will be available and installed prior to significant rainfall. Significant rainfall is the local rainfall of 0.5" or greater within a 24-hour period in the subject watershed, below the 1,000-foot contour.

[2] Aquatic herbicide can be used in California red-legged frog and California tiger salamander SMP potential range map areas only when the creek is dry and no rain is forecast for the next 48 hours. Surfactant use on the 14 creeks supporting anadromous salmonids is permitted when the stream is dry in the immediate work location and no rain is forecast for the next 24 hours.

[3] No new instream sediment removal projects and bank stabilization work will be initiated after October 15.

[4] If work is occurring within the wetted channel, biological pre-activity surveys must occur within 7 days prior to the initiation of work activities and a qualified biologist must be on site to monitor the work. (See BMP GEN-1)

TABLE 3-2
In-Channel (Below OHW) Work Window for Creeks
That Do Not Support Sensitive Fish Species

Work Activity	June 15–Oct 15	Oct 15–Nov 30 No work once significant rainfall (0.5" within 24-hr within watershed)[1]	Dec 1–Dec 31 No work once significant rainfall (0.5" within 24-hr within watershed)[1]	June 15–Dec 31 Work even after significant rainfall (0.5" within 24-hr within watershed)[1]	Year Round, except where mechanized equipment crosses a creek or water quality is otherwise affected
In-channel hand pruning In-channel hand removal (including tree removal) and stump treatment					X
Herbicide	X[2]	X[2]	X[2]		
Sediment Removal	X	X, if at least 50% complete on October 15[3]		X, specific reaches of Berryessa, Lower Silver, Thompson, Canoas, Ross, Calabazas, San Tomas Aquino[3]	
Bank Stabilization	X	X, if at least 50% complete on October 15 or is a new project that will be completed in five consecutive days or less			
Concrete Removal / Bank Rehabilitation Mitigation	X	X			
Encampment Cleanup Mitigation					X
Minor Maintenance					X
Management of Animal Conflict – Burrow Filling					X

X = work is allowed
Sensitive fish = anadromous salmonids and green sturgeon and longfin smelt in San Francisco Bay tidal areas.

[1] 72-hour look-ahead weather forecasts from the National Weather Service (or other qualified local vendor) are consulted to prepare for possible winterization measures. If a significant rainfall is forecast within the coming 72-hr forecast window, maintenance work that may result in sediment runoff to the stream shall be stopped to allow adequate time to complete erosion control measures. Winterization materials will be available and installed prior to significant rainfall. If after a storm event occurs and there was not significant rainfall, the project may continue until next significant rainfall or October 31. Significant rainfall is defined as rainfall of 0.5" or greater within a 24-hour period in the subject watershed, below the 1,000-foot contour.

[2] Aquatic herbicide can be used in California red-legged frog and California tiger salamander SMP potential range map areas only when the creek is dry and no rain is forecast for the next 48 hours.

[3] Work may occur on Berryessa Creek (0-88+80; 232+70-236+00; 284+30-288+00), Lower Silver Creek (Reach 3 between Stations 37+40 and 381+19), Thompson Creek (0+00-10+00), Canoas Creek (0+00-390+00), Ross Creek (0+00-86+30), Calabazas Creek (35+00-105+00), and San Tomas Aquino Creek (80+00-100+00) with the following conditions:
- Site conditions are dry and access for all construction equipment and vehicles will not impact waterways; and
- All work will stop if any rainfall is forecast for the next 72-hour period.

TABLE 3-3
Non-In-Channel (Above OHW) Work Window

Work Activity	Year-Round, except where mechanized equipment crosses a creek or water quality is otherwise affected	Date Specific Work Period
Vegetation Management (including pruning, limb removal, vegetation removal <6" dbh and tree removal 6-12" dbh)	X	
Herbicide[2]	X Per Material Safety Data Sheet and Product label limitations	[1]
Mowing		Feb 1–Nov 30
Grazing[3]	X	
Management of Animal Conflicts	X Per special status species and pesticide requirements	
Bank Rehabilitation Mitigation	X	
Encampment Cleanup Mitigation	X	
Minor Maintenance	X	

X = work is allowed

[1] Herbicide application can occur in California red-legged frog and California tiger salamander SMP potential range map areas only when the creek or area is dry and no rain is forecast for the next 48 hours.

[2] Herbicide use on terraces will be limited to times when there is no flowing or ponded water on the terrace, and when no rain is forecast for the next 48 hours.

[3] Grazing animals shall be restricted from entering the channel, all flowing and standing waters, and wetland habitats.

Protected Fish Species in North Santa Clara County

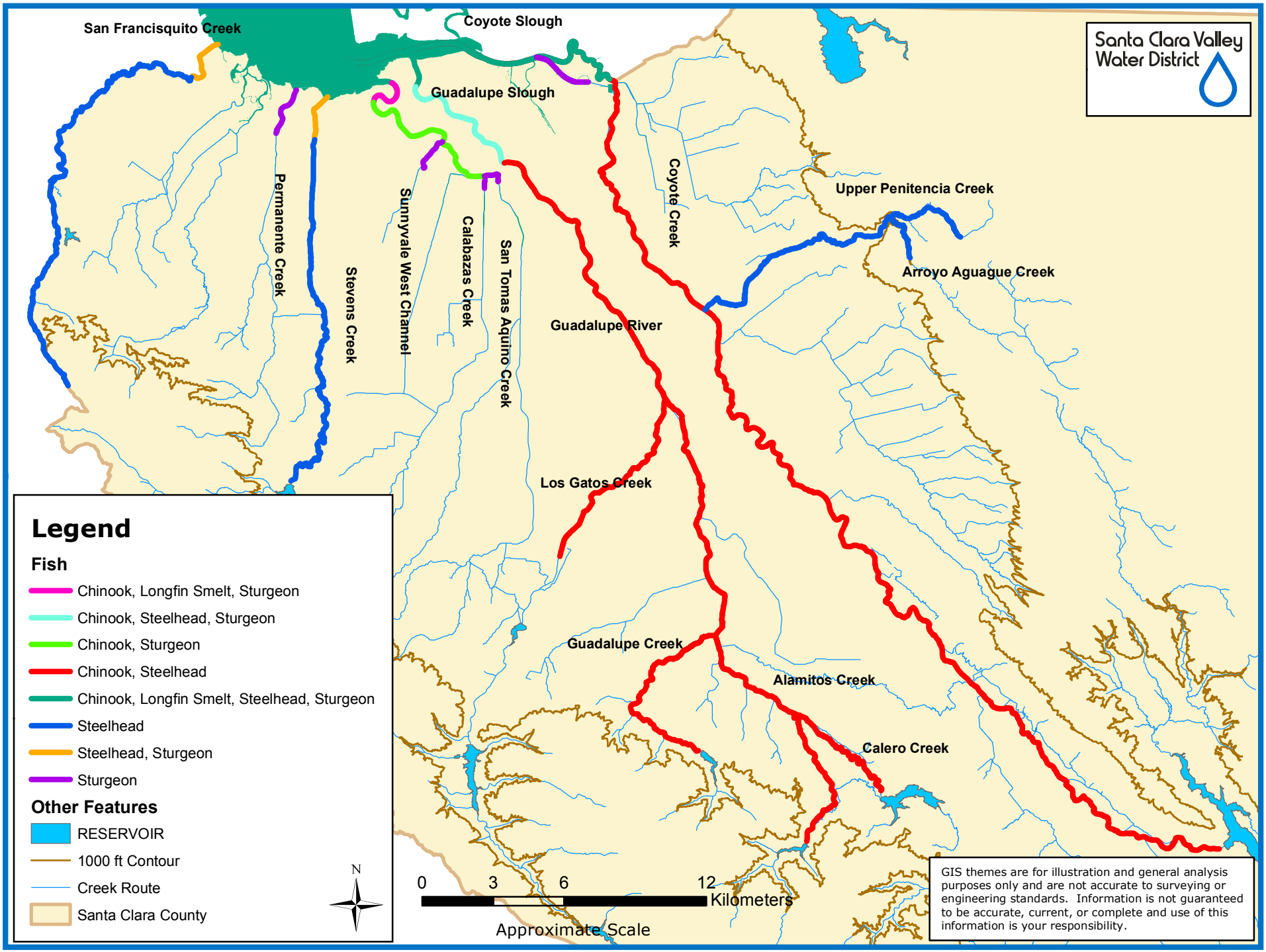


Figure 3-1. Protected Fish Species Distribution in the Northern Portion of Santa Clara County.

Protected Fish Species in South Santa Clara County

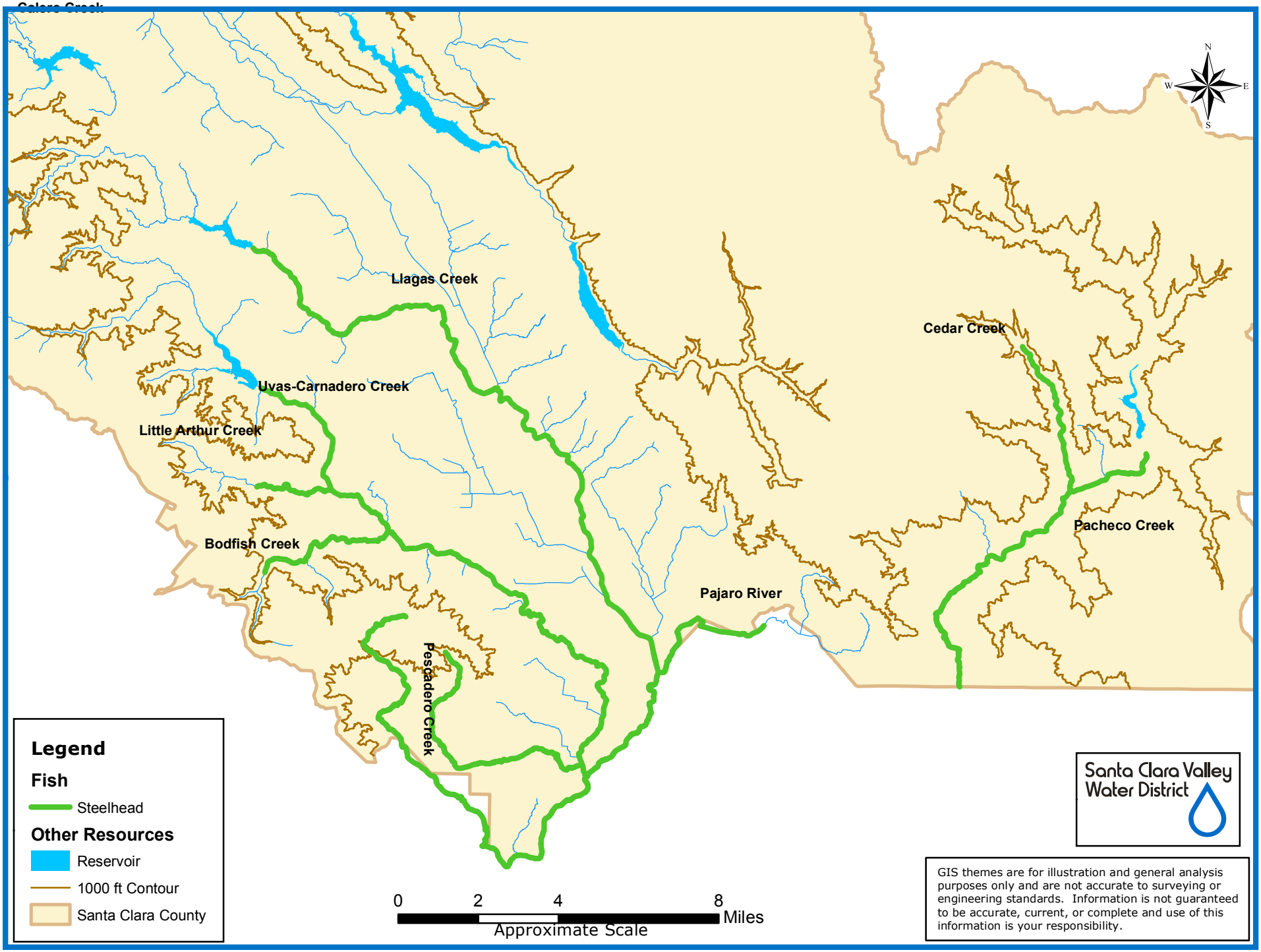


Figure 3-2. Protected Fish Species in the South County

3.5 BEST MANAGEMENT PRACTICES (BMPS)

BMPs are operational and procedural practices developed to protect natural resources and the health and safety of maintenance workers and the general public. These measures are designed to avoid or minimize impacts associated with stream maintenance activities. Individual BMPs may be applied program-wide or on a site-by-site basis to protect the site and the surrounding area. As discussed in Section 3.1, SMP environmental principles guide the use and implementation of BMPs at maintenance project sites. BMPs enable Valley Water to implement maintenance solutions that avoid and minimize impacts on the environment, consider the ecological system around the project, and integrate maintenance activities towards sustainability.

BMPs are evaluated annually and revised as needed to ensure their effectiveness. Valley Water staff and contractors are trained annually on the BMPs, including any revisions that have been agreed to by the regulatory agencies. The table of BMPs is located in Attachment A. This table is organized into groups corresponding to program activities and specific environmental resources. A description of each BMP group is provided below. When BMPs are revised, they are submitted to the agencies for review and approval prior to implementation. These revisions do not require amendments to the permits.

Pre-Project Planning and General BMPs (GEN-X)

Pre-project planning BMPs are implemented when developing the annual NPW. These BMPs are employed prior to on-site maintenance work. Pre-project planning BMPs are used to identify site requirements for dust control, hazardous materials management, sediment stockpiling, water quality protection, dewatering planning, vehicle maintenance and fire protection. Pre-project BMPs also include protection of sensitive biological and cultural resources. Site design constraints for sediment removal and bank stabilization activities are also identified as part of the pre-project planning process. Public safety BMPs describe public outreach and protection measures. General BMPs are applicable program-wide and include standard construction practices, worker safety and impact avoidance measures.

Vegetation Management (VEG-X)

Vegetation management BMPs provide guidance on avoidance and minimization of impacts associated with vegetation removal, pruning, herbicide application, and grazing.

Minimization and Avoidance

Non-in-channel vegetation management activities also use applicable BMPs to avoid and minimize impacts to the environment. Field staff conduct field surveys at the start of every job and periodically as the job progresses, to ensure that no changes in conditions have occurred since the pre-construction biological surveys were performed. Any change in conditions is reported to biological staff and if necessary, adjustments are made prior to commencing or continuing work. If adjustments cannot be made to avoid

or adequately minimize impacts, work may be deferred in either the entire site or in specific areas within the site.

Herbicide products with the lowest toxicity levels are used. Staff test herbicide effectiveness rates to ensure that the lowest effective rate is used. When working below top of bank, instead of broadcast spraying, staff employ spot spraying and direct stump application to reduce the amount of herbicide used and to avoid or minimize impacts to non-target vegetation and other resources.

Valley Water further minimizes impacts by specifically targeting emergent vegetation during the post-emergent work conducted in the late winter and spring. This practice establishes an annual approach with less intensive treatments and reduced impacts, compared to a less frequent approach with more intensive treatments and substantially higher impacts. Valley Water's vegetation management approach encourages growth of native species to competitively exclude non-native or undesirable vegetation through shading, where feasible.

Sediment Removal (SED-X)

Sediment removal BMPs provide guidance specific to sediment removal. The sediment removal BMPs include management of groundwater resources, prevention of downstream scouring, restoration of channel features and berm bypasses.

Minimization and Avoidance

Prior to the initiation of sediment removal operations, Valley Water technical, engineering, biological and construction staff conduct a series of field meetings to strategize sediment removal efforts. Access, staging, travel, water diversion, boundaries of work areas and habitat values are some of the issues discussed in detail. When habitat values may be impacted by the need to access the channel, staff work collaboratively to identify methods to minimize vegetation removal, minimize impacts to aquatic habitat and reduce the amount of temporary grading work needed to construct access paths or ramps. Stream flow diversions are common for sediment removal operations. Staff consider opportunities to remove sediment without disrupting stream flows by selectively removing pockets of sediment outside the low flow channel. This option leaves stream functions in the low flow channel unchanged during sediment removal operations. For sites where installation of stream flow diversions cannot be avoided, staff install diversion dams and energy dissipation tools to minimize water quality impacts that can occur at the pump and bypass discharge point. Native fish at the project site are collected and relocated during the dewatering process.

Sediment removal in channels that support anadromous salmonids and have maintenance guidelines will be performed only when the deposition is at or beyond the allowable threshold established in the facility's MG. Sediment removal in such channels will be performed only when the deposition is reducing flow conveyance to less than acceptable levels as confirmed by measurements taken in the field and verified by hydraulic modeling. Sediment removal is performed during the summer construction season to avoid impacts to spawning and migrating anadromous salmonids. Dewatering

and fish relocation BMPs ensure that impacts from the sediment removal activity are reduced. Maximum lengths for sediment removal are included at the end of this chapter and in Chapter 5.

Sediment removal on the lower Guadalupe River is designed to occur within the specific sediment deposition reaches (SDRs) (Figure 3-3). These sediment deposition reaches were designed to capture sediment when flows exceed the capacity of the main channel, allowing sediment removal without impacting salmonid habitat.

Bank Stabilization (BANK-X)

Bank stabilization BMPs include measures to prevent downstream erosion, protect water quality and prioritize repair of past bank stabilization projects for up to two years' post construction.

Minimization and Avoidance

Valley Water technical, engineering, biological and construction staff conduct a series of field meetings to consider site-specific parameters that will determine which repair method(s) can be considered and to strategize construction efforts. Staff also evaluate habitat values within the stream bed and bank to inform the maintenance approach in restoring the channel's design capacity. The goal is to return the channel to its design condition or better, to the greatest extent feasible. Access, staging, travel, water diversion, exact areas of work, habitat values, and locations of sensitive habitat are some of the issues discussed in detail. When habitat values might be impacted by the need to access the channel, staff work collaboratively to identify alternative access points and methods to minimize vegetation removal and reduce the amount of temporary grading work (access path or ramps). When stream flow diversions are required to implement the construction of erosion projects, staff discuss opportunities to minimize the impact area to avoid disrupting stream flows over a larger area. For sites that cannot avoid the installation of stream flow diversions, staff use diversion dams and energy dissipation tools to minimize water quality impacts that can occur at the pump and bypass discharge point.

Valley Water seeks to select the softest bank stabilization repair method that will stabilize the bank and limit further erosion. Staff evaluate whether the site needs to be repaired to prevent further erosion or destabilization of the stream bank, and whether other conditions exist that could compromise the integrity, safety and/or functionality of Valley Water facilities. If a repair is indicated, Valley Water conducts a field assessment to evaluate a variety of relevant factors for the repair, including the benefits of the repair; site opportunities and constraints; geomorphic conditions; fish and wildlife data; and potential presence of endangered species. The water district also conducts engineering calculations, which may include hydrology, hydraulics, hydraulic geometry and geotechnical constraints. Bank stabilization methods that would not address the erosion/risk hazard, or that are not technically feasible at the proposed location, are dismissed. Of the remaining alternatives, the one with the optimal combination of low cost, meeting the repair objective(s), and having the least environmental impact is then selected.

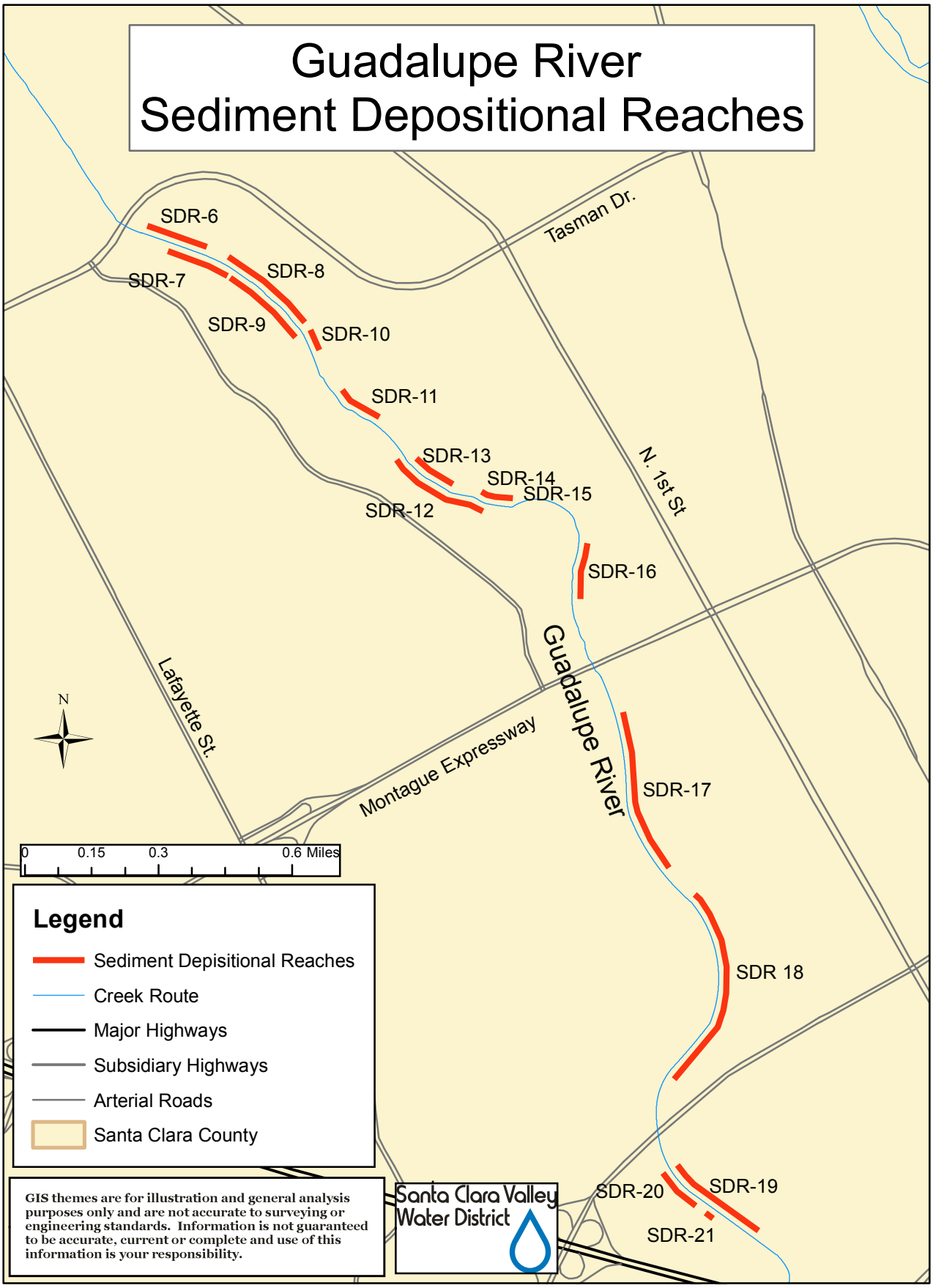


Figure 3-3. Guadalupe River Sediment Depositional Reaches

Bank stabilization methods that involve either the sole use of native vegetation or other bioengineered design techniques, or a combination of hard armoring and native vegetation or bioengineered design techniques, are evaluated for their suitability for use at each site. Soft or hybrid methods are utilized whenever they are determined to be practicable. Table 6-1 shows the parameters considered in selecting the appropriate repair methods. In designing and implementing bank repair projects, Valley Water uses the standard designs shown in Attachment D. These designs are based on industry standards for soft, hybrid and hard bank stabilization techniques.

In addition, Valley Water staff consider the scour depth and the rock size. Scour depth varies depending on the velocity and the soil type at that location. In determining the appropriate rock size, when flow data is available, hydraulic modeling determines the velocity that needs to be sustained in that reach, allowing for calculation of the minimum appropriate rock sizing that can sustain the shear stress. Based on additional localized site constraints, a factor of safety may be applied to the sizing calculation. The potential for natural reestablishment of riparian and other vegetation is incorporated into each bank design and method selection. Multiple factors are considered to avoid and minimize the potential impacts of a bank stabilization operation.

Post-Project Restoration (REVEG-X)

These measures provide guidance for planting vegetation at work sites where ground-disturbing activities have occurred.

Management of Animal Conflicts (ANI-X)

Animal conflict management BMPs provide guidance on avoidance of the redistribution of rodenticides, protection of sensitive species, and protection of water quality when slurry mixtures are used adjacent to streams.

Use of Pesticides (HM-X)

Pesticide BMPs include guidance on posting notices of pesticide use at work sites according to label requirements and use of products with the lowest toxicity at the lowest practical rates. These practices minimize exposure to humans, domestic animals, wildlife, non-target vegetation and water quality.

3.6 MAINTENANCE GUIDELINES (MGs)

3.6.1 Purpose and Objectives

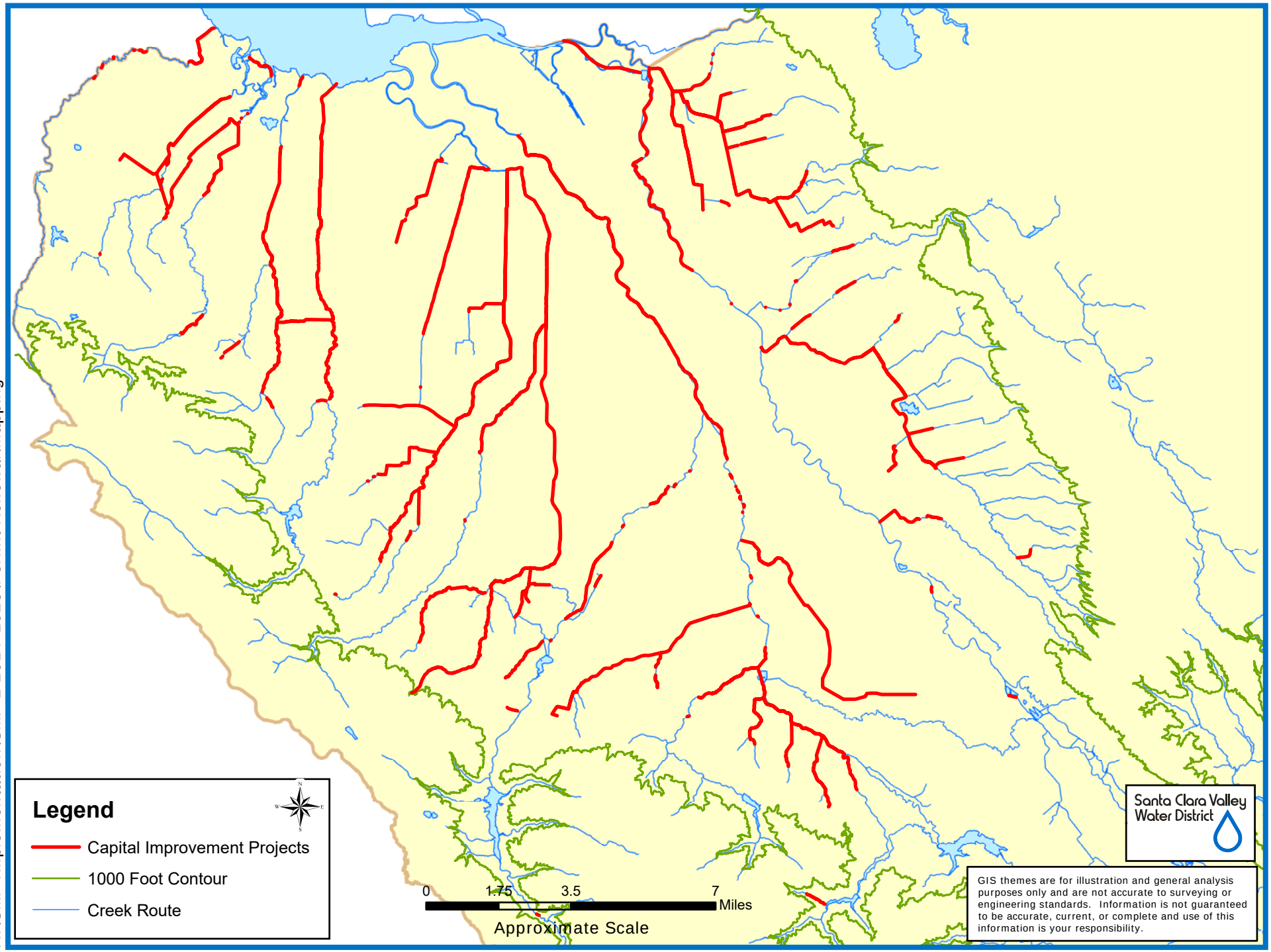
Maintenance guidelines (MGs) provide an approach for identifying conditions that would trigger maintenance actions on Valley Water facilities as described in previous sections of this document. Valley Water maintains its facilities to convey storm water runoff flows. When properly maintained, these facilities convey flows at recurrence intervals up to the level for which they were designed (reaches where flood control projects have been constructed) or at historic levels (non-engineered channels that have been modified historically or unmodified channels). The design flow conveyance, reflected in as-builts or record drawings, establishes an expected Level of Service (LOS). Valley Water owns

approximately 275 miles of creeks in the county of which roughly 90 percent have been modified for flood protection purposes with a Capital Improvement Project built by or accepted by Valley Water (See Figure 3-4). While the remaining channels may not have a designed flow conveyance value, Valley Water maintains its channels to ensure continued creek flows. Historical knowledge of 'hot spots' or typical 'pop-out' areas is critically important to minimize the impacts of localized flooding. Even where there are not designed channels, Valley Water provides some maintenance to enable reasonably unencumbered channel flows. Where a designed flow is not dictating the need for maintenance, Valley Water will apply the process described in Section 3.6.2 to identify service level needs.

MGs provide objectives that define the corrective and routine maintenance necessary to provide the established level of service (LOS) on Valley Water facilities. Valley Water facilities, for the purposes of the SMP, are categorized as Modified with Ecological Value, Modified, or Unmodified. The LOS of a Valley Water facility is based on planning documents, engineers' reports and Board-accepted projects with as-built plans or record drawings.

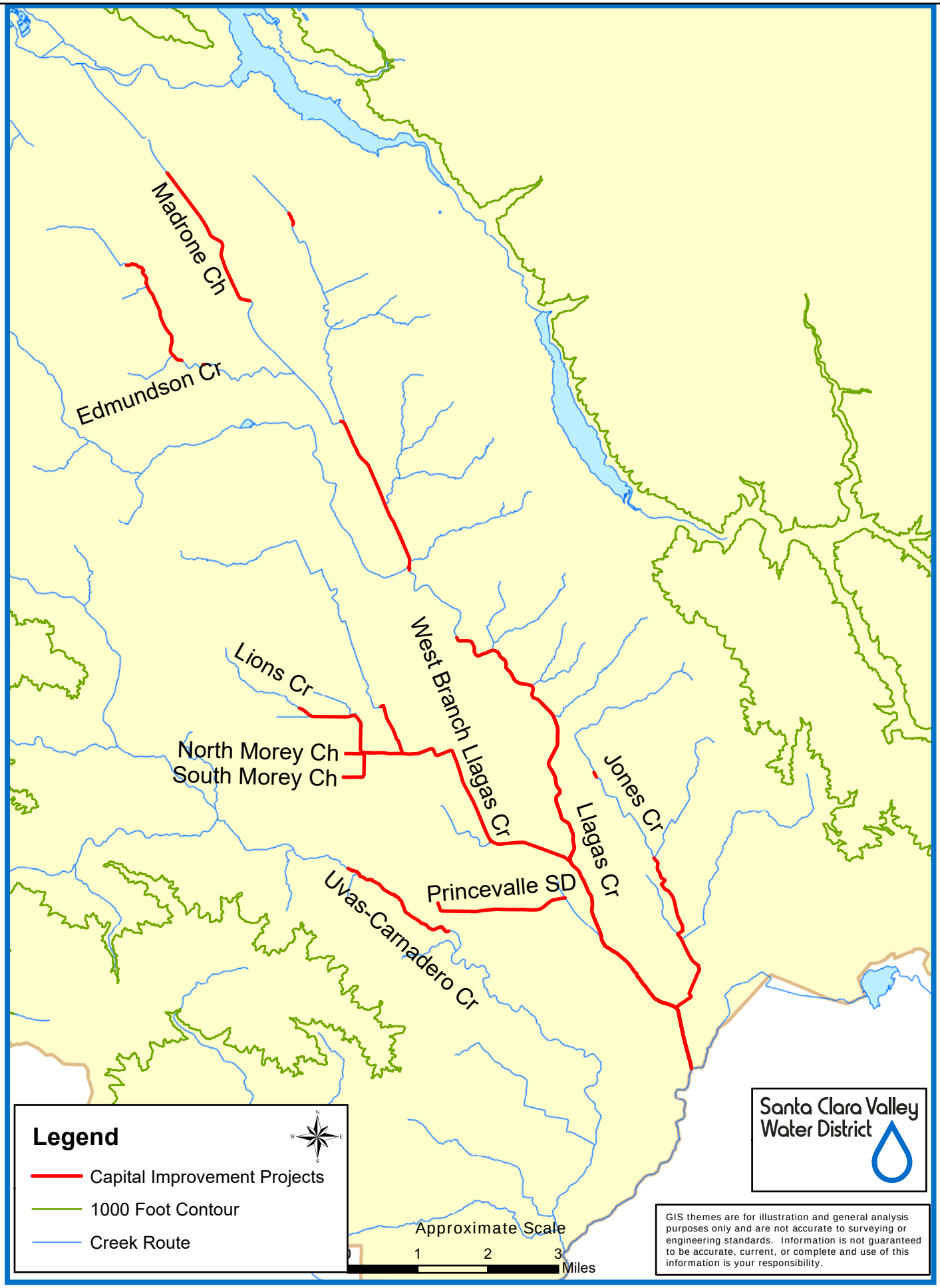
MGs will be developed for channels designated as Modified or Modified with Ecological Value only. When work is proposed in unmodified channels, Valley Water will follow the methodology described in Section 3.6.2. If an unmodified channel has the same work performed on it in the same area more than two times in a five-year period, then that reach of creek will be prioritized for development of MGs.

Figure 3-4a. Capital Improvement Projects - North County



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Figure 3-4b. Capital Improvement Projects - South County



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3.6.2 Evaluation Procedure Where Maintenance Guidelines Do Not Exist

A priority of the SMP is to maintain the design flow conveyance of Valley Water facilities. MGs guide sediment removal and vegetation management activities according to established, quantifiable thresholds based on an established LOS. The LOS can be compromised by sediment accumulation, vegetation growth and other types of channel obstructions. The District has over 100 stream gage and monitoring locations it uses to verify creek capacity. Additionally, during high flow rain events, District staff and hydrographers go out and collect additional flow data and high water marks to calibrate hydraulic models. Triggers will be adjusted according to updated hydraulic and hydrologic models and conditions observed in the field. Areas identified as needing maintenance to restore capacity will be evaluated and prioritized depending on the flooding risk. More specifically, for modified and modified with ecological value channels where channels have been modified for flood protection through capital improvement projects, the LOS and MG is based on the design parameters by which the channel was constructed. Where an MG has not been prepared for this type of channel, information will be provided pursuant to those listed in Section 3.6.3 that describe the as-built condition of the reach. Absent a specific freeboard requirement used in a project design, in general, Valley Water targets freeboard as 3 feet in sections with levees and floodwalls, 4 feet within 100 feet of bridges, and 1 foot in sections without levees and floodwalls. Maintenance is typically triggered when half the design freeboard is lost due to sedimentation or vegetative growth.

Maintenance on unmodified or non-engineered but historically modified channels will typically be limited to instream vegetation management, bank stabilization and those activities associated with property management, including removal of blockages and sediment removal at bridges and culverts.

Where vegetation management and/or sediment removal is necessary but MGs do not exist on these un-modified or non-engineered but historically modified channels, Valley Water will develop and submit the following information in the NPW:

1. Classification of the channel reach as Unmodified, Modified, or Modified with Ecological Value (Channels may be non-engineered but historically modified);

2. Statement as to whether the channel reach is part of a Previously Mitigated Area (PMA) (Section 10.3) or Five-Year Mitigation Area (FMA) (Section 10.4.1) and, if so, maintenance activities covered under the PMA/FMA;

3. For modified and modified with ecological value channel reaches, the 100-year flood flow rate, the estimated capacity of the channel and the historic conditions needing maintenance;

4. General channel reach dimensions;

5. For unmodified channel reaches, a description of Valley Water's best estimate of the natural condition of the reach, a description of any past practices and a description of the need for the proposed work;

6. Roughness and sediment objectives for the channel and the assumptions and rationale used to develop the objectives, including optimizing environmental values while still providing the target flow conveyance;

7. Evaluation of alternative approaches that could achieve the same result (e.g., removing an obstruction or hydraulic constriction, removing sediment instead of in-channel vegetation, etc.) that could achieve the same result while minimizing or avoiding impacts to sensitive habitat; and

8. Anticipated frequency of maintenance.

3.6.3 Scope and Content of Developed Maintenance Guidelines

MGs developed by Valley Water will provide comprehensive, quantifiable parameters that define the channel conditions for conveyance of flow at the established LOS and tolerances or triggers that, when taken as a whole, drive maintenance activities. The tolerances or triggers will consider capacity while protecting habitat values to the maximum extent practicable.

MGs will include the following information:

1. The established LOS which is the design capacity/Q.

2. Channel type, location of channel reach, length of channel reach.

3. Channel dimensions such as invert width, bank slope and channel depth for each representative reach of the channel, based on as-built plans or record drawings (where available) for channels categorized as Modified or Modified with Ecological Value.

4. For channels subject to sediment removal, estimated active (bankfull) channel dimensions or dimensions that can best establish quasi-stable hydrogeomorphic conditions that do not cause nuisance or excessive erosion or deposition. These dimensions shall be developed using a combination of information from regional stream restoration curves, reference reach data, computation of effective discharges, shear stresses and other assessments, as well as addressing different reach conditions and constraints. These active channel dimensions shall guide the management approaches contained in the MGs and finished grades in reaches undergoing sediment removal where compatible with as-constructed design dimensions.

5. For sediment and vegetation removal at bridges and crossings, a reasonable allowance for head loss will be established for each bridge/crossing, and maintenance triggers will be based on analysis that identifies the minimum work necessary to maintain conveyance objectives.

6. Sediment objectives for each channel reach will establish how much deposition can occur before the tolerance for loss of flow capacity is exceeded.

7. Vegetation management objectives for each channel reach shall describe the desired vegetation condition (e.g., vegetation type, density, etc.) for the given roughness that optimizes environmental values, including beneficial uses, for the reach (e.g., habitat, complexity, shade, etc.), while still providing the design flood flow conveyance.

8. The following shall be noted in the MG and will be updated as new information becomes available. These notes may contain suggestions for corrective actions that could be assessed during the development of future capital projects.

    a. Channel reaches with hydraulic constrictions (e.g., undersized culverts, bridge abutments, railroad trestles, utility crossings and other natural or human-caused obstructions) that could potentially cause backwater conditions, increased water surface elevations, bank instabilities or fish passage barriers; and

    b. Channel reaches that are a priority for maintenance based on chronic problems such as sediment accumulation, flooding or excessive erosion, and an assessment of the cause;

3.6.4 Workplan for Development of Maintenance Guidelines

Valley Water has already developed MGs that guide maintenance activities for a number of facilities. These MGs vary in age and in some cases need to be updated to reflect current maintenance guideline approaches. Where MGs do not exist, Valley Water relies on record drawings or uses existing channel reach dimensions and runs hydraulic models.

Updating and developing MGs are essential to maintaining Valley Water facilities to the established or historic LOS. Valley Water will update existing or develop new MGs for 39 facilities over the 10-year period for the SMP-2. MGs will be updated or developed as follows:

1. All new and existing MGs will be prepared and updated using the information described in Section 3.6.3. Prioritization of MG development will be based on the type of maintenance, the volume and frequency of work and the anticipated impacts considering the sensitivity of resources.

Table 3-4 and Figures 3-5 and 3-6 show the facilities targeted for development of MGs over the next 5 years. Facilities are listed per watershed. MGs for any new capital facilities will be developed through the CIP process.

TABLE 3-4
List of Facilities for MG Development (2014-2023)[1,2,3,4]

Watershed	Creek	GIS Station (from)	GIS Station (to)	Status[5]
Lower Peninsula	Adobe	0+00	561+90	2015
	Stevens	0+00	670+00	2015
	Matadero	85+00	418+00	2017
	Permanente	0+00	528+70	2019
	San Francisquito	0+00	492+31	2019
West Valley	Calabazas	0+00	680+00	2015
	San Tomas Aquino	0+00	824+00	2017
	Saratoga	0+00	530+70	2019
	Regnart	0+00	139+51	2019
	Wildcat	0+00	194+80	2020
	Sunnyvale East Channel	0+00	339+87	2021
Guadalupe	Ross	0+00	324+72	2014
	Alamitos	0+00	405+96	2016
	Golf	0+00	90+00	2016
	Los Gatos[6]	0+00	420+00	2017
	Randol[6]	0+57	34+60	2019
	Canoas	0+00	390+34	2019
	Greystone	0+00	81+89	2020
	Guadalupe River	743+00	755+00	2021
		1045+50	1074+15	2021
Coyote	Upper Silver	0+00	393+87	2015
	Lower Penitencia	46+00	217+00	2017
	Berryessa	205+00	301+50	2017
	Lower Silver	0+00	320+00	2019
	Thompson	1+64	195+26	2019
	Coyote	0+00	732+20	2019
	Calera	22+80	63+00	2020
	Los Coches	0+00	63+00	2020
	Upper Penitencia	36+30	205+50	2021

Watershed	Creek	GIS Station (from)	GIS Station (to)	Status[5]
Uvas/Llagas (Pajaro)	Lions	0+00	187+94	2015
	Uvas-Carnadero	367+50	465+00	2016
	Princevalle Storm Drain	0+00	95+34	2016
	Llagas	0+00	382+00	2017
	West Branch Llagas	0+00	220+00	2017
	Jones	0+00	255+92	2018
	Madrone Channel	0+00	220+00	2019
	North Morey Channel	0+00	13+48	2019
	South Morey Channel	0+00	33+13	2019
	Edmundson	0+00	43+39	2020

Notes:
1. MGs are developed for reaches of creek in which there is a defined LOS and where Valley Water has the authority to operate.
2. Watersheds are organized geographically, as follows: Lower Peninsula, West Valley, Guadalupe, Coyote, and Uvas/Llagas (Pajaro).
3. GIS stationing may be adjusted as LOS are defined.
4. Shaded cells indicate creeks for which MGs have been prepared (as of October 2018) and are being utilized as working documents.
5. Status indicates year in which MG was prepared and/or is projected to be completed.
6. Added by Valley Water as a creek for which a MG is to be created; creek was not originally identified in Table 3-4 of existing (2014) SMP manual as requiring MG to be developed.

Figure 3-5. Maintenance Guideline Development for North County Channels

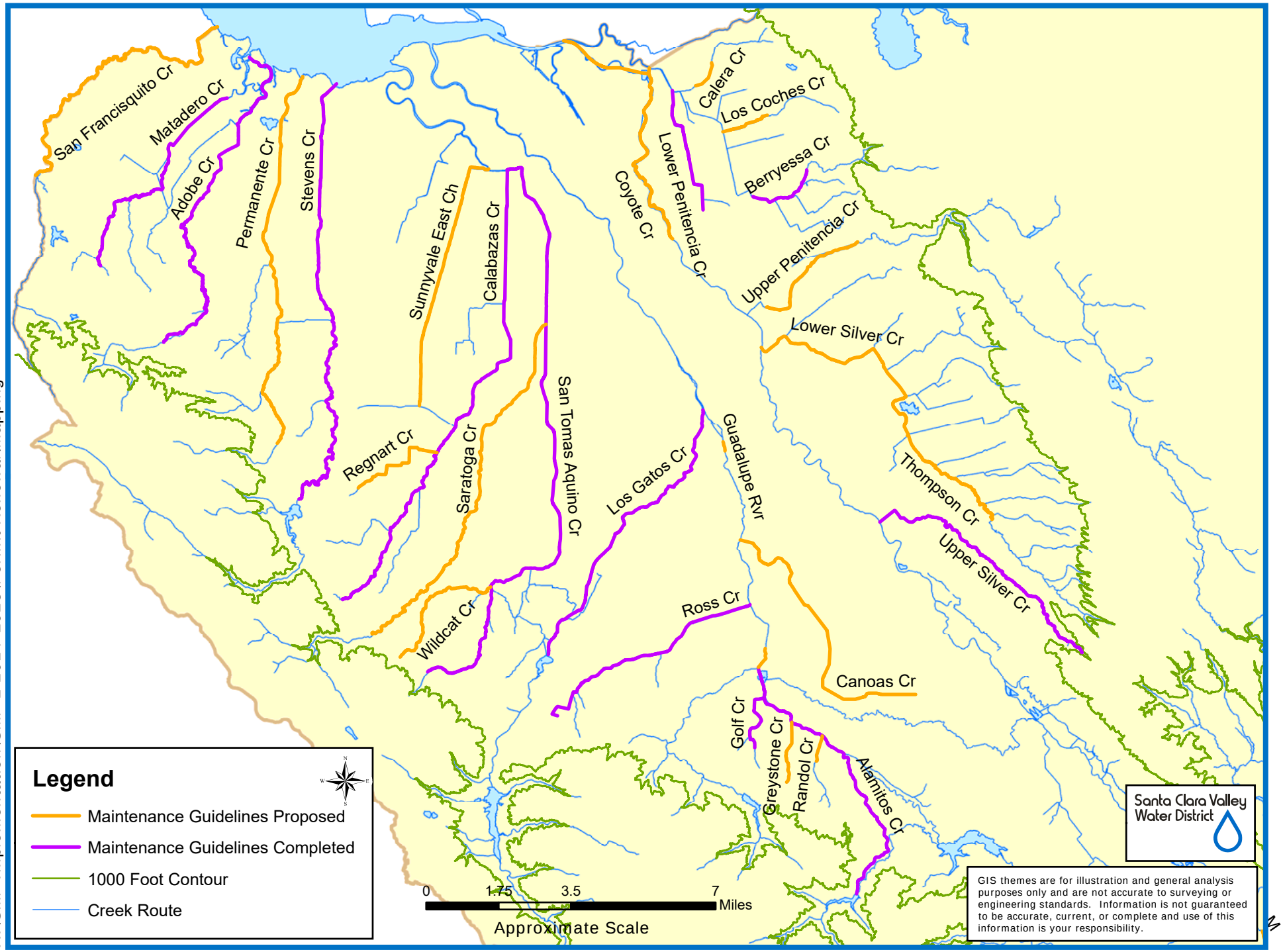
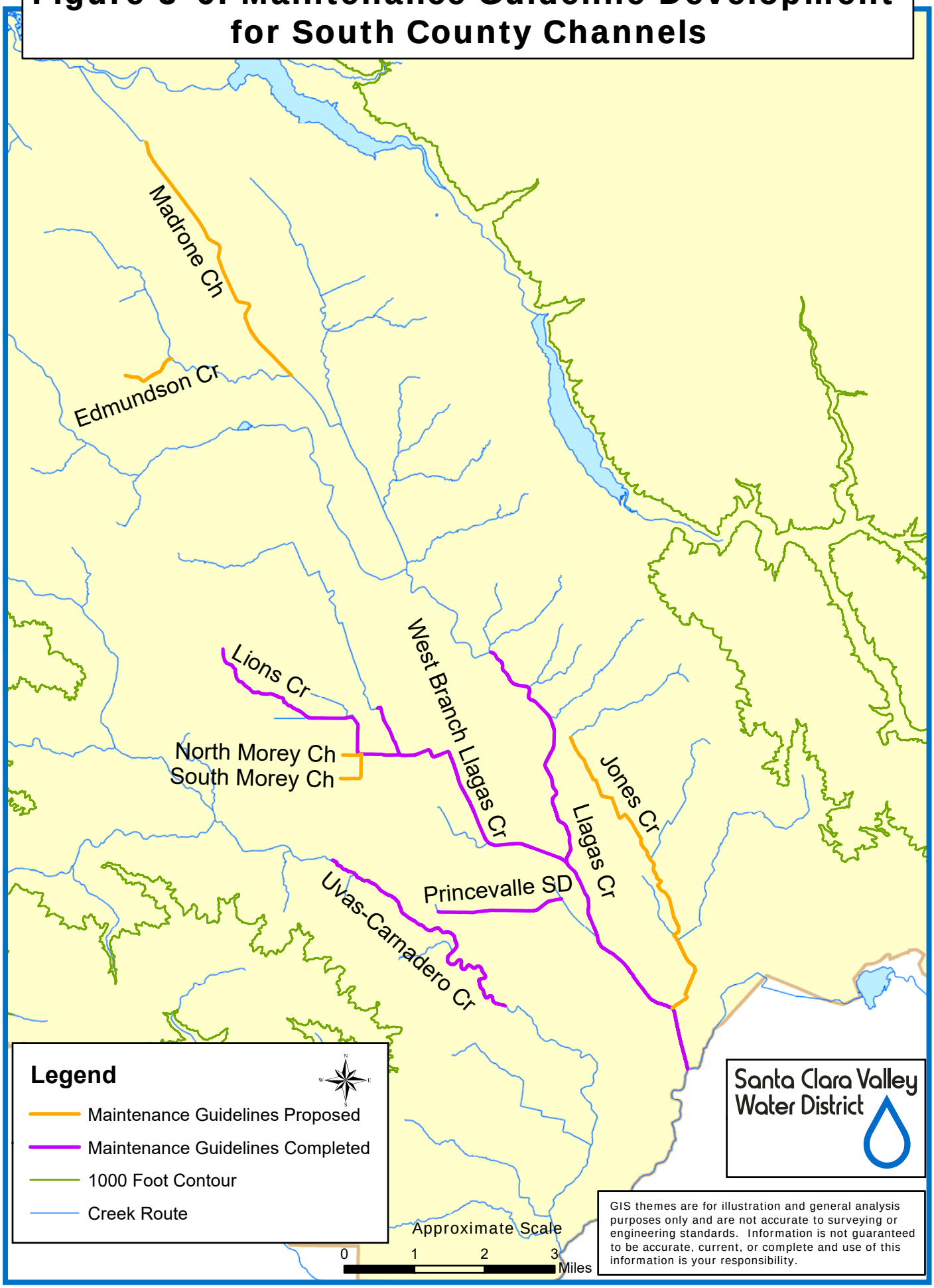


Figure 3-6. Maintenance Guideline Development for South County Channels



X:\SMP Implementation\SMP-2 2014-2023\Permit Renewal\Mapping

3.7 PROJECTIONS

Work projections were used to conduct the environmental impact analysis in the 2012 SMP Final Subsequent Environmental Impact Report (FSEIR), and thereby determine potential impacts, necessary BMPs and mitigation measures. Maintenance activities are permitted throughout the program area as long as they do not result in significant environmental effects substantially different than those evaluated for the SMP as a whole (as informed by the projections that were used for the analysis).

Since the FSEIR certification, Valley Water removed work activities along canals from the SMP.

3.8 PROGRAM LIMITS

Because the SMP is managed programmatically, each work activity has a range of project-specific limitations. The SMP protects natural resources by adhering to program and project limits. Work areas are managed for the entire SMP area to ensure that the maximum work covered by the Program, FEIR and regulatory permits is not exceeded.

The program limits include the following:

- Overall (10-year) acreage limitations on work activities, see Chapters 4-9;
- Annual acreage limitations on work activities, see Chapters 4-9;
- Limits on the extent of work in a particular area (e.g., extent of canopy removal, linear feet subject to maintenance based on channel type);
- Numbers of trees over 6" dbh that can be removed (annually and over the 10-year lifetime of the SMP); and
- Average annual and 10-year limits on the amount of herbicides and pesticides that can be used.

Program limits for each work activity are described in the work activity-specific chapters.

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CHAPTER 4. VEGETATION MANAGEMENT

4.1 PURPOSE

The Vegetation Management Program is designed to manage vegetation within channel corridors and water district right-of-way. Valley Water uses an integrated approach for vegetation management to ensure the most effective technique is used in a manner that minimizes impacts to the environment while meeting the requirements of flood protection, fire safety, maintenance access, infrastructure protection, mitigation and other legal requirements.

Vegetation management may have multiple benefits, including benefits to flow conveyance and flood management, reductions to public safety threats such as fire hazards, increases in access to creek corridors for both water district staff and the general public, maintenance of water quality, and improvements to the streams' function as habitat for wildlife and native plants.

A variety of vegetation management activities are anticipated during the program period (2014-2023). Multiple vegetation management activities may be used in combination to achieve program objectives depending on the location, season and resource conditions at the channel site.

This Vegetation Management chapter includes the following sub-sections:

4.1 Purpose
4.2 Maintenance Planning
4.2.1 In-Channel (Below OHWM) Vegetation Maintenance Planning
4.2.2 Non-In-Channel (Above OHWM) Vegetation Maintenance Planning
4.3 Vegetation Management
4.3.1 Pruning
4.3.2 Corrective Pruning
4.3.3 Coppicing
4.3.4 Vegetation Removal
4.4 Herbicide Application and Mechanical Methods
4.4.1 Herbicide
4.4.2 Mowing
4.4.3 Grazing
4.5 Impact Avoidance and Activity Specific BMPs
4.5.1 Program Limits for Vegetation Management
4.5.2 Program Limits for Herbicide and Mechanical Vegetation Management

4.2 MAINTENANCE PLANNING

The following sections provide general guidelines for planning vegetation management work, including maintenance work triggers and the assessment and prioritization process.

4.2.1 In-Channel Vegetation Maintenance Planning

In-channel vegetation management is conducted within a stream or slough (below ordinary high water/mean high water (OHW/MHW)).

Triggers

Vegetation management activities are triggered after inspection of a facility indicates a deficiency as defined by any of the following:

1. Visual observation (verified by field measurement) indicating that vegetation exceeds allowable tolerances identified in the Maintenance Guidelines (MGs);

2. Visual observation (verified by field measurement), compared with the design or as-built channel roughness condition, indicating the need to remove vegetation;

3. Visual observation (verified by quantitative estimate of roughness conditions), compared with the vegetation condition that provides a balance between flow capacity and habitat function and value in the channel, indicating that vegetation must be removed to restore that balance;

4. Vegetation poses a threat to proper function or integrity of facilities; for example, if vegetation growth is directing flows into a channel bank, leading to bank erosion; and/or

5. Essential maintenance or access is prohibited or public safety is threatened.

Assessment and Prioritization Process

Assessment of annual inspection records and field data may identify potential locations in need of vegetation management. Technical staff evaluate these locations to determine if conditions meet any of the triggers, using the following process:

Inspections

Valley Water staff annually inspect channels. Inspection results that identify potentially problematic vegetation growth are forwarded to technical staff for further evaluation.

Assessment and Analysis of Inspection Results

Technical staff analyze inspection results to ensure an accurate assessment of current channel capacity and conveyance at potential site locations. Staff may collect additional site measurements and information including, but not limited to, cross-section surveys, photo documentation and vegetation inventories. These measurements and information are compiled to develop a clear understanding of the current condition, particularly the current channel roughness (Manning's N value). Staff compare the current condition to available MGs. If MGs are not available for a location, staff follow the process described in Section 3.6.2. This information is then compared against the defined maintenance triggers to determine if the site will require vegetation management.

Valley Water maintenance crews inspect and maintain all creek crossings as necessary to ensure flow conveyance. Each crossing is distinct and is evaluated per site-specific conditions. As such, the amount and type of work is different for each crossing. Inspections may also identify the presence of undesirable non-native vegetation. These results are forwarded to technical staff for review and may result in the collection of additional field data to document the extent of the non-native vegetation. Invasive vegetation, as listed in Table 10-3, that is removed for the purposes of flow conveyance is considered an impact-neutral activity and no mitigation will be required.

4.2.2 Non-In-Channel Vegetation Management Planning

Vegetation management outside of the stream (above OHW/MHW) is performed to:

1. Provide maintenance access for in-channel activities
2. Address public safety issues
3. Maintain the structural integrity of facilities
4. Maintain ecological health

Each of these activity types is described separately below. Maintenance will be performed when applicable triggers are met and are not limited by MGs or Section 3.6.2, except where otherwise noted below.

A. Maintenance Access

Maintenance access activities include pruning of obstructive vegetation and herbicide application on maintenance roads. These annual preventative maintenance activities ensure continual access to facilities for maintenance purposes and contribute to fuel reduction and fire code compliance.

Triggers

Pruning work is triggered when vegetation along existing maintenance roads, maintenance footpaths and fence lines hangs over the roadway or path, impairing access or causing potential for damage to vehicles or equipment traveling along the roadway.

Herbicide work on maintenance roads is planned and scheduled for dry periods during mid-fall through late spring, before weeds or other undesirable vegetation become established. Herbicide application is conducted preemptively and therefore does not have a specific trigger mechanism.

An herbicide work assessment is performed for each site prior to scheduling application. This assessment includes recommendations and methods of application that are then documented in individual work orders and pesticide recommendations for each site. Herbicide applications are performed by licensed applicators under the written direction of a licensed Pest Control Advisor after an assessment of conditions is performed. Worker qualifications and herbicide application techniques are discussed further in Section 4.4.

Assessment and Work Process

Pruning work is prioritized based on the impacts to vehicle and pedestrian traffic and the length of time since the last pruning event. Facilities require pruning on varying intervals; some are scheduled annually, while others are scheduled for pruning every two to three years. Vegetation management staff inspect all maintenance roads and access ramps twice annually and apply herbicide as necessary. Staff apply pre-emergent herbicide to all Valley Water maintenance roads to prevent vegetative growth that could impede access and along property lines to provide firebreaks. Follow-up treatments of post-emergent herbicide are typically applied to all maintenance roads and along property lines as needed. Post-emergent herbicides are applied via spot spraying, which limits the amount of herbicide used.

B. Public Safety

Maintenance activities to address public safety issues include mechanical mowing, hand mowing/weed whacking, pruning and herbicide applications above OHW. These annual preventative maintenance activities are performed to abate combustible vegetative fuels and meet local fire codes and civil ordinances.

Triggers

Work to address public safety issues is triggered when vegetation on Valley Water facilities, including maintenance roads, could be considered a fire hazard by fire officials. Valley Water complies with California Government code section 51182, which requires the maintenance of a firebreak within 30 feet of occupied structures on its property by removing flammable vegetation or combustible growth. California Government code 51184 states: Section 51182 shall not apply to any land or water acquired or managed for lands kept in a predominantly natural state as habitat for wildlife, plant, or animal communities. Valley Water also follows guidance recommended by the County Agricultural Commissioner's Office by clearing flammable vegetation on its property located within 30 feet of structures on neighboring properties.

Herbicide work on maintenance roads has a dual purpose of providing maintenance access and establishing firebreaks adjacent to neighboring properties. Mechanical mowing and hand weed abatement are performed on slopes and large areas such as floodplains where herbicide use is not practical or would be more impactful.

Mowing activities in this category are prioritized based on the type of adjacent property, fire codes and the effects of local micro-climates (temperature, wind, etc.). Inspection and herbicide application are regularly performed to prevent vegetative growth that could present a fire hazard during summer months.

Assessment and Work Process

These work activities are performed after an inspection of the facility has identified vegetation that could be considered a fire hazard. Work assessments are performed on a site-by-site basis. Typically, trained staff perform an assessment at each location to determine the appropriate fire hazard abatement method. A work order is generated and appropriate staff or contractors are dispatched to perform the work. For all activities, work is performed in a manner that reduces potential fuel load to a level acceptable to local fire authorities.

C. Structural Integrity of Facilities

Valley Water preserves the structural integrity of its facilities through control of woody volunteer growth on engineered structures. Such structures include concrete wing walls and appurtenances and levees whose integral strength may become damaged by woody vegetation. This corrective maintenance activity is performed after deficiencies are identified in annual facility inspections.

Triggers

Work to address structural integrity of facilities is triggered after an annual inspection has determined that conditions are present that could degrade the structural strength of facilities. Examples of conditions that trigger work include vegetation growing in concrete weep holes and expansion joints. Work activities do not involve ground disturbance.

Assessment and Work Process

Activities in this category are performed as needed. Prioritization is based on the potential consequences of facility failure. Once an inspection of the facility has identified that vegetation either represents or could represent a structural deficiency in the facility, a work order request is generated and appropriate staff or contractors are dispatched to perform the work.

D. Maintenance for Ecological Health

Maintenance activities to support ecological health focus on management of invasive plants and corrective pruning. Removal of invasive plant species supports the growth of native plants and habitats. Corrective pruning can address other issues, such as diseased or damaged trees or instances of Sudden Oak Death and other pathogens. Additional activities include pruning, vegetation removal <6" dbh and herbicide applications of invasive plant species. If vegetation is removed to maintain ecological health, this removal should not be done to an extent that could degrade habitat quality. As described under Chapters 4 and 10, vegetation removal undertaken for ecological health, including opportunistic Invasive Plant Management Program (IPMP) activities and corrective pruning, generally do not incur mitigation.

Triggers

Work to maintain ecological health is triggered after an annual inspection has observed diseased or damaged trees or has determined that the establishment or continued growth of non-native vegetation poses a threat to the continued growth, natural recruitment or survival of native species. Non-native and invasive vegetation can establish, outcompete and overwhelm native vegetation, degrading habitat value.

Assessment and Prioritization Process

Opportunistic IPMP activities in this category will be prioritized based on protecting the existing functions and values of the habitat. Corrective pruning activities in this category will be prioritized based on the ecological value of the affected trees and the urgency of the disease or damage.

These work activities are performed after an inspection of the facility has identified that undesirable vegetation could degrade or has degraded native habitat and the benefits provided to a variety of species. Upon this determination, a work order is generated and appropriate staff or contractors are dispatched to perform the work.

4.3 VEGETATION MANAGEMENT

4.3.1 Pruning

A. Purpose

Pruning of trees and shrubs is necessary to provide access to Valley Water facilities, improve visibility for inspection of Valley Water facilities, protect Valley Water infrastructure, and maintain the designed hydraulic capacity of channel systems, as determined through Maintenance Guidelines or through the quantitative process described in Chapter 3.2.

Valley Water may thin vegetation to reduce or prevent fire hazards in compliance with local fire codes. Tree pruning may include thinning the canopy of an individual tree or shrub.

B. Work Activity

Pruning refers to removal of select branches from trees or shrubs to achieve a defined objective. Pruning may be conducted with mechanized and non-mechanized hand tools. Pruning typically takes place along maintenance roads, fences and levee slopes, although it may also occur in-channel or along terrace areas.

C. Requirements

Pruning requirements have been incorporated into the SMP to provide a consistent approach to this work activity. Pruning can stimulate new growth, change energy allocations in woody plants, and sometimes weaken plants or make them more susceptible to pathogens and disease. Excessive pruning in one season can initiate a sprouting response in the plant that can take many years to correct or amend.

The following pruning standards will be used, except for cases where these standards would create unsafe conditions for workers:

1. Pruning will be done by qualified staff in a manner that will achieve the maintenance goals of the facility while preserving the short and long-term health of the vegetation.

2. Pruning will be performed according to national American National Standards Institute (ANSI) A300 (Part 1) 2017 Pruning, ANSI Z133.1 – 2000 Safety Requirements and International Society of Arboriculture (ISA) Best Management Practices Tree Pruning (revised 2008) or the most current updates.

3. Pruning will remove no more than 25 percent of the structure of an individual tree in one season. If more than 25 percent of the structure of a tree is to be removed, this is considered vegetation removal and is addressed in Section 4.3.4.

4. Pruning tools will be kept sharp and disinfected frequently with an approved agent (isopropyl alcohol, Lysol, etc.), particularly when working on diseased/dying plants or moving between several locations.

4.3.2 Corrective Pruning

A. Purpose

Corrective pruning is performed to promote long-term tree health, as prescribed by a Certified Arborist. Corrective pruning may address defects that would eventually result in whole tree failure, such as co-dominant leaders, decayed or diseased limbs, extensive branch dieback, incorrect past pruning, or injury due to storm or mechanical damage. Corrective pruning may be used as an alternative to tree removal.

B. Work Activity

Corrective pruning involves the removal of individual woody plant parts and is conducted with mechanized and non-mechanized hand tools. Corrective pruning may occur anywhere in the stream profile.

C. Requirements

1. All corrective pruning will be performed according to national ANSI A300 (Part 1) 2017 Pruning, ANSI Z133.1 – 2000 Safety Requirements and International Society of Arboriculture (ISA) Best Management Practices Tree Pruning (revised 2008) or the most current updates.

2. Corrective pruning will be prescribed and marked by an ISA Certified Arborist.

3. Typically, no more than 25 percent of the structure of an individual tree will be removed in one season. Rare cases may occur, however, such as the removal of a co-dominant leader, where more than 25 percent of the structure of the tree is removed in one season. Such cases are still considered corrective pruning.

4. Removal of limbs greater than 4" diameter may be necessary for the health of the tree or for other reasons and is still considered corrective pruning.

4.3.3 Coppicing

A. Purpose

Coppicing is the cutting of a woody plant to ground level, creating annual "sucker" growth that may be used as cutting material for direct installation in mitigation projects. The plants that are chosen might typically be targeted for complete removal (e.g., near bridges) but instead are coppiced routinely as a propagule source. Typical species include willows, mulefat and poplars. After cutting the tree back to the ground, rather than treating the remaining stump with herbicide, the tree is instead left to resprout and provide an ongoing cutting source. Select trees within each of the major watersheds may be dedicated to this activity.

B. Work Activity

Coppicing of woody plants involves severely pruning the entire plant near the ground to promote multi-stemmed regrowth. Coppicing may transform a single-trunk standard growth form into a multi-trunked growth form. Hand-held and small mechanical tools are typically used for coppicing. Larger equipment may be necessary to remove the vegetation from the channel, after which it would be hauled away.

C. Requirements

Trees that would otherwise need to be removed may be good candidates for coppicing.

4.3.4 Vegetation Removal Activities (Vegetation Removal < 6" dbh, Limb Removal > 4" diameter and Tree Removal 6-12" dbh)

A. Purpose

Vegetation removal activities are a routine work occurrence and are necessary to maintain the proper function of Valley Water facilities, maintain conveyance capacity, remove debris accumulation and enhance the functions and values of the riparian system. Different criteria for vegetation removal apply, depending on species type, facility type and location within the channel system. Trees greater than 12" diameter at breast height (dbh) are not included in this program, but in some cases, Valley Water may request a waiver to remove large invasive trees. In these cases, Valley Water will provide a detailed description of the tree(s) involved, the surrounding area, the purpose for removal, and the positive and negative impacts of the proposed removal as part of the waiver process. Based on this information, Valley Water will include in the waiver a proposal as to whether any mitigation and/or monitoring will be associated with removal of each greater than 12" dbh invasive tree.

A tree trunk diameter is measured by the standard diameter at breast height (dbh) or approximately 4.5 feet above ground level. The dbh of multi-stem trees will be calculated by adding the dbh of the individual stems. The dbh of fast-growing multi-stem trees, such as willows or Acacia, will be calculated by adding the dbh of the individual stems then dividing by two. Dbh will not be measured or reported for shrubs (as defined by Table 10-5 or by the Jepson Manual). Removal of shrubs will be classified as vegetation removal <6" dbh.

If a multi-stem species is proposed for removal and is not on either the Invasive Plant List Table 10-3 or Typical Revegetation Palette list Table 10-5 and defined as a tree, the following methodology will apply. A multi-stem tree or shrub with seven (7) or less trunks or stems several feet above ground, will calculate the dbh by adding the diameters of the individual stems at 4.5 feet above ground. If the cumulative dbh is >6", then it will be counted as a tree. An individual species with greater than seven (7) stems at dbh will be assessed by their canopy cover and will not be considered a tree removal.

Vegetation removal activities may occur anywhere in the channel cross-section, including but not limited to streams and their immediate overstory, stream banks, levees, access roads, pedestrian paths, outboard areas and at bridges and culverts.

Tree removal is the complete removal of above-ground portions of any tree using mechanized or non-mechanized hand tools. Removed trees may be stump treated with herbicide to prevent regrowth. This is not considered part of the herbicide work described in Section 4.4.1, but instead part of the tree removal activity. Cut-stump treatment with herbicide is assumed for all tree removal, unless otherwise noted in this manual. Biological clearances will assume

herbicide treatment unless otherwise noted on the work order and biologists will take this into consideration when conducting these clearances.

1. Vegetation Removal for Flow Conveyance

   Vegetation removal may be necessary to retain design flow conveyance capacity and to maintain channels. These conditions can occur when a tree (or trees) on the bank has fallen into the stream or moved in such a way that the tree's new orientation impedes flows or causes debris blockages, resulting in an increased flood risk. Fallen trees can also divert stream flows into the opposite stream bank, increasing the erosion and flood risk. Although specific locations of downed trees are not always predictable, this work is considered "anticipated" due to its natural and regular occurrence.

   Trees may also be removed from locations where their roots or branches interfere with or undermine the integrity of Valley Water facilities. These facilities include, but are not limited to, concrete linings, concrete wing walls, gabions, sacked concrete walls, stream flow gauges, storm drain outfalls, culverts and pipes.

   Vegetation < 6" dbh may be routinely removed from channels to reduce the accumulation of debris and to reduce the risk of flooding. This vegetation removal may include woody, emergent, invasive and herbaceous vegetation. Trees and vegetation immediately upstream and downstream of bridges may be removed to prevent debris accumulation at the bridges. Each crossing is distinct and will be evaluated based on site-specific conditions or maintenance guidelines, if available. Therefore, the amount and type of work may vary for each bridge crossing. Where maintenance guidelines exist, vegetation will not be removed beyond that which is described in the relevant maintenance guidelines or beyond what is consistent with the vegetation objectives for a specific creek reach.

2. Vegetation Removal for Bank Stabilization, Maintenance Access and Infrastructure Inspection/Protection

   Bank stabilization projects often require the installation of temporary roads and ramps to access the work area. Tree removal may be required in such cases when pruning or limb removal > 4" diameter will not provide sufficient clearance for maintenance vehicles and heavy equipment. Vegetation removal may also be required for facility inspection and access. Pruning or limb removal > 4" diameter will typically be considered and prioritized over complete tree removal. Where tree removal is necessary for equipment access, staff will preferentially target invasive or non-native trees and select an access route that avoids mature, native trees. Occasionally, the water district may encounter projects in which there is a choice between the removal of a native tree that is less than 12" dbh and the removal of an invasive tree that is greater than 12" dbh.

In these situations, Valley Water may contact the regulatory agencies to request a waiver to spare the native tree by removing the invasive tree. The water district's request will include an assessment of the anticipated effect of this removal on the site's wildlife habitat function and a proposal as to whether any mitigation and/or monitoring will be associated with the removal of each greater than 12" dbh invasive tree.

3. Vegetation Removal for Ecological Health/Stewardship

In the interest of stewardship, Valley Water will make efforts to improve the health and vigor of trees on Valley Water properties through proper arboricultural and vegetation management techniques. Efforts to control the spread of invasive plants, plant diseases and pathogens such as Sudden Oak Death and western bark beetles will be implemented through this Program, as supported by relevant best management practices (BMPs) (e.g., GEN-31and VEG-2 in Attachment A) that prevent movement of invasives and infected materials to additional locations. Removal of infected trees may be necessary to guarantee the ecological health of the greater area. Valley Water staff conducting tree health assessments shall be Certified Arborists, botanists or other vegetation specialists qualified to make such decisions.

Trees may be removed or pruned (see Section 4.3.2, Corrective Pruning) to improve both aquatic and terrestrial habitat quality. To promote water resources stewardship, efforts will be made to improve the ecological health of riparian and upland woodlands on Valley Water facilities. Trees with structural defects, insect infestation or pathogens that threaten the ecological health of the tree or assemblage may be removed. Woodlands with stunted growth due to competition for resources may be thinned to facilitate normal growth. Prior to removing or stand thinning of trees, an ecological health assessment of the riparian and/or upland woodlands will be conducted and documented with written recommendations by qualified staff for consideration by management in planning the tree removal or pruning activity.

B. Work Activity

Tree removal 6 – 12" dbh is defined as the complete removal of above-ground portions of any individual tree with a dbh of 6 - 12". Cut stump treatment is a paired activity with tree removal and is assumed to occur unless noted otherwise on the work order.

Vegetation removal < 6" dbh is defined as the complete removal of above-ground portions of any individual plant or tree with a dbh less than 6". Cut stump treatment or foliar herbicide is a paired activity with vegetation removal < 6" dbh and assumed to occur unless noted otherwise on the work order.

Limb removal > 4" diameter is defined as the removal of limbs >4" diameter. The removal of these limbs can be conducted in lieu of complete tree removal, thereby minimizing impacts to vegetation.

Vegetation removal activities are typically performed using small hand tools or mechanized tools such as chainsaws or pole saws to manage vegetation. In some cases, mechanized equipment mounted on a vehicle such as a Marsh Master may be used. Cut vegetation is transported from the channel bed to the access road by hand or by mechanical equipment such as a crane, excavator or loader. Vegetation is chipped on site or may be hauled away in dump trucks/compactors. The cut stump herbicide application portion of this work activity is performed using tools such as drip cans, a spray bottle or a paintbrush for topical treatment.

C. Removal Criteria

Vegetation removal activities are performed as described above for the purposes of flow conveyance, maintenance access, infrastructure inspection/protection, bank stabilization, and ecological health/stewardship. Both native and non-native trees located within a channel, channel bank, or levee may require removal if flow conveyance capacity is reduced, the structural integrity of the facility is compromised, or necessary visual inspection of infrastructure is prevented. Tree removals are always evaluated carefully and native trees are given a higher level of consideration for preservation than non-native species. While non-native species are less desirable, all tree species have potential to provide some habitat value to the riparian ecosystem. Not all non-native trees may be appropriate candidates for removal. Removal of any tree will be assessed using the following criteria:

1. Presence or absence of adjacent vegetation of similar stature providing equivalent habitat functions such as roosting, nesting, or perching sites, shaded riverine aquatic (SRA) habitat or other valuable habitat attributes.

2. Current or documented use by wildlife that would be difficult to replace locally (i.e., near the tree removal location) if the vegetation were removed. Such use would include raptor nests, evidence of use by cavity nesting species, evidence of a rookery and similar wildlife uses.

3. Instances in which the tree is providing vegetative structure (root system) to a stream bank that is likely to erode if the tree is removed. In such cases pruning or thinning will be considered instead of removal to retain the soil stability function. Root wads are typically left in place with tree removal activities to help maintain creek bank integrity.

D. Requirements

1. Tables 10-1a and 10-1c provide a specific mitigation ratio by channel type to determine the mitigation debt and mitigation credit.

2. Removal of limbs >4" is prescribed and marked by an ISA Certified Arborist or those experienced and knowledgeable in ISA pruning standards.

3. Removal of limbs >4" that are extending to the trunk or larger lateral to avoid leaving long stubs, will be marked by an ISA Certified Arborist or those experienced and knowledgeable in ISA pruning standards.

4. All vegetation removal activities require a biological survey. In certain circumstances, the work may need to be supervised by a qualified horticultural specialist or Certified Arborist.

5. Vegetation removal activities must meet one of the purposes stated above in Section 4.3.4.

4.4 HERBICIDE AND MECHANICAL VEGETATION MANAGEMENT

The Valley Water vegetation management program uses an integrated approach of chemical, mechanical, cultural and biological methods to manage vegetation on its facilities. Herbicides are used in conjunction with mechanical and hand vegetation suppression to support hydraulic function, maintenance access, fire safety, infrastructure inspection/protection and ecosystem function. Herbicides are used in the manner that is least disruptive to biological resources. Staff are trained in BMPs relevant to herbicide use and label-trained on each herbicide. This training and review is conducted annually for internal staff and as a condition of work for contract staff performing herbicide applications. All herbicide applicators are required to obtain a Qualified Applicator Certificate (QAC) or Qualified Applicator License (QAL) from the California Department of Pesticide Regulation (CDPR). All contractors are also licensed and trained in proper SMP protocols and BMPs prior to working. Daily checklists are used to monitor herbicide application activities. Staff applying herbicide are also periodically monitored for compliance with additional internal Valley Water protocols.

Control of herbaceous and emergent vegetation, including grasses, broadleaf weeds, cattails and bulrush, in the SMP area, are performed for many of the same reasons as management of woody species. Herbaceous and emergent vegetation may impede flow conveyance and create fire hazards. Invasive plant species may have negative ecological impacts, including out-competing more desirable native species, resulting in habitat degradation.

Vegetation control is performed to limit weed growth, seeding and expansion into new areas; reduce weeds in areas of special management (mitigation sites); maintain road rights-of-way and firebreaks along and beyond the top of bank; prevent vegetation encroachment into Valley Water facilities; maintain vegetation-free areas as buffers; and provide localized treatments to protect facilities and resources.

Guiding Principles

The goal of SMP vegetation management is to achieve the desired vegetation control while balancing environmental and economic considerations. Herbicides, while often the most effective management tool economically, are not appropriate for use in all situations, such as in the presence of certain special-status species. However, herbicides used appropriately are in many cases the most environmentally desirable method for achieving the correct level of vegetation control. The selection of an approved herbicide, sometimes coupled with the use of an appropriate surfactant (per label recommendations), can provide a higher level of vegetation control, which may reduce maintenance frequency and minimize physical impacts to the site associated with mowing or other control methods. Targeted use of herbicides may eliminate the need to bring in heavy mowing equipment or large hand crews that can be more disruptive to on-site biological resources.

Valley Water complies with the Integrated Pest Management requirements of the Municipal Regional Stormwater NPDES Permit (MRP). The MRP mandates that pesticides (in this case specifically herbicides) be used only when other methods such as mulching, mechanical weed abatement, hand pulling/weed abatement and grazing have proven impracticable. When pesticides are used, the least toxic products that will meet the need are used at the lowest effective rate. Valley Water continually works to minimize pesticide use as much as practical. Valley Water's pesticide use is reviewed regularly as part of the compliance effort with the MRP. It is consistent with California Department of Pesticide Regulation requirements and court orders for threatened and endangered species, as stipulated by a 2004 United States District Court order, for certain pesticides applied near salmon-supporting waters (see **http://www.cdpr.ca.gov/docs/endspec/salmonid.htm** for further information). A 2006 US EPA injunction and order for no-use buffer zones surrounding California red-legged frog upland and aquatic habitats for certain pesticides may be viewed at **http://www.cdpr.ca.gov/docs/endspec/rl_frog/index.htm**.

4.4.1 Herbicide

A. Purpose

Herbicides are applied where the presence of herbaceous, emergent or small woody vegetation conflicts with the maintenance guidelines and standards for the facility. In the case of woody vegetation, treatment is limited to saplings <2" dbh and generally not exceeding 8' in height. Post-emergent herbicides are applied to manage firebreaks and roadways along the terraces up to the inboard hinge and into the outboard cross-section. Pre-emergent and post-emergent herbicides are used on roadways and in some out-board areas. Cut-stump treatments are addressed in Section 4.3.4, Vegetation Removal.

B. Work Activity

The application of herbicide occurs in-channel (below OHW) on lower maintenance roads and on terrace areas, as well as on non-in-channel areas (above OHW) such as upper maintenance roads and inboard or outboard levee slopes. Various herbicide formulations may be used.

All herbicide applications are performed using equipment appropriate to the specific application type. In-channel herbicide application may use a hose and handgun sprayer, or a backpack unit for smaller areas.

On unpaved access roads, herbicide is applied from a truck-mounted boom, handgun or backpack (used around gates, curves, etc.), as needed to control weeds, to allow maintenance access and provide firebreaks. The booms have multiple nozzles that are specifically calibrated to provide the dosage and spray pattern appropriate to the area. Equipment is regularly calibrated to ensure that application rates are consistent with written recommendations. The application is managed from an on-board computer mounted in each spray rig. During all herbicide applications, notifications are posted near treated areas to notify the public of the application. These notifications will remain in place at a minimum until the application dries to reduce the risk of incidental exposure.

Herbicide used to treat cut stumps following tree removal activities is considered part of tree removal and is addressed under Section 4.3.4, Vegetation Removal.

C. Requirements

Requirements 1-6 below apply to all work areas.

1. All herbicide use must be preceded by the appropriate biological surveys and clearances.

2. All herbicide applications must be preceded by a Pest Control Recommendation provided by a California licensed Pest Control Advisor. A recommendation is provided after each site is surveyed and the most appropriate control methods for the site are determined.

3. Foliar applications to woody vegetation are limited to plants <2" dbh and typically less than 8' in height.

4. Herbicide use is permitted throughout the entire stream profile.

5. Herbicide application can only occur in SMP potential range map areas for California red-legged frog and California tiger salamander when the creek or area is dry and no rain is forecast for the next 48 hours.

6. Valley Water also has coverage under the Statewide General NPDES Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States General Permit No. CAG990005 and fully complies with all provisions of that permit.

D. Aquatic Herbicides and Surfactants

Only herbicides and surfactants that have been approved for aquatic use by the EPA and are registered for use by the California Department of Pesticide Regulation (CDPR) will be used for SMP aquatic vegetation control. The lowest recommended rate of both herbicides and surfactants to achieve project objectives will be utilized to achieve desired control. An indicator dye may be added to the tank mix to help the applicator identify areas that have been treated and monitor the application. Aquatic herbicides are applied to emergent vegetation and plants growing near the wetted channel, not to the water's surface itself.

Surfactants are materials that are added to herbicide mixtures to enhance their performance. The surfactant may assist with spreading over the vegetation, sticking to the foliage, penetrating thick cuticles or otherwise increasing the efficacy of the application. Most aquatic herbicides either require or highly recommend the use of a surfactant to achieve reasonable levels of control. In instances where surfactants are absent from the tank mix, the level of control is often reduced. A reduction in control may require a higher return frequency that results in more herbicide being used in the system and more frequent disturbance to the site.

Surfactant use is limited to the products that are documented to have the least toxic affect to aquatic life. As new herbicide and surfactant products become available, Valley Water will evaluate them and adopt materials that achieve optimum control while affording the best protection to environmental resources. New products may be substituted as they become available, provided the new products do not exceed the toxicity or usage limits of the products they replace. It is the intent of Valley Water that new products will not increase the level of toxicity to non-target receptors nor the quantity of product used relative to the formulation(s) being replaced.

4.4.2 Mowing

A. Purpose

Mowing is conducted to provide visual access for facility inspections, to allow vehicle/equipment access and/or to meet local fire codes. Current local fire codes call for all weeds and grasses to be maintained below 6" in height for 10' laterally on both sides of access routes. Vegetation must be cut back 30' around any structures and this 30' firebreak must be maintained. Parcels up to one acre in size must be completely mowed. All work is performed to conform to local fire code requirements.

B. Work Activity

Mowing is the area-wide cutting of above-ground plant material by vehicle-mounted or hand-held equipment. Work primarily occurs on the terraces, outboard areas and creek slopes.

C. Requirements

All standard procedures for biological clearances apply per applicable BMPs as described in Attachment A. Because much of this work is performed by contractors, annual BMP training is required and contractors must complete daily BMP checklists. Per CAL FIRE guidance, mowing does not occur if the ambient air temperature is 80 degrees Fahrenheit or greater, the relative humidity is 30 percent or lower, and wind speeds are 10 mph or greater.

4.4.3 Grazing

A. Purpose

Grazing is used in limited circumstances for herbaceous weed control on Valley Water facilities. Grazing involves the use of various species of domestic animals, such as goats, to provide non-targeted weed control.

B. Work Activity

Once biological staff determine that there are not sensitive species present that could be adversely affected, a small herd is put on a parcel and protective measures are established. Grazing animals are excluded from wetted channels, wetlands and other aquatic resources, and vegetation to be preserved is fenced off.

C. Requirements

All standard procedures for biological clearances apply per applicable BMPs as described in Attachment A. When working in or near salt marsh harvest mouse habitat, a qualified biologist will guide fence installation to exclude grazing animals from salt marsh harvest mouse specific habitat. Once exclusion fencing has been installed, a biologist does not need to be on site to monitor grazing.

4.5 IMPACT AVOIDANCE AND ACTIVITY SPECIFIC BMPS

The following BMPs provide specific and detailed guidance for the variety of vegetation management procedures implemented by Valley Water: pruning, vegetation removal, tree removal, herbicide application, mowing and grazing. Fully trained and qualified field crews perform these procedures. Pre-planning GEN BMPs are also implemented as applicable to the specific site conditions and resources.

BMP Number	BMP Title	BMP Description
VEG-1	Minimize Local Erosion Increase from In-channel Vegetation Removal	To minimize the potential effect of localized erosion, the toe of the bank will be protected by leaving vegetation to the maximum extent possible and consistent with the maintenance guidelines or original design requirements.
VEG-2	Non-native Invasive Plant Removal	Invasive species (e.g., cape ivy [*Delairea odorata/Senecio mikanoides]*, arundo [*Arundo donax*]) will be disposed of in a manner that will not contribute to the further spread of the species. Cape ivy removed during a project shall be bagged and disposed of in a landfill. Arundo canes will be prevented from floating downstream or otherwise entering the creek or waterway.
VEG-3	Use Appropriate Equipment for In-channel Removal	When using heavy equipment to cut or remove in-channel vegetation, low ground pressure equipment such as tracked wheels will be utilized to reduce impacts to the streambed.
VEG-4	Standard Grazing Procedures	1. Vegetation and areas to be preserved will be fenced off to exclude grazing animals. 2. Grazing animals will be excluded from stream channels using fencing or other barriers.
HM-4	Posting and Notification for Pesticide Use	Posting of areas where pesticides are used will be performed in compliance with QEMS Document Q751D02 Control and Oversight of Pesticide Use: 1. Posting will be performed in compliance with the label requirements of the product being applied. 2. Posting will be provided for any products applied in areas used by the public for recreational purposes, or those areas readily accessible to the public, regardless of whether the label requires such notification. In doing this, Valley Water ensures that exposure risk is minimized further by adopting practices that go beyond the product label requirements. (The posting method may be modified to avoid destruction of bait stations or scattering of rodenticide.) 3. These postings will notify staff and the general public of the date and time of application, the product's active ingredients, and common name, and the time of allowable re-entry into the treated area.

BMP Number	BMP Title	BMP Description
		4. Signs will not be removed until after the end of the specified re-entry interval. 5. Right-to-know literature on the product will be made available to anyone in the area during the re-entry period. 6. A Valley Water staff contact phone number will be posted on the sign, including a cellular phone number. 7. Notification of pesticide activities will be made as required by law. Also, Valley Water will maintain records of neighbors with specific needs relative to notification before treatment of an adjacent area so that such needs are met.

4.5.1 Program Limits for Vegetation Management

The woody vegetation limits described below apply to channels that do not have Maintenance Guidelines established. These limits are provided to guide maximum project, annual and program maintenance activities until such time as Maintenance Guidelines are established.

Where Maintenance Guidelines exist, projects will comply with the quantitative objectives established by the Maintenance Guidelines as identified in Section 3.6.

A. Pruning

Pruning activities include removal of overhanging growth (OHG) from maintenance roads and fence lines to provide access to Valley Water facilities, improve visibility to inspect Valley Water facilities, protect Valley Water infrastructure, and maintain the designed hydraulic capacity of the channel systems. Pruning of OHG from roadways and fence lines does not require notification and is not subject to the pruning limits below.

Pruning activities that impact more than 0.01 acres of riparian or wetland vegetation will adhere to the following limits:

10-year Program Limit:	40 acres
Annual Limit:	20 percent of 10-year limit
Per-Project Limit:	No more than 20 percent canopy removal within the reach.

B. Coppicing

Coppicing will not have limits on its geographic extent because the activity is not widespread and provides an ecological benefit. No more than 20 percent canopy removal will be allowed in any reach. Canopy removal is visually assessed based on the pre-maintenance condition.

C. Vegetation Removal

Removal of Trees 6-12" dbh. The following limits will apply:

10-year Program Limit:	2000 live trees
Annual Limit:	20 percent of 10-year limit
Per-Project Limit:	No more than 20 percent canopy removal in any reach.
Other:	Tree removal that is necessary based on Maintenance Guidelines or triggers may exceed the annual and Program tree limits and will be subject to agency approval.

Vegetation Removal <6" dbh. Maintenance Guidelines and the Chapter 3.2 interim process will dictate when, where and what work is needed on a project-by-project basis.

4.5.2 Program Limits for Herbicide and Mechanical Vegetation Management

A. Herbicide Use

Annual and 10-year program limits are based on gallons/pounds/ounces of product and are summarized in the tables below. The per-project limit will correspond to the product label restrictions per application.

Herbicides are used only when alternatives such as mowing, hand removal or grazing have been shown to be ineffective or inefficient to meet the needs and requirements of the site. Valley Water has always been conservative in the use of herbicides and currently uses Category III and IV (CAUTION) herbicides which are the least toxic chemical herbicides. Products listed on the CDPR “A” list of known groundwater contaminants will not be used. No herbicide shall be used by Valley Water staff without a written recommendation from a Pest Control Advisor.

TABLE 4-1
In-Channel Herbicide Use Limits, 2014–2023

Product	In-Channel Use	
	Estimated Average Annual	10-Year Program Limits
Aquatic Herbicide	932 gallons	9,320 gallons
Surfactant	310 gallons	3,100 gallons

Notes:
1. In-channel program limits will be greater than previous annual average usage due to the addition of South County (Pajaro Basin) in-channel vegetation management.
2. The in-channel herbicide program has reduced annual herbicide usage in the North County area (Santa Clara Basin) by 25% during the first five years of the program. Five-year total in-channel herbicide usage was 1,550 gallons which is a 33 percent reduction for the first five years of the program.

TABLE 4-2
Non-In-Channel Herbicide Use Limits, 2014–2023

Type of Chemical	Non-In-Channel Use	
	Estimated Average Annual	10-Year Program Limits
Post-emergent Herbicides	1,316 gallons	13,160 gallons
Pre-emergent Herbicide	13,128 pounds	141,454 pounds
Surfactant	278 gallons	2,780 gallons

B. Mowing and Grazing

There are no limits on these activities for the following reasons:

1. Activities are generally conducted in areas of ruderal vegetation, dominated by non-native annuals, and as such have little ecological impact.

2. Activities are likely to benefit native plant species.

3. Activities are necessary to meet fire code standards (non-discretionary).

4. On USACE levees, activities are necessary to meet USACE requirements (non-discretionary).

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CHAPTER 5. SEDIMENT REMOVAL

5.1 PURPOSE

The mechanical removal of sediment is necessary when accumulated sediment: (1) reduces flow conveyance capacity below acceptable levels; (2) prevents facilities or appurtenant structures from functioning as intended; or (3) impedes fish passage and access to fish ladders. Sediment removal work occurs per the triggers and maintenance guidelines approach described below.

Triggers

The following channel conditions may trigger sediment removal:

1. Visual observation (verified by field measurement) indicates that sediment exceeds allowable tolerances identified in the Maintenance Guidelines (MGs).

2. Visual observation (verified by field measurement), compared with the design or as-built dimensions of the channel, indicates the need to remove sediment.

3. Sediment deposition poses a threat to proper function or integrity of facilities (including channel bed and banks).

4. Sediment deposition blocks access to maintenance roads, including bridge under-crossings.

5. Sediment deposition within the footprint (below/above/within) of fish ladders impedes access during anadromous fish migration seasons. Sediment-caused impediments vary depending on ladder size, flow regimes during migration seasons and sediment depth. Each ladder/fish screen is assessed based on its functionality (see Section 11.9 for more information).

Assessment and Prioritization Process

SMP staff evaluate and prioritize sites for public safety risk based on reduced flow conveyance capacity and potential for flooding.

Inspections

Staff inspect channel facilities annually to monitor stream functions and identify specific areas that require additional evaluation. Staff evaluate sediment deposition areas visually in addition to documenting them with photos, making field measurements (length and depth of sediment deposition) and collecting other site-specific information. Locations identified as needing additional evaluation are forwarded to technical staff for further evaluation.

Assessment and Analysis of Inspection Results

If needed, hydraulic modeling is performed using field survey data to ensure an accurate assessment of the current channel capacity and conveyance at locations identified for additional evaluation. Staff analyzing the inspection results may collect additional measurements and information about the site, including but not limited to: cross-section surveys, photo documentation and identification of potential causes such as constrictions or blockages. These measurements and information are compiled to develop a clear understanding of the current condition, which may include hydraulic modeling. The current condition is then compared to the available MGs, as-builts, and established Levels of Service, when available. If documentation is not available for a location, staff will follow the process described in Section 3.6.2. The resulting information is then compared against the defined maintenance triggers to determine if the site requires sediment removal. This process also includes an assessment of the presence and possible effects on sensitive habitats, using the methods described in Section 3.3.

5.2 WORK ACTIVITIES

Sediment may be removed from channel beds using various equipment, including but not limited to excavators, long-reach excavators, bulldozers, scrapers, and front-end loaders. Sediment may be removed from earthen or concrete lined channels, debris basins, culverts or pipelines, once the area is dry or isolated from the live stream flows. Where possible, sediment removal is conducted from the top-of-bank. Compact loaders may also be used to remove sediment from within the channel where larger equipment will not fit. Excavated sediment is either placed directly into dump trucks parked on the access road or stockpiled into central locations along the channel for subsequent removal. Stockpiling of materials occurs as described in BMP GEN-21.

5.2.1 Channel Access and Staging

Existing, adjacent access roads provide access to many work sites. Most Valley Water-maintained channels have at least one existing access road running along the top-of-bank on one side of the channel. Some channels have an access road on both sides, while others may have a maintenance road along the lower level channel banks. Other channels do not have access roads on either side. When the channel shape, bank height, or presence of mature vegetation prevents the use of top-of-bank access roads, equipment may be deployed along interior channel access roads or terrace locations via existing access ramps, where available. Where there is not existing access into the channel, the construction of a temporary access ramp may be required. Temporary access ramps are removed upon completion of the project, as described in BMP GEN-23. Selective clearing of shrubs or trees on the banks may be necessary to provide equipment access to the channel bed. Removal of vegetation follows SMP requirements as described in Chapter 4, Vegetation Management.

Work to be conducted within the channel bottom must be performed in dry conditions or within an area dewatered by a stream flow bypass system.

5.2.2 Requirements

1. Pre- and post-project assessments are performed on anadromous salmonid channels to assess impacts to gravels and instream habitat complexity features and develop a suitable mitigation approach (see Chapter 10, Section 10.10.3 *Mitigation for Impacts to Anadromous Salmonids*).

2. Water quality sampling is performed for any site with active diversions. See the Water Quality Monitoring Plan (Attachment E) for information on: (1) additional monitoring efforts and regulatory agency notification in case of exceedance of receiving water limitations, (2) monitoring procedure and (3) details on type of records and field documentation kept by Valley Water staff.

3. Sediment characterization is performed to determine the appropriate reuse or disposal options for the removed sediment. The Sediment Characterization Plan (Attachment F) provides additional information on: (1) how sediment sampling locations are selected, (2) sampling and analytical procedures and (3) details on the type of records and field documentation kept by Valley Water staff.

5.3 IMPACT AVOIDANCE AND ACTIVITY-SPECIFIC BMPS

Staff implement the BMPs below during sediment removal to avoid potential impacts to biological resources. Pre-planning "GEN" BMPs are also implemented as applicable to the specific site conditions and resources.

BMP Number	BMP Title	BMP Description
SED-1	Groundwater Management	If high levels of groundwater (visible water) are encountered during excavations in a work area, the water will be pumped out of the work site or left within the work area if the work activity is not causing water quality degradation in a live stream. Water Quality monitoring would need to occur. If necessary to protect water quality, the extracted water will be discharged into specifically constructed infiltration basins, holding ponds, or areas with vegetation to remove sediment prior to the water re-entering a creek. Water discharged into vegetated areas or swales will be pumped in a manner that will not create erosion around vegetation.

BMP Number	BMP Title	BMP Description
SED-2	Prevent Scour Downstream of Sediment Removal	Sediment removal sites in the transport zone on alluvial fans may cause increased scour downstream if they experience scouring flows or rapid sediment accumulation after maintenance. After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the maintenance area is smooth and continuous between the maintained and non-maintained areas and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.
SED-3	Restore Channel Features	Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the pre-construction conditions as closely as possible within the finished channel topography.
SED-4	Berm Bypass	Where sediment removal is accomplished without a bypass by creating isolated, alternating cells, the berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel.
SED-5	Sediment Characterization	Projects involving sediment removal at stream gauges, outfalls, culverts, flap gates, tide gates, grade control structures, bridges, fish ladders, and fish screens in excess of 25 cubic yards shall be characterized in accordance with Valley Water's Sediment Characterization Plans for SMP-2. These projects shall be reported in the annual summary report. Sediment removed will not be re-used without pre-approval from appropriate regulatory agencies. See Section 5.4 for information on the waiver process.

5.4 PROGRAM LIMITS FOR SEDIMENT REMOVAL ACTIVITIES

Modified Channels

Sediment removal projects must comply with quantitative objectives established by the Maintenance Guidelines (where they exist), as identified in Section 3.6. Sediment removal in modified channels will not exceed 5,000 linear feet for individual projects. The amount of sediment removed may not exceed the established project as-builts or Levels of Service.

Modified Channels With Ecological Values or Unmodified Channels

Sediment removal projects must comply with MGs' quantitative objectives, where MGs exist. Where they do not exist, the triggers and the process for Assessment and Analysis of Inspection results described in Section 5.1 above will be used to evaluate the work

objectives. Sediment removal in modified channels with ecological values and unmodified channels will not exceed 300 linear feet for individual projects. When a sediment removal project involves a combination of modified and modified with ecological value or unmodified channel types, then the individual sediment removal project limits (5,000 feet for modified and 300 feet for modified with ecological value/unmodified) shall be applied to each portion of the combined project.

Sediment removal from unmodified and modified with ecological value type channels must be associated with a facility or human-made structure (i.e., bridge, outfall, gauge, grade control, etc.). One or more portions of the sediment removal reach must be located 100 feet or less from the structure or facility to be considered "associated." The amount of sediment removed may not exceed the established project as-builts or Levels of Service. There is no limit to the number of sediment removal projects that may occur in a single year.

Exceptions

Upon request by Valley Water, the CDFW, RWQCBs, NMFS, USFWS and the USACE will review projects and may waive the per-project limits for sediment removal projects. Each applicable agency must provide waivers before Valley Water can proceed. The water district will submit requests for such waivers as part of the NPW. The agencies will respond to the waiver requests during the NPW review period.

For waiver requests that may affect federally-listed species, Valley Water will submit waiver requests to the NMFS and USFWS at the same time that they submit requests to the other agencies. All waiver requests will be reviewed during the NPW approval process.

All waiver requests may include the following:

1. A narrative description of the stream. This should include known information on volume and duration of flood flow events; approximate length, width, and depth of the waterbody and characteristics observed associated with an OHWM (e.g. bed and bank, wrack line or scour marks): a description of the adjacent vegetation community and a statement regarding the wetland status of the adjacent areas (e.g., wetland, non-wetland): surrounding land use; water quality; issues related to cumulative impacts in the watershed; and any other relevant information;

2. An analysis of the potential impacts to the waterbody associated with sediment removal;

3. An analysis of the potential impacts to special-status plants or animals associated with the sediment removal project;

4. Measures taken to avoid and minimize losses to Waters of the State, including alternate methods of constructing the proposed activity(s); and

5. A description of how the activity meets as-built condition of any prior capital improvement projects and how the activity provides independent utility if it requires a waiver.

The Maintenance Guidelines, where developed, may provide a basis for the information to be used in subsections 1. through 5., above.

Waivers for sediment characterization > 25 CY may be requested from the Regional Water Board Executive Officer. Valley Water will provide the following information: (1) a narrative discussion explaining the justification for waiving sediment characterization, which may include, but need not be limited to, interpretation of existing historic sediment characterization data for the project reach and/or entire stream channel; (2) project-specific information: location of the sediment removal project, stream length where sediment will be removed, and volume of sediment to be removed; and (3) sediment reuse information: location of reuse, sediment reuse purpose, foundation reuse or surface reuse, and volume of sediment to be reused.

To ensure that SMP projects are unconnected, single and complete actions and not part of a larger action that will exceed the SMP's per-project size and placement limits, each project must demonstrate independent utility. An SMP project will be considered to have independent utility if it would be constructed absent the construction of other projects in the area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate, single and complete projects with independent utility. A separation of 500 feet between sediment removal work sites is required.

CHAPTER 6. BANK STABILIZATION

6.1 PURPOSE

Bank stabilization repairs eroding channel banks, beds and levees and reduces the risk of further erosion. Stabilizing banks and minimizing bank failure reduces instream sedimentation and protects water quality, riparian habitat and trails.

Channel bank and bed erosion often occurs during or following major storm events. A combination of sustained or increased flow velocities and reduced soil strength can cause erosion, which can be accelerated by inappropriate adjacent land uses. Bank erosion can lower stream bank elevations, particularly on levees, and thereby increase flood risk to adjacent properties. Bank and bed erosion and its sediment yield can also increase turbidity, degrade water quality and lead to downstream deposition that may further reduce conveyance capacity and increase flood risk. Additionally, bank erosion may cause vegetation and soil loss, damage private or public property, and impact trails, access roads and utilities.

Bank stabilization activities occur per the triggers and maintenance guidelines approach described below.

Triggers

Bank stabilization is triggered when channel conditions:

1. Cause or could cause significant damage to Valley Water and/or adjacent property;

2. Create or could create a public safety concern; and/or

3. Cause or could cause in-channel sedimentation and/or affect water quality and other beneficial uses such as riparian habitat and recreation.

Assessment and Prioritization Process

Annual field inspections and subsequent desk assessments identify erosion sites determined to be of moderate to high risk to public safety, water quality, habitat values and/or infrastructure. Sites with the highest priority are submitted for approval in the Notice of Proposed Work (NPW).

Inspections

Valley Water staff annually inspect channel facilities to identify specific areas that require additional evaluation. Staff initially evaluate bank and bed erosion sites visually. Inspectors then document the sites with photographs, identify possible causes, record site proximity to infrastructure or private property and add other relevant information before providing inspection data to technical staff for further evaluation.

Assessment and Analysis of Inspection Results

Technical staff review inspection results to determine which areas require additional investigation or collection of field data to assess:

- The proximity of the erosion site to adjacent private and public structures;
- Whether the erosion is compromising critical maintenance access;
- Whether scour characteristics show the potential for a larger failure;
- Whether Valley Water has fee/easement/agreements;
- Whether the area is unstable or experiencing rapid change/erosion, showing a potential for substantial change; and
- Whether an erosion site affects a completed capital improvement project (CIP) or adjacent public infrastructure.

When further analysis determines that conditions at a specific erosion site meet one or more of the maintenance triggers, staff develop a plan to stabilize the site. The plan is based on the parameters and considerations described in Section 6.2, and descriptions of bank stabilization techniques in Attachment D.

Evaluation of the site and selection of the repair method includes the collaborative work of engineers, biologists and construction staff to ensure impacts are minimized and stream functions and values are maximized.

6.2 TREATMENT SELECTION

Depending on conditions, maintenance triggers, Maintenance Guidelines (MGs) and other site assessment processes as discussed in Chapter 3, Valley Water considers a wide range of potential bank repair treatments for each site. Table 6-1 summarizes approved bank stabilization treatments. Attachment D (Bank Stabilization Measures) provides more detailed information for each treatment. For applicable mitigation ratios for each treatment method, see Table 10-2.

Bank stabilization methods are described as hard, hybrid, or soft depending upon the degree of bank hardening involved. As shown in Table 6-1, hard methods may include concrete blocks, sacked concrete, rock or other hardened materials. Soft methods may include biotechnical treatments that emphasize vegetation and earthen banks. Hybrid methods are typically earthen bank repairs that may include some type of vegetated rock material.

For the SMP, rock may be placed in-channel based on the hydraulic analysis. The bank stabilization measures included in Attachment D generally have the rock placed up to the elevation of the Ordinary High Water Mark (OHWM). The OHWM is defined by the USACE as the line on the shore or bank established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank,

shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. The term “toe of bank” or “bank toe” generally refers to the bottom location of the bank where it meets the channel bed.

When determining the appropriate treatment approach, staff consider soil conditions, channel and bank scour velocities, slope stability, channel form/position and other active geomorphic conditions. Consideration of the cause of the bank failure (over-land runoff, burrowing animals, undersized culvert upstream, etc.) is also critical when determining the appropriate treatment approach.

Staff evaluate bank stabilization projects for the inclusion of additional wood features beyond those in the chosen bank design. Where possible and feasible, additional wood features are included in projects located in salmonid channels, thereby mitigating for the removal of large woody debris (LWD) associated with other items. (See Chapter 9 for more information.)

When an existing hardened bank site is evaluated for stabilization work, staff assess whether a softer treatment method could be used instead of a hardened replacement. When the site will support it, hybrid or soft bank measures will replace hardscape bank treatments. As described in Chapter 10.9, removal of concrete structures or fragments from below OHW may act as mitigation for bank stabilization impacts or other SMP-related impacts that require mitigation if they leave behind softscape in the footprint of the removal. Where hardscape treatments are replaced with soft or hybrid approaches, the sites may provide mitigation within the area of hardscape that is removed on a project-by-project basis per negotiation during the NPW process.

6.3 WORK ACTIVITIES

Work activities at bank stabilization sites typically involve site preparation, recontouring and bank repair treatment installation, earth and soil compaction and grading, and vegetation planting and other on-site restoration activities.

During site preparation, the eroded or destabilized bank site is cleared of vegetation and loose soil is stockpiled locally for later use. Bank repair treatment materials are also staged locally. If necessary, access is developed for in-channel activities.

Work sites will be accessed via established maintenance roads and/or temporary dirt ramps constructed as needed to access the project site. Valley Water-maintained channels usually have one access road along the top of the bank on one side of the channel. Some channels may have a lower maintenance road(s) along a terrace.

Selective clearing of shrubs or trees on the banks may be necessary to provide equipment access to the channel bed and to create a safe work area. If bank repair work requires activities in the channel bottom, all work will be performed in dry conditions or within an area dewatered by a stream flow bypass system.

Bank stabilization activities use bioengineering or “soft” approaches when feasible and appropriate. Softer approaches are typically used in lower-velocity, grass-lined channels, in more natural creek settings or where the creek conditions can tolerate higher hydraulic roughness. The most common soft approach at these sites is to reconstruct the slope with earthen materials and revegetate it.

Softscape approaches may use a variety of willow plantings, contour wattling, brush mattresses, root wads, log crib walls and earthen soil banks to provide effective erosion control and resource enhancement. Where feasible, these softscape approaches are combined with additional plantings (see Table 10-4, Typical Revegetation Palette) or other instream features to further enhance and restore riparian and channel habitat. For sites with higher tolerances for hydraulic roughness, staff will review adjacent habitat conditions to determine soft approaches that best suit the area.

Valley Water considers hybrid or hardened approaches for specific locations that require a higher level of resistance for erosive shear forces. Softscape approaches shown in Table 6-1 can be combined with the selective use of rock to provide added shear strength. The outer bends of channels where flow velocities and shear stresses are greater are also common locations for using hardscape elements. For installation of hard structures, existing undesirable soil and material from the failed bank is removed and the bank is reconstructed with back-filled soil and the appropriate hardscape material per the project design.

Equipment used for bank stabilization activities typically includes excavators, bulldozers, cranes, front-end loaders, dump trucks, water trucks, pumps, generators, compactors and hand-operated compactors. Staging typically occurs on adjacent access roads or lands, if available, or within the work area. Where possible, soil and riprap are staged in areas that have been previously disturbed, such as service roads and turnouts.

Bank stabilization repair is completed with soil compaction, finish grading, and planting and/or other on-site restoration practices as planned for the repair. When repairs are made, banks are contoured to match the adjacent bank slope to the extent possible. If healthy riparian vegetation exists adjacent to the bank failure site, care is taken to minimize disturbance of such vegetation.

6.3.1 Project Requirements

1. Pre- and post-project assessments will be performed on anadromous salmonid channels to assess impacts to gravels, instream habitat complexity features and LWD, and suitable mitigation approaches will be developed as required (see Chapter 10, Section 10.10.3 *Mitigation for Impacts to Anadromous Salmonids*).

2. Bank stabilization can be performed in any creek under Valley Water jurisdiction, where property rights authorize Valley Water to work, or as approved by the Valley Water Board of Directors.

3. Notification requirements for bank stabilization projects are outlined in Chapter 12. Staff will provide hydraulic analysis results and a description to support hardscape designs.

4. In-kind repairs on non-anadromous salmonid channels that do not change the character, scope or size of the original structure, that occur in the same project footprint, that do not extend rock any higher than the existing condition, and that do not bring in new fill are not subject to regulatory review. In-kind rock repairs on anadromous salmonid channels that require dewatering will be included in the NPW.

5. Water quality monitoring is performed per the Water Quality Monitoring Plan (Attachment E), and all excavated sediment is tested per the Sediment Characterization Plan (Attachment F)**.**

6. Winterization is the process of preparing and maintaining work sites with adequate BMPs to prevent erosion and sediment transport and protect water quality during the rainy season. Valley Water relies on weather forecasts to prepare for anticipated significant rainfall and monitors the 72-hour National Weather Service (or local vendor) forecasts year-round to prepare for winterization timing. If a significant rainfall is forecast within the coming 72-hour forecast window, then maintenance work that may result in sediment runoff to the channel is stopped to allow adequate time to complete erosion control measures.

7. Every bank stabilization project is winterized after completion. Winterization is completed prior to the occurrence of significant rainfall.

Basic guidance for winterization procedures (and Post-Project Restoration Measures, BMP Section E) includes the following:

1. Direct runoff away from disturbed areas.

2. Retain existing vegetation as much as possible.

3. Contour grading consistent with the surrounding terrain.

4. Prepare temporary drainages and outlets.

5. Grade/excavate outside of rainy season.

6. Minimize length and steepness of slope.

7. Stabilize disturbed areas by mulching and revegetation (e.g., hydromulching, hydroseeding, hydraulic matrices, and blankets).

8. Use dissipating measures to keep runoff velocities low.

9. Trap sediment on site.

10. Inspect, log and maintain control measures after each storm.

TABLE 6-1
Bank Stabilization Methods

I.D. No.	Method	Suggested Slope[1]	Scour Velocity supported (feet per second)[1]	Hardscape[2,3], Softscape, or Hybrid
1	Earth Repair	2:1 or flatter	≤6	Soft
1A	Earth Repair with Buried Rock	1.5:1 or flatter	≤6	Soft
1B1	Earth Repair with Rock Base Vegetated	2:1 or flatter for earth repair section; 1.5:1 or flatter for boulder section	≤6	Hybrid
1B2	Earth Repair with Rock Base Not Vegetated	2:1 or flatter for earth repair section; 1.5:1 or flatter for boulder section	≤12	Hard
2	Live Construction	2:1 or flatter	≤6	Soft
2A1	Live Construction with Boulder Base	2:1 or flatter for live construction; 1.5:1 or flatter for boulder section	≤ 6	Hybrid if rock area is vegetated;
2A2				Hard if rock area is not vegetated
2B	Live Construction with Log Base	2:1 or flatter for live construction; 1:1 or flatter for log base section	≤ 15	Soft
3	Contour Wattling	2:1 or flatter	≤ 6	Soft
3A1	Contour Wattling with Boulder Base	2:1 or flatter for contour wattling area; 1.5:1 or flatter for boulder section	≤ 6	Hybrid if rock area is vegetated;
3A2				Hard if rock area is not vegetated
3B	Contour Wattling with Log Base	2:1 or flatter for contour wattling area; 1.5:1 or flatter for log base section	≤ 15	Soft
4	Brush Mattress (Brush Layering)	2:1 or flatter	≤ 6	Soft
4A1	Brush Mattress (Brush Layering) with Boulder Base	2:1 or flatter for brush mattress; 1.5:1 or flatter for boulder section	≤ 6	Hybrid if rock area is vegetated;
4A2				Hard if rock area is not vegetated

I.D. No.	Method	Suggested Slope[1]	Scour Velocity supported (feet per second)[1]	Hardscape[2,3], Softscape, or Hybrid
4B	Brush Mattress (Brush Layering) with Log Base	2:1 or flatter for brush mattress; 1:1 or flatter for log base section	≤ 15	Soft
5	Surface Matting (Erosion Mats)	2:1 or flatter	≤ 12	Soft
5A	Surface Matting (Erosion Mats) with Boulder Base	2:1 or flatter for erosion mat; 1.5:1 or flatter for boulder section	≤ 6 if boulders are planted with live stakes; 12 if boulders are not planted	Hybrid
5B	Surface Matting (Erosion Mats) with Log Base	2:1 or flatter for erosion mat; 1:1 or flatter for log base section	≤ 15	Soft
6	Add Rock to Invert	N/A	For incised channels or scour holes downstream of concrete-lined areas	Hard
6A	Rock Cross Vanes	N/A	For channels types “B” and “F” of Rosgen’s stream classification	Hard
6B	Root Wads and Boulders	N/A	≤ 10	Hybrid
6C	Live Log Crib Walls	Up to 0.25:1	6 to 12	Soft
6D	Log Revetment	Up to 0.25:1 or flatter	≤ 15	Hybrid
6E	Bendway Weirs	N/A	Thalweg management	Hard
7	Cellular Confinement System	Up to 0.5:1	≤ 6	Hard
8	Rock Blanket	Up to 1.5:1; 2:1 preferable	≤ 15	Hard
8A	Boulder Revetment	Up to 1:1; 2:1 preferable	≤ 6 if boulder joints planted; ≤ 15 if not planted	Hard
8B	Boulder Revetment with Soil and Vegetation	Up to 1:1; 2:1 preferable	≤ 6	Hybrid

I.D. No.	Method	Suggested Slope[1]	Scour Velocity supported (feet per second)[1]	Hardscape[2,3], Softscape, or Hybrid
9	Articulated Concrete Blocks	0.75:1 up to 3:1	≤ 15 for closed ACBs[4] ≤ 6 for open ACBs[4]	Hard
9A	Articulated Concrete Blocks with Planted Areas	Up to 1:1	≤ 15 for closed ACBs[4] ≤ 6 for open ACBs[4]	Hybrid
10	Concrete Crib Walls	Up to 1:1	6 to 15 depending on size of crib wall's openings	Hard
11	Sacked Concrete	Up to 0.5:1	≤ 15	Hard
12	Gunite Slope Protection	Up to 0.1:1	≤ 15	Hard

Notes:

1. Slopes and velocities are intended to be used as guides and are not prescriptive. Methods may be adjusted based on site conditions and other factors.
2. In-kind repairs on non-anadromous salmonid channels that do not change the character, scope or size of the original structure, that occur in the same project footprint, are not extending rock any higher than the existing condition and are not bringing in new fill are not subject to regulatory review. In-kind rock repairs on anadromous salmonid channels will be included in the NPW.
3. To the extent possible, hardscape elements of methods 1 through 9A will be mitigated for on-site, above OHWM.
4. ACB: Articulated Concrete Blocks.
5. When synthetic geotextile matting is utilized as part of a bank stabilization method, the area of synthetic geotextile use would be considered hardscape (3:1 ratio).

6.4 IMPACT AVOIDANCE AND ACTIVITY-SPECIFIC BMPS

The following BMPs guide implementation of bank stabilization projects to avoid impacts on biological and cultural resources, and are implemented by the field crew and supervisor. Preplanning "GEN" BMPs are also implemented as applicable to specific site conditions and resources.

BMP Number	BMP Title	BMP Description
BANK-1	Bank Stabilization Design to Prevent Erosion Downstream	To further prevent potential downstream erosion impacts due to bank stabilization, the site design will be adjusted to provide proactive protection of vulnerable areas within the reach of the worksite. Such measures include, but are not limited to, appropriately keyed-in coir logs, riparian planting, strategic placement of rock, and flow deflectors. Bank stabilization will include appropriate transition designs that contour the repaired site to conform to adjacent areas upstream and downstream to prevent potential erosion impacts.
BANK-2	Concrete Use Near Waterways	Concrete that has not been cured is alkaline and can increase the pH of the water. Fresh concrete will be isolated until it no longer poses a threat to water quality, using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of 30 days after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet sacked concrete will not be allowed to enter a live stream. 2. Poured concrete will be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete will be kept moist and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles. 5. Temporary concrete washout facilities shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations. Concrete wasted shall be removed and disposed of appropriately.

BMP Number	BMP Title	BMP Description
		6. Where slurries containing portland cement concrete or asphalt concrete are generated (such as from saw cutting, coring, grinding, etc.), slurry wastes shall not be allowed to enter storm drains or watercourses, and shall be removed and disposed of appropriately.
BANK-3	Bank Stabilization Post-Construction Maintenance	Valley Water may maintain or repair bank stabilization projects that are less than 2 years old that are damaged by winter flows. Valley Water will notify the regulatory agencies 24 hours prior to beginning the work. The work will be reported as part of the Annual Summary Report submitted by January 31 of each year or, if necessary, the subsequent year. Appropriate BMPs will be applied during maintenance repairs.

6.5 PROJECT AND PROGRAM LIMITS

Per-Project Limits

For individual projects, soft methods may not exceed 500 linear feet. Hard and hybrid methods may not exceed 300 linear feet. No method may exceed 0.5 acres below the OHWM for individual projects. The Per-Project Limits are intended to ensure minimal effects on aquatic and other sensitive biological resources.

Bank Stabilization Annual Limit

There is no limit to the total number of bank stabilization projects that may occur in a single year. The annual bank stabilization limit is one (1) linear mile of channel.

Hardscape areas being replaced with softscape or hybrid methods may exceed the Per-Project Limits for maximum length and will not be counted toward the annual maximum length of one (1) mile. Hardscape areas replaced with softscape or hybrid methods may provide a mitigation credit that can be applied to other projects owing mitigation; however, the permitting agencies would need to approve this approach on a project-by-project basis.

To ensure that SMP projects are unconnected, single and complete actions, and not part of a larger action that will exceed the SMP's per-project size and placement limits, each project must demonstrate independent utility. An SMP project will be considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate, single and complete projects with independent utility. A separation of 500 feet between bank stabilization repair sites is required.

Exceptions

Upon Valley Water request, the CDFW, RWQCBs, NMFS, USFWS, and the USACE will review and may waive the Per-Project Limits for bank stabilization projects by making a written determination that the project will result in minimal adverse effects. Valley Water must obtain waivers from each applicable agency to proceed. Valley Water will submit project limit waiver requests as part of the NPW. The agencies will work diligently to respond to the waiver requests during the NPW review period. If the agencies cannot conclude their waiver review by the end of the NPW review period, they will respond to Valley Water with the status of the waiver review and will indicate the time needed to complete the review.

For waiver requests that may affect federally-listed species, the USACE will make an effects call and determine if consultation with the USFWS or NMFS is warranted. Valley Water will submit waiver requests to the NMFS and USFWS at the same time they submit requests to the other agencies.

All waiver requests may include the following:

1. A narrative description of the stream, including volume and duration of flood flow events; the approximate length, width, and depth of the waterbody and characteristics observed associated with an OHWM (e.g., bed and bank, wrack line or scour marks); a description of the adjacent vegetation community and a statement regarding the wetland status of the adjacent areas (e.g., wetland, non-wetland); surrounding land use; water quality; issues related to cumulative impacts in the watershed; and any other relevant information.

2. An analysis of the potential impacts to the waterbody associated with the bank stabilization project.

3. An analysis of the potential impacts to special-status plants or animals associated with impacts from the bank stabilization project.

4. Measures taken to avoid and minimize losses to Waters of the State or U.S, including alternate methods of constructing the proposed activity(s), and the mitigation approach describing how the unavoidable losses are proposed to be offset.

5. For projects conducted to maintain past CIP's, a description of how the activity meets the as-built condition of any prior capital improvement projects and how the activity provides independent utility if it requires a waiver.

The Maintenance Guidelines, where developed, may provide a good basis for the information to be used in sub-sections 1. through 5., above.

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CHAPTER 7. MANAGEMENT OF ANIMAL CONFLICTS

7.1 PURPOSE

The activity of animals sometimes conflicts with the integrity and maintenance of Valley Water facilities (e.g., levees, creeks, structures). Some examples of the types of conflicts include: burrowing into levees and creek banks, damaging mitigation sites by eating vegetation, and interfering with work activities. Animals burrowing into levees and banks may threaten the structural integrity of the levees and banks, which can lead to failure, sloughing and slumping. Animals foraging on revegetated mitigation sites can reduce the health and vigor of plants or even denude local areas. Animals can be territorial or defensive of specific resources or locations, thereby interfering with Valley Water facilities or work activities. The presence of some animals may require Valley Water to postpone work activities. Valley Water performs animal conflict management activities to protect its facilities and active work sites. Other work may be triggered by U.S. Army Corps of Engineers (USACE) levee inspections.

Triggers

Valley Water may implement animal conflict management activities when:

1. Visual observations indicate damage from animals burrowing into levees, creek banks or undermining other Valley Water facilities and/or assets;

2. Visual observations show excessive animal forage on mitigation sites;

3. Visual observations of animals in a work site raise concerns for worker safety, such as when bees or wasps are present; and/or

4. Knowledge of animal conflict potential occurs in cases such as burrowing, where vegetation management or biological controls could be effective but take time to implement.

Assessment and Work Process

Two main processes identify the triggers for animal conflict management work. The first is watershed staff field inspections. In this process, watershed staff log animal conflict issues, mainly burrowing rodent activities, during their annual/quarterly inspections. Staff identify the areas where animal damage has caused or has a high potential of causing a bank or levee failure. Field inspections of work areas prior to starting projects may identify the presence of potentially harmful species that pose a health risk to the general public and/or Valley Water staff. Field inspections of mitigation sites may identify excessive animal foraging on revegetation and the need for preventative measures, such as revegetation fencing or caging. Knowledge of previous nesting activity in a proposed work area that would prevent a project from being constructed may trigger a request for an evaluation of preventative nesting measures, such as bird barrier netting on bridges or structures.

The second process that identifies this work is requests for services generated by internal staff or external entities. These requests are sent to watershed staff and are followed up with a field inspection to determine the need for work and which allowable activities would be effective.

Prioritization of these activities is made at the watershed level, based on the critical nature of the facility. Rodent activity on levees, for example, receives immediate and ongoing attention until burrow activities are no longer evident. For stream banks or other infrastructure, priority is given to areas that show damage or evidence of multiple rodents.

7.2 WORK ACTIVITIES

Conflicts may be managed by: maintenance of a safe work site environment, biological control, physical alterations, bird nest deterrence, habitat alteration, non-lethal trapping, and chemical control. These actions may effectively manage the area by addressing different life stages and activities of the target animals.

Maintaining a Safe Work Site Environment

Field conditions and the types of animals encountered vary seasonally, geographically, and by work activity. Swarms of wasps and bees can be located in trees, while arachnids, flies and mosquitoes may live around culverts and bridges. Honey bee colonies and swarms may be captured and relocated by local apiarists at Valley Water's request.

Integrated Pest Management Activities (Biological Control)

Raptor nest structures and perches may be installed and maintained in areas to encourage natural predation of burrowing rodents such as ground squirrels, gophers, and moles. Artificial raptor nest structures (e.g., barn owl nest boxes) would be placed in areas of burrowing rodent activity and outside of potential sensitive species habitat, such as Ridgway's Rail and Salt Marsh Harvest Mouse habitat. Vegetation management, sediment reuse, road grading, or other SMP activities may be conducted within the vicinity of occupied artificial raptor nest structures following site-specific biological evaluation and adherence of BMP GEN-6. Maintenance of artificial nest structures may include annual cleaning, structure repair or relocation and nest monitoring.

Mechanical and Physical Controls

Physical Alteration of a Facility

Physical alteration of a facility may include minor alterations that do not change a facility's size or functionality, but do enhance Valley Water's ability to conduct work. Physical alterations may also occur to reduce or eliminate the effects of burrowing animals. All activities must incorporate BMPs for erosion control and may not result in water quality degradation. Examples of physical alterations include:

1. Surface Compaction of Levee Faces

   Surface compaction consists of using heavy equipment (crawler tractors, rollers/compacts, etc) to consolidate, re-compact, or harden the levee surface. Compaction is achieved by driving heavy equipment up and down or across the levee slope. Reconstruction of a levee slope (removal and replacement of channel banks using compacted soil) is considered a bank stabilization activity per the requirements described in Chapter 6.

2. Filling Burrows With Soil or Slurry Material

   Filling burrows with slurry consists of using a truck or trailer-mounted mixing machine to dispense the slurry through a hose into adjacent rodent burrows. This relatively small equipment provides mobility and flexibility, and can mix less than a few cubic yards at any given time. A typical operation includes a truck or flatbed where bags of slurry mixture can be stored and transported, a trailer-mounted mixing/pumping machine, and a water truck. At the location of rodent burrows to be filled, bags of dry slurry material are hand-loaded into the mixing machine and water is added until the appropriate consistency is reached. The material is then pumped through a hose and into the rodent burrow until the burrow is filled. Viscosity of the slurry mixture is critical in properly filling the burrows and will vary depending on soil moisture at the hole location. If the burrow is within the buffer area of a sensitive species, staff must inspect the hole with a burrow camera prior to filling. Systematic excavations may be necessary to ensure no impact to sensitive species. Staff may perform excavations with a small backhoe or hand tools.

3. Placement of Physical Barriers

   Materials such as geotextile mats, chain link fencing (installed flush with the ground surface or buried), and erosion control blankets may be placed on the ground surface, above ordinary high water mark (OHWM) for up to 300 linear feet, to inhibit animal burrowing. Placement of physical barriers consists of preparing an area for barrier installation, installing the barrier, and providing follow-up maintenance as needed. Site preparation includes scraping the barren soil, removing groundcover vegetation (weeds or grasses), or trenching. Geotextile mats, when used, will be installed in a way that matting would not become exposed at the surface. Equipment used for this operation can include hand tools, tractors, mowers, trenchers and excavators. This work is similar to bank stabilization activities although it is limited to above OHW and 300 linear feet. This area may include both inboard and outboard sides of the levee for 300 feet with at least an equal amount of open area prior to another linear installation; and only on one side of levee slopes. Inboard and outboard areas will only have installations set in an alternating pattern, such that no inboard and outboard levee faces would have erosion control blankets along the same levee stationing. Staff will monitor the site during regular inspections to assess barrier effectiveness and prevent unforeseen negative impacts. Materials may be

similar to those used on bank stabilization projects for winterization and to prevent erosion and protect water quality.

Bird Nest Deterrence for Work Area Structures

Netting on bridges, or structures such as stream gauges and culverts, may be installed and maintained to prevent birds such as swallows or black phoebes from nesting. Staff may remove the mud nests of these birds on structures prior to nest completion. Valley Water staff will not remove active nests and will continue to minimize impacts to nesting birds by conducting nesting bird surveys and implementing avoidance measures.

Habitat Modification Through Vegetation Management

Modifying habitat through vegetation management is another method to influence animal behavior. Low-growing herbaceous vegetation may be cleared prior to the avian nesting season to minimize nesting in the area. Likewise, mowing vacant or fallow lands adjacent to flood protection levees can decrease future food sources and habitat for burrowing rodents. Limiting available forage areas adjacent to key Valley Water facilities may reduce burrowing rodent populations. Habitat modification may include:

1. Managing vegetation growth to prevent individuals from taking up residence, burrowing or nesting.

2. Maintaining vegetative barriers to reduce animal occupancy at a site.

3. Changing a plant palette to reduce habitat suitability or desirability.

Live Trapping

Live trapping is typically used when other control methods are not appropriate due to potential non-target effects on special-status species. Live trapping may take place year-round. Wire cage live traps are baited with untreated bait. Live traps have openings no smaller than 2 inches by 1 inch, which is large enough to allow mice and other small species to escape the trap. Live traps are checked daily. Ground squirrels are removed from the site and are humanely euthanized with carbon dioxide gas. Non-target species are released on site as soon as they are detected.

Chemical Control

Repellents may be used to deter rodents or other nuisance species, such as rabbits. Repellents may include plants and extracts that target specific species. Examples include peppermint oil or capsaicin; and the sprinkling of pepper, cinnamon, or cayenne, in areas with frequent rodent activities.

Lethal chemical control is implemented only when other animal conflict management activities are inadequate to feasibly address a conflict, such as when ongoing population control of burrowing mammals is required.

1. Management

Lethal chemical control methods are prescribed by a Pest Control Advisor. Compliance with species and habitat protections under the Program is managed by a biologist knowledgeable with the affected species in accordance with applicable BMPs. Lethal chemical control methods comply with County Agriculture Commission requirements.

2. Methodology

a. Fumigants

Fumigants are used when there is sufficient moisture in the soil to prevent the gases from diffusing out of the burrow. In Santa Clara County, this normally occurs from late January through early May. In active burrow areas an initial fumigant treatment is conducted. One to two weeks later, burrows that continue to show signs of activity are retreated. California ground squirrels and gophers are the most targeted species.

(1) Gas Cartridges (smoke bombs): Gas cartridges consist of a mixture of sodium nitrate, charcoal and sawdust compressed in a tube. Cartridges are lit with a fuse and placed directly into the burrow, which is then sealed with soil. The cartridge produces a carbon monoxide gas that spreads through the burrow and asphyxiates the animals within. If smoke is observed from any other burrows (indicating interconnection of burrows), those burrows are sealed as well.

(2) Aluminum phosphide: Aluminum phosphide is a colorless gas with a pungent odor (University of California [UC] BMPs for California Ground Squirrel Control, 2011). Two to four aluminum phosphide tablets are placed directly into the burrow. The burrow entrance is then plugged with crumpled newspaper to prevent soil from covering the tablets, and then sealed with soil. The moisture in the burrow activates the fumigant, which produces a phosphine gas that spreads through the burrow and is lethal to the enclosed animals.

3. Coordination With Local, State or Federal Agencies

Valley Water may contract with or request assistance from local, state or federal agencies to capture nuisance animals such as feral cats, dogs, red fox, opossum, or skunks.

4. Safety

Label use restrictions are followed for all rodenticides used. Fumigants are not to be used near dry grasses or other flammable material, or near buildings.

5. Additional Requirements

When conducting Management of Animal Conflict activities, the following additional requirements will apply:

a. The method of control used will be based on the seasonal efficacy of the target animals' life cycles and on avoidance of impacts to special-status species.

b. A Valley Water Wildlife Biologist will conduct a desk audit to determine whether suitable special-status species habitat is present in or adjacent to a maintenance activity.

c. If the Valley Water Wildlife Biologist determines that a special-status species could occur in the activity area, avoidance and minimization measures will be incorporated into the work order requirements in accordance with the BMPs (see Section 7.3, below).

7.3 IMPACT AVOIDANCE AND ACTIVITY-SPECIFIC BEST MANAGEMENT PRACTICES

Of the methods for management of animal conflicts, lethal controls have the highest potential for environmental and biological impacts. Therefore, animal conflict management BMPs focus on such controls. The application area for lethal controls is identified during the annual planning process (see the Biological Resource Planning BMPs) and is reviewed by wildlife biologists. Species habitat areas are considered based on SMP potential range map areas, updated California Natural Diversity Database (CNDDB) occurrence records, and known local biological information. They are also included in the SMP Update Subsequent EIR. In addition, pre-planning "GEN" BMPs are also implemented as applicable to the specific site conditions and resources.

BMP Number	BMP Title	BMP Description
ANI-1	Surface Barrier Applications to prevent burrowing	Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed in an area no longer than 300 feet and only above OHW. This area may include both inboard and outboard sides of the levee for 300 feet with at least an equal amount of open area prior to another linear installation; and only on one side of levee slopes. Inboard and outboard areas will only have installations set in an alternating pattern, such that no inboard and outboard levee faces would have erosion control blankets along the same levee stationing.

BMP Number	BMP Title	BMP Description
ANI-2	Prevent Harm to the Salt Marsh Harvest Mouse and California Clapper Rail	No rodenticides or fumigants will be used within the range of the SMHM or Ridgway's Rail as identified on SMP potential range maps. Methods of rodent control within SMHM or Ridgway's Rail habitat will be limited to live trapping. All live traps shall have openings measuring no smaller than 2 inches by 1 inch to allow any SMHM that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line.
ANI-3	Burrowing Owl, Bald Eagle and Golden Eagle Buffer Zone	Per the California Department of Fish and Wildlife's 2008 *Guidance for Burrowing Owl Conservation*, a 656-yard buffer will be established around known burrowing owl locations where no rodenticides or fumigants (including smoke bombs) will be used. A 0.5-mile buffer will be established around known bald eagle and golden eagle nesting locations where no rodenticides will be used.
ANI-4	Animal Control in Sensitive Amphibian Habitat	Fumigants will not be used within the habitat areas of special status amphibians. Any live traps will allow California red-legged frogs, California tiger salamanders, or foothill yellow-legged frogs to safely exit (e.g., by having openings measuring no smaller than 2 inches by 1 inch).
ANI-5	Slurry Mixture near Waterways	All slurry type mixes used to fill rodent burrows will be prevented from entering any waterway by using appropriate erosion control methods and according to the manufacturer's specifications. If the creek bed is dry or has been dewatered, any material that has entered the channel will be removed.
ANI-6	Species Requiring Depredation Permit	Animal Conflict Management will not include lethal control of species listed in California Fish & Game Code Section 4181, including beaver and gray squirrel, without first obtaining a depredation permit.
HM-4	Posting and Notification for Pesticide Use	Posting of areas where pesticides are used will be performed in compliance with Valley Water Policy Ad-8.2 Pesticide Use as follows: 1. Posting will be performed in compliance with the label requirements of the product being applied. 2. In addition, posting will be provided for any products applied in areas used by the public for recreational purposes, or those areas readily accessible to the public, regardless of whether the label requires such notification. In doing this, Valley Water ensures that exposure risk is minimized further by adopting practices that go beyond the product label requirements. (The

BMP Number	BMP Title	BMP Description
		posting method may be modified to avoid destruction of bait stations.) 3. These postings will notify staff and the general public of the date and time of application, the product's active ingredients and common name, and the time of allowable re-entry into the treated area. 4. Signs will not be removed until after the end of the specified re-entry interval. 5. Right-to-know literature on the product will be made available to anyone in the area during the re-entry period. 6. A Valley Water staff contact phone number will be posted on the sign, including a cellular phone number. 7. Notification of pesticide activities will be made as required by law. Also, Valley Water will maintain records of neighbors with specific needs relative to notification before treatment of an adjacent area so that such needs are met.

7.4 PROJECT AND PROGRAM LIMIT

Animal conflict management activities involving surface compaction, filling of burrows, and tilling above ordinary high water will not exceed 42 linear miles during the period 2014–2023.

CHAPTER 8. MINOR MAINTENANCE ACTIVITIES

8.1 PURPOSE

Minor Maintenance activities are routine small-scale activities performed to make repairs and keep Valley Water facilities operational. Maintenance activities may occur along creeks and at stream gauges. Though they may occur throughout the SMP area, they do not change the footprint of any existing facility or structure. These are minor activities because they are small in size and their potential environmental impacts are temporary and limited in impact.

8.2 WORK ACTIVITIES

Minor Maintenance activities include:

1. Minor sediment removal consists of 25 cubic yards or less of material at outfalls, culverts, flap gates, tide gates, inlets, grade control structures, bridges, and streamflow measuring stations (stream gauges) to maintain functions of such structures. Minor maintenance work at these facilities is limited to 25 cubic yards per facility. Removal of sediment cannot extend farther than 100 feet in any direction from the structure.

2. Trash and debris removal can include removal of anthropogenic trash as well as removal of downed trees, limbs, and other plant material. Reportable live vegetation impacts still apply.

3. Repair and installation of fences and gates, including repairs or installations with minor ground disturbance.

4. Grading and other repairs to restore the original contour of existing maintenance roads. Repair of existing roads includes repair to both upper and lower maintenance roads. Road repair may include adding aggregate material and/or other in-kind materials within the existing roadway footprint.

5. Grading small areas beyond top of bank to improve drainage and reduce erosion.

6. Repair of structures with similar materials within the same footprint (such as replacement of concrete linings, culverts, pipes, valves or similar structures; or repairing a weir, in-stream orifice, or communication pipe). For purposes of this activity description, similar materials means that materials will be replaced in-kind, such that hardscape and softscape facilities will be replaced with similar materials, respectively. Other types of hardscape may be used to repair existing hardscape; however, in-kind replacement of hardscape is only exempt from agency notification if the replacement would not modify the original design. Hardscape may also be replaced with softscape if practicable (See Chapter 10).

7. Installation and on-going maintenance of mitigation sites, including: irrigation, weed control, replanting dead or declining plants, and other types of ongoing maintenance at mitigation sites.

8. Removal of obstructions, other than sediment and large woody debris, at structures such as bridges (not to exceed 100 feet upstream and downstream of a bridge), streamflow measuring stations (stream gauges), box culverts, storm drain outfalls, pier nose, trash booms, and drop structures to maintain functions of such structures.

9. Stream gauge maintenance, including stilling well cleaning, painting of gauge houses, replacing/adding antenna or solar panels to existing structures, replacing instrumentation, repairing cableways, cleaning weirs of algae and debris, and unburying staff markers/orifice/communication pipes.

10. Minor erosion repair above ordinary high water mark (OHWM) includes the repair of small rills or gullies (less than 5 ft. wide) that may develop in channel banks or upland areas due to localized runoff conditions. These minor erosion repairs differ from bank stabilization activities described in Chapter 6 which address erosion caused by flows in the channel itself, and are larger in extent and involve engineering design. These minor erosion repairs are typically caused by small local runoff occurring outside of the channel that is drained toward the channel. Typically, these minor erosion repairs involve recompacting earth in a narrow 1-5 ft. wide section of the upper streambank, maintenance road, or other upland location above the OHWM.

8.2.1 Requirements

A minor activity is work that results in the removal of less than 0.08 acre (3485 sq ft) of wetland or riparian vegetation. The minimum reporting size is 0.01 acres (436 sq ft) of wetland or riparian vegetation impacts per project or any activity where dewatering is performed on a creek reach that supports sensitive fish species. In addition, all minor activities for a single year have a total wetland or riparian vegetation impact of 0.4 acre and a total of 4 acres for the 10-year program. Any impacts to wetland or riparian vegetation necessary for access or staging for these minor maintenance activities are calculated as part of this total. Minor maintenance projects with impacts less than the minimum reporting size of 0.01 acres (436 sq ft) do not require tracking or reporting.

8.3 IMPACT AVOIDANCE AND ACTIVITY SPECIFIC BMPS

There are no specific BMPs for Minor Maintenance activities. Species and work activity-specific BMPs are implemented as applicable. GEN-20: Erosion and Sediment Control Measures, shall apply if large areas of soil are exposed as a result of minor maintenance activities. Minor maintenance activities that occur in the wetted channels of streams that support sensitive fish species that are being done outside of the in-stream work windows must adhere to the relevant biological survey and monitoring requirements described under BMP GEN-1.

8.4 PROJECT AND PROGRAM LIMITS

Per-Project Limit:	0.08 acres (3485 sq ft) of wetland/riparian vegetation impacts.
Annual Limit:	0.4 acres of wetland/riparian vegetation impacts.
Program Limit:	5-year program limit is 2.0 acres of wetland/riparian vegetation impacts; 10-year program limit is 4.0 acres of wetland/riparian vegetation impacts.
Other:	Minor Maintenance activities are limited to actions that result in temporary impacts and may not include any actions that result in permanent impacts (i.e., construction of a new structure, tree removal 6-12" dbh, limb removal >4" diameter, or new hardscape). Minor Maintenance activities are limited only based on the wetland/riparian vegetation impacts associated with each project. To ensure that Minor Maintenance SMP projects are unconnected, single and complete actions, and not part of a larger action that will exceed the SMP's per-project size and placement limits, each Minor Maintenance project must demonstrate independent utility. A SMP project will be considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility of the same activity type.
Exceptions:	None.

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CHAPTER 9. LARGE WOODY DEBRIS

Managing downed trees is a frequent stream maintenance activity. Logs and riparian vegetation increase channel roughness and reduce conveyance, requiring large wood removal to maintain flood capacity (Marzolf 1978, Singer and Swanson 1983, Young 1991, Gippel et al. 1996). The SMP defines large woody debris (LWD) as large naturally occurring wood having a minimum diameter of 12 inches (30.5 cm) and a minimum length of 6 feet (1.82 meters) that occurs below Ordinary High Water (OHW)/bankfull elevation. Large woody debris includes the portion of a tree trunk or lateral branches greater than 12 inches in diameter extending above OHW perched on the stream bank. LWD is further defined as downed logs, trees and other woody debris along streambeds, and SMP LWD management actions pertain only to anadromous salmonid channels (see Figures 3-1 and 3-2, and Table 9.1 below). Natural processes such as bank erosion, landslides, windthrow and tree mortality place LWD naturally in stream channels throughout the year.

TABLE 9.1
Anadromous Salmonid Creeks Within the Stream Maintenance Program Area

Central California Coast Steelhead Distribution in the Project Area	
Creek/River	**Upper Limit of Steelhead Distribution**
Alamitos Creek	Almaden Dam
Arroyo Aguague[1]	Falls upstream from confluence with Upper Penitencia Creek
Calero Creek	Calero Dam
Coyote Creek	Leroy Anderson Dam
Guadalupe River/Creek	Guadalupe Dam
Los Gatos Creek	Camden Avenue Drop Structure
Los Trancos Creek[1]	Approximately 0.4 mile north of headwaters
San Francisquito Creek	Searsville Dam
Stevens Creek	Stevens Creek Dam
Upper Penitencia Creek	Cherry Flat Dam

South-Central California Coast Steelhead Distribution in the Project Area	
Creek/River	**Upper Limit of Steelhead Distribution**
Bodfish Creek	Bodfish Creek Falls
Cedar Creek[1]	Approximately 3 miles north of Cedar Creek Boulder Falls #2
Little Arthur Creek[1]	Concrete Dam (near Redwood Retreat Road crossing)
Llagas Creek	Chesbro Dam
Pacheco Creek[1]	North Fork Dam
Pajaro River	Steelhead occur in all portions of the creek within Santa Clara County
Pescadero Creek[1]	Headwaters
Tar Creek[1]	Southern end of Castro Valley approximately 1.8 river miles from headwaters
Uvas/Carnadero Creek	Uvas Dam
South Fork Pacheco Creek[1]	South Fork Pacheco Creek Boulder Falls
[1]Although work is not expected on these creeks, they are within the SMP project area and are therefore included here.	

9.1 PURPOSE

Woody debris, including LWD, provides an important ecological role in Santa Clara County channels. The main objective of LWD management in anadromous salmonid channels is to retain woody debris in-channel where possible to preserve the physical and biological processes associated with the natural recruitment of wood to waterways. Retention of woody debris will be considered in locations where it will not increase the flood risk by way of sedimentation, debris capture or flow deflection. Retention will also be considered where the woody debris appears stable and will not mobilize and damage nearby infrastructure. If LWD is deemed to pose a potential flood risk or likely to damage infrastructure, Valley Water may reposition, modify, cut or remove it to maintain channel flood capacity or infrastructure integrity. The primary goals associated with these actions are to:

- Retain as much LWD in the channel as possible for the benefit of native fish habitat;
- Minimize obstructions;
- Reduce the potential for erosion resulting from downed trees, deflecting flows towards banks where possible; and
- Protect and support the as-built functions of Valley Water facilities.

Removing debris jams/trash rafts may also involve modifications to LWD. Debris jams/trash rafts are collections of woody debris that have become entangled in the channel, typically including a mixture of non-organic trash. Clearing debris jams/trash rafts generally includes the removal of small woody debris, small lateral branches and inorganic trash to alleviate water quality and channel capacity problems.

9.2 WORK ACTIVITIES

The LWD Assessment and Prioritization Process is triggered by annual or bi-annual field inspections by Valley Water staff, requests for services by members of the community or external entities such as cities or the County.

The tiered prioritization process to manage LWD, described below, balances flood protection and ecological objectives. Decisions to retain, modify, cut or remove LWD are based on review by maintenance crews, engineering staff and biologists. Staff addresses multiple questions in the field such as downed tree species, degree of channel blockage, location of the tree in relation to flow, and ecological benefits of the downed tree. Heavy equipment may be used to modify LWD placement. LWD work activities may occur year-round; however, LWD management activities will be scheduled during the SMP instream work season when feasible. Where mechanized equipment must cross a creek or water quality may be otherwise affected, LWD management actions must be performed during the SMP instream work season of June 15 to October 15.

9.3 REQUIREMENTS

To effectively manage LWD in streams within the urban landscape, Valley Water will utilize the following five-tiered approach to evaluate LWD. Qualified biologists will evaluate LWD management in Tiers 2-5 as described below to determine the ecological and geomorphic integrity the LWD may provide to the stream.

Tiered approach:

- **Tier 1) Retain LWD**—Retain LWD in its existing location. Based on the field assessment described above, wherever possible, LWD will be left in place and monitored for changed conditions that may trigger the need for further management actions. Tier 1 does not require prior agency notification and does not require monitoring by a qualified biologist.

- **Tier 2) LWD Modification and/or Repositioning**—Modify and/or reposition LWD and retain as one intact piece. If LWD cannot be left in its original configuration below the bankfull elevation due to flooding, debris trapping or erosion potential, the wood may be modified and left in place or repositioned on-site. Modifications are limited to removal of trash associated with the LWD and the limbing of branches.

  Repositioning of LWD may occur when it is necessary to re-orient or change the position of the LWD to avoid excessive bank scour, to avoid aggradations, or to avoid channel incision. Lateral limbs <12" in diameter may be removed. Lateral limbs or portions of the tree trunk >12" in diameter or larger and 6' in length may not be removed under Tier 2. Cutting LWD to reduce the length does not qualify as a Tier 2 action.

  Repositioning of Tier 2 LWD is limited to placement within 100 feet (upstream or downstream) of the original LWD location. Tier 2 does not require prior agency notification. Where appropriate, LWD may be anchored in place.

- **Tier 3) Cutting LWD into Smaller Pieces**—If previous management actions, (i.e., limbing branches and/or repositioning) do not alleviate flooding or erosion risks, LWD may be cut into smaller pieces. Cuts to LWD will be the minimum required to remove obstructions to flow and erosion risk. All cut wood must be larger than the LWD definition of 12 inches in diameter by 6 feet in length. Cut wood pieces reduced to less than 6 feet in length must be mitigated as described in Section 10.10.3. Mitigation will be required for the portion of LWD below the OHW/bankfull hinge point that was cut to less than 6 feet in length (see Figure 9.1). LWD repositioning of cut pieces is limited to within 100 feet upstream or downstream of the original LWD location. Where LWD is positioned across the channel, it may be cut to provide flow clearance within the channel while leaving root masses or other LWD material along/within the banks. Where appropriate, LWD may be anchored in place.

Tier 3 actions will be reported to the appropriate regulatory agencies within one week of completion, and in the ASR. Each piece of cut LWD will be fitted with an aluminum tree tag, given a unique identifying number and monitored by a qualified biologist. Stream channels are dynamic, and natural recruitment and movement of wood is a natural process; therefore, if the wood remains within the on-site channel reach as defined above for one full calendar year post-construction, it will be deemed to have met the monitoring requirements and no mitigation is required. All tagged pieces that are not on-site after one year will be mitigated as described in Section 10.10.3. Mitigation will be provided for impacts to the portion of LWD below the OHW/bankfull hinge point (see Figure 9.1). For Tier 3 actions occurring in the high-quality creek reaches identified in Table 9.2, mitigation will also be provided for impacts to the portion of LWD above the OHW/bankfull hinge point (see Figure 9.2).

- **Tier 4) LWD Removal and Replacement Off-site**—Tier 4 applies to the removal of LWD and reuse elsewhere in the watershed. Relocation of wood will be conducted considering factors such as the presence of a floodplain, channel width/depth ratio, increased biological value (e.g., natural channel versus modified channel), or improved access. If needed, LWD may be temporarily stockpiled off-site for later use at a location approved by the appropriate regulatory agencies and must be placed in-stream no later than the following SMP work season.

  Tier 4 removal does not require prior agency notification; however, relocation sites require agency pre-approval. Removal and placement actions will be reported within one week of these actions occurring, and in the ASR. Completed Tier 4 actions will be reported in the ASR. Relocated LWD will be fitted with an aluminum tree tag, given a unique identifying number and monitored by a qualified biologist for one full calendar year post-construction. If Tier 4 LWD does not stay in place on-site (within 100 feet of the original replacement site) for one full calendar year, mitigation will be provided as described in Section 10.10.3. Mitigation will be provided for impacts to the portion of LWD below the OHW/bankfull hinge point (see Figure 9.1). For Tier 4 actions occurring in the high-quality creek reaches identified in Table 9.2, mitigation will also be provided for impacts to the portion of LWD above the OHW/bankfull hinge point (see Figure 9.2).

- **Tier 5) Removal of LWD**—Valley Water may remove LWD when it is determined to be a potential flood threat or a threat to bank stability, public safety and/or facilities. Complete removal of LWD typically occurs in highly-modified streams with low or zero tolerance for instream vegetation or structures such as LWD. Tier 5 will be reported to the appropriate regulatory agencies within one week of completion, and in the ASR. Trees that are removed may be chipped or disposed of in the local landfill. Cutting LWD into pieces smaller than six feet in length and leaving it within the channel is also considered to be removal as the habitat values have been lost. All Tier 5 LWD actions will be mitigated as described in Section 10.10.3. Mitigation will be provided for impacts to the portion of LWD below the OHW/bankfull hinge point (see Figure 9.1). For Tier 5 actions

occurring in the high-quality creek reaches identified in Table 9.2 mitigation will also be provided for impacts to the portion of LWD above the OHW/bankfull hinge point (see Figure 9.2).

The removal of LWD to facilitate fish passage or to maintain the function of existing fish ladders will not require mitigation. Such actions will be reported as LWD removal for fish passage to the appropriate regulatory agencies within one week of completion, and in the ASR in the fish ladder monitoring report.

TABLE 9.2
Large Woody Debris High-Quality Reaches with SMP Program Area

Creek/River	High-Quality Reach	Reach Creek Stationing
Alamitos Creek	Almaden Lake to Almaden Dam	2000-40500
Arroyo Aguague[1]	Entire Creek	0-51937
Calero Creek	Confluence with Alamitos Creek to Calero Dam	0-22000
Coyote Creek	HWY 101 near Morgan Hill to Leroy Anderson Dam	209000-222500
Guadalupe Creek	Almaden Expressway to Guadalupe Dam	108000-139000
Los Trancos Creek[1]	Entire Creek	0-38975
San Francisquito Creek	Sand Hill Rd to Searsville Dam	38400-67800
Stevens Creek	Stevens Creek Blvd to Stevens Creek Dam	51500-67500
Upper Penitencia Creek	Noble Ave to Cherry Flat Reservoir	20000-51000
Bodfish Creek	Entire Creek	0-43112
Cedar Creek[1]	Entire Creek	0-32778
Little Arthur Creek[1]	Entire Creek	0-35148
Llagas Creek	Lake Silvera to Chesbro Reservoir Dam	73133-101000
Pacheco Creek[1]	Entire Creek	0-93412
Pajaro River	Entire River Reach in Program Area	100000-168595
Pescadero Creek[1]	Entire Creek	0-49988
Tar Creek[1]	Entire Creek	0-45992
Uvas Carnadero Creek	Miller Ave to Uvas Dam	43865-91500
South Fork Pacheco Creek[1]	Entire Creek	0-48009

[1]Although work is not expected on these creeks, they are within the SMP project area and are therefore included here.

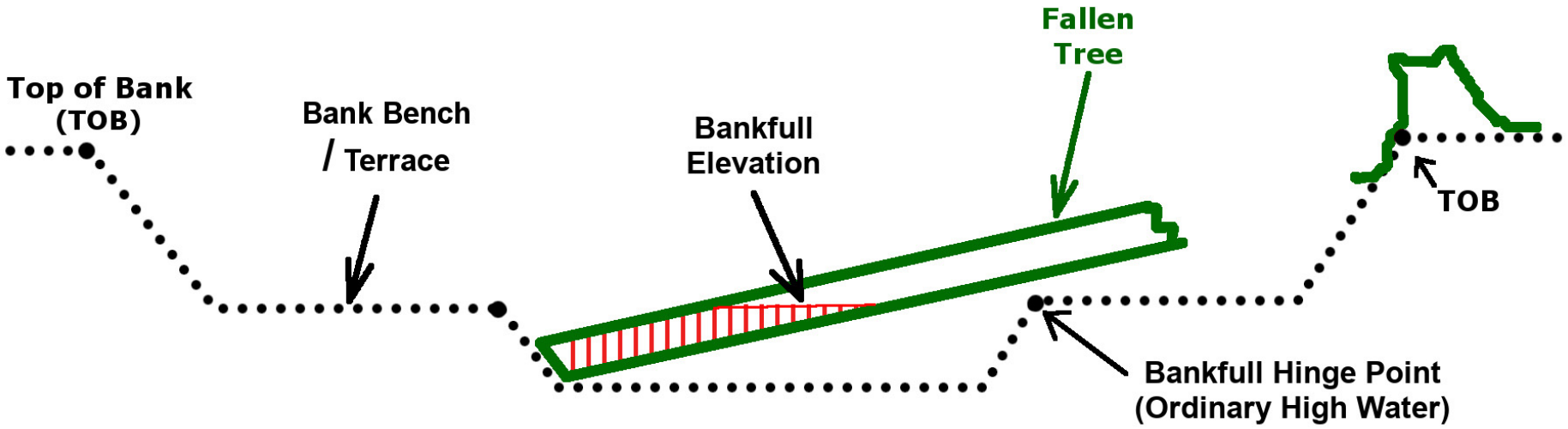
- **Debris Jams/Trash Rafts**—A trash raft is an accumulation of floating trash found in the creek channel impeded by woody debris or a narrow channel. Removal of trash rafts improves the water quality of local waterways by removing hazardous items such as spray paint cans, butane canisters, plastics, and Styrofoam that emit chemicals into the water and pose a threat to wildlife who may confuse debris for food. A debris jam is an accumulation of large wood and other materials that can span an entire stream, and in urban settings, may create trash rafts and often consists of high volumes of trash imbedded with woody debris. The removal of debris jams/trash rafts may also require the need to modify and/or remove LWD. Due to the overall water quality and environmental benefits of trash removal, mitigation may not be required for the removal of LWD associated with a trash raft removal if prior notification with photos is submitted to the appropriate regulatory agencies and agency pre-approval is obtained.

Figure 9.1: LARGE WOODY DEBRIS (LWD)
MITIGATION ACCOUNTING CRITERIA

Mitigation is required for all fallen trees within anadromous salmonid channels with the following characteristics:

Minimum 30cm (12 inches) diameter and 183 cm (6 feet) in length occurring below the bankfull elevation/ordinary high water.

Only the portion below the bankfull elevation (red hatched area) will be measured for mitigation accounting purposes.

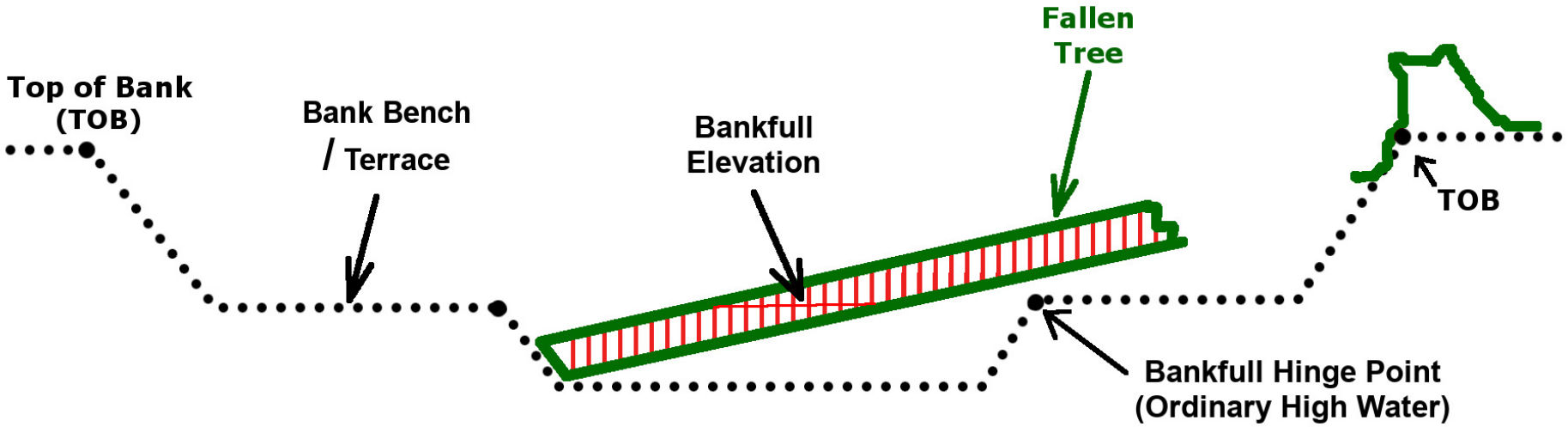


These guidelines pertain to the in-channel area which is defined as the stream channel within bankfull discharge demarcations. Bankfull is the river elevation (stage) at which time the most effective geomorphic work occurs. This is also referred to as the dominant discharge and is the stage that generally corresponds to a flow event with a 1-2 year recurrence interval. This coincides with bankfull hinge point in this figure. A typical small storm occurring on a regular basis will bring water up to the bankfull elevation as shown on the diagram above.

Figure 9.2: LARGE WOODY DEBRIS (LWD)
MITIGATION ACCOUNTING CRITERIA IN HIGH-QUALITY REACHES

Mitigation is required for all fallen trees within anadromous salmonid channels with the following characteristics:

Minimum 30cm (12 inches) diameter and 183 cm (6 feet) in length occurring below bankfull elevation/ordinary high water. The portion above and below the bankfull elevation/ordinary high water (red hatched area) will be measured for mitigation accounting purposes if the large woody debris is located in a high-quality reach identified in Table 9.2.



These guidelines pertain to the in-channel area which is defined as the stream channel within bankfull discharge demarcations. Bankfull is the river elevation (stage) at which time the most effective geomorphic work occurs. This is also referred to as the dominant discharge and is the stage that generally corresponds to a flow event with a 1-2 year recurrence interval. This coincides with bankfull hinge point in this figure. A typical small storm occurring on a regular basis will bring water up to the bankfull elevation as shown on the diagram above.

9.4 IMPACT AVOIDANCE AND ACTIVITY-SPECIFIC BMPS

In order to reduce the potential for impacts associated with modification, repositioning or removal of LWD, the following activity specific Best Management Practices (BMPs) will be employed:

- Pre-activity surveys for sensitive species will be conducted by a qualified biologist and work must occur within seven days of the survey.
- A qualified biologist will monitor all LWD modifications and removals for Tiers 2, 3, 4, and 5 to minimize impacts to sensitive species.
- Valley Water will provide an annual salmonid educational awareness/training to all maintenance staff involved in LWD management. Training will emphasize methods to cross a stream and work in-water that avoid and minimize impacts to water quality and salmonid habitat. These methods will be presented in a Salmonid BMP pamphlet distributed to all field crews at the time of the annual in-person training. This pamphlet includes a list of steelhead creeks in the county, a diagram of the best areas to cross creek channels, and methods to avoid/minimize impacts to salmonid habitat.

9.5 PROJECT AND PROGRAM LIMITS

LWD work activities are permitted year round except where mechanized equipment is required to work within the live stream channel or if water quality may otherwise be affected. If mechanized equipment is required to work within the live stream channel or if water quality may be affected, LWD management actions must be performed during the SMP work season of June 15 to October 15.

Per-Project Limit: There is no specific limit to the number of LWD repositionings, modifications and removals.

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CHAPTER 10. MITIGATION PROGRAM

10.1 PURPOSE

Unavoidable impacts may require mitigation, depending on the nature of the impact and the regulatory authority involved. Valley Water is committed to providing appropriate and effective mitigation for SMP impacts. This chapter describes the regulations and practices the water district follows to address unavoidable impacts to the environment through mitigation.

Mitigation is one element of a comprehensive approach to impact avoidance, minimization, and compensation. As described in Chapter 3, project planning, resource evaluations and maintenance guidelines are used to prioritize work activities and avoid unnecessary maintenance. Valley Water takes the cost of mitigation into account when determining the feasibility of maintenance work. When maintenance is required, Valley Water implements best management practices (BMPs) to avoid and/or minimize impacts.

SMP-2 activities may impact aquatic, wetland and/or riparian habitats. It is the intent of Valley Water to mitigate for impacts to all Waters of the U.S., regulated by the U.S. Army Corps of Engineers (USACE); Waters of the State, regulated by the San Francisco Bay and Central Coast Regional Water Quality Control Boards (RWQCBs); and bed/bank/channel and associated riparian habitats, regulated by the California Department of Fish and Wildlife (CDFW). Mitigation will be determined using the methods described in this chapter.

This chapter is organized as follows:

Section 10.2 Applicable Regulatory Guidance for Mitigation Program

Section 10.3 SMP-1 Background and Mitigation Provided to Date

Section 10.4 SMP-2 Mitigation Approach (2014-2023)

Section 10.5 SMP-2 Mitigation for Vegetation and Sediment Removal Impacts

Section 10.6 Ecological Services Mitigation: Revegetation, Invasive Plant Management, Encampment Cleanup and Bank Rehabilitation

Section 10.7 Bank Stabilization and Wetland Impacts

Section 10.8 Land Acquisition Mitigation

Section 10.9 Concrete Removal Mitigation

Section 10.10 Mitigation for Impacts to Special-Status Species and Associated Habitat

10.2 APPLICABLE REGULATORY GUIDANCE FOR MITIGATION PROGRAM

The mitigation concepts, objectives and activities described in this chapter were developed with guidance from and in collaboration with, the Program's Inter-Agency Working Group (IAWG). A more detailed summary of regulatory agency guidance and how it relates to SMP activities can be found in Chapter 2.

10.2.1 2008 Mitigation Rule: U.S. Army Corps of Engineers (USACE) and Environmental Protection Agency (USEPA)

In 2008, the USACE and USEPA issued the Compensatory Mitigation for Losses of Aquatic Resources, Final Rule, commonly referred to as the 2008 Mitigation Rule (2008 USACE 33 CFR, Parts 325 and 332 (2008); and EPA 40 CFR Part 230 (2008)). The mitigation sequence established by CWA Section 404(b)(1) guidelines is to avoid, minimize and compensate for impacts. Mitigation is required to address residual impacts that are neither avoided nor minimized completely through other measures.

Mitigation may involve the rehabilitation, establishment, enhancement, and/or in certain circumstances, preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved (Sec. 332.2). Any mitigation which is required by USACE must be below top of bank (immediately adjacent to and providing benefits within USACE jurisdiction) or below OHWM or below the high tide line or within 3-parameter federal wetlands (hydrology, hydrophytic vegetation, and hydric soils).

Implementation of mitigation projects shall occur, to the maximum extent practicable, in advance of or concurrent with the activity causing the authorized impacts. This is particularly true when off-site mitigation is pursued. For on-site mitigation, it is recognized that the on-site mitigation activities, by necessity, will likely occur during or following the maintenance activities. It is preferable to reduce the time lag between the loss of aquatic resource functions caused by the permitted impacts and the replacement of such functions as provided by mitigation. As described in the 2008 Mitigation Rule, mitigation ratios may be adjusted to address the temporal loss of functions. A more detailed summary of the 2008 Mitigation Rule and how it relates to SMP activities can be found in Chapter 2, Section 2.2.3.

Valley Water will prepare compensatory mitigation plans for mitigation that is required by USACE. The components of a compensatory mitigation plan are described under Attachment I. Valley Water will submit these compensatory mitigation plans as part of the NPW process.

10.2.2 California Fish and Game (F&G) Code: California Department of Fish and Wildlife (CDFW)

CDFW promulgates mitigation requirements through various sections of the California F&G Code and associated regulations related to lake and streambed habitats and species that receive protection under the California Endangered Species Act (CESA), as follows:

- 1602 Streambed Alteration Agreements—Under Section 1602 of the California F&G Code, CDFW may issue permits that allow impacts to the bed, channel or bank of rivers, streams, lakes and associated riparian habitat. As a condition of these permits, CDFW may require measures to protect fish and wildlife resources, which may include mitigation.

- California Endangered Species Act—CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates and plants and their habitats that are threatened with extinction and those experiencing a significant decline which, if not halted, will lead to a threatened or endangered designation, will be protected or preserved.

- California F&G Code Section 2081—Under Section 2081 of the California F&G Code, CDFW may issue permits authorizing the incidental take of species that are listed as threatened or endangered or are candidates for such listing under CESA.

- California Code of Regulations (CCR) Title 14 Section 783—This section of the CCR implements Sections 2080 and 2081 of the California F&G Code and CESA. Section 783 implements the requirements described above, that impacts from the incidental take of CESA-protected species be minimized and fully mitigated.

10.2.3 U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS)

The USFWS and NMFS are charged with implementing and enforcing the Endangered Species Act (ESA). Conditions of incidental take approvals provided by the USFWS and NMFS may include mitigation requirements. Valley Water biologists will evaluate all SMP activities for the potential to impact ESA-protected species. In the NPW and ASR, for any item that may affect ESA-listed species, a Valley Water biologist will indicate whether the activity is likely to adversely affect the species and will describe any mitigation to be used to compensate for these impacts.

10.2.4 Regional Water Quality Control Boards (RWQCBs)

The Regional Water Quality Control Boards have established basin plans for the San Francisco Bay and Monterey Bay Watersheds. These plans identify beneficial uses and water quality standards for the watersheds. The basin plans incorporate by reference the Clean Water Act section 404(b)(1) guidelines, which apply to wetlands and other waters including streams. In considering mitigation for impacts to wetlands, the RWQCB follows the California Wetlands Conservation Policy (Executive Order W-59-93). The objectives of this policy include:

1. To ensure no overall net loss and achieve a long-term net gain in the quantity, quality and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship and respect for private property.

2. To reduce procedural complexity in the administration of State and Federal wetlands conservation programs.

3. To encourage partnerships to make restoration, landowner incentive programs and cooperative planning efforts the primary focus of wetlands conservation.

For the RWQCBs (San Francisco Bay and Central Coast), the preferred mitigation approach for SMP activities is in-kind, on-site, near-site, in-water body and in-watershed mitigation over out-of-kind, off-site land acquisition approaches. Valley Water will continue to look for in-kind mitigation opportunities within the water district's jurisdiction to offset impacts that may result from maintenance activities.

10.3 SMP-1 BACKGROUND AND MITIGATION TO DATE

SMP-1 refers to the original SMP period 2002-2013. SMP-1 provides for the permanent mitigation of sites where maintenance work was previously mitigated for under the program. For example, where sediment removal projects were mitigated during the SMP-1 period, the impacts to vegetation <6" dbh and wetlands on the sediment removed were also permanently mitigated. During the 2002-2013 SMP (SMP-1), Valley Water mitigated work activities in perpetuity through a combination of land acquisition, habitat protection and wetland restoration/creation. SMP-1 mitigation projects are summarized in tables in Attachment B.

Previously Mitigated Areas (PMAs)

Previously Mitigated Areas (PMAs) are sites in which certain maintenance activities occurred and were mitigated for in perpetuity during SMP-1. PMAs are considered to be mitigated for these activities in perpetuity, with no additional mitigation necessary for similar SMP-2 maintenance. PMAs are listed in the tables in Attachment B. They include pruning of overhanging growth (of maintenance roads and fence lines) and in-channel (below OHW) herbicide application, sediment removal or vegetation removal <6" dbh. While Attachment B lists work done on the canals, canals were excluded from SMP-2; therefore, work may not occur in the canals using the SMP-2 permits. PMAs do not apply to sensitive species impacts or impacts to their habitat.

10.4 SMP-2 MITIGATION APPROACH (2014-2023)

10.4.1 Mitigation Strategies

SMP-2 includes four mitigation approaches: (1) on-site and off-site ecologic services-based mitigation; (2) land acquisition-based mitigation; (3) species-specific mitigation; and (4) a single-user mitigation bank as developed in coordination with the USACE and other regulatory agencies. Further descriptions can be found in Chapter 2. This range of solutions addresses the variety of maintenance activities, impact types and resource conditions that occur along SMP channels, as well as the availability of appropriate mitigation opportunities. The mitigation ratios developed for SMP-2 considered the nature and extent of potential impacts caused by maintenance activities, including how functions and values are potentially affected.

SMP-2 on-site and off-site ecological services mitigation activities may include invasive plant management, native plant revegetation, the removal of trash and pollutants from encampment activities and the rehabilitation of encampment-related excavated banks. SMP-2 land acquisition-based mitigation may include use of remaining credit from completed SMP-1 mitigation projects listed in Attachment B, Table 2 and the creation of new land acquisition-based projects. SMP-2 species-specific mitigation may include gravel augmentation, building instream complexity and payment of fees to the Santa Clara Valley Habitat Agency for species covered by the Valley Habitat Plan (VHP).

If the mitigation area exceeds that which is required to mitigate for an item, then the excess mitigation can be applied to other SMP-2 mitigation needs within that watershed. This type of "excess" mitigation, and its application to other impact items, will be identified and tracked in the annual NPW and ASR.

In the second half of the SMP-2 time period, Valley Water is moving toward a strategy of prioritizing large multi-benefit mitigation sites. Valley Water will be proposing between one and three large mitigation projects to be done during the second half of SMP-2. This set of mitigation projects will be anticipated to provide mitigation adequate to cover the majority of the second half of SMP-2 impacts within USACE jurisdiction. Each of these projects may incorporate several of the mitigation strategies which are described in this chapter. Proposals will include an estimation of the types and amount of mitigation credit to be generated by the project based on the mitigation activity ratios presented in Table 10-1c and elsewhere in this chapter.

Five-Year Mitigation Areas (FMAs)

Certain SMP-2 activities, once mitigated, may create Five-Year Mitigation Areas (FMAs). An area where one of these activities has occurred and has been mitigated for under SMP-2 becomes an FMA for that activity and location. FMAs are considered to be mitigated for that impact activity and location for a period of five years after the initial impact. Further work of the same activity within the FMA during this five-year period will not incur any new mitigation debt. For five-year periods that would extend beyond 2023, these FMAs should extend into SMP-3. Table 10-1a denotes those activities that are classified as potential FMAs. The FMA rules do not cover sensitive-species impacts.

10.4.2 Mitigation Structure

Table 10-1a summarizes the impact ratios for SMP-2 activities. Table 10-1b lists SMP-2 activities that do not incur any mitigation obligation. Table 10-1c lists the mitigation credit ratios for various forms of mitigation.

TABLE 10-1a
Summary of Impact Ratios

Type of Work Activity	Mitigation Ratio[3]	Notes	Mitigation Activity	Previously Mitigated Areas (PMA)	Five-Year Mitigation Area (FMA) Applicable[4]
Vegetation removal <6" dbh (sq ft)	1:1	(mitigation obligation: area of canopy removed) For bank stabilization projects, mitigation is not required for cumulative temporary impacts that are less than the Minor Maintenance per project maximum (3485 sq ft). Mitigation is not required for sediment removal projects.	IPMP, Revegetation or encampment cleanup	YES	YES
Tree removal 6-12" dbh (sq ft canopy cover and tree replacement count)	Canopy Cover 0:1; 1:1; 2:1; 3:1 AND Tree Replacement Count 1:1	(mitigation obligation: area of canopy cover removed) 3:1 for native removal 2:1 for non-native removal (non-native trees that are not on the invasive plant list) 1:1 potential ratio for invasive tree removals identified by biologist as having habitat value. 0:1 for invasive tree removal (Section 10.5.1) AND 1:1 Tree Replacement Count	Revegetation	NO	NO
Pruning (sq ft)	1:1	(mitigation obligation: area of canopy removed). Pruning requiring mitigation includes pruning for flow conveyance, inspections and to protect infrastructure. Corrective pruning, overhanging growth and coppicing do not require mitigation. No compensatory mitigation required for pruning of invasive tree limbs < 4" diameter. For bank stabilization and sediment removal projects mitigation is not required for cumulative temporary impacts that are less than the Minor Maintenance per project maximum (3485 sq ft). Pruning projects that have less than 436 square feet of impact do not require mitigation.	IPMP, Revegetation or encampment cleanup	YES	YES

Type of Work Activity	Mitigation Ratio[3]	Notes	Mitigation Activity	Previously Mitigated Areas (PMA)	Five-Year Mitigation Area (FMA) Applicable[4]
Limb removal >4" diameter (sq ft)	0:1; 2:1; 3:1	(mitigation obligation: area of canopy removed) 3:1 for native tree limbs removed 2:1 for non-native tree limb removal (non-native trees that are not on the invasive plant list) 0:1 No compensatory mitigation obligation for pruning of invasive trees limbs >4" diameter	IPMP, Revegetation or encampment cleanup	N/A	N/A
Aquatic Herbicide (sq ft)	1:1	For new work areas only (mitigation obligation: work area)	IPMP, Revegetation or encampment cleanup	YES	YES
Post Emergent Herbicide (sq ft)	1:1	Mitigation required for new areas only. No compensatory mitigation required for applications on existing roads and beyond TOB for access. (mitigation obligation: work area)	IPMP, Revegetation or encampment cleanup	YES	YES
Temporary Wetland	0:1	If regrowth within 2 years. (See Section 10.7.3)	N/A	N/A	N/A
Permanent Wetland Impacts (sq ft)	1.5:1 (Revegetation) or as determined in mitigation site plan (for land acquisition)	(mitigation obligation: area of impact) Wetland impacts can occur from Sediment Removal, Bank Stabilization and Vegetation Management work.	Below OHW Revegetation, created wetlands or Land Acquisition Mitigation	YES[1]	NO
Permanent Bank Stabilization (sq ft)	See Table 10-2	Mitigation ratio applies to the hardened area only. This refers to impacts in the Permanent columns of Table 10-2.	Revegetation, Hardscape or Concrete Removal or Land Acquisition Mitigation	NO	NO
Temporary Bank Stabilization (sq ft)	See Table 10-2	This refers to impacts in the Temporary impact columns of Table 10-2.	IPMP, Revegetation, or encampment cleanup	NO	NO

Type of Work Activity	Mitigation Ratio[3]	Notes	Mitigation Activity	Previously Mitigated Areas (PMA)	Five-Year Mitigation Area (FMA) Applicable[4]
Sediment Removal[2]	1:1	Applies to non-PMA or earthen channel bottom. (mitigation obligation: area of impact)	IPMP, Revegetation or encampment cleanup	YES	NO
Large woody debris removal (cubic yards)	1:1	In anadromous salmonid creeks only. (mitigation obligation: area of impact)	LWD installation	NO	NO
Loss of instream habitat complexity features/coarse sediment removal (sq ft/cubic yards)	1:1	In anadromous salmonid creeks only. (mitigation obligation: area of impact)	Instream complexity/ gravel augmentation	NO	NO
Tidal Wetland	1.2:1	(mitigation obligation: area of impact) Tidal wetland impacts can occur from Sediment Removal, Bank Stabilization and Vegetation Management work.	Mitigation will be debited from the 9 ac of tidal wetland restoration that has already been completed at the Island Ponds (see 10.10.5).	YES	NO

[1] PMA for sediment removal, instream vegetation removal <6" dbh or aquatic herbicide.
[2] Salmonid habitat impacts are assessed and determined separately from mitigation owed for sediment removal.
[3] Mitigation ratios are presented as mitigation obligation:area of impact. A ratio of 0:1 indicates the activity is self-mitigating. Mitigation ratios may be modified on a project-by-project basis per negotiation during the NPW process.
[4] The FMA rules do not cover sensitive-species impacts.

TABLE 10-1b
Summary of Activities With No Compensatory Mitigation Required

Type of Work Activity	Notes
Vegetation Management	
Coppicing	Cutting of a tree to create annual growth to be used for mitigation plantings.
Corrective Pruning	Pruning to promote long-term tree health.
Grazing	No compensatory mitigation required for areas outside of sensitive habitats such as wetlands, woody riparian or sensitive species habitat.
Mowing/Weed abatement	No compensatory mitigation required for areas outside of sensitive habitats such as wetlands, woody riparian or sensitive species habitat.
Pruning (overhanging growth)	No compensatory mitigation required for pruning of access along existing roadways and fence lines (includes upper and lower maintenance roads).
Post-emergent herbicide	No compensatory mitigation required when work occurs beyond top of bank, existing roadways and fence lines.
Pre-emergent herbicide	When beyond top of bank, on existing roadways or along fence lines.
Other Activities	
Sediment Removal[1]	None required where there is a debris basin or sediment deposition reach (SDR).
Management of Animal Conflicts	No separate mitigation for Management of Animal Conflicts. Impacts are accounted for under other work activities identified in Table 10-1a.
Minor Maintenance	No compensatory mitigation required for Minor Maintenance activities. These activities must remain under the per-project limit, annual limit and program limits.
[1] Salmonid habitat impacts are assessed and determined separately from mitigation owed for sediment removal.	

TABLE 10-1c
Summary of Mitigation Credit by Channel Type[1]

Type of Mitigation Activity	Modified Channel Mitigation Ratio	Modified Channel With Ecological Value Mitigation Ratio	Unmodified Channel Mitigation Ratio	Notes
Invasive Plant Management (sq ft)	1:1; 2:1	1:1; 2:1	1:1; 2:1	1:1 for Tier 1 invasive species; 2:1 for Tier 2 invasive species. IPMP can be used for permanent bank stabilization impacts in modified channels and for other temporary impacts.
Revegetation (sq ft)	1.1:1	1.3:1	1.5:1	
Large woody debris installation (cubic yards)	1:1	1:1	1:1	
Instream Complexity/Gravel Augmentation (sq ft/cubic yards)	1:1	1:1	1:1	
Concrete removal (below top of bank, includes structures and rubble)	2:1	2:1	3:1	
Encampment cleanup or rehabilitation of excavated banks	1:1	1:1	1:1	
Land Acquisition	Ratios will be described in mitigation site plans.			
Island Ponds	~9 acres of remaining credit for tidal wetland impacts			
Pajaro Basin Freshwater wetland	5.3 acres of remaining credit including 3.7 acres of credit for jurisdictional wetland impacts			Can only be used for impacts within CCRWQCB jurisdiction
[1]Mitigation credit ratios are presented as area of mitigation credit generated:area of mitigation project. Mitigation ratios may be modified on a project-by-project basis per negotiation during the NPW process.				

TABLE 10-2
Summary of Bank Stabilization Mitigation
by Channel Type

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel	
			Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
1	Earth Repair	Soft	0:1		0:1		0:1	
1A	Earth Repair with Buried Rock	Soft	0:1		0:1		0:1	
1B1	Earth Repair with Rock Base Vegetated	Hybrid	0:1		0:1		0:1	
1B2	Earth Repair with Rock Base Not Vegetated	Hard		0:1 off-site for rock base impacts		0.3:1 off-site for rock base impacts		0.5:1 off-site for rock base impacts
2	Live Construction	Soft	0:1		0:1		0:1	
2A	Live Construction with Boulder Base	1. Hybrid if rock area is vegetated	0:1 if boulder base is vegetated		0:1 if boulder base is vegetated		0:1 if boulder base is vegetated	
		2. Hard if rock area is not vegetated		0.5:1 off-site for base impacts if boulder base is not vegetated		2:1 off-site for base impacts if boulder base is not vegetated		3:1 off-site for base impacts if boulder base is not vegetated
2B	Live Construction with Log Base	Soft	0:1		0:1		0:1	
3	Contour Wattling	Soft	0:1		0:1		0:1	
3A	Contour Wattling with Boulder Bae	1. Hybrid if rock area is vegetated	0:1 if boulder base is vegetated		0:1 if boulder base is vegetated		0:1 if boulder base is vegetated	
		2. Hard if rock area is not vegetated		0.5:1 off-site for base impacts if boulder base is not vegetated		2:1 off-site for base impacts if boulder base is not vegetated		3:1 off-site for base impacts if boulder base is not vegetated
3B	Contour Wattling with Log Base	Soft	0:1		0:1		0:1	

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel	
			Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
4	Brush Mattress (Brush Layering)	Soft	0:1		0:1		0:1	
4A	Brush Mattress (Brush Layering) with Boulder Base	1. Hybrid if rock area is vegetated	0:1 if boulder base is vegetated		0:1 if boulder base is vegetated		0:1 if boulder base is vegetated	
		2. Hard if rock area is not vegetated		0.5:1 off-site for base impacts if boulder base is not vegetated		2:1 off-site for base impacts if boulder base is not vegetated		3:1 off-site for base impacts if boulder base is not vegetated
4B	Brush Mattress (Brush Layering) with Log Base	Soft	0:1		0:1		0:1	
5	Surface Matting (Erosion Mats)	Soft	0:1		0.5:1		2:1	
5A	Surface Matting (Erosion Mats) with Boulder Base	Hard		0.5:1		2:1		3:1
5B	Surface Matting (Erosion Mats) with Log Base	Soft	0:1		0.5:1		2:1	
6	Add Rock to Invert (Channel stabilization method; considered hard for notification purposes)	Hard		3:1		3:1		3:1
6A	Rock Cross Vanes (Grade control structure; considered hard for notification purposes)	1. No additional mitigation required if the agencies provide written concurrence that rock placed along channel bed provides habitat complexity functions		0:1		0:1		0:1

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel	
			Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
		2. Off-site mitigation required if the placement of rock is extensive along the channel bed and uniform		2:1		2.5:1		3:1
6B	Root Wads and Boulders	Hybrid	0:1		0:1		0:1	
6C	Live Log Crib Walls	Soft	0.5:1		2:1		2.5:1	
6D	Log Revetment	Hybrid	0.5:1		2:1		2.5:1	
6E	Bendway Weirs (considered hard for notification purposes)	1. No additional mitigation required if the agencies provide written concurrence that rock placed along channel bed provides habitat complexity functions		0:1		0:1		0:1
		2. Off-site mitigation required if the placement of rock is extensive along the channel bed and uniform		2:1		2.5:1		3:1
7	Cellular Confinement System	Hard		3:1		3:1		3:1
8	Rock Blanket	Hard		3:1		3:1		3:1
8A	Boulder Revetment	Hard		3:1		3:1		3:1
8B	Boulder Revetment with Soil and Vegetation	Hybrid	0.5:1		2:1		2.5:1	
9	Articulated Concrete Blocks	Hard		3:1		3:1		3:1
9A	Articulated Concrete Blocks with Planted Areas	Hard		3:1		3:1		3:1

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel	
			Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
10	Concrete Crib Walls	Hard		3:1		3:1		3:1
11	Sacked Concrete	Hard		3:1		3:1		3:1
12	Gunite Slope Protection	Hard		3:1		3:1		3:1

Notes:

- Mitigation ratios are presented as mitigation obligation:area of impact. A ratio of 0:1 indicates the activity is self-mitigating.
- Mitigation ratios may be modified on a project-by-project basis per negotiation during the NPW process.
- Mitigation ratio applies to the bank method area.
- Mitigation ratios shall be applied to calculate mitigation requirements in square feet.
- These ratios are for non-land acquisition mitigation.
- When synthetic geotextile matting is utilized as part of a bank stabilization method, the area of synthetic geotextile use would be considered hardscape (3:1 ratio).

10.5 SMP-2 MITIGATION FOR VEGETATION AND SEDIMENT REMOVAL IMPACTS

Mitigation for vegetation and sediment removal impacts will be completed through on-site ecological services mitigation where possible and practical. When on-site mitigation is not appropriate, off-site ecological services mitigation will be performed within the same watershed as the impact.

10.5.1 Vegetation Impacts

Vegetation impacts, including both vegetation management activities and vegetation impacts which are associated with access, staging and construction of other SMP-2 activity types will be mitigated primarily through a combination of revegetation, invasive plant management and encampment cleanup. The majority of vegetation impacts are considered to be temporary in nature. However, removal of trees 6-12" dbh is considered to be a permanent vegetation impact, which may only be mitigated with revegetation and tree replacement (See Section 10.6.2).

Table 10-4, Typical Revegetation Palette, distinguishes trees versus shrubs. Any 'tree' on this list with a dbh > 6", will be considered a tree. Any 'shrub' on this list, even if it has a cumulative dbh > 6" will **not** be considered a tree removal. This work will be performed as vegetation removal < 6" dbh and the impact calculated by area only. If a multi-stem species is proposed for removal and is not defined as a tree on either the Invasive Plant List Table 10-3 or the revegetation list Table 10- 4, the following methodology will apply. For a multi-stem tree or shrub with seven (7) or less trunks or stems several feet above ground, the dbh will be calculated by adding the diameters of the individual stems at 4.5 feet above ground. If the cumulative dbh is > 6", then it will be counted as a tree. An individual species with greater than seven (7) stems at dbh will be assessed by their canopy cover and will not be considered a tree removal.

Removal of 6-12" dbh trees will be mitigated through the planting of replacement trees. Limb removals > 4" diameter that remove less than 25 percent of the individual tree, as required in Chapter 4, and are on the approved invasive plant list (Table 10-3) do not incur a mitigation debt. Pruning overhanging growth (OHG) from roadways and fence lines does not incur a mitigation debt. Removal of invasive species as identified in Table 10-3 for purposes other than IPMP is generally considered to be a neutral impact (no debt nor credit). However, in some cases, a biologist may determine that a specific invasive removal will have a negative impact on the habitat function of a site and may assign a debt ratio to that removal accordingly. This debt will be reported in the NPW and ASR.

Revegetation mitigation areas will not be impacted for at least 10 years. If it is necessary to impact a revegetation mitigation area for any reason other than to improve the health of the mitigation site, mitigation for the activity will be provided using the standard approach and mitigation ratio (1.1, 1.3 or 1.5) for that channel type. In addition, the impacted mitigation area will be replaced in-kind (either on- or off-site), the monitoring clock for the impacted mitigation area will extend in duration for another five years and the site will not be impacted for at least another 10 years from the date of the maintenance activity. This approach reflects the fact that most vegetation removed

for SMP activities is relatively young, and as a result, the ability to impact (with subsequent mitigation) revegetation sites after 10 years will not lead to a net reduction in the maturity of riparian vegetation in the SMP area. Activities performed to enhance the health of mitigation sites (including both SMP-1 and SMP-2 mitigation sites) such as pruning or thinning to reduce overcrowding that may have occurred due to abundant and vigorous growth, may be performed at any time without the need for additional mitigation.

10.5.2 Additional Vegetation Management Impact/Mitigation Conditions

Pruning

1. The impact area will be calculated by the square footage (area) of vegetation removed multiplied by the vertical proportion/percentage of the tree or stand that is pruned.

2. Mitigation for pruning activities is required only for the specific work area and the specific portions of the trees that have been pruned.

3. Pruning may result in FMAs. If new pruning within an FMA involves simply removing branches and foliage that have re-sprouted from areas pruned in the prior five years, then no new mitigation is required. If pruning involves removing new branches and foliage, whether on the same trees that were previously pruned or on new trees, then additional mitigation for these new impacts is required.

Herbicide

Mitigation is not required for maintenance road spraying, unless there are potential impacts to special-status species (see Table 10-5).

Vegetation Removal

All woody vegetation < 6" dbh that is not listed in Table 10-3, the Invasive Plant Species List, or within a PMA/FMA, will be calculated as a mitigation debt.

Mowing

Mitigation may be required for mowing of sensitive habitats such as wetlands or woody riparian vegetation, mowing of special-status plants, or mowing of habitat for the least Bell's vireo, California tiger salamander or California red-legged frog. Outside such habitats, mitigation will not be required for mowing grasses and non-woody vegetation.

10.5.3 Sediment Removal Impacts

Sediment removal is mitigated with IPMP, revegetation, or encampment cleanup at a 1:1 ratio with the impact based on the area of the sediment removal area. Sediment removal which occurs within a debris basin or sediment deposition reach does not incur any mitigation debt. Sediment removals may incur mitigation debts for vegetation impacts or wetland impacts

associated with the sediment removal work, which may be mitigated in the manner associated with those impacts. Sediment removals within PMAs do not incur any mitigation debt for the sediment removal, for wetlands, or for removal of vegetation <6" dbh within the sediment removal area.

10.6 ECOLOGICAL SERVICES MITIGATION: REVEGETATION, INVASIVE PLANT MANAGEMENT, ENCAMPMENT CLEANUP/BANK REHABILITATION AND CONCRETE REMOVAL

Mitigation will be provided for impacts to all Waters of the U.S. and State, as well as for riparian habitats outside of Waters of the U.S. and State (pursuant to CDFW jurisdiction), as necessary.

10.6.1 Invasive Plant Management Program (IPMP)

Controlling the spread of invasive plant species is critical to improving the ecological health of our streams and watersheds. Invasive plants tend to spread aggressively, negatively altering resource allocation regimes, wildlife behavior patterns, soil stability and water quality, resulting in degraded habitat quality and ecological value. In addition, invasive plants can exacerbate flooding and fire danger, undermine structural assets and obstruct access to roads, levees and trails.

The goal of the Invasive Plant Management Program (IPMP) is to preserve and improve habitat within Santa Clara County streams and riparian corridors through removal of invasive plants. Staff will achieve this goal through early detection and systematic removal of invasive plants in existing high-quality habitats, opportunistic removal of invasive plants in SMP work locations and control efforts in currently degraded habitats to improve the overall ecological site condition.

The IPMP will serve as mitigation for SMP-2 impacts by controlling the population of invasive plant species from affected habitats. The IPMP has a two-pronged approach: (1) a systematic program to control priority invasive plants throughout Santa Clara County; and (2) an opportunistic program to manage invasive plants within active individual SMP work sites. These two approaches are integrated together to enhance the overall ecological health of our creeks and watersheds.

The IPMP may be implemented in any location within the SMP coverage area. Priority will be given to conducting control work in locations that contain sensitive habitats, provide habitat for sensitive species and/or provide quality habitat for a variety of wildlife. When possible, Valley Water will coordinate with adjacent landowners to accomplish a complimentary and consistent approach to invasive plant management.

Over the course of the 10-year program, the systematic portion of the IPMP will target: (1) removal of priority invasive plants in existing high-quality habitats; and (2) control efforts in currently degraded habitats to improve overall ecological site conditions. Mitigation needs and credit will be determined annually, depending on the proposed work for the year. A proposal for mitigation credit and the associated acreage to be treated for this program will be submitted in the NPW. Mitigation credit accrued will be

used to compensate for impacts from vegetation maintenance activities, sediment removal and applicable bank stabilization methods. Mitigation credit for each project site will be submitted with the ASR.

The opportunistic portion of the IPMP will target removal of invasive plants at specific sites or during other routine Valley Water activities. Work efforts will vary each year depending on the number of project sites where invasive plant removal is feasible. Opportunistic invasive removal not conducted for mitigation credit will be reported via the specific work activity type, e.g. vegetation removal < 6" dbh or tree removal 6-12" dbh.

Opportunistic IPMP activities will be performed to provide ecological benefits without seeking mitigation credit.

10.6.1.1 Plan Implementation

A. Systematic Component

Table 10-3 lists the invasive plant species. The table integrates and weighs a variety of factors, including:

- the 2006 CAL-IPC ratings;
- the anticipated rate of spread without management intervention;
- the feasibility of effective control;
- impacts to fish and wildlife;
- impacts to sensitive plant communities;
- increases in flood or fire danger; and
- aggressive growth patterns known to cause structural damage to flood control facilities or to impede maintenance access.

The water district will consult the California Department of Food and Agriculture (CDFA), CAL-IPC and BAEDN invasive plant databases periodically to ensure that the species list is current. Any revisions to Table 10-3 will be submitted to the permitting agencies for approval. Specific locations targeted for control activities will be selected based on the baseline inventory as well as a variety of other factors, including: quality of habitat, feasibility of control and access constraints. Integrated Vegetation Management techniques will be employed (mechanical, chemical, combination) to utilize the most effective method for each species while providing the greatest amount of protection to environmental resources.

Success Criteria. Criteria for success will be developed for each site and/or for each individual target species. Eradication will be the ultimate goal for defined sites where conditions exist to make it a realistic goal. Exclusion or containment

strategies may be used where an invasive plant poses a threat to a sensitive species or habitat type yet complete eradication is deemed infeasible. These control strategies may also be used to suppress highly competitive invasive species, giving existing native species the ability to thrive. The NPW submitted for each IPMP site will include a narrative description of the site (including potential constraints that may limit work), site objectives for restoring ecological function and the quantitative success criteria that will be used to evaluate the site's success.

Tier 1 and Tier 2. Some invasive species require greater effort to achieve effective eradication or containment; therefore, management of these species will result in greater mitigation credit. Table 10-3 divides the invasive species list into two tiers based on the level of effort required for effective management. Species in the Tier 1 category will result in a mitigation credit of 1:1 (mitigation area credited: impact area). Species needing three years or more of treatment are in the Tier 2 category and will result in a mitigation credit of 2:1. Tier 2 provides mitigation at a ratio of 2:1, recognizing additional resources needed to be successful, difficulty in managing/eradicating the species and benefits provided to the site ecology. Invasive species removed for the purposes of flow conveyance, a sediment removal project, or bank stabilization project will be considered neutral, resulting in neither mitigation credit nor debt (mitigation ratio is 0:1).

At the discretion of Valley Water and the regulatory agencies, removal of invasive trees that are greater than 12" dbh may occur as part of an IPMP item if these removals further its objectives. This is particularly relevant to sites where such trees threaten to continue to propagate if left in place. If removal of invasive trees >12" dbh is part of an IPMP site's objectives, the NPW will include a narrative discussion of the reasons for the removal. In addition, a biologist will prepare an analysis of the effects this removal would have on the site's ecological function as wildlife habitat. Such analyses will also be submitted as part of the NPW.

Staff will work to encourage natural revegetation/recruitment at treatment sites, including suppression of other weed species. In areas where revegetation does not occur naturally within one to three years, a biological/horticultural assessment will be made to determine what impediments may exist to natural revegetation. In areas where revegetation potential exists, Valley Water will develop a plan to install site-appropriate vegetation. Mitigation credits for revegetation may be applied, consistent with SMP-2 mitigation accounting. IPMP may be combined with other forms of mitigation such as revegetation or land acquisition to encourage a holistic, sustainable mitigation program.

B. Opportunistic Component

Invasive plant species are frequently found during field inspections and are often associated with other identified SMP work activities such as vegetation management, sediment removal and minor maintenance. In these instances,

opportunistic control of invasive plants may enhance habitat quality and benefit the ecological landscape. Invasive species removal for flow conveyance, sediment removal or bank stabilization will be considered neutral, requiring neither mitigation credit nor debt.

IPMP's opportunistic component has no specific target acreage. Proposed mitigation credit for each project site will be submitted with the ASR along with a site description, IPMP objectives and success criteria. To obtain mitigation credit, opportunistic IPMP sites will be required to meet the same monitoring standards as systematic IPMP sites, including submission of annual monitoring reports. Not all opportunistic IPMP sites will request a mitigation credit.

Opportunistic IPMP sites should never include removal of trees greater than 12" dbh. Opportunistic invasive removal not proposing mitigation credit will be reported via the specific work activity type, e.g. vegetation removal <6" dbh or tree removal 6-12" dbh.

C. Coordination and Education

Valley Water will coordinate with other regional control and early detection programs to stay apprised of regional issues (BAEDN, CAL-IPC, Invasive Spartina Project, Arundo Del Norte, and others). The IPMP will document invasive species occurrence and control data and submit pertinent information to regional databases such as CAL-IPC, Cal Flora and BAEDN. Valley Water will also coordinate with other Santa Clara County landowners for a consistent and complementary approach to invasive plant management throughout the county.

To inform Valley Water field staff and the public about priority invasive species, Valley Water will publish an informational brochure that identifies plants with photographs and describes the threats each one poses. By increasing awareness, the brochure will aid in early detection and identification of invasive species in previously unidentified locations. In addition, the water district will place informational postings at publicly accessible sites during control activities.

10.6.1.2 IPMP Monitoring

Treatment areas will be mapped with a GPS and tracked for long-term success at all programmatic sites. This tracking will help measure the efficacy of a particular treatment and determine if additional control work and/or a different technique will be necessary. Treatment monitoring will measure performance against the success criteria for each site. Monitoring results will be critical for prioritizing follow-up treatments and planning seasonal work.

The IPMP was developed for the purpose of meeting SMP mitigation requirements. It may be used as mitigation for a variety of SMP impacts. Mitigation using the IPMP will be applied at the following ratios (invasive plant area removed to impact mitigation requirement area): 1:1 for Tier 1 species (control requires 2 years or less time to achieve) and 2:1 for Tier 2 species (control requires more than 2 years to achieve).

As a mitigation element of the SMP, the IPMP is defined as a separate work category. While it has elements of vegetation management, revegetation and maintenance, it is not subject to the limitations defined for these separate work activities when they are performed as mitigation. IPMP activities will only be conducted up to the optimal level to maximize ecological values at a site; removal beyond that for other purposes (e.g., flood conveyance) are subject to applicable SMP limits and permit conditions. Since the IPMP is a mitigation activity, it will have a higher level of biological oversight and resource protection than “impact” program components.

TABLE 10-3
Invasive Plant List

Species	Common Name	Habitat	Life Form	Systematic Program Mitigation Ratios
Species with 1-2 years of control work (Tier 1)				
Casuarina cunninghamiana	river she-oak, beefwood	Riparian and upland	tree	1:1
Cotoneaster spp.	Cotoneaster	Riparian and upland	tree	1:1
Eucalyptus spp.	eucalyptus, gum	Riparian and upland	tree	1:1
Ficus carica	Common fig	Riparian and upland	tree	1:1
Fraxinus spp.	Ash	Riparian and upland	tree	1:1
Juglans spp. (J. regia, J. californica)	Walnut	Riparian and upland	tree	1:1
Ligustrum spp.	Privets	Riparian and upland	tree	1:1
Nicotiana glauca	tree tobacco	Upland and ruderal (levees)	tree	1:1
Olea europaea	Olive	Riparian and upland	tree	1:1
Palm Spp. (Phoenix canariensis, Washingtonia robusta)	Palms	Riparian and upland	tree	1:1
Populus nigra ‘Italica’	Lombardy poplar	Riparian and upland	tree	1:1
Rhamnus alaternus	Italian buckthorn	Riparian and upland	tree	1:1
Salsola tragus	Russian tumbleweed	Riparian and upland	annual herbaceous	1:1
Schinus molle	Peruvian pepper tree	Riparian and upland	tree	1:1
Sesbania punicea	red sesbania, rattlebox	Riparian and upland	perennial herbaceous	1:1
Species with 3 years or more of control work (Tier 2)				
Acacia spp.	Acacia	Riparian and upland	tree	2:1
Ailanthus altissima	tree of heaven	Riparian and upland	tree	2:1
Non-native Ambrosia spp.	Ragweed	Riparian and upland	annual herbaceous	2:1
Arundo donax	giant reed	Riparian and upland	perennial grass	2:1
Broom spp.	Broom species	Riparian and upland	shrub	2:1
Centaurea spp.	Yellow starthistle, Purple starthistle	Upland and ruderal (levees)	annual herbaceous	2:1

Species	Common Name	Habitat	Life Form	Systematic Program Mitigation Ratios
Conium maculatum	poison hemlock	Upland and ruderal (levees)	annual/biennial	2:1
Cortaderia spp.	pampas grass, jubata grass	Upland and ruderal (levees)	perennial grass	2:1
Cynara cardunculus	artichoke thistle	Tidal and fresh water marsh and ruderal	perennial herbaceous	2:1
Delairea odoata	Cape Ivy	Riparian and upland	vine	2:1
Dittrichia graveolens	Stinkweed	Upland and ruderal (levees)	annual herbaceous	2:1
Foeniculum vulgare	Fennel	Riparian and upland	perennial herbaceous	2:1
Hedera spp.	English ivy, Algerian ivy	Riparian and upland	vine	2:1
Non-Native Lepidium spp.	Pepperweed	Tidal and fresh water marsh and ruderal	perennial herbaceous	2:1
Myriophyllum aquaticum + spicatum	Parrotfeather	Aquatic	aquatic	2:1
Phalaris aquatica	Harding grass	Riparian and upland	perennial grass	2:1
Phragmites australis	common reed	Tidal and fresh water marsh	perennial grass	2:1
Quercus ilex	holly oak	Riparian and upland	tree	2:1
Ricinus communis	castor bean	Upland and ruderal (levees)	annual, biennial	2:1
Robinia pseudoacacia	black locust	Riparian and upland	tree	2:1
Rubus armeniacus	himalayan blackberry	Riparian	vine	2:1
Salix babylonica (and hybrids)	weeping willow	Riparian	tree	2:1
Spartina alterniflora	atlantic cordgrass	Tidal marsh	perennial grass	2:1
Tamarix ramosissima	salt cedar	Riparian and upland	tree	2:1
Ulmus spp.	Elm	Riparian and upland	tree	2:1
Vinca major	vinca, periwinkle	Riparian and upland	perennial herbaceous	2:1

10.6.2 Revegetation Program

The primary goal of the riparian planting program is to compensate for the loss of quality and quantity of riparian habitat resulting from SMP impacts. Revegetation will establish and/or enhance habitat for native wildlife species while providing shade, sources of organic matter and coarse woody debris, improved root and soil structure and other water quality benefits to aquatic species.

The typical planting palette for the revegetation program is shown in Table 10-4. Figure 10-1 presents an example of a revegetation plan cross-section, referencing plants listed in Table 10-4. Revegetation sites may require site preparation, including minor grading and topsoil preparation, and incorporation of soil amendments.

Efforts will be made to source container plants used in SMP revegetation projects from nurseries that are in full compliance with the *Guidelines to Minimize Phytophthora Pathogens in Restoration Nurseries* (Working Group for Phytophthoras in Native Habitats, 2016). SMP-2 restoration projects may also utilize seeds, plugs and/or cuttings.

Revegetation mitigation credit will be calculated based on the total area (as measured in square feet) of the revegetation site multiplied by the mitigation credit ratio. The mitigation credit ratios are based on the channel type of the associated stream: 1.1 for Modified Channels, 1.3 for Modified with Ecological Value Channels and 1.5 for Unmodified Channels. The resulting area of mitigation credit will then be matched to appropriate impact areas (similarly calculated by multiplying impact area by impact ratio). Revegetation mitigation must be matched to impacts within the same watershed.

For the mitigation of impacts associated with the removal of trees 6-12" dbh, there is an additional mitigation balancing requirement. For each 6-12" dbh tree removed there must be one native tree installed on a mitigation site within the same watershed. Removal of individual trees 6-12" dbh will incur a mitigation debt measured in square feet of canopy cover with the following impact ratios: 3:1 for native tree removal, 2:1 for non-native tree removal, and either 0:1 or 1:1 for invasive tree removal. The removal of invasive trees (as defined under Table 10-3) will not incur any tree count matching requirement. Biologists will assess the function and value being provided by the invasives scheduled for removal to that specific site. If the invasives are providing unique function and value, they will be mitigated at a 1:1 ratio. If they are not providing unique value, no compensatory mitigation will be required. Shrubs as defined by Table 10-4 or by the Jepson Manual (for example: coyote brush, toyon, mulefat, sandbar willow and dogwood, among others) will not incur any tree count matching requirement. If a revegetation site meets the final success criteria, including the tree survivorship criteria of 75 percent, all native trees which were installed in that site will count toward the tree count balance.

In most cases, there is no requirement to match the impact tree count and the mitigation tree count by species. However, 6-12" dbh Western sycamore (*Platanus racemosa*) must be replaced by Western sycamore, and 6-12" dbh oak (*Quercus* sp.) must be replaced with a native species of oak (*Quercus* sp.). For example, the removal of a coast

live oak (*Quercus agrifolia*) could be balanced by the installation of a valley oak (*Quercus lobata*).

The total balance of 6-12" dbh tree removals and 6-12" dbh tree installations in each watershed will be reported in a table that is submitted with each ASR. This table will also show the balance of oaks and sycamores in each watershed. In the final accounting for the SMP-2 program, the total number of 6-12" dbh trees removed in each watershed must balance with the total number of trees installed on all successful revegetation sites in that watershed at a 1:1 ratio.

Where appropriate, staff may revegetate maintenance locations, thereby providing on-site mitigation for maintenance activities. Potential for revegetation is highly dependent on conditions, including hydrology and soils, at each site. Where opportunities for on-site revegetation are unavailable or highly constrained, mitigation will be implemented at suitable off-site locations within the same watershed.

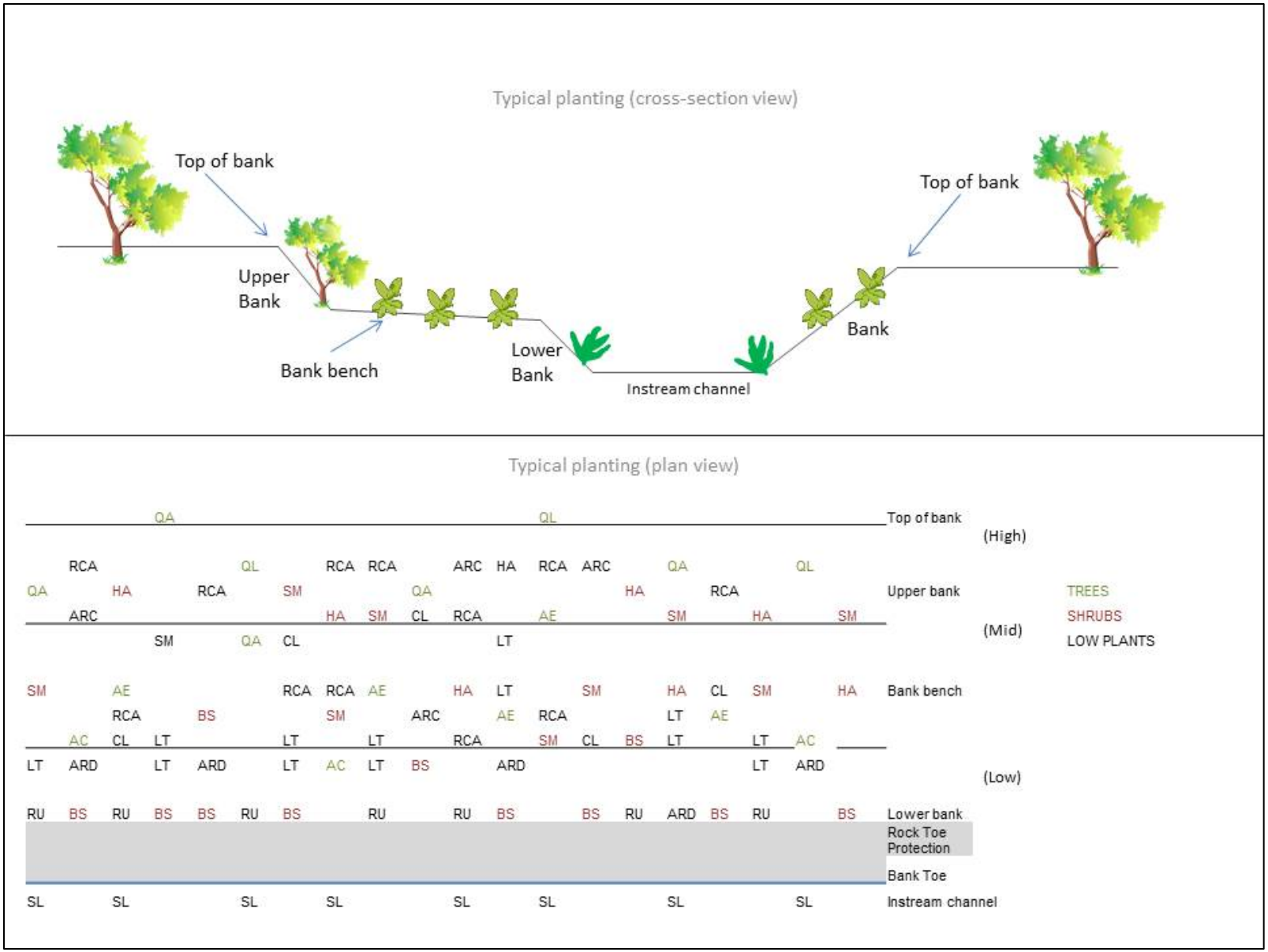


Figure 10-1: Typical Planting Plan

TABLE 10-4
Typical Revegetation Palette

Symbol	Botanical Name	Common Name	Slope Planting Location
TREES			
AC	Acer negundo	Box elder	Low to mid, riparian and upland
AE	Aesculus californica	Buckeye	Mid to high, upland
AR	Alnus rhombifolia	Alder	Waters edge, low, riparian
PR	Platanus racemosa	Western sycamore	Low to mid, riparian and upland
PF	Populus fremontii	Fremont cottonwood	Low to mid, riparian
PT	Populus trichocarpa	Black cottonwood	Waters edge, low, riparian
PI	Prunus ilicifolia	Holly leaf cherry	Mid to high, upland
QA	Quercus agrifolia	Coast live oak	Mid to high, upland
QD	Quercus douglasii	Blue oak	High, upland
QL	Quercus lobata	Valley oak	Mid to high, upland
SL	Salix laevigata	Red willow	Waters edge, low, riparian
SLAS	Salix lasiandra	Arroyo willow	Waters edge, low, riparian
SLU	Salix lucida	Shining willow	Waters edge, low, riparian
SM	Sambucus mexicana	Elderberry	Mid to high, upland
SHRUBS			
BS	Baccharis salicifolia	Mulefat	Low to mid, riparian and upland
CG	Cornus glabrata	Brown dogwood	Low to mid, riparian
ERNU	Eriogonum nudum	Naked buckwheat	Upland
HA	Heteromeles arbutifolia	Toyon	Mid to high, upland
RC	Rhamnus californica	Coffeeberry	Mid to high, upland
SE	Salix exigua	Sandbar willow	Waters edge, low, riparian
LOW PLANT, VINES			
ARC	Artemesia californica	California sage	Mid to high, upland
ARD	Artemesia douglasiana	Mugwort	Low to mid, riparian and upland
SYCH	Symphyotrichum chilensis	California aster	Low to mid, riparian and upland
CL	Clematis ligusticifolia	Virgin's bower	Mid to high, upland
EF	Eriogonum fasciculatum	California buckwheat	Mid to high, upland
EO	Euthamia occidentalis	Goldenrod	Low to mid, riparian and upland
PHNO	Phyla nodiflora	Lippia	Low riparian
ASFA	Asclepias fascilcularis	Narrowleaf milkweed	Riparian and Upland
HEOR	Heterotheca oregona	Oregon false goldenaster	Riparian and Upland
CYER	Cyperus eragrostis	Tall cyperus	Low riparian, Waters edge
ACMI	Achillea millefolium	Yarrow	Mid to High, Upland
ERNU	Grindelia hirsutula	Gumplant	High
HEPU	Helenium puberulum	Sneezeweed	Water's edge, low, riparian
CASP	Carex spp.	Sedge	Water's edge, Low, Riparian
RISA	Ribes sanguineum	Pink winter currant	Riparian and Upland
RISP	Ribes speciosum	Fuschia-flowering gooseberry	Riparian and Upland
EPCA	Epilobium canum	California fuschia	Upland

Symbol	Botanical Name	Common Name	Slope Planting Location
GLLE	Glycyrrhiza lepidota	American licorice	Riparian, Low
RCA	Rosa californica	California rose	Mid to high, upland
RU	Rubus ursinus	California blackberry	Low to high, riparian and upland
ELTR	Elymus triticoides	Blue wild rye	Low to high, riparian and upland
SYL	Symphoricarpos albus	Snowberry	Mid to high (shade), upland
BAGL	Baccharis glutinosa	Marsh baccharis	Water's edge, low, riparian
HEVI	Heterotheca villosa	Hairy false goldenaster	Riparian and Upland
GRASSES (SEED)		Valley Water Erosion Control Mix	
	Hordeum californicum	Prostrate California Barley	All slope locations
	Elymus glaucus "Berkeley"	Berkeley' Blue Wildrye	All slope locations
	Bromus carinatus	California Brome	All slope locations
	Vulpia microstachys	Three Weeks Fescue	All slope locations
OPTIONAL			
STPU	Stipa pulchra	Purple needlegrass	High
JUPA	Juncus patens	Spreading rush	Upland
JUXI	Juncus xiphioides	Iris leaved rush	Water's edge, low, riparian
	Elymus X triticum	Sterile wheat	Temporary, all slope locations

10.6.3 Encampment Cleanup and Bank Rehabilitation

Encampment cleanup mitigation will include removal of human-caused, inorganic trash that is in, or positioned to enter, aquatic and riparian habitats. In recent years, Valley Water has observed a dramatic increase in trash on water district-managed lands. This increase in trash is thought to be primarily due to the recent increase in unauthorized encampments. The abundance of trash is perhaps the most readily noticeable environmental issue in creeks throughout many of the urban and suburban areas of Santa Clara County.

Valley Water will use encampment cleanup as mitigation for removal of vegetation <6" dbh, pruning, limb removal >4", herbicide application and sediment removal. The methodology for calculating mitigation credit for encampment cleanups is based on an estimated area cleaned (square feet). Methods for this calculation must be approved by all relevant regulatory agencies prior to requesting mitigation credit for encampment cleanup. Encampment cleanup mitigation will occur in the same watershed where the impact occurred.

Valley Water may also repair and rehabilitate stream banks impacted by encampment-related excavation as mitigation for temporary or permanent bank stabilization impacts. If the encampment-related repair activity is to rehabilitate an excavated bank that is not considered necessary for flood protection, then mitigation credit would be applied for SMP-2 bank repair activities at a 1:1 ratio. If the encampment-related earth repair activity is required for flood protection purposes, the repair would be considered a mitigation neutral activity (i.e., repair of encampment-related bank excavation areas would not require mitigation). Mitigation credit for encampment-related bank stabilization is based on actual measured area rehabilitated.

10.7 BANK STABILIZATION AND WETLAND IMPACTS

10.7.1 Bank Stabilization

Stabilizing and repairing eroding stream channel banks and levees is a routine SMP activity. While bank stabilization is routine and expected, specific work locations are not certain until after each winter season. Bank stabilization maintenance needs are assessed annually on an as-needed basis.

Table 10-2 identifies the 12 SMP bank stabilization treatments and variations. Table 10-2 describes whether the techniques use softscape, hardscape or hybrid elements and the mitigation ratios according to channel types. The bank stabilization techniques shown in Table 10-2 are described in more detail in Attachment D.

Potential impacts from bank stabilization projects are avoided and minimized through evaluating and refining the project needs, designing projects to affect the minimum feasible area and employing BMPs to reduce impacts during project construction.

Mitigation for bank stabilization impacts below OHW may be accomplished through revegetation as described in Section 10.6, through land acquisition or the remaining 3.7 acres of jurisdictional wetland mitigation as described in Section 10.8, or through concrete removal as described in Section 10.9. Permanent impacts below OHW on unmodified channels and modified with ecological value channels may be mitigated with revegetation, concrete removal or via the 3.7 acres of jurisdictional wetland mitigation. Mitigation for the above-OHW bank stabilization impacts may be accomplished through any of the mitigation methods.

10.7.2 Mitigation Ratios for Bank Stabilization

Bank stabilization projects that use entirely softscape or biotechnical techniques, are generally self-mitigating. The treatments with mitigation ratios of 0:1 in Table 10-2 are self-mitigating and therefore do not require mitigation for bank construction impacts. Vegetation impacts may still require mitigation.

Hybrid treatments rely on live native vegetation for much of their strength but are aided by the strategic placement of cobble/boulders in the lower bank zone. Use of rootwads and other geomorphic treatments to increase channel and bank complexity are included in project designs where feasible. Live vegetation increases bank resistance to erosion by protecting the bank toe against hydraulic forces through root development; provides mechanical reinforcement of the banks; and reduces soil moisture (and associated soil pore pressure that can increase bank instability) through canopy interception and evapotranspiration. The SMP's hybrid approaches will stabilize banks and also reduce fine sediment delivery to the channel; increase instream habitat complexity relative to only rocked banks; reduce the relative percent cover of non-native invasive plant species; and promote native vegetation that provides multiple ecosystem functions and values.

The portions of hybrid treatments where the rock areas are left unplanted have mitigation ratios of either 0:1 or 0.5:1, 2:1, or 2.5:1 for Modified Channels, Modified Channels with Ecological Value, or Unmodified Channels, respectively. The additional mitigation area is required to compensate for the loss of channel functions due to the placement of non-vegetated rock. If the rock area for hybrid treatments is planted, such as for treatments 1B1, 2A, 3A and 4A, ecologic functions are provided in the lower bank zone and the mitigation ratios become 0:1 (self-mitigating). Hybrid treatment 6B involves root wads, crib walls and log revetment biotechnical approaches, and is also self-mitigating.

Valley Water conducts bank stabilization mitigation activities along the entire bank slope to provide integrated functions above and below the OHWM. Mitigation activities that have been incorporated into hybrid treatments may physically occur above the OHWM, but the functions occur along the entire bank slope, and extend into the lower bank zone below the OHWM. This is particularly true for the ecologic benefits of shade, reduced non-native cover, increased overhanging protective cover, greater root strength throughout the bank, improved soil structure throughout the bank, reduced bank erosion and fine sediment yields (East Merced RCD, 2005).

Hardscape techniques 9, 10, 11, and 12 require 3:1 mitigation where hardscape replaces earthen or softer bank conditions. This is to compensate for the permanent loss of potential habitat, including the loss of shading, overhanging escape cover, structural complexity, refugia, and other functions provided by natural streambanks that are in good condition and provide these services. Most SMP channels that require such hardened techniques do not provide these ecosystem functions in their current condition. Mitigation is not required for the in-kind repair or replacement of existing concrete or hardened banks. However, replacement of existing hardscape with soft or hybrid treatments may be eligible for mitigation credits (on a project-by-project basis per agency negotiation during the NPW process). In general, bank stabilization techniques 9–12 have had minimal application in the SMP since 2002. However, such techniques are retained in the Program in the event that specific hydraulic conditions at a bank stabilization site may require such approaches.

As necessary, mitigation for special-status species due to bank stabilization projects will be provided through annually assessed, species-specific mitigation (see Section 10.10, below).

Depending on the size and functions of the natural resources enhanced and restored on-site as mitigation for bank repair activities, if the area restored exceeds the required mitigation area, then the excess mitigation can be applied (as appropriate) to another specifically identified mitigation need associated with another bank stabilization project within that watershed. This type of excess mitigation, and its application to another bank stabilization site, will be identified and tracked in the annual NPW and ASR as described in Chapters 11 and 12.

10.7.3 Wetland Impacts

The area of wetlands that each SMP item is impacting will be quantified and reported to the regulatory agencies through the NPW and ASR processes. Wetland impacts will be divided into two categories with the following mitigation requirements:

Temporary Wetland Impacts—Impacts in which the wetland is restored to pre-project conditions within two years. These impacts will not incur mitigation.

Permanent Wetland Impacts—Impacts in which the wetland is not restored to pre-project conditions within two years. These impacts may be mitigated either through below-OHW revegetation at a 1.5:1 ratio or through land acquisition mitigation at the site-specific, agreed-upon ratio. If permanent wetland impacts are mitigated through land acquisition, they will be mitigated in perpetuity.

As part of the NPW and ASR submittals, wetland impacts within bank stabilization and sediment removal projects will be classified as either temporary or permanent, depending on the anticipated timeline of restoration. Impact sites will be monitored for two subsequent years to determine whether restoration of wetlands has occurred in the anticipated timeline. No compensatory mitigation or monitoring for wetlands will be required in areas that are classified as sediment removal PMAs.

As described in 10.10.5, permanent impacts to tidal wetlands which may be habitat for certain sensitive tidal species can be mitigated through the use of the mitigation credits remaining from the creation of the Island Pond tidal wetlands during SMP-1. When this credit is used, no additional wetland mitigation will be required beyond that which is used to satisfy the debt for sensitive tidal species impacts.

Wetlands within bank stabilization and sediment removal activities will be mapped by qualified biologists. While a formal wetland delineation will not be conducted, biologists will consider hydrology, hydric soils and presence of hydrophytic vegetation when determining wetland presence. Biologists will map all wetlands which are anticipated to be impacted by the project and will determine whether these impacts are temporary or permanent. The wetland area will be calculated as the product of the length and width of the area.

Temporary Wetland Impacts

Once the project is complete, wetland monitoring will be done by mapping wetlands in the same manner that they were mapped prior to project impacts. The first year of monitoring will occur in the calendar year following the initial impact year. To be considered restored, the total area of wetlands within the project impact area and immediate vicinity must be at least 80 percent of the area of wetlands that was mapped prior to the impact activity. There is no need for the wetlands that naturally restore after the impact activity to be precisely in the same footprint as the wetlands that were mapped before the impact activity if they are in or within the immediate vicinity of the project impact area.

If wetlands have naturally restored to at least 80 percent of the pre-project area in the first year of monitoring, no further monitoring or action will be required. If wetlands have not naturally restored at the first year of monitoring, a second year of monitoring and mapping will occur in the calendar year two years after the initial impact. If wetlands naturally restore, Valley Water will retain data concerning the monitoring, but will not report to the regulatory agencies. If wetlands have not naturally restored at the second year of monitoring, Valley Water will report this as permanent wetland impacts to the regulatory agencies as part of the ASR. Mitigation for permanent wetland impacts will be required for the difference between the area of wetlands mapped during the second year of monitoring and the area of wetlands which were impacted. The report submitted to the regulatory agencies as part of the ASR will include the pre-project wetland maps, maps depicting the wetlands at the second year of monitoring, a comparison of the area of wetlands before the project impact and at the second year of monitoring, and a plan for how to provide mitigation. If the natural restoration of wetlands is thought to have been affected by processes outside of Valley Water control, such as drought, extreme rains, fire or vandalism, Valley Water may request an extension in the monitoring and natural restoration time frame. This request will be submitted as part of the ASR report.

Permanent Wetland Impacts

Following the report of permanent wetland impacts in the ASR, there is no requirement to monitor. However, if permanent wetland impacts are monitored in the manner described above and during monitoring are found to have met the requirements to be considered temporary, the impact will be reclassified as temporary and any mitigation which had been done for these permanent wetland impacts may be applied to other impacts. Once permanent wetlands have been either reported in the ASR as being permanently impacted or have been verified through the monitoring process, appropriate mitigation will be identified. If partial natural restoration of wetlands has occurred, permanent wetland impacts will be equal to the difference between the area of wetland mapped during the second year of monitoring and the area of wetlands impacted.

10.8 LAND ACQUISITION MITIGATION

The SMP-2 mitigation program includes land acquisition and mitigation activities as strategies to address SMP impacts. As described above in Section 10.4, the USACE requires a mitigation banking structure to facilitate the use of acquired lands as consolidated or programmatic mitigation while using a Regional General Permit (RGP). Valley Water envisions establishing a single-user umbrella mitigation bank in coordination with the USACE to facilitate land acquisition mitigation for SMP-2. A mitigation bank structure would require approval from the Interagency Review Team prior to approval as SMP mitigation.

Valley Water will coordinate with regulatory staff to assess, review and approve the use of potential lands as suitable mitigation for SMP-2 activities. Valley Water will propose mitigation credit ratios for each land acquisition mitigation project. These ratios will be reviewed and approved by regulatory agencies as part of this process.

Valley Water will develop a mitigation plan that will be consistent with the objectives and requirements of the USACE's Habitat Mitigation and Monitoring Proposal (HMMP) Guidelines. This plan will identify the ecological functions and values to be preserved, enhanced, restored or created. It will also determine management measures to ensure that the identified functions and values are maintained into the future. The quality of the identified functions and values will be maintained in a state similar to the time the lands began to function as mitigation. Valley Water will develop a long-term management plan for each land acquisition site in addition to, or in combination with, the site's mitigation plan.

If mitigation is required, the USACE district engineer may approve a conceptual or detailed mitigation plan to meet required time frames for general permit verifications. If a conceptual mitigation plan is approved, a final mitigation plan should be submitted prior to any impacts within USACE jurisdiction. If required, a final mitigation plan incorporating the elements of Sections 332.4 (c)(2) – (c)(14) must be approved by the USACE district engineer before the permittee commences work in Waters of the U.S. As an alternative, the USACE district engineer may address the mitigation plan components identified in Sections 332.4(c)(2) – (c)(14) as specific permit conditions, instead of components of a mitigation plan. The USACE San Francisco and Sacramento Districts developed

Mitigation and Monitoring Proposal Guidelines (USACE 2004), which provide additional detail on the content and preparation of mitigation plans.

In addition to Valley Water purchasing mitigation lands outright, other mitigation opportunities may occur in which lands are owned by other parties. Under such mitigation partnership arrangements, Valley Water would collaborate with landowners to fund, develop, monitor and ensure success of mitigation projects on non-Valley Water-owned lands. Valley Water would develop the mitigation plan for such lands, including a detailed description of how the mitigation activities will be developed, monitored and maintained for the long term, and how Valley Water will fund these practices into the future. Such lands would require long-term conservation easements and permits to protect their status for providing mitigation. The mitigation plan for such partnership projects would be developed, reviewed and approved with regulatory staff on a project-by-project basis.

In accordance with the FSEIR for SMP-2, mitigation credits from SMP-1 that were not used to mitigate for SMP-1 impacts may potentially be applied to new work areas in need of mitigation support. Valley Water will identify sites in which there is existing mitigation credit and will work with regulatory staff to review and approve these sites for SMP-2 mitigation credits.

The first completed SMP-1 mitigation site Valley Water will use to mitigate for SMP-2 impacts is the Pajaro Basin Freshwater Wetland. This mitigation involved the creation of a seasonal wetland with a willow riparian corridor adjacent to Uvas-Carnadero Creek and the Pajaro River. In 2016, this mitigation project was approved by USACE, CDFW and CCRWQCB as having successfully completed its five-year mitigation criteria. This site encompasses 10.1 acres total, of which 8.5 acres is jurisdictional wetland. Of the jurisdictional wetland portion, 4.7 acres have been used as mitigation for SMP-1 activities. That leaves 5.3 acres of potential mitigation credit available, including 3.7 acres of jurisdictional wetlands. Valley Water may use this remaining 3.7 acres of jurisdictional wetland as mitigation for below-OHW bank stabilization impacts or for permanent freshwater wetland impacts that occur anywhere in Central Coast Regional Water Quality Control Board jurisdiction. This mitigation will be provided at the ratios presented in Table 10-2 (e.g., 3:1 for concrete crib walls) for below-OHW bank stabilization projects and at the ratio of 1.5:1 for permanent wetland impacts.

10.9 CONCRETE REMOVAL MITIGATION

Concrete removal may act as mitigation for bank stabilization. Concrete removal involves the removal of concrete from below top of bank. Removal of concrete may include removal of any concrete structures or fragments of concrete regardless of their provenance. Concrete removals will only be considered valid mitigation if they leave behind softscape in the footprint of the removal. In modified and modified with ecological value channels, concrete removal mitigation credit will be calculated based on the area of concrete removed multiplied by 2. For example, the removal of 500 square feet of below ordinary high water concrete structure which leaves softscape in the footprint where the concrete had been will result in 1000 square feet of mitigation credit.

In unmodified channels, mitigation will be calculated based on the area of concrete removed multiplied by 3.

10.10 MITIGATION FOR IMPACTS TO SPECIAL-STATUS SPECIES AND ASSOCIATED HABITAT

As maintenance activities are determined, a qualified biologist will identify biological resources that may be impacted by the activity or that may trigger activity-specific survey requirements. To identify the potential for impacts, biologists may use site visits and/or any reliable and relevant data. Additional information about the approach to working in sensitive habitats in included under Chapter 3.3.

Several special-status species occur, or may potentially occur, in SMP project areas. For the purpose of this manual, special-status species are defined as all species for which agency approvals may include species-specific conditions and/or for which mitigation is required for CEQA compliance. As a result, such species include those potentially occurring in the SMP area that are listed under the federal or California Endangered Species Acts as threatened, endangered, proposed threatened, proposed endangered or as a candidate species, identified specifically in the Streambed Alteration Agreement, covered by a Fishery Management Plan, or requiring mitigation for CEQA compliance.

Owing to differences in the distributions, habitat associations, temporal occurrence (e.g., for migratory species) and mobility of the various special-status species that occur in the SMP area, the potential for, types of, and magnitude of impacts vary considerably among species. In addition, the description of impacts may vary among regulatory agencies. For example, “take” of the state- and federally-listed California tiger salamander is defined differently under the federal and state Endangered Species Acts, so that impacts to these species may be described differently by the USFWS and CDFW.

Expected impacts to these special-status species and their habitats will be quantified on an acreage basis annually. Impacts will be assessed based on the geographic locations of proposed SMP activities relative to the distributions of these species and suitability of habitat for them, and in the case of special-status plants, based on presence/absence during pre-activity surveys. Impact assessments will also take into consideration avoidance and minimization achieved through implementation of BMPs.

10.10.1 General Mitigation Approach

The mitigation of impacts to regulated and sensitive habitats, and to certain special-status species, is required by the 2011 SFEIR and regulatory agency permits. The Biology section of the 2011 SFEIR provides a detailed description of potential program impacts to special-status species and mitigation appropriate under CEQA to reduce impacts to less-than-significant levels. The mitigation approaches in this manual will be consistent with the USACE’s Section 404 permit (and associated USFWS and NMFS BOs and EFH recommendations), the SFBRWQCB 401 certification/Waste

Discharge Requirements (WDRs), CCRWQCB 401 Certification, and the CDFW CESA incidental take permit (once obtained) and streambed alteration agreement.

Table 10-5 identifies the special-status species and sensitive habitats for which mitigation will be required, and the type and amount of mitigation required. Mitigation for impacts to specific special-status species (except for those requiring mitigation for CESA compliance) may take the form of the payment of impact fees to the Santa Clara Valley Habitat Agency (see Table 10-5).

Whenever Valley Water acquires new land for CESA-listed species mitigation, it will obtain a conservation easement and prepare a long-term management plan to describe the long-term management and/or maintenance activities that will take place on the habitat mitigation lands. In addition, the water district will provide funding for long-term management.

10.10.2 Applicability of Mitigation for Impacts to Waters of the U.S. and State, and CDFW 1602-jurisdictional Habitats, Towards Impacts to Special-Status Species and Associated Habitat

To the extent feasible, habitat mitigation for impacts to individual special-status species will integrate with mitigation efforts to address impacts to Waters of the U.S., Waters of the State, and riparian habitats, as described above. Ideally, a given set of mitigation actions can be performed to compensate for effects on multiple sensitive habitats and resources. For example, mitigation for impacts to the Monterey roach, Pacific lamprey, western pond turtle, and non-special-status fish and amphibians is being provided through the implementation of wetland, aquatic, riparian and anadromous salmonid mitigation. Similarly, instream complexity or gravel augmentation activities along a creek supporting anadromous salmonids can help address wetland impacts.

10.10.3 Mitigation for Impacts to Anadromous Salmonids

Where feasible, bank stabilization treatments will incorporate habitat complexity features into the project-specific designs. These habitat complexity features may be used to compensate for impacts to existing instream complexity elements at bank stabilization sites. For loss of instream habitat complexity features at bank stabilization sites which cannot be mitigated on-site, Valley Water will mitigate for these features according to Attachment G. For loss of anadromous salmonid spawning gravels at sediment removal project sites, Valley Water will mitigate for the loss of coarse sediment according to Attachment G. Mitigation for the loss of spawning gravels and instream complexity features will be determined by site assessments in anadromous salmonid channels. Site assessments will be conducted prior to sediment removal and bank stabilization projects to determine the presence and extent of coarse substrate and instream complexity features. This assessment will inform calculation of mitigation requirements.

The loss of Tier 3, 4 and 5 LWD from anadromous salmonid channels, as described in Chapter 9, will be mitigated by installing LWD at a ratio of 1:1 (mitigation to impact). However, when LWD is removed from an anadromous salmonid channel to facilitate fish passage or to maintain functions of fish ladders it will not incur a mitigation obligation. The mitigation requirement associated with removal of LWD will be based on the volume of wood removed.

TABLE 10-5
Mitigation for Sensitive Habitats and Special-Status Species Affected by SMP-2 Activities

Resource Requiring Mitigation	Determination of Impact Area	Mitigation Type	Mitigation Factor (area or volume)	Activities Affecting the Resource
Anadromous salmonid creeks (Coarse gravel)	A Valley Water fisheries ecologist will assess the volume of coarse substrate removed.	Gravel augmentation in suitable channel location.	1:1 (cubic yard)	Sediment removal
Anadromous salmonid creeks (Instream complexity)	A Valley Water fisheries ecologist will assess the type and extent of instream complexity feature(s) impacted.	Installation/enhancement of instream complexity features.	1:1 (on the basis of the function of the habitat features)	Large woody debris removal, sediment removal, bank stabilization.
Burrowing owl	Permanent impact to nesting owls or foraging habitat acreage will be determined in collaboration with the SCVHA, USFWS and CDFW.	Payment of Burrowing Owl Conservation Fees to SCVHA.	N/A	Access construction
California tiger salamander	For the USFWS the impacts will be determined by overlaying SMP activity areas on VHP habitat modeling for this species (within the VHP area) or SMP mapping of this species' distribution (outside the VHP area). For CDFW impacts will be determined by overlaying activity areas on the CTS distribution map contained in the FSEIR.	For the USFWS payment of impact fees will be based on the land use fees in the VHP. Mitigation for state listed species will be through an Incidental Take Permit in consultation with CDFW.	N/A	Per CDFW Draft ITP: Non-aquatic herbicide application, transport to and from site, storage of construction materials and equipment, construction of temporary ramps, filling or removal of levee cracks, excavation of banks and installation of hardened materials, grading with heavy equipment, levee surface compaction, reconstruction of levee slopes, placement of physical barriers on levee surface, slurry filling and compaction of rodent burrows, use of fumigants.

Resource Requiring Mitigation	Determination of Impact Area	Mitigation Type	Mitigation Factor (area or volume)	Activities Affecting the Resource
California red- legged frog	Impacts will be determined by overlaying SMP activity areas on VHP habitat modeling for this species (within the VHP area) or SMP mapping of this species' distribution (outside the VHP area).	Payment of impact fees based on the fee schedule in the VHP or habitat preservation and management.	N/A (necessary ratios are already incorporated into VHP fee schedule) [ratio for habitat preservation or management is pending BO finalization].	Herbicide, pruning, vegetation removal, large woody debris removal, or management of animal conflicts.
Least Bell's vireo/yellow-breasted chat	Impacts will be determined by overlaying SMP activity areas on VHP habitat modeling for this species.	Payment of impact fees based on the fee schedule in the VHP or habitat preservation and management.	N/A (necessary ratios are already incorporated into VHP fee schedule) [ratio for habitat preservation or management is pending BO finalization].	Herbicide, mowing, pruning, vegetation removal, sediment removal (primarily due to access).
Pallid bat	A Valley Water biologist will determine, based on pre-activity surveys and existing data, whether an activity will result in the loss of a tree containing a pallid bat roost.	Will be based on consultation with CDFW.	To be determined.	Vegetation removal, tree pruning, or sediment removal.
Special-status plant species	A Valley Water botanist will determine whether special-status plants are present using existing survey data/mapping of known plant occurrences and pre-activity field surveys for special-status plants. The botanist will estimate the impact on the basis of the highest number of individuals known to be present within the impact area by comparing pre-impact mapping with a post-impact assessment, based on field surveys and/or GIS overlays.	Preservation, enhancement, and management of occupied habitat (or payment of impact fees based on the VHP fee schedule for covered species).	Mitigation area must (a) already support equal or greater numbers (and health) of individuals of the species in question and (b) contain sufficient unoccupied habitat to allow for an increase in populations, the increase being at least equivalent to the number impacted, through habitat enhancement and management.	Herbicide, mowing, pruning, vegetation removal, or sediment removal (primarily due to access).

Resource Requiring Mitigation	Determination of Impact Area	Mitigation Type	Mitigation Factor (area or volume)	Activities Affecting the Resource
Tidal wetland/aquatic species	A Valley Water biologist will estimate the area of impact to these habitats visually or via GIS, based on field mapping of extent of these habitats prior to maintenance and field mapping (or GIS overlay) of the footprint of the actual impact area.	Tidal wetland restoration that has already occurred at the Island Ponds will count as permanent mitigation (in perpetuity) for potential impacts to this habitat (see 10.10.5).	1.2:1 (acreage)	
Yellow warbler	The area of habitat impacts will be determined based on a GIS overlay, with field assessment if needed, on the basis of the area of impacts to occupied breeding habitat.	Restoration of riparian habitat in areas with little adjacent development (where yellow warblers may breed).	1:1 (area)	Herbicide, pruning, vegetation removal, sediment removal (primarily due to access).

Gravel Augmentation

Valley Water will conduct a survey of streams that support anadromous salmonids to identify potential gravel augmentation sites and will recommend a list of sites for regulatory agency review and approval. Mitigation will be provided by placement of coarse substrate at identified and approved sites.

Prior to conducting all sediment removal projects in anadromous salmonid streams, Valley Water will complete pre-project site assessments, utilizing the procedures described in Attachment G. The total volume of coarse substrate proposed for removal from anadromous salmonid channels at each project site will be presented in the NPW. Each year the estimated volume of coarse substrate removed from anadromous salmonid channels in each watershed will serve as the basis for the volume of gravel needing to be replaced. Valley Water will recommend gravel augmentation sites in the NPW. The cumulative total by watershed will serve as the basis for determining the annual mitigation requirement for this SMP activity.

All mitigation proposals will be identified in the annual NPWs for approval by the appropriate resource agencies.

Instream Complexity Mitigation

Valley Water will conduct a survey of streams that support anadromous salmonids to identify potential sites for establishment of instream habitat complexity features. Valley Water will consult with appropriate agencies to develop a recommended list of sites for instream complexity mitigation projects for each watershed. Where possible, Valley Water will consult with appropriate agencies on individual project designs in advance of an NPW submittal.

Review and approval of individual projects will occur through the NPW submittal process as discussed in Chapter 12.

Prior to conducting all bank stabilization projects in anadromous salmonid streams, Valley Water will complete pre-project site assessments utilizing the procedures described in Attachment G. Mitigation for impacts to instream complexity features at bank stabilization sites will be replaced on-site where conditions allow. For bank stabilization projects that do not fully compensate on-site for impacts to instream habitat complexity features and for impacts to instream habitat complexity features at sediment removal project sites, Valley Water will provide off-site mitigation.

Large Woody Debris

Mitigation for large woody debris (LWD) will be provided by installing LWD at a ratio of 1:1 (mitigation to impact).

Review and approval of individual projects will occur through the NPW submittal process as discussed in Chapter 12.

10.10.4 Mitigation for Impacts to California Tiger Salamander, California Red-Legged Frog and Least Bell's Vireo

Valley Water biologists will determine the extent of impacts to lands that are both within the potential range and within potentially suitable habitat for these species. The mitigation required by the USFWS PBO for impacts for California tiger salamanders and California red-legged frogs will be provided through the payment of land use fees to the Santa Clara Valley Habitat Agency or through habitat acquisition, preservation and management at a 3:1 (mitigation:impact) ratio, on an acreage basis. Habitat conservation may include:

California Tiger Salamander (CTS)

1. The preservation, management and enhancement (through long-term management targeted toward this species) of high-quality habitat that is already occupied by California tiger salamanders; or

2. The restoration or enhancement and preservation of degraded habitat or habitat that is unsuitable for use by California tiger salamanders, but that (1) is in close proximity to areas of known occurrence and (2) could be made more suitable for use via construction of one or more breeding ponds or management to improve the quality and availability of burrows in upland habitat.

Mitigation required by the CDFW (ITP) for California tiger salamanders is to be determined in consultation with the CDFW.

California Red-Legged Frog (CRLF)

1. The preservation and management of high-quality habitat that is already occupied by California red-legged frogs; or

2. The restoration or enhancement of degraded habitat or habitat that is unsuitable for use by California red-legged frogs, but that (1) is in close proximity to areas of known occurrence; and (2) could be made more suitable for use via construction of one or more breeding ponds, enhancement of breeding and non-breeding aquatic habitat via improvements to emergent vegetation or other cover, or management to improve the quality of upland habitat.

Least Bell's Vireo (LBV)

Mitigation required by the USFWS for the least Bell's vireo may occur in one of three ways:

1. Valley Water will pay land-use fees to the VHP for impacts to least Bell's vireo habitat, as mapped by the VHP.

2. Vegetation management along the banks and benches in any given area mapped as suitable least Bell's vireo habitat by the VHP will occur no more frequently than every 10 years to allow for the regrowth of shrubs and taller forbs,

which will provide foraging habitat for least Bell's vireos and other riparian birds. The levee tops will be excluded from this requirement; vegetation management can occur on the levee tops as needed. These limitations may need to be adapted if they do not maintain sufficient tall, shrub habitat along the edges of the woody riparian corridor to provide suitable least Bell's vireo foraging habitat, or if they produce abnormally dense, stunted willow growth unsuitable for nesting vireo use. If this measure cannot be implemented feasibly, or if Valley Water elects not to implement this measure, the measure below will be implemented.

3. Valley Water will create or restore suitable conditions for the least Bell's vireo at a 3:1 ratio on an acreage basis by acquiring land, an easement on land, or permission from landowners along any channels mapped as providing suitable habitat for the least Bell's vireo and otherwise consistent with the VHP; and by managing a strip 50 feet wide outside of the woody riparian canopy so that tall forbs and shrubs may grow. This strip will be managed so that it is disturbed via mowing every 10 years, with no more than 20 percent disturbed in a given year, so that suitable conditions are maintained. This management regime may need to be adapted, as described in the preceding paragraph, to ensure that suitable conditions are maintained. If this compensation option is selected, Valley Water will prepare an HMMP for the compensation site.

10.10.5 Mitigation for Impacts to Tidal Wetland/Aquatic Species

Mitigation for impacts to special-status species using tidal wetland/aquatic habitats (as well as non-tidal salt marsh), including the California Ridgway's rail, salt marsh harvest mouse, salt marsh wandering shrew, Alameda song sparrow, longfin smelt and green sturgeon, consists of the restoration of tidal wetland/aquatic habitats suitable for use by these species. Although no take (as defined by CESA) of fully protected species such as the California Ridgway's rail or salt marsh harvest mouse will occur as a result of SMP activities, mitigation for indirect impacts, such as those to habitat, will be needed.

As mitigation for impacts to tidal habitats and tidal marsh species projected to result from the 2002–2012 SMP work activities, Valley Water restored the "Island Ponds" (Ponds A19, A20, and A21), located between Coyote Slough and Mud Slough near Alviso, to tidal action. By restoring these ponds, Valley Water obtained credit for 30 acres of tidal habitat that is suitable, or that will be suitable as habitat matures, for the tidal marsh species mentioned above. Monitoring has documented achievement of all performance criteria appropriate for the development of both vegetated tidal salt/brackish marsh and tidal aquatic habitat, with the formation of nascent tidal marsh habitat, including extensive channel networks, within these ponds. SMP-1 impacts required 21 acres of tidal mitigation. The 2002-2012 SMP permit applications included a tidal mitigation debt of 12 acres for work performed prior to SMP-1; with nine (9) acres of tidal mitigation needed to compensate for SMP-1 impacts for work performed from 2002-2012. This resulted in a total SMP-1 mitigation debt of 21 acres. Because the Island Ponds project provides 30 acres of mitigation credit, nine (9) acres of excess tidal habitat restoration at the Island Ponds is available as mitigation. Valley Water will use it for impacts to tidal wetlands and aquatic habitats, and to tidal marsh species that may occur under SMP-2.

The water district does not anticipate needing more than nine (9) acres of tidal habitat mitigation during SMP-2.

10.10.6 Mitigation for Impacts to Yellow Warbler Breeding Habitat

Yellow warbler breeding habitat is riparian woodlands, often with an overstory of mature cottonwoods and sycamores, a midstory of box elder and willow, and a substantial shrub understory. Valley Water will determine whether impacted riparian habitat is suitable for yellow warblers on the basis of breeding-season surveys (if reliable data is available) or through identification during field surveys of a location and plant community that is appropriate as potential yellow warbler breeding habitat. If yellow warblers are observed in potential breeding habitat during biological surveys or if the potential breeding habitat is otherwise known to have been occupied by yellow warblers in recent years, it will be considered occupied yellow warbler breeding habitat. If biologists determine that the work will impact occupied yellow warbler breeding habitat, mitigation will be required as described below.

When impacts to occupied yellow warbler habitat occur outside of PMA, permanent impacts must be mitigated with revegetation in a similar location (e.g., in relatively undeveloped reaches of creeks rather than in creeks surrounded closely on both sides by development), and using a planting palette that has potential to create yellow warbler habitat as defined at a ratio no less than 1:1 (on an acreage basis). This may be performed as part of the general revegetation mitigation for the site without requiring additional mitigation debt.

10.10.7 Mitigation for Impacts to the Pallid Bat

If a tree or structure containing a pallid bat colony is to be removed or physically disturbed by an SMP activity, Valley Water will identify the roost, the approximate number of pallid bats using the colony and an assessment of the impacts to the pallid bat colony. Valley Water will then formulate a plan to mitigate the impacts to the colony. Valley Water will submit the plan to CDFW for review, negotiation and approval, and then implement the approved plan.

10.10.8 Mitigation for Impacts to the Burrowing Owl

In addition to the avoidance methods incorporated into the BMPs, Valley Water will implement the following mitigation protocol for burrowing owls:

- Identify locations of known nesting burrowing owls by updating the water district's database of burrowing owl occurrences on a regular basis and through the use of the California Natural Diversity Data Base, local experts and the Santa Clara Valley Habitat Agency.
- For each SMP project, determine whether the project site and surrounding work area are located in grassland or bare ground habitat.
- If an SMP project is located in grassland or bare ground habitat, survey the surrounding work area and associated grassland habitat to identify any nest sites

and/or any burrowing owl foraging habitat that is located within 0.5 mile of a nest site.

- If there are nests on site, or if there are nests dependent on grasslands on site, conduct an impacts analysis to determine whether there will be any permanent impacts to burrowing owl nests or associated foraging habitat. Permanent impacts are defined as those impacts where the site cannot be restored to pre-project conditions within one year.
- Any permanent impacts to burrowing owl nests or to burrowing owl foraging habitat that are identified may be mitigated through payment of burrowing owl conservation fees to the Santa Clara Valley Habitat Agency.

10.10.9 Mitigation for Impacts to the San Francisco Dusky-Footed Woodrat

BMP GEN-14 includes measures to minimize impacts to San Francisco dusky-footed woodrats and their nests, including pre-activity screening for the potential for occurrence, pre-activity surveys in suitable habitat, nest avoidance where feasible, measures to evict woodrats from their nests (to avoid mortality), and measures to relocate the nest materials to appropriate habitat nearby. In certain circumstances (e.g., if large numbers of nests would be affected by a maintenance activity), the CDFW may require Valley Water to prepare a minimization and avoidance plan that describes these measures, and that CDFW will review and approve.

10.10.10 Mitigation for Impacts to Special-Status Plant Species

SMP activities are not projected to impact serpentine habitats or species. Mitigation will be provided if SMP activities result in the loss of individual special-status plants, other than the Santa Clara red ribbons, Hospital Canyon larkspur, western leatherwood, Hall's bush-mallow and robust monardella. Prior to initiation of SMP activities in potential impact areas using existing data and field verification, a biologist will conduct a review to identify areas where these species could potentially occur. Where appropriate, a qualified botanist will also conduct a pre-activity survey for special-status plants in areas where occurrence is possible. Valley Water will determine the extent of impacts to special-status plants that will occur, considering avoidance and minimization measures.

Valley Water will mitigate for unavoidable impacts to populations of special-status plants through a combination of preservation and enhancement of those species' populations outside SMP maintenance sites. For impacts to populations (including partial populations) of a specific special-status plant species, mitigation will include preservation, enhancement and management of lands that (a) already support equal or greater numbers (and health) of individuals of that species; and (b) contain sufficient unoccupied habitat to allow for an increase in populations. Under (b) the increase in population would be at least equivalent to the number impacted, through habitat enhancement and management. For determining the number of individuals impacted, the highest number of individuals known to be present within the impact area (if the impact area has undergone multiple surveys) will be used to determine the magnitude of the impact. Mitigation for impacts to special-status plants may occur via the payment of mitigation impact fees to the Santa Clara Valley Habitat Agency.

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CHAPTER 11. MITIGATION MONITORING

11.1 PURPOSE

This chapter describes the monitoring requirements for the mitigation approaches covered in Chapter 10. The monitoring requirements, success criteria and potential remedial actions that may be necessary, are described here by work activity. Monitoring will be used to determine compliance with success criteria and to help determine the efficacy of SMP mitigation methods. Changed site conditions that affect the feasibility of meeting monitoring requirements will be described in the monitoring reports. Monitoring reports may be provided to the resource agencies in the Annual Summary Report (ASR) or as a separate submittal. Any changes to these monitoring requirements will be approved by the resource agencies prior to implementation. If the success criteria have been met, a letter will be submitted to all appropriate regulatory permitting agencies requesting final sign-off of the project.

11.2 INVASIVE PLANT MANAGEMENT PROGRAM (IPMP)

11.2.1 Monitoring

IPMP sites will be assessed annually for three or five years following initial control activities, depending on tier. Treatment areas and any associated replanting areas will be mapped with Global Positioning System (GPS) devices at the time of treatment. Geographic Information System (GIS) layers will be developed from the GPS data for long-term tracking. Annual assessments will be used to determine if additional control work or follow-up control work is necessary at treatment sites. Results of control activities, including success or remediation, will be reported in the ASR monitoring reports. Monitoring reports for IPMP mitigation items will be submitted in years one, three and five. These monitoring reports will include invasive plant maps for each site.

For each site, Valley Water will identify specific monitoring methods, treatment activities and treatment timing in the Notice of Proposed Work (NPW), specific to the targeted species and site. The approach can vary by species, year of treatment, size of the treatment area, adjacent land activities and protected species/habitats. Monitoring reports will include the technique used to remove the plant, plant species, and type and amount of follow-up needed. This information will be used to analyze the success of removal techniques for different plant species. Monitoring results will be critical for prioritizing follow-up treatments and for planning seasonal work. Specific reporting items are listed in Chapter 12.3.3, Mitigation Monitoring Reporting.

11.2.2 Success Criteria and Remedial Actions

Valley Water will develop success criteria for each site, and/or for each individual target species. Item-specific success criteria are developed and proposed as part of that item's NPW. Exclusion or containment strategies may be used where an invasive species poses a threat to a sensitive species or habitat type and complete eradication is

deemed infeasible. These control strategies may also be used to suppress highly competitive invasive species, giving existing native species the ability to thrive.

IPMP project monitoring is based on the success criteria proposed for that item. An IPMP mitigation item that has achieved the item-specific success criteria for that site will be considered successful. If an IPMP item achieves the item-specific success criteria before the end of the five-year monitoring period, monitoring will continue to confirm that the item still meets the success criteria at the end of the three or five-year monitoring period (depending on tier) and to plan for remedial actions if reinvasion occurs. If the final success criteria are not met by year five, Valley Water will implement remedial measures and will continue monitoring annually or as otherwise stipulated in writing by the interagency work group until the success criteria are achieved. A discussion of implemented remedial measures will be included in the monitoring reports. If the success criteria are met at any year beyond year five during this continued monitoring and maintenance period, then the site will be considered to have achieved success.

Once an IPMP site has achieved the success criteria, Valley Water will seek sign off from all appropriate regulatory agencies following each agency's procedures.

11.3 REVEGETATION MONITORING

11.3.1 Monitoring

The baseline site conditions at the time of plant installation will be documented in the field. Planting sites will be mapped with GPS devices at the time of planting and GIS layers will be developed from the GPS data for long-term tracking of planting areas. At the time of planting, staff will record the number, location, species of plantings and the square footage of the area planted. Baseline photographs will be taken at fixed, pre-designated photo points immediately following initial plant installation. This information will be reported in the ASR.

Mitigation planting sites will be monitored by a qualified biologist or a qualified vegetation program specialist to evaluate the survival and successful establishment of the plantings. Monitoring will be conducted over a five-year period with quantitative assessments performed in years one, three and five; and qualitative assessments performed in years two and four following planting. The data collected during monitoring visits will be used to determine if success criteria are met and to recommend management modifications or contingency measures to meet the final success criteria. If the final success criteria are not met by year five, remedial measures will be implemented and monitoring will continue annually or as otherwise stipulated in writing by the interagency work group until the success criteria are achieved.

Once a revegetation site has achieved the success criteria, Valley Water will seek sign off from all appropriate regulatory agencies following each agency's procedures.

11.3.2 Success Criteria

Revegetation Above OHW

Plant Survival

In revegetation areas located above ordinary high water (OHW), plant survival will be monitored in years one, three and five. Percent survival is appropriate in drier above-OHW areas where the associated vegetation is slower growing. Survivorship and health and vigor will only be assessed and reported for plant species which are classified as trees as defined by Table 10-4 or by the Jepson Manual. The plant survival success criterion will be 80% in years one and three, and 75% in year five. Replanting will occur if these criteria are not met at any point during the monitoring period. Replanting dates will be tracked and included in the monitoring reports. To be considered successful, revegetation sites should not have received any artificial irrigation during the final year of monitoring.

If the final success criteria are not met at year five (or year seven if using the optional extended monitoring period, see Tables 11-4 and 11-5), remedial measures will be discussed with the permitting agencies.

Percent Cover

Percent cover of all native herbaceous and woody vegetation will be assessed in years one, three, and five in above-OHW areas. There are no percent-cover-related success criteria for native species in above-OHW areas in years one and three as it is assumed the mitigation plantings will be in the early stages of development. If this success criterion is not met in year five, remedial measures will be discussed with the permitting agencies.

Percent cover of non-native vegetation will be assessed in years one, three and five using the line intercept method. The success criterion for percent non-native cover is less than 10% in years one, three and five.

Health and Vigor

Health and vigor will be assessed in years one, three and five at all planting locations.

The success criteria for years one and three will be an overall health and vigor rating of two or three for the site as a whole. The success criterion for year five will be an overall health and vigor rating of three for the site.

TABLE 11-1
Performance and Success Criteria for Above-OHW Areas

Criteria	Year 1 Success Criteria	Year 3 Success Criteria	Year 5 Success Criteria
Survival of individual trees (%)	80%	80%	75%
Health and vigor[1] (number)	2,3	2,3	3
Percentage of maximum non-native cover (%)	<10%	<10%	<10%
Natural recruitment of native vegetation (yes/no)[2]	N/A (planting effort is recent)	Yes	Yes
Supplemental irrigation	Yes	Yes	None within the last year (normally year 5)
Percent cover by natives (%)	N/A	N/A	50%

[1]Potential health and vigor ratings listed in Table11-3.
[2]This criteria does not apply to sites that were planted using seeds, plugs and/or cuttings.

Revegetation Below OHW

Percent Cover

Percent cover of non-native and native herbaceous and woody vegetation will be assessed in years one, three and five in revegetation areas located below OHW. The success criterion for percent native cover in below-OHW areas is 50% in year three and 75% in year five. The success criterion for percent non-native cover is less than 10% in years one, three and five. There is not a success criterion for percent cover of native vegetation in below-OHW areas for year one as it is assumed the mitigation plantings will be in the early stages of development. If the success criteria are not met in year five, remedial measures will be discussed with the permitting agencies.

Plant Survival

Percent plant survival will be assessed only in years one, three, and five in below-OHW areas. The success criteria will be 75% of planted plants in year five. There are no survival success criteria for years one and three. Survivorship and health and vigor will only be assessed and reported for plant species which are classified as trees as defined by Table 10-4 or by the Jepson Manual.

TABLE 11-2
Performance and Success Criteria for Below-OHW Areas

Criteria	Year 1 Success Criteria	Year 3 Success Criteria	Year 5 Success Criteria
Percent cover by natives (%)	N/A	50%	75%
Percentage of maximum non-native cover (%)	<10%	<10%	<10%
Natural recruitment of planted vegetation (yes/no)[1]	N/A (planting is new)	Yes	Yes
Percent survival of individual trees (%)	N/A	N/A	75%
[1]This criteria does not apply to sites that were planted using seeds, plugs and/or cuttings.			

Monitoring Methodology

Both quantitative and qualitative monitoring will be conducted. The methodologies for each are described below.

Quantitative Monitoring

Quantitative monitoring will be conducted to assess the establishment and survival of the plantings, as determined by percent survival, percent cover, and health and vigor.

Plant Survival

The total number of planted trees that are living at the time of monitoring will be counted in the field. Tree survival will be tallied by species; the survival of each species will be calculated using the following equation:

> Percent Survival of Species A = (Number of Individuals of Species A Alive During Monitoring Period / Total Number of Species A Installed) * 100

The overall percent survival will be calculated using the following equation:

> Overall survival = (Total Number of all Species Alive at Time of Monitoring/Total Number of Plantings Installed) * 100

Percent Cover

Percent cover of native herbaceous and woody species will be determined using the line intercept method (Bonham 1989) along permanently established fixed length transects. The number of transects will be sufficient to adequately assess the performance of vegetation, with a minimum of one transect per 2,500 square feet of area. The end points of each transect will be marked with T-posts and mapped in year one so that the same transects can be used throughout the monitoring period. Transects will be oriented parallel or perpendicular to the creek channel. The length of the transects will be

determined in the field. The number, length and location of transects shall be established to adequately represent the monitoring area. The length of cover for each species will be recorded to the nearest 0.5 feet along each transect. This data will be used to calculate percent cover.

Health and Vigor

A qualitative assessment of overall plant health and vigor will be made for all tree plantings by considering such factors as: plant leaf color, bud development, new growth, herbivory, drought stress, fungal/insect infestation and physical damage. The table below describes the rating system. Health and vigor will be assessed for individual plantings using the scale shown in the table below as a general guide, but the monitor may take other factors into account if they deem it appropriate. The average health and vigor for each planted tree species will be calculated by averaging the health and vigor scores of each individual tree. If there are too many plantings for the health and vigor of each one to be assessed, assessments may be limited to a representative selection of the plantings. This representative selection will include individuals of all planted species.

TABLE 11-3
Health and Vigor Ratings for Mitigation Plantings

Health and Vigor Rating	Numerical Value	% Healthy Foliage
High	3	67-100%
Medium	2	34-66%
Low	1	1-33%
Dead	0	none

Qualitative Monitoring

Qualitative monitoring will be conducted in years one through five to assess the broader context of the site and its overall ecological condition, and to identify problems that may affect the ability of the planting sites to effectively meet the success criteria, including weed invasion and erosion. During qualitative monitoring assessments, a qualified biologist or a qualified vegetation program specialist will walk the planting site to assess the presence of naturally recruited native plants, occurrence of invasive species, signs of erosion, evidence of drought stress and supplemental irrigation effectiveness, signs of deer browse or disease, presence of trash/refuse and signs of vandalism. Photos will be taken to document changes in site conditions over time. Qualitative monitoring results for monitoring conducted in years two and four will be included in monitoring reports prepared for years three and five or submitted in even monitoring years.

Natural Recruitment

Trends in natural recruitment will be assessed by estimating, by species, the number of naturally recruited native species in each planting area and the abundance of seedlings and saplings of these species. When revegetating using seeds, plugs and/or cuttings, it is difficult to determine whether seedlings and saplings are derived from the initial

installation or are a product of natural recruitment. Therefore, this metric will not be monitored or reported for sites that were installed using seeds, plugs and/or cuttings.

Invasive Species

In addition to the quantitative percent cover monitoring to ensure the <10% success criterion is met, trends in invasive species will be assessed by documenting species presence and the extent to which any invasive species are out-competing or otherwise harming the plantings.

Erosion

Evidence of erosion, including bare soil, bank slumps and the formation of rills, etc. will be noted. The extent to which erosion may compromise plant survival will also be evaluated.

Drought Stress

Signs of drought stress include wilted vegetation, chlorotic (yellow) leaves, bark cracks and stem and twig die-back, particularly on the outermost branches. Indications of drought stress will be assessed in the late spring and summer, depending on precipitation amounts and frequency, so that supplemental irrigation can be scheduled as needed.

Effectiveness of Irrigation

If supplemental irrigation is provided, its effectiveness will be assessed during monitoring.

Deer Browse

Broken twigs on outer branches and damaged bark caused by antler-rubbing are signs of deer browse. The impact to plant health caused by deer browse will be evaluated so that remedial measures (installation or repair of foliage protection cages, etc.) can be implemented if needed.

Trash/Refuse and Vandalism

The extent of anthropogenic impacts to each planting site, including the presence of trash and human disturbance, will be assessed and described.

Photo Documentation

Photos of each planting area will be taken from fixed locations selected during installation. Photographs will also be taken to record any events that may have a significant effect on the success of the mitigation site, such as flood, erosion, fire or vandalism.

Monitoring Schedule

Monitoring will be conducted between May 1 and October 31 of each monitoring year.

Completion of Mitigation

Monitoring of the planting sites will be conducted for a minimum of five years. At the end of the monitoring period for each site, a final report will be prepared to describe whether that site has met the success criteria.

Contingencies and Remedial Actions

If Valley Water believes that a site may achieve success if monitoring and maintenance are continued longer than the standard five-year period, it may elect to switch to a seven-year monitoring schedule at any time up to and including the fifth year of monitoring. If switching to a seven-year monitoring schedule, the success criteria will be those described in Table 11-4 or Table 11-5 below (depending on whether the planting is classified as below or above OHWM). At the end of the monitoring period if final success criteria are not met, an analysis of the cause(s) of failure and proposed remedial actions will be prepared and submitted to the appropriate regulatory permitting agencies. The project proponent shall provide funding for the planning, implementation and monitoring of any remedial actions that may be required by the permitting agencies to meet the goals of the mitigation.

TABLE 11-4
Proposed Optional Extended Monitoring Period Performance and Success Criteria for Revegetation Zone Areas Above OHWM

Criteria	Year 1 Success Criteria	Year 3 Success Criteria	Year 5 Success Criteria	Year 7 Success Criteria
Percent survival of individual trees (%)	80%	80%	75%	75%
Health and vigor (number)[1]	2,3	2,3	2,3	3
Percentage of maximum non-native cover (%)	<10%	<10%	<10%	<10%
Natural recruitment of native vegetation (yes/no)[2]	N/A (planting effort is recent)	No	Yes	Yes
Supplemental irrigation	Yes	Yes	Yes	None within the last year
Percent cover by natives (%)	N/A	N/A	35%	50%

[1]Potential health and vigor ratings listed in Table 11-3.
[2]This criteria does not apply to sites that were planted using plugs, seeds and/or cuttings.

TABLE 11-5
Proposed Optional Extended Monitoring Period Performance and Success Criteria for Revegetation Zone Areas Below OHWM

Criteria	Year 1 Success Criteria	Year 3 Success Criteria	Year 5 Success Criteria	Year 7 Success Criteria
Percent survival of individual trees (%)	N/A	N/A	75%	75%
Percentage of maximum non-native cover (%)	<10%	<10%	<10%	<10%
Natural recruitment of native vegetation (yes/no)[1]	N/A (planting effort is recent)	No	Yes	Yes
Percent cover by natives (%)	N/A	35%	60%	75%
[1]This criteria does not apply to sites that were planted using plugs, seeds and/or cuttings.				

11.4. LAND ACQUISITION

As described in Chapter 10, land acquisition and management for conservation may be applied for the purpose of providing mitigation in perpetuity for certain impacts associated with SMP-2. If new land acquisition and management mitigation occurs under SMP-2, a long-term management plan will be provided to ensure that monitoring, maintenance and management of the land is done in a manner that is consistent with the mitigation goals.

11.4.1 Monitoring

Monitoring requirements for lands set aside to mitigate for maintenance activities will be described in the Long-Term Management Plans developed for each site.

11.4.2 Success Criteria and Remedial Actions

Success criteria and any necessary remedial actions will be included within the Long-Term Management Plans developed for each site.

11.5 INSTREAM COMPLEXITY IN ANADROMOUS SALMONID CHANNELS

11.5.1 Monitoring

The monitoring plan will establish the type and timing of monitoring to be conducted, as well as adaptive management alternatives if the final success criteria are not met. The relationship between the success criteria and the salmonid life stage that is anticipated to benefit will be clearly described. The monitoring schedule will be defined in the NPW for each item and it will occur at a minimum in years one, three and five post-construction. All monitoring will be performed by a qualified biologist. Monitoring and evaluation parameters will be drawn from the principles and procedures for project

evaluation and monitoring contained in the California Salmonid Stream Habitat Restoration Manual (Part VIII Project Evaluation and Monitoring). Methods will include as-built design drawings, photographs and narrative descriptions. Post-construction monitoring methods will be defined in the NPW for each item. A variety of methods may be included to determine whether success criteria have been met. A summary report with photos will be sent to the agencies during the even monitoring years. This will not include as detailed information as the odd monitoring years, but will provide a brief status report as to the state of the mitigation items.

11.6 LARGE WOODY DEBRIS (LWD) MANAGEMENT

Stream channels are dynamic and natural recruitment and movement of wood is a natural process; therefore, if the wood placement is stable for one year post-construction it will be deemed to have met the monitoring success requirements. LWD is monitored based on its Tier classification. Tiers 1 and 2 will not require on-going monitoring. Tier 3 LWD involves notifying regulatory agencies within one week of conducting work, monitoring for one year, and reporting results in the ASR. If Tier 3 LWD does not stay in place for one full calendar year, it will require mitigation. Tier 4 involves notifying regulatory agencies within one week of conducting work, monitoring for one year, and reporting results in the ASR. Tier 4 will be fitted with an aluminum tree tag and given a unique identifying number. If Tier 4 LWD does not stay in place for one full calendar year, it will require mitigation.

LWD Installation Monitoring for LWD mitigation installation includes monitoring the installation post-construction in years one, three and five. Installation documentation must include “as-built” design drawings, photographs and narrative descriptions. Mitigation for LWD is further described in Chapter 10.

11.6.1 Mitigation Monitoring

Large woody debris (LWD) mitigation will be monitored post-construction in years one, three and five. The purpose of monitoring is to better understand the response of the channel to LWD placement under a range of flow conditions and identify if improvements in LWD placement can be achieved. This information will assist in guiding the placement of future LWD. Monitoring will be performed by a qualified biologist to evaluate the condition of the project, utilization by target species and achievement of the project-specific success criteria. Monitoring and evaluation parameters will be drawn from the principals and procedures for project evaluation and monitoring contained in the California Salmonid Stream Habitat Restoration Manual (Part VIII Project Evaluation and Monitoring). Methods will include “as-built” design drawings, photographs and narrative descriptions. Post-construction assessments should include a variety of methods to determine if project-specific objectives have been achieved such as: provide cover, provide velocity refuge, induce lateral scour, and encourage deposition of spawning gravels. A summary report with photos will be sent to the permitting agencies during the even monitoring years. This will not include as detailed information as the odd monitoring years, but will provide a brief status report as to the state of the mitigation items.

11.6.2 Success Criteria and Remedial Actions

LWD is a naturally active resource within streams and channels. Movement of LWD is anticipated and often desired. The success criteria for placement of the LWD will largely depend on the objective of the installation. The objective and measurable criteria will be included in the NPW. Additionally, successful placement of wood should not induce any adverse effects to the stream channel including accelerated erosion or deposition, physical structure failure or displacement of other ecologically beneficial features (i.e., lateral scour pool, loss of riffle habitat etc.). If the wood has achieved the desired objective for installation as stated in the NPW (e.g., provide cover, provide velocity refuge, induce lateral scour, encourage deposition of spawning gravels) and has not created any unintended adverse effects to the stream course, it will be deemed successful and no further actions are required beyond the five-year monitoring requirement.

11.7 GRAVEL AUGMENTATION IN ANADROMOUS SALMONID CHANNELS

In collaboration with the resource agencies, Valley Water will develop mitigation designs for coarse sediment augmentation projects. These mitigation designs will include the objectives and success criteria for each project. Valley Water will include coarse sediment augmentation sites in the NPW prior to implementation. These sites may be combined with instream habitat complexity projects and objectives.

11.7.1 Monitoring

The monitoring plan will establish the type of monitoring to be conducted, the timing of the monitoring to be conducted and adaptive management alternatives if the final success criteria are not met. The relationship between the success criteria and the salmonid life stage that is anticipated to benefit will be clearly described. The monitoring schedule will be defined in the NPW for each item and it will occur, at a minimum, in years one, three and five post-construction. All monitoring will be performed by a qualified biologist. Monitoring and evaluation parameters will be drawn from the principals and procedures for project evaluation and monitoring contained in the California Salmonid Stream Habitat Restoration Manual (Part VIII Project Evaluation and Monitoring). Monitoring plans will include “as-built” design drawings, photographs and narrative descriptions. Post-construction assessments may include a variety of monitoring methods to determine if project-specific objectives have been achieved (such as fish observations, water depths and velocities, or habitat features). A summary report with photos will be sent to the permitting agencies during the even monitoring years. This will not include as detailed information as the odd monitoring years, but will provide a brief status report as to the state of the mitigation items.

11.8 BANK STABILIZATION

11.8.1 Monitoring

Hardscape and hybrid bank stabilization projects will be monitored and reported on in years one, three and five following construction. Softscape bank repairs do not require

monitoring. Monitoring will include a visual observation of erosion conditions 200 feet upstream and downstream of the site, conditions of the bank stabilization repair, and conditions of any vegetation planting that was performed. Annual reports will include at least 10 project sites per basin, plus any sites that have had chronic failures (chronic is defined as three or more times within 10 years). South county sites will be reported for all projects completed that year. If there are more than 10 projects in South county, no more than 10 need to be included in the annual report.

11.8.2 Success Criteria and Remedial Actions

The success criterion for a bank stabilization repair is the retention of the repair itself. For bank stabilization sites that have failed more than twice in a five-year period, Valley Water will monitor creek flows (cfs) and water levels (stage) during two storm events per rainy season. These storms will be high-flow events, typically with a recurrence interval of 1.5 to five years.

Monitoring shall include photo documentation and visual inspections with explanation of: (1) conditions upstream and downstream of the site and (2) conditions of the bank stabilization repair. Revegetation plantings on-site will be monitored per Section 11.3. The purpose of this monitoring is to identify potential causes of bank failures. Many factors affect bank repair success. Assessing sites within or shortly after high flow events provides valuable information in assessing bank repair methods under different flow conditions.

If a bank stabilization repair has failed or partially failed, it will be assessed and prioritized for remediation along with other eroded sites. Remedial actions may include repair or modification of the site. Failure of vegetated bank repair methods or hydroseeding cover will be remediated as described for the particular type of ecological service mitigation selected.

11.9 SPECIES TARGETED MONITORING

Chapter 10 indicates the special-status species and sensitive habitats for which mitigation will be required, per work activity type. The monitoring requirements per species are listed below.

11.9.1 Fish Ladders and Screens

Monitoring, success criteria and remedial actions for instream complexity and gravel augmentation in anadromous salmonid channels is described in Sections 11.5 and 11.7, above.

Fish ladders in anadromous salmonid channels will be monitored between March 1 and April 30 to determine their condition and required maintenance. Sediment deposition within the fish ladder footprint (i.e., below/above/within) will be assessed to maintain anadromous fish access during migration seasons. Sediment impediments vary depending on the size of the ladder, flow regimes during migration seasons and depth of sediment. Each ladder/fish screen will be assessed based on its functionality.

The following components, where applicable, of each facility will be inspected:

1. upstream access and channels
2. downstream access and channels
3. culverts
4. baffles/pools
5. pool/chute structures
6. entry and terminal pools
7. weirs
8. bypass channels
9. gates
10. debris racks
11. control systems
12. screen faces and
13. screen cleaning systems.

Inspections will determine if sediment, debris or algal growth are impairing the functionality of the facility. Inspections will also determine if any components of the facility are loose, broken, missing or present sharp edges. For fish screens, inspections must determine if screens are firmly attached with no gaps, tears, rips or holes. Work activities will be performed at times consistent with the work windows as defined in this manual. A follow-up inspection of each of the facilities will be performed between September 1 and October 31 to confirm completion of maintenance and repairs, if any were performed. If no repairs or maintenance were performed, the follow-up inspection will confirm whether the condition of the facility remains as reported in the previous NPW. The follow-up inspection will identify any condition that is compromising the functionality of the fish ladder or screen, or could do so in the future.

Inspections will examine all aspects of the facilities described in the Stream Maintenance Program Fish Ladder Inspection Form, which may be found in Attachment H of this manual. The inspection form is used to report the results of these facility inspections.

TABLE 11-6
Annual Fish Ladder/Screen Monitoring Areas

Facility Name	Monitoring Item
Coyote Creek	Coyote Canal Diversion – fish screen, Coyote Percolation Ponds/Steel Dam – fish ladder
Upper Penitencia Creek	Mabury Diversion – fish screen and fish ladder, Noble Avenue Diversion – fish screen and fish ladder
Guadalupe Creek	Masson Diversion – fish screen and fish ladder
Guadalupe River	Alamitos Diversion – fish screen and fish ladder
Stevens Creek	Central Avenue fish ladder, Fremont Avenue fish ladder, Moffett Boulevard fish ladder
Llagas Creek	14 fish ladders

11.9.2 California Tiger Salamander and California Red-Legged Frog

Mitigation will be provided via the protection, enhancement and management of habitat that currently supports or could support these species. Monitoring requirements, success criteria and any remedial actions will depend on the specific characteristics of the mitigation site and the enhancements implemented. This information would be described in a site-specific Long-Term Management Plan, approved in writing by USFWS and CDFW.

11.9.3 Least Bell's Vireo

It is expected that mitigation will be provided via payment of fees to the Santa Clara Valley Habitat Agency, in which case no monitoring is required.

If mitigation is provided by conducting vegetation management no more frequently than once every ten years to allow for regrowth of shrubs and taller forbs, Valley Water will track where and when work was done in order to ensure that work is not conducted for at least ten years after the initial impact.

However, if mitigation is provided via the protection, enhancement, and management of habitat that currently supports or could support this species, monitoring requirements, success criteria and any remedial actions will depend on the specific characteristics of the mitigation site and the enhancements implemented. This information would be described in a site-specific Habitat Management and Monitoring Plan (HMMP), approved in writing by USFWS and CDFW.

11.9.4 Yellow Warbler

For impacts in areas supporting yellow warblers and mapped as least Bell's vireo habitat under the Santa Clara Valley Habitat Plan (VHP), the water district will mitigate as per the least Bell's vireo above and no additional monitoring is required.

Revegetation that is being used as mitigation for yellow warbler habitat will be monitored in accordance with Section 11.3 to ensure that the mitigation has been successful in establishing riparian habitat. Because of the patchy distribution of the yellow warbler, even in ostensibly suitable riparian habitat, no monitoring for presence of the species is proposed. Success criteria and remedial actions will therefore be as described for general revegetation projects under Section 11.3.

11.9.5 Tidal Wetland/Aquatic Species

Mitigation for impacts to special-status species using tidal wetland/aquatic habitats and non-tidal salt marsh, including the California Ridgway's rail, salt marsh harvest mouse, salt marsh wandering shrew, Alameda song sparrow, longfin smelt and green sturgeon, consists of the restoration of tidal wetland/aquatic habitats suitable for use by these species.

Valley Water has pre-mitigated for nine acres of tidal wetlands and aquatic habitats. The mitigation obligation was met by restoring 30 acres of tidal habitat with the "Island Ponds" (Ponds A19, A20 and A21), located between Coyote Slough and Mud Slough near Alviso. Since the mitigation obligation has successfully been completed, no further monitoring is necessary. From 2014 to 2019, only 966 square feet of the Island Ponds mitigation credit has been used as mitigation for SMP impacts to tidal wetland species habitat. This leaves available approximately 8.98 acres of credit from the Island Ponds.

11.9.6 Burrowing Owl

If occupied owl burrows cannot be avoided, Valley Water will meet with the USFWS and CDFW to develop a management strategy for dealing with the occupied burrow.

11.9.7 Pallid Bat

Valley Water will conduct site-specific monitoring activities described in a plan approved by the CDFW. The plan will include success criteria and remedial actions.

11.9.8 Special-Status Plant Species

Compensation for unavoidable impacts to populations of non-serpentine-associated special-status plants will be provided by a combination of preservation and enhancement of those species' populations outside SMP work sites. Monitoring requirements, success criteria and any required remedial actions will be described in the Habitat Management and Monitoring Plan for the area.

If mitigation occurs via the payment of mitigation fees to the Santa Clara Valley Habitat Agency, no further actions are required.

11.10 CONCRETE REMOVAL MITIGATION

Concrete removal that is completed for mitigation credit will not require any monitoring beyond submission of the ASR.

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CHAPTER 12. PROGRAM MANAGEMENT AND REPORTING

12.1 PURPOSE

This chapter describes the SMP-2 management and reporting process.

Valley Water's annual stream maintenance planning, implementation and reporting process occurs in three phases: (1) Notice of Proposed Work (NPW) development and notification, (2) implementation of annual routine stream maintenance work, and (3) annual summary reporting (ASR). Maintenance work is proposed either as part of the NPW or as other identified work throughout the year via individual work orders. New projects may be submitted to the agencies for approval throughout the work season. Winter rains and high flows regularly occur after the creation of the NPW. Winter conditions can cause trees to fall and cause blockages. They can also cause banks to fail that were not a condition of concern during the initial NPW field inspections. These projects will be consolidated and submitted to the agencies as a second NPW per Sections 12.2 and 12.2.3 below.

Internally, work orders are used to describe, request, and implement stream maintenance projects. Work orders describe the project, implementation schedule, project cost, permit requirements and other special conditions. Work orders will continue to be the primary vehicle for the implementation of maintenance projects.

This chapter is organized as follows:

- Section 12.2 Pre-work season Notice of Proposed Work (NPW)
- Section 12.3 Post-work season Annual Summary Report (ASR)
- Section 12.4 Fish ladder and fish screen inventory reporting
- Section 12.5 Data management system used to manage and report SMP projects
- Section 12.6 SMP-2 annual performance review and the next permit renewal process

12.2 NOTICE OF PROPOSED WORK

This section describes the annual Notice of Proposed Work (NPW) process and contents of the notification package. The NPW identifies which work activities require notification, the agencies to be notified, project specifications, agency review process, and the process to document project changes. The NPW submittals include work descriptions along with the anticipated construction and vegetation impacts. The actual construction and vegetation impacts that occur during the completion of the project are assessed and included in the Annual Summary Report (ASR).

12.2.1 Projects Requiring Notification

The following table shows the notification requirements per work activity and identifies the jurisdiction of each regulatory agency.

TABLE 12-1
Projects Requiring Notification per Agency Jurisdiction

Maintenance Activity	USACE[1]	CDFW[2]	RWQCBs[3]	NMFS[4]	USFWS[5]	BCDC[6]
Bank Stabilization	X	X	X	X	X	X
Sediment Removal	X	X	X	X	X	X
Hardscape Removal (for mitigation)	X	X	X	X	X	X
Vegetation Management In-Channel (below OHW)						
Large Woody Debris[7, 8]	X	X	X	X	X	
Vegetation Removal (<6", 6-12" dbh)		X	X	X	X	X
Pruning		X	X	X	X	
Mowing[9]		X	X	X	X	
Herbicide[10]		X	X	X		
Vegetation Management Below Top of Bank and Non-In-Channel (above OHW)						
Vegetation Removal (<6", 6-12" dbh)		X	X	X	X	X
Pruning		X	X	X	X	
Corrective Pruning		ASR only	ASR only	ASR only	ASR only	
Coppicing		ASR only	ASR only	ASR only	ASR only	
Grazing		X	X	X	X	
Mowing[9]		X			X	
Herbicide[10]		X	X	X		
Management of Animal Conflicts						
Physical Alteration of the Facility	X	X	X		X	X
Habitat Modification	X	X	X		X	X
Non-lethal Trapping and Relocation		ASR only				
Lethal Control						
Fumigants		X	X			
Trapping		X			X	
Minor Maintenance – Only if there may be greater than 436 sf (0.01 ac) but less than 3485 sf (0.08 ac) of wetland/riparian vegetation impacts. [1, 11]						
Vegetation Removal		X	X	X	X	
Sediment Removal	X	X	X	X	X	X
Road Maintenance – below top of bank only		X	X		X	X

Maintenance Activity	USACE[1]	CDFW[2]	RWQCBs[3]	NMFS[4]	USFWS[5]	BCDC[6]
Grading for Improved Drainage and Reduced Erosion		X	X		X	X
Stream Gauge Maintenance		X	X	X	X	
Repair of Existing Structures / Fences / Gates[12]		X	X	X	X	X
Minor Erosion Repair Above OHWM		X			X	X
Trash and debris						
Removal of obstructions		X	X	X		
Fish Ladder/Fish Screen Maintenance	X	X	X	X		
Notes: X denotes the regulatory approval needed for the work activity.						

1. Generally applies to work within Waters of the U.S. (including tidal areas) – generally below the OHWM. NOTE: All SMP activities below the Mean High Water Line in tidal areas may require Corps authorization.
   Sediment removed in the manner of 'pure excavation' is not regulated by the ACOE, though any dewatering activities that include the installation of a coffer dam still would be. The ACOE is not taking jurisdiction of vegetation management activities within bank and sediment items.
2. Includes all areas and species within CDFW jurisdiction (F&G Code Section 1600 et seq.). Notification will be made to CDFW for any work when a qualified biologist determines that there may be 'take' or the potential to 'adversely affect' a state listed species.
3. Only applies to work within Waters of the State, which includes the area below top-of-bank of the outermost bank or levee, and the riparian corridor to the upland dripline of riparian vegetation.
4. Only applies to anadromous salmonid/sturgeon streams.
5. Only applies in federal species-specific areas.
6. Only applies within BCDC jurisdiction.
7. Agencies will be notified within one week of Tiers 3, 4 and 5 LWD projects being performed and these projects will be included in the ASR. LWD associated with debris jams/trash rafts may be removed with Agency pre-approval.
8. Large woody debris will require notification to the agencies when a qualified biologist determines that there may be 'take' or the potential to 'adversely affect' any state or federally listed species.
9. Only applies in new areas in sensitive habitats such as wetlands or woody riparian vegetation, for mowing of special-status plants, or for mowing of habitat for the least Bell's vireo, California tiger salamander, California red-legged frog, Ridgway's rail or salt marsh harvest mouse.
10. Except on maintenance roads.
11. Riparian/wetland impacts between 436 – 3485 sq ft may be solely reported in the ASR.
12. In-kind repairs that are replacing hardscape in anadromous salmonid channels will be notified even if there are not riparian/wetland vegetation impacts.

12.2.2 Contents of Project Notification

The following section describes the SMP work activities, mitigation projects, and other documents to be included in the NPW for agency approval. See Section 12.2.5 for a list of activities that do not require NPW inclusion.

1. NPW-Vegetation Management Work Activity – Below Top of Bank

Vegetation Removal <6", Tree Removal 6-12" dbh, Limb Removal >4" dbh, and new Pruning and Herbicide areas. Where Maintenance Guidelines exist, the following line items may reference the Maintenance Guidelines. A list of previously approved and recurring sites not requiring notification is located in Attachment B for Previously Mitigated Areas (PMAs).

1. SMP project number.

2. Water body name.

3. Activity Type (Vegetation Removal <6", Tree Removal 6-12" dbh, Limb Removal >4" dbh, Pruning, or Herbicide).

4. Project location:

    4.1. Station From (channel stationing).
    4.2. Station To (channel stationing).
    4.3. Latitude Center Point (decimal degrees).
    4.4. Longitude Center Point (decimal degrees).

5. Work area width (ft).

6. Channel cross section location (beyond top of bank, below top of bank, and/or below/above OHWM.

7. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

8. Directions to the site, including street crossings.

9. Is the channel reach and proposed maintenance activity covered in a PMA (Yes/No). If yes, no further impact quantification is required. For modified and modified with ecological value channel reaches with a design Q, provide established LOS or design flow rate. For modified and modified with ecological value channel reaches without a design Q, provide a description of historical conditions needing maintenance and estimated capacity of the channel. For unmodified channel reaches, provide a further description as to past practices and understanding for the need of the proposed work.

10. Roughness and sediment objectives for the channel, and description of triggers to meet the design Q. Describe why the proposed action will help achieve the desired condition. Use MG's where available. Hydraulic analysis will not be included for pruning activities for levee inspections, access, ecological health, stream gauges, etc., or for vegetation removal for fire safety or to abate mosquito breeding.

11. Anticipated work site conditions (including a description of vegetation and percentage density range of plants) [Percentage of all vegetation on-site in existing conditions, where existing means what the site will probably look like just before maintenance occurs, rather than what it looks like during the site visit.]

12. Reason for removing vegetation (based on visual observation). MG's will provide more technical information to justify whether or not work is needed.

13. Detailed description of the type and amount of vegetation proposed for removal (relate to density percentage above). Not applicable to tree removal 6-12" or limb removal >4".

14. For Herbicide and Vegetation Removal <6" diameter outside of PMA, provide total area (sq ft). If invasive vegetation is being impacted and calculated under the IPMP for mitigation credit, it will be included under that section. If area is entirely within the PMA, no further quantification or mitigation is required.

15. For Tree Removal 6-12" dbh, provide:

    15.1. Tree species
    15.2. Total area (sq ft)
    15.3. Number of trees to be removed
    15.4. Range of trunk diameters in dbh (in)

16. For Limb Removal >4" diameter, provide:

    16.1. Tree species
    16.2. Total area (sq ft)
    16.3. Number of limbs to be removed
    16.4. Range of limb diameters (in)

17. For Pruning of more than 0.01 acres (436 sq ft) of wetland or riparian vegetation per project, provide total area (sq ft) (estimate area of impact by the square footage (area) of vegetation removed multiplied by the vertical proportion/percentage of the tree or stand that is pruned).

18. Is there the potential to impact wetlands below the OHWM of waters of the United States and the State? (Yes/No). If yes, are impacts estimated to be Temporary or Permanent. Valley Water staff will determine extent of impact and application of minimization actions during pre-construction survey.

19. Mitigation description (for work in non-PMA/FMA areas): Mitigation project identification number and details (mitigation type, creek, stationing, channel cross section location, below/above OHWM, tidal/non-tidal), mitigation ratio per impact type, and mitigation area applied (sq ft). Identification (including map) of any areas that are proposed for inclusion into the PMA pool of work areas.

2. NPW-Mowing Work Activity

Notification is only required for mowing in new areas in sensitive habitats such as wetlands or woody riparian vegetation, mowing of special-status plants, or mowing of habitat for the least Bell's vireo, California tiger salamander, California red-legged frog, Ridgway's rail or salt marsh harvest mouse. Notification information for new areas will include:

1. SMP project number.

2. Water body name and location of impact.

3. Channel type of impact site (modified, modified with ecological value, or unmodified).

4. Special-status species potentially occurring on the site and impact rationale.

5. Describe potential presence of standing or flowing water.

6. Detailed description of the type and amount of vegetation proposed for mowing.

7. Reason for removing the vegetation.

8. Creek name and location of mitigation and proposed mitigation approach, if applicable.

3. NPW-Sediment Removal Work Activity

Where sediment removal is necessary for non-Minor Maintenance activities, Maintenance Guidelines will provide the rationale for the location and depth/extent of sediment removal, if available. If maintenance guidelines exist, the rationale will make reference to those documents.

Sediment removal projects that use direct (pure) excavation and result in sediment discharge not regulated by the USACE, will not require USACE authorization. See Chapter 2 for more information. Instream habitat complexity and coarse substrate impacts will still need project assessments in anadromous salmonid channels, and all vegetation impacts will be mitigated for as required. Temporary vegetation impacts (pruning, herbicide, and vegetation removal <6" dbh) that meet the Minor Maintenance threshold of < 3,485 sq ft per project will not incur mitigation.

1. SMP project number.

2. SMP project name.

3. Water body name.

4. Project location:

    4.1. Station From (channel stationing).
    4.2. Station To (channel stationing).
    4.3. Latitude Center Point (decimal degrees).
    4.4. Longitude Center Point (decimal degrees).

5. Directions to the site, including street crossings.

6. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

7. Bank – Left, Right or Both (looking downstream).

8. Maintenance, engineering, and environmental staff that conducted pre-project assessment, including date(s) assessment was conducted.

9. Project description.

10. Site conditions requiring maintenance.

11. Past SMP sediment work in the same reach.

12. Will native soil be disturbed?

13. Cultural resources findings, if applicable.

14. Description of vegetation at work site.

15. Description of vegetation at project staging area and access routes.

16. Description of vegetation up- and downstream of project site.

17. Construction Impacts:

    17.1. Impact type (construction, access, dewatering, etc.)
    17.2. Permanent or temporary impact
    17.3. Above and/or below OHWM
    17.4. Approximate construction length (ft)
    17.5. Average construction width (ft)
    17.6. Construction depth (ft)
    17.7. Total construction area (sq ft)

18. Waters of the State (top of bank to OHWM; Excludes WOUS) – Temporary:

    18.1. Impact type
    18.2. Impact area (sq ft)
    18.3. Volume/material excavated (CY)
    18.4. Volume/material filled (CY)

19. Waters of the State (top of bank to OHWM; Excludes WOUS) – Permanent:

    19.1. Impact type
    19.2. Impact area (sq ft)
    19.3. Volume/material excavated (CY)
    19.4. Volume/material filled (CY)

20. Section 404 Waters of the United States (below OHWM/MHWM) – Temporary:

    20.1. Impact type
    20.2. Impact area (sq ft)
    20.3. Volume/material excavated (CY)
    20.4. Volume/material filled (CY)

21. Section 404 Waters of the United States (below OHWM/MHWM) – Permanent:

    21.1. Impact type
    21.2. Impact area (sq ft)
    21.3. Volume/material excavated (CY)
    21.4. Volume/material filled (CY)

22. Section 10 Waters of the United States (below OHWM/MHWM) – Temporary:

    22.1. Impact type
    22.2. Impact area (sq ft)
    22.3. Volume/material excavated (CY)
    22.4. Volume/material filled (CY)

23. Section 10 Waters of the United States (below OHWM/MHWM) – Permanent:

    23.1. Impact type
    23.2. Impact area (sq ft)
    23.3. Volume/material excavated (CY)
    23.4. Volume/material filled (CY)

24. Will diversion and/or dewatering be required?

25. Diversion/dewatering activities: Describe diversion/dewatering methodology, including length, and the method for disposing of dewater effluent (for groundwater pumping).

26. Provide a general description of the access and staging area(s), location, and size. For new access and staging area(s), provide estimated length (feet) and width (feet).

27. Will the access route and/or staging area require grading activities or vegetation disturbance? If Yes, briefly describe activities and amount of vegetation disturbance (vegetation removal details will be included in the vegetation impacts summary).

28. For Tree Removal 6-12" dbh:

    28.1. Tree species
    28.2. Total area (sq ft)
    28.3. Number of trees to be removed
    28.4. Range of trunk diameters in dbh (in)

29. For Limb Removal >4" diameter:

    29.1. Tree species
    29.2. Total area (sq ft)
    29.3. Number of limbs to be removed
    29.4. Range of limb diameters (in)

30. For Vegetation Removal <6" diameter:

    30.1. Species
    30.2. Total area (sq ft)
    30.3. Range of trunk diameters in dbh (in) if applicable

31. For Pruning:

    31.1. Species
    31.2. Total area (sq ft)

32. Impacts within wetland boundaries:

    32.1. Permanent or temporary impact
    32.2. Wetland type (fresh or tidal)
    32.3. Approximate impact length (ft)
    32.4. Average impact width (ft)
    32.5. Total impact area (sq ft)
    32.6. Location above or below OHWM

33. Does the project site and sediment activity qualify as a Previously Mitigated Area (PMA)?

34. For modified and modified with ecological value channel reaches, provide the established LOS or design flow rate for each reach.

35. For unmodified channels, or modified and modified with ecological value channels that are non-engineered but historically modified reaches, provide: the flow used for hydraulic analysis, the return period of the selected flow, the rationale for selecting the flow and a description of any past practices supporting the need for the proposed work.

36. Roughness and sediment objectives or triggers for the channel from the MG or the assumptions and rationale used to develop the objectives, including optimizing environmental values while still providing the design flood flow conveyance.

37. Evaluation of alternative approaches that could achieve the same result (e.g., removing a hydraulic constriction, removing sediment instead of instream vegetation, etc.).

38. Anticipated frequency of maintenance.

39. Pre-project assessment of coarse substrate and instream complexity to be removed within anadromous salmonid channels (as identified in Chapter 9, Table 9.1), even if within PMA.

40. Will large woody debris removal be required (anadromous salmonid creeks as identified in Chapter 9 Table 9.1)? If yes, describe fallen trees and other instream woody material to be removed, and attach photograph(s).

    40.1. Large woody debris description
    40.2. LWD volume removed (CY)
    40.3. LWD tier

41. Sensitive Biological Resources present: If yes, describe known resource issues, such as proximity to known habitat or sightings of Chinook salmon, Central Coast steelhead DPS, North American green sturgeon southern DPS, designated Essential Fish Habitat, burrowing owl, nesting

birds/migratory birds, raptors, SF dusky footed woodrat, western pond turtle, California tiger salamander, California red-legged frog, longfin smelt, least Bell's vireo and any other state- or federally-listed endangered or threatened species.

42. CDFW LISTED SPECIES: Note: Final determination regarding potential for take of state-listed species (include their listing status) to be made by CDFW.

    42.1. Species determination:

    - determine that with implementation of the proposed conservation measures, the project will not result in take of state-listed species as defined in California Fish and Game Code Section 86

    OR

    - determine that take of state-listed species may result.

    42.2. Reason for decision.

43. NMFS LISTED SPECIES: Note: Final determination regarding potential for take of federally listed species (include their listing status) to be made by USACE.

    43.1. Species determination:

    - No effect. Sensitive species/habitat administered by NMFS are not present in the project area and indirect effects will not occur

    OR

    - Project may affect the following federally listed species and qualifies for application of the NMFS Biological Opinion for the SMP.

    43.2. Reason for decision: Provide a rationale for the effects determination for each NMFS protected species listed under 'Sensitive Biological Resources Present', incorporating information if the proposed project would impact any channel providing habitat for different life cycles for anadromous salmonids (i.e., migration, spawning, rearing, or refugia).

44. USFWS LISTED SPECIES: Note: Final determination regarding potential for take of federally-listed species (include their listing status) to be made by USACE.

    44.1. Species determination:

    - No effect. Sensitive species/habitat administered by the USFWS are not present in the project area and indirect effects will not occur.

    OR

    - Project may affect the following federally listed species and qualifies for application of the USFWS Programmatic Biological Opinion for the SMP.

    44.2. Reason for decision: Provide a rationale for the effects determination for each USFWS protected species listed under 'Sensitive Biological Resources Present'.

45. Mitigation description (both on-site and off-site): Mitigation project identification number and details (mitigation type, creek, stationing, channel cross section location, below/above OHWM, tidal/non-tidal), mitigation ratio per impact type, and mitigation area applied (sq ft). Identification (including map) of any areas that are proposed for inclusion into the PMA pool of work areas.

46. Photographs (upstream, downstream, perpendicular, adjacent land use).

47. Site Plans / Maps:

    47.1. Cross-section of repair (delineate ordinary high-water mark [OHWM], mean high-water mark, and/or high tide line).
    47.2. Site plan diagram (Plan View).
    47.3. Showing project footprint including access roads, staging areas, and dewatering/diversion activities.
    47.4. Showing delineation of special aquatic sites and other waters of the United States and/or the state.

4. NPW-Bank Stabilization Work Activity

1. SMP project number.

2. SMP project name.

3. Water body name.

4. Project location:

    4.1. Station From (channel stationing).
    4.2. Station To (channel stationing).
    4.3. Latitude Center Point (decimal degrees).
    4.4. Longitude Center Point (decimal degrees).

5. Directions to the site, including street crossings.

6. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

7. Bank – Left, Right or Both (looking downstream).

8. Maintenance, engineering, and environmental staff that conducted pre-project assessment, including date(s) assessment was conducted.

9. Outer bend, inner bend, or straight section.

10. Project description.

11. Equipment to be used (including for dewatering and construction of temporary access roads).

12. General channel reach conditions.

13. Site conditions requiring maintenance.

14. Past SMP maintenance work in the same reach.

15. Will native soil be disturbed?

16. Cultural resources findings, if applicable.

17. Description of vegetation at work site.

18. Description of vegetation at project staging area and access routes.

19. Description of vegetation up- and downstream of project site.

20. Adjacent SMP repairs within 500 radial feet.

21. Approximate levee/bank slope at erosion site.

22. Approximate scour velocity at erosion site.

23. Construction Impacts:

    23.1. Impact type (construction, access, dewatering)
    23.2. Permanent or temporary impact
    23.3. Below and/or above OHWM

23.4. Approximate construction length (ft)
23.5. Average construction width (ft)
23.6. Average construction height (ft)
23.7. Total construction area (sq ft)

24. Waters of the State (top of bank to OHWM; Excludes WOUS) – Temporary:

    24.1. Impact type
    24.2. Impact area (sq ft)
    24.3. Volume/material excavated (CY)
    24.4. Volume/material filled (CY)

25. Waters of the State (top of bank to OHWM; Excludes WOUS) – Permanent:

    25.1. Impact type
    25.2. Impact area (sq ft)
    25.3. Volume/material excavated (CY)
    25.4. Volume/material filled (CY)

26. Section 404 Waters of the United States (below OHWM/MHWM) – Temporary:

    26.1. Impact type
    26.2. Impact area (sq ft)
    26.3. Volume/material excavated (CY)
    26.4. Volume/material filled (CY)

27. Section 404 Waters of the United States (below OHWM/MHWM) – Permanent:

    27.1. Impact type
    27.2. Impact area (sq ft)
    27.3. Volume/material excavated (CY)
    27.4. Volume/material filled (CY)

28. Section 10 Waters of the United States (below OHWM/MHWM) – Temporary:

    28.1. Impact type
    28.2. Impact area (sq ft)
    28.3. Volume/material excavated (CY)
    28.4. Volume/material filled (CY)

29. Section 10 Waters of the United States (below OHWM/MHWM) – Permanent:

    29.1. Impact type
    29.2. Impact area (sq ft)
    29.3. Volume/material excavated (CY)
    29.4. Volume/material filled (CY)

30. Will diversion and/or dewatering be required?

31. Diversion/dewatering activities: Describe diversion/dewatering methodology, including length, and the method for disposing of dewater effluent (for groundwater pumping).

32. Proposed SMP design method. Method type may change between the NPW and ASR if within the same type (hard, soft, hybrid) or softer method type. Proposing a harder method must receive agency approval first.

33. Rationale for design template selection.

34. Was the bank stabilization project evaluated for inclusion of additional wood features beyond those in the chosen bank design?

35. Where hardscape methods are proposed, a discussion of alternatives and a quantitative demonstration of why non-hardscape means of stabilization are infeasible.

36. Reason for the bank failure.

37. For any new proposed hardscape, provide an assessment of the potential fluvial geomorphologic impacts of the activity and/or impact associated with alteration of the channel configuration.

38. Provide a general description of the access and staging area(s), location and size. For new access and staging area(s), provide estimated length (ft) and width (ft). Vegetation removal details will be included in the vegetation impacts summary.

39. Will the access route and/or staging area require grading activities or vegetation disturbance? If Yes, briefly describe activities and amount of vegetation disturbance. Vegetation removal details will be included in the vegetation impacts summary.

40. For Tree Removal 6-12" dbh:

    40.1. Tree species
    40.2. Total area (sq ft)
    40.3. Number of trees to be removed
    40.4. Range of trunk diameters in dbh (in)

41. For Limb Removal >4" diameter:

    41.1. Tree species
    41.2. Total area (sq ft)
    41.3. Number of limbs to be removed
    41.4. Range of limb diameters (in)

42. For Vegetation Removal <6" diameter:

    42.1. Species
    42.2. Total area (sq ft)
    42.3. Range of trunk diameters in dbh (in) if applicable

43. For Pruning:

    43.1. Species
    43.2. Total area (sq ft)

44. Impacts within wetland boundaries:

    44.1. Permanent or temporary impact
    44.2. Wetland type (fresh or tidal)
    44.3. Approximate impact length (ft)
    44.4. Average impact width (ft)
    44.5. Total impact area (sq ft)
    44.6. Location above or below OHWM

45. For modified and modified with ecological value channel reaches, provide the design flood return period and design flow rate for each reach.

46. Pre-project assessment of coarse substrate and instream complexity to be removed within anadromous salmonid channels (as identified in Chapter 9 Table 9.1), even if within PMA.

47. Will large woody debris removal be required (anadromous salmonid creeks as identified in Chapter 9 Table 9.1)? If yes, describe fallen trees and other instream woody material to be removed, and attach photograph(s).

    47.1. Large woody debris description
    47.2. LWD volume removed (CY)
    47.3. LWD tier

48. Sensitive Biological Resources present: If yes, describe known resource issues, such as proximity to known habitat or sightings of Chinook salmon, Central Coast steelhead DPS, North American green sturgeon southern DPS, designated Essential Fish Habitat, burrowing owl, nesting birds/migratory birds, raptors, SF dusky footed woodrat, western pond turtle, California tiger salamander, California red-legged frog, longfin

smelt, least Bell's vireo and any other state- or federally-listed endangered or threatened species.

49. CDFW LISTED SPECIES: Note: Final determination regarding potential for take of state-listed species (include their listing status) to be made by CDFW.

    49.1. Species determination:

    - determine that with implementation of the proposed conservation measures, the project will not result in take of state-listed species as defined in California Fish and Game Code Section 86

    OR

    - determine that take of state-listed species may result.

    49.2. Reason for decision.

50. NMFS LISTED SPECIES: Note: Final determination regarding potential for take of federally listed species (include their listing status) to be made by USACE.

    50.1. Species determination:

    - No effect. Sensitive species/habitat administered by NMFS are not present in the project area and indirect effects will not occur

    OR

    - Project may affect the following federally listed species and qualifies for application of the NMFS Biological Opinion for the SMP.

    50.2. Reason for decision: Provide a rationale for the effects determination for each NMFS protected species listed under 'Sensitive Biological Resources Present', incorporating information if the proposed project would impact any channel providing habitat for different life cycles for anadromous salmonids (i.e., migration, spawning, rearing, or refugia).

51. USFWS LISTED SPECIES: Note: Final determination regarding potential for take of federally-listed species (include their listing status) to be made by USACE.

51.1. Species determination:

- No effect. Sensitive species/habitat administered by the USFWS are not present in the project area and indirect effects will not occur

OR

- Project may affect the following federally listed species and qualifies for application of the USFWS Programmatic Biological Opinion for the SMP.

51.2. Reason for decision: Provide a rationale for the effects determination for each USFWS protected species listed under 'Sensitive Biological Resources Present'.

52. Mitigation description (both on-site and off-site): Mitigation project identification number and details (mitigation type, creek, stationing, channel cross section location, below/above OHWM, tidal/non-tidal), mitigation ratio per impact type, and mitigation area applied (sq ft).

53. Photographs (upstream, downstream, perpendicular, adjacent land use).

54. Site Plans/Maps:

54.1. Cross-section of repair (delineate ordinary high-water mark [OHWM], mean high-water mark, and/or high tide line).
54.2. Site plan diagram (Plan View).
54.3. Showing project footprint including access roads, staging areas, and dewatering activities.
54.4. Showing delineation of special aquatic sites and other waters of the United States and/or the state.

5. NPW-Management of Animal Conflicts Work Activity

1. SMP project number.

2. SMP project name.

3. Water body name.

4. Project location:

4.1. Station From (channel stationing).
4.2. Station To (channel stationing).
4.3. Latitude Center Point (decimal degrees).
4.4. Longitude Center Point (decimal degrees).

5. Directions to the site, including street crossings.

6. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

7. Bank – Left, Right or Both (looking downstream).

8. Maintenance, engineering, and environmental staff that conducted pre-project assessment, including date(s) assessment was conducted.

9. Project description.

10. Type of animal conflict management activity (placement of physical barriers, burrow filling/burrow collapsing, kill traps and fumigants).

11. If burrow destruction within special status species habitat areas, describe activity and density/scale of burrows.

12. Equipment to be used (including for dewatering and construction of temporary access roads).

13. General channel reach conditions.

14. Site conditions requiring maintenance.

15. Past SMP maintenance work in the same reach.

16. Will native soil be disturbed?

17. Cultural resources findings, if applicable.

18. Description of vegetation at work site.

19. Description of vegetation at project staging area and access routes.

20. Description of vegetation up- and downstream of project site.

21. Adjacent SMP repairs within 500 radial feet.

22. Construction Impacts (as applicable):

    22.1. Impact type (construction, access, dewatering)
    22.2. Permanent or temporary impact
    22.3. Below and/or above OHWM
    22.4. Approximate construction length (ft)
    22.5. Average construction width (ft)
    22.6. Average construction height (ft)
    22.7. Total construction area (sq ft)

23. Waters of the State (top of bank to OHWM; Excludes WOUS) – Temporary:

    23.1. Impact type
    23.2. Impact area (sq ft)
    23.3. Volume/material excavated (CY)
    23.4. Volume/material filled (CY)

24. Waters of the State (top of bank to OHWM; Excludes WOUS) – Permanent:

    24.1. Impact type
    24.2. Impact area (sq ft)
    24.3. Volume/material excavated (CY)
    24.4. Volume/material filled (CY)

25. Section 404 Waters of the United States (below OHWM/MHWM) – Temporary:

    25.1. Impact type
    25.2. Impact area (sq ft)
    25.3. Volume/material excavated (CY)
    25.4. Volume/material filled (CY)

26. Section 404 Waters of the United States (below OHWM/MHWM) – Permanent:

    26.1. Impact type
    26.2. Impact area (sq ft)
    26.3. Volume/material excavated (CY)
    26.4. Volume/material filled (CY)

27. Section 10 Waters of the United States (below OHWM/MHWM) – Temporary:

    27.1. Impact type
    27.2. Impact area (sq ft)
    27.3. Volume/material excavated (CY)
    27.4. Volume/material filled (CY)

28. Section 10 Waters of the United States (below OHWM/MHWM) – Permanent:

    28.1. Impact type
    28.2. Impact area (sq ft)
    28.3. Volume/material excavated (CY)
    28.4. Volume/material filled (CY)

29. Will diversion and/or dewatering be required?

30. Diversion/dewatering activities: Describe diversion/dewatering methodology, including length, and the method for disposing of dewater effluent (for groundwater pumping).

31. Proposed SMP design method. Method type may change between the NPW and ASR if within the same type (hard, soft, hybrid) or softer method type. Proposing a harder method must receive agency approval first.

32. Rationale for design template selection.

33. Was the bank stabilization project evaluated for inclusion of additional wood features beyond those in the chosen bank design?

34. Where hardscape methods are proposed, a discussion of alternatives and a quantitative demonstration of why non-hardscape means of stabilization are infeasible.

35. Reason for the bank failure.

36. For any new proposed hardscape, provide an assessment of the potential fluvial geomorphologic impacts of the activity and/or impact associated with alteration of the channel configuration.

37. Provide a general description of the access and staging area(s), location and size. For new access and staging area(s), provide estimated length (ft) and width (ft). Vegetation removal details will be included in the vegetation impacts summary.

38. Will the access route and/or staging area require grading activities or vegetation disturbance? If Yes, briefly describe activities and amount of vegetation disturbance. Vegetation removal details will be included in the vegetation impacts summary.

39. For Tree Removal 6-12" dbh:

    39.1. Tree species
    39.2. Total area (sq ft)
    39.3. Number of trees to be removed
    39.4. Range of trunk diameters in dbh (in)

40. For Limb Removal >4" diameter:

    40.1. Tree species
    40.2. Total area (sq ft)
    40.3. Number of limbs to be removed
    40.4. Range of limb diameters (in)

41. For Vegetation Removal <6" diameter:

    41.1. Species
    41.2. Total area (sq ft)
    41.3. Range of trunk diameters in dbh (in) if applicable

42. For Pruning:

    42.1. Species
    42.2. Total area (sq ft)

43. Impacts within wetland boundaries:

    43.1. Permanent or temporary impact
    43.2. Wetland type (fresh or tidal)
    43.3. Approximate impact length (ft)
    43.4. Average impact width (ft)
    43.5. Total impact area (sq ft)
    43.6. Location above or below OHWM

44. Sensitive Biological Resources present: If yes, describe known resource issues, such as proximity to known habitat or sightings of Chinook salmon, Central Coast steelhead DPS, North American green sturgeon southern DPS, designated Essential Fish Habitat, burrowing owl, nesting birds/migratory birds, raptors, SF dusky footed woodrat, western pond turtle, California tiger salamander, California red-legged frog, longfin smelt, least Bell's vireo and any other state- or federally-listed endangered or threatened species.

45. CDFW LISTED SPECIES: Note: Final determination regarding potential for take of state-listed species (include their listing status) to be made by CDFW.

    45.1. Species determination:

    - determine that with implementation of the proposed conservation measures, the project will not result in take of state-listed species as defined in California Fish and Game Code Section 86

    OR

    - determine that take of state-listed species may result.

    45.2. Reason for decision.

46. USFWS LISTED SPECIES: Note: Final determination regarding potential for take of federally-listed species (include their listing status) to be made by USACE.

46.1. Species determination:

- No effect. Sensitive species/habitat administered by the USFWS are not present in the project area and indirect effects will not occur

OR

- Project may affect the following federally listed species and qualifies for application of the USFWS Programmatic Biological Opinion for the SMP.

46.2. Reason for decision: Provide a rationale for the effects determination for each USFWS protected species listed under 'Sensitive Biological Resources Present'.

47. Mitigation description (both on-site and off-site): Mitigation project identification number and details (mitigation type, creek, stationing, channel cross section location, below/above OHWM, tidal/non-tidal), mitigation ratio per impact type, and mitigation area applied (sq ft).

48. Photographs (upstream, downstream, perpendicular, adjacent land use).

49. Site Plans / Maps:

49.1. Cross-section of activity (delineate ordinary high-water mark [OHWM], mean high-water mark, and/or high tide line).
49.2. Site plan diagram (Plan View).
49.3. Showing project footprint including access roads, staging areas, and dewatering activities.
49.4. Showing delineation of special aquatic sites and other waters of the United States and/or the state.

6. NPW-Minor Maintenance Work Activity

Minor maintenance activities having riparian/wetland impacts between 436-3485 sq ft **may** be solely reported in the ASR, unless dewatering/diversion is required on a creek reach that supports sensitive fish species.

1. SMP project number.

2. Water body name.

3. Project location:

3.1. Station From (channel stationing).
3.2. Station To (channel stationing).
3.3. Latitude Center Point (decimal degrees).
3.4. Longitude Center Point (decimal degrees).

4. Directions to the site, including street crossings.

5. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

6. Bank – Left, Right or Both (looking downstream).

7. Anticipated work site conditions.

8. Maintenance activity type.

9. Reason for the activity.

10. Total estimated amount of riparian and wetland vegetation to be impacted (sq ft).

11. Impacts to riparian vegetation (temporary impacts only):

    11.1. Total area (sq ft)

12. Impacts within wetland boundaries (temporary impacts only):

    12.1. Wetland type (fresh or tidal)
    12.2. Approximate impact length (ft)
    12.3. Average impact width (ft)
    12.4. Total impact area (sq ft)
    12.5. Location above or below OHWM

13. Volume of material to be excavated for sediment removal (CY).

14. Will diversion and/or dewatering be required?

15. Diversion/dewatering activities: Describe diversion/dewatering methodology, including length, and the method for disposing of dewater effluent (for groundwater pumping).

7. NPW-Large Woody Debris Modification or Removal Work Activity (not as a part of Bank Stabilization or Sediment Removal Work Activity)

LWD is not required to be submitted in the NPW, but may be. Each proposal for Tiers 3, 4 and 5 LWD will be sent to the permitting agencies either before work commences or within one week of the work being completed and will include the following elements:

1. SMP project number.

2. Water body name.

3. Project location:

    3.1. Station From (channel stationing).
    3.2. Station To (channel stationing).
    3.3. Latitude Center Point (decimal degrees).
    3.4. Longitude Center Point (decimal degrees).

4. Directions to the site, including street crossings.

5. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

6. Bank – Left, Right or Both (looking downstream).

7. Project description.

8. Tier number

9. Will diversion and/or dewatering be required?

10. Diversion/dewatering activities: Describe diversion/dewatering methodology, including length, and the method for disposing of dewater effluent (for groundwater pumping).

11. Monitoring/evaluation criteria if applicable.

12. Amount of mitigation owed in CY.

13. Photographs.

8. NPW-Invasive Plant Removal Mitigation Project

The NPW will include a description of each systematic IPMP mitigation site that is to be initiated in that year. This description will include acreage of target species to be controlled and general locations of control activities. Many interconnected factors go into determining the level of success that can be expected. Acreage of target species to be controlled as well as general locations of control activities will be discussed. Opportunistic IPMP is reported to the agencies in the ASR as vegetation removal < 6" or tree removal 6"–12" dbh.

1. SMP project number.

2. Water body name.

3. Project location:

    3.1. Station From (channel stationing).
    3.2. Station To (channel stationing).
    3.3. Latitude Center Point (decimal degrees).
    3.4. Longitude Center Point (decimal degrees).

4. Directions to the site, including street crossings.

5. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

6. Bank – Left, Right or Both (looking downstream).

7. Site description including a discussion of any potential constraints that limit work within the site. This should also include a description of the existing vegetation, the approximate density of plants and a discussion of special-status species potentially occurring on the site.

8. Area of species proposed for removal (sq ft).

9. Description of how the targeted plants will be removed.

b. Description of species constraints or limitations in the techniques that can be used due to regulatory and/or ESA concerns.

10. Description of control strategies. Different species require different repeat treatments to be effective. Therefore, the success strategy might be laid out over a period of time for difficult-to-control species (Tier 2 invasive species identified in Table 10-3).

11. Objectives of mitigation with consideration to the restoration of ecological functionality.

12. Mitigation credit per Table 10-1c:

    12.1. Mitigation ratio and credit area (sq ft) per invasive species Tier
    12.2. Total mitigation credit area (sq ft)

13. Site-specific quantitative success criteria.

14. Is compensatory mitigation plan required? If Yes, include as separate report per Attachment I.

9. NPW-Revegetation Mitigation Project

1. SMP project number.

2. Water body name.

3. Project Location:

    3.1. Station From (channel stationing).
    3.2. Station To (channel stationing).
    3.3. Latitude Center Point (decimal degrees).
    3.4. Longitude Center Point (decimal degrees).

4. Directions to the site, including street crossings.

5. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

6. Bank – Left, Right or Both (looking downstream).

7. Site description including a discussion of any potential constraints that limit work within the site. This should also include a description of the existing vegetation, the approximate density of plants and a discussion of special-status species potentially occurring on the site.

8. Objectives of mitigation with consideration to the restoration of ecological functionality.

9. Mitigation credit per Table 10-1c:

    9.1. Mitigation ratio and credit area (sq ft) per channel type
    9.2. Total mitigation credit area (sq ft)

10. Site-specific quantitative success criteria.

11. Is compensatory mitigation plan required? If Yes, include as separate report per Attachment I.

10. NPW-Gravel Augmentation/Instream Complexity Mitigation Project

1. SMP Project Number.

2. Water Body Name.

3. Project Location:

    3.1. Station From (channel stationing).
    3.2. Station To (channel stationing).
    3.3. Latitude Center Point (decimal degrees).
    3.4. Longitude Center Point (decimal degrees).

4. Directions to the site, including street crossings.

5. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

6. Bank – Left, Right or Both (looking downstream).

7. Mitigation types (instream complexity, gravel augmentation)

8. Pre-project site assessment per Attachment G.

9. Monitoring/evaluation criteria.

10. Success criteria.

11. Will diversion and/or dewatering be required?

12. Diversion/dewatering activities: Describe diversion/dewatering methodology, including length, and the method for disposing of dewater effluent (for groundwater pumping).

13. Habitat function to be replaced, per salmonid life cycle stages.

14. Pre-project creek profile.

15. Will vegetation be removed due to project activities? Activity types: -Vegetation Removal <6" (temporary impact) -Trees Removed 6-12" (permanent impact) -Pruning (temporary impact) -Limb removal >4" (permanent impact).

    15.1. Vegetation group (temporary impact) or Species (permanent impact)
    15.2. Impact area (sq ft)
    15.3. For permanent impacts, dbh or diameter (in)

16. Amount of mitigation estimated to be placed, measured in area (sq ft) and volume (CY)

17. Photographs.

18. Project design plans and specifications.

19. Is compensatory mitigation plan required? If Yes, include as separate report per Attachment I.

11. NPW-Large Woody Debris Mitigation Project

1. SMP Project Number.

2. Water Body Name.

3. Project Location:

    3.1. Station From (channel stationing).
    3.2. Station To (channel stationing).
    3.3. Latitude Center Point (decimal degrees).
    3.4. Longitude Center Point (decimal degrees).

4. Directions to the site, including street crossings.

5. Channel type (modified, modified with ecological value, or unmodified). Including stationing per channel type if project crosses channel types.

6. Bank – Left, Right or Both (looking downstream).

7. Pre-project site assessment per Attachment G.

8. Monitoring/evaluation criteria.

9. Success criteria.

10. Will diversion and/or dewatering be required?

11. Diversion/dewatering activities: Describe diversion/dewatering methodology, including length, and the method for disposing of dewater effluent (for groundwater pumping).

12. Habitat function to be replaced, per salmonid life cycle stages.

13. Pre-project creek profile.

14. Will vegetation be removed due to project activities? Activity types: -Vegetation Removal <6" (temporary impact) -Trees Removed 6-12" (permanent impact) -Pruning (temporary impact) -Limb removal >4" (permanent impact).

    14.1. Vegetation group (temporary impact) or Species (permanent impact)
    14.2. Impact area (sq ft)
    14.3. For permanent impacts, dbh or diameter (in)

15. Amount of mitigation estimated to be placed, measured in area (sq ft) and volume (CY)

16. Photographs.

17. Project design plans and specifications.

18. Is compensatory mitigation plan required? If Yes, include as separate report per Attachment I.

12. NPW-Stream Corridor Restoration and Other Mitigation Projects

For larger, multi-benefit mitigation projects, a proposal for mitigation will be submitted annually per stream corridor restoration or other type of mitigation project. Each proposal will be developed and reviewed by permitting agencies and will include the elements detailed in Attachment I, following U.S. Army Corps of Engineers mitigation plan guidelines.

13. NPW-Bank Stabilization and Sediment Removal Project Maps

The following maps will be included with the NPW submittal for all bank stabilization and sediment removal projects:

1. County-wide map of locations all projects included in this NPW submittal (at sufficient scale to identify waterway) and referenced by SMP Project Number. Projects are color coded by activity type (e.g., non-minor maintenance sediment removal, bank stabilization).

2. Individual watershed maps of projects included in this NPW and referenced by SMP Project Number. Projects are color coded by activity type (e.g., non-minor maintenance sediment removal, bank stabilization). Maps will show federal and state listed species occurrences and/or designated critical habitat and/or essential fish habitat.

14. NPW-Winter Work Reporting

Winter work occurs outside of the typical reporting cycle, between the ASR submittal and the start of the SMP work season, consistent with the work window limits in Tables 3-1 to 3-3. Due to the time of year that winter work is conducted (between January 15 and June 15), it is reported in following year's ASR.

15. NPW-Previously Mitigated Area/Five-year Mitigated Areas (PMA/FMA) Reporting

NPW packets for Previously Mitigated Areas (PMAs) for sediment removal, in-channel vegetation removal (vegetation removal <6"), in channel vegetation (aquatic) herbicide, and pruning of overhanging growth and Five-year Mitigated Areas (FMAs, after the first year submittal) will require less reporting information. The PMA report will include work proposed by creek, stationing, and activity only. The FMA report will include work proposed by creek, stationing, activity, project number from first year submittal, mitigation project number(s) and description, year FMA was created, year FMA will expire, and biological review information.

A list of PMA and FMA Vegetation Management activities anticipated to be performed that year will be included in the NPW (See Attachment B for the complete list of PMA sites). PMA and FMA vegetation items may be performed throughout the year consistent with the work window limits in Tables 3-1 through 3-3. While a progress report will be submitted in the ASR, the comprehensive list of PMA/FMA vegetation work proposed, completed, or not completed will be submitted in the following NPW.

12.2.3 Review Process for Agencies

The NPW will be submitted to the agencies by April 15 of each year for review and comment (See Table 12-1). Agencies will have 45 days to respond and issue a Notice to Proceed. Agency staff are committed to providing a response for projects within their jurisdiction within the allotted time period.

At Valley Water's discretion, a second NPW submittal, NPW 2, may be submitted later in the work season to address projects not included in the initial NPW (April 15th submittal). This may be necessary due to late season storms or other conditions in the field that result in the need to perform additional projects. NPW 2 will be submitted no later than August 1 and will follow the same process and timeframe. While this additional submittal provides some flexibility to manage the annual work cycle, it will be a smaller, focused list of projects intended to address and appropriately prioritize maintenance projects.

While there is not a limit in the number of submittals provided, it is in the interest of all agencies, including Valley Water, to minimize this number. In practice, there is one main submittal on April 15. Additional projects may be submitted prior to or after to address work priorities and scheduling concerns.

12.2.4 Notification of Project Changes

Project changes typically include length (linear distance), bank repair method type and changes in dewatering activities. When changes are requested, the following information will be provided as appropriate, such as:

1. Project length – Waivers for extending the length of a project may be granted via a waiver request in the NPW, as described in Chapters 5 and 6.

2. Bank repair method type – Similar method types are allowed to be changed between the NPW and ASR. If the method is within the same category type (hard, soft or hybrid) or is a softer method, it will be noted in the ASR and no prior notification will be provided. If a 'harder' method is proposed, the regulatory agencies will be notified for project approval.

3. Dewatering/diversions system method and plan – For projects that require substantial modification to and/or did not initially include a dewatering/diversion plan in the NPW but for which now require dewatering/diversion, the regulatory agencies will be notified for approval.

For any other project changes that may be requested, the SMP staff will send an email to all agencies and state in the body of the email which agencies have authority over the project. Valley Water will request written responses from agencies with jurisdiction for the project within three (3) business days.

12.2.5 Projects Not Requiring NPW Notification

The following activities will not be subject to any notification requirements:

1. Pruning of overhanging growth (from fence lines and both upper and lower maintenance roads).

2. Pruning of vegetation that is expected to result in the removal of less than 0.01 acres (436 sq ft) of riparian vegetation per project.

3. Corrective pruning.

4. Coppicing.

5. Grazing.

6. Herbicide spraying on maintenance roads and revegetation sites. Notifications will not be provided for areas adjacent to upper maintenance roads and a couple of feet below the hinge or for areas a few feet below the hinge and separated by a wide area that would in no way cause drift or flow into the creek. Areas that are below the hinge, that have a concrete or earth bank but are close to the channel, ex. width (not slope distance) < 40', would require notification.

7. Removal of dead/dying and down vegetation obstructions on maintenance roads (upper and lower), excluding LWD.

8. Mowing, unless it is a new site in sensitive habitats such as wetlands or woody riparian vegetation or there are potential impacts to special-status species (see Table 10-5).

9. Minor Maintenance activities that will impact less than 0.01 acres of wetland or riparian vegetation per work site and do not dewater a creek reach that supports sensitive fish species. In-kind replacements that modify the original design will be reported in the NPW for approval.

10. Minor Maintenance activities with riparian/wetland impacts between 436-3485 sq ft may be solely reported in the ASR.

11. Opportunistic IPMP. Opportunistic IPMP sites may not be proposed for mitigation credit. They are areas identified during another work activity and proactively removed. Opportunistic IPMP work not proposed for mitigation credit, may be solely reported in the ASR.

12. Management of Animal Conflicts – live trapping.

12.2.6 Carry-Over Projects

Carry-over projects are items that were approved by the regulatory agencies but were either not performed or partially performed. While these will primarily be bank stabilization and sediment removal activities, this would apply to any activity. Upon initial agency approval, a project may be carried over for up to one year without further approval. Project lengths cannot be increased by more than 50 feet. No new significant vegetation impacts can occur. Harder bank stabilization methods will need agency approval as the impacts incurred may be more significant than the impacts previously approved.

Carry-over projects will be identified in the NPW, stating any estimated vegetation impact, project length, and/or bank stabilization method differences. The original item number will be included for tracking clarity. The regular ASR submittal process will occur for these projects.

12.3 ANNUAL SUMMARY REPORT

Valley Water shall submit the annual summary report by January 31. Annual mitigation monitoring report(s) may be submitted separately or as an attachment to the ASR. The ASR will include:

- Actual impact numbers (e.g., linear footage/acreage) for activities where such numbers were only estimated in the NPW.
- Description of maintenance activities completed the previous year.
- A list of what projects were proposed in the NPW but not performed.
- Cumulative summary of SMP impacts to date.
- Cumulative summary of compensatory activities to date, including the information stated below by work activity.
- Total balance of 6-12" dbh tree removals and replacement tree installations in each watershed will be reported in a table. This table will also show the balance of oaks and sycamores in each watershed.

12.3.1 Work Activity Reporting

Activities that are required to be reported in the ASR, but are not required to have been reported in the NPW, include: corrective pruning, coppicing, LWD (although there will be an email submittal no later than one week after the work has been completed), Opportunistic IPMP (submitted under the appropriate vegetation management activity), and Minor Maintenance activities that impact 436-3485 sq ft of riparian/wetland vegetation and that did not require dewatering on a creek reach that supports sensitive fish species.

1. ASR-Vegetation Management PMA/FMA

ASR packets for Previously Mitigated Areas (PMAs) for sediment removal, in-channel vegetation removal (vegetation removal <6"), in channel vegetation (aquatic) herbicide, and pruning of overhanging growth and Five-year Mitigated Areas (FMAs, after the first year submittal) requires less reporting information. The PMA report will include work conducted by creek, stationing, and activity only. The FMA report will include work conducted by creek, stationing, activity, project number from first year submittal, mitigation project number(s) and description, year FMA was created, year FMA will expire, and biological review information. A list of PMA/FMA work that was performed will be provided in the ASR or the following NPW. The FMA list of qualifying projects will be updated annually based on newly mitigated work areas.

2. ASR-Vegetation Management – Below Top of Bank. Vegetation removal <6", Tree Removal 6-12" dbh, Limb Removal >4", and new Pruning and Herbicide

1. Project identification number.

2. Creek name, location of impact (including channel stations and observable landmarks, such as street crossings).

3. Statement as to whether the channel reach and proposed maintenance activity is covered in a Five-Year Mitigation Area (FMA) (yes/no). State Year X of 5 for FMA.

4. A description of site conditions encountered, vegetation types and approximate density (percentage range on-site).

5. A detailed description of the type and density (percentage range on-site of vegetation removed).

6. Vegetation Activity Type and Impacts (herbicide, pruning, vegetation removal <6" dbh) in non-FMA (Pruning that resulted in the removal of more than 0.01 acres (436 sq ft) of wetland or riparian vegetation per project is exempt from reporting. Area of impact is the square footage (area) of vegetation removed multiplied by the vertical proportion/percentage of the tree or stand that is pruned (sq ft or ac).)

    6.1. Total Area (sq ft / acres) (temporary)
    6.2. Total Area (sq ft) covered by FMA

7. Tree impacts (Removal of limbs >4" dbh and trees 6-12" dbh).

    7.1. Tree species (list names).
    7.2. Number of trees or limbs >4" removed.
    7.3. Range of trunk diameters (dbh) limb diameters (in).

8. Description of temporary or permanent impacts to wetlands (if any).

    8.1. Above or below the OHWM of waters of the United States and the State.
    8.2. Temporary Impact area (sq ft)
    8.3. Permanent Impact area (sq ft)

9. A description of special-status species impacts (if any).

10. Mitigation project information, including SMP Project Number, Water Body Name, channel stationing, relation to OHWM, and other conditions as relevant to assess suitability of applied mitigation.

3. ASR-Mowing where an NPW was required

1. Project identification number.
2. Water body name and location of impact.
3. Channel type of impact site (modified, modified with ecological value, or unmodified).
4. Detailed description of the type and amount of vegetation mowed.
5. Reason for removing the vegetation.
6. Description of special-status species encounters, impacts and impact rationale.
7. Describe presence of standing or flowing water.
8. Water body name and location of mitigation and proposed mitigation approach, if applicable.

4. ASR-Sediment Removal

1. Project identification number.
2. Water body name and location of impact (including channel stationing, observable landmarks such as street crossings, any changes in location from NPW).
3. Channel type.
4. A description of site conditions encountered and vegetation types.
5. Vegetation removal activity types: -Trees Removed <6" (temporary impact) -Trees Removed 6-12" (permanent impact) -Pruning (temporary impact) -Limb removal >4" (permanent impact), wetlands. Vegetation group (temporary impact) or Species (permanent impact). Area (sq ft). For permanent impacts, dbh (inches)
6. Large Woody Debris (for Table 9.1 anadromous salmonid creeks): Dimensions. Volume (cy) removed. Tier. Mitigation Owed.
7. A description of any water quality problems or construction-related impacts encountered during maintenance activities.
8. A description of special-status species impacts (if any).
9. A detailed description of sediment removed: including the length, width, and depth of sediment removed, and how the sediment was removed

(pure excavation [from TOB] or not), highlighting any changes from what was proposed in the NPW.

10. Results of sediment characterization for which Valley Water submitted a proposal for re-use of sediments that exceeded the Beneficial Re-use Guidelines as specified in the Sediment Characterization Plan.

11. Anadromous salmonid channels will include the post-project assessment as described in Attachment G.

12. Mitigation proposal for construction, vegetation, instream complexity/large woody debris/gravel augmentation (for anadromous salmonid creeks only).

13. Mitigation project information, including SMP Project Number, Water Body Name, channel stationing, relation to OHWM, and other conditions as relevant to assess suitability of applied mitigation.

14. Photographs (upstream, downstream, perpendicular): The ASR shall include pre-project and post-project photographs for each maintenance site.

5. ASR-Bank Stabilization

1. Project identification number.

2. Water body name and location of impact (including channel stationing, observable landmarks such as street crossings, any changes in location from NPW).

3. Channel type.

4. A detailed description of the bank stabilization work performed, including construction length and width, highlighting any changes from what was proposed in the NPW.

5. Method type (Allowable to change between the NPW and ASR if the method is within the same category type or a softer method. Proposing a harder method must receive agency approval first.).

6. Vegetation removal activity types: -Vegetation Removed <6" (temporary impact) -Trees Removed 6-12" (permanent impact) -Pruning (temporary impact) -Limb removal >4" (permanent impact), wetlands. Vegetation group (temporary impact) or Species (permanent impact). Area (sq ft). For permanent impacts, dbh (inches)

7. Large Woody Debris (for Table 9.1 anadromous salmonid creeks): Dimensions. Volume (cy) removed. Tier. Mitigation Owed.

8. A description of any water quality problems or construction-related impacts encountered during maintenance activities.

9. A description of special-status species impacts (if any).

10. Results of sediment characterization for which Valley Water submitted a proposal for re-use of sediments that exceeded the Beneficial Re-use Guidelines as specified in the Sediment Characterization Plan.

11. Anadromous salmonid channels will include the post-project assessment as described in Attachment G.

12. Photographs (upstream, downstream, perpendicular): The ASR shall include pre-project and post-project photographs for each maintenance site.

13. Mitigation project information, including SMP project number, water body name, channel stationing, relation to OHWM, and other conditions as relevant to assess suitability of applied mitigation.

6. ASR-Animal Conflict Management

Trapping:

1. Map of areas where trapping occurred (line along creek).
2. Creek name and location (stationing).
3. Creek work length.
4. Number of trap days. Effectiveness (summarize the results, including number and type of species – include target and non-target species).
5. If any problems arose, and effects to any special status and common species that were observed.

Burrow destruction:

1. Project identification number.
2. Creek name and location of activity (including channel stationing and observable landmarks, such as street crossings) for any species impacts.
3. Description of special-status species on the site.
4. Type of destruction performed: soil or slurry filling.
5. If any problems arose, and effects to any special status and common species that were observed.
6. Is there a net increase/decrease in rodent burrows being observed as a result of burrow filling or collapsing?

Physical Barriers:

1. Project identification number.
2. Creek name and location of impact (including channel stationing and observable landmarks, such as street crossings.
3. Channel type.

4. A detailed description of the work performed, including construction length and width, highlighting any changes from what was proposed in the NPW.
5. Method type Vegetation removal activity types: -Trees Removed <6" (temporary impact) -Trees Removed 6-12" (permanent impact) -Pruning (temporary impact) -Limb removal >4" (permanent impact), wetlands, highlighting any changes from what was proposed in the NPW Vegetation group (temporary impact) or Species (permanent impact) Area (sf) For permanent impacts, dbh (inches)
6. A description of special-status species impacts, if any.
7. Photographs: The ASR shall include pre-project and post-project photographs for each maintenance site.

7. ASR-Corrective Pruning

1. Project identification number.

2. Creek name and location of work site (including channel stationing and observable landmarks, such as street crossings).

3. Channel type.

4. Purpose for vegetation removal.

5. Detailed description of the type, size, and amount of vegetation removed.

6. Description of sensitive species impacts, if any.

8. ASR-Minor Maintenance:

This report shall describe minor maintenance activities that resulted in impacts greater than 0.01 acre of wetlands or riparian habitat. Minor maintenance activities having riparian/wetland impacts between 436-3485 sq ft may be solely reported in the ASR, and will include the following:

1. Project identification number.

2. Creek name and location of impact (including GIS stationing, channel stations and observable landmarks, such as street crossings).

3. Work site conditions.

4. Channel type (modified, modified with ecological value, or unmodified).

5. Maintenance activity type.

6. Reason for the activity.

7. Amount of vegetation to be impacted (sq ft).

8. Volume of material to be excavated (CY).

9. Diversion/dewatering description.

10. A description of special-status species impacts (if any).

9. ASR-Large Woody Debris Impact (not a part of bank stabilization or sediment removal)

1. Project identification number.

2. Creek name and location of LWD impact, including channel stations and observable landmarks, such as street crossings.

3. Channel type of impact site (modified, modified with ecological value, or unmodified).

4. Narrative Description.

5. Photographs, prior to and after work.

6. LWD Dimensions.

7. Tier.

8. Volume (CY) and area of impact (sq ft).

9. A description of special-status species impacts (if any).

12.3.2 Mitigation Activity Reporting

1. ASR-Invasive Plant Management

Opportunistic IPMP is reported to the agencies in the ASR as vegetation removal < 6" or tree removal 6" – 12".

1. Project identification number.

2. Creek name and location of mitigation, including channel stations and observable landmarks, such as street crossings.

3. Channel type (modified, modified with ecological value, or unmodified).

4. Cross-section location.

5. Area of species removed (sq ft) including the mitigation credit/ratio as described in Table 10-3.

6. Description of how the targeted plants were removed.

7. Description of types of control strategies. Different species require different repeat treatments to be effective. Therefore, the success strategy will be laid out over a period of time for difficult-to-control species (Tier 2 species in Table 10-3).

8. Mitigation site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site).

9. Site description including a discussion of any potential constraints that limit work within the site.

10. Objectives of mitigation with consideration to the restoration of ecological functionality.

11. Site specific quantitative success criteria.

12. A description of special-status species impacts (if any).

13. Photographs.

2. ASR-Revegetation Installation

1. Project identification number.

2. Creek name and location of mitigation, including channel stations and observable landmarks, such as street crossings.

3. Channel type (modified, modified with ecological value, or unmodified).

4. Cross-section location.

5. Revegetation area created (sq ft / acres).

6. Mitigation site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site).

7. Site description including a discussion of any potential constraints that limit work within the site.

8. Objectives of mitigation with consideration to the restoration of ecological functionality.

9. A description of special-status species impacts (if any).

10. Photographs of site.

3. ASR-Gravel Augmentation/Instream Complexity Installation

1. Project identification number.
2. Mitigation types (instream complexity, gravel augmentation).
3. Creek name and location of mitigation, including channel stations and observable landmarks, such as street crossings.
4. Channel type of mitigation site (modified, modified with ecological value, or unmodified).
5. Project Description.
6. Photographs.
7. As-built design drawings.
8. Project design plans and specifications.
9. Monitoring/evaluation criteria.
10. Success criteria.
11. Habitat function to be replaced, per salmonid life cycle stages.
12. Pre-project creek profile.
13. Vegetation impacts (follow same reporting as for bank/sediment).
14. Methods for coarse sediment placement.
15. Timing of coarse sediment placement.
16. Was the site dewatered and were there any water quality issues; if so, describe.
17. Amount of mitigation placed, measured in area (sq ft) and volume (CY).
18. A description of special-status species impacts (if any).

4. ASR-Large Woody Debris Installation

1. Project identification number.
2. Creek name and location of mitigation, including channel stations and observable landmarks, such as street crossings.
3. Channel type of mitigation site (modified, modified with ecological value, or unmodified).

4. Project Description.
5. Photographs.
6. As-built design drawings.
7. Project design plans and specifications.
8. Post construction monitoring methods.
9. Success criteria.
10. Objectives, per salmonid life cycle stages.
11. Post-project creek profile.
12. Was the site dewatered and were there any water quality issues; if so, describe.
13. Vegetation impacts (follow same reporting as for bank/sediment).
14. Additional vegetation impacts (follow same reporting as for bank/sediment).
15. Tag numbers.
16. Volume of mitigation created (CY).
17. A description of special-status species impacts (if any).

12.3.3 Mitigation Monitoring Reporting

Mitigation Monitoring Reports shall describe monitoring results of mitigation sites identified in the ASRs as specified in Chapter 11. Valley Water shall provide reports until mitigation success criteria have been achieved and a notice of mitigation completion has been submitted to the agencies. After approval of the notice of mitigation completion by the applicable regulatory agencies, submittal of annual mitigation monitoring reports are no longer required.

Depending on the size, functions and values of the natural resources enhanced and restored on-site as mitigation activities, if the area restored exceeds the required mitigation amount, then the excess mitigation can be applied (as appropriate) to another specifically identified mitigation need associated with another project.

1. **Monitoring of Hybrid and Hardscape Bank Stabilization Sites**: Sites identified per the requirements in Chapter 11, shall be monitored and reported in years 1, 3 and 5 after construction.

    1. Temporary wetland impacts will be monitored to ensure regrowth occurs within 2 years. If after 2 years the wetland has not regrown to near

pre-project conditions, then the impact will be considered permanent and mitigation will be owed.

2. Hydroseeding of softscape repairs will be monitored to ensure BMP compliance (GEN-20 Erosion and Sediment Control Measures).

3. Photographs.

4. Visual inspections with explanation of: (1) conditions upstream and downstream of the site and (2) conditions of the bank stabilization repair.

2. Salmonid Mitigation Monitoring

1. LWD Tiers 3 and 4:

    1. Is Tier 3 and 4 still in place after one full calendar year?
    2. If no, mitigation is required. Provide updated mitigation balance.

2. LWD Tier 5:

    1. Has the Tier 5 LWD achieved the desired objective/success criteria for installation as stated in the NPW (i.e. provide cover, provide velocity refuge, induce lateral scour, encourage deposition of spawning gravels) and has not created any unintended adverse effects to the stream course?
    2. As-built design drawings.
    3. Narrative description.
    4. Photographs, pre- and post-project.

3. Instream Complexity/Gravel Augmentation:

    <u>Years 1, 3 and 5</u>

    1. Evaluation of the condition of the project, utilization by target species, and achievement of project specific success criteria.
    2. As-built design drawings.
    3. Narrative description.
    4. Establish the type of monitoring to be conducted.
    5. Timing of the monitoring to be conducted.
    6. Monitoring year number.
    7. Adaptive management alternatives if the success criteria are not met.
    8. Photographs, pre- and post-project:

    <u>Years 2 and 4</u>

    1. Description of project status, including any potential concerns for not meeting the success criteria or adaptive management actions being undertaken.
    2. Photographs.

3. **IPMP Monitoring** reporting will provide details regarding the species treated, control methods used, and mapped locations of treatment work.

Monitoring reports will compare monitoring data to success criteria for that site. Recommendations for the continued management of each site will be provided as part of the monitoring report, including future management needs and the feasibility of active revegetation, if applicable. Tier 1 (from Table 10-3) will be reported in years 1 and 3. Tier 2 will be reported in years 1, 3 and 5.

After final year success criteria have been achieved, a summary report for each IPMP site will be submitted to the regulatory agencies.

4. **Revegetation Monitoring**

Annual monitoring reports will be submitted to each appropriate regulatory permitting agency by January31 for years 1, 3 and 5. Results of qualitative monitoring that is conducted in years 2 and 4 will be included in monitoring reports prepared for years 3 and 5. Maps showing monitoring locations and representative photographs will be included with each report.

After final year success criteria have been achieved, a summary report for each revegetation site will be submitted to the regulatory agencies.

Annual monitoring reports will be prepared in the following format:

- Introduction
- Methods
- Results
- Summary table showing annual monitoring results of current and all previous years in comparison to success criteria for current and all previous years
- Discussion (including performance in relation to success criteria)
- Management Recommendations
- Map of mitigation site location

And include the following items:

<u>Quantitative</u>

1. Plant species
2. Percent survival for the entire site
3. Percent cover of native plants
4. Percent cover of non-native plants
5. Health and vigor

<u>Qualitative</u>

1. Discussion (habitat development and comparisons to success and performance criteria for each site)
2. Remedial actions taken

3. Future management recommendations
4. Natural recruitment notes
5. Invasive species notes
6. Erosion notes
7. Drought stress notes
8. Effectiveness of irrigation notes
9. Deer browse notes
10. Trash/refuse and vandalism notes
11. Dates of any replanting
12. Photos
13. Maps
14. Photo documentation and
15. Status of irrigation (increased/decreased/removed)

5. Land Acquisition

For land acquisition provided as mitigation in perpetuity for all sediment removal and vegetation maintenance activities conducted under the SMP, a long-term management plan and easement will be developed.

12.3.4 Program Reporting

1. **Not Performed**: A list of project names and Project identification numbers that were included in the NPW but were not performed.

2. **Water Quality Monitoring Plan**: This report shall describe monitoring results in accordance with the Water Quality Monitoring Plan (See Attachment E).

3. **California EcoAtlas**: It has been determined through regional, state and national studies that tracking of mitigation/restoration projects must be improved to better assess the performance of these projects, following monitoring periods that last several years. Therefore, Valley Water shall provide Regional Water Board staff with the information necessary to use the California Wetlands Form to provide an annual summary of SMP projects reported in the ASRs. Regional Water Board staff will complete the standard California Wetlands form using the information provided in the ASRs. Valley Water shall electronically submit the completed standard form and map(s) showing the locations and boundaries of all SMP projects to: habitatdata@waterboards.ca.gov.

12.4 FISH LADDER/FISH SCREEN INVENTORY

Valley Water inspects fish ladder and fish screen facilities two times per year following the inspection form template (See Attachment H). Inspections will determine if sediment, debris, or algal growth are impairing the functionality of the facility. Inspections will also determine if any components of the facility are loose, broken, missing, or present sharp edges. For fish screens, inspections will determine if screens are firmly attached and no gaps, tears, rips, or holes are present. The inspection reports will also present any other condition that is or could be in the future compromising the functionality of the fish ladder or screen.

An initial inspection is generally performed in the spring and the inspection results are included in the NPW. A follow-up inspection of each of the facilities will be performed between September 1 and October 31 to confirm the completion of maintenance and repairs, if any were performed. If no repairs or maintenance were performed, the follow-up inspection will confirm whether or not the condition of the facility remains as reported in the previous inspection report. The results of the follow up inspections will be reported in the ASR.

12.5 DATA MANAGEMENT

Valley Water will electronically store SMP project information, including project notification packages, annual monitoring reports and agency correspondence over the entire period of the program (i.e., at least the 10-year period of 2014-2023). This stored information can be used in GIS to track SMP projects and mitigation. It will identify SMP project locations and dimensions, providing historical information that will facilitate cumulative impact analyses throughout the life of the program.

Stored SMP project information will help ensure that both project impacts and enhancement of habitat and other aquatic resource functions in the SMP-2 coverage area are well documented. It will also demonstrate that SMP work has been adequately monitored to achieve the program goal of no net loss of aquatic and other ecological resource functions.

SMP project information will be provided in a format accessible to all regulatory agency staff. Annual reporting formats will include a combination of narratives, tables, spreadsheets, and figures to meet individual agency reporting requirements and facilitate review and understanding of SMP projects. Valley Water will provide the data described below to the regulatory agencies to facilitate its use in GIS.

The NPW and ASR submittal processes will be evaluated after the first two years of SMP-2. If it is determined that regulatory agency staff are not reviewing, using or applying the submitted information, the information to be included in these reports will be discussed and renegotiated. Verification of receipt of reports submitted to the agencies will be provided via electronic signature of the file opening.

Current NPM/ASR Nomenclature

Work is proposed to the agencies in the NPW with actual work accomplishments being reported in the ASR. With the creation of a new database, a nomenclature was designed to identify work activities and be able to apply the permit requirements to them. This approach enables readers to quickly know critical pieces about the work without needing to remember every action or be required to look at the full report. Each work “item” is uniquely identified by calendar year, work activity type and consecutive number per year. “Item” numbers will be presented as “YR”-“Basin””Activity”-“consecutive number”, example 20-SS-001. The first two digits are the calendar year. The first letter is the Water Boards’ Basin. “S” is Santa Clara basin and “P” is Pajaro Basin. The second letter is the SMP 2 Work Activity category, shown in the table below. The last three digits is a consecutive number per Basin and Work Activity, automatically generated when a new *Item* is created. For example, SS-001 is the first sediment

removal item in Santa Clara basin created in the database for that year. PA-010 is the 10th Animal Conflict item in Pajaro basin created in the database for that year.

Each SMP 2 item must have only one work activity and only one location. Two NPW items with the same activity cannot have intersecting stationing locations.

Category Letter	Category Name
B	Bank Stabilization
G	Gravel Augmentation Mitigation
C	Instream Complexity Mitigation
I	Invasive Plant Management Mitigation
D	LWD Impact
L	LWD Mitigation
A	Management of Animal Conflicts
M	Minor Maintenance
R	Revegetation Mitigation
S	Sediment Removal
V	Vegetation Management
This description has been added to assist agency staff in reading the NPW's and ASR's. Future database needs may alter this nomenclature.	

Data Parameters

- Project identification number
- Year
- Creek name
- Station from
- Station to
- Size of project area
- Type of mitigation paid, if any
- Related mitigation project identification number
  - Year installed
  - Creek name
  - Station from
  - Station to
  - Size of project area
- Anadromous
- Other listed species habitat

Anadromous Salmonid Compensatory Mitigation Sites

Assessments will continue to be conducted for work that is performed for gravel extraction during this period; with assessment results being reported and gravel volumes tallied. With concurrence from the resource agencies, Valley Water may combine the mitigation requirements within a watershed and mitigate at a single mitigation site for both gravel and instream habitat complexity.

Conversely the water district may need to use several separate mitigation sites within a watershed to fulfill all mitigation obligations. When the annual NPW identifies the need for mitigation of impacts to gravel, the resource agencies will approve Valley Water's selection of gravel augmentation projects from this list. As new mitigation site opportunities are identified over the permit period, these sites will be submitted to the agencies for addition to the gravel augmentation projects' list.

12.5.1 Tracking

1. Federal Species Take Limits

1. Per the requirements of the USFWS Biological Opinion, the Maximum Potential Impact (acres) is identified for the following species and locations:

    - CRLF – 5 acres in STC-1, 5 acres in STC-2
    - CTS – 9 acres total in all critical habitat areas combined

Critical Habitat Unit	Max. Potential CTS Impacts (acres)
San Felipe Creek (Unit 7)	1.0
Laurel Hill (Unit 8)	2.0
Cebata Flat (Unit 9)	2.0
Lions Peak (Units 10a and 10b)	1.0
Braen Canyon (Unit 11)	1.0
San Felipe (Unit 12)	2.0

2. Per the requirements of the NMFS Biological Opinion:

    Incidental take will have been exceeded if more than 810 juvenile CCC steelhead or more than 180 S-CCC steelhead are collected, or if more than 25 individual CCC steelhead or more than 6 individual S-CCC steelhead are harmed or killed annually by SMP activities.

    If any steelhead are found dead or injured, the biologist must contact NMFS by phone immediately at the NMFS North Central Coast Office at (707) 575-6050.

2. Maintenance Guideline Areas

Each successive NPW during SMP-2 shall contain a higher percentage of proposed maintenance work (e.g., proposed sediment removal and vegetation management) that is located within reaches where new or updated MGs have been developed.

12.6 ANNUAL PERFORMANCE REVIEW AND PERMIT REAUTHORIZATION

Performance Review

Valley Water will coordinate annually with the regulatory agencies to review overall SMP performance, including but not limited to the following: an overview of the ASR from the prior construction season, status of mitigation obligations incurred by maintenance projects and mitigation site management, data management and reporting, and the effectiveness of program coordination and communication.

Guidelines for Future Permit Renewals

The SMP-2 update process brought the regulatory agencies together over a 3-year period to comment and assist in the development of the SMP-2 program. While a collaborative approach is often desirable, individual agency regulatory changes, timing to acquire permits while maintaining a continuous implementation of the SMP, are key challenges. Decisions made by agencies and Valley Water early into the process may need to be changed due to timing constraints and priorities later in the process.

It is recommended that the SMP-3 development process consider these factors. The following questions would be beneficial for discussions with regulatory agency staff to assist in creating a more efficient and effective SMP:

- What SMP changes does Valley Water need?
- Which program elements weren't ideally suited to meet Valley Water objectives?
- Did the mitigation structure work?
- Are there elements of the program that could be combined or simplified?
- Are there regulatory changes that would necessitate large program changes?
- Is the SMP an effective tool compared to other routine operations and maintenance programs?
- Did the agency approval process work?
- What will the consultation responsibilities be between the ACOE and the USFWS and NMFS?

Answers to these questions and discussions with regulatory agency staff will assist in creating a more efficient and effective Stream Maintenance Program.

TABLE 12-2
List of Agency Representatives

Last	First	Agency	Title	Phone	E-mail
Blinn	Brenda	California Department of Fish & Wildlife	Senior Environmental Scientist (Supervisor)	(707) 944-5541	Brenda.Blinn@wildlife.ca.gov
Molina	Mayra	California Department of Fish & Wildlife	Environmental Scientist	(415) 831-4640	mayra.molina@wildlife.ca.gov
Valiela	Luisa	EPA	San Francisco Bay Lead	(415) 972-3400	valiela.Luisa@epamail.epa.gov
Stern	Gary	NMFS	San Francisco Bay Region Supervisor	(707) 575-6096	Gary.stern@noaa.gov
Trent	Andy	NMFS		(707) 578-8553	andrew.trent@NOAA.gov
Morrison	Liz	RWQCB, SF	Section Lead	(510) 622-2330	elizabeth.morrison@waterboards.ca.gov
Glendening	Susan	RWQCB, SF	Environmental Specialist	(510) 622-2338	susan.glendenning@waterboards.ca.gov
Lichten	Keith	RWQCB, SF	Watershed Division Chief	(510) 622-2376	Keith.Lichten@waterboards.ca.gov
Cassady	Mark	RWQCB-Central Coast	Environmental Specialist	(805) 549-3689	mark.cassady@waterboards.ca.gov
Goeden	Brenda	SF Bay Conservation and Development Commission (BCDC)	Sediment Program Manager	(415) 352-3612	brenda.goeden@bcdc.ca.gov
Breen	Daniel	USACE	Senior Regulatory Project Manager San Francisco District	(415) 503-6803	Daniel.B.Breen@usace.army.mil
Galacatos	Katerina	USACE	Division Manager Regulatory, South Branch	(415) 503-6769	katerina.galacatos@usace.army.mil
Griego	Vincent	USFWS		(916) 414-6493	Vincent.Griego@fws.gov
Olah	Ryan	USFWS		(916) 414-6600	ryan.olah@fws.gov

ATTACHMENT A

Best Management Practices

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A. SECTION A—PRE-PROJECT PLANNING AND GENERAL BMPS

General BMPs are applicable program-wide, for most routine SMP maintenance activities. These measures include standard construction practices and impact avoidance measures that will minimize potential environmental impacts. These BMPs will be implemented by the stream maintenance crew, as appropriate and as overseen by site managers, for all activities associated with the maintenance program. The majority of these BMPs are implemented prior to and during maintenance operations, though the level of activity varies depending on the work type. Stream Maintenance Program operations often pose situations that warrant standard measures to avoid or minimize impacts to water quality. The following best management practices represent measures currently used by the SMP; however, since many of these pollution prevention measures are based on industry standards for stormwater management maintained by the California Stormwater Quality Association (CASQA), the selection of appropriate BMPs from this list must be verified by comparison with the most current standards found on the CASQA website.

Other General BMPs are conducted prior to implementing maintenance activities on site. This group of measures includes procedures to identify site or maintenance constraints, such as biological or cultural resource surveys which coincide with permit compliance requirements. Site design constraints for sediment and bank stabilization activities in particular are also identified as part of the pre-project planning process.

BMP Number	BMP Title	BMP Description
GEN-1	In-Channel Work Window	All ground-disturbing maintenance activities (i.e., sediment removal, bank stabilization, tree removal, and mechanized vegetation management) occurring in the channel (below bankfull) will take place between June 15 and October 15. No new instream sediment removal projects and bank protection work will be initiated after October 15. Requests for work window extensions must be submitted to the regulatory agencies by October 1st, listing the creek names and reaches where a work extension will occur. Work extensions vary per work activity. The agencies will provide a single response within one week. Significant rainfall applies after October 15. An extension through December 31 may apply if the following requirements are met and regulatory agency approval is received: For ground-disturbing activities: ▪ Work may continue if no significant rainfall, defined as greater than 0.5 inches per 24 hours within a local watershed, is either forecasted[1] or observed. Following October 15th, maintenance work shall cease for the season if such a rain event is forecasted or observed. ▪ Winterized sites will be visually inspected prior to, and within 48 hours following, each significant rain event (defined as rainfall 0.5 inch or greater within a 24-hour period in the subject watershed) to ensure that winterization measures are properly implemented and maintained.

[1] Weather Forecasts. No phase of the project may be started if that phase and its associated erosion control measures cannot be completed prior to the onset of a storm event if that construction phase may cause the introduction of sediments into the stream. Seventy-two-hour weather forecasts from the National Weather Service or other localized and more detailed weather forecast service will be consulted prior to start-up of any phase of the project that may result in sediment runoff to a stream.

BMP Number	BMP Title	BMP Description
		Sediment Removal ▪ Extended Work Window: 1. Creeks supporting anadromous fish: An extended work window may occur from October 15 through October 31, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first. 2. Creeks not supporting anadromous fish: An extended work window may occur from October 15 through November 30th, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first. ▪ Extended Work Window in Lower Quality Areas: 1. Sediment removal work may occur until December 31. 2. Work will only occur on Berryessa Creek (0-88+80; 232+70-236+00; 284+30-288+00), Lower Silver Creek (Reach 3 between Stations 37+40 and 381+19), Thompson Creek (0+00-10+00), Canoas Creek (0+00-390+00), Ross Creek (0+00-86+30), Calabazas Creek (35+00-105+00), and San Tomas Aquino Creek (80+00-100+00) with the following conditions: o site conditions are dry and access for all construction equipment and vehicles will not impact waterways; and o all work will stop if any rainfall is forecast for the next 72-hour period. 3. Work may occur after a significant rainfall event but no later than December 31. 4. Sites must be maintained in a rapidly winterizable[2] state (implement control measures BMP GEN-20). Bank stabilization projects may continue until the approved date stated below. Prior to a forecasted significant rainfall event (0.5 in/24 hrs), all incomplete bank stabilization projects must be winterized. 1. In Creeks Supporting Anadromous Fish o An extended work window may occur until October 31st for bank stabilization projects that will be 50% complete by October 15th. 2. In Creeks Not Supporting Anadromous Fish o An extended work window may occur until November 30th for projects that will be 50% complete by October 15th or until significant rainfall. o An extended work window may occur until November 30th for new bank stabilization projects that will be completed in five (5) days or less, or until significant rainfall. ▪ Instream hand pruning and hand removal of vegetation will occur year-round, except when: o Wheeled or tracked equipment needs to access the site by crossing a creek, ponded area, or secondary channel; or

[2] Winterization is the process to maintain work sites with the appropriate BMP's to prevent erosion, sediment transport, and protect water quality. Winterization occurs upon completion of bank repairs or on incomplete projects after October 15 and prior to significant rainfall, 0.5 inches or greater of local watershed rainfall within 24 hours. Winterization shall be completed prior to the occurrence of such actual significant rainfall.

BMP Number	BMP Title	BMP Description
		o Work occurs in streams that support steelhead. In these streams instream vegetation maintenance will cease on December 31 or when local rainfall greater than 0.5 inches is predicted within a 24-hour period of planned activities, whichever happens first. Modification and removal of instream large woody debris will occur at any time of the year, and as further described in the NMFS Biological Opinion. Work (including LWD, encampment cleanup, and burrow filling) within the wetted channel of streams that support steelhead that is being done outside of the in-stream work window must adhere to the following conditions: 1. Pre-activity surveys must be conducted within seven days of the start of work. 2. A qualified biologist must be on site to monitor this in-stream work.
GEN-2	Instream Herbicide Application Work Window	Instream herbicide applications will take place between June 15 and October 15, or until the first occurrence of any of the following conditions; whichever happens first: ▪ local rainfall greater than 0.5 inches is forecasted within a 24-hour period from planned application events; or • when steelhead begin upmigrating and spawning in the 14 anadromous steelhead creeks, as determined by a qualified biologist (typically in November/December), i. A qualified biologist will determine presence/absence of sensitive resources in designated herbicide use areas. Proposed herbicide use will be limited to an aquatic formulation on the District's Approved Pesticide List. Surfactant use would be limited to non-ionic products on the District's Approved Pesticide List. ii. A qualified fisheries biologist will review the proposed stream reaches for aquatic herbicide application. The fisheries biologist would conduct a pre-construction survey (and any other appropriate data research) to determine whether the proposed herbicide application is consistent with approvals concerning biological resources and determine what BMPs would be instituted for work to proceed. In addition, herbicide application requirements are as follows: • No direct application into water. • Herbicide application shall not occur when wind conditions may result in drift.

BMP Number	BMP Title	BMP Description
GEN-3	Avoid Exposing Soils with High Mercury Levels	Sediment removal and bank stabilization projects in portions of the Guadalupe River watershed affected by historic mercury mining may expose soils containing mercury. 1. In Basin Plan identified creeks in the Guadalupe River Basin, soils that are likely to be disturbed or excavated shall be tested for mercury (Hg). Soils shall be remediated if disturbed or excavated soils exposed to streamflow have a residual sample test exceeding 0.2 mg mercury per kg erodible sediment (dry wt., median). 2. Remediation may be accomplished either by: a. treating the site so that contaminated soils excavated for the purpose of bank stabilization shall not be susceptible to erosion; or b. further excavating contaminated soils and replacing them with clean fill or other bank stabilization materials that are free from contaminants. c. Soils with residual sample mercury concentrations exceeding 0.2 mg mercury per kg erodible sediment (dry wt., median) shall be removed and disposed of in a Class I landfill following established work practices and hazard control measures. Soils with residual sample mercury concentrations less than 0.2 mg mercury per kg erodible sediment (dry wt., median) will remain at the project site. 3. To ensure worker safety during sediment removal and bank stabilization projects with elevated mercury concentrations in the exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the Occupational Safety and Health Agency (OSHA).

Biological Resources

GEN-4	Minimize the Area of Disturbance	To minimize impacts to natural resources, soil disturbance will be kept to the minimum footprint necessary to complete the maintenance operation.
GEN-5	Mitten Crab Control Measure	Sediment from the San Francisco Bay Watershed, including that for reuse, cannot be moved to areas any farther south than Coyote Creek Golf Drive in south San Jose, and the intersection of McKean and Casa Loma Roads.
GEN-6	Minimize Impacts to Nesting Birds via Site Assessments and Avoidance Measures	1. For activities occurring between January 15 and August 31, project areas will be checked by a qualified biologist or Designated Individuals (DI – for limited ground nesting species surveys) for nesting birds within 2 weeks prior to starting work. If a lapse in project-related work of 2 weeks or longer occurs, another focused survey will be conducted before project work can be reinitiated. 2. If nesting birds are found, a buffer will be established around the nest and maintained until the young have fledged. Appropriate buffer widths are 0.5 mile for bald and golden eagles; 250 feet for other raptors and the least Bell's vireo, herons, and egrets; 25 feet for ground-nesting non-raptors; 700 feet for the California clapper rail; 600 feet for the California least tern and western snowy plover; and 50 feet for non-raptors nesting on trees, shrubs and structures. Mowing and weed whacking will have a 25 feet buffer. A qualified biologist may identify an alternative buffer based on a site specific-evaluation. No work within the buffer will occur without written approval from a qualified biologist, for as long as the nest is active. 3. All vegetation management, sediment reuse, road grading, or other SMP activities in or immediately adjacent to suitable California clapper rail or Alameda song sparrow nesting habitat, as determined by a qualified biologist, shall not be conducted prior to September 1 (the non-nesting season). 4. If a pre-activity survey in high-quality San Francisco common yellowthroat breeding habitat (as determined by a qualified biologist) identifies more singing male San Francisco common yellowthroats than active nests,

BMP Number	BMP Title	BMP Description
		then the inconspicuous nests of this species might have been missed. In that case, maintenance activities in that area shall be delayed until the San Francisco common yellowthroat non-breeding season (i.e., August 16–March 14). 5. The boundary of each buffer zone will be marked with fencing, flagging, or other easily identifiable marking if work will occur immediately outside the buffer zone. 6. All protective buffer zones will be maintained until the nest becomes inactive, as determined by a qualified biologist. 7. If monitoring shows that disturbance to actively nesting birds is occurring, buffer widths will be increased until monitoring shows that disturbance is no longer occurring. If this is not possible, work will cease in the area until young have fledged and the nest is no longer active. 8. Biological evaluation is required for all vegetation management, sediment reuse, road grading, or other SMP activities conducted within 250 feet of occupied artificial nest structures (e.g. barn owl boxes). The appropriate buffer distance would be determined by a qualified biologist based on site-specific and activity-specific conditions to minimize nest disturbance and prevent abandonment.
GEN-6.5	Protection of Nesting Least Bell's Vireos	1. To the extent feasible, SMP activities within those areas mapped as vireo habitat in the Santa Clara Valley Habitat Plan shall be scheduled to occur outside of the least Bell's vireo nesting season (March 15 – July 31). If it is not feasible for maintenance activities along these reaches to be scheduled during the non-nesting season, the following measures will be implemented. 2. For activities within woody riparian habitat mapped as vireo habitat in the Santa Clara Valley Habitat Plan that will occur between March 15 and July 31, any work will be preceded by a focused survey for least Bell's vireos. Pre-activity surveys will consist of two site visits, conducted on separate days within 14 days before the initiation of maintenance activities in the given area, with at least one of these surveys occurring within 5 calendar days before the initiation of such activities. Surveys will be conducted between dawn and 11:00 a.m., during mild weather conditions (i.e., not during excessive cold, heat, wind, or rain), within all riparian habitat in and within 250 feet of any proposed maintenance location along these reaches. The surveys will be conducted by a qualified biologist who is familiar with the visual and auditory identification of this species. 3. To minimize impacts to nesting least Bell's vireos and other birds, the biologist will not initially be looking for Bell's vireo nests during these surveys. Rather the biologist will look and listen for individual vireos. If a least Bell's vireo is detected, it will be observed to determine whether it is actively nesting. The biologist will note the nest location, or if finding the actual nest could result in excessive disturbance or risk damaging the nest, the biologist will determine the approximate location, based on observation of birds carrying nesting material, carrying food, or repeatedly visiting a certain area. 4. If an active nest is found, a minimum 250-foot no-activity buffer will be established around the nest. If a territorial male is found but no nest can be detected, then the approximate centroid of the bird's area of activity will be the point from which the buffer will be applied. The required buffer may be reduced in areas where dense riparian forest occurs between the construction activities and the active nest or where sufficient barriers or topographic relief exists to protect the nest from excessive noise or other disturbance. The biologist will coordinate with the USFWS and CDFW to evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis. 5. No work will occur within the buffer without verification by a biologist that the nest is inactive and until any fledged young are no longer dependent on adults for food. 6. If a least Bell's vireo and/or its nest is detected during pre-activity surveys, the District will contact the USFWS and CDFG within two working days regarding the presence and location of the bird/nest.

BMP Number	BMP Title	BMP Description
GEN-7	Protection of Burrowing Owls	1. If occupied burrows are identified, a 250-foot radius no work buffer zone will be established around the burrow. The buffer may be modified, with CDFW approval, to take into consideration of paved roads, intervening riparian corridors and levees. 2. No construction work will occur within the 250-foot buffer zone until after the nesting season. 3. After the nesting season, work may occur within the 250 foot buffer zone provided: a. A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction). b. The same qualified biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities. c. If there is any change in owl foraging behavior as a result of construction activities, these activities will cease within the 250-foot buffer. d. If the owls are gone for at least one week, the project proponent may request approval from the Santa Clara County Habitat Agency that a qualified biologist excavate the usable burrows to prevent owls from re-occupying the site. After the usable burrows are excavated, the buffer zone will be removed and construction may continue. e. Monitoring must continue as described above for the non-breeding season as long as the burrow remains active. 4. Routine use of existing District maintenance roads within the 250-foot buffer will be allowed. However, no construction traffic will be allowed to use the maintenance road during the active nesting period. 5. Exceptions. a. Mowing on levees may occur during the nesting season and within 250 feet of active burrows provided the burrows are marked by a qualified biologist. b. No vehicle mounted mowers will be used within 10 ft of occupied burrows. c. A qualified biologist will monitor the mowing within the buffer zone and stop the mowing if burrowing owls are observed on the surface at the nest or another burrow. d. Areas within 10 feet of the burrows may be mowed using hand equipment when no owls are visible on the surface. e. All mowing activities within the buffer zone will be completed within 30 minutes.
GEN-8	Protection of Sensitive Fauna Species from Herbicide Use	Approved herbicides and adjuvants may be applied in habitat areas for sensitive wildlife species (including steelhead, California red-legged frog, California tiger salamander, salt marsh harvest mouse, and Bay checkerspot butterfly); all applications will occur in accordance with federal and state regulations. For sprayable or dust formulations: when the air is calm or moving away from sensitive wildlife habitat, applications will commence on the side nearest the habitat and proceed away from the habitat. When air currents are moving toward habitat, applications will not be made within 200 yards by air or 40 yards by ground upwind from occupied habitat. However, these distances may be modified for the control of invasive species on salmonid streams if the following measures are implemented: ▪ A qualified biologist will determine presence/absence of sensitive resources in designated herbicide use areas and develop site-specific control methods (including the use of approved herbicide and surfactants). Proposed herbicide use would be limited to the aquatic formulation of glyphosate (Rodeo or equal). Surfactant use would be limited to non-ionic products, such as Agri-dex, Competitor, or another brand name

BMP Number	BMP Title	BMP Description
		using the same ingredients. Any modifications to these materials would require review and approval by NMFS and CDFW. ▪ A qualified fisheries biologist will review proposed herbicide application methods and stream reaches. The fisheries biologist would conduct a pre-construction survey (and any other appropriate data research) to determine whether the proposed herbicide application is consistent with SMP approvals concerning biological resources and determine which BMPs would be instituted for work to proceed.
GEN-9	Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities	A qualified botanist will identify special status plant species and sensitive natural vegetation communities and clearly map or delineate them as needed in order to avoid and/or minimize disturbance, using the CDFW protocols and the *CNPS Botanical Survey Guidelines* to formulate the following protocols: 1. A qualified botanist will use the GIS database, CNDDB, and/or other suitable tools to identify special status plants and sensitive natural vegetation communities located within or near work areas. 2. Surveys of areas identified as sensitive natural communities or suitable habitat for special status plant species will be conducted by a qualified botanist prior to commencement of work. 3. Surveys will be conducted during the appropriate time of the year to adequately identify special-status plants that could occur on the site of proposed maintenance activities. 4. The qualified botanist will ensure avoidance and/or minimize impacts by implementing one or more of the following, as appropriate, per the botanist's recommendation: a. Flag or otherwise delineate in the field the special status plant populations and/or sensitive natural community to be protected; b. Allow adequate buffers around plants or habitat; the location of the buffer zone will be shown on the maintenance design drawings and marked in the field with stakes and/or flagging in such a way that exclusion zones are visible to maintenance personnel without excessive disturbance of the sensitive habitat or population itself (e.g., from installation of fencing). c. Time construction or other activities during dormant and/or non-critical life cycle period; d. Store removed sediment off site; and e. Limit the operation of maintenance equipment to established roads whenever possible. 5. No herbicides, terrestrial or aquatic, will be used in areas identified as potential habitat for special status plants species or containing sensitive natural communities, until a qualified botanist has surveyed the area and determined the locations of special status plant species present. 6. If special status plant species or sensitive communities are present, then a qualified botanist will determine if a given type of vegetation management method is ecologically appropriate for a given area. Alternative strategies based on the botanist's recommendations will be coordinated with appropriate staff. 7. All impacts to sensitive natural communities and special status plants identified by the qualified botanist will be avoided and/or minimized.
GEN-10	Avoid Impacts to Bay Checkerspot Butterfly and Associated Critical Habitat	1. Areas supporting Bay checkerspot larval host plants will be identified by a qualified botanist and protected from disturbance to the extent feasible, by establishing buffer zones around individual plants or populations. The size of the buffer will be determined by a qualified botanist; the actual distance will depend on the plant species potentially affected and the type of disturbance. No herbicide will be applied to the buffer area, and to the extent feasible, maintenance personnel and equipment will not operate within such areas. 2. Herbicides may be used in serpentine areas that do not contain Bay checkerspot butterfly larval host plants or sensitive plant species and habitat when approved by a qualified botanist and for the following maintenance purposes: a. To protect sensitive species and habitat;

BMP Number	BMP Title	BMP Description
		b. To manage for control of invasive and non-native plants; and/or c. To maintain access to a facility.
GEN-11	Protection of Salt Marsh Harvest Mouse and California Clapper Rail	1. A District qualified biologist will conduct a desk audit to determine whether suitable Salt Marsh Harvest Mouse (SMHM) or California Clapper Rail (CCR) habitat is present in or adjacent to a maintenance activity. 2. Within 7 days prior to work within the range of the Salt Marsh Harvest Mouse (SMHM) or California Clapper Rail (CCR), as depicted on the District's GIS layers, the proposed project area will be surveyed by a qualified biologist to identify specific habitat areas. Surveyed areas will include work locations and access routes. The range of the salt marsh harvest mouse and California clapper rail is based on the SCVWD's GIS mapping reflecting occurrence information and potential habitat. If this mapping is revised, it will be provided to the Service for review. 3. To minimize or avoid the loss of individuals, activities within or adjacent to California clapper rail and salt marsh harvest mouse habitat will not occur within two hours before or after extreme high tides (6.5 feet or above) when the marsh plain is inundated, because protective cover for those species is limited and activities could prevent them from reaching available cover. 4. Specific habitat areas are vegetated areas of cordgass (*Spartina* spp), marsh gumplant (*Grindelia* spp.), pickleweed (*Sarcocornia pacifica*), alkali heath, (*Frankenia* sp.), and other high marsh vegetation, brackish marsh reaches of creek with heavy accumulations of bulrush thatch (old stands), and high water refugia habitat that may include annual grasses, and shrubs immediately adjacent to channels. 5. Within the identified specific habitat areas, vegetation will be removed by hand from areas to be directly impacted by the work activities if possible (hand removal of vegetation is some channels may not be possible). If within the mapped range of the mouse but outside of areas identified as specific habitat areas, then other methods may be possible. 6. Prior to the initiation of work each day for all vegetation management work, ground or vegetation disturbance, operation of large equipment, grading, sediment removal, and bank stabilization work and prior to expanding the work area, if suitable habitat occurs within the immediate work area, a qualified biologist will conduct a pre-construction survey of all suitable habitat that may be directly or indirectly impacted by the day's activities (work area, access routes, staging areas). a. If during the initial daily survey or during work activities a CCR is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until the CCR leaves the work area. b. If during the initial daily survey or during work activities a SMHM or similar rodent is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until a *Site Specific Species Protection Form* can be developed and implemented by a qualified biologist to protect the SMHM or similar rodent is developed and implemented by the qualified biologist. Acceptable plan activities may include one or more of the following activities: 1) establishment of a buffer zone at least 50 feet in radius from the rodent; 2) ongoing active monitoring, 3) construction of silt fence barrier between maintenance work and location of the rodent, 4) delay of work activity until the qualified biologist can provide CDFW and the Service a suggested course of action and seek concurrence. 7. Mowing using heavy equipment (tractors, boom mowers, rider mowers) will not be conducted in habitat areas or within 50 feet of habitat areas. If mowing with hand equipment is necessary within 50 feet of habitat areas, an on-site monitor will observe the area in front of the mower from a safe vantage point while it is in operation. If SMHM are detected within the area to be mown, no mowing will occur in that area. If CCR are detected within the area to be mown, the mowing will stop until the individual(s) have left the work area.

BMP Number	BMP Title	BMP Description
		8. See ANI-2 for additional restrictions. 9. If visual observation cannot confirm California clapper rail left the work area then it is assumed that the individual(s) remains in the work area and the work will not resume until the area has been thoroughly surveyed (and absence confirmed) or the Service has been contacted for guidance. 10. When grazing occurs in or near salt marsh harvest mouse habitat, a qualified biologist will guide fence installation to exclude grazing animals from salt marsh harvest mouse specific habitat. Once exclusion fencing has been installed, a biologist does not need to be on site to monitor grazing.
GEN-12	Protection of Special-Status Amphibian and Reptile Species	1. A District qualified biologist will conduct a desk audit to determine whether suitable special-status amphibian or reptile habitat is present in or adjacent to a maintenance activity based on all available information including the habitats modeled in the Valley Habitat Plan. 2. If the District Wildlife or Fisheries Biologist determines that a special-status amphibian or reptile could occur in the activity area, a qualified biologist will conduct one daytime and one nighttime survey within a 7 day period preceding the onset of maintenance activities. a. If a special-status amphibian or reptile, or the eggs or larvae of a special status amphibian or reptile, are found within the activity area during a pre-activity survey or during project activities, the qualified biologist shall notify the project proponent about the special-status species and conduct the following work specific activities: (1) For minor maintenance activities and for vegetation removal activities that will take less than 1 day, a qualified biologist shall conduct a special status species survey on the morning of and prior to the scheduled work. (a) If no special status species is found, the work may proceed. (b) If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed. (c) If an active western pond turtle nest is detected within the activity area, a 50-foot buffer zone around the nest will be established and maintained during the breeding and nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. (d) If adults or non-larval juveniles of a special status species are found, one of the following two procedures will be implemented: i) If, in the opinion of the qualified biologist, capture and removal of the individual to a safe place outside of the work area is less likely to result in adverse effects than leaving the individual in place and rescheduling the work (e.g., if the species could potentially hide and be missed during a follow-up survey), the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFW approval, depending on the listing status of the species in question), and work may proceed. ii) If, in the opinion of the qualified biologist, the individual is likely to leave the work area on its own, and work can be feasibly rescheduled, a buffer will be established around the location of the individual(s) and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled.

BMP Number	BMP Title	BMP Description
		(2) For minor maintenance and vegetation removal activities that will take more than 1 day, the qualified biologist shall conduct a special-status species survey on each morning of and prior to the scheduled work commencing. (a) If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed. (b) If an active western pond turtle nest is detected within the activity area, a 50 ft-buffer zone around the nest will be established and maintained during the breeding and nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. (c) If adults or non-larval juveniles of a special status species are found, the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFW approval, depending on the listing status of the species in question), and work may proceed. (3) For Sediment Removal and Bank Stabilization Projects the wildlife or fisheries biologist in cooperation with the project proponent shall complete a *Site Specific Species Protection Form for the project*. Elements of the form include: work rescheduling, training work crews, daily surveys, establishment of buffers and buffer fencing, on-site monitoring, habitat modification in advance of work activities, capture and relocation of individual special-status species, methods of documentation, and reporting of results. b. If no special status amphibian or reptile is found within the activity area during a pre-activity survey, the work may proceed. c. During animal conflict management activities, if special status species are found within a burrow proposed for destruction, a qualified biologist will determine an appropriate buffer distance around that burrow to ensure adequate protection of the habitat. The buffer area may include not destroying adjacent burrows as that may damage subterranean networks of the occupied burrow or produce substrate vibrations which could interfere with prey detection mechanisms. If two consecutive follow up surveys are conducted (spaced 30 days apart) in which the burrow is found to be unoccupied, work can proceed as planned. A naturally found back filled burrow known to have been inhabited by a special-status species will be presumed to still be occupied by that species and a clearly delineated buffer demarcation of the burrow area will be in place for the duration of nearby work activities. In rare instances in which destruction of the burrow is not avoidable during animal conflict management, the animal will be relocated to a safe burrow outside the impact area, with USFWS and/or CDFW approval, depending on the listing status of the species in question. A biologist will observe the relocated animal until it is certain that the animal is not in immediate danger of desiccation or predation.

BMP Number	BMP Title	BMP Description
GEN-13	Protection of Bat Colonies	1. A District Wildlife Biologist will conduct a desk audit to determine whether suitable habitat (appropriate roost trees or anthropogenic structures) is present for bat colonies within 100 feet of the work site, staging areas, or access routes. 2. If potential bat colony habitat is determined to be present, within two weeks prior to the onset of work activities a qualified biologist will conduct a survey to look for evidence of a bat use. If evidence is observed, or if potential roost sites are present in areas where evidence of bat use might not be detectable (such as a tree cavity), an evening survey and/or nocturnal acoustic survey may be necessary to determine if the bat colony is active and to identify the specific location of the bat colony. 3. If an active bat colony is present then the qualified biologist will make the following determinations: a. The work can proceed without unduly disturbing the bat colony b. There is a need for a buffer zone to prevent disturbance to the bat colony, and implementation of the buffer zone (determined on a case-by-case basis by a qualified biologist) will reduce or eliminate the disturbance to an acceptable level. 4. If a bat colony is found in a tree or structure that must be removed or physically disturbed the qualified biologist will consult with DFW prior to initiating any removal or exclusion activities.
GEN-14	Protection of San Francisco Dusky-footed Woodrat	1. Prior to work within riparian, oak woodland, or coyote brush scrub habitat, or the removal of any oak trees outside these habitats, a District Wildlife Biologist will conduct a desk audit to determine whether woodrats could be present within suitable habitat for San Francisco dusky-footed woodrat or is known to be present in or adjacent to a maintenance activity site. 2. If the District Wildlife Biologist determines that no San Francisco dusky-footed woodrat habitat is present, or there is habitat present but it will not be affected by the maintenance activity, then no further action is required. 3. If the District Wildlife Biologist determines that suitable San Francisco dusky-footed woodrat habitat is present and may be affected by the maintenance activity, a qualified biologist shall conduct a pre-activity survey within 2 weeks prior to the start of work to determine if woodrat nests are present, or within 5 feet of, the immediate activity area. If woodrat nests are determined to be present, the following measures shall be implemented: a. To the extent feasible, impacts to woodrat nests will be avoided by maintaining a minimum 5-ft buffer between maintenance activities and nests. Even if a 5-ft buffer cannot be maintained, the District will minimize impacts to nests by avoiding the direct destruction or modification of the nests to the extent feasible. b. If one or more woodrat nests are determined to be present and physical disturbance or destruction of the nests cannot be avoided, then the woodrats shall be evicted from their nests and the nest material relocated outside of the disturbance area, prior to onset of activities that would disturb the nest, to avoid injury or mortality of the woodrats. First, an alternate location for the nest material shall be chosen by a qualified biologist based on the following criteria: 1) proximity to current nest location; 2) safe buffer distance from planned work; 3) availability of food resources; and 4) availability of cover. An alternate nest structure will then be built at the chosen location. The structure will be made up of small logs (e.g., available materials 2 inches in diameter or greater) stacked to provide a foundation on which the woodrats can add nest material. Subsequently, during the evening hours (i.e., within 2 hours prior to sunset), a qualified biologist will slowly dismantle the existing woodrat nest to allow any woodrats to flee and seek cover. All sticks from the nest will be collected and spread over the alternate structure. If

BMP Number	BMP Title	BMP Description
		young woodrats that are still dependent on their mother are discovered, relocation efforts will cease for the evening and the California Department of Fish and Wildlife will be contacted for guidance on how to proceed.
GEN-15	Salvage Native Aquatic Vertebrates from Dewatered Channels	If fisheries or native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a fish and native aquatic vertebrate relocation plan shall be implemented to ensure that fish and native aquatic vertebrates are not stranded. Relocation efforts will be based on the District's Fish Relocation Guidelines (Attachment B). Streams that support a sensitive species (i.e. steelhead) will require a relocation effort and/ or initial onsite monitoring by a qualified biologist depending on seasonal conditions: 1. In non-tidal channels, where water is to be diverted, prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual work sites when site conditions preclude reasonably effective operation of capture gear and equipment. 2. Aquatic invertebrates will not be transferred (other than incidental catches) because of their anticipated abundance and colonization after completion of the repair work.
GEN-15.5	Avoidance of Impacts on the San Joaquin Kit Fox	1. A qualified District biologist will conduct a desk audit to determine whether an SMP activity will occur in an area where the San Joaquin kit fox could potentially occur (i.e., roughly east of Frazier Lake Road and south of Bloomfield Avenue), and in potential habitat for the species. 2. If the District biologist determines that an SMP activity could occur in an area that could potentially support a kit fox, the SCVWD will implement applicable pre-activity surveys and other measures in accordance with the USFWS's *San Joaquin Kit Fox Survey Protocol for the Northern Range*, as follows: a) Conduct a preconstruction/pre-activity survey no less than 14 days and no more than 30 days prior to the beginning of project implementation. Surveys shall identify kit fox habitat features on the project site and evaluate use by kit fox and, if possible, and assess the potential impacts to the kit fox by the proposed activity. The status of all dens shall be determined and mapped in accordance with the survey protocol. b) If a natal/pupping den is discovered within the project area or within 200 feet of the project boundary, the USFWS shall be immediately notified. Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Destruction of any known or natal/pupping kit fox den would require take authorization from the USFWS. c) The project proponent will establish exclusion zones around the kit fox dens, if determined to be present. The configuration of the exclusion should have a radius measured outward from the entrance or cluster of entrances. The following radii are minima to be applied: ▪ Potential den: 50 feet ▪ Known den: 100 feet ▪ Natal/pupping den: Service must be contacted (occupied and unoccupied) ▪ Atypical den: 50 feet. 3. If take of the San Joaquin kit fox will occur, take authorization from the USFWS and CDFW will be necessary.

BMP Number	BMP Title	BMP Description
General Maintenance Practices		
GEN-16	In-Channel Minor Activities	For in-channel minor work activities, work will be conducted from the top of the bank if access is available and there are flows in the channel.
GEN-17	Employee/Contractor Training	All appropriate District staff and contractors will receive annual training on Stream Maintenance Program BMPs. The training will also include an overview of special-status species identification and habitat requirements. District staff and contractors will receive fact sheets to assist with in-the-field identification of special-status species and their habitats.
GEN-18	Paperwork Required On-Site	1. Copies of regulatory permits related to the Stream Maintenance Program will be kept on-site and available for review, if requested by regulatory personnel. 2. Copies of the Stream Maintenance Program Manual and this BMP Manual will be kept on-site.
GEN-19	Work Site Housekeeping	1. District employees and contractors will maintain the work site in neat and orderly conditions on a daily basis, and will leave the site in a neat, clean, and orderly condition when work is complete. 2. Slash, sawdust, cuttings, etc. will be removed to clear the site of vegetation debris. As needed, paved access roads and trails will be swept and cleared of any residual vegetation or dirt resulting from the maintenance activity. 3. For activities that last more than one day, materials or equipment left on the site overnight will be stored as inconspicuously as possible, and will be neatly arranged. Any materials and equipment left on the site overnight will be stored to avoid erosion, leaks, or other potential impacts to water quality (see BMPs GEN-24). 4. The District's maintenance crews are responsible for properly removing and disposing of all debris incurred as a result of construction within 72 hours of project completion. 5. All trash that is brought to a project site during maintenance activities (e.g., plastic water bottles, plastic lunch bags, cigarettes) will be collected at the site daily.
GEN-20	Erosion and Sediment Control Measures	1. Soils exposed due to maintenance activities will be seeded and stabilized using hydroseeding, straw placement, mulching, and/or erosion control fabric. These measures will be implemented such that the site is stabilized and water quality protected prior to significant rainfall. The channel bed and areas below the Ordinary High Water Mark (OHWM) are exempt from this BMP. 2. The preference for erosion control fabrics will be to consist of natural fibers; however, steeper slopes and areas that are highly erodible may require more structured erosion control methods. No non-porous fabric will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application. 3. Erosion control measures will be installed according to manufacturer's specifications and following the California Stormwater Quality Association (CASQA) Construction Stormwater Best Management Practice Handbook guidelines. 4. Appropriate measures include, but are not limited to, the following: o Silt Fences o Straw Bale Barriers o Brush or Rock Filters o Storm Drain Inlet Protection o Temporary Sediment Traps o Temporary Sediment Basins

BMP Number	BMP Title	BMP Description
		o Erosion Control Blankets and Mats o Soil Stabilization (i.e., tackified straw with seed, jute or geotextile blankets, etc.) o Wood chips o Straw mulch 5. Where necessary to minimize soil from being tracked onto streets near work sites, stabilize construction entrances and exits. 6. All temporary construction-related erosion control methods shall be removed at the completion of the project (e.g., silt fences). 7. Oily, greasy, or sediment-laden substances or other material that originate from the project operations and may degrade the quality of surface water or adversely affect aquatic life, fish, or wildlife will not be allowed to enter, or be placed where they may later enter, any waterway. The project will not increase the turbidity of any watercourse flowing past the construction site by taking all necessary precautions to limit the increase in turbidity as follows: where natural turbidity is between 0 and 50 NTU, waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses; where natural turbidity is greater than 50 NTU, increases will not exceed 10 percent; where the receiving water body is a dry creek bed or storm drain, waters in excess of 50 NTU will not be discharged from the work area. 8. Active non-stormwater discharges of sediment, sediment-laden water, and/or construction related materials shall cease immediately. Corrective actions shall be implemented before the next rain event, but no longer than 10 business days after the potential and/or actual discharges are discovered. If more than 10 business days are required for compliance, a rationale shall be recorded. Active non-stormwater discharges and visual increases in turbidity must be immediately reported to the District's Stream Maintenance Program Implementation Project Manager. 9. Each maintenance site will be visually inspected at least once daily during extended storm events to confirm that BMPs are effective and maintained as necessary. 10. Each maintenance site will be visually inspected within two business days (48 hours) after each significant rain event to determine whether BMPs were effective and identify the need to modify or maintain existing BMPs or include additional BMPs to be protective.
GEN-21	Staging and Stockpiling of Materials	1. To protect on-site vegetation and water quality, staging areas should occur on access roads, surface streets, or other disturbed areas that are already compacted and only support ruderal vegetation. Similarly, all maintenance equipment and materials (e.g., road rock and project spoil) will be contained within the existing service roads, paved roads, or other pre-determined staging areas. 2. Building materials and other maintenance-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains. 3. Materials with decaying organic material, or other potentially odorous materials, will be handled in a manner that avoids impacting residential areas and other sensitive receptors, including not stockpiling odorous materials longer than seven (7) calendar days. 4. No runoff from the staging areas may be allowed to enter water ways, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, swale, hay wattles or bales, silt screens). 5. The discharge of decant water to water ways from any on-site temporary sediment stockpile or storage areas is prohibited.

BMP Number	BMP Title	BMP Description
		6. Wet material removed from an isolated creek reach may be pulled to the side of the channel (within the channel and below top of bank) and allowed to naturally drain prior to removal from the channel. Pulled material will be removed from the channel prior to deactivation of the site or forecast of rain. 7. During the wet season (generally October 1 through April 30), no stockpiled soils will remain exposed, unless surrounded by properly installed and maintained (i.e., per manufacturer specifications) silt fencing or other means of erosion control. During the dry season; exposed, dry stockpiles will be watered, enclosed, covered, or sprayed with non-toxic soil stabilizers (GEN-24). 8. All pipes, culverts, or similar structures stored at a site within sensitive species areas, for one or more overnight periods shall be securely capped prior to storage or inspected before the pipe is subsequently moved. If any potential special-status species are observed within a pipe, a District biologist shall be consulted on what steps should be taken to protect the species. If a District biologist is on-site, they may remove the special status species from the pipes and relocate to the nearest appropriate and unaffected habitat.
GEN-22	Sediment Transport	To prevent sediment-laden water from being released back into waterways during transport of spoils to disposal locations, truck beds will be lined with an impervious material (e.g., plastic), or the tailgate blocked with wattles, hay bales, or other appropriate filtration material. Trucks may then drain excess water by slightly tilting the loads and allowing the water to drain out through the applied filter, but only within the active project area of the creek where the sediment is being loaded into the trucks or within an identified vegetated area (swale) that is separated from the creek.
GEN-23	Stream Access	District personnel will use existing access ramps and roads to the extent feasible. If necessary to avoid large mature trees, native vegetation, or other significant habitat features, temporary access points will be constructed in a manner that minimizes impacts according to the following guidelines: 1. Temporary access points will be constructed as close to the work area as possible to minimize equipment transport 2. In considering channel access routes, slopes of greater than 20 percent will be avoided, if possible. 3. Any temporary fill used for access will be removed upon completion of the project and pre-project topography will be restored to the extent possible. 4. When temporary access is removed, disturbed areas will be revegetated or filled with compacted soil, seeded, and/or stabilized with erosion control fabric immediately after construction to prevent future erosion. 5. Personnel will use the appropriate equipment for the job that minimizes impacts and disturbance to the stream bottom. Appropriately-tired vehicles, either tracked or wheeled, will be used depending on the site and maintenance activity.
GEN-24	On-Site Hazardous Materials Management	1. An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use will be maintained by the worksite manager. 2. As appropriate, containers will be properly labeled with a “Hazardous Waste” label and hazardous waste will be properly recycled or disposed of off-site. 3. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage. 4. Quantities of toxic materials, such as equipment fuels and lubricants, will be stored with secondary containment that is capable of containing 110% of the primary container(s). Generators and other equipment with the potential to leak or spill fuels and lubricants will be stored or operated with secondary containment.

BMP Number	BMP Title	BMP Description
		5. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system. 6. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. 7. Sanitation facilities (e.g., portable toilets) will be placed outside of the creek channel and floodplain. Direct connections with soil, the storm drainage system, and surface waters will be avoided. 8. Sanitation facilities will be regularly cleaned and/or replaced, and inspected daily for leaks and spills.
GEN-25	Existing Hazardous Materials	If hazardous materials, such as oil, batteries or paint cans, are encountered at the maintenance sites, the District will carefully remove and dispose of them according to applicable regulatory requirements. District staff will wear proper protective gear and store the waste in appropriate hazardous waste containers until it can be disposed at a hazardous waste facility.
GEN-26	Spill Prevention and Response	The District will prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels, storm drains, or on the ground following these measures: 1. District field personnel will be appropriately trained in spill prevention, hazardous material control and cleanup of accidental spills. 2. Equipment and materials for cleanup of spills will be available on site and spills and leaks will be cleaned up immediately and disposed of according to applicable regulatory requirements. 3. Field personnel will ensure that hazardous materials are properly handled and natural resources are protected by all reasonable means. 4. Secondary containment will be used for all containers, equipment, and vehicles with potential to leak or spill hazardous materials. Rainwater in secondary containment that may have mixed with hazardous waste will be properly disposed of. 5. Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations). All field personnel will be advised of these locations. 6. District staff will routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained. *Spill Response Measures:* For small spills on impervious surfaces, absorbent materials will be used to remove the spill, rather than hosing it down with water. For small spills on pervious surfaces such as soil, the spill will be excavated and properly disposed rather than burying it. Absorbent materials will be collected and disposed of properly and promptly. If a hazardous materials spill occurs that cannot be contained or cleaned up with the onsite materials, the onsite District field personnel will be responsible for immediately initiating an emergency response sequence by notifying the proper authorities (i.e., District Emergency Response (ER) Team and public fire and hazmat agencies) of the release; taking appropriate defensive steps from a safe distance to secure the site to minimize damage to people, environment, and property (PEP); and deferring all other response activities to public emergency response agencies and/or the District Emergency Response (ER) Team or District ER Contractor. Depending on the nature of the release, the District ER Team's actions will include: urgent (responding within 2 hours of notification) field response site reconnaissance, emergency sequence initiation, defensive containment, release control, incident command; or priority (non 2-hour) field response site reconnaissance and clean-up operations.

BMP Number	BMP Title	BMP Description
		If a "reportable" spill of petroleum products occurs, the District's Stream Maintenance Implementation Program Manager will be notified and action taken to contact the appropriate safety and cleanup crews. A reportable spill is defined as when: ▪ a film or sheen on, or discoloration of, the water surface or adjoining bank/shoreline is observed; or ▪ a sludge or emulsion is deposited beneath the surface of the water or adjoining banks/shorelines (40 Code of Federal Regulations 110); or when ▪ another violation of water quality standards is observed. A written description of the reportable release must be submitted to the appropriate Regional Water Quality Control Board and the California Department of Toxic Substances Control (DTSC). This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. If an appreciable spill has occurred, and results determine that project activities have adversely affected surface water or groundwater quality, a detailed analysis will be performed to the specifications of DTSC to identify the likely cause of contamination. This analysis will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, the District or contractors will select and implement measures to control contamination, with a performance standard that surface and groundwater quality will be returned to baseline conditions. These measures will be subject to approval by the District, DTSC, and the Regional Water Quality Control Board.
GEN-27	Existing Hazardous Sites	Upon selection of maintenance project locations, the District will conduct a search for existing known contaminated sites, as part of its annual preparation of the Notice of Proposed Work (NPW), on the State Water Resource Control Board's GeoTracker Web site (http://www.geotracker.waterboards.ca.gov). The GeoTracker search will only be performed for the District's ground disturbing activities. For any proposed ground disturbing maintenance sites located within 1,500 feet of any "open" sites where contamination has not been remediated, the District will contact the RWQCB case manager listed in the database. The District will work with the case manager to ensure maintenance activities would not affect cleanup or monitoring activities or threaten the public or environment.
GEN-28	Fire Prevention	1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors. 2. During the high fire danger period (April 1–December 1), work crews will have appropriate fire suppression equipment available at the work site.
GEN-29	Dust Management	The District will implement the Bay Area Air Quality Management District's (BAAQMD) required Dust Control Measures (http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en). Current measures stipulated by the BAAQMD Guidelines include the following: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

BMP Number	BMP Title	BMP Description
		3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. Water used to wash the various exposed surfaces (i.e., parking areas, staging areas, soil piles, graded areas, etc.) will not be allowed to enter the water way. 5. All vehicle speeds on unpaved roads shall be limited to 15 mph. 6. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. 7. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 8. All construction equipment shall be maintained and properly tuned in accordance with manufacturer‘s specifications. All equipment shall be checked by a certified visible emissions evaluator. 9. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District‘s phone number shall also be visible to ensure compliance with applicable regulations.
GEN-30	Vehicle and Equipment Maintenance	1. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented. 2. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work. Maintenance, repairs, or other necessary actions will be taken to prevent or repair leaks, prior to use. 3. Incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) will be checked for leaking oil and fluids. Vehicles or equipment visibly leaking operational fluids will not be allowed on-site. 4. No heavy equipment will operate in a live stream. This will not apply to activities for which no other option exists, such as sediment removal which cannot be conducted from top of bank, etc. In these cases, dewatering will be conducted as necessary, following the protocols in BMPs GEN-33 or GEN-34. 5. No equipment servicing will be done in the creek channel or immediate floodplain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps and generators). 6. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location, and that can be performed without releasing any material into the floodway or water, will be conducted in the channel or floodplain. 7. If necessary, all servicing of equipment done at the job site will be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. Designated areas will not directly connect to the ground, surface water, or the storm drain system. The service area will be clearly designated with berms, sandbags, or other barriers. Secondary containment, such as a drain pan, to catch spills or leaks will be used when removing or changing fluids. Fluids will be stored in appropriate containers with covers, and properly recycled or disposed of offsite.
GEN-31	Vehicle Cleaning	1. Equipment will be cleaned of any visible sediment or vegetation clumps before transferring and using in a different watershed to avoid spreading pathogens or exotic/invasive species. 2. Vehicle and equipment washing can occur on-site only as needed to prevent the spread of sediment, pathogens or exotic/invasive species. No runoff from vehicle or equipment washing is allowed to enter water bodies, including creek channels and storm drains, without being subjected to adequate filtration (e.g., vegetated buffers, straw wattles or bales, fiber rolls, and silt screens). The discharge of decant water from

BMP Number	BMP Title	BMP Description
		any on-site wash area to water bodies or to areas outside of the active project site is prohibited. Additional vehicle/equipment washing will occur at the approved wash area in the District's corporation yard.
GEN-32	Vehicle and Equipment Fueling	1. No fueling will be done in the channel (top-of-bank to top-of-bank) or immediate floodplain unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). 2. All off-site fueling sites (i.e., on access roads above the top-of-bank) will be equipped with secondary containment and avoid a direct connection to soil, surface water, or the storm drainage system. 3. For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, will be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.

Dewatering

GEN-33	Dewatering for Non-Tidal Sites	When a work area includes a flowing stream (e.g., sediment removal, bank stabilization, instream complexity or concrete work), the entire streamflow will be diverted around the work area by construction of a temporary dam and/or bypass. Where appropriate, stream flow diversions will occur via gravity driven systems. A. Planning to avoid and minimize impacts to water quality and aquatic wildlife: 1. For construction and monitoring of a stream flow bypass, the *Sediment Removal and Bank Stabilization Projects* checklist will be completed. 2. Recommendations by a qualified Fisheries Biologist to protect native fisheries and aquatic vertebrates will be incorporated into the bypass design. The recommendations may include but are not limited to: a. Screening the stream flow diversion source or pump to prevent entrainment of native fish or amphibian species. The screening dimensions will be appropriate to the species present. b. Relocation of native aquatic vertebrates. This will include the methods to be used to capture and hold and move the aquatic vertebrates and a description of where the aquatic vertebrates will be relocated. 3. Depending on the channel configurations, sediment removal activities may occur where the flows are not bypassed around the work site as long as a berm is left between the work area and stream flows to

BMP Number	BMP Title	BMP Description
		minimize water quality impacts during excavation activities. The berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel. B. Construction: 1. The construction of facilities will be based on the water bypass plan. 2. Coffer dams will be installed both upstream and downstream of the work area to minimize impacts or the distance necessary to accomplish effective passive systems. 3. In streams where water may enter the construction site from downstream (reverse flow) additional coffer dams (downstream) may be necessary. When multiple coffer dams are constructed, the upstream dam will be constructed first. 4. Instream cofferdams will only be built from materials such as sandbags, earth fill, clean gravel, or rubber bladders which will cause little or no siltation or turbidity. 5. Plastic sheeting will be placed over k-rails, timbers, and earth fill to minimize water seepage into and out of the maintenance areas. The plastic sheets will be firmly anchored, using sandbags, to the streambed to minimize water seepage. 6. When pumping is necessary to dewater a work site, a temporary siltation basin and/or use of silt bags may be required to prevent sediment from re-entering the wetted channel. Pump intakes will be screened to prevent harm to aquatic wildlife. 7. If necessary to prevent erosion, an energy dissipater will be constructed at the discharge point. 8. Timing of flow diversions will be coordinated with the completion of the dam structure to facilitate not drying up the downstream creek area and to minimize dry back conditions.

BMP Number	BMP Title	BMP Description
GEN-33	Dewatering for Non-Tidal Sites	C. Implementation: 1. Water flows downstream of the project site will be maintained to prevent stranding aquatic vertebrates. 2. Water diverted around work sites and water detained by coffer dams will be protected from maintenance activity-related pollutants, such as soils, equipment lubricants or fuels. 3. The Fish Relocation Guidelines (Attachment B) will be implemented to ensure that fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering. a. Native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual work sites when site conditions preclude reasonably effective operation of capture gear and equipment. b. Aquatic invertebrates will not be transferred (other than incidental catches) because of their anticipated abundance and colonization after completion of the repair work. 4. Filtration devices (silt bags attached to the end of discharge hoses and pipes to remove sediment from discharged water) or settling basins will be provided as necessary at discharge sites to ensure that the turbidity of discharged water is not visibly more turbid than the water in the channel upstream of the maintenance site. If increases in turbidity are observed, additional measures will be implemented such as a larger settling basin or additional filtration. If increases in turbidity persist, the District's Stream Maintenance Program Implementation Project Manager will be alerted since turbidity measurements may be required. 5. Water remaining in the work area will be removed by evaporation, seepage, or pumping. When pumping is required to dewater a site, the decanted water will be discharged with water bypassed around the site or in a separate erosion control – energy dissipation area/vegetated swale. The turbidity of discharged water will not be visibly more turbid than the receiving water. D. Deconstruction: 1. When maintenance is completed, the flow diversion structure will be removed as soon as possible. Impounded water will be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. 2. Removal will normally proceed from downstream in an upstream direction. 3. When diversion structures are removed, the ponded water will be directed back into the low-flow channel in a phased manner to minimize erosion and downstream water quality impacts. Normal flows will be restored. 4. The area disturbed by flow bypass mechanisms will be restored to the pre-project condition at the completion of the project (to the extent practical). This may include, but is not limited to, recontouring the area and planting of riparian vegetation.

BMP Number	BMP Title	BMP Description
GEN-34	Dewatering in Tidal Work Areas	For tidal areas, a downstream cofferdam will be constructed to prevent the work area from being inundated by tidal flows: 1. Installation of cofferdams and fish exclusion measures will be installed at low tide when the channel and project site are at their driest. 2. It is preferable to not use any bypass pipes when work is being conducted on one side of the channel, if isolated by the cofferdam, and flows can continue on the other side of the creek channel without entering the project area. 3. If downstream flows cannot be diverted around the project site, the creek waters will be transmitted around the site through cofferdam bypass pipes. Waters discharged through tidal cofferdam bypass pipes will not exceed 50 NTUs over the background levels of the tidal waters into which they are discharged. If necessary to prevent erosion, an energy dissipater will be constructed at the discharge point. 4. Water diverted around work sites and water detained by coffer dams will be protected from maintenance activity-related pollutants, such as soils, equipment lubricants or fuels. 5. If upstream flows are present, the entire streamflow will be diverted around the work area. This may occur in work areas straddling non-tidal and tidal reaches. In muted tidal reaches (e.g., systems with a downstream tide gate), timing of flow diversions will be coordinated with the completion of the dam structure to facilitate not drying up the downstream creek area and to minimize dry back conditions during low tide. 6. Cofferdams in tidal areas may be made from earthen or gravel material. If earth is used, the downstream and upstream faces will be covered by a protected covering (e.g., plastic or fabric) if needed to minimize erosion. A protected covering or sheeting will be placed on the water side of an earthen coffer dam to protect water quality. 7. When maintenance is completed, the cofferdams and bypass pipes will be removed as soon as possible but no more than 72 hours after work is completed. Flows will be restored at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat.
GEN-35	Pump/Generator Operations and Maintenance	When needed to assist in channel dewatering, pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species: 1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dryback or washout conditions. 2. Generators will be stored or operated with secondary containment. 3. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. 4. All pump intakes will be screened. Pumps in steelhead creeks will be screened according to NMFS criteria (http://www.swr.noaa.gov/sr/fishscrn.pdf) to prevent entrainment of steelhead.

Public Safety

GEN-36	Public Outreach	The public will be informed of stream maintenance work prior to the start of work as part of the preparation of the NPW for all projects in the NPW: 1. Each spring, a newspaper notice will be published with information on the NPW work sites, approximate work dates, and contact information. 2. Neighborhood Work Notices will be distributed as part of the NPW preparation prior to the start of work. 3. Local governments (cities and County) will be notified of scheduled maintenance work. The NPW will be submitted to the public works departments, local fire districts, and the District's Flood Protection and Watershed Advisory Committees.

BMP Number	BMP Title	BMP Description
		4. The District will post specific information on individual maintenance projects on the Stream Maintenance Web site: (http://valleywater.org/EkContent.aspx?id=379&terms=stream+maintenance) 5. For high profile projects, at the District's discretion, signs will be posted in the neighborhood to notify the public at least one week in advance of maintenance schedules, trail closures, and road/lane closures as necessary and as possible. Signage used at work sites will include contact information for lodging comments and/or complaints regarding the maintenance activities.
GEN-37	Implement Public Safety Measures	The District will implement public safety measures during maintenance as follows: 1. Construction signs will be posted at job sites warning the public of construction work and to exercise caution, as appropriate to public accessed areas. 2. Where work is proposed adjacent to a recreational trail, warning signs will be posted several feet beyond the limits of work. Signs will also be posted if trails will be temporarily closed. 3. If needed, a lane will be temporarily closed to allow for trucks to pull into and out of access points to the work site. 4. Temporary fencing, either the orange safety type or chain link, will be installed above repair sites on bank stabilization projects. 5. When necessary, District or contracted staff will provide traffic control and site security.
GEN-38	Minimize Noise Disturbances to Residential Areas	The District will implement maintenance practices that minimize disturbances to residential areas surrounding work sites: 1. With the exception of emergencies, work will be conducted during normal working hours. Maintenance activities in residential areas will not occur on Saturdays, Sundays, or District observed holidays except during emergencies, or with approval by the local jurisdiction and advance notification of surrounding residents. 2. Vehicles, generators and heavy equipment will be equipped with adequate mufflers. 3. Idling of vehicles will be prohibited beyond 5 minutes unless operation of the engine is required to operate a necessary system such as a power take-off (PTO).
GEN-39	Planning for Pedestrians, Traffic Flow, and Safety Measures	1. Work will be staged and conducted in a manner that maintains two-way traffic flow on public roadways in the vicinity of the work site. If temporary lane closures are necessary, they will be coordinated with the appropriate jurisdictional agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any lane closures will include advance warning signage, a detour route and flaggers in both directions. When work is conducted on public roads and may have the potential to affect traffic flow, work will be coordinated with local emergency service providers as necessary to ensure that emergency vehicle access and response is not impeded. 2. Bicycle and pedestrian facility closures will be scheduled outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. 3. Public transit access and routes will be maintained in the vicinity of the work site. If public transit will be affected by temporary road closures and require detours, affected transit authorities will be consulted and kept informed of project activities. 4. Adequate parking will be provided or designated public parking areas will be used for maintenance-related vehicles not in use through the maintenance period. 5. Access to driveways and private roads will be maintained. If brief periods of maintenance would temporarily block access, property owners will be notified prior to maintenance activities.

BMP Number	BMP Title	BMP Description
Cultural Resources		
GEN-40	Discovery of Cultural Remains or Historic or Paleontological Artifacts	Work in areas where remains or artifacts are found will be restricted or stopped until proper protocols are met. 1. Work at the location of the find will halt immediately within 100 feet of the find. A "no work" zone shall be established utilizing appropriate flagging to delineate the boundary of this zone, which shall measure at least 100 feet in all directions from the find. 2. The District shall retain the services of a Consulting Archaeologist or Paleontologist, who shall visit the discovery site as soon as practicable, and perform minor hand-excavation to describe the archaeological or paleontological resources present and assess the amount of disturbance. 3. The Consulting Archaeologist shall provide to the District and the Corps, at a minimum, written and digital-photographic documentation of all observed materials, utilizing the guidelines for evaluating archaeological resources for the California Register of Historic Places (CRHP) and National Register of Historic Places (NRHP). Based on the assessment, the District and Corps shall identify the CEQA and Section 106 cultural-resources compliance procedure to be implemented. 4. If the find appears to not meet the CRHP or NRHP criteria of significance, and the Corps archaeologist concurs with the Consulting Archaeologist's conclusions, construction shall continue while monitored by the Consulting Archaeologist. The authorized maintenance work shall resume at the discovery site only after the District has retained a Consulting Archaeologist to monitor and the Watershed Manager has received notification from the Corps to continue work. 5. If the find appears significant, avoidance of additional impacts is the preferred alternative. The Consulting Archaeologist shall determine if adverse impacts to the resources can be avoided. 6. When avoidance is not practical (e.g., maintenance activities cannot be deferred or they must be completed to satisfy the SMP objective), the District shall develop an Action Plan and submit it to the Corps within 48 hours of Consulting Archaeologist's evaluation of the discovery. The action Plan may be submitted via e-mail to (rstradford@spd.usace.army.mil). The Action Plan is synonymous with a data-recovery plan. It shall be prepared in accordance with the current professional standards and State guidelines for reporting the results of the work, and shall describe the services of a Native American Consultant and a proposal for curation of cultural materials recovered from a non-grave context. 7. The recovery effort will be detailed in a report prepared by the archaeologist in accordance with current archaeological standards. Any non-grave artifacts will be placed with an appropriate repository. 8. The Consulting Paleontologist will meet the Society for Vertebrate Paleontology's criteria for a "qualified professional paleontologist" (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995).

BMP Number	BMP Title	BMP Description
		9. The paleontologist will follow the Society for Vertebrate Paleontology's guidelines for treatment of the artifact. Treatment may include preparation and recovery of fossil materials for an appropriate museum or university collection, and may include preparation of a report describing the finds. The District will be responsible for ensuring that paleontologist's recommendations are implemented. 10. In the event of discovery of human remains (or the find consists of bones suspected to be human), the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent.) 11. Immediately notify the Santa Clara County Coroner and provide any information that identify the remains as Native American. If the remains are determined to be from a prehistoric Native American, or determined to be a Native American from the ethnographic period, the Coroner shall contact the Native American Heritage Commission (NAHC) within 24 hours of being notified of the remains. The NAHC then designates and notifies within 24 hours a Most Likely Descendant (MLD). The MLD has 24 hours to consult and provide recommendations for the treatment or disposition, with proper dignity, of the human remains and grave goods. 12. Preservation in situ is the preferred option. Human remains shall be preserved in situ if continuation of the maintenance work, as determined by the Consulting Archaeologist and MLD, will not cause further damage to the remains. The remains and artifacts shall be documented and the find location carefully backfilled (with protective geo-fabric if desirable) and recorded in District project files. 13. Human remains or cultural items exposed during maintenance that cannot be protected from further damage shall be exhumed by the Consulting Archaeologist at the discretion of the MLD and reburied with the concurrence of the MLD in a place mutually agreed upon by all parties.
GEN-41	Review of Projects with Native Soil	A cultural resources specialist will conduct a review and evaluation of those sites that would involve disturbance / excavation of native soil previously undisturbed by contemporary human activities to determine their potential for affecting significant cultural resources. The evaluation of the potential to disturb cultural resources will be based on an initial review of archival information provided by the California Historical Resources System/Northwest Information Center (CHRIS/NWIC) in regard to the project area based on a 0.25 mile search radius. It is recommended that this initial archival review be completed by a professional archaeologist who will be able to view confidential site location data and literature to arrive at a preliminary sensitivity determination. If necessary, a further archival record search and literature review (including a review of the Sacred Lands Inventory of the Native American Heritage Commission); and a field inventory of the project area will be conducted to determine the presence/absence of surface cultural materials associated with either prehistoric or historic occupation. The results along with any mitigation and/or management recommendations would be presented in an appropriate report format and include any necessary maps, figures, and correspondence with interested parties. A summary table indicating appropriate management actions (e.g., monitoring during construction, presence/absence testing for subsurface resources; data recovery, etc.) will be developed for each project site reviewed. The management actions will be implemented on site to avoid significant effects to cultural resources.

BMP Number	BMP Title	BMP Description
Utilities		
GEN-42	Investigation of Utility Line Locations	An evaluation of the locations of utility lines that could be affected by maintenance activities will be conducted annually as part of the preparation of the Notice of Proposed Work (NPW). Utilities will be avoided as much as possible. For maintenance areas with the potential for adverse effects on utility services, the following measures shall be implemented: 1. Utility excavation or encroachment permits shall be required from the appropriate agencies. These permits include measures to minimize utility disruption. The District and its contractors shall comply with permit conditions. Such conditions shall be included in construction contract specifications. 2. Utility locations shall be verified through a field survey (potholing) and use of the Underground Service Alert services. 3. Detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and/or fill of areas around utility cables and pipelines. All affected utility services shall be notified of the District's maintenance plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services. 4. Residents and businesses in the project area shall be notified of planned utility service disruption 2 to 4 days in advance, in conformance with state standards. 5. Disconnected cables and lines shall be reconnected promptly.

B. SECTION B—SEDIMENT REMOVAL BMPS

This group of BMPs is intended to be implemented specifically during sediment removal activities to avoid potential impacts on biological resources.

BMP Number	BMP Title	BMP Description
SED-1	Groundwater Management	If high levels of groundwater (i.e., visible water) are encountered during excavations in a work area, the water will be pumped out of the work site or left within the work area if the work activity is not causing water quality degradation in a live stream. Water Quality monitoring would need to occur. If necessary to protect water quality, the extracted water will be discharged into specifically constructed infiltration basins, holding ponds, or areas with vegetation to remove sediment prior to the water re-entering a creek. Water discharged into vegetated areas or swales will be pumped in a manner that will not create erosion around vegetation.
SED-2	Prevent Scour Downstream of Sediment Removal	Sediment removal sites in the transport zone on alluvial fans may cause increased scour downstream if they experience scouring flows or rapid sediment accumulation after maintenance. After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the maintenance area is smooth and continuous between the maintained and non-maintained areas and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.
SED-3	Restore Channel Features	Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the pre-construction conditions as closely as possible, within the finished channel topography.

BMP Number	BMP Title	BMP Description
SED-4	Berm Bypass	Where sediment removal is accomplished without a bypass by removing alternating cells, the berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel.
SED-5	Sediment Characterization	Projects involving sediment removal at stream gauges, outfalls, culverts, flap gates, tide gates, grade control structures, bridges, fish ladders, and fish screens in excess of 25 cubic yards shall be characterized in accordance with the SCVWD's Sediment Characterization Plans for SMP-2. These projects shall be reported in the annual summary report. Sediment removed will not be reused without pre-approval from appropriate regulatory agencies. See section 5.4 for information on the waiver process.

C. SECTION C—VEGETATION MANAGEMENT BMPS

These BMPs provide specific and detailed guidance on the variety of vegetation management procedures implemented by the District. BMPs for the following maintenance techniques are included: tree pruning, tree removal, plant removal, woody debris management, herbicide application, mowing, discing, flaming, and grazing. Practices will be implemented by fully trained and qualified field crews.

BMP Number	BMP Title	BMP Description
VEG-1	Minimize Local Erosion Increase from In-channel Vegetation Removal	To minimize the potential effect of localized erosion, the toe of the bank will be protected by leaving vegetation to the maximum extent possible and consistent with the maintenance guidelines or original design requirements.
VEG-2	Non-native Invasive Plant Removal	Invasive species (e.g., cape ivy [*Delairea odorata/Senecio mikanoides]*, arundo [*Arundo donax*]) will be disposed of in a manner that will not contribute to the further spread of the species. Cape ivy removed during a project shall be bagged and disposed of in a landfill. Arundo canes will be prevented from floating downstream or otherwise entering the creek or waterway.
VEG-3	Use Appropriate Equipment for Instream Removal	When using heavy equipment to cut or remove instream vegetation, low ground pressure equipment, such as tracked wheels will be utilized to reduce impacts to the streambed.
VEG-4	Standard Grazing Procedures	1. Vegetation and areas to be preserved will be fenced off to exclude grazing animals. 2. Grazing animals will be excluded from stream channels, using fencing or other barriers.

D. SECTION D—BANK STABILIZATION BMPS

These BMPs provide additional guidance during implementation of bank stabilization projects to avoid impacts on biological and cultural resources. Review of the Post-Project Restoration BMPs in Section E is recommended because those measures will be implemented after bank stabilization projects are complete. The BMPs included in this section are implemented by the field crew and site manager.

BMP Number	BMP Title	BMP Description
BANK-1	Bank Stabilization Design to Prevent Erosion Downstream	To further prevent potential downstream erosion impacts due to bank stabilization, the site design will be adjusted to provide proactive protection of vulnerable areas within the reach of the worksite. Such measures include, but are not limited to, appropriately keyed-in coir logs, riparian planting, strategic placement of rock, and flow deflectors. Bank stabilization will include appropriate transition designs upstream and downstream of the work site to prevent potential erosion impacts.
BANK-2	Concrete Use Near Waterways	Concrete that has not been cured is alkaline and can increase the pH of the water. Fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of 30 days after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet sacked concrete will not be allowed to enter a live stream. 2. Poured concrete will be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles. 5. Temporary concrete washout facilities shall be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations. Concrete wasted shall be removed and disposed of appropriately. 6. Where slurries containing portland cement concrete or asphalt concrete are generated (such as from saw cutting, coring, grinding, etc.), slurry wastes shall not be allowed to enter storm drains or watercourses, and shall be removed and disposed of appropriately.
BANK-3	Bank Stabilization Post-Construction Maintenance	The District may maintain or repair bank stabilization projects that are less than 2 years old that are damaged by winter flows. The District will notify the regulatory agencies 24 hours prior to beginning the work and the work will be reported as part of the Post-Construction Report submitted by January 15 of each year or if necessary, the subsequent year. Appropriate BMPs will be applied during maintenance repairs.

E. SECTION E—POST-PROJECT RESTORATION BMPS

These BMPs will be implemented, as appropriate, on all sites that involve ground disturbance.

BMP Number	BMP Title	BMP Description
REVEG-1	Seeding	Sites where maintenance activities result in exposed soil will be stabilized to prevent erosion. Disturbed areas shall be seeded with native seed as soon as is appropriate after maintenance activities are complete. An erosion control seed mix may be applied to exposed soils, and down to the ordinary high water mark (OHWM). 1. The seed mix should consist of California native grasses (e.g., *Hordeum brachyantherum*, *Elymus glaucus*, and *Vulpia microstachyes*) or annual, sterile seed mix. 2. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable, or have other appropriate erosion control measures in place (GEN-20).
REVEG-2	Planting Material	Revegetation and replacement plantings will consist of locally collected native species. Species selection will be based on surveys of natural areas on the same creek that have a similar ecological setting and/or as appropriate for the site location.

F. SECTION F—MANAGEMENT OF ANIMAL CONFLICT BMPS

Methods of animal management included in the SMP are avoidance, biological controls, physical alterations, habitat alterations, and lethal controls. Of all these methods, implementation of lethal controls has the highest potential for environmental and biological impacts. Therefore, the animal management BMPs provided in this section focus on lethal controls. The application area for lethal controls will be identified during the annual planning process (see the Biological Resource Planning BMPs) and guided as directed by wildlife biologists. Species habitat areas are defined by the District's GIS species mapping, updated CNDDB and known local biological information and are included in the SMP Update Subsequent EIR.

BMP Number	BMP Title	BMP Description
ANI-1	Surface Barrier Applications to prevent burrowing	Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed no longer than 300 feet and only above OHW. This area may include both inboard and outboard side of levee for 300 feet with at least an equal amount of open area prior to another linear installation; and only on one side of levee slopes. Inboard and outboard areas will only have installations set in an alternating pattern, such that no inboard and outboard levee faces would have erosion control blankets along the same levee stationing.
ANI-2	Prevent Harm to the Salt Marsh Harvest Mouse and California Clapper Rail	1. No rodenticides or fumigants will be used within the range of the SMHM or CCR as identified on District range maps. 2. Methods of rodent control within SMHM or CCR habitat will be limited to live trapping. All live traps shall have openings measuring no smaller than 2 inches by 1 inch to allow any SMHM that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line.
ANI-3	Burrowing Owl, Bald Eagle and Golden Eagle Buffer Zone	Per the California Department of Fish and Wildlife's 2008 *Guidance for Burrowing Owl Conservation*, a 656-yard buffer will be established around known burrowing owl locations where no rodenticides or fumigants (including smoke bombs) will be used. A 0.5-mile buffer will be established around known bald eagle and golden eagle nesting locations where no rodenticides will be used.

BMP Number	BMP Title	BMP Description
ANI-4	Animal Control in Sensitive Amphibian Habitat	1. Fumigants will not be used within the habitat areas of special status amphibians. 2. The use of bait stations within the potential habitat areas of California red-legged frog, California tiger salamander, or foothill yellow-legged frog will be limited to bait stations specifically designed to prevent entry by these species. 3. Any live traps will allow California red-legged frogs, California tiger salamanders, or foothill yellow-legged frogs to safely exit (e.g., by having openings measuring no smaller than 2 inches by 1 inch).
ANI-5	Slurry Mixture near Waterways	All slurry type mixes used to fill rodent burrows will be prevented from entering any waterway by using appropriate erosion control methods and according to the manufacturer's specifications. If the creek bed is dry or has been dewatered, any material that has entered the channel will be removed. Staff will monitor the work activity.
ANI-6	Species requiring depredation permit	Animal Conflict Management will not include lethal control of species listed in California F&G Code Section 4181 including beaver and gray squirrel without first obtaining a depredation permit.

G. SECTION G—USE OF PESTICIDES

Pesticides may be used for vegetation management or control of animal damage.

BMP Number	BMP Title	BMP Description
HM-4	Posting and Notification for Pesticide Use	Posting of areas where pesticides are used will be performed in compliance with District Policy Ad-8.2 Pesticide Use as follows: 1. Posting will be performed in compliance with the label requirements of the product being applied. 2. In addition, posting will be provided for any products applied in areas used by the public for recreational purposes, or those areas readily accessible to the public, regardless of whether the label requires such notification. In doing this, the District ensures that exposure risk is minimized further by adopting practices that go beyond the product label requirements. (The posting method may be modified to avoid destruction of bait stations or scattering of rodenticide.) 3. These postings will notify staff and the general public of the date and time of application, the product's active ingredients, and common name, and the time of allowable re-entry into the treated area. 4. Signs will not be removed until after the end of the specified re-entry interval. 5. Right-to-know literature on the product will be made available to anyone in the area during the re-entry period. 6. A District staff contact phone number will be posted on the sign, including a cellular phone number. 7. Notification of pesticide activities will be made as required by law. Also, the District will maintain records of neighbors with specific needs relative to notification before treatment of an adjacent area so that such needs are met.

Source: Data compiled by Horizon Water and Environment in 2011

ATTACHMENT B

Previously Mitigated Areas:
Mitigation Provided Under SMP-1 and SMP-2

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Mitigation Provided Under SMP-1 Tables

During SMP-1, Valley Water provided mitigation in the form of land acquisition, habitat protection and enhancement, and wetland restoration/creation. The Mitigation Program for SMP-1 is summarized below in Table 1. More specifically, mitigation credit for SMP-1 freshwater wetland mitigation, stream and watershed protection and red-legged frog is further outlined in Table 2. The mitigation credit that was created in SMP-1, termed Previously Mitigated Areas (PMAs), is reported in Tables 3a and 3b and is listed by facility and stationing. PMAs may only be applied to the same work activity, on the same creek, in the same lateral location. Most PMAs occur in-channel, below OHW. The activity of Overhanging Growth (OHG) referred to the routine pruning of vegetation along upper maintenance roads and fence lines. Table 4 lists mitigation projects for bank stabilization and LWD impacts which were completed under SMP-1 (not resulting in PMAs) and are included for informational purposes. Table 5 lists the Five-Year Mitigation Areas (FMAs) further described in Chapter 10. Lastly, Table 6 provides a list of mowing locations.

TABLE 1
SMP-1 Mitigation Program Status

Project		Mitigation Purpose	Mitigation Requirement	Mitigation Completed	Percent of Requirement Completed
1	Tidal Wetland Restoration (Island Ponds)	Restore salt ponds to tidal marsh conditions. Provides mitigation for tidal wetland/species impacts.	30 acres	30 acres	100%
2	Freshwater Wetland Creation/Restoration	Convert or restore areas to seasonal or perennial wetlands. Provides mitigation for non-tidal wetland impacts.	10 ac Santa Clara Basin[1] 4 ac Pajaro Basin	7.5 ac + 2.5 ac additional from S&WP = 10 ac for Santa Clara Basin[1] 4.7 ac Pajaro Basin[2]	100% Santa Clara Basin[1] 100% Pajaro Basin

Project		Mitigation Purpose	Mitigation Requirement	Mitigation Completed	Percent of Requirement Completed
3	Stream and Watershed Protection	Preserve, protect, and improve streams and associated watersheds. Provides mitigation for non-tidal wetland and CRLF impacts	Freshwater wetland habitat: 81 credits for Santa Clara Basin 11 credits for Pajaro Basin CRLF Habitat – 108 ac plus 20 ac penalty +128 ac credit Districtwide	Freshwater wetland habitat: 86.6 credit for Santa Clara Basin 10.3 credits + 0.7 remaining from Pajaro Wetland + 11 credits for Pajaro Basin[2] CRLF Habitat – 128 ac credit[3]	100%+ Santa Clara Basin 100% Pajaro Basin[2] 100% CRLF Habitat
4	Giant reed (*Arundo donax*) Control	Control giant reed outbreaks; map, revegetate, educate, and coordinate reed control efforts in County. Provides mitigation for riparian impacts.	125 ac Districtwide	126 ac Districtwide	100%

Project		Mitigation Purpose	Mitigation Requirement	Mitigation Completed	Percent of Requirement Completed
5	Invasive smooth cordgrass (*Spartina alterniflora*) Control	Control invasive cordgrass along tidal shorelines. Provides mitigation for time lag until tidal wetland mitigation is established.	Up to 10 acres in tidal areas	10 acres	100%

[1] 2.5 acres of mitigation requirement rolled into stream and watershed protection requirements. 7.5 acres of constructed wetlands in Santa Clara Basin completes the remaining mitigation requirement.

[2] 0.7 acres of additional wetland created in Pajaro Basin to fulfill the 11-acre Pajaro Basin SWPP requirement

[3] This includes the required 108 acres plus a 20-acre penalty.

TABLE 2
Summary of SMP-1 Freshwater Wetland Mitigation,
Stream and Watershed Protection and Red-Legged Frog Credit

Basin	Property	Total Credit Area Acreage	Acreage of SMP-1 Wetlands/SWPP Credits Acquired	Acreage of SMP-1 Red-Legged Frog Credits Acquired
Pajaro	Pajaro Freshwater Wetland	4.7	4.7	
	Carnadero Preserve	133.5	10.3	
	PAJARO TOTAL	**138.2**	**15**	
Santa Clara	Island Ponds			
	Coyote Parkway Freshwater Wetland	7.5	7.5	
	Stevens Canyon Ranch	69	5.4	
	Moore Property	56	4.5	56
	Coyote Ridge[1]	431.2	34.7	72
	Hendrys Creek	99	8.3	
	Upper Penitencia Creek (Kammerer)	188.3	15.4	
	Rancho Canada de Pala Preserve	219.9	18.3	
	SANTA CLARA TOTAL	**1070.9**	**94.1**	**128**

[1] Coyote Ridge California red-legged frog credit consists of 52 acres of SMP-1 credit + 20-acre additional timelag penalty from USFWS.

TABLE 3
Previously Mitigated Areas

Table 3a. Overhanging Growth PMA

Watershed Name	GIS ID	Facility Name	From Station	To Station	Length (feet)
Lower Peninsula	10100	ADOBE CREEK	12917	24690	11773
Lower Peninsula	10120	BARRON CREEK	0	10401	10401
Lower Peninsula	10210	MATADERO CREEK	9602	10916	1314
Lower Peninsula	10210	MATADERO CREEK	10916	19908	8992
Lower Peninsula	10230	PERMANENTE DIVERSION CHANNEL	0	7100	7100
Lower Peninsula	10240	PERMANENTE CREEK	11484	12948	1464
Lower Peninsula	10240	PERMANENTE CREEK	13144	26026	12882
Lower Peninsula	10240	PERMANENTE CREEK	26026	34304	8278
Lower Peninsula	10280	SAN FRANCISQUITO CREEK	6164	7705	1541
West Valley	20100	CALABAZAS CREEK	10542	36605	26063
West Valley	20100	CALABAZAS CREEK	36906	37735	829
West Valley	20100	CALABAZAS CREEK	38771	52487	13716
West Valley	20130	JUNIPERO SERRA CHANNEL	0	13425	13425
West Valley	20170	REGNART CREEK	0	6082	6082
West Valley	20170	REGNART CREEK	7086	8591	1505
West Valley	20180	RODEO CREEK	0	5014	5014
West Valley	20180	RODEO CREEK	6393	9940	3547
West Valley	20190	SAN TOMAS AQUINO CREEK	15896	23000	7104
West Valley	20190	SAN TOMAS AQUINO CREEK	43476	67413	23937
West Valley	20210	SARATOGA CREEK	0	28306	28306
West Valley	20210	SARATOGA CREEK	37113	41768	4655
West Valley	20230	SMITH CREEK	0	6328	6328
West Valley	20260	SUNNYVALE EAST CHANNEL	6444	31301	24857
West Valley	20300	WILDCAT CREEK	1912	7716	5804
West Valley	20370	EL CAMINO STORM DRAIN	3356	9547	6191
Guadalupe	30110	CANOAS CREEK	0	39032	39032
Guadalupe	30130	GOLF CREEK	1498	6929	5431
Guadalupe	30140	GREYSTONE CREEK	530	2122	1592
Guadalupe	30140	GREYSTONE CREEK	2228	5626	3398
Guadalupe	30150	GUADALUPE RIVER	54034	60339	6305
Guadalupe	30190	LONE HILL CREEK	0	1787	1787
Guadalupe	30230	ROSS CREEK	0	23355	23355
Guadalupe	30230	ROSS CREEK	27284	27601	317
Guadalupe	30230	ROSS CREEK	29329	30049	720
Guadalupe	30290	RANDOL CREEK	0	4565	4565
Coyote	40120	NORTH BABB CREEK	0	1410	1410
Coyote	40120	NORTH BABB CREEK	4105	5402	1297
Coyote	40130	SOUTH BABB CREEK	0	4498	4498
Coyote	40180	CALERA CREEK	4141	6302	2161
Coyote	40250	LOS COCHES CREEK	1893	5249	3356
Coyote	40260	LOWER SILVER CREEK	0	24617	24617

Table 3a. Overhanging Growth PMA

Watershed Name	GIS ID	Facility Name	From Station	To Station	Length (feet)
Coyote	40260	LOWER SILVER CREEK	36827	38068	1241
Coyote	40290	MIGUELITA CREEK	1126	2345	1219
Coyote	40290	MIGUELITA CREEK	3677	4297	620
Coyote	40310	PIEDMONT CREEK	0	1786	1786
Coyote	40310	PIEDMONT CREEK	1886	2580	694
Coyote	40330	LOWER PENITENCIA CREEK	6892	10423	3531
Coyote	40370	SIERRA CREEK	0	7290	7290
Coyote	40380	UPPER SILVER CREEK	0	3649	3649
Coyote	40420	NORWOOD CREEK	0	3057	3057
Coyote	40430	QUIMBY CREEK	0	3780	3780
Coyote	40470	THOMPSON CREEK	6375	9416	3041
Coyote	40490	PENITENCIA EAST CHANNEL	0	3654	3654
Uvas/Llagas & Pajaro	50170	PRINCEVALLE DRAIN	6825	9535	2710
Uvas/Llagas & Pajaro	50310	WEST BRANCH LLAGAS CREEK	6328	16509	10181

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Lower Peninsula	ADOBE CREEK	Channel Sediment Removal	12600	18500	5900	Modified
Lower Peninsula	ADOBE CREEK	Herbicide only	12917	24690	11773	Modified
Lower Peninsula	ADOBE CREEK	Vegetation Removal Only	24690	55960	31270	Unmodified, Modified
Lower Peninsula	ADOBE CREEK	Channel Sediment Removal	52940	53150	210	Modified
Lower Peninsula	BARRON CREEK	Herbicide Only	0	10250	10250	Modified
Lower Peninsula	BARRON CREEK	Channel Sediment Removal	50	1988	1938	Modified
Lower Peninsula	BARRON CREEK	Herbicide Only	15790	17054	1264	Unmodified, Modified
Lower Peninsula	BARRON CREEK	Channel Sediment Removal	16044	16779	735	Modified
Lower Peninsula	HALE CREEK	Herbicide Only	0	6174	6174	Unmodified, Modified
Lower Peninsula	HENEY CREEK	Herbicide Only	4875	5325	450	Modified
Lower Peninsula	MATADERO CREEK	Vegetation Removal Only	7980	9245	1265	Unmodified
Lower Peninsula	MATADERO CREEK	Channel Sediment Removal	9198	12231	3033	Unmodified, Modified
Lower Peninsula	MATADERO CREEK	Herbicide Only	9602	19908	10306	Modified
Lower Peninsula	MATADERO CREEK	Channel Sediment Removal	40000	40100	100	Modified
Lower Peninsula	PERMANENTE DIVERSION CHANNEL	Herbicide Only	0	7239	7239	Modified
Lower Peninsula	PERMANENTE DIVERSION CHANNEL	Channel Sediment Removal	2600	2735	135	Modified
Lower Peninsula	PERMANENTE DIVERSION CHANNEL	Channel Sediment Removal	3500	7150	3650	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Lower Peninsula	PERMANENTE CREEK	Herbicide Only	10665	35641	24976	Unmodified, Modified
Lower Peninsula	PERMANENTE CREEK	Vegetation Removal Only	26026	33000	6974	Unmodified, Modified
Lower Peninsula	PERMANENTE CREEK	Channel Sediment Removal	34508	35641	1133	Modified
Lower Peninsula	PERMANENTE CREEK	Vegetation Removal Only	34611	42945	8334	Modified
Lower Peninsula	SAN FRANCISQUITO CREEK	Channel Sediment Removal	7300	8100	800	Modified
Lower Peninsula	STEVENS CREEK	Herbicide Only	8846	41643	32797	Unmodified, Modified
Lower Peninsula	STEVENS CREEK	Vegetation Removal Only	8899	51770	42871	Unmodified, Modified
Lower Peninsula	STEVENS CREEK	Channel Sediment Removal	8900	13648	4748	Modified
Lower Peninsula	SUMMERHILL CREEK	Herbicide Only	0	664	664	Modified
Lower Peninsula	DEER CREEK	Herbicide Only	7400	9100	1700	Unmodified
Lower Peninsula	STANFORD CHANNEL	Herbicide Only	2330	3560	1230	Modified
West Valley	CALABAZAS CREEK	Herbicide Only	2000	52600	50600	Modified
West Valley	CALABAZAS CREEK	Channel Sediment Removal	4900	10400	5500	Modified
West Valley	CALABAZAS CREEK	Vegetation Removal Only	29000	37735	8735	Modified
West Valley	CALABAZAS CREEK	Vegetation Removal Only	44730	50787	6057	Modified
West Valley	CALABAZAS CREEK	Vegetation Removal Only	51289	52600	1311	Modified
West Valley	CALABAZAS CREEK	Channel Sediment Removal	59235	59702	467	Unmodified, Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
West Valley	JUNIPERO SERRA CHANNEL	Herbicide Only	0	13425	13425	Modified
West Valley	JUNIPERO SERRA CHANNEL	Channel Sediment Removal	0	1997	1997	Modified
West Valley	JUNIPERO SERRA CHANNEL	Vegetation Removal Only	0	2097	2097	Modified
West Valley	MISTLETOE CREEK	Herbicide Only	1369	1669	300	Unmodified, Modified
West Valley	REGNART CREEK	Herbicide Only	0	6480	6480	Modified
West Valley	REGNART CREEK	Channel Sediment Removal	1189	2318	1129	Modified
West Valley	REGNART CREEK	Herbicide Only	7086	8591	1505	Modified
West Valley	REGNART CREEK	Channel Sediment Removal	8290	8792	502	Modified
West Valley	RODEO CREEK	Vegetation Removal Only	0	5014	5014	Modified
West Valley	RODEO CREEK	Herbicide Only	0	5014	5014	Modified
West Valley	RODEO CREEK	Channel Sediment Removal	353	453	100	Modified
West Valley	RODEO CREEK	Herbicide Only	7477	10000	2523	Unmodified, Modified
West Valley	RODEO CREEK	Vegetation Removal Only	7575	9940	2365	Unmodified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	0	1600	1600	Modified
West Valley	SAN TOMAS AQUINO CREEK	Vegetation Removal Only	3220	15690	12470	Modified
West Valley	SAN TOMAS AQUINO CREEK	Herbicide Only	3220	23800	20580	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	5800	7900	2100	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	8689	15690	7001	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	15875	17145	1270	Modified
West Valley	SAN TOMAS AQUINO CREEK	Vegetation Removal Only	15896	16926	1030	Modified
West Valley	SAN TOMAS AQUINO CREEK	Vegetation Removal Only	17955	23000	5045	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	19250	21500	2250	Modified
West Valley	SAN TOMAS AQUINO CREEK	Herbicide Only	43476	67413	23937	Unmodified, Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	62960	63690	730	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	64430	64701	271	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	66690	67413	723	Unmodified, Modified
West Valley	SAN TOMAS AQUINO CREEK	Vegetation Removal Only	67400	76000	8600	Unmodified
West Valley	SARATOGA CREEK	Herbicide Only	0	30915	30915	Unmodified, Modified
West Valley	SARATOGA CREEK	Channel Sediment Removal	0	3389	3389	Modified
West Valley	SARATOGA CREEK	Vegetation Removal Only	0	47430	47430	Unmodified, Modified
West Valley	SMITH CREEK	Vegetation Removal Only	0	3639	3639	Modified
West Valley	SMITH CREEK	Herbicide Only	0	3639	3639	Modified
West Valley	SMITH CREEK	Herbicide Only	5621	6328	707	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
West Valley	SMITH CREEK	Herbicide Only	8220	9257	1037	Unmodified, Modified
West Valley	SMITH CREEK	Vegetation Removal Only	8500	9257	757	Unmodified
West Valley	SUNNYVALE EAST CHANNEL	Channel Sediment Removal	0	2250	2250	Modified
West Valley	SUNNYVALE EAST CHANNEL	Herbicide Only	2305	31301	28996	Modified
West Valley	SUNNYVALE EAST CHANNEL	Vegetation Removal Only	6444	31301	24857	Modified
West Valley	SUNNYVALE WEST CHANNEL	Herbicide Only	5320	15465	10145	Modified
West Valley	SUNNYVALE WEST CHANNEL	Channel Sediment Removal	12700	13000	300	Modified
West Valley	SUNNYVALE WEST CHANNEL	Vegetation Removal Only	13702	14718	1016	Modified
West Valley	SUNNYVALE WEST CHANNEL	Vegetation Removal Only	14876	15323	447	Modified
West Valley	DAVES CREEK	Herbicide Only	1187	2340	1153	Modified
West Valley	PROSPECT CREEK	Vegetation Removal Only	0	2974	2974	Unmodified, Modified
West Valley	PROSPECT CREEK	Herbicide Only	0	2010	2010	Unmodified, Modified
West Valley	EL CAMINO STORM DRAIN	Herbicide Only	0	8400	8400	Modified
Guadalupe	ALAMITOS CREEK	Vegetation Removal Only	0	315	315	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	1682	1978	296	Unmodified
Guadalupe	ALAMITOS CREEK	Herbicide Only	2162	23250	21088	Unmodified, Modified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	11700	12200	500	Unmodified, Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	12750	12843	93	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	13170	13242	72	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	14075	14210	135	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	21270	21546	276	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	21600	21919	319	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	22150	22250	100	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	22685	23100	415	Unmodified
Guadalupe	CANOAS CREEK	Channel Sediment Removal	0	39032	39032	Modified
Guadalupe	CANOAS CREEK	Herbicide Only	0	39032	39032	Modified
Guadalupe	CALERO CREEK	Herbicide Only	12800	13200	400	Unmodified
Guadalupe	CALERO CREEK	Herbicide Only	13465	16507	3042	Unmodified
Guadalupe	GOLF CREEK	Herbicide Only	0	7550	7550	Modified
Guadalupe	GREYSTONE CREEK	Herbicide Only	0	7850	7850	Modified
Guadalupe	GREYSTONE CREEK	Vegetation Removal Only	2048	2151	103	Modified
Guadalupe	GREYSTONE CREEK	Vegetation Removal Only	5626	7411	1785	Modified
Guadalupe	GREYSTONE CREEK	Channel Sediment Removal	5745	6036	291	Modified
Guadalupe	GUADALUPE RIVER	Herbicide Only	6205	7151	946	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Guadalupe	GUADALUPE RIVER	Vegetation Removal Only	24477	107415	82938	Unmodified, Modified
Guadalupe	GUADALUPE RIVER	Herbicide Only	24477	107415	82938	Unmodified, Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	42000	47000	5000	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	49578	49902	324	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	65445	65545	100	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	66075	66775	700	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	69750	71215	1465	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	73235	74325	1090	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	79850	79950	100	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	93700	94040	340	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	97600	97750	150	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	106522	107027	505	Modified
Guadalupe	LONE HILL CREEK	Herbicide Only	0	2027	2027	Modified
Guadalupe	LOS GATOS CREEK	Herbicide Only	0	42379	42379	Unmodified, Modified
Guadalupe	LOS GATOS CREEK	Channel Sediment Removal	40040	40170	130	Modified
Guadalupe	ROSS CREEK	Vegetation Removal Only	0	23570	23570	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Guadalupe	ROSS CREEK	Herbicide Only	0	23979	23979	Modified
Guadalupe	ROSS CREEK	Channel Sediment Removal	255	3051	2796	Modified
Guadalupe	ROSS CREEK	Channel Sediment Removal	3121	8560	5439	Modified
Guadalupe	ROSS CREEK	Channel Sediment Removal	12316	12799	483	Modified
Guadalupe	ROSS CREEK	Channel Sediment Removal	19350	19500	150	Modified
Guadalupe	ROSS CREEK	Herbicide Only	26700	27050	350	Modified
Guadalupe	ROSS CREEK	Herbicide Only	27284	27601	317	Modified
Guadalupe	GUADALUPE CREEK	Vegetation Removal Only	107431	120238	12807	Unmodified, Modified
Guadalupe	GUADALUPE CREEK	Herbicide Only	107431	120870	13439	Unmodified, Modified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	107535	107794	259	Modified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	107820	108125	305	Modified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	113345	113360	15	Modified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	116700	116800	100	Unmodified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	120314	120575	261	Unmodified
Guadalupe	RANDOL CREEK	Herbicide Only	0	10185	10185	Unmodified, Modified
Guadalupe	RANDOL CREEK	Vegetation Removal Only	8230	10185	1955	Unmodified, Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Guadalupe	SOUTH EAST SANTA TERESA CREEK	Channel Sediment Removal	2420	2470	50	Modified
Guadalupe	WEST BRANCH RANDOL CREEK	Vegetation Removal Only	0	1350	1350	Modified
Coyote	NORTH BABB CREEK	Herbicide Only	0	1410	1410	Modified
Coyote	NORTH BABB CREEK	Herbicide Only	3970	5402	1432	Modified
Coyote	SOUTH BABB CREEK	Herbicide Only	0	4570	4570	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	0	8771	8771	Modified
Coyote	BERRYESSA CREEK	Herbicide Only	0	29907	29907	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	11511	11671	160	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	16620	16680	60	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	16816	20310	3494	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	22555	23355	800	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	23375	23993	618	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	28639	28800	161	Modified
Coyote	CALERA CREEK	Herbicide Only	305	8264	7959	Unmodified, Modified
Coyote	CALERA CREEK	Channel Sediment Removal	1026	4058	3032	Modified
Coyote	CALERA CREEK	Channel Sediment Removal	4227	4312	85	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Coyote	CALERA CREEK	Vegetation Removal Only	5025	6105	1080	Modified
Coyote	CALERA CREEK	Channel Sediment Removal	7364	7460	96	Modified
Coyote	RUBY CREEK	Herbicide Only	0	1340	1340	Modified
Coyote	RUBY CREEK	Herbicide Only	7945	8440	495	Modified
Coyote	COYOTE CREEK	Vegetation Removal Only	45340	81800	36460	Unmodified, Modified
Coyote	COYOTE CREEK	Herbicide Only	45340	81800	36460	Unmodified, Modified
Coyote	COYOTE CREEK	Channel Sediment Removal	46395	46470	75	Modified
Coyote	COYOTE CREEK	Channel Sediment Removal	46848	46923	75	Modified
Coyote	COYOTE CREEK	Vegetation Removal Only	83530	85560	2030	Modified
Coyote	COYOTE CREEK	Herbicide Only	84145	86400	2255	Modified
Coyote	COYOTE CREEK	Channel Sediment Removal	143520	144228	708	Unmodified
Coyote	COYOTE CREEK	Vegetation Removal Only	144200	144800	600	Unmodified
Coyote	COYOTE CREEK	Herbicide Only	150906	156738	5832	Unmodified, Modified
Coyote	FISHER CREEK	Herbicide Only	13500	15673	2173	Modified
Coyote	LOS COCHES CREEK	Herbicide Only	0	6790	6790	Modified
Coyote	LOS COCHES CREEK	Channel Sediment Removal	55	846	791	Modified
Coyote	LOS COCHES CREEK	Channel Sediment Removal	1577	2523	946	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Coyote	LOS COCHES CREEK	Vegetation Removal Only	1998	2209	211	Modified
Coyote	LOS COCHES CREEK	Vegetation Removal Only	5975	6800	825	Modified
Coyote	LOS COCHES CREEK	Channel Sediment Removal	6400	6750	350	Modified
Coyote	LOWER SILVER CREEK	Vegetation Removal Only	0	5245	5245	Modified
Coyote	LOWER SILVER CREEK	Herbicide Only	0	31880	31880	Modified
Coyote	LOWER SILVER CREEK	Vegetation Removal Only	7563	9348	1785	Modified
Coyote	LOWER SILVER CREEK	Channel Sediment Removal	12876	15540	2664	Modified
Coyote	LOWER SILVER CREEK	Channel Sediment Removal	19668	20333	665	Modified
Coyote	LOWER SILVER CREEK	Vegetation Removal Only	24590	29210	4620	Modified
Coyote	LOWER SILVER CREEK	Channel Sediment Removal	24719	31862	7143	Modified
Coyote	LOWER SILVER CREEK	Herbicide Only	36827	38114	1287	Modified
Coyote	MIGUELITA CREEK	Herbicide Only	1126	2460	1334	Modified
Coyote	MIGUELITA CREEK	Channel Sediment Removal	1451	2453	1002	Modified
Coyote	MIGUELITA CREEK	Herbicide Only	3650	4297	647	Modified
Coyote	MIGUELITA CREEK	Channel Sediment Removal	3677	3987	310	Modified
Coyote	MIGUELITA CREEK	Channel Sediment Removal	15840	15990	150	Unmodified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Coyote	PIEDMONT CREEK	Herbicide Only	0	1797	1797	Modified
Coyote	PIEDMONT CREEK	Vegetation Removal Only	1797	1896	99	Modified
Coyote	PIEDMONT CREEK	Herbicide Only	1886	4300	2414	Modified
Coyote	UPPER PENITENCIA CREEK	Herbicide Only	1965	6512	4547	Unmodified, Modified
Coyote	UPPER PENITENCIA CREEK	Channel Sediment Removal	7200	7215	15	Modified
Coyote	UPPER PENITENCIA CREEK	Herbicide Only	7241	11792	4551	Unmodified, Modified
Coyote	UPPER PENITENCIA CREEK	Channel Sediment Removal	17050	17150	100	Modified
Coyote	UPPER PENITENCIA CREEK	Channel Sediment Removal	20400	20410	10	Unmodified
Coyote	LOWER PENITENCIA CREEK	Vegetation Removal Only	0	4975	4975	Modified
Coyote	LOWER PENITENCIA CREEK	Herbicide Only	0	21693	21693	Modified
Coyote	LOWER PENITENCIA CREEK	Channel Sediment Removal	1193	4975	3782	Modified
Coyote	LOWER PENITENCIA CREEK	Channel Sediment Removal	8979	9126	147	Modified
Coyote	LOWER PENITENCIA CREEK	Channel Sediment Removal	10599	10852	253	Modified
Coyote	LOWER PENITENCIA CREEK	Channel Sediment Removal	11374	13311	1937	Modified
Coyote	SIERRA CREEK	Herbicide Only	0	7290	7290	Modified
Coyote	SIERRA CREEK	Channel Sediment Removal	3825	4161	336	Modified
Coyote	SIERRA CREEK	Channel Sediment Removal	4295	4395	100	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Coyote	SIERRA CREEK	Channel Sediment Removal	6693	7293	600	Modified
Coyote	UPPER SILVER CREEK	Herbicide Only	0	6374	6374	Modified
Coyote	UPPER SILVER CREEK	Channel Sediment Removal	1115	4112	2997	Modified
Coyote	TULARCITOS CREEK	Vegetation Removal Only	100	3600	3500	Modified
Coyote	TULARCITOS CREEK	Herbicide Only	100	3705	3605	Modified
Coyote	TULARCITOS CREEK	Channel Sediment Removal	2500	3700	1200	Modified
Coyote	NORWOOD CREEK	Herbicide Only	0	3113	3113	Modified
Coyote	NORWOOD CREEK	Channel Sediment Removal	1300	3070	1770	Modified
Coyote	NORWOOD CREEK	Herbicide Only	12402	13110	708	Unmodified, Modified
Coyote	QUIMBY CREEK	Channel Sediment Removal	0	1018	1018	Modified
Coyote	QUIMBY CREEK	Herbicide Only	0	3790	3790	Modified
Coyote	QUIMBY CREEK	Channel Sediment Removal	1170	3790	2620	Modified
Coyote	EVERGREEN CREEK	Vegetation Removal Only	0	3700	3700	Unmodified, Modified
Coyote	THOMPSON CREEK	Herbicide Only	0	7070	7070	Unmodified, Modified
Coyote	THOMPSON CREEK	Channel Sediment Removal	0	1005	1005	Modified
Coyote	THOMPSON CREEK	Vegetation Removal Only	6983	10000	3017	Unmodified, Modified
Coyote	THOMPSON CREEK	Vegetation Removal Only	27225	27840	615	Unmodified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Coyote	FLINT CREEK	Herbicide Only	0	1957	1957	Modified
Coyote	FLINT CREEK	Herbicide Only	6290	7130	840	Unmodified, Modified
Coyote	PENITENCIA EAST CHANNEL	Herbicide Only	0	3654	3654	Modified
Coyote	PENITENCIA EAST CHANNEL	Channel Sediment Removal	2400	3600	1200	Modified
Coyote	COCHRAN CHANNEL	Herbicide Only	0	7556	7556	Modified
Coyote	COYOTE BYPASS	Channel Sediment Removal	8879	8897	18	Modified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Vegetation Removal Only	17316	38880	21564	Modified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Channel Sediment Removal	36900	37100	200	Modified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Channel Sediment Removal	50250	50510	260	Unmodified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Vegetation Removal Only	66430	68108	1678	Unmodified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Vegetation Removal Only	74000	77175	3175	Unmodified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Vegetation Removal Only	82727	83175	448	Unmodified
Uvas/Llagas & Pajaro	JONES CREEK	Channel Sediment Removal	11200	13624	2424	Modified
Uvas/Llagas & Pajaro	WEST LITTLE LLAGAS CREEK	Vegetation Removal Only	4480	16304	11824	Unmodified, Modified
Uvas/Llagas & Pajaro	WEST LITTLE LLAGAS CREEK	Channel Sediment Removal	7700	12350	4650	Modified
Uvas/Llagas & Pajaro	WEST LITTLE LLAGAS CREEK	Channel Sediment Removal	15680	15788	108	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Uvas/Llagas & Pajaro	WEST LITTLE LLAGAS CREEK	Vegetation Removal Only	19015	22420	3405	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Vegetation Removal Only	0	21840	21840	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	4637	5608	971	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	6637	7606	969	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	10302	10602	300	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	11300	11600	300	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	12100	21840	9740	Modified
Uvas/Llagas & Pajaro	PRINCEVALLE DRAIN	Channel Sediment Removal	0	251	251	Modified
Uvas/Llagas & Pajaro	PRINCEVALLE DRAIN	Vegetation Removal Only	0	10000	10000	Modified
Uvas/Llagas & Pajaro	PRINCEVALLE DRAIN	Channel Sediment Removal	8036	9536	1500	Modified
Uvas/Llagas & Pajaro	UVAS-CARNADERO CREEK	Vegetation Removal Only	27000	49425	22425	Unmodified, Modified
Uvas/Llagas & Pajaro	CORRALLITOS CREEK	Vegetation Removal Only	0	952	952	Modified
Uvas/Llagas & Pajaro	TENNANT CREEK	Vegetation Removal Only	8235	10739	2504	Modified
Uvas/Llagas & Pajaro	TENNANT CREEK	Channel Sediment Removal	10570	10700	130	Modified
Uvas/Llagas & Pajaro	WEST BRANCH LLAGAS CREEK	Vegetation Removal Only	0	22000	22000	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Uvas/Llagas & Pajaro	SAN MARTIN CREEK	Vegetation Removal Only	7200	9285	2085	Modified
Uvas/Llagas & Pajaro	EAST LITTLE LLAGAS CREEK	Channel Sediment Removal	0	12300	12300	Modified
Uvas/Llagas & Pajaro	EAST LITTLE LLAGAS CREEK	Vegetation Removal Only	0	22509	22509	Unmodified, Modified
Uvas/Llagas & Pajaro	LIONS CREEK	Vegetation Removal Only	0	10719	10719	Unmodified, Modified
Uvas/Llagas & Pajaro	SOUTH MOREY CHANNEL	Vegetation Removal Only	0	3312	3312	Modified
Uvas/Llagas & Pajaro	SOUTH MOREY CHANNEL	Channel Sediment Removal	1883	3312	1429	Modified
Uvas/Llagas & Pajaro	NORTH MOREY CHANNEL	Vegetation Removal Only	0	1348	1348	Modified
Uvas/Llagas & Pajaro	NORTH MOREY CHANNEL	Channel Sediment Removal	575	1348	773	Modified
Uvas/Llagas & Pajaro	LOWER MILLER SLOUGH	Vegetation Removal Only	0	5501	5501	Modified
Uvas/Llagas & Pajaro	UPPER MILLER SLOUGH	Vegetation Removal Only	0	1022	1022	Modified
Coyote	COYOTE CANAL	Herbicide Only	0	37982	37982	Modified
Coyote	COYOTE CANAL EXTENSION	Herbicide Only	0	6323	6323	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Herbicide Only	2149	47283	45134	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	6748	7600	852	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	7823	11341	3518	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	12373	12900	527	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	14233	14353	120	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	30208	30258	50	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	31463	32463	1000	Modified
Guadalupe	KIRK DISTRIBUTION SYSTEM	Herbicide Only	380	930	550	Modified
Guadalupe	KIRK DISTRIBUTION SYSTEM	Herbicide Only	3394	5129	1735	Modified
Guadalupe	KIRK DISTRIBUTION SYSTEM	Herbicide Only	6165	7920	1755	Modified
Guadalupe	PAGE DISTRIBUTION SYSTEM—UPPER	Herbicide Only	960	3100	2140	Modified
Guadalupe	PAGE DISTRIBUTION SYSTEM—UPPER	Herbicide Only	4550	6344	1794	Modified
Guadalupe	PAGE DISTRIBUTION SYSTEM—UPPER	Herbicide Only	7980	9630	1650	Modified
Guadalupe	VASONA CANAL	Herbicide Only	0	1050	1050	Modified
Guadalupe	VASONA CANAL	Herbicide Only	2450	3190	740	Modified
Guadalupe	VASONA CANAL	Herbicide Only	4130	7030	2900	Modified
Guadalupe	VASONA CANAL	Herbicide Only	7380	8615	1235	Modified
Guadalupe	ALMADEN-CALERO CANAL	Herbicide Only	0	23919	23919	Modified
Guadalupe	ALMADEN-CALERO CANAL	Vegetation Removal Only	150	2950	2800	Modified
Guadalupe	ALMADEN-CALERO CANAL	Channel Sediment Removal	250	300	50	Modified
Guadalupe	ALMADEN-CALERO CANAL	Channel Sediment Removal	500	9000	8500	Modified
Guadalupe	ALMADEN-CALERO CANAL	Vegetation Removal Only	3610	9240	5630	Modified

Table 3b. In-Channel (below OHW) Work Activities PMA

Note: Channel types are listed per SMP-1 (Modified with Ecological Value added in SMP-2).

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Guadalupe	ALMADEN-CALERO CANAL	Vegetation Removal Only	9700	23919	14219	Modified

TABLE 4
Mitigation Sites for SMP-1 Bank Stabilization and Large Woody Debris Projects

During the SMP-1 period 2002-2013, Valley Water conducted on-site mitigation activities for bank stabilization projects. Valley Water also conducted large woody debris (LWD) mitigation for projects where LWD was removed from an anadromous salmonid channel during SMP-1. Bank stabilization projects are listed in Table 10-4a and the LWD projects are listed in Table 10-4b. Mitigation was not required for sites where LWD was modified or relocated.

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
LOWER PENINSULA	10100	ADOBE CK.	24800	25260	PROJECT #164 ADOBE U/S FTHL TO EL CAMINO	21780	2005
LOWER PENINSULA	10100	ADOBE CK.	34180	34450	PROJECT #164 ADOBE U/S FTHL TO EL CAMINO	750	2006
LOWER PENINSULA	10100	ADOBE CK.	37460	38200	PROJECT #179 ADOBE CK. Moos, Ward Property	700	2003, 2004
LOWER PENINSULA	10100	ADOBE CK.	48100	48300	PROJECT #273 ADOBE D/S O'KEEFE	290	2008, 2009
LOWER PENINSULA	10120	BARRON CK.	120	250	PROJECT #292 BARRON CRK. U/S ADOBE CONFL.	300	2009
LOWER PENINSULA	10160	HALE CK.	10510	10575	PROJECT #257 HALE @ 1st BAPTIST CHURCH	5000	2007
LOWER PENINSULA	10160	HALE CK.	11480	11520	PROJECT #208 HALE D/S MAGDALENA	1615	2004

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
LOWER PENINSULA	10240	PERMANENTE CK.	28500	28550	PROJECT #241 PERMANENT D/S BARBARA	100	2006
LOWER PENINSULA	10240	PERMANENTE CK.	40100	40200	PROJECT #226 PERMANENTE @ LUNDY	1600	1998
LOWER PENINSULA	10240	PERMANENTE CK.	44560	44635	PROJECT #265 PERMANENTE @ ROTH PROPERTY	2050	2007
LOWER PENINSULA	10290	STEVENS CK.	18180	18225	PROJECT #254 STEVENS CK. D/S MIDDLEFIELD RD.	500	2007
LOWER PENINSULA	10290	STEVENS CK.	43925	43960	PROJECT #248 STEVENS CK D/S HOMESTEAD	1920	2000
LOWER PENINSULA	10290	STEVENS CK.	50850	50920	PROJECT #167 STEVENS CK. CLEAR CK CT	1200	2002
WEST VALLEY	20100	CALABAZAS CK.	36987	37145	PROJECT #356 CALABAZAS U/S HWY. 280	1288	2012
WEST VALLEY	20100	CALABAZAS CK.	42405	44400	PROJECT #307 CALABAZAS D/S BOLLINGER BRIDGE	1190	2010
WEST VALLEY	20100	CALABAZAS CK.	44800	45330	PROJECT # 246 CALABAZAS U/S BOLLINGER BRIDGE	10100	2006, 2009
WEST VALLEY	20100	CALABAZAS CK.	48761	49100	PROJECT #329 CALABAZAS CK U/S & D/S RAINBOW DR.	3985	2010, 2012

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
WEST VALLEY	20100	CALABAZAS CK.	51750	51880	PROJECT #245 CALABAZAS D/S PROSPECT	600	2005
WEST VALLEY	20100	CALABAZAS CK.	55440	56850	PROJECT #355 CALABAZAS U/S UPRR SITE SB30, SB11, 13, SB38	3985	2011
WEST VALLEY	20100	CALABAZAS CK.	59350	59400	PROJECT #258 CALABAZAS D/S COMER DR.	250	2007
WEST VALLEY	20100	CALABAZAS CK.	60860	60880	PROJECT #333 CALABAZAS CK @ PADERO CT.	250	2010
WEST VALLEY	20100	CALABAZAS CK.	64160	64180	PROJECT #171 CALABZAS @ QUARRY RD.	600	2002
WEST VALLEY	20140	MISTLETOE CK.	1639	1654	PROJECT #259 MISTLETOE CR. D/S MISTLETOE CT.	500	2007
WEST VALLEY	20170	REGNART CK.	12500	12600	PROJECT #145 REGNART U/S UPRR	1050	2000
WEST VALLEY	20170	REGNART CK.	5450	5550	PROJECT #244 REGNART CK U/S PACIFICA DR.	225	2006
WEST VALLEY	20180	RODEO CK.	1325	1340	PROJECT #243 RODEO U/S RAINBOW	120	2006
WEST VALLEY	20190	SAN TOMAS CK.	59490	59710	PROJECT #176 SAN TOMAS U/S MCCOY	2850	2002

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
WEST VALLEY	20190	SAN TOMAS CK.	60415	60485	PROJECT #372 SAN TOMAS U/S MCCOY (2013)	1000	2012
WEST VALLEY	20190	SAN TOMAS CK.	63820	63950	PROJECT #357 SAN TOMAS D/S WESTMONT	8333	2011, 2012
WEST VALLEY	20190	SAN TOMAS CK.	66650	66850	PROJECT #255 SAN TOMAS D/S POLLARD	2400	2007
WEST VALLEY	20190	SAN TOMAS CK.	68400	68475	PROJECT #275 SAN TOMAS U/S SOBEY	105	2008
WEST VALLEY	20190	SAN TOMAS CK.	70725	70775	PROJECT #256 SAN TOMAS D/S MONTCLAIRE	250	2007
WEST VALLEY	20190	SAN TOMAS CK.	73000	73275	PROJECT #174 SAN TOMAS @ AVON	1140	2003
WEST VALLEY	20210	SARATOGA CK.	15040	15065	PROJECT #387 SARATOGA U/S PRUNERIDGE	125	2011
WEST VALLEY	20210	SARATOGA CK.	23550	23600	PROJECT #202 SARATOGA D/S BOLLINGER	250	2003
WEST VALLEY	20210	SARATOGA CK.	27490	27580	PROJECT #274 SARATOGA D/S ENGLISH	50	2009
WEST VALLEY	20210	SARATOGA CK.	31515	31960	PROJECT #153 SARATOGA U/S PROSPECT	3220	2009

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
WEST VALLEY	20210	SARATOGA CK.	35725	35900	PROJECT #242 SARATOGA U/S COX	1350	2006
WEST VALLEY	20210	SARATOGA CK.	38920	38960	PROJECT #144 SARATOGA D/S VIA MONTE	1500	2000
WEST VALLEY	20210	SARATOGA CK.	46400	46450	PROJECT #223 SARATOGA D/S WALNUT	4000	2008
WEST VALLEY	20210	SARATOGA CK.	50240	50400	PROJECT #222 SARATOGA U/S 4TH	2000	2005
WEST VALLEY	20300	WILDCAT CK.	2880	3000	PROJECT #359 WILDCAT CK. D/S PORTOS	2300	2012
WEST VALLEY	20300	WILDCAT CK.	960	980	PROJECT #203 WILDCAT D/S QUITO	300	2004
WEST VALLEY	20360	PROSPECT CK.	3985	4065	PROJECT #201 PROSPECT CREEK @ BLUE HLLS	1500	2004
GUADALUPE	30100	ALAMITOS CK.	11000	11050	PROJECT #175 ALAMITOS U/S & D/S GRAYSTONE	3500	2004
GUADALUPE	30100	ALAMITOS CK.	12050	12225	PROJECT #175 ALAMITOS U/S & D/S GRAYSTONE	3500	2001
GUADALUPE	30100	ALAMITOS CK.	12500	12630	PROJECT #276 ALAMITOS @ BUBBLINGWELL	2750	2007

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
GUADALUPE	30100	ALAMITOS CK.	13160	13440	PROJECT #291 ALAMITOS @ BRET HARTE	792	2009
GUADALUPE	30100	ALAMITOS CK.	14110	14170	PROJECT #318 ALAMITOS CK. @ RANDOL CK. CONFL.	3825	2010
GUADALUPE	30100	ALAMITOS CK.	21300	21900	PROJECT #212 ALAMITOS @ PRICEWOOD	6723	2004
GUADALUPE	30100	ALAMITOS CK.	21300	21405	PROJECT #321 ALAMITOS CK. @ FIELDWOOD CT.	2250	2010
GUADALUPE	30100	ALAMITOS CK.	22150	22350	PROJECT #296 ALAMITOS CRK D/S ALMADEN EXPRSSWY	3300	2010
GUADALUPE	30100	ALAMITOS CK.	22685	22775	PROJECT #316 ALAMITOS CRK U/S ALMADEN EXPRSSWY	3500	2010
GUADALUPE	30100	ALAMITOS CK.	3175	3575	PROJECT #142 ALAMITOS D/S MAZZONE	10800	2000
GUADALUPE	30100	ALAMITOS CK.	40225	40280	PROJECT #295 ALAMITOS CRK D/S ALMADEN DAM	212	2009
GUADALUPE	30100	ALAMITOS CK.	8900	10100	PROJECT #272 ALAMITOS @ GREYSTONE CONFL.	15144	2008, 2009, 2010
GUADALUPE	30110	CANOAS CK.	10000	10830	PROJECT #231 CANOAS D/S CAPITOL AVE. BOTH BANKS	12500	2006

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
GUADALUPE	30110	CANOAS CK.	9220	10000	PROJECT #231 CANOAS D/S CAPITOL AVE. BOTH BANKS	1500	2005
GUADALUPE	30130	GOLF CK.	4070	4195	GOLF D/S CULLIGAN	2500	2004
GUADALUPE	30130	GOLF CK.	580	1110	PROJECT #228 GOLF CREEK U/S ALMADEN EXPR, &	14625	2005
GUADALUPE	30140	GREYSTONE CK.	5840	5940	PROJECT #278 GREYSTONE U/S OLIVE BRANCH	2500	2007
GUADALUPE	30150	GUADALUPE RVR.	74725	75025	PROJECT #177 GUADALUPE RVR D/S VIRGINIA	780	2003
GUADALUPE	30150	GUADALUPE RVR.	81230	81440	PROJECT #178 GUADALUPE RVR U/S ALMA	2800	2003
GUADALUPE	30150	GUADALUPE RVR.	90700	90800	PROJECT #172 GUADALUPE RIVER @ HILLSDALE	3000	2003
GUADALUPE	30150	GUADALUPE RVR.	93780	94020	PROJECT #370 GUADALUPE RVR U/S CAPITOL EXPRSWY.	6500	2012
GUADALUPE	30200	LOS GATOS CK.	13750	14140	PROJECT #187 LOS GATOS U/S LEIGH	17250	2001
GUADALUPE	30200	LOS GATOS CK.	17885	18125	PROJECT #187 LOS GATOS U/S MERIDIAN	5500	2001

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
GUADALUPE	30200	GUADALUPE RVR.	45440	46815	PROJECT #250 GUADALUPE RVR D/S TRIMBLE	22440	2006, 2007
GUADALUPE	30200	GUADALUPE RVR.	72660	72700	PROJECT #155 GUADALUPE RVR D/S WOZ WAY (2 SITES	10367	1998, 1999
GUADALUPE	30230	ROSS CK.	12400	12700	PROJECT # 247 ROSS CRK D/S HARWOOD RD.	4407	2006
GUADALUPE	30230	ROSS CK.	13880	14023	PROJECT #294 ROSS CRK U/S HARWOOD	1540	2009
GUADALUPE	30230	ROSS CK.	14990	15450	PROJECT #260 ROSS CRK D/S LEIGH AVE.	1600	2009
GUADALUPE	30230	ROSS CK.	17975	18150	PROJECT #277 ROSS CRK D/S UNION	3660	2008
GUADALUPE	30230	ROSS CK.	18275	18840	PROJECT #312 ROSS CRK U/S UNION AVE	2560	2010
GUADALUPE	30230	ROSS CK.	21280	21415	PROJECT #293 ROSS CRK U/S LOS GATOS/ALMADEN RD.	1350	2009
GUADALUPE	30230	ROSS CK.	7700	8350	PROJECT #262 ROSS CRK KIRK AVE. D/S TO MERIDIAN	20000	2007
COYOTE	40180	CALERA CK.	5910	5950	PROJECT #206 CALERA CRK. U/S HILLVIEW	300	2003

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
COYOTE	40210	COYOTE CK.	85500	85730	PROJECT #261 COYOTE CR @ SBMHP, Nottinghill d/s Berryessa	13950	2007, 2009
COYOTE	40260	LOWER SILVER CK.	28800	29640	LOWER SILVER D/S TULLY AVE.	1800	2012
COYOTE	40320	UPPER PENITENCIA CK.	11300	11730	PROJECT #279 UPPER PENITENCIA D/S CAPITOL	6400	2008, 2009
COYOTE	40320	UPPER PENITENCIA CK.	19960	20025	PROJECT #156 UPPER PENITENCIA @ NOBLE	600	2000
COYOTE	40470	THOMPSON CK.	28810	28870	PROJECT #323 THOMPSON U/S FARNSWORTH	1300	2010
COYOTE	40470	THOMPSON CK.	3560	4275	PROJECT #169 THOMPSON AT EVERDALE, Pettigrew	16652	2002, 2003, 2010
COYOTE	40470	THOMPSON CK.	6210	6970	PROJECT #346 THOMPSON D/S ABORN RD.	16500	2010
COYOTE	40470	THOMPSON CK.	7270	7520	PROJECT #207 THOMPSON U/S ABORN RD.	5721	2013
COYOTE	40470	THOMPSON CK.	8340	8380	PROJECT #207 THOMPSON U/S ABORN RD.	560	2004

Table 4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
COYOTE	40470	THOMPSON CK.	9400	9550	PROJECT #361 THOMPSON U/S CADWALLADER	1640	2012
PAJARO	50100	LLAGAS CK.	50300	50425	PROJECT. #251 LLAGAS @ E. LITTLE LLAGAS CONFL.	1690	2007
PAJARO	50490	BODFISH CK.	1190	2240	PROJECT #141 BODFISH CREEK U/S & D/S RANCHO VISTA	2500	2002

Table 4b. Large Woody Debris Mitigation Sites in SMP-1

Watershed	GIS ID	Creek	From Station	To Station	Year	LWD VOLUME (cubic yards)	Notes
Guadalupe	30100	Alamitos	11881	11938	2004	8	Large woody debris installed in 2004 as part of SMP bank repair project (B16).
Guadalupe	30100	Alamitos	12750	12843	2007	20.3	Large woody debris installed in 2007 as part of SMP bank repair (B14).
Guadalupe	30100	Alamitos	13170	13242	2008	12.33	Large woody debris installed in 2008 as part of SMP Bank Repair (5B20).
Guadalupe	30100	Alamitos	21600	21865	2008	13.55	Large woody debris installed in 2008 as part of SMP Bank Repair projects (5B22 & 5B23).
Guadalupe	30120	Calero	2800	3000	2005	23	Live leaning tree cabled in place to protect infrastructure. Lateral scour bars installed into eroding bank.
Coyote	40210	Coyote	144200	144800	2010	9	LWD added as part of the bank protection and sediment removal work.

Table 4b. Large Woody Debris Mitigation Sites in SMP-1

Watershed	GIS ID	Creek	From Station	To Station	Year	LWD VOLUME (cubic yards)	Notes
Coyote	40210	Coyote	174600	175550	2012	6.82	Redwood logs used to create a log weir for large woody debris mitigation.
Lower Peninsula	10290	Stevens	10700	11525	2012	6.08	Installation of 5 redwood logs in-stream for large woody debris. The logs were tagged (#13-#17).
Coyote	40320	Upper Penitencia	6357	6373	2010	13	Log weir installation.
Coyote	40320	Upper Penitencia	11100	11101	2009	10	LWD mitigation project
Pajaro	50180	Uvas-Carnadero	32590	32990	2012	11.35	12 seasoned eucalyptus logs 0.00 11.35 11.35 were installed for large woody debris mitigation credit. The logs were tagged #1-12.

ATTACHMENT C

Special-Status Plants and Special-Status Fish and Wildlife

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ATTACHMENT C
Special-Status Plants and Special-Status Fish and Wildlife

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
Federal or State Endangered and Threatened Plant Species			
Tiburon paintbrush (*Castilleja affinis* ssp. *Neglecta*)	FE, ST, CNPS List 1B.2, VHP	Valley and foothill grassland (serpentinite)/ serpentine bunchgrass grassland	**Unlikely to Occur**. Documented occurrences in the Program Area on Coyote Ridge between Anderson Reservoir and U.S. Highway 101. Potential habitat includes serpentine bunchgrass grasslands located on the northern portion of Coyote Ridge and portions of the Santa Teresa Hills. However, SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of Tiburon paintbrush. Therefore, a low probability exists for it to occur in close proximity to any SMP activities.
Coyote ceanothus (*Ceanothus ferrisiae*)	FE, CNPS List 1B.1, VHP	Chaparral, coastal scrub, valley and foothill grassland on serpentinite/ serpentine bunchgrass grassland and mixed serpentine chaparral	**Unlikely to Occur**. Three populations are recorded in the Anderson Reservoir area, within the south-central portion of the Program area. A fourth population is located near Morgan Hill off Llagas Road and Old Monterey Road. The species also may occur on serpentine soils on northern Coyote Ridge and portions of the Santa Teresa Hills. However, SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of coyote ceanothus away from known locations. Therefore, this species is not expected to occur in or very near any SMP work sites.
Santa Clara Valley dudleya (*Dudleya setchellii*)	FE, CNPS List 1B.1, VHP	Cismontane woodland, valley and foothill grassland on serpentinite, rocky/ serpentine rock outcrop	**May be Present**. This species occurs in numerous locations in the Program area, on serpentine rock outcrops, including the Santa Teresa Hills, Communications Hill, near Monterey Road/Senter Road, Coyote Ridge, near Anderson Reservoir, and in the upper Llagas Creek watershed. Although many populations have been documented in the Program area, much of the suitable habitat has not been surveyed as it occurs on private lands. Potential habitat occurs elsewhere on serpentine soils in the lower foothills of the Santa Cruz Mountains and the Diablo Range. SCVWD surveys in 2004 and 2008 documented the Santa Clara Valley dudleya on SCVWD lands only along canals, which are not included in the SMP 2013 Manual Update. A possibility (albeit low) exists that the species occurs on serpentine substrates along creeks near SMP work sites.

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
Metcalf Canyon jewel-flower (*Streptanthus albidus* ssp. *Albidus*)	FE, CNPS List 1B.1, VHP	Valley and foothill grassland (serpentinite)/ serpentine bunchgrass grassland	**May be Present**. The majority of the Metcalf Canyon jewel-flower's range is considered to occur in the Program area. The species occurs on serpentinesoils on Coyote Ridge and near Anderson Reservoir in the Program area, on Communication Hill, and off Llagas Rd, in Morgan Hill. Some uncertainty exists around the taxonomic treatment of this species and most beautiful jewel-flower, but potentially suitable habitat is present north of Alum Rock, in the Santa Teresa Hills, west of Coyote Valley, along Coyote Ridge, on Communications Hill, and perhaps in a serpentine outcrop near Monterey Road and Senter Road. SCVWD surveys in 2004 and 2008 documented the Metcalf Canyon jewel-flower on SCVWD lands only along canals, which are not included in the SMP 2013 Manual Update. There is a possibility (albeit low) that the species occurs on serpentine substrates along creeks near SMP work sites.
CNPS-Listed Plant Species			
Franciscan onion (*Allium peninsulare* var. *franciscanum*)	CNPS List 1B.2	Cismontane woodland, valley and foothill grassland on clay, volcanic soils, often serpentinite/oak woodland	**May be Present**. No known occurrences exist in the Program area, but suitable habitat may be present. The closest known population occurs off Page Mill Road in Palo Alto, but suitable habitat exists in the Program area in oak woodland habitats, such as those in the Santa Teresa and Almaden Hills.
Bent-flowered fiddleneck (*Amsinckia lunaris*)	CNPS List 1B.2	Coastal bluff scrub, cismontane woodland, valley and foothill grassland/oak woodland and chaparral	**May be Present**. No known occurrences exist in the Program area, but suitable habitat may be present. One population has been described from Santa Clara County on Kinkaid Road, 1.1 miles north of Mt. Hamilton Road, outside of the Program area. However, suitable habitat is present at similar elevations in the Program area in chaparral and oak woodland habitats, particularly in the western portion of the Program area near the Almaden Hills and near Llagas Creek.
Anderson's manzanita (*Arctostaphylos andersonii*)	CNPS List 1B.2	Broadleafed upland forest, chaparral, and North Coast coniferous forest habitats (openings) at elevations of 197-2,395 feet	**May be Present**. No known occurrences in the Program area, but suitable habitat may be present. Eight documented populations occur above 1,000 feet elevation in the Santa Cruz mountains, outside of the Program area. However, potential habitat is present in the foothills toward the eastern and western edges of the Program area.

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
Brittlescale (*Atriplex depressa*)	CNPS List 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grasslands, and vernal pools on alkaline, clay soils/California annual grassland habitat on alkaline soil, seasonal wetlands	**May be Present**. No known occurrences exist in the Program area, but suitable habitat may be present. The closest known occurrence is in the baylands north of Mud Slough, in similar habitat to that occurring south and southwest of the Water Pollution Control Plant (WPCP) in the Program area. Although no occurrences are in the Program area, suitable habitat is present on low-lying moist, alkaline, clay soils near the Bay, where the species may be present.
Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*)	CNPS List 1B.2, VHP	Chaparral, cismontane woodland, valley and foothill grassland sometimes in serpentinite/serpenti ne bunchgrass grassland, mixed serpentine chaparral, and oak woodland	**Unlikely to Occur**. One extirpated historical occurrence exists from east of Coyote Creek in the Program area, and one extant occurrence has been recorded near the northern portion of Coyote Ridge. Additional suitable habitat in the Program area includes serpentine soils, such as those on Coyote Ridge and the Santa Teresa Hills, along the foothills. However, SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of big-scale balsamroot. Therefore, this species is not expected to occur in or very near any SMP work sites.
Round-leaved filaree (*Erodium macrophyllum*)	CNPS List 1B.1	Cismontane woodland, valley and foothill grassland/in California annual grassland and oak woodland habitat on clay soils	**May be Present**. Suitable habitat may be present in the Program area. Nine records for round-leaved filaree have been made in the Program area. Suitable habitat occurs on clay soils in the foothills of the Santa Cruz Mountains and the Diablo Range.
Pink creamsacs (*Castilleja rubicundula* ssp. *Rubicundula*)	CNPS List 1B.2, VHP No Take	Chaparral (openings), cismontane woodland, meadows and seeps, valley and foothill grassland on serpentinite/oak woodland, serpentine bunchgrass grassland	**Unlikely to Occur**. The species has been recorded approximately 4.5 miles south of Gilroy in the Program area. Suitable habitat also is present on serpentine soils such as those along Coyote Ridge, within the Santa Teresa Hills, near Anderson Reservoir, west of Coyote Valley, within Communications Hill (although it has not been found there in surveys), and within the area of serpentine north of Alum Rock. However, SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of pink creamsacs. Therefore, this species is not expected to occur in or very near any SMP work sites.

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
Congdon's tarplant (*Hemizonia parryi* ssp. *congdonii*)	CNPS List 1B.2	Valley and foothill grassland (alkaline)/ California annual grassland habitat on alkaline soils	**May be Present**. Suitable habitat may be present in the Program area. Five populations have been recorded in the Program area, in the Warm Springs region of Fremont and in Alviso. The species may occur in disturbed areas on alkaline soils and may occur in disturbed California annual grassland habitat near seasonally wet habitat, specifically in the northern reaches of the Program area near Alviso.
Mt. Hamilton thistle (*Cirsium fontinale* var. *campylon*)	CNPS List 1B.2, VHP	Chaparral, cismontane woodland, valley and foothill grassland in serpentinite seeps/ serpentine seeps	**May be Present**. Numerous recorded populations exist in the Program area. It is found near the Almaden Calero Canal, Coyote Canal, Coyote Canal Extension, Silver Creek, Metcalf Canyon, Anderson Dam spillway, Coyote Creek tributaries, springs east of Coyote Creek, drainages between Kirby Canyon landfill, and Coyote Creek golf course, drainage near Almaden Research Center, north of Calero Reservoir in a tributary to Arroyo Creek, and other locations. Suitable habitat is present elsewhere on mesic serpentine habitat, such as seeps and swales throughout the foothills in the central portion of the Program area. SCVWD surveys in 2004 and 2008 documented the Mt. Hamilton thistle on SCVWD lands only along canals, which are not included in the SMP 2013 Manual Update. A possibility exists that the species occurs on serpentine substrates along creeks near SMP work sites.
Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*)	CNPS List 4.3	Chaparral, cismontane woodland/ chaparral, oak woodland; slopes near drainages	**May be Present**. Suitable habitat may be present in the Program area. This CNPS list 4.3 species has a narrow endemic range that has been reduced to Santa Clara and Alameda counties. Three of 17 records in Santa Clara County are below 1,000 feet elevation and are within the Program area. Suitable habitat exists in chaparral and oak woodland habitats in the upper limits of the Program area, in the foothills of the Santa Cruz Mountains and the Diablo Range.
San Francisco collinsia (*Collinsia multicolor*)	CNPS List 1B.2, VHP	Closed-cone coniferous forest, coastal scrub, sometimes serpentinite	**May be Present**. One population has been documented near Stanford University, but was last reported in 1903. A second occurrence, listed in Edenvale, is located in the Program area. However, this population was recorded in an area that has since been developed, and the species was last observed there in 1961. A new occurrence was observed by SCVWD botanist J. Hillman (pers. comm.) in 2009, on

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
			the shoreline of Anderson Reservoir, and another occurrence was reported in Almaden/Quicksilver Park (outside of the Program area) in 2001 (although this occurrence has not been relocated). SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of San Francisco collinsia. However, SCVWD did document an occurrence along the shoreline of Anderson Reservoir in 2009, and the majority of occurrences are not located on serpentine soils. Thus, some potential exists for the species to occur in or near SMP work sites.
Hospital Canyon larkspur (*Delphinium californicum ssp. interius*)	CNPS List 1B.2	Found in chaparral and cismontane woodland habitats at elevations of approximately 760-3,615 feet	**May be Present**. Suitable habitat may be present in the Program area. The species inhabits a small endemic range that covers the mid- and upper elevations of the inner Coast Ranges in the San Francisco Bay Area and south towards Mount Hamilton. Potential habitat occurs toward the upper elevations of the Program area in the Diablo Range, in wet, boggy meadows, canyons, and chaparral openings.
Western leatherwood (*Dirca occidentalis*)	CNPS List 1B.2	Mesic broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and riparian woodland habitats at elevations of approximately 164-1,296 feet	**May be Present**. Suitable habitat may be present in the Program area. Four occurrences have been documented in the northeastern portion of the Program area, and these are presumed extant. Potential habitat occurs in the Santa Cruz mountains, in the foothills along the northeastern edge of the Program area.
Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*)	CNPS List 1B.1	Vernal pools/California annual grassland habitat on alkaline soil, seasonal wetland	**May be Present**. Suitable habitat may be present in the Program area. Several historical occurrences of the species have been reported in the Program area. However, all occurrences in Santa Clara County have been extirpated by development, except one located in the vicinity of San Felipe Lake on the southern border of the county. Habitat of a suitable quality may be present in alkaline depressions, vernal pools, or roadside ditches along South San Francisco Bay, near Alviso.

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
Talus fritillary (*Fritillaria falcate*)	CNPS List 1B.2	Serpentinite, often talus-based soils in chaparral, cismontane woodland, and lower montane coniferous forest habitats at elevations of approximately 984-5,003 feet	**Absent**. Out of range; no suitable habitat occurs for this species. No documented occurrences occur in the Program area. The last documented observation was in Blackbird Valley, a tributary to Arroyo Colorado Creek, in 1995. This was at a 3,000-foot elevation, outside the Program area. The species is presumed to be absent.
Fragrant fritillary (*Fritillaria liliacea*)	CNPS List 1B.2, VHP	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland, often in serpentinite/oak woodland, serpentine bunchgrass grassland	**Unlikely to Occur**. Six populations have been documented in various locations in the Program area. Additional suitable habitat occurs on serpentine soils in the Program area, such as Coyote Ridge, Anderson and Calero Reservoirs, west of Coyote Valley, the Santa Teresa Hills, Communications Hill, and serpentine north of Alum Rock. SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of fragrant fritillary. Therefore, this species is not expected to occur in or very near any SMP work sites.
Loma Prieta hoita (*Hoita strobilina*)	CNPS List 1B.1, VHP	Chaparral, cismontane woodland, riparian woodland, usually serpentinite/mesic mixed serpentine chaparral, serpentine seeps	**May be Present**. Known occurrences of the species have been recorded on several creeks in the Program area, suggesting the possibility that the species may occur in SMP work sites. Numerous records exist in the Program area, from serpentine soils predominantly in the Santa Cruz mountains from Saratoga to Gilroy, to the Diablo range near Coyote Ridge. Suitable habitat is present in the Program area in riparian areas, particularly in mesic-serpentine influenced soils of the Santa Cruz Mountains.
Satan's goldenbush (*Isocoma menziesii* var. *diabolica*)	CNPS List 4.2	Cismontane woodland/oak woodland	**May be Present**. Suitable habitat may be present in the Program area. The species only has been documented in Santa Clara and San Benito counties. It occurs in the Program area in the foothills near the Almaden Hills. Suitable habitat is present in the foothills where oak woodland habitat occurs in the Santa Teresa Hills, the Almaden Hills, near Anderson Reservoir, and along Coyote Ridge.

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
Woolly-headed lessingia (*Lessingia hololeuca*)	CNPS List 3	Clay and serpentinite soils in broadleafed upland forest, coastal scrub, lower montane coniferous forest, and valley and foothill grassland habitats at elevations of approximately 49-1,000 feet	**Unlikely to Occur**. Two records exist in the Program area, one in the foothills west of Los Gatos and one in an area north of Gilroy. Potential habitat exists in the Program area, on serpentine soils in the foothills of the Santa Cruz Mountains. SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of wooly-headed lessingia. Therefore, this species is not expected to occur in or very near any SMP work sites.
Smooth lessingia (*Lessingia micradenia* var. *glabrata*)	CNPS List 1B.2, VHP	Chaparral, cismontane woodland- on serpentinite, often roadsides/mixed serpentine chaparral and oak woodland	**May be Present**. In the Program area, 27 records have been made throughout the foothills in the central and southern portions of the county, in both the Santa Cruz Mountains and the Diablo Range. Suitable habitat is present on rocky slopes and along roadsides in serpentine-derived soils throughout the central and southern foothills of Santa Clara County. SCVWD surveys in 2004 and 2008 documented the smooth lessingia on SCVWD lands only along canals, which are not included in the SMP 2013 Manual Update. The possibility exists that the species occurs on serpentine substrates along creeks near SMP work sites.
Showy golden madia (*Madia radiata*)	CNPS List 1B.1	Cismontane woodland and valley and foothill grassland habitats from 82-2,953 feet in elevation	**May be Present**. Suitable habitat may be present in the Program area. The only documented occurrence in Santa Clara County is from an elevation of 2,200 feet, outside the Program area. Potential habitat exists within the Program area, in the foothills on clay soils.
Davidson's bush-mallow (*Malacothamnus davidsonii*)	CNPS List 1B.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland/ chaparral, oak woodland, mixed riparian forest and woodland	**May be Present**. No extant records are found in the Program area; however, suitable habitat is present. Three historical records exist near Stanford and Los Altos, dating from 1936. Suitable habitat is present in the woodland and riparian habitats of the foothills of the Santa Cruz Mountains, on sandy substrates.

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
Hall's bush-mallow (*Malacothamnus hallii*)	CNPS List 1B.2, VHP	Chaparral, coastal scrub/chaparral	**May be Present**. SCVWD surveys in 2004 and 2008 documented the Hall's bush-mallow only along canals, which are not included in the SMP 2013 Manual Update. A possibility exists that the species occurs along creeks near SMP work sites. Numerous records of the species exist in the Program area, in the Santa Teresa Hills and along Coyote Ridge. Additional suitable habitat is present in the foothills of the Santa Cruz Mountains and the Diablo Range.
Oregon meconella (*Meconella oregano*)	CNPS List 1B.1	Coastal prairie and coastal scrub communities, at elevations from 820-2,034 feet	**May be Present**. No known occurrences exist in the Program area, but suitable habitat may be present. Three occurrences were recorded in Santa Clara County as recently as 2005. All were in the same location near the summit of Mt. Hamilton. Potential habitat may occur in the upper reaches of the Program area (above 820 feet elevation) in the Diablo Range.
Mt. Diablo cottonweed (*Micropus amphiboles*)	CNPS List 3.2	Broad-leafed upland forest, chaparral, cismontane woodland, valley and foothill grassland in rocky habitat/oak woodland, chaparral, California annual grassland	**May be present**. Suitable habitat may be present in the Program area. One record of the species exists in the Program area from a location west of Campbell. Suitable habitat occurs within rocky oak woodland habitat in the Santa Cruz Mountains and the Diablo Range.
Robust monardella (*Monardella villosa* ssp. *globosa*)	CNPS List 1B.2, VHP	Broad-leafed upland forest (openings), chaparral (openings), cismontane woodland, coastal scrub, valley and foothill grassland/chaparral, oak woodland, and California annual grassland	**May be Present**. Five records exist for the species in the Program area. These predominantly occur in Almaden Quicksilver County Park, Rancho San Antonio Open Space Preserve, and Lexington Reservoir County Park. Suitable habitat is present in the Program area, particularly in the foothills of the Santa Cruz Mountains and the Diablo Range.
Hooked popcorn-flower (*Plagiobothrys uncinatus*)	CNPS List 1B.2	Valley and foothill grasslands, cismontane woodlands, and chaparral habitats (sandy soils) at elevations of approximately 990-2,510 feet; across all habitat types often associated with canyon slopes	**May be Present**. No known occurrences exist in the Program area, but suitable habitat may be present. Potential habitat exists in sandy soils at higher elevations in the foothills bordering the Program area.

Common Name (*Scientific Name*)	Status[1, 2]	Habitat Association	Potential to Occur in the Program Area
Most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*)	CNPS List 1B.2, VHP	Chaparral, cismontane woodland, valley and foothill grassland in serpentinite/ serpentine bunchgrass grassland, mixed serpentine chaparral	**May be Present**. Numerous populations have been recorded in the Program area along Coyote Ridge, near Anderson and Calero reservoirs, and in the Santa Teresa Hills. In addition, suitable habitat is present in the Program area on serpentine soils, such as those on Communications Hill and the serpentine habitat area near Alum Rock. SCVWD surveys in 2004 and 2008 documented the most beautiful jewel-flower only along canals, which are not included in the SMP 2013 Manual Update. A possibility exists that the species occurs on serpentine substrates along creeks near SMP work sites.
Saline clover (*Trifolium depauperatum* var. *hydrophilum*)	CNPS List 1B.2	Mesic, alkaline, or saline sites in valley and foothill grassland habitat, in vernal pool habitat, or in marshes and swamps at elevations from 0-984 feet; occurs in both coastal and inland marshes (Hickman 1993)	**May be Present**. No known occurrences in the Program area, but suitable habitat may be present. The nearest documented occurrences are between Millers Canal and the Pajaro River off Highway 125 near the San Benito and Santa Clara county line. Suitable habitat in the Program area would be mesic-alkaline soils in vernal pools, marshes, and swamps, and grasslands, such as those near Alviso and the Pajaro River.

[1]Federal and State Endangered and Threatened Status Definitions:
[2]California Native Plant Society (CNPS)
– = None

List Status Definitions:

Federal
BLM Designated as Sensitive by the Bureau of Land Management (BLM)
FE Endangered under the Endangered Species Act (ESA)
FT Threatened under the ESA

State
SE Endangered under the California Endangered Species Act
SR Rare under the Native Plant Protection Act
1B California Rare Plant Rank of rare, threatened, or endangered in California and elsewhere

Source: Data compiled by H.T. Harvey & Associates in 2013

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Federal or State Endangered, Threatened, or Candidate Species			
Bay checkerspot butterfly (Euphydryas editha bayensis)	FT	Native grasslands on serpentine soils; larval host plants are Plantago erecta and/or Castilleja sp.	Present. Occurs within the Program area in serpentine bunchgrass grasslands and serpentine rock outcrop/barrens on the east side of the Santa Clara Valley, from Coyote Ridge south to Harvey Bear Ranch and on the west side of the valley from the Santa Teresa Hills south to San Martin.
Green sturgeon (Acipenser medirostris)	FT, CSSC	Spawns in large river systems such as the Sacramento River; forages in nearshore oceanic waters, bays, and estuaries	May be Present. Known to occur in San Francisco Bay; apparently occurs in the South Bay very rarely as a non-breeding visitor. May occur in the tidal reaches of sloughs in the Alviso area within the Program area, albeit infrequently and in low numbers, if at all. Does not spawn in the South Bay. Likely occurs only irregularly and in low numbers in the Program area. The species is not expected to be a concern because of the very limited abundance of the species in the Program vicinity and the limited extent of SMP activities to occur in tidal habitats.
Longfin smelt (Spirinchus thaleichthys)	ST	Spawns in fresh water in the upper end of the San Francisco Bay; occurs year-round in the South Bay	May be Present. Occurs in the South Bay year-round (Wernette 2000), and has been collected in Alviso Slough (EDAW 2007) and in the Island Ponds between Coyote Slough and Mud Slough (Hobbs 2011). May be present in the tidal reaches of other sloughs in the South Bay as a rare non-breeding visitor, but in very low numbers. Does not spawn in the Program area, and the species is likely to occur only in low numbers in the Program area because of the very limited abundance of the species in the vicinity and limited extent of SMP activities in tidal habitats.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Central California coast steelhead (Oncorhynchus mykiss)	FT	Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats	Present. Known to occur in the Program area in a number of streams flowing into the San Francisco Bay, including Coyote Creek, Upper Penitencia Creek, Arroyo Aguague, Los Gatos Creek, Alamitos Creek, Arroyo Calero, Los Trancos Creek, Guadalupe Creek, the Guadalupe River, Stevens Creek, and San Francisquito Creek. Likely present in all accessible reaches of these streams in the Program area during migration. Juveniles present year-round in upper reaches of these streams. Also present in the lower, tidal reaches of Alviso Slough, Coyote Slough, Stevens Creek, and San Francisquito Creek, and in estuarine habitats of the South Bay during migration.
South-Central California coast steelhead (Oncorhynchus mykiss)	FT	Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats	Present. Known to occur in the Program area in the Pajaro River and its tributaries, including Llagas Creek, Uvas/Carnadero Creek, Little Arthur Creek, Bodfish Creek, Tar Creek, and Pacheco Creek. Likely present in all accessible reaches of these streams in the Program area during migration.
California tiger salamander (Ambystoma californiense)	FT, SE/ CSSC	Vernal or temporary pools in annual grasslands or open woodlands	Present. Historically may have occurred throughout the Program area; however, several populations located along the valley floor have been extirpated because of habitat loss, and the species is absent from most of the valley floor. Recent occurrences are scattered throughout the Program area on both sides of the Santa Clara Valley.
California red-legged frog (Rana draytonii)	FT, CSSC	Streams, freshwater pools, and ponds with emergent or overhanging vegetation	Present. This species apparently has been extirpated from much of the valley floor, as well as the brackish marshes bordering the South Bay, and red-legged frogs are not expected to occur throughout most of the developed portions of the Program area, even in streams and ponds. However, red-legged frogs are known or expected to occur in a number of locations at the periphery of the Program area (i.e., in or near the upper, less developed reaches of streams in the Program area).

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
San Francisco garter snake (Thamnophis sirtalis tetrataenia)	FE, SE	Freshwater marshes, ponds, and slow-moving streams along the coast	Absent. Garter snakes in the northwestern part of the Program area (i.e., in the Palo Alto/Stanford area) fall within the intergrade zone between the San Francisco garter snake and the red-sided garter snake (Thamnophis sirtalis infernalis) (Barry 1994). The intergrade populations do not belong exclusively to either subspecies; thus, true San Francisco garter snakes do not occur in the Program area.
Bank swallow (Riparia riparia)	ST	Colonial nester on vertical banks or cliffs with fine-textured soils near water	Absent as Breeder. No recent breeding records from Santa Clara County. Occurs only as a rare migrant.
California condor (Gymnogyps californianus)	FE, SE	Nests in caves in steep, isolated cliffs or cavities in mature redwood trees. Forages over grasslands, open woodlands, and along coastal beaches	May be Present. Historically present as a non-breeder but not currently known to occur in the Program area. No breeding habitat for this species is present in the Program area. Reintroduced individuals from Pinnacles National Monument in San Benito County occasionally range as far north as the Program area (and may do so increasingly in the future, if the reintroduced population expands), because five were sighted at the summit of Mt. Hamilton in June 2011. However, such individuals are unlikely to occur in the low-elevation areas where the SMP activities are expected to occur.
Bald eagle (Haliaeetus leucocephalus)	SE, SP	Occurs mainly along seacoasts, rivers, and lakes; nests in tall trees or in cliffs, occasionally on electrical towers; feeds mostly on fish	Present. Has been recorded nesting in the Program area (i.e., below 1,000 feet elevation) at Coyote Reservoir, where a pair nested in 2010; at Anderson Reservoir, where a nesting pair was present in 2010 and possibly in several prior years; and at San Felipe Lake, where a pair was nesting in 2011. However, no SMP activities are projected to be performed near any of these nest sites. Elsewhere in Santa Clara County, it has nested only at Calaveras Reservoir, which is outside the Program area. Small numbers forage in the Program area at all the large reservoirs, and in Coyote Valley, primarily during the non-breeding season.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Swainson's hawk (Buteo swainsoni)	ST	Nests in trees surrounded by extensive marshland or agricultural foraging habitat	Absent as Breeder. Apparently nested in small numbers in Santa Clara County historically, and an 1894 nest record exists for the Berryessa area (in eastern San Jose) (Bousman 2007). Currently, the species is known to occur in the Program area only as a very infrequent transient during migration. Although young not long out of the nest have been recorded on several occasions in the Santa Clara Valley in recent years, more concrete evidence of nesting has not been documented, so this species currently is not known to breed in the Program area.
California clapper rail (Rallus longirostris obsoletus)	FE, SE, SP	Salt marsh habitat dominated by pickleweed and cordgrass	Present. Suitable breeding habitat is present in the Program area in saltmarsh habitat along the lowermost tidal reaches of creeks that flow into the San Francisco Bay (Liu et al. 2009). On very rare occasions, non-breeding individuals wander up tidal sloughs (e.g., in tidal brackish/freshwater marsh habitats along Alviso Slough); however, all suitable breeding habitat for clapper rails is present in saline and brackish tidal marshes.
California black rail (Laterallus jamaicensis coturniculus)	ST, SP	Breeds in fresh, brackish, and tidal salt marsh	May be Present. Not known to breed in the South Bay; occurs only as a very infrequent winter visitor to tidal salt marshes along the edge of the Bay.
Western snowy plover (Charadrius alexandrinus nivosus)	FT, CSSC	Sandy beaches on marine and estuarine shores and salt pannes in the San Francisco Bay saline managed ponds	Present. Nests on levees, islands, and salt flats in some of the South Bay saline-managed ponds in the Mountain View/Sunnyvale/Alviso area, and in New Chicago Marsh in Alviso. Forges in these same areas and on levees and managed pond bottoms in other ponds along the Bayedge.
California least tern (Sterna antillarum browni)	FE, SE, SP	Nests along the coast on bare or sparsely vegetated, flat substrates; in the South Bay, nests in salt pannes and on an old airport runway; forages for fish in open waters	Present. Does not breed in the Program area. The South Bay is an important post-breeding staging area for least terns. Most such staging has occurred in managed ponds along the Bay in the Mountain View/Sunnyvale area (occasionally in the Alviso area).

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Least Bell's vireo (Vireo bellii pusillus)	FE, SE	Nests in heterogeneous riparian habitat, often dominated by cottonwoods and willows	May be Present. The only breeding records in Santa Clara County are from Llagas Creek southeast of Gilroy in 1997 and the Pajaro River south of Gilroy in 1932. Otherwise, records include one or two singing males along lower Llagas Creek in May 2001, and a singing male in June 2006 along Coyote Creek near the Coyote Creek Golf Club. Although this species may increase in number and distribution as core populations increase, it is unlikely to be more than a rare and very locally occurring breeder along south county streams.
Townsend's big-eared bat (Corynorhinus townsendii)	SC	Roosts in caves and mine tunnels, and occasionally in deep crevices in trees such as redwoods or in abandoned buildings, in a variety of habitats	May be Present. No known extant populations on the Santa Clara Valley floor, and no breeding sites known from the Program area. Occasionally individual Townsend's big-eared bats may roost and forage in habitats nearly anywhere in the Program area, but such individuals are expected to occur very infrequently and in small numbers. Roosting colonies are known from UTC property east of Coyote Ridge near Metcalf Road and at Almaden-Quicksilver County Park. Although both locations are outside the Program area, these records indicate the potential for this species to occur in suitable habitat in the Program area, possibly near southern Coyote Ridge and northern Anderson Reservoir or in the Guadalupe Mines area.
Salt marsh harvest mouse (Reithrodontomy s raviventris)	FE, SE, SP	Salt marsh habitat dominated by common pickleweed	Present. Known to occur in the Program area in saline and brackish marshes, particularly those dominated by pickleweed or dense mature tri-corner bulrush (Schoenoplectus americanus) habitat around the Bay edge, including both fully tidal and diked/muted tidal marshes (H.T. Harvey & Associates 2010).
San Joaquin kit fox (Vulpes macrotis mutica)	FE, ST	Flat or gently sloping grasslands, mostly on the margins of the San Joaquin Valley and adjacent valleys	May be Present. Expected to occur only in the southeastern portion of the Program area, in the vicinity of Pacheco Creek and the uppermost reaches of the Pajaro River. If it occurs here at all, likely to occur in low numbers, and infrequently, during dispersal between areas of known breeding activity outside the Program area. No SMP activities are projected in areas where the kit fox can occur.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
California Species of Special Concern			
Central Valley fall-run Chinook salmon (Oncorhynchus tshawytscha)	CSSC	Cool rivers and large streams that reach the ocean and that have shallow, partly shaded pools, riffles, and runs	Present. Known to occur in the Program area in Coyote Creek, Los Gatos Creek, Alamitos Creek, and the Guadalupe River in very small numbers (Leidy et al. 2003). Uses the lower reaches of Coyote Creek and Alviso Slough as migration corridors between estuarine habitats and upstream spawning and rearing habitats. However, genetic analysis has confirmed that Chinook in South Bay streams are all derived from hatchery stock, and conditions for successful spawning in the Program area are marginal.
Monterey roach (Lavinia symmetricus subditus)	CSSC	Fairly warm streams and rivers flowing into Monterey Bay	Present. Restricted to the tributaries of the Monterey Bay. It is considered plentiful in the Pajaro watershed and is known to occur in Llagas Creek, Uvas Creek, and the Pajaro River.
Foothill yellow-legged frog (Rana boylii)	CSSC	Partially shaded shallow streams and riffles with a rocky substrate. Occurs in a variety of habitats in coast ranges	Present. This species has disappeared from the farmed and urbanized areas of Santa Clara County as well as many of the perennial streams below major reservoirs. Foothill yellow-legged frogs may still be present along the eastern and western margins of the Program area, along the upper reaches of cobbly streams (H.T. Harvey & Associates 1999).
Western pond turtle (Actinemys marmorata)	CSSC	Permanent or nearly permanent water in a variety of habitats	Present. Occurs in a number of aquatic habitats in the Program area, including a number of creeks, rivers, lakes, and ponds (H.T. Harvey & Associates 1999, CNDDB 2011). The majority of recent occurrences in the Program area have been from southern areas or from the margins of the Program area, as breeding populations have been extirpated from most agricultural and urbanized areas. However, individuals of this long-lived species still occur in urban streams and ponds as well.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
California horned lizard (Phrynosoma coronatum frontale)	CSSC	Open habitats with sandy, loosely textured soils, such as chaparral, coastal scrub, annual grassland, and clearings in riparian woodlands with the presence of native harvester ants (Pogonomyrmex barbatus)	Present. Recorded recently in the Program area only near Calero Reservoir. Probably restricted to a few locations at the margins of the Program area.
Silvery legless lizard (Anniella pulchra pulchra)	CSSC	Areas with sandy or loose loamy soils under the sparse vegetation of beaches, chaparral, or pine-oak woodland; or sycamores, cottonwoods, or oaks that grow on stream terraces	Absent. Historically recorded in Program area in the Alviso area, but no recent records. Silvery legless lizards have been displaced by development or disturbed by agriculture in much of the Program area, and a suite of other factors (e.g., off-road vehicle activity, erosion, livestock grazing, and the introduction of exotic plant species) has altered remaining habitat to the extent that the species is unlikely to occur in the Program area.
Redhead (Aythya americana)	CSSC (nesting)	Nests in marshes and at pond margins	Absent as Breeder. Recorded nesting in the Program area only on a few occasions, in the 1970s and 1980s, at the Palo Alto Flood Control Basin. Low probability of nesting elsewhere.
Western least bittern (Ixobrychus exilis hesperis)	CSSC (nesting)	Nests and forages in freshwater marshes	Absent as Breeder. Although the species has been recorded occasionally in the Program area, no breeding confirmations exist for the Program area, and this species likely occurs only as an occasional migrant.
Black skimmer (Rynchops niger)	CSSC (nesting)	Nests on abandoned levees and islands in saline managed ponds and marshes	Present. Uncommon resident. Black skimmers have nested in the South Bay since 1994. Near the Program area, the species has nested on islands in saline managed ponds in the Alviso area (e.g., on ponds AB1, AB2, A1, A2W, A7, A8 and A16, and Pond A12 (Bousman 2007). May forage in tidal sloughs, but is not expected to occur away from tidal/bayland areas.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Northern harrier (Circus cyaneus)	CSSC (nesting)	Nests in marshes and moist fields, forages over open areas	Present. Within the Program area, potential nesting habitat is present primarily in tidal marshes along sloughs, in diked/muted tidal salt marshes near the Bay, in fallow fields and pastures in Coyote Valley, and in fallow fields and wetlands along lower Llagas Creek, Carnadero Creek, and the Pajaro River. The accessibility of these areas to predators, particularly away from Bay marshes, limits the abundance of nesting pairs in the Program area. Non-breeders are known to forage regularly in grassland, agricultural, and wetland habitats in the Program area, occasionally (e.g., during vole outbreaks) in high densities.
Long-eared owl (Asio otus)	CSSC (nesting)	Riparian bottomlands with tall, dense willows and cottonwood stands (also dense live oak and the California Bay along upland streams); forages primarily in adjacent open areas	May be Present. Rare resident and occasional winter visitor in Santa Clara County (Bousman 2007). Historical breeding records exist for the Santa Clara Valley floor and one recent nest was recorded at Ed Levin County Park west of Calaveras Reservoir (Noble 2007). Could potentially breed in oak woodlands, riparian habitats, and other wooded habitats in the Program area, although likely only in very low numbers.
Short-eared owl (Asio flammeus)	CSSC (nesting)	Nests in marshes and moist fields, forages over open areas	May be Present. Has been recorded nesting in the Program area only in the Palo Alto Flood Control Basin, although it has not been confirmed nesting there since the 1970s. Low probability of nesting elsewhere.
Burrowing owl (Athene cunicularia)	CSSC	Open grasslands and ruderal habitats with suitable burrows, usually those made by California ground squirrels	Present. Present year-round in the Program area in open, agricultural, and grassland areas, where active ground squirrel burrows are present. However, the species has undergone a decline in Santa Clara County. Core populations of breeding and overwintering burrowing owls occur at the San Jose International Airport, in the North San Jose/Alviso area, and in the northern Mountain View area.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Vaux's swift (Chaetura vauxi)	CSSC (nesting)	Nests in snags in coastal coniferous forests or, occasionally, in chimneys; forages aerially	May be Present. In the South Bay, breeds primarily in snags within Santa Cruz Mountain forests, outside of the Program area. However, it also breeds in residential chimneys in the foothills of the Santa Cruz Mountains. Swifts have been observed foraging widely over various habitats, but most commonly in suburban areas having chimneys suitable for nesting, such as Los Gatos, Los Altos, Los Altos Hills, Cupertino, and Campbell (Rottenborn 2007). Thus, it likely breeds more commonly than currently recorded (though still in small numbers) in residential areas in the northwestern part of the Program area. The species forages aerially over these areas during the breeding season, and anywhere over the larger Program area during migration.
Olive-sided flycatcher (Contopus cooperi)	CSSC (nesting)	Breeds in mature forests with open canopies, along forest edges in more densely vegetated areas, in recently burned forest habitats, and in selectively harvested landscapes	Present. Common summer resident in western Santa Clara County (Bousman 2007). This species breeds widely in the Santa Cruz Mountains, and more sparingly in the Diablo Range, but it does not breed on the Santa Clara Valley floor. Likely, few pairs nest at sites below 1,000 feet elevation, but confirmed breeding has occurred at elevations as low as 400 feet (Bousman 2007).
Loggerhead shrike (Lanius ludovicianus)	CSSC (nesting)	Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats	Present. Breeds in a number of locations in the Program area where open grassland, ruderal, or agricultural habitat with scattered brush, chaparral, or trees provides perches and nesting sites (Bousman 2007), although populations seem to have declined in recent years as suitable habitat dwindles with increasingly development. Occurs slightly more widely (i.e., in smaller patches of open areas providing foraging habitat) during the non-breeding season.
Yellow warbler (Dendroica petechia)	CSSC (nesting)	Nests in riparian woodlands	Present. Uncommon breeder in wooded riparian habitats in the Program area. Prefers riparian corridors with an overstory of mature cottonwoods and sycamores, a midstory of box elder and willow, and a substantial shrub understory (Bousman 2007), particularly in areas with more open space adjacent to the riparian habitat (rather than in heavily developed areas). The species is an abundant migrant throughout the Program area during the spring and fall.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
San Francisco common yellowthroat (Geothlypis trichas sinuosa)	CSSC	Nests in herbaceous vegetation, usually in wetlands or moist terraces	Present. In the Program area, the greatest proportion of breeding records are from brackish and freshwater marshes near the edge of the Bay, and in early-successional riparian habitat in broader floodplains along lower Coyote Creek and the Guadalupe River (Bousman 2007). Nests typically are located in extensive stands of bulrushes in brackish marshes and dense cattail beds in freshwater marsh habitat, but also are found in forbs in riparian habitats. Yellowthroats nesting from the northern San Jose/Milpitas/Santa Clara/Los Gatos area northward, both along the edge of the Bay and in riparian and wetland habitats inland, are likely of this subspecies, whereas those in areas to the south are likely of the more widespread subspecies arizela.
Yellow-breasted chat (Icteria virens)	CSSC (nesting)	Nests in dense stands of willow and other riparian habitat	Present. Rare breeder, and only slightly more regular transient, in willow-dominated riparian habitats in the Program area. Historically, it likely bred more widely in Santa Clara County, but it is now rare because of the loss of suitable breeding habitat and brood parasitism in brown-headed cowbirds. In the Program area, the species is most numerous and occurs most regularly on lower Llagas Creek, but it has been recorded along Coyote Creek in the vicinity of Hellyer Park upstream, and it likely occurs in low numbers on other streams south of the more urbanized San Jose area.
Alameda song sparrow (Melospiza melodia pusillula)	CSSC	Nests in salt marsh, primarily in marsh gumplant and cordgrass along channels	Present. Endemic to Central and South San Francisco Bay. In the Program area, it occurs in the taller vegetation found along tidal sloughs, including salt marsh cordgrass and marsh gumplant, near the South Bay. The location of the interface between populations of the Alameda song sparrow and those of the race breeding in freshwater riparian habitats (gouldii) along most creeks is not known because of difficulties in distinguishing individuals of these two races in the field.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Grasshopper sparrow (Ammodramus savannarum)	CSSC (nesting)	Breeds and forages in grasslands, meadows, fallow fields, and pastures	Present. Nests in extensive grasslands with some heterogeneity, including serpentine grasslands. In the Program area, breeding birds occur in the foothills of the Santa Cruz Mountains, and from Calaveras Reservoir southeast to the hills above Pacheco Creek (Heller 2007). Breeding birds also occur in the southeast portion of the Program area, where the hills drop down to the Pajaro River Valley (Heller 2007). It may occur somewhat more widely during migration, but it is seldom detected in the Program area outside the breeding season.
Bryant's savannah sparrow (Passerculus sandwichensis alaudinus)	CSSC	Nests in pickleweed dominated salt marsh and adjacent ruderal habitat	Present. Breeds in the Program area primarily in short pickleweed-dominated portions of diked/muted tidal salt marsh habitat, and in adjacent ruderal habitat, in the South San Francisco Bay (Rottenborn 2007). Breeding also has been confirmed in expanses of short grassland in inland/non-instream areas on the west side of the Coyote Valley and in the Santa Cruz Mountain foothills just north of the Pajaro River Valley (Rottenborn 2007). During the non-breeding season, alaudinus and other savannah sparrow subspecies may forage in open areas throughout the Program area.
Tricolored blackbird (Agelaius tricolor)	CSSC (nesting colony)	Nests near fresh water in dense emergent vegetation	Present. Typically nests in extensive stands of tall emergent herbaceous vegetation in freshwater marshes and ponds. In the Program area, the species is patchily distributed in the Santa Clara Valley, its distribution reflecting the patchy nature of its breeding habitat (Rottenborn 2007). The species occurs as an uncommon non-breeding forager throughout most of the Program area.
Salt marsh wandering shrew (Sorex vagrans halicoetes)	CSSC	Medium-high marsh 6 to 8 feet above sea level with abundant driftwood and common pickleweed	May be Present. Formerly more widely distributed in the Bay Area. This small insectivorous mammal is now confined to salt marshes of the South Bay (Findley 1955). Salt marsh wandering shrews occur most often in medium-high wet tidal marsh (6 to 8 feet above sea level), with abundant driftwood and other debris for cover (Shellhammer 2000). They also have been recorded occasionally in diked marsh. This species typically is found in fairly tall pickleweed, in which these shrews build nests.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Pallid bat (Antrozous pallidus)	CSSC	Forages over many habitats; roosts in caves, rock outcrops, buildings, and hollow trees	Present. Historically, likely present in a number of locations throughout the Program area, but this species has declined in recent decades. Known maternity colonies in the Program area occur at several locations, such as on Cochrane Road near Anderson Dam; south of Berryessa Creek and close to Old Piedmont Road, and on Chaboya Court at the end of Quimby Road in eastern San Jose; and on the Highway 152 bridge over Uvas Creek. Suitable roosting sites are present in a number of other areas, particularly in or near open space or less developed areas around the periphery of the Program area, and the species may be more widespread than is known. Individuals potentially could forage in the Program area in open areas located within several miles of colonies.
Western red bat (Lasiurus blossevillii)	CSSC	Roosts in foliage in forest or woodlands, especially in or near riparian habitat	Present. Occurs as a migrant and winter resident, but does not breed in the Program area. May roost in foliage in trees virtually anywhere in the Program area, but is expected to roost primarily in riparian areas.
San Francisco dusky-footed woodrat (Neotoma fuscipes annectens)	CSSC	Nests in a variety of habitats including riparian areas, oak woodlands, and scrub	Present. Currently, with the exception of records along Coyote Creek and along the edges of the valley, San Francisco dusky-footed woodrats are not known to occur on the urban Santa Clara Valley floor (H.T. Harvey & Associates 2010). They also have likely been extirpated in the southern portion of the county, in the Gilroy and Morgan Hill areas where the valley floor is developed (H.T. Harvey & Associates 2010). In the Program area, Coyote Creek likely supports extant populations of the San Francisco dusky-footed woodrat. Where low open valleys are less developed, woodrat populations appear to remain intact.
American badger (Taxidea taxus)	CSSC	Burrows in grasslands and occasionally in infrequently disked agricultural areas	Present. Known to occur in the Program area primarily in grasslands and less frequently disturbed agricultural habitats, mostly in the foothills but sometimes on the valley floor.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
State Fully Protected Species			
American peregrine falcon (Falco peregrinus anatum)	SP	Forages in many habitats; nests on cliffs and tall bridges and buildings	Present. Peregrine falcons are uncommon breeders in the Program area, but non-breeders are present in small numbers in fall and winter. They may occur anywhere throughout the Program area as a forager or migrant, although always at low densities. In the Program area, peregrine falcons are known to nest at San Jose City Hall and on electrical towers in Mountain View and Alviso managed ponds. The may breed more widely in the Program area from 2012 through 2022.
Golden eagle (Aquila chrysaetos)	SP	Breeds on cliffs or in large trees (rarely on electrical towers), forages in open areas	Present. Breeds widely in the Diablo Range and less commonly in the Santa Cruz Mountains, mostly above the elevation of the Program area, but a few pairs breed at the edges of the Santa Clara Valley at elevations within the Program area (Bousman 2007). Forages somewhat more widely in agricultural/open space areas on the valley floor, such as in the Alviso area, in Coyote Valley, and in the Pajaro River watershed.
White-tailed kite (Elanus leucurus)	SP	Nests in tall shrubs and trees, forages in grasslands, marshes, and ruderal habitats	Present. Breeds across the northern edge of Santa Clara County, from the foothills of the Santa Cruz Mountains near Palo Alto through the open areas edging the South Bay, and into the foothills of the Diablo Range east of Milpitas (Mammoser 2007). Also occurs at scattered locations southward along the Santa Clara Valley floor and the foothills on either side of the valley. Also fairly common along Llagas and Uvas/Carnadero creeks and the Pajaro River.
Ringtail (Bassariscus astutus)	SP	Cavities in rock outcrops and talus slopes, as well as hollows in trees, logs, and snags that occur in riparian habitats and dense woodlands, usually in close proximity to water	May be Present. Ostensibly, suitable habitat is present in forested areas at the upper margins of the Program area, but few confirmed records exist. The species has been observed near Lexington Reservoir, near Highway 152 just west of Gilroy, and near the confluence of Carnadero Creek and the Pajaro River, and it may be present in other areas removed from urbanization.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Other Special-Status Species			
Mimic tryonia (Tryonia imitator)		Coastal lagoons, estuaries, and salt marshes with permanent water	Present. The CNDDB has two records of this species in Santa Clara County, both within the Program area in the Alviso area (CNDDB 2011).
Hom's micro-blind harvestman (Microcina homi)		Endemic to serpentine soils in California; found under moist rocks in open hillside-grassland habitat	May be Present. The species has been observed or collected at eight sites, all within Santa Clara County (USFWS 1998). In the Program area, it has been observed in the Santa Teresa Hills, the Morgan Hill area, north of U.S. Highway 101 on Metcalf Road, and near Silver Creek Road (CNDDB 2011).
Jung's micro-blind harvestman (Microcina jungi)		Endemic to serpentine soils in California	May be Present. Known only from one rocky serpentine grassland location 0.9 mile south of the junction of Silver Creek and San Felipe roads near San Jose (USFWS 1998, CNDDB 2011).
Opler's longhorn moth (Adela oplerella)		Serpentine-derived or similar soils that support the moth's host plant, California cream cups	May be Present. Known from nine serpentine habitat locations in Santa Clara County, all within the Program area (USFWS 1998). Occurs on both sides of U.S. Highway 101 from Upper Hellyer Canyon to just south of Gilroy.
Unsilvered fritillary (Speyeria adiaste adiaste)		Openings in conifer and redwood forests, as well as oak woodlands, chaparral, and grassy slopes in the central coast region of California. Require violets (Viola spp.) as larval host plants	Absent. This subspecies is known from the Santa Cruz Mountains in San Mateo, Santa Cruz, and Santa Clara counties. It is not expected to occur at elevations below 1,000 feet in Santa Clara County. It has been determined to be absent from the Program area.
Pacific lamprey (Lampetra tridentata)		Spawns in gravel-bottomed streams or rivers upstream of riffle habitat. Adults forage in marine areas	Present. Historically, this species may have been present in streams throughout the Program area. It currently is known from the Guadalupe River San Francisquito, Coyote, Upper Penitencia, Lower Silver, Guadalupe, Alamitos, Stevens, and Uvas creeks, and may be locally common in these areas (Leidy 2007, SCVWD 2002–2009). The species' status is poorly documented, and abundance in other streams throughout the Program area is poorly understood. It may be present in all accessible portions of streams in the Program area during migration between spawning areas and marine foraging habitat.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Pacific harbor seal (Phoca vitulina richardsi)	MMPA	Found throughout the northern Atlantic and Pacific Oceans along coastal waters, river mouths, and bays	May be Present. Permanent resident of San Francisco Bay. Primary haul-out sites in the San Francisco Bay include Mowry Slough (243 seals in 1999), northeast of the Program area. Suitable haul-out sites for harbor seals are present in the Program area in the tidal reaches of sloughs in the South Bay area and use of haul-out sites varies over time. No pupping sites are currently known within the Program area, although potentially suitable pupping habitat is present.

List Status Definitions:

Federal
FE Endangered under the Endangered Species Act (ESA)
FT Threatened under ESA

State
SE Endangered under the California Endangered Species Act (CESA)
ST Threatened under CESA
SC Candidate for Listing under CESA
SP State Protected
CSSC California Species of Special Concern
MMPA Species Protected by the Marine Mammal Protection Act

Source: Data compiled by H.T. Harvey & Associates in 2013

ATTACHMENT D

Bank Stabilization Methods

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ATTACHMENT D
Bank Stabilization Methods

INTRODUCTION

Attachment D includes the range of methods available for conducting stream bank stabilization in the Stream Maintenance Program.

For each method, a stream flow velocity that is included. However, stream velocities will vary with the type of vegetation, the maturity of the vegetation, and the channel type. Bank stabilization projects in unmodified channels and modified channels with ecological value are designed in consideration of both impact avoidance and acceptable risk of flooding and damage to District facilities. The factors and rationale supporting the District's determination of "acceptable risk" will be included in the NPW.

Slopes and velocities identified herein are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

For all methods that include a revegetation or planting component, the following planting guidelines apply:

The plant palette will be based on an evaluation of the vegetation communities up- and down-stream of the erosion site, and the local soil, moisture, and hydraulic conditions. The species' relative erosion control effectiveness will also be considered. Plants utilized in the restored project area will consist of native herbaceous, shrub and/or tree species, or a mixture of these species selected from the SMP plant palette provided in Table 10-7 of the Program Manual. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows:

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center

For any tree removals or other associated vegetation impacts with the project, mitigation will be accounted for separately.

Attachment D applies to on-site[1] mitigation associated with bank stabilization activities authorized under the SMP. Off-site mitigation (i.e., mitigation outside the footprint of the authorized bank stabilization structure) requires submittal of compensatory mitigation plans to the permitting agencies (see Chapter 10 and SMP2 permits). Off-site compensatory mitigation plans must be approved in writing by the agencies, and must be implemented prior to or concurrent with the bank stabilization impacts for which off-site mitigation is being provided.

For off-site mitigation sites located within the mapped SMP coverage area, the compensatory mitigation plans must include a map showing the location of the mitigation site, an SMP mitigation site identification number, a planting plan diagram (to scale), planting specifications, and the date the plantings are to be installed. For off-site mitigation sites outside of the mapped SMP coverage area, the compensatory mitigation plans must be prepared in accordance with the USACE mitigation plan requirements for general permits (33 CFR 332.4[c]) and the most current version of the USACE San Francisco District's Mitigation and Monitoring Proposal Guidelines.

[1] For the purposes of this document, on-site is within the project disturbance area. Off-site is outside of the project disturbance area.

#1: EARTH REPAIR

DESCRIPTION

Earth repair involves the replacement and repair of eroded channel banks using compacted soil. The eroded slope is scarified and readied for fill placement. A three-foot deep key is cut into the invert. Fill is placed and compacted 80% to 90% in 8-inch lifts. The new slope is trimmed to a 2:1 slope. The surface is seeded with fast sprouting native grass species. Geotextile/erosion control fabric is placed over hydroseeding to secure newly compacted bank, where needed per site velocity and bank slope.

The fill material needs to be appropriate to this purpose. There should be no deleterious or organic material or other debris contained in the fill. The Atterberg Plasticity Index of the material should be between 15 and 25, with the Liquid Limit no higher than 40. The material must contain at least 20% clay (by weight) passing U.S. standard sieve number 200.

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Site shall be hydroseeded or hand-seeded as conditions require. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Provides limited biotic resources
Bank:	Provides limited biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits.

This repair method includes revegetation of the repair area using native grass and herbaceous species. This repair method will only be used on grass-lined channels where grass is the predominant vegetation, and that contain no significant (i.e., more than scattered, isolated trees and shrubs) riparian vegetation. Consequently, no additional mitigation is required. If trees and shrubs are removed as part of the bank repair, they will be replaced pursuant to the requirements set forth in Chapter 10.

#1: EARTH REPAIR



Before—Quimby Creek u/s White



After—Quimby Creek u/s White

#1A: EARTH REPAIR WITH BURIED ROCK

DESCRIPTION

Earth repair with buried rock protects against erosion scour and stabilizes excavated or steep channel embankments. The buried rock (rock buttress) contributes to slope stability and prevents embankment failure (e.g., slumps, slides, sags). The rock structure will guard against bank scour, loss of adjacent property, protect infrastructure, and arrest future erosion, thereby reducing the loss of riparian vegetation during high flow events. The rock buttress is buried and compacted earth is placed over the top to provide an area for revegetation. No hardscape features are visible above-ground upon completion of this method.

The buried rock typically requires a cutoff wall to prevent undermining. The cutoff wall is an excavated trench with revetment, rock, or boulders placed inside. The rock buttress is composed of rock revetment or boulders placed and stacked in such a manner as to construct a gravity retaining wall. The buttress height is limited and may be installed on cut benches in the embankment for purposes of stability. Earth is placed in successive lifts adjacent to the base of the rock buttress and over the tops of the boulders. Once the earth has been placed, the overbuilt embankment is cut and trimmed back to match the upstream and downstream channel side slopes and toes.

DESIGN CRITERIA

Appropriate on bank slopes of 1.5:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

Soil cover over boulders must be a minimum of one and a half feet.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as rock placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. This repair method includes revegetation of buried revetment. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#1B1: EARTH REPAIR WITH BOULDER BASE VEGETATED

DESCRIPTION

Earth repair with rock base is used to protect against erosion scour and stabilizes steep embankments. This method is typically applied to small "flashy" channels in order to stabilize and prevent embankment failure. Due to the high erosive stresses on the channel embankments during storm events, the rock base will be sized appropriately to the localized hydraulic conditions to protect against bank scour, and loss of embankment material above the rock base. Compacted earth (80% to 90% relative compaction) is placed over the rock base to provide a uniform slope transition from the rock base to the top of bank.

The final earth repair slope will be consistent with the design criteria. At the upstream and downstream limits of the restored creek bank, the transitions zones will provide a bank slope similar to the adjacent channel conditions. Erosion control for the new earth slope will include the installation of seeding with fast sprouting native grass species, or applying geotextile/erosion control fabric over hydroseeding to secure the newly compacted bank.

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for earth repair section. 1.5:1 or flatter for boulder section.

Boulders must be keyed in (minimum 3 feet deep) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as rock placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#1B1: Earth Repair with Boulder Base



Before—Canoas Creek u/s Hillsdale



After—Canoas Creek u/s Hillsdale

#1B2: EARTH REPAIR WITH BOULDER BASE NOT VEGETATED

DESCRIPTION

Earth repair with vegetated rock base is used to protect against erosion scour and stabilizes steep embankments. This method is typically applied to small "flashy" channels in order to stabilize and prevent embankment failure. Due to the high erosive stresses on the channel embankments during storm events, the rock base will be sized appropriately to the localized hydraulic conditions to protect against bank scour, and loss of embankment material above the rock base. Compacted earth (80% to 90% relative compaction) is placed over the rock base to provide a uniform slope transition from the rock base to the top of bank.

The final earth repair slope will be consistent with the design criteria. At the upstream and downstream limits of the restored creek bank, the transitions zones will provide a bank slope similar to the adjacent channel conditions. Erosion control for the new earth slope will include the installation of seeding with fast sprouting native grass species, or applying geotextile/erosion control fabric over hydroseeding to secure the newly compacted bank.

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for earth repair section. 1.5:1 or flatter for boulder section.

Boulders must be keyed in (minimum 3 feet deep) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as rock placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#2: LIVE CONSTRUCTION

DESCRIPTION

Live construction consists of traditional methods of grading slopes and planting live grasses and other plants to control erosion and to restore habitat. Vegetation planting methods commonly used include cuttings, transplants, live staking, and direct seeding (including hydro-seeding). Biodegradable erosion control materials will be used where necessary in conjunction with live construction to assist in plant establishment.

Excellent revegetation potential. Most successful in stream banks where moderate erosion and channel migration are anticipated. Bank slope, eroding velocity, and reinforcement at the toe of the bank are limiting factors. Enhances conditions for colonization of native species. Stream bank soil materials, probable groundwater fluctuation, and bank loading conditions are factors for determining appropriate design.

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

#2A: LIVE CONSTRUCTION WITH BOULDER BASE

DESCRIPTION

Live construction consists of traditional methods of grading a flatter slope and planting live grasses and other plants to control erosion. Vegetation planting methods commonly used include cuttings, transplants, live staking, and direct seeding (including hydro-seeding). Biodegradable erosion control materials are used where necessary in conjunction with live construction to assist in plant establishment.

Appropriately-sized boulders are placed along the base of the rebuilt bank up to the elevation indicated by the hydraulic analysis and ecological site conditions. Voids in between the boulders can be planted using live stakes.

Excellent revegetation potential. Enhances conditions for colonization of native species. Streambank soil materials, probable groundwater fluctuation, and bank loading conditions are factors for determining appropriate design.

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for live construction section. 1.5:1 or flatter for boulder section.

Boulders must be keyed in (minimum 3 feet deep) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as rock placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

#2A: Live Construction with Boulder Base



Before—Canoas Creek u/s Hillsdale



After—Canoas Creek u/s Hillsdale

#2B: Live Construction with Log Base

DESCRIPTION

Live construction consists of traditional methods of grading a flatter slope and planting native vegetation to control erosion. Biodegradable erosion control materials are used where necessary in conjunction with live construction to assist in plant establishment[2].

Logs are anchored to the bed and/or native bank up to ordinary high water mark or the elevation indicated by the hydraulic analysis. Determine scour depth, log size (typically between 6 inches to 24 inches in diameter), and anchor system based on specific site conditions. Root wads may also be used where applicable and/or available.

This repair method is used to protect the toe line from erosion. It is especially useful for long straight channel reaches. The logs provide immediate protection from erosion while live branch cuttings contribute long-term durability and ultimately replace the decaying logs[3].

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for live construction section. 1.5:1 or flatter for the log base section.

Install the log base with anchors.

Appropriate for local stream velocities of 15 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-9 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-8. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-8. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as log placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. Installation of the logs is self-mitigating. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

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[2] Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

[3] Source: Santa Clara Valley Water District, "Design Manual Open Channel Hydraulics and Sediment Transport." July 2009

#3: CONTOUR WATTLING

DESCRIPTION

This method consists of tying long bundles of plant stems (typically willows or cottonwoods) together with twine and anchoring them in shallow trenches with wooden stakes or cuttings. When the stems develop root systems and mature, the plants establish structural soil stabilization properties. This technique is generally used to manage surface erosion.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization of native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Reinforcement at the base of the bank slope may be a limiting factor (see bank stabilization methods 3A and 3B). Not appropriate for treatment of slopes actively undergoing mass earth movement[4].

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows: Wattle wood shall be collected and soaked at least 10 days prior to installation. Prepare trenches (1/2 depth of wattle) and install wattles in location as approved by engineer. Live stakes/cuttings may be used as wattle stakes. Firmly attach bundles with rope to stakes. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. Installation of the planted contour wattles is self-mitigating. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[4] Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

#3A: Contour Wattling with Boulder Base

DESCRIPTION

This method consists of tying long bundles of plant stems together with rope and anchoring them in shallow trenches with wooden stakes or cuttings. When the stems develop root-systems and mature, the plants establish structural soil stabilization properties.

Appropriately-sized boulders are placed at the base of the rebuilt bank up to the elevation indicated by the hydraulic analysis. Voids in between the boulders can be planted using live stakes.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization by native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Not appropriate for treatment of slopes actively undergoing mass earth movement[5].

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for contour wattling section of slope, and slopes of 1.5:1 or flatter for boulder section.

Boulders must be keyed in (minimum 3-foot depth) at the base of the bank. Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-9 of the Program Manual. Planting shall be installed as follows: Wattle wood shall be collected and soaked at least 10 days prior to installation. Prepare trenches (½-depth of wattle) and install wattles in location as approved by engineer. Live stakes/cuttings shall be used as wattle stakes. Firmly attach bundles with rope to stakes. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[5] Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

#3B: CONTOUR WATTLING WITH LOG BASE

DESCRIPTION

Contour wattling consists of tying bundles of plant stems together with rope and anchoring them in shallow trenches with wooden stakes or cuttings. When the stems develop root systems and mature, the plants establish structural soil stabilization properties.

Logs are anchored to the bed and/or native bank up to the elevation indicated by the hydraulic analysis. Determine scour depth, log size (typically between 6 inches to 24 inches in diameter), and anchor system based on specific site conditions. Where applicable and/or appropriate, rootwads may also be used.

This repair method is used to protect the toe line from erosion as well as manage surface erosion. It is especially useful for long straight channel reaches. The logs provide immediate protection from erosion while contour wattlings contribute to long-term durability and ultimately replace the decaying logs.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization by native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Not appropriate for treatment of slopes actively undergoing mass earth movement[6].

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for contour wattling section of slope, and slopes of 1.5:1 or flatter for the log base section.

Install the log base with anchors.

Appropriate for local stream velocities of 15 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows: Wattle wood shall be collected and soaked at least 10 days prior to installation. Prepare trenches (½-depth of wattle) and install wattles in location as approved by engineer. Live stakes/cuttings shall be used as wattle stakes. Firmly attach bundles with rope to stakes. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[6] Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

#4: BRUSH MATTRESS (BRUSH LAYERING)

DESCRIPTION

The eroded slope is graded and smoothed to ensure all stakes are in contact with soil. A minimum 2-foot deep trench is dug at the base of the bank for the butt ends of the branches. Wood, steel, or live stakes are partially driven in rows on three-foot centers in the area that will be covered by the mattress. After the stakes have been placed, live branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½ inch to 1 inch in diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches.

Once the bank is covered by a thick layer, cross branches are placed horizontally over the bottom layer. These branches are placed against the stakes and then tied to the stakes using wire or rope. The stakes are then driven into the bank a minimum of two feet or deeper, if possible. After the completion of the mattress, the base trench is filled with appropriately sized boulders and rocks to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[7].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This method is not appropriate where toe scour is anticipated (see bank stabilization methods 4A and 4B). This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[8].

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows. Wood for mattressing shall be collected and soaked at least 10 days prior to installation. Install in location as approved by engineer. Prepare trenches. Install butt ends so that excellent contact with moist soil is maintained. Keep moist throughout installation. Live stakes/cuttings may be used as mattress stakes. Firmly attach rope to stakes in a criss-cross fashion so that bottom layer of wood is in contact with the slope. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[7] Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual.

[8] Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

#4A: BRUSH MATTRESS (BRUSH LAYERING) WITH BOULDER BASE

DESCRIPTION

The lower portion of the eroded slope (as indicated by the hydraulic analysis) is graded at a maximum of 1.5:1 slope. The upper portion of the slope is graded at a minimum slope of 2:1 and smoothed to ensure all plantings are in contact with soil. Appropriately-sized boulders are placed at the base of the rebuilt bank up to elevation indicated by the hydraulic analysis. Voids between the boulders can be planted using live stakes.

A minimum 2-foot deep trench is dug at the top of the boulder line for the butt ends of the branches. Wood, steel, or live stakes are partially driven in rows on three-foot centers in the area that will be covered by the mattress. After the stakes have been placed, live branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½ inch to 1 inch in diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches. Once the bank is covered by a thick layer of willows, cross branches are placed horizontally over the bottom layer. These branches are placed against the stakes and then tied to the stakes using wire or rope. The stakes are then driven into the bank a minimum of two feet or deeper, if possible. After the completion of the mattress, the toe trench is back filled with boulders and rocks to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[9].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[10].

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for brush mattress section of slope. 1.5:1 or flatter for the boulder section.

Boulders must be keyed in (minimum 3-foot depth) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows: Wood for mattressing shall be collected and soaked at least 10 days prior to installation. Install in location as approved by engineer. Prepare trenches. Install butt ends so that excellent contact with moist soil is maintained. Keep moist throughout installation. Live stakes/cuttings may be used as mattress stakes. Firmly attach rope to stakes in a criss-cross fashion so that bottom layer of wood is in contact with slope. Provide supplemental irrigation if

[9] Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual.

[10] Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. This repair method includes revegetation of the repair area using native species. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#4B: BRUSH MATTRESS (BRUSH LAYERING) WITH LOG BASE

DESCRIPTION

Brush mattress with log base consists of grading the upper and lower portions of the eroded slope at a minimum of 2:1 and maximum of 1:1 slopes respectively, and smoothed to ensure all willows are in contact with soil. Logs are placed at the base of the native bank up to the elevation indicated by the hydraulic analysis. Where applicable and or available, rootwads may be used in combination with logs.

A maximum 2-foot deep trench is dug at the top of the log base for the butt ends of the willow branches. Wood, steel, or live willow stakes are partially driven in rows on three-foot centers in the area that will be covered by the mattress. After the stakes have been placed, live branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½ inch to 2 inches in diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches. Once the bank is covered by a thick layer of willows, cross branches are placed horizontally over the bottom layer. Stakes are then driven into the bank as deep as possible.

These branches are placed against the stakes and then tied to the stakes using biodegradable wire or rope. After the completion of the mattress, the toe trench is back filled with logs to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[11].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[12].

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for brush mattress section of slope. 1:1 or flatter for the log base section.

Install log base with anchors. An evaluation of the vegetation communities up- and down-stream of the erosion site, the optimal vegetated habitat the site can support given the local soil, moisture, and hydraulic conditions determines appropriate vegetation species.

Appropriate for local stream velocities of 15 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows: Wood for mattressing shall be collected and soaked at least 10 days prior to installation. Install in location as approved by engineer. Prepare trenches. Install butt ends so that excellent contact with moist soil is maintained. Keep moist throughout installation. Live

[11] Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.
[12] Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual.

stakes/cuttings may be used as mattress stakes. Firmly attach rope to stakes in a criss-cross fashion so that bottom layer of wood is in contact with slope. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#5: SURFACE MATTING (EROSION MATS)

DESCRIPTION

This method consists of securing, jute, or geotextile erosion control fabric to channel banks using stakes or staples. These materials provide soft armor protection against erosive forces and are combined with plantings. Abrasive sediment, debris, foot traffic, and sunlight will wear, snag, and tear these fabrics with time, potentially undermining the structure. These methods are intended to be the skeleton of a vegetated erosion control system. The establishment of vegetation is crucial to the long-term success of erosion mats.

Works best in small, uniform, improved channels with mild bank slopes. This method has good revegetation potential. Base protection is required where scour is anticipated at the base of the slope (see bank stabilization methods 5A and 5B).

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter.

Typically, appropriate for local stream velocities of 12 feet per second or less depending on the type of erosion mat and revegetation method selected.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site, and the optimal vegetated habitat the site can support given the local soil, moisture, and hydraulic conditions, as well as erosion control effectiveness. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as log placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. This repair method includes revegetation of the repair area using native species. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#5: SURFACE MATTING (EROSION MATS)



Before—Guadalupe River d/s Trimble



After—Guadalupe River d/s Trimble

#5A: SURFACE MATTING (EROSION MATS) WITH BOULDER BASE

DESCRIPTION

The lower portion of the eroded slope (below the elevation indicated by the hydraulic analysis) is graded at a maximum of 1.5:1 slope. The upper portion of the slope is graded at a minimum slope of 2:1 and smoothed to ensure erosion mat is in full contact with soil. Appropriately-sized boulders are placed at the base of the rebuilt bank up to the elevation indicated by the hydraulic analysis. Voids between the boulders can be planted.

In the upper portion of the slope, jute, or geotextile erosion control fabric is attached to channel banks using staking or staples. These materials provide soft armor protection against erosive forces and are combined with planting. Debris, foot traffic, and sunlight will wear, snag, and tear these fabrics with time. The boulder base protection will prevent undermining of the structure. These methods are intended to be the skeleton of a vegetated erosion control system.

Works best in uniform improved channels with mild bank slopes. This method has good revegetation potential.

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for erosion mat section of slope. 1.5:1 or flatter for the boulder section.

Boulders must be keyed in (minimum 3-foot depth) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less if boulders are planted with live stakes; 12 feet per second if boulders are not planted.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as rock placement allows

Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. This repair method includes revegetation of the repair area using native species. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#5A: SURFACE MATTING (EROSION MATS) WITH BOULDER BASE (HYBRID)



Before—Veg Saratoga Creek d/s Bollinger



After—Veg Saratoga Creek d/s Bollinger

#5A: SURFACE MATTING (EROSION MATS) WITH BOULDER BASE (HARD)



Before—Greystone Creek u/s Olive Branch



After—Greystone Creek u/s Olive Branch

#5B: SURFACE MATTING (EROSION MATS) WITH LOG BASE

DESCRIPTION

Surface matting with log base consists of grading the upper and lower portions of the eroded slope (up to the elevation indicated by the hydraulic analysis) at a minimum of 2:1 and maximum of 1.5:1 slopes respectively, and smoothed to ensure erosion mat is in full contact with soil. Logs are placed at the base of the native bank up to the elevation indicated by the hydraulic analysis. Root wads may be used, where applicable and/or available.

In the upper portion of the slope, jute, or geotextile erosion control fabric is attached to channel banks using stakes, staples, or anchors. These materials provide soft armor protection against erosive forces and are combined with planting. Debris, foot traffic, and sunlight may wear, snag, and tear these fabrics with time. The log base protection will prevent undermining of the structure. These methods are intended to be the skeleton of a vegetated erosion control system.

This repair type works best in uniform improved channels with mild bank slopes and has good revegetation potential.

DESIGN CRITERIA

Appropriate on bank slopes of 2:1 or flatter for erosion mat section of slope. 1.5:1 or flatter for the log section.

Install the log base with anchors.

Appropriate for local stream velocities of 15 feet per second or less.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Plantings will be installed as follows:

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as log placement allows

Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#6: ADD ROCK TO INVERT

DESCRIPTION

This is a technique most commonly used to armor a channel invert susceptible to incision or scour downstream of various control structures such as bridges or concrete channels. Rock channel bottoms can also be valuable in terms or reoxygenation of water in the creek. This installation method can also retard stream turbidity in many cases[13].

Rocks are placed in scour holes or along the invert for the appropriate length as indicated by the hydraulic analysis, depending on the length and depth of repair needed. This can include scour holes just downstream of a drop structure that needs armoring, or an entire reach of channel can be armored with well-graded, angular rock to stop incision. If lining a long length of channel, rocks can be formed into a concave shape and a key can be constructed every few hundred feet to stabilize the lining.

DESIGN CRITERIA

Appropriate for incised channels or scour holes downstream of a concrete portion of creek.

HABITAT IMPACT ASSESSMENT

Channel bottom:	May adversely impact biotic resources
Bank:	May adversely impact biotic resources

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

[13] Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and Sediment Transport, June 2009.

#6: ADD ROCK TO INVERT



Before—Regnart Creek d/s Pacifica



After—Regnart Creek d/s Pacifica

#6A: ROCK CROSS VANES

DESCRIPTION

The cross-vane is a grade control structure that decreases near-bank shear stress, velocity and stream power, but increases the energy in the center of the channel. The structure will establish grade control, reduce bank erosion, create a stable width/depth ratio, and maintain channel capacity, while maintaining sediment transport capacity and sediment competence. The cross-vane is also a stream habitat improvement structure.

The cross-vane is typically composed of a row of header rocks and a row of footer rocks. The header rocks can be installed with half of its size embedded below the final grade. The footer rocks are installed downstream of and at a lower elevation than the header rocks to provide support. The top of the footer rocks are positioned at the final grade[14].

With the channel boundary opening up at the floodplain level, the vane may be properly keyed into the side slopes, an advantage not easily afforded by incised channels[14]. Each leg of the vane typically makes an angle of 20-30 degrees with the bank[15].

Method 6A (Rock Cross Vanes) and Method 6E (Bendway Weirs) share similar, but also slightly different, characteristics. Both are grade control structures, but direct the energy of flow in different ways. Bendway weirs direct flows away from the outer bank toward the inner bank, while rock cross vanes direct flows to the center of the channel. Length, height, and level of each structure also vary depending on design criteria. Bendway weirs are level-crested (flat), whereas cross vanes are sloped. Length of bendway weirs is determined by future thalweg location, whereas for cross vanes, length is determined by height at bank end and vane slope angle. Height of bendway weirs is determined by base flow (typically one foot above base flow) and for cross vanes, height varies from half-bank full stage to bank full stage.

DESIGN CRITERIA

Appropriate in “B” and “F” type channels, according to Rosgen’s stream classification system.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies. Permanent impacts associated with rock placement will be mitigated on-site through a NMFS-approved methodology as described in Chapter 10 of the Manual. No additional mitigation is required if the agencies provide written concurrence that rock placed along the channel bed provides habitat complexity functions.

[14] Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and Sediment Transport, June 2009.

[15] Source: Wildland Hydrology, Inc.; Rosgen, David L.P.H.; “The Cross-Vane, W-Weir and J-Hook Vane Structures…Their Description, Design and Application for Stream Stabilization and River Restoration.”

#6A: ROCK CROSS VANES



Before—Permanente Creek u/s Charleston



After—Permanente Creek u/s Charleston

#6B: ROOT WADS AND BOULDERS

DESCRIPTION

This method combines boulders, logs, and live plant material to armor a stream bank. Fish habitat is enhanced in addition to creating a natural-looking bank stabilization structure[16].

Footer logs are set in a toe trench below the thalweg line with the channel end pointed downstream and the butt end angled 45 to 60 degrees upstream. A second log (with root wad) is set on top of the footer log diagonally, forming an "X." The root wad end is set pointing upstream and the butt end lying downstream 45 to 60 degrees. The apex of the logs is anchored together using boulders, re-bar or cables. Large boulders are placed on top and between the logs at each apex. After all the logs and boulders are set in place, live plant material such as willows is placed within the spaces of the structure, behind the boulders. Excavated gravel and stream materials can then be placed over the bank end portion of the structure.

This method will tolerate high boundary shear stresses if logs and root wads are well-anchored. This method should, where appropriate, be used in conjunction with soil bioengineering or live vegetation plantings to stabilize the upper bank and ensure a regenerative source of stream bank vegetation. The life of the structure depends on the species of logs used. It might need replacement if vegetative colonization does not take place. This method can create local scour (channel bottom) and erosion (opposite bank)[17].

DESIGN CRITERIA

Appropriate for channel velocities at 10 feet per second or less.

Note: Velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as log and rock placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[16] Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual.
[17] Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

#6C: LIVE LOG CRIB WALLS

DESCRIPTION

Log crib walls are used to reduce sediment input and protect banks in areas where logs are available and boulders are not practical[18]. Cribbing provides protection in areas with near-vertical banks where bank sloping options are limited by issues such as right of way restrictions[19]. Crib walls afford a natural appearance, immediate protection, and accelerate the establishment of woody species[19]. This method is effective on the outside of bends where high velocities are present and in situations where a low wall may be required to stabilize the base of the bank and reduce slope steepness[19]. This method does not adjust to toe scour and should be used in combination with soil bioengineering systems and live plantings to stabilize the upper slopes[19]. Logs should be selected for soundness, durability, uniformity of size, and ease of handling (straight logs much preferred) and delivery.

Two rows of base logs or untreated timbers are placed in trenches below stream grade to prevent undercutting of the structure. Base logs should be as large (long and thick) as can be manipulated while conforming to the contour of the stream bank. Good base logs are crucial to ensure stability and durability of the cribwall[18]. Geotextile fabric should be placed behind and inside the face of (to keep material in) the structure. Tie-back logs are notched, nailed, or bolted into the base logs and placed at regular intervals (6 to 8 feet typically) along the base logs. Tie-back logs are attached to both rows of base logs. Once the first row of tie-back logs has been connected a second set of face logs is placed on top of the tie-backs. These logs are placed approximately 6 inches back into the slope. This procedure is repeated until the desired level of bank protection is achieved. As each lift is constructed, the face logs and tie-backs are filled with a mix of gravel and cobbles to the top of the face log. It is not necessary to use topsoil in the fill material; but there should be sufficient fine-grained material to insure vegetation growth. Live cuttings are then laid in to form a complete cover layer. These live branches should be long enough to have their butt end in the native soil behind the crib wall. The tips should stick out of the crib wall no more than a quarter of the cutting total length. The branches are then covered with gravel/cobble mix to the top of the tie-backs and the nest layer is continued.

DESIGN CRITERIA

Appropriate for slopes up to 0.25:1.

Appropriate for velocities from 6 feet per second up to 12 feet per second, depending on opening size.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-9 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-8. Grass species utilized will be SCVWD

[18] Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual.
[19] Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

Erosion Control Mix per Table 10-8. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as log placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Minimizes further degradation of biotic resources, with limited revegetation potential.
Bank:	Minimizes further degradation of biotic resources, with limited revegetation potential.

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#6D: LOG REVETMENT

DESCRIPTION

For sites where erosion has cut out the base of the bank and a portion of a steep bank and there is no room for shaping back the bank slope, log revetment may be used for bank repair. Log revetment is a stack of logs that forms the protected bank slope with compacted soil backfill behind the logs. Each individual log is anchored to the foundation and rebar is used to connect logs to each other. The logs are cut to fit the size of the eroded bank. There is minimal excavation except to clear away debris and loose materials. Live tree roots are saved as much as possible by burying them in the soil backfill[120].

Log revetment will be mitered to match the upstream and downstream bank slopes. The bottom log of the log revetment is aligned with the upstream and downstream toe line to minimize encroachment into the flow area[20]. Two adjacent logs are laid below grade to act as a footing for the structure. These footer logs are anchored into the native ground using either rebar or duckbill anchors and cable, or some other site-appropriate anchoring method. Logs are then stacked one on top of the other, at the appropriate slope, and are rebarred to one another. Each log is anchored into existing ground using duckbill anchors and cable, rebar, or another site-appropriate method, until the appropriate height is obtained.

DESIGN CRITERIA

Appropriate on steep bank slopes 0.25:1 or flatter. Appropriate for velocities up to 15 feet per second.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[20] Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and SedimenTransport, June 2009.

#6E: BENDWAY WEIRS

DESCRIPTION

Bendway weirs are instream grade control structures used as a means for thalweg management. Typically, a minimum of five structures are placed in series (known as a "weir field") to move, realign, or relocate the stream thalweg through a bend and downstream of the weir field. Weirs are typically ⅓-½ the width of the stream and consist of submerged upstream-angled stone sills (5,000-lb maximum weight stone) placed perpendicular along the outer banks. These structures direct flows toward the inner bank, decreasing velocities on the outer bend allowing sediment to deposit. This method will also reduce bank erosion since near bank shear stresses are decreased as flows are diverted away from the outer bank.

When placed in degraded streams, bendway weirs can mimic the environmental benefits of large woody debris by providing cover and creating rearing habitat for fish. They increase the diversity and complexity of the streambed habitat with the formation of stable scour holes at the end of weir fields, deep pools between weirs, and pool-riffle regimes[21]. Since minimal upper bank clearing is required, disturbance to terrestrial habitats is also minimized.

Method 6A (Rock Cross Vanes) and Method 6E (Bendway Weirs) share similar, but also slightly different, characteristics. Both are grade control structures, but direct the energy of flow in different ways. Bendway weirs direct flows away from the outer bank toward the inner bank, while rock cross vanes direct flows to the center of the channel. Length, height, and level of each structure also vary depending on design criteria. Bendway weirs are level-crested (flat), whereas cross vanes are sloped. Length of bendway weirs is determined by future thalweg location, whereas for cross vanes, length is determined by height at bank end and vane slope angle. Height of bendway weirs is determined by base flow (typically one foot above base flow) and for cross vanes, height varies from half-bank full stage to bank full stage.

DESIGN CRITERIA

Flow direction is more important than shear or velocity when designing bendway weir structures.

Rock size used will determine the appropriate channel velocity this method can withstand.

HABITAT IMPACT ASSESSMENT

Channel Bottom: Enhances biotic resources
Bank: Enhances biotic resources

Mitigation: Off-site as specified in Table 10-6 and the SMP permits. Or On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[21] Source: McCullah, John, & Donaly, Gray (2005); Environmentally-Sensitive Streambank Stabilization [E-SenSS CD]; "Design Manual for Environmentally Friendly Streambank Erosion Bendway Weirs."

#7: CELLULAR CONFINEMENT SYSTEM

DESCRIPTION

Soil cellular confinement system (geocell) is a polyethylene plastic cellular system where structural strength is developed by the composite design of soil, plant roots, and the plastic's cellular configuration. This system is available in 8 inches deep honeycomb mats that are installed in offset vertical layers to create terraced planting areas. The honeycomb cells are filled with soil, moderately compacted, and planted with woody vegetation and grasses. The structure functions similarly to a crib wall structure.

This method has limited potential for vegetation establishment.

DESIGN CRITERIA

Appropriate for slopes up to 0.5:1.

Appropriate for velocities up to 6 feet per second.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center

HABITAT IMPACT ASSESSMENT

Channel bottom:	Permanent impact
Bank:	Permanent impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

#8: ROCK BLANKET

DESCRIPTION

This method consists of placing a blanket of appropriately-sized rock over the bank, to the extent indicated by the hydraulic analysis, to control erosion. Smaller cobbles may be placed in the voids of the rock to create a solid structure so as to minimize scour behind the rock and failure of the structure. This method is appropriate where long-term durability is needed, design discharge is high, there is significant threat to life or property, or there is no practical way to otherwise incorporate vegetation into the design. This method should, where appropriate, be used with soil-bioengineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit to this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[22].

Angular rock should be used, because they tend to interlock, making the structure act like a single structure rather than a collection independent stones.

DESIGN CRITERIA

Appropriate for slopes up to 1.5:1, preferably 2:1. Rock sizes of 6 inches to 18 inches in diameter. Appropriate for velocities up to 15 feet per second.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as rock placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Permanent Impact
Bank:	Permanent Impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

[22] Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

#8: ROCK BLANKET



Before—Calabazas Creek d/s Bollinger



After—Calabazas Creek d/s Bollinger

#8A: BOULDER REVETMENT

DESCRIPTION

Boulder revetment is a method for armoring stream banks with large boulders for preventing bank erosion. Revetment footing is laid in a "toe" trench dug along the base of the bank. Large boulders are then laid on the bank slopes up to the elevation indicated by the hydraulic analysis. Large angular boulders are best suited for this purpose. Boulder revetment can provide protection in areas where log or boulder instream structures may lead to bank erosion. The boulders used should be dense and structurally competent[23].

Geotextile fabrics should be avoided, as they prevent the natural establishment of vegetation[23].

This method should, where appropriate, be used with soil bio-engineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit of this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[24].

This structure would allow for some natural revegetation of the bank.

DESIGN CRITERIA

Appropriate for slopes up to 1:1, preferably 2:1.

Appropriate for velocities up to 6 feet per second if boulder joints are planted, 15 feet per second if boulders are not planted.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as rock placement allows

HABITAT IMPACT ASSESSMENT

Channel bottom:	Permanent impact
Bank:	Permanent impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

[23] Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual.

[24] Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

#8A: BOULDER REVETMENT



Before—Golf Creek d/s Culligan



After—Golf Creek d/s Culligan

#8B: BOULDER REVETMENT WITH SOIL AND VEGETATION

DESCRIPTION

Boulder revetment is a method for armoring stream banks with large boulders for preventing bank erosion. Revetment footing is laid in a "toe" trench dug along the base of the bank. Large boulders are then laid on the bank slopes up to the elevation indicated by the hydraulic analysis. Large angular boulders are best suited for this purpose. Boulder revetment can provide protection in areas where log or boulder instream structures may lead to bank erosion. The boulders used should be dense and structurally competent[25].

Soil is placed over the boulders and vegetation is installed by staking and/or direct seeding. Bio-degradable erosion control mats may be placed over the soil to help control erosion until vegetation establishes itself. Special care must be taken in staking to avoid damage to the stakes' cambium and to ensure good soil/water/stake contact. Thick revetment layers may require special tools for establishing staking pilot holes[26].

Geotextile fabrics should be avoided, as they prevent the natural establishment of vegetation[25].

This method should, where appropriate, be used with soil bio-engineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit of this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[26].

DESIGN CRITERIA

Appropriate for slopes up to 1:1, preferably 2:1. Appropriate for velocities up to 6 feet per second.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center or as rock placement allows

[25] Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual.

[26] Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Enhances biotic resources
Bank:	Provides limited biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. This method includes replanting of the repair area. Mitigation may be required depending on whether or not this method is used with soil bio-engineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

#8B: BOULDER REVETMENT WITH SOIL AND VEGETATION



Before—Ross Creek u/s Los Gatos-Almaden



After—Ross Creek u/s Los Gatos-Almaden

#9: ARTICULATED CONCRETE BLOCKS

DESCRIPTION

Articulated concrete blocks (ACB) consists of concrete interlocking blocks that are cabled together to form mats that can be laid on the channel slope and/or channel bottom. The ACB is extended below the invert to form a cutoff wall.

ACBs are available in two styles: open cell and closed cell. The open cell style allows for vegetation to be recruited into the soil filing of the cell. Vegetation growth is restricted by the sizes of the cell openings and by the disconnection caused by the cell walls.

DESIGN CRITERIA

Appropriate for slopes 0.75:1 up to 3:1.

Appropriate for velocities up to 15 feet per second for closed cell ACBs, 6 feet per second for open cell ACBs.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Permanent impact
Bank:	Permanent Impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

#9A: ARTICULATED CONCRETE BLOCKS WITH PLANTING AREAS

DESCRIPTION

Articulated concrete blocks (ACB) consists of concrete interlocking blocks that are cabled together to form mats that can be laid on the channel slope and/or channel bottom. The ACB is extended below the invert as a cutoff wall to prevent undermining of slope protection.

ACBs are available in two styles: open cell and closed cell. The open cell style allows for vegetation to be recruited into the soil filing of the cell. Vegetation growth is restricted by the sizes of the cell openings and by the disconnection caused by the cell walls.

Open planting areas can be constructed into the ACB mats by creating an opening in the mat by removing some of the blocks. The open areas can be revegetated with shrubs and trees. Irrigation is provided to the planted vegetation to aid plant establishment.

DESIGN CRITERIA

Appropriate for slopes up to 1:1.

Appropriate for velocities up to 15 feet per second for closed cell ACBs, 6 feet per second for open cell ACBs.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center

HABITAT IMPACT ASSESSMENT

Channel bottom:	Permanent Impact
Bank:	Permanent Impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

#10: CONCRETE CRIB WALLS

DESCRIPTION

Concrete crib walls consist of stacked interlocking concrete frames that form a retaining wall. The structural strength is developed by the composite design of a concrete frame with compacted backfill. Crib walls are constructed with open face panels that are planted by live staking. This method restricts plant growth by the size of the panel opening. As the crib wall slope is flattened and the lattice becomes more open, the vegetation potential increases and the allowable velocity decreases because of the exposed soil and vegetation.

DESIGN CRITERIA

Appropriate for slopes up to 1:1.

Appropriate for velocities from 6 feet per second up to 15 feet per second, depending on the size of the crib wall's openings.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center

HABITAT IMPACT ASSESSMENT

Channel bottom:	Permanent impact
Bank:	Permanent Impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

#11: SACKED CONCRETE

DESCRIPTION

Sacked concrete slope protection (SCSP) consists of burlap bags filled with concrete and placed against channel banks. SCSP requires a three-foot deep concrete or SCSP cutoff wall at the base of the slope to prevent failure. SCSP does not provide any revegetation potential. However, it offers the opportunity to contour walls such that impacts to existing vegetation are avoided

DESIGN CRITERIA

Appropriate for slopes up to 0.5:1.

Appropriate for velocities up to 15 feet per second.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Permanent impact
Bank:	Permanent impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

#12: GUNITE SLOPE PROTECTION

DESCRIPTION

Gunite slope protection consists of a concrete mixture sprayed under pressure oven an eroded bank. Reinforcing steel may be placed against the bank prior to spraying.

DESIGN CRITERIA

Appropriate for slopes up to 0.1:1 (near vertical). Appropriate for velocities up to 15 feet per second.

Note: Slopes and velocities are intended to be used as guides (and are not prescriptive), and therefore, methods may be adjusted based on site conditions and other factors.

HABITAT IMPACT ASSESSMENT

Channel bottom:	Permanent impact
Bank:	Permanent impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

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ATTACHMENT E

Water Quality Monitoring Plan

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WATER QUALITY MONITORING PLAN

FOR THE
SANTA CLARA VALLEY WATER DISTRICT
MULTI-YEAR STREAM MAINTENANCE PROGRAM

Revised by

Carole Foster
Project Manager
Stream Maintenance Program Unit

Scott Akin
Environmental Services Manager
Stream Maintenance Program Unit

Under the Direction of

Sue Tippets
Deputy Operating Officer
Watersheds Operation and Maintenance Division

October 2018

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1.0 Introduction

The purpose of the Stream Maintenance Program (SMP) is to alleviate local flooding problems and to meet the requirements of the Federal Emergency Management Agency for flood protection. To ensure compliance with the San Francisco Bay and Central Coast Regional Water Quality Control Board's (Water Boards) Waste Discharge Requirements (WDRs) and Water Quality Certifications (WQCs), field water quality parameters will be measured/observed by the Santa Clara Valley Water District (District), or its designated water quality monitoring contractor, during SMP operations using active diversions, which include pH, turbidity, temperature and dissolved oxygen. This plan has been revised based on field conditions encountered during the years of operation of the SMP.

2.0 Purpose

The purpose of the Water Quality Monitoring Plan (Plan) is to verify and document compliance with the requirements and prohibitions established by the Water Board as specified in the WDRs/WQCs. This includes field/data reporting forms, sample collection, and formal reports to the Water Boards. A water quality monitoring report will be submitted to the Water Boards and other agencies/organizations (if requested) after the completion of each year's active diversion operations, in accordance with the Water Board's WDRs/WQCs.

3.0 Scope

The scope of this plan is to outline the process, means, and verification of monitoring water quality during SMP projects that use active diversions for all four authorized types of construction (Bank Stabilization, Minor Maintenance, Vegetation Management and Sediment Removal).

4.0 Definition of Terms

Actual discharge: an active, non-stormwater discharge of sediment, sediment-laden water, and/or construction related materials from the **active site** to the **receiving water.**

Grab sample: an individual sample collected in a short period of time not exceeding 15 minutes. They are to be used primarily in determining compliance with effluent and receiving water limits. Grab samples only represent the condition that exists at the time the water and effluent are collected.

Point of discharge: the location point at which water diverted around the active site is discharged into **tidal or non-tidal** waters of the State.

Active site: the confine of a SMP activity occurring on a waterway in which a pump is being used to divert water around the project site.

Duly authorized representative: one who

a. Authorization is made in writing by a principal executive officer, or

b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity (e.g., field supervisor, project manager, chief engineer).

Downstream discharge/Effluent water: the water that flows out of a diversion, the discharged water (passive or active diversion).

Upstream water: water from a river or stream that is being diverted around a project site, from the upper end of the project site.

Receiving water: any water body that actually or potentially receives surface or ground water at the point of discharge, which passes over, through, or under dredged sediment during placement, dewatering, settling/consolidation, and excavation/removal activities – the water body that receives the discharge.

Active diversion: any method of diverting water around a project site other than non-mechanical means.

Passive diversion: the method of diverting water around a project site using no mechanical means. As well, working in channel where the project is being conducted outside of the live stream because of a natural buffer, such as excavating in pockets of sediment, will be considered a passive diversion.

5.0 Specifications for Sampling and Analyses

The District, or its designated water quality monitoring contractor**,** will perform sampling and analyses in accordance with the following conditions and requirements included in the WDRs/WQCs issued by the Water Board. Two types of data collection will be conducted at the sites - water quality observations and water quality analyses using field instruments. No laboratory analyses will be conducted.

5.1 Water Quality Standard Observations

Standard observations of surface water conditions shall be conducted upstream and downstream of the active project area to visually detect impacts of the water diversion. The following standard observations of the receiving waters will be collected on every day of operation on the field reporting form (Appendix A):

1. Floating and suspended materials of waste origin (to include, but not limited to, oil, grease, or other material that may come from the diversion/project site) presence or absence and size of the affected area.
2. Discoloration and turbidity: description of color, source, distance of travel and wind direction.

3. Odor: presence or absence, characterization, source, distance of travel, and wind direction.
4. Hydrographic condition including: depth of water columns, sampling depths, time and height of corrected low and high tides.
5. Weather condition including: air temperature, wind direction and velocity (speed), and precipitation.

5.2 Water Quality Analysis using Field Instruments

5.2.1 Water Quality Testing

Water Quality data will be collected by direct immersion of the instrument probe into the water column, or directly immersed into collection apparatus. The sample will be immediately analyzed on site for constituents in Table 1. Samples shall be collected with accurately calibrated field measurement instrument(s) and the results logged.

Table 1

Constituents	**Type of Sample**	**Units**
Turbidity	Grab/Dip	NTUs
pH	Grab/Dip	Not Applicable
Dissolved Oxygen	Grab/Dip	mg/l
Temperature	Grab/Dip	Degrees Fahrenheit

5.2.2 Water Quality Testing Locations

Samples will be collected at a distance of 100 feet (or at a location that is most representative of the typical undisturbed condition) upstream of the beginning of the active diversion and 100 feet (or at a location that is most representative of surface water affected by the diversion) directly downstream from the point of discharge into the receiving water of the non-tidal sites. For tidal sites, water samples will be collected only at the point of discharge on the receiving waters (with no upstream collection). The samples will not be taken during a rainstorm event or subsequent runoff event. For sites that straddle both freshwater and tidal areas, tidal sampling protocol will be followed. Samples of the discharge from temporary storage sites (if utilized) are to be collected as near as possible to the point of discharge without compromising the safety of personnel. Wherever possible, the probes will collect data from 1 foot below the surface (tidal and non-tidal sites).

5.2.3 Water Quality Testing Frequency

At every active diversion site, water quality samples shall be collected at least twice daily. Each sample set collected at the upstream and downstream locations must be taken within no more than a half an hour of each other (unless limiting circumstance exists, such as creek access over long creek reaches).

5.2.3a Background Sampling (pre-construction baseline sampling)

Prior to the installation of an active diversion and/or its components, at least one (1) day of background water samples (two samples per day evenly spaced during working hours) will be collected from the established testing locations. If there is a change in stream conditions (e.g., storm event) while there is a shutdown of the active diversion, new baseline sampling shall be conducted.

5.2.3b Operational Sampling

Water quality samples will be collected from the established testing locations at the active diversion sites, at least two (2) samples per day, evenly spaced during the work hours, with the first sample collected no earlier than one (1) hour after work has commenced each day.

5.2.3c Unauthorized Actual Discharge Sampling

In the event of an unauthorized actual discharge of sediment-laden or otherwise contaminated water (either observed directly or evidence thereof) from the active site to the receiving water, water quality samples will be collected as soon as practicable from the established testing locations at the active diversion sites. If no exceedances are detected, monitoring may return to operational sampling frequency. If exceedances are detected, sampling will continue to occur every two (2) hours until the exceedance has been corrected.

5.2.3d Background Sampling (post-construction baseline sampling)

After the removal of an active diversion and/or its components (either/or when pumps are shutoff and water is reintroduced into the project site), at least one (1) day of background water samples (two samples per day evenly spaced during working hours) will be collected from the established testing locations. The samples will be representative of typical undisturbed conditions and will not be taken during a rainstorm or subsequent runoff event.

5.2.3e Stock Pile Sampling

Water draining from a temporary sediment stockpile will be sampled on every day that there is a discharge which enters into a live stream. Sampling will be conducted at all points of discharge/runoff. Stockpile(s) must meet SMP Best Management Practices and San Francisco Bay/Central Coast Regional Water Quality Control Boards – Permit Condition standards. The sample will be immediately analyzed on site for constituents in Table 1.

5.2.4 Exceedances

5.2.4a What is an Exceedance?

An exceedance is where the receiving (downstream) water quality sample result for constituent(s) analyzed on site show an exceedance of the upstream water sample results, as specified in Table 2.

TABLE 2

Parameter	**Exceedance Limit**
pH	>0.5 units deviation from background (upstream)
Dissolved Oxygen	minimum of 5.0 mg/l for tidal waters or non-tidal warm water Minimum 7.0 mg/l for non-tidal cold waters *or* no change if background <5.0 mg/l
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.
Temperature	The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above the natural receiving water temperature.

5.2.4b What to do if there is an Exceedance

If any water quality monitoring sample results in an exceedance, then the District will implement the following process to correct the exceedance:

1. Upon discovery of an exceedance, the District shall identify the source of the exceedance and immediately implement procedures to correct the source of the exceedance. Equipment and supplies shall be on-site (or readily available nearby) that could be quickly deployed to provide additional filtration if turbidity is observed. These supplies may include the following options: bladders for settling, filter bags and pumps, silt filter dams, or silt barrier as appropriate depending on site conditions.
2. A report to the Water Board case manager shall be made by telephone of any exceedances of whatever origin immediately after it is discovered.
3. Confirmation samples will be taken within two (2) hours following the exceedance.
4. The District shall stop all work at the site for exceedances lasting longer than two hours. The District shall update the Water Board staff of site conditions and the corrective actions that are taken.

5. Sampling every 2 hours will continue until the exceedance has been corrected. All constituents will continue to be monitored.
6. If all exceedances have been eliminated within four (4) hours of confirmation, work may proceed at the site, and the Regional Board case manager will be notified.
7. Region 3 Water Board staff will be notified promptly, and in no case more than 24 hours, after the unauthorized discharge or water quality problem arises.
8. The District shall notify Region 2 Water Board staff in writing within five calendar days of all exceedances. An electronic mail report shall include the following information: time and date of incident, duration, estimate of discharge or bypass volume exceedance, and documentation of sampling results/observations determining compliance status. The report shall also include detailed discussion of reasons for non-compliance, and specific steps that were or will be taken to correct the failure and prevent it from reoccurring.

5.2.4c Exceedance Reporting

A report to the Executive Officer and Water Board case manager shall be made by telephone of any exceedances of whatever origin immediately after it is discovered. A written report shall be filed with the Water Board within five calendar days and shall include the following information:

a. A map showing the location(s) of exceedances(s);
b. Approximate flow rate;
c. Nature of effects, i.e., all pertinent observations and analyses; and
d. Corrective measures underway or proposed.

5.3 Records to be Maintained

Written reports, calibration and maintenance records, and other records shall be maintained by the District and accessible at all times. Records shall be kept at the District for a minimum of 5 years. This period of retention shall be extended during the course of any unresolved litigation regarding this exceedance or when requested by the Water Board. Records shall include notes and observations for each sample as follows:

a. Identification of sampling site by creek name, cross street, and item number (if available from the annual reports).

b. Date and time of sampling.

c. Date and time analyses are started and completed and the name of person conducting analyses.

f. Data and results of analyses and/or observations.

Records shall include a map or maps of the site showing the location of the project(s) and water sampling locations, coffer dams, discharge pipes, access ramps, etc.

6.0 Quality Assurance and Quality Control

The QA/QC portion of the WDRs is an important component of the Plan involving, at the core of compliance, quality assurance of field sampling. As such, this section describes the two major elements of the QA/QC plan which are (1) field sampling to ensure compliance with WDRs criteria and (2) reporting of that compliance.

District utilizes sampling contractors and/or internal staff to conduct water quality sampling for the SMP projects. These monitors will use District approved field sampling instruments and sampling equipment. As field sampling is the ultimate means of ensuring compliance with WDRs requirements, it is imperative to have operating procedures that show the field sampling is being conducted in a manner that will collect analysis in an accurate way. In order to do this, the following criteria must be followed:

1. All personnel conducting water quality monitoring must read the relevant SMP best management practices, this Plan, the Water Board's current SMP WDRs/WQCs, and manufacture calibration/instruction manuals for all sampling instruments used.
2. The SMP Project Manager must train personnel conducting this activity on all aspects of water quality monitoring.
3. Verification document signed that the relevant documents have been read and additional training has occurred.

All this documentation will be held with the SMP Project Manager (PM), for a period of five years. Further, all equipment will be tested and calibrated, in accordance with the equipment's manufacture requirements, at least once a week to ensure the instruments are in proper working condition.

The reporting of the compliance/non-compliance of each project meeting the WDRs/WQCs criteria is captured in an end of season report that is submitted to the Water Board, see Final Water Quality Monitoring Report, attachments to the WDR and the District's SMP Program Manual.

7.0 Reporting

7.1 Responsible Entity

The SMP PM is responsible for implementing this Plan as required in the WDRs/WQCs issued by the Water Boards for the SMP. The PM will evaluate the data for compliance with the requirements of the WDRs/WQCs and will inform the Watershed Field Operations staff or contractor of any non-compliance event in order for them to take immediate corrective action.

7.2 Reports to the Water Board

Permit Exceedances

The District shall notify the Water Board staff in electronic mail within five calendar days of all exceedances. Written reports shall include time and date of incident, duration, estimate of discharge or bypass volume exceedances, and documentation of sampling results/observations determining compliance status. The report shall also include detailed discussions of reasons for non-compliance and specific steps that were or will be taken to correct the failure and prevent it from re-occurring.

7.3 Final Monitoring Report

Upon completion of active diversion activities, an annual monitoring report will be filed with the SMP Annual Summary Report (ASR).

The final monitoring report will include:

1. Certification Statement
2. Introduction
3. Compliance Summary
4. Purpose and Scope
5. Description of Work Performed
6. Water Quality Sampling Data by Individual Site
7. Maps – County level showing where monitoring activities occurred

Embedded within these sections:

1. A transmittal letter which includes a summary of all violations of WDRs/WQCs, any changes to the project design, and any unplanned releases or failures that occurred during the active diversion operations.
2. The report shall provide: the magnitude of the releases or failures; any discharge limit exceedances; dates of all exceedances, cause of the failure, releases or other violations; any corrective actions taken or planned; and the dates of completion of corrective action.

Field Reporting Forms

APPENDIX A

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Stream Maintenance Program Data Reporting Form

Creek Name/Item Number	Sample Date/Time	Direction	Turbidity	Dissolved Oxygen	pH	Temperature	Activity Monitored

Stream Maintenance Program Calibration Form

Instrument Identification	Time of Calibration	Date of Calibration	Issues

Field Observation Reporting Form

Site Information

Site Name	Site Location	Date

Standard Observations

Weather

Air Temperature	Precipitation (Heavy/Light)	Wind Direction/Speed

Visual

Floating Suspended Materials — Present Absent

Turbidity/Discoloration — Present Absent

If present, what is the suspected source?

Water Depth — U/S D/S

If present, Site Foreman Notified? _____ Time/Name_____

Odor

Present Absent

If present, describe suspected source and estimate of affected area (wind direction and travel distance)

If present, Site Foreman Notified? _____ Time/Name_____

Flow (FOR NON TIDAL SITES)

Estimated rate (cubic feet per second)

Tides (FOR TIDAL SITES) from NOAA tide chart

Time	Height

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ATTACHMENT F

Sediment Characterization Plan

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SEDIMENT CHARACTERIZATION PLAN

FOR THE

SANTA CLARA VALLEY WATER DISTRICT

MULTI-YEAR STREAM MAINTENANCE PROGRAM

Revised by

Carole Foster Project Manager
Stream Maintenance Program Unit

Scott Akin
Environmental Services Manager
Stream Maintenance Program Unit

Under the Direction of

Sue Tippets Deputy Operating Officer
Watershed Operations and Maintenance Division

DECEMBER 2019

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1.0 INTRODUCTION

The Santa Clara Valley Water District (Valley Water) conducts sediment removal, vegetation management, bank protection repairs, minor maintenance, and canal maintenance activities in channels/creeks for the purpose of alleviating the potential for local flooding problems and to meet the requirements of the Federal Emergency Management Agency for flood protection. Under the aforementioned activities of the Multi-Year Stream Maintenance Program (SMP), channel/creek sediment is often removed as a result of these activities. In order to effectively manage the removal and disposal of the sediments removed as a result of these activities, it is necessary to characterize the chemical and physical properties of the sediments (or also known as creek material as some of the tested material is from the creek banks or stockpiles, etc.). This characterization allows Valley Water to (1) effectively plan for disposal of the sediments and (2) assist with determining the best management practices (BMP) to implement in order to avoid and minimize impacts to water quality, aquatic life, and Beneficial Uses as specified in the San Francisco Bay and Central Coast Regional Water Quality Control Boards' (Water Boards) Basin Plans. The sediment characterization plan proposed for Valley Water's SMP, as presented herein, is a result of Valley Water's sediment testing and evaluation effort, and continuous improvement process based on guidance from regulatory agencies and other stakeholders, since 1997.

2.0 PURPOSE

According to the Basin Plans, the Water Boards establish and enforce Waste Discharge Requirements (WDRs) for point and nonpoint source of pollutants at levels necessary to meet numerical and narrative water quality objectives. The sediment tests performed by Valley Water each year as part of its SMP are based on the historic occurrence of pollutants within Santa Clara Valley streams, in accordance with the Basin Plans' water quality objectives, and the Water Boards' WDR through a stakeholder process. The stakeholder process and lessons learned meetings involved participation of the Water Boards, the California Department of Fish and Wildlife (DFW), the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), and various environmental organizations which assisted Valley Water in continuous evaluation and improvement of the sediment characterization plan.

There are four main reasons for characterizing the sediments described as follows:

Landfill Acceptance

Landfills require creek sediment to be characterized before they accept the material for disposal.

Reuse Sites

An evaluation of test results is conducted for the placement of excavated materials in beneficial reuse sites. The beneficial reuse options include wetland creation and restoration, levee maintenance, and construction fill. Material reused within the 500 feet upstream or downstream is done without sediment testing with prior approval by the Regional Water Boards. Off-site construction fill also requires prior approval by the Regional Water Boards.

The San Francisco and Central Coast Regional Water Quality Control Boards

The Water Boards have required characterization of the materials to determine if the proposed disposal method is acceptable. The Water Boards must ensure that the disposal of the material will not pose a threat to the waters of the State. The Water Boards are interested in determination of total mercury and polychlorinated biphenyls (PCBs) in residual sediment after sediment removal.

The California Department of Fish and Wildlife

DFW requests that the materials be characterized to determine if they will adversely impact fish and wildlife as the removal operations may cause sediments to be re-suspended and migrate downstream where it may have an impact on fish and wildlife. DFW defers to the Water Boards for the determination of suitability for creek material removal.

3.0 SCOPE

Under the SMP, sediment will be tested using the San Francisco Bay Regional Water Quality Control Board's Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines (May 2000) to facilitate any beneficial reuse of sediment generated by Valley Water. The physical and chemical properties of sediments tested by Valley Water include metals, pesticides and organophosphorous compounds, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, moisture content, chloride, pH, total sulfides, ammonia, and toxicity (as described below).

This sampling plan documents sampling and analytical procedures which will be utilized for the creek sites under the SMP. It is not intended to be a full characterization of all the stream sediments. The Sediment Characterization Plan is primarily designed to characterize sediment designated for removal (using composite, continuous core and residual sediment sampling methods). Residual sediment samples will only be collected in an attempt to characterize the sediment that may be subject to erosion and transport during flows.

The Sediment Characterization Plan addresses the following sampling methods designed to meet the overall objectives of landfill acceptance, sediment reuse sites, water quality protection, and fish and wildlife protection:

1. Composite sediment sampling
2. Continuous Core sampling
3. Residual sediment sampling

Additional testing and/or alternate sampling methods may be conducted to meet Quality Assurance Project Plan (QAPP) requirements for sediment reuse for specific levee maintenance or marsh restoration projects, such as the South Bay Salt Pond Restoration Project and the South San Francisco Bay Shoreline Project. Specific project QAPPs may require oversight of the sediment screening process and import of materials by an independent Quality Assurance Officer (QAO). In some cases, the QAO may have the authority to approve reuse of materials if the sediment was tested according to QAPP guidelines and test results are below QAPP screening criteria. Any deviation from QAPP guidelines requires reuse approval from the Water Board.

4.0 OBJECTIVES

The specific objectives of the Sediment Characterization Plan are as follows:

1. Characterize the sediments for acceptance by landfills.

2. Characterize the sediments to determine their suitability for beneficial reuse (i.e., non-landfill reuse sites).

3. Compliance with regulatory requirements for the sediment removal activities.

4. Provide data for evaluation of the feasibility of long-term disposal, reuse, and recycling opportunities for sediment generated by Valley Water.

5.0 SAMPLING METHODS AND PROCEDURES

This section describes the frequency of sampling and the location of sample collection at the SMP sites involving sediment removal activities. From both the regulatory and scientific perspectives, the primary objectives of a sampling plan for a solid material are twofold: namely, (1) to collect samples that are representative samples as exhibiting average properties of the whole solid material and (2) to collect samples that will allow measurements of the chemical properties of the waste that are both accurate and precise.

Sediment samples will be collected for characterization of sediment designated for removal and analyzed in accordance with the contaminants listed in Table 4: Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged Material (Re-use Guidelines) from the Water Board's Basin Plan (see below). Sampling parameters/analytes listed in Table 4 may be modified after a history of sampling is obtained. This may result in not requiring monitoring for some of these contaminants under certain situations or at certain locations, or adding more parameters/analytes if deemed necessary by the Executive Officer of the Water Board.

Reliable information concerning the chemical properties of a solid waste is needed for the purpose of comparing chemical properties with applicable regulatory thresholds. For chemical information to be reliable, it must be accurate and precise. Accuracy is usually achieved by incorporating some form of randomness into the selection process for the samples that generate the data. Precision is most often obtained by selecting an appropriate number of samples.

For this Sediment Characterization Plan, Valley Water will utilize a systematic random sampling technique generated by the sediment sampling database, in which all sampling points from a population are randomly selected. The advantages of systematic random sampling over other sampling techniques are the ease with which samples are identified, and collected, an increase in precision, and to collect representative data on chemical properties. All samples shall be collected in accordance with the most recent U.S. EPA Guidelines and sampling methodologies. The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than U.S. EPA – approved methods of Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer of the Water Board.

The following techniques provide a general sampling approach and will suffice for most projects. Where these techniques would not provide a representative sample of the project area, Water Board staff will be consulted to provide additional sampling direction.

5.1 Composite Sediment Samples

The purpose of composite sediment sampling is to conduct the widest range of characterization along the project sites' lengths and widths in order to capture the most variation of the area. This broader scope of randomly generated 4-point sampling will give a greater sense of the variability of the channel material than a specific sample point.

5.1.1 Composite Sample Collection Frequency

In order to characterize the sediment, one composite in-situ sample consisting of 4 random samples shall be collected and analyzed approximately every 4,000 cubic yards. Approximately one sample shall be collected every 1,000 cubic yards. These samples will be composited together by the laboratory. The length of the channel is also taken into consideration as Valley Water's database will generate sampling points based on the length of the project area. As such, projects with long project lengths will have sample points farther apart in order to better characterize the variability in sediment contaminants along the entire length of the worksite.

5.1.2 Composite Sample Locations

The location of each sample at the Sediment Removal Program sites must be selected in the following three dimensions: (1) the creek station, or the location along the length of the creek; (2) the location along the creek cross section; and (3) the depth below ground surface (bgs). With these parameters, a sample point is randomly generated. The rationale for selection of a sampling location in all three dimensions is described below.

5.1.3 Composite Sample Depth

The sampling depth of the composite samples are also randomly generated, varying from surface sampling to maximum excavation depth of the proposed project.

5.2 Continuous Core Sediment Samples

The purpose of continuous core sampling is to take samples at selected locations (e.g., below outfalls, depression areas of the creek, likely contaminated areas) where the highest likelihood of contamination exists in the project site. This type of sample is not taken on the banks (above the toe of the channel) nor from stockpiles, only from within toe to toe of the channel.

5.2.1 Continuous Core Sample Collection Frequency

One continuous core sample is taken every 4000 cubic yards per project site.

5.2.2 Continuous Core Sample Locations

The location of the sample is determined in the field upon attempting to locate areas of depression or outfalls within the project site. As these features are not always apparent, the location will sometimes have to be placed in the most likely areas of these features.

5.2.3 Continuous Core Sample Depth

The depth of the sample is randomly generated by Valley Water's sediment sampling database and printed on the sediment sampling plan generated in the office and used out in the field.

5.3 Residual Sediment Samples

The purpose of residual sediment sampling is to conduct limited characterization of sediment left behind after sediment removal from earthen channels and creeks. The exposed sediment in the channel/creek bottom will only be sampled and analyzed for total mercury and PCBs. Contaminants that test above the Table 4 detection limits will be reported to the Water Board prior to sediment removal.

5.3.1 Residual Sample Collection Frequency

Residual sediment samples will be collected at one every 4000 cubic yards on earthen channels.

5.3.2 Residual Sample Locations

This type of sample will be collected at each earthen channel/creek site. The location of the residual sample will coincide with the continuous core sample.

5.3.3 Residual Sample Depth

The samples will be collected from within 1 foot below the planned maximum depth of excavation for that project.

5.4 Sample Collection

All samples shall be collected by means of a hand trowel, a hand auger, or another sampling method approved by the regulatory agencies. The individual collecting the sample will have the discretion of choosing the sampling method which is the most efficient to perform.

Sampling will be conducted in accordance with the methods described below:

5.4.1 Hand Trowel Procedure

1. Remove vegetation and woody debris from the ground surface.
2. If collecting a subsurface sample, use a shovel to dig down to the desired sampling interval.
3. Use a stainless-steel hand trowel to collect soil.
4. Place soil in an appropriate sampling container.
5. Replace all excavated soils to their original location (i.e., backfill the sampling hole).

5.4.2 Hand Auger Procedure

1. Remove vegetation and woody debris from the ground surface.
2. Use the hand auger to advance down to the top of the sampling interval.
3. Use a hand auger to collect soil from the desired depth.
4. Use a clean (decontaminated) tool to scoop the soil out of the auger and place in an appropriate sampling container.
5. Replace all excavated soils to their original location (i.e., backfill the sampling hole).
6. If hand auger refusal is encountered, sample will be collected from an alternate location.

5.5 Sample Containers and Sample Volumes

All samples shall be collected using wide-mouthed glass jars or other sampling containers as directed or supplied by the laboratory.

Sampling volume and number of containers necessary shall be specified by Valley Water's contract of internal laboratory. It is anticipated that multiple containers of sediment will need to be collected at each location.

5.6 Decontamination Procedures

All equipment used to collect soil samples (hand trowel or hand auger) shall be decontaminated prior to collecting each sample, on-site. Equipment shall be decontaminated by at least rinsing the equipment twice with water, drying and then visually inspecting to ensure that there are no residual particles from the previous sample. The final rinse shall be with de-ionized or distilled water.

5.7 Sample Preservation

All samples shall be immediately preserved in accordance with the EPA sampling and testing procedures. This is most commonly done by placing the samples in an insulated cooler with ice. Samples may also be stored in a refrigerator.

The laboratory shall immediately record the temperature of the sample containers upon receipt of the samples, if required by the EPA sampling and testing procedures for the contaminants that are being analyzed.

5.8 Chain of Custody Procedures

Standard chain of custody procedures shall be used throughout the sampling collection procedures. A chain of custody shall be prepared for all samples. Each individual who has responsibility for the samples is required to sign the chain of custody upon relinquishing the samples to another party. The receiving party taking custody of samples shall also sign the chain of custody form.

When in the field, samples shall always be in sight of the individual responsible for the samples, or the samples shall be stored within a locked vehicle. If the samples are stored in an office prior to delivery to the laboratory, the samples shall be stored in a secure location. Applicable sample storage and preservation procedures shall be followed.

5.9 Survey of Sampling Locations

All sampling locations will be identified by Geographic Information System (GIS) or linear referencing creek route system stationing.

6.0 ANALYTICAL PROCEDURES

Every sediment sample location, with the exception of residual samples, shall be sampled for the full list of parameters/analytes listed in Table 4 for the Reuse Guidelines. Sampling parameters/analytes listed in Table 4 may be modified after a history of sampling is obtained. This may result in not requiring monitoring for some of these contaminants under certain situations or at certain locations, or adding more parameters/analytes if deemed necessary by the Executive Officer.

6.1 Rational for Analytical Test Method Selection

The rationale used for selecting test methods is based largely on the laboratory's ability to meet the detection limit requirements listed in Table 4. All methods are EPA standards, but may vary from time to time (based on changes from the EPA). Although, the driving force behind the selection of the test methods will be Water Board's Re-use Guidelines. As stated earlier, additional testing and/or alternate sampling methods may be conducted to meet Quality Assurance Project Plan (QAPP) requirements for sediment reuse for specific levee maintenance or marsh restoration projects. QAPPs may require different (often lower) detection limit requirements.

6.1.1 Moisture Content

Sediments in creeks naturally contain moisture; moisture content may fluctuate during the year and is dependent on creek flows, groundwater elevation, and other local conditions. The moisture content of in-situ soils will be higher than the moisture content of excavated sediments, due to the natural process of evaporation and infiltration.

Analysis of moisture content is required for Class III landfill acceptance for wet soils. In addition, it is necessary to measure the moisture content in order to determine the dry weight concentrations of constituents within the sediment.

Selected Test Method and Frequency of Testing

All samples except residual sediment samples shall be analyzed for moisture content by EPA Method 160.3 or the most current prescribed method.

6.1.2 Toxicity

Creek sediments may be toxic due to nonpoint source pollutants which may have been deposited into the creeks. Toxicity is of concern if the sediment is to be reused.

Sediment toxicity test will be conducted only on composite samples from sites where the waters may not be controlled during sediment removal operations due to tidal action; therefore, toxicity sampling shall only be conducted on sediment removal projects which would not divert the water around the project site during excavation.

Selected Test Method and Frequency of Testing

All samples in tidal areas meeting the criteria stated above, except residual sediment samples, shall be tested for toxicity by means of a toxicity screening bioassay, by the test method specified in California Code of Regulations, Title 22. The samples will be tested using *Eohaustorius estuarius* species, unless otherwise specified by the EPA.

6.1.3 Methylmercury Testing

Past mining operations allowed mining tailing and debris discharge to some creeks, which increased mercury levels in sediments and soils in those watersheds, specifically the Guadalupe Watershed.

Selected Test Method and Frequency of Testing

Only the following creeks will be required to have the additional analysis of methylmercury be performed for all composite samples, in accordance with EPA 1630:

Alamitos Creek
Guadalupe Creek
Guadalupe River
Los Gatos Creek
Randol Creek

7.0 QUALITY CONTROL

A QA/QC plan is an important component of a monitoring program involving extensive field sampling and laboratory analyses. The two objectives of the QA/QC plan are: (1) to provide a means of ongoing control and evaluation of the sampling and analysis procedures; and (2) to quantify data precision and accuracy for use in data interpretation. Duplicate samples are no longer required. The QA/QC plan will be followed in all phases of the monitoring program including sampling and validation reporting. QA/QC requirements are noted below.

Valley Water will utilize a sampling contractor or internal staff to conduct field sampling. The assigned field staff and/or contractor will be responsible for managing all field sampling equipment. The actual assignment of sampling areas and analysis are given to the sampling staff by the Stream Maintenance Program Project Manager (PM). Verification of equipment, analysis, chain of custodies, etc. will also be conducted by the PM.

All equipment used for field sampling will be kept in good working order and as required, will be tested and/or calibrated before leaving the office. Verification of working order/calibration (if necessary) should be re-verified, visually, upon arrival at the site to ensure the instruments are in proper working condition.

8.0 LABORATORY

Whichever laboratory is used to perform analysis under this sediment sampling plan must be certified by the State of California Department of Health Services under the Environmental Laboratory Accreditation Program. Sub-labs that are out of state must hold current certification in their state's accreditation program. Further, the contract lab is required to perform their own quality control tests with the results published in the final lab report.

9.0 REPORTING

Upon receipt of the analytical results from the laboratory, Valley Water will submit the results to the Water Board and request approval for reuse as described below. Valley Water shall attempt to compile the results in 2 to 3 submittals to the Water Board.

1. For ease of review, only the contaminants that test above the Water Board's Table 4 detection limits will be reported to the Water Board.

2. The entirety of the results, for detected and non-detected, shall be maintained in Valley Water's database and made available upon request. Further, the signed lab copy of the results shall be maintained for no less than 3 years by Valley Water.

3. For project site sediments that are going to a landfill, the Water Board is only required to approve the removal of the material as the landfill will approve acceptance to their disposal facility.

TABLE 4
Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged Material

ANALYTE	Wetland Surface Material		Wetland Foundation Material	
	Concentration	Decision Basis	Concentration	Decision Basis
METALS (mg/kg)				
Arsenic	15.3	Ambient Values	70	ER-M
Cadmium	0.33	Ambient Values	9.6	ER-M
Chromium	112	Ambient Values	370	ER-M
Copper	68.1	Ambient Values	270	ER-M
Lead	43.2	Ambient Values	218	ER-M
Mercury	0.43	Ambient Values	0.7	ER-M
Nickel	112	Ambient Values	120	ER-M
Selenium	0.64	Ambient Values		
Silver	0.58	Ambient Values	3.7	ER-M
Zinc	158	Ambient Values	410	ER-M
ORGANOCHLORINE PESTICIDES/PCBS (□g/kg)				
DDTS, sum	7.0	Ambient Values	46.1	ER-M
Chlordanes, sum	2.3	TEL	4.8	PEL
Dieldrin	0.72	TEL	4.3	PEL
Hexachlorocyclohexane, sum	0.78	Ambient Values		
Hexachlorobenzene	0.485	Ambient Values		
PCBs, sum	22.7	ER-L	180	ER-M
POLYCYCLIC AROMATIC HYDROCARBONS (□g/kg)				
PAHs, total	3,390	Ambient Values	44,792	ER-M
Low molecular weight PAHs, sum	434	Ambient Values	3,160	ER-M
High molecular weight PAHs, sum	3,060	Ambient Values	9,600	ER-M
1-Methylnaphthalene	12.1	Ambient Values		
1-Methylphenanthrene	31.7	Ambient Values		
2,3,5-Trimethylnaphthalene	9.8	Ambient Values		
2,6-Dimethylnaphthalene	12.1	Ambient Values		
2-Methylnaphthalene	19.4	Ambient Values	670	ER-M
2-Methylphenanthrene		Ambient Values		
3-Methylphenanthrene		Ambient Values		
Acenaphthene	26.0	Ambient Values	500	ER-M
Acenaphthylene	88.0	Ambient Values	640	ER-M
Anthracene	88.0	Ambient Values	1,100	ER-M
Benz(a)anthracene	412	Ambient Values	1,600	ER-M
Benzo(a)pyrene	371	Ambient Values	1,600	ER-M
Benzo(e)pyrene	294	Ambient Values		
Benzo(b)fluoranthene	371	Ambient Values		
Benzo(g,h,i)perylene	310	Ambient Values		
Benzo(k)fluoranthene	258	Ambient Values		
Biphenyl	12.9	Ambient Values		
Chrysene	289	Ambient Values	2,800	ER-M
Dibenz(a,h)anthracene	32.7	Ambient Values	260	ER-M
Fluoranthene	514	Ambient Values	5,100	ER-M
Fluorene	25.3	Ambient Values	540	ER-M
Indeno(1,2,3-c,d)pyrene	382	Ambient Values		
Naphthalene	55.8	Ambient Values	2,100	ER-M
Perylene	145	Ambient Values		
Phenanthrene	237	Ambient Values	1,500	ER-M
Pyrene	665	Ambient Values	2,600	ER-M

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ATTACHMENT G

Steelhead Impact Minimization Measures

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ATTACHMENT G
Steelhead Impact Minimization Measures

The following measures will be applied to sediment removal and bank stabilization projects that occur in anadromous salmonid channels. These measures will be performed in the anadromous salmonid streams within the SMP area (Table 1).

TABLE 1
Anadromous Salmonid Creeks
Within the Stream Maintenance Program Area

Central California Coast Steelhead Distribution in the Project Area

Creek/River	Upper Limit of Steelhead Distribution
Alamitos Creek	Almaden Dam
Arroyo Aguague[1]	Falls upstream from confluence with Upper Penitencia Creek
Calero Creek	Calero Dam
Coyote Creek	Leroy Anderson Dam
Guadalupe River/Creek	Guadalupe Dam
Los Gatos Creek	Camden Avenue Drop Structure
Los Trancos Creek[1]	Approximately 0.4 mile north of headwaters
San Francisquito Creek	Searsville Dam
Stevens Creek	Stevens Creek Dam
Upper Penitencia Creek	Cherry Flat Reservoir

South-Central California Coast Steelhead Distribution in the Project Area

Creek/River	Upper Limit of Steelhead Distribution
Bodfish Creek	Bodfish Creek Falls
Cedar Creek[1]	Approximately 3 miles north of Cedar Creek Boulder Falls #2
Little Arthur Creek[1]	Cement Dam (near Redwood Retreat Road crossing)
Llagas Creek	Chesbro Reservoir Dam
Pacheco Creek[1]	North Fork Dam
Pajaro River	Steelhead occur in all portions of the creek within Santa Clara County
Pescadero Creek[1]	Creek source
Tar Creek[1]	Southern end of Castro Valley approximately 1.8 river miles from source
Uvas/Carnadero Creek	Uvas Dam
South Fork Pacheco Creek[1]	South Fork Pacheco Creek Boulder Falls

[1] Although work is not expected on these creeks, they are within the SMP project area and are therefore included here.

1 MITIGATION SITE IDENTIFICATION

1.1 Coarse Sediment Augmentation Site Identification

The SCVWD will identify potential locations for gravel augmentation in salmonid occupied watersheds: Alamitos Creek, Guadalupe Creek, Los Gatos Creek, Guadalupe River, Upper Penitencia Creek, Coyote Creek, Stevens Creek, and San Francisquito Creek. The SCVWD will prepare design plans and will submit the plans as part of the Notice of Proposed Work for regulatory agency review and approval. Sites for coarse sediment augmentation may be combined with instream habitat mitigation sites. Sites for coarse sediment augmentation may occur in locations where finer sediments need to be removed.

1.2 Instream Habitat Complexity Mitigation Site Identification

The SCVWD will identify potential locations for instream habitat complexity in salmonid occupied watersheds: Alamitos Creek, Guadalupe Creek, Los Gatos Creek, Guadalupe River, Upper Penitencia Creek, Coyote Creek, Stevens Creek, and San Francisquito Creek. The SCVWD will prepare design plans and will submit the plans as part of the Notice of Proposed Work for regulatory agency review and approval. Sites for instream habitat complexity may be combined with coarse sediment augmentation mitigation sites.

1.3 Mitigation Plan Elements

The SCVWD will develop mitigation designs for coarse sediment augmentation and instream habitat complexity projects. Coarse sediment augmentation and instream habitat complexity features may be combined into the same project. Mitigation for course sediment augmentation and instream habitat complexity features may be incorporated as part of bank stabilization projects. The mitigation designs will include the objectives for each project. The specific information included in the mitigation designs will include: affected watershed, location (stream, reach), pre-project site assessment, methods for coarse sediment placement, timing of coarse sediment placement, dewatering plan (if needed), proposed success criteria, and a monitoring plan. The monitoring plan will establish the type of monitoring to be conducted, the timing of the monitoring to be conducted, the duration of the monitoring to be conducted and adaptive management alternatives if the success criteria are not met. The SCVWD will include coarse sediment augmentation projects and instream habitat complexity sites in the NPW prior to implementation.

Mitigation proposed on-site or within sites close to the project impact site, are desirable as they provide direct instream benefits close to the area of impact and are therefore replacing loss features within a similar channel reach in which they have been displaced. This provides a higher level of benefit to the species within that reach of channel. Sites will not be chosen for coarse sediment augmentation if sediment removal is anticipated to occur more than twice in the 10-year SMP-2. Mitigation credits and obligations for coarse sediment augmentation and instream habitat complexity features will be tracked for each watershed.

2 COARSE SEDIMENT AUGMENTATION

2.1 Project Assessments

2.1.1 Pre-Project Coarse Sediment Assessment

A qualified biologist will conduct a surface assessment of the affected reach of channel to determine the location and quantity of coarse sediment (gravel and cobble [12.5 to 250 mm in diameter]) that may be removed by the proposed project. The patches of coarse sediment that have a surface area equal to or greater than 10 square feet, and are also at least 0.5 feet thick, and contain more gravel than sand, will be mapped. The surface area of the patches of coarse sediment meeting these minimum measurements, will be multiplied by 1.5 feet to calculate the volume of coarse substrate to be mitigated. For coarse substrate within the project site, a map, diagram (i.e., hand sketch), or table will be prepared indicating the number and location of coarse sediment patches within the channel project site. Photographs of the project site will be taken to show the patches of coarse sediment areas. The pre-project assessment results will be submitted in the NPW.

Assessments will not be conducted at sediment removal projects at fish ladders, stream gauges, Sediment Depositional Reaches (SDRs), outfalls, or at sediment removal sites needed for fish passage.

2.1.2 Post–Project Coarse Sediment Assessment

At the completion of the sediment removal project, a qualified biologist will conduct a post-project assessment of the surface gravels within the project area using the same methods as the pre-project assessment to determine the amount of available sediment remaining onsite. For coarse substrate within the project site, a map, diagram (i.e., hand sketch), or table will be prepared indicating the number and location of coarse sediment patches within the channel. Photographs of the project site will be taken to show the patches of coarse sediment areas and will be submitted in the Annual Summary Report (ASR).

2.2 Coarse Sediment Impact Calculations

The volume of course sediment calculated in the pre-project assessment will be compared with the volume of course sediment calculated in the post-project assessment to determine the mitigation obligation or mitigation credit resulting from each project. Mitigation credits and obligations for coarse sediment augmentation will be tracked for each watershed.

2.3 Coarse Sediment Mitigation and Monitoring

Sites proposed for gravel augmentation will be included in the NPW. The sites selected for mitigation will be in the same watershed where the impact occurs. Mitigation may be provided prior to or within a year after an obligation for the removal of coarse sediment. Sites used for coarse sediment augmentation will be monitored according to the

monitoring plan described in the approved design plans and submitted in the NPW for review.

3 INSTREAM HABITAT COMPLEXITY FEATURES

3.1 Project Assessments

3.1.1 Pre-Project Assessment of Instream Habitat Complexity Features

A habitat assessment will be conducted at sediment removal sites that occur below the bankfull elevation and at bank stabilization sites on salmonid streams. The habitat assessment will be conducted by a qualified biologist during the late winter or spring months. Habitat complexity features may include the following:

1. Channel bed area with large cobble (defined as substrate with a medium diameter of 6 to12 inches).

2. Boulders (defined as substrate with medium diameter of 12 inches or greater)

3. Shrub or tree root mass

4. Tree branches or collection of floating and submerged branches/vegetation (branches with diameter less than 12 inches, any length)

5. Large woody debris (greater than 12 inches in diameter, any length)

6. Undercut bank

7. Surface turbidity/bubble curtain

If the site is a perennial stream or contains water during the survey the qualified biologist will conduct a level 3 Habitat Typing (Flosi et al., 2010) methods. The habitat assessment area will include the entire proposed project site and extend upstream and downstream 5 times the in-channel width, or up to a maximum of 300 feet. The habitat complexity assessment will be conducted during the late winter or spring of the year. For habitat complexity features within the project site, a map, diagram (i.e, hand sketch), or table will be prepared listing each of the habitat features, the surface area, location and function. This includes all features within the SMP project site, both those that are expected to be impacted by the SMP activity and those not expected to be impacted. Photographs will also be taken of the site and features. The pre-project assessment results will be submitted in the NPW. If the site does not contain flowing water during the survey, a SCVWD biologist will assess the length of the project site to identify the above habitat complexity features.

Assessments will not be conducted at sediment removal projects at fish ladders, stream gauges, Sediment Depositional Reaches (SDRs), outfalls, or at sediment removal sites needed for fish passage.

3.1.2 Post-Project Habitat Complexity Features Assessment

Post project habitat complexity assessments for sediment removal will use the same methods as the pre-project assessment. A post project assessment will be conducted by a qualified biologist using level 3 Habitat Typing (Flosi et al., 2010) methods. The habitat assessment area will be conducted along the length of the project site. The post project assessment will include sufficient documentation to determine the retention or loss of the pre-project habitat complexity. The post-project survey will also identify the habitat/bioengineering features of the project that have been installed/constructed to benefit aquatic habitat at the project site. A diagram (i.e., hand sketch) and photographs will be taken of the site and used to illustrate the conditions. The post-project assessment report will include a table identifying the habitat complexity feature, the surface area, location, and function of the habitat features on-site.

3.2 Instream Habitat Complexity Features Impact Calculations

If the pre-project survey indicates the potential loss of instream habitat complexity features, the surface area of the features, type of features, the location of the features in the channel and other characteristics will be used to estimate the area and value of features to be impacted. The total square feet of habitat complexity features impacted will be calculated. The quantity of instream habitat complexity features identified in the pre-project assessment will be compared with the quantity of instream habitat complexity features in the post-project assessment to determine the mitigation obligation or mitigation credit resulting from each project. Mitigation credits and obligations for instream habitat complexity features will be tracked for each watershed.

3.3 Instream Habitat Complexity Features Mitigation and Monitoring

Sites proposed for the installation of instream habitat complexity features will be included in the NPW. The sites selected for mitigation will be in the same watershed where the impact occurs. Mitigation may be provided prior to or within a year after an obligation for impacts for the loss of instream habitat complexity features. The habitat value of the mitigation installed within each watershed will be commensurate with the habitat value of the features impacted within that watershed. Sites used for mitigation credit for the installation of instream habitat complexity features will be monitored according to the monitoring plan developed per project site and described in the approved design plans.

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ATTACHMENT H

Stream Maintenance Program Fish Ladder Inspection

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ATTACHMENT H
Stream Maintenance Program Fish Ladder Inspection Form

Project Identification Number:
Creek Name:
GIS ID:
GIS Stationing:

1st Inspection Date:	**2nd Inspection Date**:
Overall description of the condition of the facility (baffles, pools, chute structure, etc.)	Overall description of the condition of the facility (baffles, pools, chute structure, etc.)
Proposed work to the actual structure	Was work performed from the 1st Inspection?
Estimated volume (cy) material to be removed within the ladder	How much material (cy) was removed within the ladder?
Estimated volume (cy) material to be removed within 100 feet upstream or downstream of the ladder	How much material (cy) was removed within 100 feet upstream or downstream of the ladder?
Water depth and velocity measurements (at the upstream entrance of the fish ladder)	Water depth and velocity measurements (at the upstream entrance of the fish ladder)

Stream Maintenance Program Fish Ladder Inspection Form

Attachment H

Condition of upstream access for fish, does any work need to be performed (excluding sediment removal)?	Was work performed from the 1st Inspection?
Condition of downstream access for fish, does any work need to be performed (excluding sediment removal)?	Was work performed from the 1st Inspection?
Do entry and terminal pools exist and what is the condition of them (estimated depth, area, etc.)?	Do entry and terminal pools exist and what is the condition of them (estimated depth, area, etc.)?
Do weir(s) exist 100 feet upstream or downstream of the fish ladder? What is the condition of the weir(s) and are they creating any issues for fish passage?	Any follow up needed/additional information from 1st inspection?
Fish Screens Only: Condition of or need for cleaning of Gates, Debris Racks, Control Systems, Screen Faces or Screen Cleaning Systems	Any follow up needed/additional information from 1st inspection?

Stream Maintenance Program Fish Ladder Inspection Form

Attachment H

1st Inspection Photos	**2nd Inspection Photos**
Upstream View	Upstream View
Downstream View	Downstream View

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ATTACHMENT I

Compensatory Mitigation Plan

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ATTACHMENT I
Compensatory Mitigation Plan

The Stream Maintenance Program must provide a mitigation plan including the following 12 components listed below for each mitigation project site (33 CFR 332.4(c)/40 CFR 230.92.4(c)).

1. **Objectives**. A description of the resource type(s) and amount(s) that will be provided, the method of compensation (restoration, establishment, preservation etc.), and how the anticipated functions of the mitigation project will address watershed needs.

2. **Site Selection**. A description of the factors considered during the site selection process. This should include consideration of watershed needs, onsite alternatives where applicable, and practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the mitigation project site.

3. **Site Protection Instrument**. A description of the legal arrangements and instrument including site ownership, that will be used to ensure the long-term protection of the mitigation project site.

4. **Baseline Information**. A description of the ecological characteristics of the proposed mitigation project site, in the case of an application for a DA permit, the impact site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other characteristics appropriate to the type of resource proposed as compensation. The baseline information should include a delineation of waters of the United States on the proposed mitigation project site. A prospective permittee planning to secure credits from an approved mitigation bank or in-lieu fee program only needs to provide baseline information about the impact site.

5. **Determination of Credits**. A description of the number of credits to be provided including a brief explanation of the rationale for this determination.

- For permittee-responsible mitigation, this should include an explanation of how the mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the permitted activity.

- For permittees intending to secure credits from an approved mitigation bank or in-lieu fee program, it should include the number and resource type of credits to be secured and how these were determined.

6. **Mitigation Work Plan**. Detailed written specifications and work descriptions for the mitigation project, including: the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water; methods for establishing the desired plant community; plans to control invasive plant species; proposed grading plan; soil management; and erosion control measures. For stream mitigation projects, the mitigation work plan may also include other relevant information, such as planform

geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and riparian area plantings.

7. **Maintenance Plan**. A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

8. **Performance standards**. Ecologically-based standards that will be used to determine whether the mitigation project is achieving its objectives.

9. **Monitoring Requirements**. A description of parameters monitored to determine whether the mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting monitoring results to the DE must be included.

10. **Long-Term Management Plan**. A description of how the mitigation project will be managed after performance standards have been achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management.

11. **Adaptive Management Plan**. A management strategy to address unforeseen changes in site conditions or other components of the mitigation project, including the party or parties responsible for implementing adaptive management measures.

12. **Financial Assurances**. A description of financial assurances that will be provided and how they are sufficient to ensure a high level of confidence that the mitigation project will be successfully completed, in accordance with its performance standards.

GLOSSARY OF SIGNIFICANT TERMS

100-Year Flood	Flood of a magnitude with an expected recurrence of once in 100 years. Synonymous with 1 percent flood.
Adaptive Management	A dynamic process that recognizes that the future cannot be perfectly predicted. In response to imperfect predictions, planning and management strategies are modified as better information becomes available. It is a continuous improvement process whereby monitoring and analysis of the results of past actions are fed back into the current decision-making process.
Anadromous	A term used to describe the life history characteristics where fishes move from saltwater to freshwater to lay eggs. The juvenile fish then move from freshwater to saltwater to grow and mature.
Annual Work Plan	The stream maintenance work identified through field inspections. Specific information, such as location, size, and type of work activity is provided in the Annual Work Plan.
Appurtenant Structures	Structures, such as storm outfalls, stream gages, trash racks, flap gates, tide gates, vaults, bridges, wing walls, and headwalls that are associated with channels
Aquatic Vegetation	Plants growing in water.
Avoidance	Strategies for the planning, design, maintenance, and operation of Valley Water facilities which avert environmental impacts.
Bank Stabilization	Bank stabilization involves any action by Valley Water to repair and prevent erosion of stream banks.
Bank Repair	Maintenance of banks that are eroding or are unstable.

Glossary of Significant Terms

Bankfull	The river elevation (stage) at which time the most effective geomorphic work occurs. This is also referred to as the dominant discharge and is the stage that generally corresponds to a flow event with a 1 to 2-year recurrence interval.
Bankfull Elevation	The point where the normal channel meets the floodplain.
Bed	The bottom of a body of water, such as a stream.
Bench	A flat or slightly sloped area which is adjacent to a stream channel and which is above ordinary high water (OHW) (also known as a terrace).
Berm	A raised area of earth acting as a temporary or permanent levee.
Best Management Practice (BMP)	An activity, procedure, or other standard management and work practice that provides the most effective means of preventing or reducing pollution or other negative environmental consequences. BMPs are incorporated into project activities to avoid and minimize environmental impacts.
Biological Monitor	A biological monitor is an individual who shall have academic and professional experience in biological sciences and related resource management activities as it pertains to this project, experience with construction-level biological monitoring, be able to recognize species that may be present within the project area, and be familiar with the habits and behavior of those species.
Biotechnical	A method of bank stabilization emphasizing the incorporation of soft structures (e.g., vegetation). See “Soft Structures.”
Box Culvert	A water channel in the shape of a rectangular concrete box.

Glossary of Significant Terms

Bypass Structures	On construction sites, a generic term for any type of structure(s) used to pond water and convey it around a work site (e.g., cofferdams, bypass pipes, channels).
California Environmental Quality Act (CEQA)	The California Environmental Quality Act is California Public Resources Code Sections 21000 et seq. CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible, recognizing that a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors. CEQA is intended to facilitate the disclosure of the significant environmental effects of proposed activities to decision-makers and the public, the identification of ways to avoid or reduce environmental damage, and the prevention of environmental damage by requiring the implementation of feasible alternatives or mitigation measures.
Capital Improvement Project (CIP)	For the purposes of the Stream Maintenance Program, a large flood control construction project that affects the flood conveyance capacity of the stream. These projects are not considered routine stream maintenance.
Channel	Creeks and canals. A natural stream that conveys water; a ditch or channel excavated for the flow of water. The area where water is concentrated to flows across the landscape. Channels include creeks, ditches, and canals, but does not include culverts, pipes, and other closed structures.
Channel Stabilization	Any action by Valley Water to repair and prevent scouring or downcutting of stream beds.
Clean Water Act	Federal Water Pollution Control Act of 1973.

Glossary of Significant Terms

Co-dominant	Equal in size and relative importance, usually associated with either the trunk/stems or scaffold limbs/branches in the crown (Matheny and Clark 1994).
Compensatory Mitigation	The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, or preservation of resources to replace those resources impacted by maintenance activities.
Culvert	Any covered structure not classified as a bridge, which conveys a waterway under a road or other area.
Cut-Stump Treatment	Chemical treatment of the cambium, or outermost plant tissue, with a concentrated systemic herbicide after the elimination of woody vegetation by cutting at ground level.
Debris	Debris consists of all non-sedimentary materials deposited in channels, on flood plains, or above top of bank as a result of natural conditions or through human activity, including such materials as downed trees and/or tree limbs, tires, shopping carts, trash, furniture, homeless encampments, and other items.
Debris Basin	A depression formed by the construction of a barrier or dam built at a suitable location to retain rock, sediment, plant material, and the like, which can be conveyed along steep hillside streams during high flows. Usually placed in hillside areas where access is better for removing sediment, generally prior to entering urbanized reaches (see also “Sediment Basin”).
Degradation	Process of a channel lowering its elevation through increased erosion, channel bed scour, or down-cutting. A type of fluvial geomorphic instability.
Design Capacity	The amount of water a channel was planned to carry.

Glossary of Significant Terms

Design Flood	The maximum calculated discharge intended to be conveyed in the design of a capacity-constructed channel. The maximum level of flood protection used as a design criterion in the design of a constructed or improved channel or waterway.
Design Flow	Flow that a facility was designed to convey.
Designated Individual	A non-biologist who has been trained by a Valley Water biologist and shown proficiency in carrying out specific tasks.
Diameter at Breast Height (dbh)	A tree trunk diameter is measured by the standard diameter at breast height (dbh) or approximately 4.5 feet above ground level. The dbh of multistem trees will be calculated by adding the dbh of the individual stems. The dbh of fast-growing multistem trees, such as willows or Acacia, will be calculated by adding the dbh of the individual stems then dividing by two.
Drop Structure	A structure designed to convey flows over a vertical distance from a higher to a lower elevation.
Emergency	A situation is considered an “emergency” if it is a sudden, unexpected occurrence involving a clear and imminent danger that demands immediate action to prevent or mitigate loss of or damage to life, health, property, or essential public services (Public Resource Code Section 21060.3).
Emergent Vegetation	Non-woody vegetation, including cattail and bulrush, that is rooted in the water but has stems and/or leaves that extend out of the water. For SMP purposes, emergent vegetation and herbaceous vegetation are considered to be different categories.
Enhancement	The manipulation of a site or feature to heighten, intensify, or improve the resource. Enhancement results in a selective gain in function and or value. Enhancement does not result in a gain in resource area.

Glossary of Significant Terms

Environmental Impact Report (EIR)	A document prepared under CEQA to describe a project that has impacts on the environment which requires a public agency to make findings and if feasible to mitigate those impacts.
Ephemeral	Creek that only flows for short periods of time during or immediately following a rain event.
Erosion	The detachment and movement of soil and rock fragments by water and other geological agents, which results in the wearing away of the land. When water is the eroding agent, erosional processes include sheet and rill erosion, gully erosion, and channel erosion.
Establishment	Creation. The manipulation of a site to develop resource functions and values that did not previously exist at a site. Establishment results in a gain in resource area.
Fish Ladders	A structure to enable fish traveling upstream, against the flow of water, to span a large vertical distance in a series of gradual steps. Used at dams or other in-stream barriers.
Five-Year Mitigated Area (FMA)	Five-Year Mitigated Areas (FMAs) are areas where a vegetation management or sediment removal activity has occurred and has been mitigated for under SMP-2. FMAs are considered to be mitigated for that impact activity and location for a period of five years after the initial impact.
Flood Capacity	The flow or volume of water a channel can carry. Capacity is dependent on cross-sectional area and frictional components (e.g., channel vegetation).
Flood Control Facility	For the purposes of the Stream Maintenance Program, any watercourse, whether natural or man-made, in which water does or may flow and which is under ownership or controlled by Valley Water for flood control purposes.

Glossary of Significant Terms

Floodplain	The relatively flat area extending from the top of a creek bank away from a creek which may be inundated occasionally during high water events.
Flow Conveyance	Flow that a facility was designed to convey often dependent on channel cross-sectional properties.
Flowrate	Measure of how fast a volume of water moves in a creek.
Fluvial	Pertaining to rivers.
Habitat	The area with a combination of resources and environmental conditions that promotes occupancy of a given species and allows those individuals to survive and reproduce.
Habitat Conservation Plan (HCP)	Plans under the Endangered Species Act (ESA) negotiated between the federal government and private landowners or state and local governments. These plans are designed to allow landowners to receive a federal permit to unintentionally harm listed species in the course of completing projects. In exchange for a permit, landowners agree to pursue specific management protections for threatened and endangered species.
Hard Structures	A type of bank stabilization structure incorporating rock, rip rap, sack concrete, mattresses, or concrete.
Hardscape	Concrete, rock, gabions, or other permanent, hard surface channel or bank treatment. Refers to designs that utilize predominantly hard structures and are generally incapable of supporting vegetation (see “Softscape,” “Hybrid” and bank stabilization table).
Hazard Tree	The combination of a failure of a tree or part of a tree with the presence of an adjacent target. A hazard does not exist if there will not be an impacted target. Excluded from SMP coverage.

Glossary of Significant Terms

Herbaceous Vegetation	Non-woody vegetation, including grasses and broadleaf weeds, which is rooted out of the water. This may include annuals, biennials, and perennials. For SMP purposes, emergent vegetation and herbaceous vegetation are considered to be different categories.
Herbicide	A chemical agent used to kill plants or inhibit plant growth.
Hybrid	For purposes of the SMP Update, refers to bank stabilization projects that consist of a combination of hard and softscape (see "Hardscape," "Softscape," and bank stabilization table).
Hydraulic	Of or pertaining to the scientific or technical study of the static and dynamic behavior of fluids. Fluvial hydraulics is an engineering discipline geared toward the physics of water flow in channels—its volume, velocity, and elevation, in space and time. Hydraulic analysis is typically used to determine discharge capacity and to assess the effects of channel vegetation on channel capacity.
Hydrology	Hydrology is the science (or study) of water in the environment with a focus on the circulation and distribution of water as expressed in the hydrologic cycle or water balance.
Hydroseed	A process for revegetation of areas with plant seeds. Often mixed with fertilizer, straw mulch, a binding agent, and green dye.
Impact	See "Significant Environmental Impact." A strong effect of an action that leads to a change of condition.
Impervious Hardscape	Paved areas such as streets and sidewalks, other developed areas, or bank stabilization methods which are impenetrable to water.
In-channel/In-stream	For the purposes of SMP-2, in-channel refers to the area below Ordinary High Water (OHW).

Glossary of Significant Terms

Inboard	This refers to which side of a levee or streambank is being referenced. The inboard side of the levee is the side sloping toward the channel.
Invasive Plant	Plants that are not native to an environment and once introduced, they establish, quickly reproduce, and spread, and cause harm to the environment, economy, or human health. For purposes of SMP, invasive plants are those species which are listed as invasive in Chapter 10 of the SMP manual.
Invasive Species	A plant or animal that aggressively spreads outside its native range.
Invert	The lowest point of the internal cross section of a pipe, culvert, or channel; the elevation of the bottom of the channel (see “instream”).
Lateral Branch	A limb or secondary trunk of a tree or shrub arising from a larger limb or trunk.
Levee	An embankment constructed to prevent a river or stream from flowing across adjacent lands.
Limb Removal	The cutting of a branch >4" in diameter
Listed Species	A species that is formally designated as endangered or threatened or rare by the state or federal Endangered Species Acts.
Low-Flow Channel	A section of stream that carries the more frequent, periodic streamflows.
Maintenance Guidelines	Engineering standards developed for each Valley Water flood control facility that will give guidance on maintenance requirements for flood control capacity. The guidelines may include design information, historical information, or special requirements for a reach of channel.
Mean High Water (MHW)	In San Francisco Bay, there are two high tides each day, usually with different elevations. Mean High Water is defined as the average height of both of these two tides.

Glossary of Significant Terms

Mitigation	Action taken by Valley Water to fulfill CEQA/NEPA permit requirements and court-mandated mitigation to avoid, minimize, rectify, or reduce adverse environmental impacts, or to compensate for the impact(s) by replacing or providing substitute resources or environments.
Modified Channel	A waterway in which channels have been substantially altered from historical conditions.
Modified Channel With Ecological Value	The Modified Channel with Ecological Value type includes channels significantly altered from historical conditions but also having features such as closed canopy riparian woodland, and/or being known to support special-status species.
Multi-Stem	A tree or shrub with a root ball and multiple trunks or stems. This may occur at ground level or several feet above ground.
Natural Flood Protection	A multiple-objective approach to providing environmental quality, community benefit and protection from creek flooding in a cost-effective manner through integrated planning and management that considers the physical, hydrologic, and ecologic functions and processes of streams within the community setting.
Non-Native Vegetation	For SMP purposes, any plant species which is thought to have not been present in Santa Clara County prior to the mid-1500s CE and which was introduced by human activity.
Non-Jurisdictional	Areas outside permitting authority of a resources agency.
Obstruction	Material or objects which impede a facility from operating appropriately.
Ordinary High Water (OHW)	In non-tidal areas, the highest level of water in a channel reached by commonly experienced flows. Defines the limit of the U.S. Army Corps of Engineers jurisdiction.

Glossary of Significant Terms

Ordinary High Water Mark (OHWM)	Is defined by the USACE as the line on the bank established by the fluctuations of water indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.
Outboard	This refers to which side of a levee or streambank is being referenced. The outboard side of a levee is the side sloping away from, and outside of, the channel.
Outfall	The end of a pipe or culvert that delivers local drainage into a creek. Features associated with an outfall structure may include erosion control materials, such as rip rap or an energy dissipater below the culvert. A flap gate, may also be part of the outfall structure.
Overhanging Growth (OHG)	The routine pruning of vegetation growth which is hanging over maintenance roads and fencelines. This was a defined work activity in SMP-1.
Permanent Wetland Impacts	Impacts in which the wetland is not restored to pre-project conditions within two years.
Policy	Statement by the Board of Directors describing a condition or course of action.
Post-Emergent Herbicide	An herbicide designed to control target plant material after it has sprouted or following a dormant period. Post-emergents control plants by disrupting various growth mechanisms.
Pre-Emergent Herbicide	An herbicide designed to control target plant material prior to germination. Pre-emergents are applied to the soil surface to prevent germination and growth of seeds in the upper soil strata.

Glossary of Significant Terms

Preservation	The setting aside of an existing site to protect or prevent a decline of a resource through legal or physical mechanisms. Preservation does not result in a gain of resource area or function.
Preventive Maintenance (PM)	Work conducted before conditions change to avoid facility degradation.
Previously Mitigated Area (PMA)	Areas where impacts for a particular activity were mitigated for in perpetuity during SMP1. Work of the same activity done under SMP2 within the PMA does not incur additional mitigation debt.
Program	A program is a series of actions that can be described at a general level of detail. Programs include agency plans, policies, or regulatory programs.
Project Area	The area within Valley Water that is subject to routine maintenance. The SMP area contains the creeks and channels below the 1000-foot elevation contour.
Protocols	An established set of ground rules or procedures governing routine stream maintenance activities.
Pruning	The cutting of a branch ≤ 4" in diameter
Qualified Biologist	A qualified biologist is an individual who has a minimum of five years of academic training and professional experience in biological sciences and related resource management activities with professional training or demonstrable experience with the special-status species for which surveys are required.
Reach	A subdivision of a drainage system consisting of a discrete portion of a channel.
Re-establishment	Manipulation of a site with the goal of returning natural/historic functions. Re-establishment results in rebuilding former resources and results in a gain in resource area and function.

Glossary of Significant Terms

Regrowth	The growth of vegetation following trimming or removal.
Rehabilitation	Manipulation of a site with the goal of repairing natural/historic functions. Rehabilitation results in a gain in resource function, but does not result in a gain in resource area.
Repair	For the purposes of the Stream Maintenance Program, repair refers to maintenance of bank stabilization structure with in-kind and/or in-place materials.
Restoration	The returning of the natural/historic functions and values to a former or degraded site. Restoration includes both re-establishment and rehabilitation.
Revetment	A term used to describe any number of hard structures used in bank stabilization.
Riprap	Loose rock or concrete of varying size, typically brought to a site. Used to protect channel banks from scouring forces.
Riparian	Located along the edge of a channel, generally on the floodplain. Characterized by access to and influence of the channel, but not in it. A riparian zone or riparian area is the interface between land and a river or stream.
Riparian Corridors	Refers to a biological zone dominated by riparian vegetation immediately next to a channel.
Riparian Vegetation (or Habitat)	Riparian habitat is composed of the trees and other vegetation and physical features normally found on the stream banks and flood plains associated with streams, lakes, or other bodies of water. (http://www.wcb.ca.gov/Riparian/)
Rootwad	A tree stump (dead or alive) with attached roots.

Glossary of Significant Terms

Roughness	Coefficient used in Mannings equation, the measure of the amount of frictional resistance water experiences when flowing through a creek.
Routine Stream Maintenance	Routine stream maintenance includes four major activities, as follows: (1) sediment removal activities that are designed to restore the flood capacity of existing Valley Water channels or associated features (e.g., tide gates), (2) vegetation management in and around Valley Water's channels, including removal of vegetation for access and fire control, (3) bank stabilization activities necessary to protect Valley Water or other facilities, and (4) management of animal conflicts. Routine stream maintenance also includes more minor maintenance activities, such as trash removal; fence work; access road maintenance; repair of structures with in-kind materials within the same footprint (such as replacement of concrete linings, culverts, pipes, valves, or similar structures); cleaning and minor sediment removal at stream gages, outfalls, flap gates, tide gates, fish ladders; and graffiti removal. Routine maintenance does not include emergency work.
Ruderal	Vegetation containing mostly introduced, weedy herbaceous species; "disturbance loving" species. Common in disturbed areas, along roadsides or vacant lots.
Runoff (Surface)	The flow of water across the land surface and in stream channels. Occurs only after the local storage capacity or infiltration rate of the landscape has been exceeded and includes both overland flow and streamflow.
Salmonid	Any member of the fish family Salmonidae.
Scour	The clearing and digging action of flowing air or water, especially the downward erosion caused by steam water in removing material (e.g., soil, rocks) from a channel bed or bank or around in-channel structures.

Glossary of Significant Terms

Secondary Channel	For purposes of the SMP, secondary channels are constructed features of a main channel that are designed with flood conveyance or maintenance purposes. These channels often have maintenance requirements that are different than the main channel and are therefore specifically managed and reported separate from the main channel.
Section 404	Refers to a section of the Clean Water Act establishing a permit program for the discharge of dredged or fill materials into Waters of the United States.
Sediment	Particles derived from rocks or biological materials that have been transported by a fluid, or solid material suspended in or settled from water.
Sediment Basin	A depression formed by the construction of a barrier or dam built at a suitable location to retain rock, sand, gravel, silt, or other material. In Valley Water, these basins also are commonly called “Debris Basins.”
Sediment Load	The sediment that is in transport. Load is a general term that refers to material in suspension and/or transport. It is not synonymous with discharge.
Sediment Removal	The act of removing sediment deposited within a stream.
Sensitive Habitat	A general term used to characterize habitats that either support sensitive species (listed species, species proposed for listing, and species of special concern) or are designated as a sensitive natural community in local or regional plans, policies, regulations, or by the CDFG or the U.S. Fish and Wildlife Service.
Sensitive Species	A general term for plants or animals on a state or federal threatened, endangered or rare species lists, species proposed for listing, and species of special concern.

Glossary of Significant Terms

Shaded Riverine Aquatic Habitat (SRA)	The aquatic area occurring along the edge of a channel where the adjacent bank is composed of natural materials and supports riparian vegetation that overhangs or protrudes into the water and filters or blocks direct sunlight into the water.
Shear Stress	The force tending to cause deformation of a material by slippage along a plane or planes parallel to the imposed stress.
Shrub	Woody plant smaller in height than a tree (less than approximately 16 feet [5 meters] at maturity.
Significant Rainfall	Local rainfall 0.5 inches or greater within a 24-hour period in the subject watershed, below the 1000-foot contour (SMP area).
SMP1	Valley Water's previous Stream Maintenance Program for 2002-2012.
Soft Structures	A type of bank stabilization structure incorporating biological materials, such as seeds, plants, plant parts (e.g., root wads), or a combination of vegetation and inert materials (e.g., brush mats/sills, wattles, fascines, or branch packing/layering).
Softscape	Earth channel or levees, either natural or modified. Also refers to "soft forms of bank stabilization" such as root wads, log structures, etc. (see "hardscape," "hybrid," and bank stabilization table.
Spawning Gravel	Rocks and pebbles deposited in stream beds that are just the right size for anadromous fish to move about as they lay their eggs.
Station	Station is a standard channel location system. Distances are measured from the mouth of creeks or from the confluence of a tributary heading upstream. Distance is measured in feet. For example, station 43+56 would be a point 4,356 feet upstream from the mouth of the channel.

Glossary of Significant Terms

Stewardship	To entrust the careful and responsible management of the environment and natural resources to one's care for the benefit of the greater community.
Stream	For the purposes of the Stream Maintenance Program, "streams" are defined as the natural watercourses and modified channels within Valley Water's jurisdiction. In this Program, streams include both the waterway and its immediate geographical corridor, including riparian corridors.
Stream Maintenance Program	The policies, methods, processes, documents and activities associated with routine management and repair of streams reaches under the jurisdiction of the Santa Clara Valley Water District and below 1000 feet.
Stream Maintenance Project	For the purposes of the Stream Maintenance Program, a project is the whole of a set of routine stream maintenance actions that are along the same channel reach. A project has a specific location, duration, and purpose.
Streambed	The part of a stream over which a column of water moves.
Sudden Oak Death	Sudden Oak Death is the common name of a disease caused by *Phytophthora ramorum*. The disease kills oak and other species of tree.
Surfactants	A shorthand term for surface-active agent, which are chemicals that modify surfaces of two liquids or a liquid and a solid. In the context of the Stream Maintenance Program, surfactants are used in combination with herbicides to increase the retention and penetration of herbicides on and into plants.
Take (of a Listed Species)	To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect a listed species or its habitat, or to attempt to engage in any such activity.
Temporary Wetland Impacts	Impacts in which the wetland is fully restored to pre-project conditions within two years.

Glossary of Significant Terms

Terrace	A flat or slightly sloped area which is adjacent to a stream channel and which is above ordinary high water (OHW) (also known as a bench).
Thalweg	Main channel in the creek.
Toe	The base of a slope.
Tree	A woody perennial that typically has one dominant vertical trunk and a height greater than 15 feet in its natural, mature form. Several exceptions to this definition exist; willows and elderberries are two examples found in the SMP area which are considered trees for the purposes of the Program, but which may not have a single dominant trunk.
Trimming	The removal of branches of a plant, usually a woody perennial.
Turbidity	The cloudiness of water, caused by suspended sediment. Turbidity is measured by the degree to which light penetration is blocked because the water is muddy or cloudy.
Unavoidable Impact	An unavoidable impact would occur if specific economic, social, legal, technical, or other considerations make mitigation measures or alternatives for the impact of a project infeasible. When such impacts are considered "significant," to support its decision on a project for which an EIR was prepared, a Lead Agency must prepare written findings the identify that either: (1) changes to the project are within another agency's jurisdiction and have been or should be adopted, (2) specific economic, social, legal, technical, or other considerations make mitigation measures or alternatives infeasible (State CEQA Guidelines Section 15091). In addition, the Lead Agency must adopt a Statement of Overriding Considerations which describes how the benefits of the project outweigh the unavoidable adverse environmental effects (State CEQA Guidelines Section 15092, 15096(h)).

Glossary of Significant Terms

Unmodified Channel	Channels that generally are unchanged from historic conditions. Unmodified channels may have small areas of modification, including bridges, outfalls, culverts, gauges, or other appurtenant structures.
Unvegetated	Areas containing either no, or only ruderal, vegetation.
Upland	Areas above the normal reach of streams or rivers and characterized by non-wetland vegetation.
Upper Watershed	Generally, the steeper portion of a watershed, above reservoirs and above urban areas.
Velocity	Speed with which water flows in a channel.
Vegetation Management/Removal	Removal of vegetation in and adjacent to creeks to maintain the ability of channels to function as flood control facilities. In addition, vegetation is removed to meet local fire code requirements and to reduce combustible weeds and grasses on property adjacent to the streams within Valley Water's jurisdiction. The control of invasive non-native vegetation is another purpose for which Valley Water undertakes vegetation control. Vegetation management can be accomplished through mowing, hand pruning, hand removal, or herbicide applications (depending on the environmental conditions of the site).
Vegetation Removal <6" dbh	The complete removal of above-ground portions of any individual plant or tree with a dbh less than 6". Cut stump treatment or foliar herbicide is a paired activity with vegetation removal <6" dbh, and is assumed to occur unless otherwise noted on the work order.
Waste Discharge Requirement	A legal mechanism of the state and regional Water Quality Control Boards to regulate discharges of dredge or fill materials.

Glossary of Significant Terms

Waters of the United States	Tidal waters, all interstate waters, including wetlands, and all other waters including tributaries to streams and rivers which could involve interstate or foreign commerce.
Watershed	Entire area that drains to a common stream, synonymous with drainage area. Valley Water's streams are typically divided into five watersheds: Lower Peninsula, West Valley, Guadalupe, Coyote, and Pajaro.
Weir	A dam, wall, screen, or other structure in a waterway for the purpose, diverting, screening, or measuring water.
Wetlands	Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetland is characterized by having the appropriate plant species (dependent on or capable of surviving root saturation), the appropriate hydrology (predictable saturation), and soils reflecting saturation and periodic anaerobic conditions.
Winterization	Winterization is the process to temporarily or permanently close a work site and prepare it for winter storm flows.
Woody Vegetation	Live vegetation having a stiff trunk or branch structure that is inflexible and does not bend over in flows. Typical vegetation types include trees and large shrubs.
Work Sites	The locations where maintenance activities occur.

Appendix C. Air Quality and Greenhouse Gas Emissions Technical Appendix

Criteria Air Pollutants and Ozone Precursors Emissions Calculations

- EIR Emissions Summary
- Construction Emissions Detail
- Off-Road Exhaust Emissions
- Truck Haul Exhaust Emissions
- Truck Haul Exhaust Detail
- Fugitive Dust Emissions Summary

Toxic Air Contaminants

- Toxic Air Contaminant Construction Rate Calculation

Energy Calculations

- Energy Consumption EIR Summary

Model Inputs and Emissions Factors

- Construction Input Parameters
- Equipment Exhaust Emissions Factors
- Generator Emission Factors
- Fugitive Dust Emissions Factors
- Equipment Horsepower and Load Factors
- Conversion Factors
- EMFAC 2021 (On-Road) Emission Rates Output
- EMFAC 2021 (On-Road) Emission Rates Output- Low Speed
- EMFAC Vehicle Classification and Weights
- Off-Road Fuel Consumption Rates
- On-Road Fuel Consumption Rates

Criteria Air Pollutants and Ozone Precursors Emissions Calculations

EIR Emissions Summary
Construction Emissions Detail
Off-Road Exhaust Emissions
Truck Haul Exhaust Emissions
Truck Haul Exhaust Detail
Fugitive Dust Emissions Summary

EIR Emissions Summary

Average Daily Emissions

	ROG (lbs/day)	NOx (lbs/day)	Exhaust PM10 (lbs/day)	Exhaust PM2.5 (lbs/day)
Average Daily Emissions	2.04	23.84	0.78	0.73
Threshold of Significance	54	54	82	54
Threshold Exceeded?	No	No	No	No

Annual Emissions

	ROG (tons/year)	NOx (tons/year)	Exhaust PM10 (tons/year)	Exhaust PM2.5 (tons/year)	MTCO2e/year
Annual Emissions	0	3	0.1	0.1	420.6
Threshold of Significance	10	10	15	10	None
Threshold Exceeded?	No	No	No	No	No

Emissions for year 1 and year 2 are the same due to anticipated equivalent construction intensity for each year

Construction Emissions Detail

On-Site Emissions

Exahust

Off-Road Equipment - Non Tier 4

Element Type	Equipment Type	ROG lb/day	NOX lb/day	CO lb/day	PM10 lb/day	PM2.5 lb/day	CO2e MT/year
Passive Barrier (Hinged)	Excavator	0.06	0.43	1.15	0.02	0.02	20.68
	Roller	0.05	0.49	0.64	0.02	0.02	10.47
	Cement Mixer	0.02	0.13	0.1	0.01	0	1.87
Berm or Property Demolition	Backhoe	0.05	0.52	0.89	0.02	0.02	14.32
	Dozer	0.3	3.25	1.83	0.14	0.13	39.27
	Roller	0.05	0.57	0.74	0.03	0.03	12.08
	pneumatic hammer	0.08	0.81	0.98	0.05	0.04	15.5
Reinforced Concrete Retaining Wall (T-Wall and L-Wall)	Excavator	0.06	0.43	1.15	0.02	0.02	20.68
	Dozer	0.26	2.82	1.58	0.12	0.11	34.04
	Concrete truck	0.16	0.96	1.04	0.03	0.03	49.22
	Roller	0.05	0.49	0.64	0.02	0.02	10.47
Type 1 and Type 2 Wall	Pile Driver	0.12	0.94	1.13	0.03	0.03	62.76
	Crane	0.05	0.53	0.29	0.02	0.02	10.63
Entire Project	Generator	0.41	3.69	5.64	0.15	0.15	100.98
		1.72	16.06	17.8	0.68	0.64	402.97

Off-Road Hauling

	ROG lb/day	NOX lb/day	CO lb/day	PM10 lb/day	PM2.5 lb/day	CO2e MT/year
Total	0.003	0.283	0.020	0.001	0.001	14.88

Fugitive

Aggregate Storage Pile Fugitive Dust

Material Type	PM10 lb/day	PM2.5 lb/day	
Soil	0.90	0.14	unmitigated

Off-Road Hauling

Trip Purpose	PM10 (lbs/day)	PM2.5 (lbs/day)
Export (soil/waste)	15.77	2.37
Export (trees/veg.)	0.42	0.06
Import (soil/fill)	7.88	1.18
Import (concrete)	5.73	0.86
Import (material/supplies)	4.19	0.63
Import (trees/veg.)	0.42	0.06
unmitigated	34.41	5.16

On-Road Emission

Trip Purpose	ROG lb/day	NOx lb/day	PM10_Ex lb/day	PM2.5_Ex lb/day	PM10_D* lb/day	PM2.5_D* lb/day	CO lb/day	CO2e MT/year
Export (soil/waste)	0.03	2.24	0.03	0.03	0.33	0.09	0.25	0.44
Export (trees/veg.)	0.01	0.19	0.00	0.00	0.01	0.00	0.17	0.02
Import (soil/fill)	0.03	2.70	0.04	0.04	0.41	0.11	0.27	0.54
Import (concrete)	0.03	1.24	0.01	0.01	0.25	0.07	0.13	0.42
Import (material/supplies)	0.02	0.87	0.01	0.01	0.18	0.05	0.10	0.29
Import (trees/veg.)	0.00	0.11	0.00	0.00	0.02	0.00	0.02	0.03
Worker Commute	0.19	0.15	0.00	0.00	0.52	0.13	2.22	1.03
Note:	0.32	7.50	0.09	0.09	1.71	0.46	3.16	2.77

* Dust emissions include breakwear, tirewear, and fugitive dust.

Off-Road Exhaust Emissions

Equipment and hours provided						Modeled Equipment	Total Equipment Hours	Offroad Equipment Emission Factors									Average Daily Emissions					Annual GHG Emission
Element Type	Equipment	HP	Total Days	Hours/ Day	Load Factor			ROG	NOX	CO	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	NOX	CO	PM10	PM2.5	CO2e
								g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	lb/day	lb/day	lb/day	lb/day	lb/day	MT/year
Passive Barrier (Hinged)	Excavator	158	130	10	0.38	Excavators	1300	0.159	1.164	3.078	0.057	0.053	528.09	0.021	0.004	530	0.06	0.43	1.15	0.02	0.02	20.68
	Roller	80	130	10	0.38	Rollers	1300	0.244	2.601	3.414	0.129	0.118	528.03	0.021	0.004	530	0.05	0.49	0.64	0.02	0.02	10.47
	Cement Mixer	9	130	10	0.56	Cement and Mortar Mixers	1300	0.553	4.2	3.255	0.164	0.151	570.18	0.023	0.005	572	0.02	0.13	0.1	0.01	0	1.87
Berm or Property Demolition																						
	Backhoe	97	150	10	0.37	Tractors/Loaders/Backhoes	1500	0.196	2.01	3.482	0.077	0.071	529.86	0.021	0.004	532	0.05	0.52	0.89	0.02	0.02	14.32
	Dozer	247	150	10	0.4	Rubber Tired Dozers	1500	0.43	4.599	2.585	0.201	0.185	528.56	0.021	0.004	530	0.3	3.25	1.83	0.14	0.13	39.27
	Roller	80	150	10	0.38	Rollers	1500	0.244	2.601	3.414	0.129	0.118	528.03	0.021	0.004	530	0.05	0.57	0.74	0.03	0.03	12.08
	pneumatic hammer	93	150	10	0.42	Other Construction Equipment	1500	0.298	2.891	3.512	0.172	0.159	527.74	0.021	0.004	529	0.08	0.81	0.98	0.05	0.04	15.5
	~~Pile Driver~~	~~300~~	~~150~~	~~10~~	~~0.2~~		~~1500~~	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reinforced Concrete Retaining Wall (T-Wall and L-Wall)	Excavator	158	130	10	0.38	Excavators	1300	0.159	1.164	3.078	0.057	0.053	528.09	0.021	0.004	530	0.06	0.43	1.15	0.02	0.02	20.68
	Dozer	247	130	10	0.4	Rubber Tired Dozers	1300	0.43	4.599	2.585	0.201	0.185	528.56	0.021	0.004	530	0.26	2.82	1.58	0.12	0.11	34.04
	Concrete truck	376	130	10	0.38	Off-Highway Trucks	1300	0.177	1.086	1.174	0.038	0.035	528.59	0.021	0.004	530	0.16	0.96	1.04	0.03	0.03	49.22
	Roller	80	130	10	0.38	Rollers	1300	0.244	2.601	3.414	0.129	0.118	528.03	0.021	0.004	530	0.05	0.49	0.64	0.02	0.02	10.47
Type 1 and Type 2 Wall	Pile Driver	300	400	10	0.2	Bore/Drill Rigs	4000	0.102	0.825	0.983	0.03	0.027	521.06	0.021	0.004	523	0.12	0.94	1.13	0.03	0.03	62.76
	Crane	231	60	10	0.29	Cranes	600	0.27	2.772	1.537	0.118	0.108	527.56	0.021	0.004	529	0.05	0.53	0.29	0.02	0.02	10.63
Entire Project	Generator	84	570	10	0.74	Generator Sets	5700	0.243	2.185	3.338	0.087	0.087	568.3	0.021	0.0043	570	0.41	3.69	5.64	0.15	0.15	100.98
																Total	**1.72**	**16.06**	**17.8**	**0.68**	**0.64**	**402.97**

Note:
The equipment are modeled as follows with default horsepower as shown in sheet Default HP LF. When data are not available (data marked red), CalEEMod default for diesel powered equipment is used.

Provided Equipment	CalEEMod Equipment
Excavator	Excavators
Roller	Rollers
Cement Mixer	Cement and Mortar Mixers
Backhoe	Tractors/Loaders/Backhoes
Dozer	Rubber Tired Dozers
pneumatic hammer	Other Construction Equipment
Concrete truck	Off-Highway Trucks
Crane	Cranes
Generator	Generator Sets
Pile Driver	Bore/Drill Rigs
pneumatic hammer	Other Material Handling Equipment

Notes:
Total Number of Work Days = 462
Equipment Emission Factor Source: CalEEMod 2022 Appendix G Table G-11 (sheet EF-CalEEMod Table G11)
Generator emissin factor data source: Sac Metro Roadway Construction Emissions Model 9.0 (Sheet EF-Generator)

Truck Haul Exhaust Emissions

Trip Purpose	Total VMT	Total Work Days	Number of Vehicles	Vehicle Type	Average Daily Emission							Annual GHG Emission
					ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D*	PM2.5_D*	CO	CO2e**
					lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	MT/year
Export (soil/waste)	5,800	462	1	HHDT	0.001	0.128	0.000	0.000	0.003	0.001	0.009	6.76
Export (trees/veg.)	154	462	1	HHDT	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.18
Import (soil/fill)	2,900	462	1	HHDT	0.001	0.064	0.000	0.000	0.001	0.001	0.004	3.38
Import (concrete)	2,222	462	1	HHDT	0.000	0.049	0.000	0.000	0.001	0.000	0.003	2.59
Import (material/supplies)	1,540	462	1	HHDT	0.000	0.034	0.000	0.000	0.001	0.000	0.002	1.79
Import (trees/veg.)	154	462	1	HHDT	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.18

Notes:
*Particulate Matter from vehicle break wear only.
** GWP used for quantifying COe Emissions are values from IPCC Sixth Assessment Report in Sheet GWP Assumpiton, assuming two-years to estimate annual emission.

The calculation is based on the followin VMT-based emission rate (g/miles)

VMT-based emission rate (g/miles)

Vehicle Category	Fuel	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	CO	CO2	CH4	N2O	CO2e	Units
HHDT	Diesel	0.04626726	4.6403841	0.01080556	0.010338115	0.10371704	0.036301	0.32366934	2233.95588	0.002149	0.351961	2330.101099	g/mile
MHDT	Diesel	0.06324987	1.8311419	0.01982208	0.018964582	0.0568047	0.0198816	0.20924639	1425.57413	0.002938	0.2246	1486.971835	g/mile

Notes:
EMFAC 2021 County-wide Emission Factors for Vehicle on paved road at low speeds are used to estimate off-road exhaust emissions.
Emission rates are aggregated over all speeds <=25 mph.

Truck Haul Exhaust Detail

Trip Purpose	Total Trips	Total VMT	Total Work Days	Number of Vehicles	Fleet Type	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D*	PM2.5_D*	CO	CO2e**
						lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	MT/year
Export (soil/waste)	5,800	232,000	462	1	Haul	0.03	2.24	0.03	0.03	0.13	0.04	0.25	0.435
Export (trees/veg.)	154	6,160	462	1	Haul	0.01	0.19	0.00	0.00	0.00	0.00	0.17	0.018
Import (soil/fill)	2,900	290,000	462	1	Haul	0.03	2.70	0.04	0.04	0.16	0.05	0.27	0.543
Import (concrete)	2,222	222,222	462	1	Vendor	0.03	1.24	0.01	0.01	0.06	0.02	0.13	0.417
Import (material/supplies)	1,540	154,000	462	1	Vendor	0.02	0.87	0.01	0.01	0.04	0.01	0.10	0.291
Import (trees/veg.)	154	15,400	462	1	Vendor	0.00	0.11	0.00	0.00	0.00	0.00	0.02	0.035
Worker Commute	27,720	554,400	462	30	Worker	0.19	0.15	0.00	0.00	0.04	0.01	2.22	1.032
Notes:	40,490				87.641174	0.3	7.5	0.1	0.1				

*Particulate Matter from vehicle break wear and tire wear only.
**GWP used for quantifying COe Emissions are values from IPCC Sixth Assessment Report in Sheet GWP Assumpiton.
The calculation is based on the followir On-road Vehicle Trips Emission Rates based on Input Unit Parameters

Haul ROG breakdown		
0.03	0.017867	VMT-based
	0	Trip-based
	0.011197	Idle/Diurnal-based
Vendor		
0.03	0.029899	VMT-based
	0	Trip-based
	0.00052	Idle/Diurnal-based
Worker		
0.19	0.022759	VMT-based
	0.079708	Trip-based
	0.087155	Idle/Diurnal-based

On-Road Unit-Parameter Emission Calculation

On-road Vehicle Trips Emission Rates based on Input Unit Parameters

Trip Type	Total VMT	Total Trips	Total Work Days	Number of Vehicles	Vehicle Types	Emission Type	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	CO	CO2e	Units
Haul	1	1	1	1	HHDT	VMT-based	0.0000	0.0040	0.0001	0.0001	0.0003	0.0001	0.0002	3.6993	lbs/day
						Trip-based	0.0000	0.0065	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	lbs/day
						Idle/Diurnal-based	0.0112	0.1343	0.0001	0.0001	0.0000	0.0000	0.1632	27.0453	lbs/day
Vendor	1	1	1	1	MHDT	VMT-based	0.0001	0.0025	0.0000	0.0000	0.0001	0.0000	0.0002	2.6245	lbs/day
						Trip-based	0.0000	0.0036	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	lbs/day
						Idle/Diurnal-based	0.0005	0.0275	0.0001	0.0001	0.0000	0.0000	0.0166	5.1270	lbs/day
Worker	1	1	1	1	LDA,LDT1, LDT2	VMT-based	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0015	0.5905	lbs/day
						Trip-based	0.0013	0.0006	0.0000	0.0000	0.0000	0.0000	0.0067	0.1756	lbs/day
						Idle/Diurnal-based	0.0029	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	lbs/day

EMFAC Emission Types Used to Estimate Onroad Emission Rates

Pollutant group	VMT-based (g/mile)	Trip-based (g/trip)	Idle/Diurnal-based
TOG, ROG	RUNEX	STREX, HOTSOAK,	IDLEX, DIURN
Gases	RUNEX	STREX	IDLEX
PM - Exhaust	RUNEX	STREX	IDLEX
PM - Dust	PMTW, PMBW		

Acronyms:

RUNEX	Running exhaust	g/mile
PMBW	PM brakewear	g/mile
PMTW	PM tirewear	g/mile
STREX	Start exhaust	g/trip
HOTSOAK	Hot Soak evaporative	g/trip
RUNLOSS	Running Loss evaporat	g/trip
IDLEX	Idle exhaust	g/trip
DIURN	Diurnal Loss evaporativ	g/trip

VMT-based emission rate (g/miles)

Vehicle Category	Fuel	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	CO	CO2	CH4	N2O	CO2e
LDA	Gasoline	0.0079468	0.0382086	0.0012422	0.0011421	0.015586688	0.00465534	0.69520017	270.173801	0.0021167	0.004408	271.4363
LDA	Diesel	0.0256933	0.1884202	0.0159248	0.0152359	0.015747545	0.00471164	0.31991367	229.947651	0.0011934	0.036228	239.8713
LDA	Electricity	0	0	0	0	0.012382393	0.00353384	0	0	0	0	0
LDA	Plug-in Hyt	0.0013783	0.0031874	0.0006287	0.0005781	0.011948033	0.00338181	0.20975733	135.585379	0.000432	0.000569	135.7526
LDT1	Gasoline	0.0247097	0.1153554	0.0017824	0.0016389	0.017260089	0.00524103	1.31741575	321.488969	0.0056211	0.008687	324.0175
LDT1	Diesel	0.2970383	1.6438099	0.2489384	0.2381694	0.018627676	0.00571969	1.58506793	414.944189	0.0137969	0.065375	433.1764
LDT1	Electricity	0	0	0	0	0.012392366	0.00353733	0	0	0	0	0
LDT1	Plug-in Hyt	0.0012315	0.0028478	0.0003835	0.0003526	0.011982042	0.00339371	0.18782429	121.221959	0.0003834	0.000501	121.3696
LDT2	Gasoline	0.0102444	0.0625705	0.0012964	0.001192	0.016943686	0.00513029	0.79562065	332.184141	0.0026417	0.005588	333.7833
LDT2	Diesel	0.0129798	0.0393317	0.0049405	0.0047268	0.0169215	0.00512252	0.12979707	301.005498	0.0006029	0.047424	313.9689
LDT2	Electricity	0	0	0	0	0.012361805	0.00352663	0	0	0	0	0
LDT2	Plug-in Hyt	0.0012951	0.0029949	0.0004765	0.0004381	0.01196702	0.00338846	0.19735814	127.450946	0.0004032	0.000528	127.6062
MHDT	Gasoline	0.0619495	0.3947976	0.0014655	0.0013475	0.057017443	0.0187561	1.27608887	1746.95873	0.0125848	0.019987	1752.766
MHDT	Diesel	0.0281953	1.1281545	0.013024	0.0124606	0.057545391	0.01894089	0.10964649	1141.32802	0.0013096	0.179817	1190.455
MHDT	Electricity	0	0	0	0	0.034718289	0.0109514	0	0	0	0	0
MHDT	Natural Ga	0.0107366	0.1243499	0.0013334	0.001226	0.057740782	0.01900927	2.99616556	979.014167	0.7514385	0.199578	1054.464
HHDT	Gasoline	1.2221969	5.5569087	0.0033752	0.0031033	0.11447953	0.03806783	47.7242012	2106.22924	0.2074132	0.167059	2157.623
HHDT	Diesel	0.0161392	1.8251944	0.0264801	0.0253346	0.113433109	0.03619279	0.07808337	1608.77639	0.0007496	0.253463	1677.993
HHDT	Electricity	0	0	0	0	0.075007752	0.02283216	0	0	0	0	0
HHDT	Natural Ga	0.0472351	1.0498644	0.0018271	0.0016799	0.174007312	0.05730256	13.0127352	1375.94017	2.2359283	0.280494	1514.898

Trip-based emission rate (g/trip)

Vehicle Category	Fuel	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	CO	CO2	CH4	N2O	CO2e
LDA	Gasoline	0.6178008	0.2455388	0.0020444	0.0018798	0	0	3.04945189	68.4734553	0.0678245	0.032293	79.18177
LDA	Diesel	0	0	0	0	0	0	0	0	0	0	0
LDA	Electricity	0	0	0	0	0	0	0	0	0	0	0
LDA	Plug-in Hyb	0.2517991	0.1155103	0.0021591	0.0019852	0	0	1.33989327	64.1083597	0.0422493	0.020584	70.90664
LDT1	Gasoline	1.0980791	0.35972	0.0027662	0.0025434	0	0	4.88611504	84.4554698	0.0985524	0.037511	97.44567
LDT1	Diesel	0	0	0	0	0	0	0	0	0	0	0
LDT1	Electricity	0	0	0	0	0	0	0	0	0	0	0
LDT1	Plug-in Hyb	0.2175636	0.1155103	0.0014847	0.0013651	0	0	1.33989327	67.756814	0.0419867	0.020339	74.4808
LDT2	Gasoline	0.6544609	0.3143641	0.0020874	0.0019193	0	0	3.47416993	85.0683336	0.0784936	0.036037	97.09652
LDT2	Diesel	0	0	0	0	0	0	0	0	0	0	0
LDT2	Electricity	0	0	0	0	0	0	0	0	0	0	0
LDT2	Plug-in Hyb	0.2227152	0.1155103	0.0017508	0.0016098	0	0	1.33989327	74.1408406	0.0419924	0.020344	80.86643
MHDT	Gasoline	0.5346132	0.424333	0.0005582	0.0005132	0	0	5.53162568	45.3761776	0.0459797	0.032398	55.50357
MHDT	Diesel	0	1.6465588	0	0	0	0	0	0	0	0	0
MHDT	Electricity	0	0	0	0	0	0	0	0	0	0	0
MHDT	Natural Ga	0	0	0	0	0	0	0	0	0	0	0
HHDT	Gasoline	1.4044689	1.379041	0.0015213	0.0013988	0	0	2.00161576	50.031377	0.0002265	0.041557	61.38277
HHDT	Diesel	0	2.9319949	0	0	0	0	0	0	0	0	0
HHDT	Electricity	0	0	0	0	0	0	0	0	0	0	0
HHDT	Natural Ga	0	0	0	0	0	0	0	0	0	0	0

Idle/Diurnal-based emission rate (g/vehicle/trip)

Vehicle Category	Fuel	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	CO	CO2	CH4	N2O	CO2e
LDA	Gasoline	1.3849539	0	0	0	0	0	0	0	0	0	0
LDA	Diesel	0	0	0	0	0	0	0	0	0	0	0
LDA	Electricity	0	0	0	0	0	0	0	0	0	0	0
LDA	Plug-in Hyb	0.4405255	0	0	0	0	0	0	0	0	0	0
LDT1	Gasoline	2.5223597	0	0	0	0	0	0	0	0	0	0
LDT1	Diesel	0	0	0	0	0	0	0	0	0	0	0
LDT1	Electricity	0	0	0	0	0	0	0	0	0	0	0
LDT1	Plug-in Hyb	0.2767464	0	0	0	0	0	0	0	0	0	0
LDT2	Gasoline	1.3492557	0	0	0	0	0	0	0	0	0	0
LDT2	Diesel	0	0	0	0	0	0	0	0	0	0	0
LDT2	Electricity	0	0	0	0	0	0	0	0	0	0	0
LDT2	Plug-in Hyb	0.3053615	0	0	0	0	0	0	0	0	0	0
MHDT	Gasoline	3.5731382	0.0861753	0	0	0	0	15.1444012	526.723337	0.2610759	0.007219	535.9781
MHDT	Diesel	0.2358958	12.489726	0.0259125	0.0247915	0	0	7.53539254	2229.37376	0.0109567	0.351239	2325.568
MHDT	Electricity	0	0	0	0	0	0	0	0	0	0	0
MHDT	Natural Ga	0.2425044	6.4526601	0.0202228	0.0185941	0	0	35.8077466	5290.54518	16.972564	1.078512	6058.514
HHDT	Gasoline	9.4346488	0	0	0	0	0	0	0	0	0	0
HHDT	Diesel	5.0786739	60.914493	0.0302465	0.0289381	0	0	74.0090385	11755.3372	0.2358912	1.852058	12267.53
HHDT	Electricity	0	0	0	0	0	0	0	0	0	0	0
HHDT	Natural Ga	0.5301215	13.184923	0.0274701	0.0252577	0	0	74.7547775	10529.3113	35.176087	2.146469	12096.71

Default Worker Fleet Composition: EMFAC 2021 light duty vehicles

		VMT-based		Trip-based	
Vehicle Category	Fuel	VMT	Vehicle-Fuel Type Composition	Trips	Vehicle-Fuel Type Composition
LDA	Gasoline	22133915	58%	2780384	58%
LDA	Diesel	46912.854	0%	6871.1932	0%
LDA	Electricity	2670452	7%	299852.7	6%
LDA	Plug-in Hyb	825567.71	2%	78720.739	2%
LDT1	Gasoline	1664705.9	4%	230185.98	5%
LDT1	Diesel	302.82578	0%	59.132313	0%
LDT1	Electricity	9323.7038	0%	1109.7959	0%
LDT1	Plug-in Hyb	4519.1823	0%	405.77576	0%
LDT2	Gasoline	10447706	27%	1360240.9	28%
LDT2	Diesel	38652.337	0%	4980.3401	0%
LDT2	Electricity	73663.773	0%	10962.384	0%
LDT2	Plug-in Hyb	112327.22	0%	10593.395	0%
	Total	38028048	100%	4784366.3	100%

Default Vendor Fleet Composition: MHDT, Diesel

Vehicle Category	Fuel	-based Composite of Vehicle-Fuel Type in Fleet	
MHDT	Gasoline	0%	0%
MHDT	Diesel	100%	100%
	Total	100%	100%

Default Haul Fleet Composition: HHDT, Diesel

Vehicle Category	Diesel	-based Composite of Vehicle-Fuel Type in Fleet	
HHDT	Gasoline	0%	0%
HHDT	Diesel	100%	100%
	Total	100%	100%

Exhaust Emission - Worker Fleet Composition from EMFAC 2021

Emisson Factors	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	CO	CO2e	Units
VMT -	0.009	0.045	0.001	0.001	0.016	0.005	0.687	267.831	g/mile
Trip -	0.602583	0.251542	0.0019542	0.0017968	0	0	3.02010434	79.6614816	g/trip
Evaporative -	1.317762	0	0	0	0	0	0	0	g/day/vehicle

Exhaust Emission - MHDT 100%

Emisson Factors	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	CO	CO2e	Units
VMT -	0.028	1.128	0.013	0.012	0.058	0.019	0.110	1190.455	g/mile
Trip -	0	1.6465588	0	0	0	0	0	0	g/trip
Evaporative -	0.235896	12.489726	0.0259125	0.0247915	0	0	7.53539254	2325.56763	g/day/vehicle

Exhaust Emission - HHDT 100%

Emisson Factors	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	CO	CO2e	Units
VMT -	0.016	1.825	0.026	0.025	0.113	0.036	0.078	1677.993	g/mile
Trip -	0	2.9319949	0	0	0	0	0	0	g/trip
Evaporative -	5.078674	60.914493	0.0302465	0.0289381	0	0	74.0090385	12267.5305	g/day/vehicle

Notes

Assume 100% paved road.

Emission type -specific emission rates are provided in worksheet EMFAC2021.

Fugitive Dust Emissions Summary

Onsite Stockpiling

Volume per Stockpile	1,000	cubic yard	
Mass per Stockpile	843	tons	
Total # of Piles during Project	1		
Estimated Total Mass	843	tons	
PM10 EF	0.49	lbs/ton	see sheet Fugitive Dust EF
Total Work Days	462		

Emission	PM10 (lbs/day)	PM2.5 (lbs/day)
unmitigated	0.90	0.14
BMP	0.35	0.05

Onsite Bulldozing

Equipment	Total Equipment Hour	PM10 EF (lb/hr)	PM10 (lbs/day)	PM2.5 (lbs/day)	
Dozer	2800	0.47	2.88	0.43	unmitigated
			1.12	0.17	BMP

On-road Vehicles

Emission Factors

Trip Purpose	Load Capacity (tons)	Vehicle Category	GVWR (ton)	Avg. Weight (tons)	PM10 EF, Unpaved Road (lbs/VMT)	Corrected PM10 EF, Unpaved Road (lb/VMT)	PM10 EF, Paved Road (lbs/VMT)	Corrected PM10 EF, Paved Road (lb/VMT)
Export (soil/waste)	13	HHDT	30	23	1.503	1.256	4.2E-4	4.0E-4
Export (trees/veg.)	13	HHDT	30	24	1.504	1.257	4.2E-4	4.0E-4
Import (soil/fill)	13	HHDT	30	23	1.503	1.256	4.2E-4	4.0E-4
Import (concrete)	18	HHDT	30	21	1.427	1.192	4.2E-4	4.0E-4
Import (material/supplies)	13	HHDT	30	24	1.504	1.257	4.2E-4	4.0E-4
Import (trees/veg.)	13	HHDT	30	24	1.504	1.257	4.2E-4	4.0E-4
Worker Commute	0	.DA, LDT1, LDT2	2	2	0.496	0.415	4.2E-4	4.0E-4

Notes:

Emission factor for travel on paved roads is estimated using Eq 3 and 3a on worksheet "Fugitive Dust EF"

Emission factor for travel on unpaved roads is estimated using Eq 2 and 2a on worksheet "Fugitive Dust EF"

Weight of worker vehicle is calcualted as the average of vehicle category max weight (LDA: 3,190 lbs, LDT1: 3,750 lbs, LDT2: 5,750 lbs, EMFAC2011

For calculating EF from paved road, the average weight of all vehicles traveling the road is assumped to be 2.4 tons

Dust Emissions

			Unpaved Road		Paved Road		Total	
Trip Purpose	Unpaved Road (mi)	Paved Road (mi)	PM10 (lbs/day)	PM2.5 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Export (soil/waste)	5,800	232,000	15.767	2.365	0.200	0.050	16	2.4
Export (trees/veg.)	154	6,160	0.419	0.063	0.005	0.001	0.4	0.1
Import (soil/fill)	2,900	290,000	7.884	1.183	0.250	0.062	8.1	1.2
Import (concrete)	2,222	222,222	5.734	0.860	0.192	0.048	5.9	0.9
Import (material/supplies)	1,540	154,000	4.189	0.628	0.133	0.033	4.3	0.7
Import (trees/veg.)	154	15,400	0.419	0.063	0.013	0.003	0.4	0.1
Worker Commute	0	554,400	0.000	0.000	0.478	0.119	0.5	0.1
		unmitigated	34.41	5.16	1.27	0.32	35.60	5.50
		BMP	13.42	2.01	1.27	0.32	14.69	2.33

mitigation 61% Reduction by BMP AQ1 watering unpaved road twice daily.

PM2.5 to PM10 Mass Emission Ratio used in Calculation

Fugitive Dust Source	PM2.5/PM10	Reference
Stockpiling	0.15	Based on k-values of PM2.5 and PM10 in EPA. AP-42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.4 Aggregate Handling and Storage Piles
Paved road	0.25	EPA. AP-42. Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust, Final Report, Oct 2005.
Unpaved road	0.15	EPA. AP-42. Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust, Final Report, Oct 2005.

Toxic Air Contaminants

Toxic Air Contaminant Construction Rate Calculation

TAC Construction Rate Calculation

Reach	Construction Duration (Wks)	Construction Duration (days)	LF to be Constructed	Construction Rate (LF/day)
Reach 4	16	96	3096	32
Reach 6	29	174	5861	34
Reach 7	25	150	4664	31
Reach 8	15	90	4664	52

Energy Calculations

Energy Consumption EIR Summary

Energy Consumption EIR Summary

Heavy-Duty Equipment

Equipment	HP	Load Factor	Modeled Equipment	Total Equipment Hours	Horsepower-Hour (hp-hr)	Fuel Usage (gallons/hp-hr)	Fuel (gallons of diesel)
Excavator	158	0.38	Excavators	1300	205400	0.051215091	10,520
Roller	80	0.38	Rollers	1300	104000	0.106786029	11,106
Cement Mixer	9	0.56	Cement and Mortar Mixers	1300	11700	0.050829881	595
Backhoe	97	0.37	Tractors/Loaders /Backhoes	1500	145500	0.046600998	6,780
Dozer	247	0.4	Rubber Tired Dozers	1500	370500	0.047454783	17,582
Roller	80	0.38	Rollers	1500	120000	0.106786029	12,814
pneumatic hammer	93	0.42	Other Construction Equipment	1500	139500	0.043712365	6,098
Excavator	158	0.38	Excavators	1300	205400	0.051215091	10,520
Dozer	247	0.4	Rubber Tired Dozers	1300	321100	0.047454783	15,238
Concrete truck	376	0.38	Off-Highway Trucks	1300	488800	0.04893101	23,917
Roller	80	0.38	Rollers	1300	104000	0.106786029	11,106
Pile Driver	300	0.2	Bore/Drill Rigs	4000	1200000	0.050516417	60,620
Crane	231	0.29	Cranes	600	138600	0.053012364	7,348
Generator	84	0.74	Generator Sets	5700	478800	0.076192038	36,481
						Total	230,723

Notes:

Data queried from OFFROAD 2021.

For Cement And Mortar Mixer where OFFROAD database is missing with equipment activity data, "Industrial - Other General Industiral Equipment" data is used for estimating Gallons per Horsepower-hour.

Trip and VMT

Vehicle Type	Total VMT	Gallons of Diesel	Gallons of Gasoline
Export (soil/waste)	232,000	37,953	
Export (trees/veg.)	6,160	1,008	
Import (soil/fill)	290,000	47,441	
Import (concrete)	222,222	30,865	
Import (material/supplies)	154,000	21,390	
Import (trees/veg.)	15,400	2,139	
Worker Commute	554,400	16,654	20,525
		157,450	20,525

Project Grand Total

Gallons of Diesel	Gallons of Gasoline
388,173	**20,525**

Model Inputs and Emissions Factors

Construction Input Parameters
Equipment Exhaust Emissions Factors
Generator Emission Factors
Fugitive Dust Emissions Factors
Equipment Horsepower and Load Factors
Conversion Factors
EMFAC 2021 (On-Road) Emission Rates Output
EMFAC 2021 (On-Road) Emission Rates Output- Low Speed
EMFAC Vehicle Classification and Weights
Off-Road Fuel Consumption Rates
On-Road Fuel Consumption Rates

Construction Input Parameters

Item	Value	Unit
Earliest Start Year	2025	year
Daily schedule	10	hours/day
Weekly Schedule	5.25	days/week
Total duration	462	work days*
Total Years	2	calendar years
OnRoad VMT		
Worker Commute (one-way)	20	miles
Onsite Construction Worker	30	workers/day
Material Export		
Distance		
Off-Haul (soil/waste) Distance	40	miles
Off-Haul (Trees/Veg.) Distance	40	miles
Quantity		
Material Export (Off-Haul)	20,000	cy
Tree Removal (Off-Haul)	500	trees
Material Import		
Distance		
Soil/Fill Source Site Distance	100	miles
Construction	100	miles
Trees/Veg. Restoration	100	miles
Quantites		
On-Haul (Soil/Fill) Quantity	12,000	cy
Concrete Quantity	10,000	cy
On-Haul (Materials/Supplies)	10,000	tons
On-Haul (Trees/Veg.) Quantity	500	#trees
Onsite stockpiling Quantity	1,000	cy
Truck Capacity		
On/Off - Haul (Soil/Fill/Waste)	10	cy
Concrete Truck Capacity	9	cy
Vendor Import Truck Capacity	13	tons/truck
Tree Hauling Truck Capacity	13	tons/truck

*462 work days assumed 22 months X 4 weeks/month X 5 weekdays/week + 22 Saturdays

Construction Trip and VMT calculation

Trip Type	# One-way Trips	Total VMT (paved road)	Daily trips	Number of Vehicles	Unpaved Road VMT
Export (soil/waste)	4000	160,000	8.7	1	4,000
Export (trees/veg.)	154	6,160	0.3	1	154
Import (soil/fill)	2,400	240,000	5.2	1	2,400
Import (concrete)	2,222	222,222	4.8	1	2,222
Import (material/supplies)	1540	154,000	3.3	1	1,540
Import (trees/veg.)	154	15,400	0.3	1	154
Worker Commute	27720	554,400	60	30	0

Assumptions:

Worker commute trip rate	1 round trips/worker/day	
Mature tree weight	2 tons/tree	https://thetimberlandinvestor.com/how-much-does-a-tree-weigh/
Replacement tree weight	2 tons/tree	assume same weight as mature tree

For haul trips, assume one mile traveled off-road for each vehicle trip; for worker commute zero miles on unpaved road.

Source: data provided to Ascent by AECOM based on 60 percent designs and represents total project anticipated activity with built- in 20% contigency on quantity esitmates

workers per day are an average daily estimate based on a size of 10 workers per crew and up to three crews working at the same time

Equpment Exhaust Emissions Factors

Statewide Average Annual Offroad Equipment Emission Factors (grams per horsepower-hour)

Equipment	Year	Fuel	Low HP	High HP	TOG	ROG	NOX	CO	SO2	PM10	PM2.5	CO2	CH4	N2O
Bore/Drill Rigs	2025	Diesel	25	50	0.708	0.595	4.004	4.301	0.006	0.194	0.179	599.97	0.024	0.005
Bore/Drill Rigs	2025	Diesel	50	75	0.357	0.3	4.671	3.327	0.005	0.255	0.235	497.786	0.02	0.004
Bore/Drill Rigs	2025	Diesel	75	100	0.169	0.142	1.745	3.249	0.005	0.051	0.047	522.567	0.021	0.004
Bore/Drill Rigs	2025	Diesel	100	175	0.137	0.115	0.9	2.952	0.005	0.04	0.037	530.619	0.022	0.004
Bore/Drill Rigs	2025	Diesel	175	300	0.135	0.113	1.055	1.055	0.005	0.035	0.032	525.609	0.021	0.004
Bore/Drill Rigs	2025	Diesel	300	600	0.122	0.102	0.825	0.983	0.005	0.03	0.027	521.059	0.021	0.004
Bore/Drill Rigs	2025	Diesel	600	750	0.084	0.071	0.417	0.959	0.005	0.016	0.014	530.305	0.022	0.004
Bore/Drill Rigs	2025	Diesel	750	999	0.205	0.172	3.862	0.994	0.005	0.089	0.082	526.939	0.021	0.004
Bore/Drill Rigs	2025	Diesel	0	25	1.02	0.843	6.436	3.804	0.011	0.242	0.223	850.855	0.035	0.007
Cement and Mortar Mixer	2025	Diesel	0	25	0.669	0.553	4.2	3.255	0.009	0.164	0.151	570.175	0.023	0.005
Cranes	2025	Diesel	300	600	0.239	0.201	1.95	1.663	0.005	0.079	0.073	527.585	0.021	0.004
Cranes	2025	Diesel	600	750	0.452	0.38	3.764	2.675	0.005	0.187	0.172	527.208	0.021	0.004
Cranes	2025	Diesel	175	300	0.322	0.27	2.772	1.537	0.005	0.118	0.108	527.564	0.021	0.004
Cranes	2025	Diesel	100	175	0.424	0.356	3.321	3.362	0.005	0.181	0.166	528.683	0.021	0.004
Cranes	2025	Diesel	50	75	1.636	1.375	9.722	4.696	0.005	0.981	0.903	525.413	0.021	0.004
Cranes	2025	Diesel	0	25	1.509	1.268	4.898	5.859	0.005	0.389	0.358	586.607	0.024	0.005
Cranes	2025	Diesel	25	50	2.245	1.886	5.81	7.309	0.005	0.565	0.52	592.06	0.024	0.005
Cranes	2025	Diesel	750	999	0.579	0.487	6.034	4.087	0.005	0.251	0.231	527.447	0.021	0.004
Cranes	2025	Diesel	75	100	0.456	0.383	3.564	3.727	0.005	0.206	0.19	526.436	0.021	0.004
Excavators	2025	Diesel	100	175	0.189	0.159	1.164	3.078	0.005	0.057	0.053	528.086	0.021	0.004
Excavators	2025	Diesel	750	999	0.094	0.079	2.36	0.992	0.005	0.021	0.02	534.921	0.022	0.004
Excavators	2025	Diesel	600	750	0.26	0.218	2.427	1.51	0.005	0.089	0.082	530.428	0.022	0.004
Excavators	2025	Diesel	175	300	0.158	0.133	0.987	1.099	0.005	0.033	0.03	528.274	0.021	0.004
Excavators	2025	Diesel	75	100	0.235	0.197	2.045	3.46	0.005	0.081	0.074	524.872	0.021	0.004
Excavators	2025	Diesel	50	75	0.267	0.224	2.514	3.342	0.005	0.139	0.128	527.223	0.021	0.004
Excavators	2025	Diesel	25	50	0.478	0.402	3.446	4.211	0.005	0.107	0.098	587.138	0.024	0.005
Excavators	2025	Diesel	0	25	1.066	0.882	6.484	3.582	0.011	0.251	0.231	845.98	0.034	0.007
Excavators	2025	Diesel	300	600	0.137	0.115	0.714	1.043	0.005	0.025	0.023	526.988	0.021	0.004
Generator Sets	2025	Diesel	0	25	0.656	0.542	4.347	2.869	0.008	0.177	0.163	568.322	0.023	0.005
Generator Sets	2025	Diesel	25	50	0.441	0.364	3.482	3.759	0.007	0.093	0.086	568.312	0.023	0.005
Off-Highway Trucks	2025	Diesel	175	300	0.222	0.187	1.149	1.234	0.005	0.044	0.041	526.221	0.021	0.004
Off-Highway Trucks	2025	Diesel	25	50	0.807	0.678	4.009	5.532	0.005	0.185	0.17	582.022	0.024	0.005
Off-Highway Trucks	2025	Diesel	50	75	0.278	0.234	1.633	3.905	0.005	0.027	0.024	522.493	0.021	0.004
Off-Highway Trucks	2025	Diesel	75	100	0.367	0.309	2.692	3.878	0.005	0.156	0.143	530.118	0.022	0.004
Off-Highway Trucks	2025	Diesel	300	600	0.211	0.177	1.086	1.174	0.005	0.038	0.035	528.587	0.021	0.004
Off-Highway Trucks	2025	Diesel	600	750	0.275	0.231	1.67	1.574	0.005	0.064	0.059	528.69	0.021	0.004
Off-Highway Trucks	2025	Diesel	750	999	0.201	0.169	2.949	1.134	0.005	0.049	0.045	524.321	0.021	0.004
Off-Highway Trucks	2025	Diesel	100	175	0.259	0.218	1.372	3.341	0.005	0.068	0.062	526.643	0.021	0.004
Other Construction Equipr	2025	Diesel	0	25	0.994	0.822	6.237	4.875	0.013	0.242	0.222	848.519	0.034	0.007
Other Construction Equipr	2025	Diesel	25	50	0.901	0.757	4.304	4.872	0.005	0.268	0.246	591.483	0.024	0.005
Other Construction Equipr	2025	Diesel	50	75	1.163	0.978	8.526	4.506	0.005	0.653	0.601	522.348	0.021	0.004
Other Construction Equipr	2025	Diesel	75	100	0.354	0.298	2.891	3.512	0.005	0.172	0.159	527.743	0.021	0.004
Other Construction Equipr	2025	Diesel	100	175	0.283	0.238	2.193	3.147	0.005	0.114	0.105	526.485	0.021	0.004
Other Construction Equipr	2025	Diesel	175	300	0.248	0.208	2.169	1.368	0.005	0.085	0.078	528.599	0.021	0.004
Other Construction Equipr	2025	Diesel	300	600	0.186	0.156	1.413	1.269	0.005	0.054	0.049	528.419	0.021	0.004
Other Construction Equipr	2025	Diesel	600	750	0.183	0.154	1.514	1.109	0.005	0.051	0.047	528.78	0.021	0.004
Other Construction Equipr	2025	Diesel	750	999	0.148	0.124	2.711	0.999	0.005	0.045	0.041	527.554	0.021	0.004
Rollers	2025	Diesel	100	175	0.151	0.127	1.1	2.906	0.005	0.049	0.045	527.452	0.021	0.004
Rollers	2025	Diesel	175	300	0.248	0.208	2.175	1.522	0.005	0.087	0.08	528.085	0.021	0.004
Rollers	2025	Diesel	75	100	0.29	0.244	2.601	3.414	0.005	0.129	0.118	528.034	0.021	0.004
Rollers	2025	Diesel	300	600	0.17	0.143	1.428	1.422	0.005	0.049	0.046	529.722	0.021	0.004
Rollers	2025	Diesel	25	50	0.675	0.567	3.678	4.113	0.005	0.166	0.153	586.902	0.024	0.005
Rollers	2025	Diesel	0	25	1.008	0.833	6.317	4.394	0.012	0.242	0.223	847.999	0.034	0.007
Rollers	2025	Diesel	50	75	2.239	1.882	15.11	6.171	0.005	1.081	0.994	527.546	0.021	0.004
Rubber Tired Dozers	2025	Diesel	300	600	0.441	0.371	3.506	2.902	0.005	0.154	0.142	532.172	0.022	0.004
Rubber Tired Dozers	2025	Diesel	600	750	0.276	0.232	2.871	1.1	0.005	0.081	0.075	527.876	0.021	0.004
Rubber Tired Dozers	2025	Diesel	175	300	0.511	0.43	4.599	2.585	0.005	0.201	0.185	528.56	0.021	0.004
Rubber Tired Dozers	2025	Diesel	100	175	0.622	0.522	4.472	3.687	0.005	0.29	0.267	528.125	0.021	0.004
Rubber Tired Dozers	2025	Diesel	75	100	0.704	0.591	4.915	4.156	0.005	0.355	0.327	531.632	0.022	0.004
Rubber Tired Dozers	2025	Diesel	50	75	0.805	0.677	5.408	4.257	0.005	0.385	0.354	527.918	0.021	0.004
Rubber Tired Dozers	2025	Diesel	25	50	0.628	0.528	3.679	5.181	0.005	0.127	0.117	586.987	0.024	0.005
Tractors/Loaders/Backhoe	2025	Diesel	750	999	0.189	0.159	2.998	1.032	0.005	0.052	0.048	528.147	0.021	0.004
Tractors/Loaders/Backhoe	2025	Diesel	25	50	0.661	0.556	3.699	4.606	0.005	0.146	0.135	580.494	0.024	0.005
Tractors/Loaders/Backhoe	2025	Diesel	50	75	1.916	1.61	12.621	5.357	0.005	1.018	0.937	527.224	0.021	0.004
Tractors/Loaders/Backhoe	2025	Diesel	75	100	0.233	0.196	2.01	3.482	0.005	0.077	0.071	529.863	0.021	0.004
Tractors/Loaders/Backhoe	2025	Diesel	100	175	0.193	0.162	1.183	3.089	0.005	0.059	0.054	525.997	0.021	0.004
Tractors/Loaders/Backhoe	2025	Diesel	175	300	0.194	0.163	1.399	1.221	0.005	0.053	0.049	526.844	0.021	0.004
Tractors/Loaders/Backhoe	2025	Diesel	300	600	0.17	0.143	0.989	1.167	0.005	0.038	0.035	525.863	0.021	0.004
Tractors/Loaders/Backhoe	2025	Diesel	600	750	0.173	0.146	1.12	1.66	0.005	0.045	0.042	503.925	0.02	0.004
Tractors/Loaders/Backhoe	2025	Diesel	0	25	1.023	0.846	6.467	3.493	0.011	0.242	0.222	848.305	0.034	0.007

Source: CalEEMod 2022 Appendix G Table G-11.

Generator Emission Factors

2025		g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr	g/hp/hr
Equipment	**MaxHP**	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	N2O
Generator Sets	15	0.607	3.491	4.269	0.008	0.178	0.178	568.299	0.054	0.005
Generator Sets	25	0.694	2.376	4.407	0.007	0.175	0.175	568.299	0.062	0.005
Generator Sets	50	0.440	3.758	3.481	0.007	0.093	0.093	568.300	0.039	0.005
Generator Sets	120	0.243	3.338	2.185	0.006	0.087	0.087	568.299	0.021	0.004
Generator Sets	175	0.184	2.930	1.297	0.006	0.053	0.053	568.299	0.016	0.004
Generator Sets	250	0.147	1.000	1.020	0.006	0.028	0.028	568.299	0.013	0.004
Generator Sets	500	0.144	0.981	0.945	0.005	0.027	0.027	568.300	0.013	0.004
Generator Sets	750	0.145	0.981	0.964	0.005	0.027	0.027	568.299	0.013	0.004
Generator Sets	9999	0.173	1.008	2.812	0.005	0.047	0.047	568.299	0.015	0.004

Source: Sac Metro Roadway Construction Emissions Model 9.0

http://www.airquality.org/LandUseTransportation/Documents/RoadConstructionEmissionsModelVer9_0_0_locked.zip

Fugitive Dust Emission Factors

1 Aggregate Storage Piles [1]

Emissions result from several distinct processes within the stockpiling cycle: 1. loading of materials through batch or drop operations, 2. equipment traffic in storage areas, 3. wind erosion of piles, 4. loadout of material through batch or drop operations

E(lb/ton)=(k)(0.0032)(U/5)^1.3/(M/2)^1.4

Where:	PM10	Unit	Source
k= Particle Size Multiplier:	0.35	dimensionless	AP-42 Chapter 13.2.4-3, PM10 emissions
U= mean wind speed	6.7	mph	CalEEMod for Santa Clara County
M= moisture content (%)	3.4	constant	AP-42 Chapter 13.2.4-3, Table 13.2.4-1, exposed ground
	0.49	**lbs/ton**	

moisture content updated to AP-42 table and added /100 in formula f
percentage

CalEEMod Wind speed
3 m/s
6.710808876 mph

2 Travel on Unpaved Roads (Heavy Duty Trucks)[2]

E(lbs/VMT)=(k)(s/12)^a (W/3)^b

1609.344 m/mile

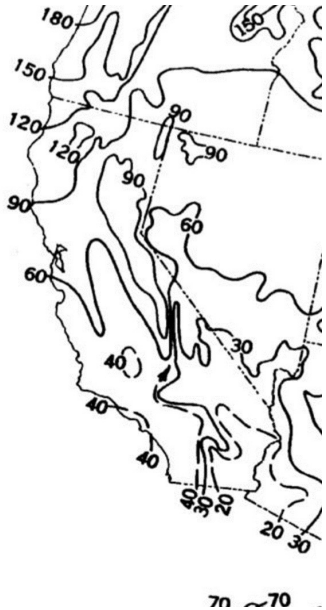
Where:	PM10	Unit	Source
k= Particle Size Multiplier:	1.5	dimensionless	AP-42 Chapter 13.2.2-2, PM10 emissions; industrial roads
s= Silt Content (%)	4.3	constant	AP-42 Chapter 13.2.2-2, service roads
a=	0.9	constant	AP-42 Chapter 13.2.2-2, industrial roads
b=	0.45	constant	AP-42 Chapter 13.2.2-2, industrial roads
W=Vehicle Weight	23.0	tons	Vehicle Weight
PM10 Emission factor	0.024	lbs/VMT	

Caleemod precipitation > 20mm
0.787402 inch

2a Correction for Natural Precipitation[3]

E(ext)=E[(365-P)/365]

Where:		Unit	Source
P=#days/yr with >=0.01 inch precipitation during the averaging period	60	days	AP-42 Chapter 13.2.2, Figure 13.2.2-1
Corrected EF PM10	**0.020**	lbs/VMT	



3 Travel on Paved Roads

E(lbs/VMT)=(k)(sL)^.912 (W)^1.021

Where:	**PM10**	Unit	Source	
k= Particle Size Multiplier:	0.0022	lb/VMT	AP-42 Chapter 13.2.1, Table 13.2.1-1, PM10 emissions	
sL= road surface silt loading	0.06	g/m^2	AP-42 Chapter 13.2.1, Table 13.2.1-2 ADT category 5,000-10,000	
W= average weight of the vehicles traveling the roa	2.4	tons	Statewide average vehicle weight in CA	Note: I found the 2.4 tons used in a bunch of EIRs (link below for example) but not the original source.
PM10 Emission factor	0.00041	lbs/VMT		https://www.dco.uscg.mil/Portals/9/Appendix_I_Air_Quality_&_GHG_Assumptions_20220527.p

Correction for Natural Precipitation[5]

3a E(ext)=E[(1-P/4N)]

Where:		Unit	Source	
Eext = annual or other long-term average emission factor		dimensionless		
P=#days/yr with >=0.01 inch precipitation during the averaging period	60	days	AP-42 Chapter 13.2.1, Figure 13.2.1-2	Note: Precipitation days per year in CalEEMod uses >0.1 inch, resulting much less precipitation days and overestimate of emission factor.
N=# days in averaging period	365	days		
Corrected EF PM10	**0.00040**	lbs/VMT		

4 Bulldozing[6]

Equation is applied to graders and dozers to estimate fugitive dust from grading activity

Emissions factors for P10 from bulldozing are scaled from those of PM15

E(lbs/hr)=1.0*s^1.5/M^1.4 AP-42 Table 11.9-1, PM15,overburden

Where

E(PM10)=E(PM15)*F

		PM15		
Where:			Unit	Source
M=	material moisture content	7.9	%	AP-42 Table 11.9-3,Overburden
s=	material silt content	6.9	%	AP-42 Table 11.9-3,Overburden
F=	scaling factor	0.75	constant	AP-42 Table 11.9-1, PM10
	PM15	0.63	lbs/hr	
	PM10	**0.47**	lbs/hr	

Sources

[1] EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.4 Aggregate Handling And Storage Piles, Eqn. 1

[2] EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.2 Unpaved Roads, Eqn. 1

[3] EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.2 Unpaved Roads, Eqn. 2

[4] EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.1 Paved Road, Eqn. 1

[5] EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.1 Paved Road, Eqn. 2

[6] EPA. AP 42, Fifth Edition, Volume I Chapter 11: Mineral Products Industry, 11.9 Mineral Products Industry, Table 11.9-1 Bulldozing

Don't delete https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-13-miscellaneous-0

EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources

13.2.1 Paved Road

13.2.2 Unpaved Roads

13.2.4 Aggregate Handling And Storage Piles

Eqn. 1 Eqn. 2

Equipment Horsepower and Load Factors

Equipment	Fuel	Horsepower	Load Factor
Aerial Lifts	Diesel	46	0.31
Air Compressors	Diesel	37	0.48
Bore/Drill Rigs	Diesel	83	0.50
Cement and Mortar Mixers	Diesel	10	0.56
Concrete/Industrial Saws	Diesel	33	0.73
Cranes	Diesel	367	0.29
Crawler Tractors	Diesel	87	0.43
Dumpers/Tenders	Diesel	16	0.38
Excavators	Diesel	36	0.38
Forklifts	Diesel	82	0.20
Generator Sets	Diesel	14	0.74
Graders	Diesel	148	0.41
Off-Highway Tractors	Diesel	38	0.44
Off-Highway Trucks	Diesel	376	0.38
Other Construction Equipment	Diesel	82	0.42
Other General Industrial Equipment	Diesel	35	0.34
Other Material Handling Equipment	Diesel	93	0.40
Pavers	Diesel	81	0.42
Paving Equipment	Diesel	89	0.36
Plate Compactors	Diesel	8	0.43
Pressure Washers	Diesel	14	0.30
Pumps	Diesel	11	0.74
Rollers	Diesel	36	0.38
Rough Terrain Forklifts	Diesel	96	0.40
Rubber Tired Dozers	Diesel	367	0.40
Rubber Tired Loaders	Diesel	150	0.36
Scrapers	Diesel	423	0.48
Signal Boards	Diesel	6	0.82
Skid Steer Loaders	Diesel	71	0.37
Surfacing Equipment	Diesel	399	0.30
Sweepers/Scrubbers	Diesel	36	0.46
Tractors/Loaders/Backhoes	Diesel	84	0.37
Trenchers	Diesel	40	0.50
Welders	Diesel	46	0.45

Source: CalEEMod 2022 Appendix G Table G-12

ion Factors

ion

grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62
days per year	365
grams per short ton	907185
grams per metric ton	1000000
cubic centimeteters per cubic yards	764555

ıts

Soil Density (g/cm3)	1.55	Queried from map (Soil bulk density for Washington, Oregon, California, Arizona, and New Mexico, USA), databasin.or
Concrete Density (g/cm3)	2.4	Jones, Katrina (1999). "Density of Concrete". The Physics Factbook

Global Warming Potentials for Greenhouse Gases based on a 100-year horizon

Source	CO2 GWP	CH4 GWP	N2O GWP	
IPCC Second Assessment Report	1	21	310	
IPCC Third Assessment Report	1	23	296	
IPCC Fourth Assessment Report (w/o climate carbon feedback)	1	25	265	
IPCC Fourth Assessment Report (with climate carbon feedback)	1	34	298	
IPCC Fourth Assessment Report (Avg)	1	25	298	
IPCC Fifth Assessment Report (Avg)	1	28	265	
IPCC Sixth Assessment Report	1	27.9	273	Source: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter_07_Supplementary_Material.pdf

EMFAC 2021 (On-Road) Emission Rates Output

Source: EMFAC2021 (v1.0.2) Emission Rates
Region Type: County
Region: Santa Clara
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN. PHEV calculated based on total VM

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	NOx_RUNEX	NOx_IDLEX	NOx_STREX	PM2.5_RUNEX	PM2.5_IDLEX
Santa Clara	2025	LDA	Aggregate	Aggregate	Gasoline	598860.3	22133914.69	22133914.69	0	2780384.029	0.038209	0	0.245539	0.001142	0
Santa Clara	2025	LDA	Aggregate	Aggregate	Diesel	1620.04	46912.85411	46912.85411	0	6871.193241	0.18842	0	0	0.015236	0
Santa Clara	2025	LDA	Aggregate	Aggregate	Electricity	61443.19	2670451.983	0	2670451.983	299852.6978	0	0	0	0	0
Santa Clara	2025	LDA	Aggregate	Aggregate	Plug-in Hyb	19037.66	825567.7143	401012.9615	424554.7527	78720.73884	0.003187	0	0.11551	0.000578	0
Santa Clara	2025	LDT1	Aggregate	Aggregate	Gasoline	51680.86	1664705.874	1664705.874	0	230185.983	0.115355	0	0.35972	0.001639	0
Santa Clara	2025	LDT1	Aggregate	Aggregate	Diesel	21.28272	302.825779	302.825779	0	59.13231308	1.64381	0	0	0.238169	0
Santa Clara	2025	LDT1	Aggregate	Aggregate	Electricity	234.4578	9323.703781	0	9323.703781	1109.79593	0	0	0	0	0
Santa Clara	2025	LDT1	Aggregate	Aggregate	Plug-in Hyb	98.13198	4519.182281	1961.286044	2557.896237	405.7757571	0.002848	0	0.11551	0.000353	0
Santa Clara	2025	LDT2	Aggregate	Aggregate	Gasoline	290874.7	10447705.78	10447705.78	0	1360240.873	0.06257	0	0.314364	0.001192	0
Santa Clara	2025	LDT2	Aggregate	Aggregate	Diesel	1049.952	38652.33695	38652.33695	0	4980.340082	0.039332	0	0	0.004727	0
Santa Clara	2025	LDT2	Aggregate	Aggregate	Electricity	2157.059	73663.77305	0	73663.77305	10962.38395	0	0	0	0	0
Santa Clara	2025	LDT2	Aggregate	Aggregate	Plug-in Hyb	2561.885	112327.2154	51267.43918	61059.7762	10593.39505	0.002995	0	0.11551	0.000438	0
Santa Clara	2025	MHDT	Aggregate	Aggregate	Gasoline	1412.263	72039.87357	72039.87357	0	28256.54946	0.394798	0.086175	0.424333	0.001347	0
Santa Clara	2025	MHDT	Aggregate	Aggregate	Diesel	10548.06	435100.6189	435100.6189	0	125915.2277	1.128155	12.48973	1.646559	0.012461	0.024792
Santa Clara	2025	MHDT	Aggregate	Aggregate	Electricity	90.80851	4838.905804	0	4838.905804	1182.343378	0	0	0	0	0
Santa Clara	2025	MHDT	Aggregate	Aggregate	Natural Ga	98.90628	4590.306874	4590.306874	0	911.9208312	0.12435	6.45266	0	0.001226	0.018594
Santa Clara	2025	HHDT	Aggregate	Aggregate	Gasoline	2.330359	124.9448223	124.9448223	0	46.62582199	5.556909	0	1.379041	0.003103	0
Santa Clara	2025	HHDT	Aggregate	Aggregate	Diesel	8692.575	1008963.948	1008963.948	0	127877.0897	1.825194	60.91449	2.931995	0.025335	0.028938
Santa Clara	2025	HHDT	Aggregate	Aggregate	Electricity	63.3712	6579.674935	0	6579.674935	825.9971986	0	0	0	0	0
Santa Clara	2025	HHDT	Aggregate	Aggregate	Natural Ga	832.405	55779.3819	55779.3819	0	7555.504424	1.049864	13.18492	0	0.00168	0.025258

T.

PM2.5_STREX	PM2.5_PMTW	PM2.5_PMBW	PM10_RUNEX	PM10_IDLEX	PM10_STREX	PM10_PMTW	PM10_PMBW	CO2_RUNEX	CO2_IDLEX	CO2_STREX	CH4_RUNEX	CH4_IDLEX	CH4_STREX	N2O_RUNEX	N2O_IDLEX	N2O_STREX	ROG_RUNEX
0.00188	0.002	0.002655	0.001242	0	0.002044	0.008	0.007587	270.1738	0	68.47346	0.002117	0	0.067825	0.004408	0	0.032293	0.007947
0	0.002	0.002712	0.015925	0	0	0.008	0.007748	229.9477	0	0	0.001193	0	0	0.036228	0	0	0.025693
0	0.002	0.001534	0	0	0	0.008	0.004382	0	0	0	0	0	0	0	0	0	0
0.001985	0.002	0.001382	0.000629	0	0.002159	0.008	0.003948	135.5854	0	64.10836	0.000432	0	0.042249	0.000569	0	0.020584	0.001378
0.002543	0.002	0.003241	0.001782	0	0.002766	0.008	0.00926	321.489	0	84.45547	0.005621	0	0.098552	0.008687	0	0.037511	0.02471
0	0.002	0.00372	0.248938	0	0	0.008	0.010628	414.9442	0	0	0.013797	0	0	0.065375	0	0	0.297038
0	0.002	0.001537	0	0	0	0.008	0.004392	0	0	0	0	0	0	0	0	0	0
0.001365	0.002	0.001394	0.000383	0	0.001485	0.008	0.003982	121.222	0	67.75681	0.000383	0	0.041987	0.000501	0	0.020339	0.001231
0.001919	0.002	0.00313	0.001296	0	0.002087	0.008	0.008944	332.1841	0	85.06833	0.002642	0	0.078494	0.005588	0	0.036037	0.010244
0	0.002	0.003123	0.004941	0	0	0.008	0.008921	301.0055	0	0	0.000603	0	0	0.047424	0	0	0.01298
0	0.002	0.001527	0	0	0	0.008	0.004362	0	0	0	0	0	0	0	0	0	0
0.00161	0.002	0.001388	0.000477	0	0.001751	0.008	0.003967	127.4509	0	74.14084	0.000403	0	0.041992	0.000528	0	0.020344	0.001295
0.000513	0.003	0.015756	0.001465	0	0.000558	0.012	0.045017	1746.959	526.7233	45.37618	0.012585	0.261076	0.04598	0.019987	0.007219	0.032398	0.061949
0	0.003	0.015941	0.013024	0.025912	0	0.012	0.045545	1141.328	2229.374	0	0.00131	0.010957	0	0.179817	0.351239	0	0.028195
0	0.003	0.007951	0	0	0	0.012	0.022718	0	0	0	0	0	0	0	0	0	0
0	0.003	0.016009	0.001333	0.020223	0	0.012	0.045741	979.0142	5290.545	0	0.751438	16.97256	0	0.199578	1.078512	0	0.010737
0.001399	0.005	0.033068	0.003375	0	0.001521	0.02	0.09448	2106.229	0	50.03138	0.207413	0	0.000226	0.167059	0	0.041557	1.222197
0	0.008772	0.027421	0.02648	0.030247	0	0.035088	0.078345	1608.776	11755.34	0	0.00075	0.235891	0	0.253463	1.852058	0	0.016139
0	0.008551	0.014281	0	0	0	0.034206	0.040802	0	0	0	0	0	0	0	0	0	0
0	0.009	0.048303	0.001827	0.02747	0	0.036	0.138007	1375.94	10529.31	0	2.235928	35.17609	0	0.280494	2.146469	0	0.047235

ROG_IDLEX	ROG_STREX	ROG_HOTSOAK	ROG_RUNLOSS	ROG_DIURN	TOG_RUNEX	TOG_IDLEX	TOG_STREX	TOG_HOTSOAK	TOG_RUNLOSS	TOG_DIURN	NH3_RUNEX	CO_RUNEX	CO_IDLEX	CO_STREX	SOx_RUNEX	SOx_IDLEX	SOx_STREX
0	0.306311	0.087189	0.224301	1.384954	0.011596	0	0.335372	0.087189	0.224301	1.384954	0.035611	0.6952	0	3.049452	0.002671	0	0.000677
0	0	0	0	0	0.02925	0	0	0	0	0	0.0031	0.319914	0	0	0.002179	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0.173285	0.041164	0.03735	0.440525	0.002011	0	0.189725	0.041164	0.03735	0.440525	0.019241	0.209757	0	1.339893	0.00134	0	0.000634
0	0.498818	0.156963	0.442299	2.52236	0.036056	0	0.546143	0.156963	0.442299	2.52236	0.036453	1.317416	0	4.886115	0.003178	0	0.000835
0	0	0	0	0	0.338158	0	0	0	0	0	0.0031	1.585068	0	0	0.003932	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0.173285	0.023895	0.020384	0.276746	0.001797	0	0.189725	0.023895	0.020384	0.276746	0.018228	0.187824	0	1.339893	0.001198	0	0.00067
0	0.360071	0.079452	0.214938	1.349256	0.014949	0	0.394233	0.079452	0.214938	1.349256	0.03712	0.795621	0	3.47417	0.003284	0	0.000841
0	0	0	0	0	0.014777	0	0	0	0	0	0.0031	0.129797	0	0	0.002852	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0.173285	0.026071	0.023359	0.305362	0.00189	0	0.189725	0.026071	0.023359	0.305362	0.019143	0.197358	0	1.339893	0.00126	0	0.000733
1.015127	0.253154	0.030988	0.250472	2.558011	0.090397	1.481271	0.277172	0.030988	0.250472	2.558011	0.044991	1.276089	15.1444	5.531626	0.01727	0.005207	0.000449
0.235896	0	0	0	0	0.032098	0.268549	0	0	0	0	0.211891	0.109646	7.535393	0	0.010808	0.021111	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.242504	0	0	0	0	0.766898	17.32175	0	0	0	0	1.06	2.996166	35.80775	0	0	0	0
0	0.00123	0.140217	1.263022	9.434649	1.783427	0	0.001346	0.140217	1.263022	9.434649	0.043157	47.7242	0	2.001616	0.020822	0	0.000495
5.078674	0	0	0	0	0.018373	5.781684	0	0	0	0	0.215507	0.078083	74.00904	0	0.015234	0.111316	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.530122	0	0	0	0	2.299347	35.93114	0	0	0	0	0.843784	13.01274	74.75478	0	0	0	0

EMFAC 2021 (On-Road) Emission Rates Output-Low Speed

Source: EMFAC2021 (v1.0.2) Emission Rates
Region Type: County
Region: Santa Clara
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, g/mile for RUNEX, PMBW and PMTW, mph for Speed, kWh/mile for Energy Consumption, gallon/mile for Fuel Consumption. PHEV calculated based on total VMT.

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Total VMT	CVMT	EVMT	NOx_RUNEX	PM2.5_RUNEX	PM10_RUNEX	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX	ROG_RUNEX	TOG_RUNEX	CO_RUNEX	SOx_RUNEX	NH3_RUNEX	PM10_PMBW	PM2.5_PMBW
Santa Clara	2025	HHDT	Aggregate	5	Diesel	1050.996	1050.996	0	17.99831	0.105181	0.109936	3416.157	0.02589	0.538217	0.557404	0.634562	1.35174	0.032349	0.147758	0.154225	0.053979
Santa Clara	2025	HHDT	Aggregate	10	Diesel	9116.632	9116.632	0	9.32818	0.025132	0.026269	3089.095	0.006676	0.486688	0.143741	0.163638	0.733931	0.029252	0.19437	0.146802	0.051381
Santa Clara	2025	HHDT	Aggregate	15	Diesel	18568.66	18568.66	0	5.75014	0.011391	0.011906	2497.145	0.002429	0.393426	0.052293	0.059532	0.391583	0.023646	0.203502	0.142969	0.050039
Santa Clara	2025	HHDT	Aggregate	20	Diesel	47161.83	47161.83	0	3.543382	0.006063	0.006337	2081.746	0.001128	0.32798	0.024295	0.027658	0.247251	0.019713	0.213779	0.063746	0.022311
Santa Clara	2025	HHDT	Aggregate	25	Diesel	22206.18	22206.18	0	3.485476	0.007975	0.008335	1930.119	0.0011	0.304091	0.023685	0.026963	0.21209	0.018277	0.206322	0.135707	0.047497
Santa Clara	2025	MHDT	Aggregate	5	Diesel	1182.151	1182.151	0	8.483454	0.058353	0.060991	2363.392	0.014018	0.372353	0.3018	0.343576	0.528352	0.02238	0.162264	0.061496	0.021524
Santa Clara	2025	MHDT	Aggregate	10	Diesel	12369.99	12369.99	0	3.36296	0.038636	0.040383	1994.689	0.007919	0.314264	0.170488	0.194087	0.390074	0.018889	0.206157	0.061496	0.021524
Santa Clara	2025	MHDT	Aggregate	15	Diesel	21581.06	21581.06	0	2.04103	0.024235	0.025331	1569.251	0.003885	0.247236	0.083641	0.095219	0.250534	0.01486	0.211421	0.061496	0.021524
Santa Clara	2025	MHDT	Aggregate	20	Diesel	28766.49	28766.49	0	1.515998	0.015051	0.015731	1335.744	0.001846	0.210447	0.039751	0.045253	0.178219	0.012649	0.213368	0.06063	0.021221
Santa Clara	2025	MHDT	Aggregate	25	Diesel	39291.55	39291.55	0	1.264184	0.011557	0.01208	1205.039	0.001315	0.189854	0.028316	0.032236	0.142755	0.011411	0.213269	0.049809	0.017433

Onroad exhaust EF assuming vehicle travel with speed less than 25 mph on unpaved road

Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Total VMT	NOx_RUNEX	PM2.5_RUNEX	PM10_RUNEX	CO2_RUNEX	CH4_RUNEX	N2O_RUNEX	ROG_RUNEX	TOG_RUNEX	CO_RUNEX	SOx_RUNEX	NH3_RUNEX	PM10_PMBW	PM2.5_PMBW
2025	HHDT	Aggregate	Aggregate	Diesel	98104.31	4.640384	0.01034	0.010806	2233.956	0.002149	0.351961	0.046267	0.052672	0.323669	0.021154	0.207635	0.103717	0.036301
2025	MHDT	Aggregate	Aggregate	Diesel	103191.2	1.831142	0.01896	0.019822	1425.574	0.002938	0.2246	0.06325	0.072005	0.209246	0.013499	0.211473	0.056805	0.019882

EMFAC Vehicle Classification and Weights

EMFAC202x Vehicle & Fuel	EMFAC202x Vehicle Class	Description	EMFAC2011 Vehicle Class	EMFAC2007 Vehicle Class
LDA-Dsl	LDA	Passenger Cars	LDA	LDA
LDA-Gas				
LDA-Elec				
LDA-Phe				
LDT1-Dsl	LDT1	Light-Duty Trucks (GVWR* <6000 lbs. and ETW** <= 3750 lbs.)	LDT1	LDT1
LDT1- Gas				
LDT1-Elec				
LDT1-Phe				
LDT2-Dsl	LDT2	Light-Duty Trucks (GVWR <6000 lbs. and ETW 3751-5750 lbs.)	LDT2	LDT2
LDT2-Gas				
LDT2-Elec				
LDT2-Phe				
MDV-Dsl	MDV	Medium-Duty Trucks (GVWR 5751-8500 lbs.)	MDV	MDV
MDV-Gas				
MDV-Elec				
MDV-Phe				
MH-Dsl	MH	Motor Homes	MH	MH
MH-Gas				
MCY-Gas	MCY	Motorcycles	MCY	MCY
LHD1 – Dsl	LHD1	Light-Heavy-Duty Trucks (GVWR 8501-10000 lbs.)	LHDT1	LHDT1
LHD1-Gas				
LHD1-Elec				
LHD2 – Dsl	LHD2	Light-Heavy-Duty Trucks (GVWR 10001-14000 lbs.)	LHDT2	LHDT2
LHD2-Gas				
LHD2-Elec				
T6 Public Class 4-Dsl	T6 Public Class 4		T6 Public	MHDT
T6 Public Class 4-Elec		Medium-Heavy Duty Public Fleet Truck (GVWR 14001-		
T6 Public Class 4-NG				
T6 Public Class 5-Dsl	T6 Public Class 5	Medium-Heavy Duty Public Fleet Truck (GVWR 16001-19500	T6 Public	MHDT
T6 Public Class 5-Elec				
T6 Public Class 5-NG				
T6 Public Class 6-Dsl	T6 Public Class 6	Medium-Heavy Duty Public Fleet Truck (GVWR 19501-	T6 Public	MHDT
T6 Public Class 6-Elec				
T6 Public Class 6-NG				
T6 Public Class 7-Dsl	T6 Public Class 7	Medium-Heavy Duty Public Fleet Truck (GVWR 26001-33000	T6 Public	MHDT
T6 Public Class 7-Elec				
T6 Public Class 7-NG				
T6 Utility Class 5-Dsl	T6 Utility Class 5	Medium-Heavy Duty Utility Fleet Truck (GVWR 16001-19500	T6 Utility	MHDT
T6 Utility Class 5-Elec				
T6 Utility Class 5-NG				
T6 Utility Class 6-Dsl	T6 Utility Class 6	Medium-Heavy Duty Utility Fleet Truck (GVWR 19501-26000	T6 Utility	MHDT
T6 Utility Class 6-Elec				
T6 Utility Class 6-NG				
T6 Utility Class 7-Dsl	T6 Utility Class 7	Medium-Heavy Duty Utility Fleet Truck (GVWR 26001-33000	T6 Utility	MHDT
T6 Utility Class 7-Elec				
T6 Utility Class 7-NG				
T6 Instate Tractor Class 6-Dsl	T6 Instate Tractor Class 6	Medium-Heavy Duty Tractor Truck (GVWR 19501-26000 lbs.)	T6 Instate small	MHDT
T6 Instate Tractor Class 6-Elec				
T6 Instate Tractor Class 6-NG				
T6 Instate Delivery Class 4-Dsl	T6 Instate Delivery Class 4		T6 Instate small	MHDT
T6 Instate Delivery Class 4-Elec				
T6 Instate Delivery Class 4-NG		Medium-Heavy Duty Delivery Truck (GVWR 14001-16000 lbs.)		
T6 Instate Delivery Class 5-Dsl	T6 Instate Delivery Class 5	Medium-Heavy Duty Delivery Truck (GVWR 16001-19500 lbs.)	T6 Instate small	MHDT
T6 Instate Delivery Class 5-Elec				
T6 Instate Delivery Class 5-NG				

EMFAC202x Vehicle & Fuel	EMFAC202x Vehicle Class	Description	EMFAC2011 Vehicle Class	EMFAC2007 Vehicle Class
T6 Instate Delivery Class 6-Dsl	T6 Instate Delivery Class 6	Medium-Heavy Duty Delivery Truck (GVWR 19501-26000 lbs.)	T6 Instate small	MHDT
T6 Instate Delivery Class 6-Elec				
T6 Instate Delivery Class 6-NG				
T6 Instate Other Class 4-Dsl	T6 Instate Other Class 4	Medium-Heavy Duty Other Truck (GVWR 14001-16000 lbs.)	T6 Instate small	MHDT
T6 Instate Other Class 4-Elec				
T6 Instate Other Class 4-NG				
T6 Instate Other Class 5 -Dsl	T6 Instate Other Class 5	Medium-Heavy Duty Other Truck (GVWR 16001-19500 lbs.)	T6 Instate small	MHDT
T6 Instate Other Class 5-Elec				
T6 Instate Other Class 5-NG				
T6 Instate Other Class 6 – Dsl	T6 Instate Other Class 6	Medium-Heavy Duty Other Truck (GVWR 19501-26000 lbs.)	T6 Instate small	MHDT
T6 Instate Other Class 6-Elec				
T6 Instate Other Class 6-NG				
T6 Instate Tractor Class 7-Dsl	T6 Instate Tractor Class 7	Medium-Heavy Duty Tractor Truck (GVWR 26001-33000 lbs.)	T6 Instate heavy	MHDT
T6 Instate Tractor Class 7 –Elec				
T6 Instate Tractor Class 7-NG				
T6 Instate Delivery Class 7 -Dsl	T6 Instate Delivery Class 7	Medium-Heavy Duty Delivery Truck (GVWR 26001-33000 lbs.)	T6 Instate heavy	MHDT
T6 Instate Delivery Class 7 -Elec				
T6 Instate Delivery Class 7 -NG				
T6 Instate Other Class 7-Dsl	T6 Instate Other Class 7	Medium-Heavy Duty Other Truck (GVWR 26001-33000 lbs.)	T6 Instate heavy	MHDT
T6 Instate Other Class 7-Elec				
T6 Instate Other Class 7-NG				
T6 CAIRP Class 4-Dsl	T6 CAIRP Class 4		T6 CAIRP small	MHDT
T6 CAIRP Class 4-Elec		Medium-Heavy Duty CA International Registration Plan Truck (GVWR 14001-16000 lbs.)		
T6 CAIRP Class 5-Dsl	T6 CAIRP Class 5	Medium-Heavy Duty CA International Registration Plan	T6 CAIRP small	MHDT
T6 CAIRP Class 5-Elec				
T6 CAIRP Class 6-Dsl	T6 CAIRP Class 6	Medium-Heavy Duty CA International Registration Plan	T6 CAIRP small	MHDT
T6 CAIRP Class 6-Elec				
T6 CAIRP Class 7- Dsl	T6 CAIRP Class 7	Medium-Heavy Duty CA International Registration Plan Truck (GVWR 26001-	T6 CAIRP heavy	MHDT
T6 CAIRP Class 7-Elec				
T6 CAIRP Class 7-NG				
T6 OOS Class 4-Dsl	T6 OOS Class 4	Medium-Heavy Duty Out-of-state Truck (GVWR 14001-16000 lbs.)	T6 OOS small	MHDT
T6 OOS Class 5-Dsl	T6 OOS Class 5	Medium-Heavy Duty Out-of-state Truck (GVWR 16001-19500 lbs.)		MHDT
T6 OOS Class 6-Dsl	T6 OOS Class 6	Medium-Heavy Duty Out-of-state Truck (GVWR 19501-26000 lbs.)		MHDT
T6 OOS Class 7-Dsl	T6 OOS Class 7	Medium-Heavy Duty Out-of-state Truck (GVWR 26001-33000 lbs.)	T6 OOS heavy	MHDT
T6TS-Gas	T6TS	Medium-Heavy Duty Truck	T6TS	MHDT
T6TS-Elec				
T7 Public Class 8-Dsl	T7 Public Class 8	Heavy-Heavy Duty Public Fleet Truck (GVWR 33001 lbs. and over)	T7 Public	HHDT
T7 Public Class 8-Elec				
T7 Public Class 8-NG				
T7 CAIRP Class 8-Dsl	T7 CAIRP Class 8	Heavy-Heavy Duty CA International Registration Plan Truck (GVWR 33001 lbs. and over)	T7 CAIRP	HHDT
T7 CAIRP Class 8-Elec				
T7 CAIRP Class 8-NG				

EMFAC202x Vehicle & Fuel	EMFAC202x Vehicle Class	Description	EMFAC2011 Vehicle Class	EMFAC2007 Vehicle Class
T7 Utility Class 8-Dsl	T7 Utility Class 8	Heavy-Heavy Duty Utility Fleet Truck (GVWR 33001 lbs. and	T7 Utility	HHDT
T7 Utility Class 8-Elec				
T7 NNOOS Class 8-Dsl	T7 NNOOS Class 8	Heavy-Heavy Duty Non-Neighboring Out-of-state Truck (GVWR 33001 lbs. and over)	T7 NNOOS	HHDT
T7 NOOS Class 8-Dsl	T7 NOOS Class 8	Heavy-Heavy Duty Neighboring Out-of- state Truck (GVWR 33001 lbs. and over)	T7 NOOS	HHDT
T7 Other Port Class 8-Dsl	T7 Other Port Class 8	Heavy-Heavy Duty Drayage Truck at Other Facilities	T7 Other Port	HHDT
T7 Other Port Class 8-Elec				
T7 POAK Class 8-Dsl	T7 POAK Class 8	Heavy-Heavy Duty Drayage Truck in Bay Area (GVWR 33001	T7 POAK	HHDT
T7 POAK Class 8-Elec				
T7 POAK Class 8-NG				
T7 POLA Class 8-Dsl	T7 POLA Class 8	Heavy-Heavy Duty Drayage Truck near	T7 POLA	HHDT
T7 POLA Class 8-Elec				
T7 POLA Class 8-NG		South Coast (GVWR 33001 lbs. and over)		
T7 Single Concrete/Transit Mix Class 8-Dsl	T7 Single Concrete/Transit Mix Class 8	Heavy-Heavy Duty Single Unit Concrete/Transit Mix Truck (GVWR 33001 lbs and over)	T7 Single	HHDT
T7 Single Concrete/Transit Mix Class 8-Elec				
T7 Single Concrete/Transit Mix Class 8-NG				
T7 Single Dump Class 8-Dsl	T7 Single Dump Class 8	Heavy-Heavy Duty Single Unit Dump Truck (GVWR 33001 lbs. and over)	T7 Single	HHDT
T7 Single Dump Class 8-Elec				
T7 Single Dump Class 8-NG				
T7 Single Other Class 8-Dsl	T7 Single Other Class 8	Heavy-Heavy Duty Single Unit Other Truck (GVWR 33001 lbs. and over)	T7 Single	HHDT
T7 Single Other Class 8-Elec				
T7 Single Other Class 8-NG				
T7 Tractor Class 8-Dsl	T7 Tractor Class 8	Heavy-Heavy Duty Tractor Truck (GVWR 33001 lbs. and over)	T7 Tractor	HHDT
T7 Tractor Class 8-Elec				
T7 Tractor Class 8-NG				
T7 SWCV Class 8-Dsl	T7 SWCV Class 8	Heavy-Heavy Duty Solid Waste Collection Truck (GVWR 33001	T7 SWCV	HHDT
T7 SWCV Class 8-Elec				
T7 SWCV Class 8-NG				
T7IS-Gas	T7IS	Heavy-Heavy Duty Truck	T7IS	HHDT
T7IS-Elec				
PTO-Dsl	PTO	Power Take Off	PTO	HHDT
PTO-Elec				
SBUS-Gas	SBUS	School Buses	SBUS	SBUS
SBUS-Dsl				
SBUS-Elec				
SBUS-NG				
UBUS-Dsl	UBUS	Urban Buses	UBUS	UBUS
UBUS-Gas				
UBUS-Elec				
UBUS-NG				
Motor Coach-Dsl	Motor Coach	Motor Coach	Motor Coach	OBUS
Motor Coach-Elec				
OBUS-Gas	OBUS	Other Buses	OBUS	OBUS
OBUS-Elec				
All Other Buses-NG	All Other Buses	All Other Buses	All Other Buses	OBUS
All Other Buses-Dsl				

Tablex. Mapping EMFAC 202x to CalEEmod by Gross Vehicle Weights

EMFAC202x Vehicle Class	CalEEMod	GVWR (lb)
LDA, MCY	LDA	-
LDT1	LDT1	<= 6000
LDT2	LDT2	<=6000
MDV, MH, LHD, T6,	MHDT	14,001 – 33,000
T7, PTO, BUS, Motor Coach	HHDT	33,000 – 60,000

OFFROAD Fuel Consumption Rates

Model Output: OFFROAD2021 (v1.0.5) Emissions Inventory
Region Type: County
Region: Santa Clara
Calendar Year: 2025
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2021 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

								Calculated Specific Fuel Consumption	
Region	Calendar Year	Vehicle Category	Fuel	Fuel Consumption	Total_Activity_hpy	Total_Population	Horsepower_Hours_hhpy	Equipment	Gallons per Horsepower-hour
Statewide	2025	Construction and Mining - Bore/Drill Rigs	Diesel	4771207.668	839659.9696	1443.423611	94448655.98	Bore/Drill Rigs	0.0505
Statewide	2025	Construction and Mining - Cranes	Diesel	4371929.499	976535.5084	3860.707641	82469997.4	Cranes	0.0530
Statewide	2025	Construction and Mining - Crawler Tractors	Diesel	12292905.64	2536452.142	6043.995316	243480458.7	Crawler Tractors	0.0505
Statewide	2025	Construction and Mining - Excavators	Diesel	39160627.08	13199289.39	22804.32297	764630632.6	Excavators	0.0512
Statewide	2025	Construction and Mining - Graders	Diesel	5730691.606	1289147.848	3540.383531	111190734.1	Graders	0.0515
Statewide	2025	Construction and Mining - Misc - Asphalt Pavers	Gasoline	173076.4709	42106.4	330.6399959	1777473.35	Asphalt Pavers	0.09737
Statewide	2025	Construction and Mining - Misc - Bore/Drill Rigs	Gasoline	111385.1591	14494.15	310.1593341	1249234.4	Bore/Drill Rigs	0.08916
Statewide	2025	Construction and Mining - Misc - Concrete/Industrial Saws	Gasoline	825062.9288	77964	4955.770464	3608594.4	Concrete/Industrial Saws	0.22864
Statewide	2025	Construction and Mining - Misc - Concrete/Industrial Saws	Diesel	41529.3606	29857	76.16977355	985281	Concrete/Industrial Saws	0.0421
Statewide	2025	Construction and Mining - Misc - Cranes	Gasoline	91972.7	30707.45	73.16	1936168.05	Cranes	0.0475
Statewide	2025	Construction and Mining - Misc - Dumpers/Tenders	Gasoline	66376.49191	1898	2311.513804	125268	Dumpers/Tenders	0.52988
Statewide	2025	Construction and Mining - Misc - Other	Gasoline	141225.8	25641.25	116.8988576	3230797.5	Other Construction Equipment	0.04371
Statewide	2025	Construction and Mining - Misc - Paving Equipment	Gasoline	1206576.475	41942.15	24710.834	1797114	Paving Equipment	0.6714
Statewide	2025	Construction and Mining - Misc - Rollers	Gasoline	582701.1543	88231.45	2617.007178	5456717.15	Rollers	0.10679
Statewide	2025	Construction and Mining - Misc - Rough Terrain Forklifts	Gasoline	652809.8	126567.4	305.4	10657532.8	Rough Terrain Forklifts	0.06125
Statewide	2025	Construction and Mining - Misc - Rubber Tired Loaders	Gasoline	346505.45	96349.05	193.4706051	6541763.6	Rubber Tired Loaders	0.05297
Statewide	2025	Construction and Mining - Misc - Skid Steer Loaders	Gasoline	1269586.288	334872.9	2925.566486	16729848	Skid Steer Loaders	0.07589
Statewide	2025	Construction and Mining - Misc - Tractors/Loaders/Backhoes	Gasoline	222547.8	75803.2	102.9982847	4775601.6	Tractors/Loaders/Backhoes	0.0466
Statewide	2025	Construction and Mining - Misc - Trenchers	Gasoline	1072687.539	241184.7	2575.332262	9394837.2	Trenchers	0.11418
Statewide	2025	Construction and Mining - Off-Highway Tractors	Diesel	6978232.456	2091968.67	2758.686843	137013421.2	Off-Highway Tractors	0.0509
Statewide	2025	Construction and Mining - Off-Highway Trucks	Diesel	16309908.73	1904053.321	2458.510115	333324587.8	Off-Highway Trucks	0.0489
Statewide	2025	Construction and Mining - Pavers	Diesel	2521012.914	776244.4305	1603.114977	48935993.71	Pavers	0.0515
Statewide	2025	Construction and Mining - Paving Equipment	Diesel	2796379.135	877130.9888	1670.310505	54653783.57	Paving Equipment	0.0512
Statewide	2025	Construction and Mining - Rollers	Diesel	6664793.099	3545251.263	8093.146289	126727173.9	Rollers	0.0526
Statewide	2025	Construction and Mining - Rough Terrain Forklifts	Diesel	8266956.923	3765036.706	9232.466677	158619809.5	Rough Terrain Forklifts	0.0521
Statewide	2025	Construction and Mining - Rubber Tired Dozers	Diesel	1431129.396	266076.1486	503.1498581	30157748.03	Rubber Tired Dozers	0.0475
Statewide	2025	Construction and Mining - Rubber Tired Loaders	Diesel	28574684.69	7261867.633	10608.196	566021571	Rubber Tired Loaders	0.0505
Statewide	2025	Construction and Mining - Scrapers	Diesel	14760481.98	1680258.23	5318.633188	306930380	Scrapers	0.0481
Statewide	2025	Construction and Mining - Skid Steer Loaders	Diesel	13545064.65	8954081.359	19729.50023	244046324	Skid Steer Loaders	0.0555
Statewide	2025	Construction and Mining - Surfacing Equipment	Diesel	1323799.766	276546.6869	472.3192267	26283123.67	Surfacing Equipment	0.0504
Statewide	2025	Construction and Mining - Tractors/Loaders/Backhoes	Diesel	38306100.22	17473200.56	34055.39937	721113232.5	Tractors/Loaders/Backhoes	0.0531
Statewide	2025	Construction and Mining - Trenchers	Diesel	1332520.939	492263.9356	1513.260631	25177675.97	Trenchers	0.0529
Statewide	2025	Industrial - Aerial Lifts	Diesel	2412409.875	2121500.802	7643.307546	43577496.3	Aerial Lifts	0.0554
Statewide	2025	Industrial - Forklifts	Diesel	10747965.87	10256401.02	21577.3481	201824733.6	Forklifts	0.0533
Statewide	2025	Industrial - Misc - Aerial Lifts	Gasoline	1893948.709	752914.7	3410.816002	37645735	Aerial Lifts	0.05031

Region	Calendar Year	Vehicle Category	Fuel	Fuel Consumption	Total_Activity_hpy	Total_Population	Horsepower_Hours_hhpy	Equipment	Gallons per Horsepower-hour
Statewide	2025	Industrial - Misc - Forklifts	Gasoline	59535311.34	29038056.8	16127.53832	1912115156	Forklifts	0.03114
Statewide	2025	Industrial - Misc - Forklifts	Nat Gas	130945118.8	58870419.3	32677.51	3876735003	Forklifts	0.03378
Statewide	2025	Industrial - Misc - Other General Industrial Equipment	Gasoline	1023969.674	322827.9	2213.514668	14569883.85	Other General Industrial Equipı	0.07028
Statewide	2025	Industrial - Misc - Other Material Handling Equipment	Gasoline	444635.7	163512.7	422.98	8789827.8	Other Material Handling Equipı	0.05059
Statewide	2025	Industrial - Misc - Sweepers/Scrubbers	Gasoline	3385400.097	920617.6	2949.49196	46246748.3	Sweepers/Scrubbers	0.0732
Statewide	2025	Industrial - Other General Industrial Equipment	Diesel	3173647.398	1346527.745	3061.689359	62436648.45	Other General Industrial Equipı	0.0508
Statewide	2025	Light Commercial - Misc - Air Compressors	Gasoline	33226510.21	1043013.05	325067.671	68082365.95	Air Compressors	0.48803
Statewide	2025	Light Commercial - Misc - Air Compressors	Diesel	993249.2587	895596.85	1281.279958	33137083.45	Air Compressors	0.0300
Statewide	2025	Light Commercial - Misc - Gas Compressors	Nat Gas	12511397	1179172.65	138.64	120157912.4	Gas Compressors	0.10412
Statewide	2025	Light Commercial - Misc - Generator Sets	Nat Gas	401868.65	47314.95	417.94	5274417.9	Generator Sets	0.07619
Statewide	2025	Light Commercial - Misc - Generator Sets	Gasoline	55588298.44	2214776.2	2114559.456	92631528.65	Generator Sets	0.6001
Statewide	2025	Light Commercial - Misc - Generator Sets	Diesel	4619238.616	1802924.8	15726.80979	59496518.4	Generator Sets	0.0776
Statewide	2025	Light Commercial - Misc - Pressure Washers	Gasoline	22991068.27	16001.6	1138811.107	464046.4	Pressure Washers	49.5448
Statewide	2025	Light Commercial - Misc - Pressure Washers	Diesel	23312.5976	18100.35	469.1421394	687813.3	Pressure Washers	0.0339
Statewide	2025	Light Commercial - Misc - Pumps	Gasoline	7513038.438	646966.15	182480.1053	43284068.85	Pumps	0.17358
Statewide	2025	Light Commercial - Misc - Pumps	Diesel	2554227.523	941108.7	8189.411973	34821021.9	Pumps	0.0734
Statewide	2025	Light Commercial - Misc - Welders	Gasoline	14876140.57	1098109.8	243879.5138	65934092.75	Welders	0.22562
Statewide	2025	Light Commercial - Misc - Welders	Diesel	5142473.42	3531813	9329.055886	162463398	Welders	0.0317
Statewide	2025	Portable Equipment - Non-Rental Compressor	Diesel	3097156.295	1226693.019	2951.130296	193607640.6	ental Compressor	0.0160
Statewide	2025	Portable Equipment - Non-Rental Generator	Diesel	39259167.06	7436067.457	5362.11432	2454746668	ental Generator	0.0160
Statewide	2025	Portable Equipment - Non-Rental Other	Diesel	10738827	2396783.052	7402.269446	671526760	ental Other	0.0160
Statewide	2025	Portable Equipment - Non-Rental Pump	Diesel	6506178.629	1341013.088	4132.77479	406859831.8	ental Pump	0.0160
Statewide	2025	Portable Equipment - Rental Compressor	Diesel	7490473.413	1352193.614	2482.526576	468386470	Rental Compressor	0.0160
Statewide	2025	Portable Equipment - Rental Generator	Diesel	67608131.41	12168762.29	8192.814652	4228024294	Rental Generator	0.0160
Statewide	2025	Portable Equipment - Rental Other	Diesel	9059579.996	2052494.558	1597.783675	566513537.9	Rental Other	0.0160
Statewide	2025	Portable Equipment - Rental Pump	Diesel	11168329.92	3730559.479	3722.597489	698318768.7	Rental Pump	0.0160

On-Road Fuel Consumption Rates

Source: EMFAC2021 (v1.0.2) Emissions Inventory
Region Type: Statewide
Region: California
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/year for CVMT and EVMT, trips/year for Trips, kWh/year for Energy Consumption, tons/year for Emissions, 1000 gallons/year for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption	Gallons per mile	KWh per mile
Statewide	2025	HHDT	Aggregate	Aggregate	Gasoline	126.6603815	2856125.265	2856125.265	0	828690.2388	0	731.486838	0.256111609	
Statewide	2025	HHDT	Aggregate	Aggregate	Diesel	315961.6421	13567953720	13567953720	0	1603491713	0	2219593.24	0.163590862	
Statewide	2025	HHDT	Aggregate	Aggregate	Electricity	2016.602043	75367156.41	0	75367156.41	9281081.049	137234693.2	0		1.820882
Statewide	2025	HHDT	Aggregate	Aggregate	Natural Ga	18819.84091	380438381.3	380438381.3	0	42158224.21	0	68147.9906	0.179130167	
Statewide	2025	LDA	Aggregate	Aggregate	Gasoline	12837662.63	1.74823E+11	1.74823E+11	0	20639903589	0	5835115.5	0.033377275	
Statewide	2025	LDA	Aggregate	Aggregate	Diesel	42627.74547	439606135.4	439606135.4	0	61856327.83	0	10421.0256	0.023705369	
Statewide	2025	LDA	Aggregate	Aggregate	Electricity	792351.2526	13224513672	0	13224513672	1364130228	5105753756	0		0.386083
Statewide	2025	LDA	Aggregate	Aggregate	Plug-in Hyb	383663.1494	6181546256	2982740241	3198806015	550497151.6	966134756.3	103644.796	0.03474818	0.30203
Statewide	2025	LDT1	Aggregate	Aggregate	Gasoline	1284221.585	15166498680	15166498680	0	1938908410	0	612727.449	0.04040006	
Statewide	2025	LDT1	Aggregate	Aggregate	Diesel	610.9429377	2934857.51	2934857.51	0	593416.9239	0	123.506623	0.042082664	
Statewide	2025	LDT1	Aggregate	Aggregate	Electricity	3472.828315	53526035.77	0	53526035.77	5799515.755	20665467.55	0		0.386083
Statewide	2025	LDT1	Aggregate	Aggregate	Plug-in Hyb	2255.842729	39689920.22	17215935.53	22473984.68	3236784.661	6787813.206	602.511166	0.034997295	0.30203
Statewide	2025	LDT2	Aggregate	Aggregate	Gasoline	6307223.657	87192656693	87192656693	0	10220613006	0	3569404.55	0.040936986	
Statewide	2025	LDT2	Aggregate	Aggregate	Diesel	22395.20738	321461220.2	321461220.2	0	37007576.78	0	9857.9929	0.030666196	
Statewide	2025	LDT2	Aggregate	Aggregate	Electricity	47977.69378	598468680	0	598468680	84748119.03	231058304.8	0		0.386083
Statewide	2025	LDT2	Aggregate	Aggregate	Plug-in Hyb	57212.95714	962031615.8	437815495.2	524216120.7	82091725.48	158328892.6	15355.1125	0.035072108	0.30203
Statewide	2025	MHDT	Aggregate	Aggregate	Gasoline	47979.48043	846727728.3	846727728.3	0	313911316.3	0	168696.65	0.199233643	
Statewide	2025	MHDT	Aggregate	Aggregate	Diesel	283391.9198	3828957501	3828957501	0	1056911936	0	437252.787	0.114196302	
Statewide	2025	MHDT	Aggregate	Aggregate	Electricity	2457.805048	42973435.21	0	42973435.21	9940758.162	46191256.47	0		1.074879
Statewide	2025	MHDT	Aggregate	Aggregate	Natural Ga	3268.742096	48227573.13	48227573.13	0	8986490.192	0	6270.60469	0.130021153	

Onroad Energy Efficiency

Fleet	Gasoline (gallon/mi)	Diesel (gallon/mi)
Worker	0.037022899	0.0300399
Vendor	0.227672626	0.138893582
Haul	0.256111609	0.163590862

Notes: Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor trips are assumed to be 50% MHDT and 50% HHDT. Haul trips are assumed to be 100% HHDT.

Appendix D. Biological Resources Technical Appendix

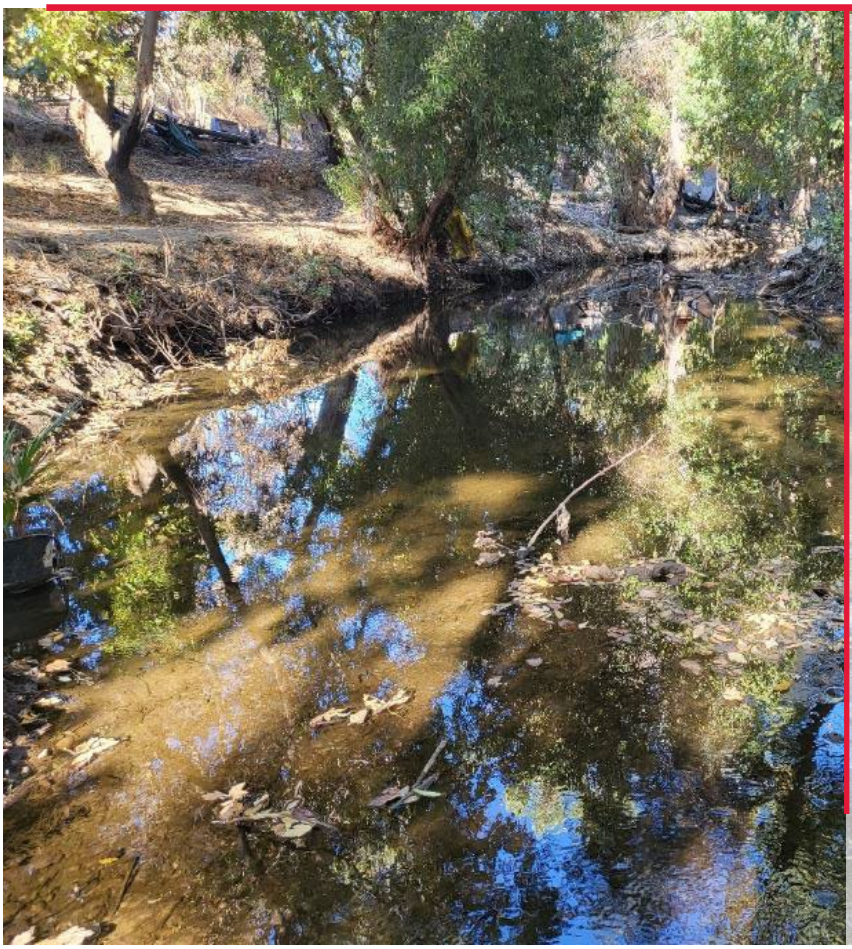
Appendix D – Biological Resources Data

Aquatic Resources Delineation Report (D1)

FINAL

Aquatic Resources Delineation Report

Coyote Creek Flood Protection Project



Prepared for:

Santa Clara Valley Water District

June 2024

Prepared by:

GEI Consultants

Consulting Engineers and Scientists

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Aquatic Resources Delineation Report

Coyote Creek Flood Protection Project

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Executive Summary

On behalf of the Santa Clara Valley Water District (Valley Water), GEI Consultants, Inc. (GEI) biologists delineated aquatic resources in the approximately 363.2-acre aquatic resources survey area (survey area) for the Coyote Creek Flood Protection Project (proposed action). The delineation was conducted in October 2023 with a follow-up visit in February 2024, in accordance with United States (U.S.) Army Corps of Engineers (USACE) methodologies outlined in Part IV, Section D, of the *Corps of Engineers Wetland Delineation Manual* (USACE Manual; Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Version 2.0* (Supplement; Environmental Laboratory 2008), and the Interim Version of the *National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams* (Cold Regions Research and Engineering Laboratory 2022). For areas in which the USACE Manual and the Supplement differ, the Supplement was followed.

This report presents the findings of GEI's review of existing literature and other available data sources, along with the results and analysis of field data collected. Nineteen (19) features totaling 29.45 acres were mapped in the survey area, including two ephemeral channels, two forested wetlands, fourteen segments of perennial channel, and one seasonal wetland. **Table ES-1** summarizes the acreages and linear feet, where appropriate, of aquatic resources by feature class mapped in the survey area.

Table ES-1. Summary of Aquatic Resources by Feature Class

Feature Class	Area (acres)	Length (linear feet)	Potential Waters of the U.S.[1]
Ephemeral Channel	0.01	98	No
Forested Wetland	2.36	-	Yes
Perennial Channel	26.95	20,660	Yes
Seasonal Wetland	0.12	-	No
Total	**29.45**	**20,758**	**-**

[1]This is a preliminary jurisdiction conclusion. Aquatic resources meeting definition of Waters of the U.S. not final until verified by USACE. Features likely still considered waters of the State.

On May 25, 2023, the U.S. Supreme Court rendered a decision on the *Sackett vs. U.S. Environmental Protection Agency* (EPA) case regarding Waters of the U.S. In that decision, the U.S. Supreme Court determined that the Clean Water Act extends only to wetlands that have a continuous surface connection with a relatively permanent body of water, which is connected to traditional navigable waters, such that it's difficult to determine where the water ends, and the wetland begins. The EPA and USACE subsequently released the *Revised Definition of "Waters of the United States"; Conforming* rule (88 Federal Register 61964) on September 8, 2023, to reflect these changes.

In accordance with the revised definition, the perennial channels (Coyote Creek and Lower Silver Creek) and adjacent forested wetlands are likely considered Waters of the U.S. due to their relatively permanent flow and/or continuous connection to downstream traditional navigable waters (lower Coyote Creek and San Francisco Bay). All other features in the survey

area, including the ephemeral channels and seasonal wetland, likely do not meet the definition of Waters of the U.S. because they either lack relatively permanent flow or are isolated features with no direct connection to traditional navigable waters.

This aquatic resources delineation is subject to verification by the USACE. GEI advises all parties to treat the information in this report as preliminary until USACE provides written verification of the extent of its jurisdiction in the survey area.

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Abbreviations and Acronyms

EPA	U.S. Environmental Protection Agency
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
GEI	GEI Consultants, Inc.
LiDAR	light detection and ranging
msl	mean sea level
NRCS	Natural Resources Conservation Service
OBL	obligate
OHWM	ordinary high water mark
PEM	emergent, palustrine
PFO	forested, palustrine
proposed action	Coyote Creek Flood Protection Project
PWS	Professional Wetland Scientist
R2	riverine, lower perennial
R6	riverine, ephemeral
Supplement	2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)
survey area	aquatic resources survey area
UPL	upland
U.S.	United States of America
USACE	U.S. Army Corps of Engineers
USACE Manual	1987 Corps of Engineers Wetland Delineation Manual
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
VHP	Santa Clara Valley Habitat Plan
WETS	Climate Analysis for Wetlands Tables

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Introduction

This introduction summarizes the purpose of this report and provides the United States (U.S.) Army Corps of Engineers (USACE) with contact information for the applicant and agent.

Overview

On behalf of the Santa Clara Valley Water District (Valley Water), GEI Consultants, Inc. (GEI) has prepared this aquatic resources delineation report for the Coyote Creek Flood Protection Project (proposed action). This document will be used as supporting documentation for project permitting. The survey area is located along Coyote Creek, in the City of San José, Santa Clara County, California (**Figure 1**). The purpose of the proposed action is to reduce the risk of flooding in urban areas along approximately 9 miles of Coyote Creek. The proposed action includes the construction of a combination of floodwalls, passive barriers, and berms adjacent to Coyote Creek. This delineation report describes aquatic resources in the 363.2-acre survey area, which was created with the intention of capturing all permanent and temporary construction areas associated with the proposed action (**Figure 2**).

Information on the existing conditions, including a summary of the data collected during the field investigation, methods used to map aquatic resources, and a discussion of the extent of aquatic resources in the survey area is included in this report. This report facilitates the following efforts: (1) provide background information, (2) avoid or minimize impacts on aquatic resources during the construction process; and (3) document aquatic resource boundary determinations for review by regulatory authorities.

Contact Information

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Survey Area

This section describes the location of the survey area and provides driving directions from the USACE office in San Francisco, California.

Location Description

The 363.2-acre survey area is located along Coyote Creek between the downstream face of the Montague Expressway bridge in the north to the upstream face of the Tully Road Bridge in the south, in San Jose, Santa Clara County, California (**Figure 1**). The survey area covers multiple planning reaches (Reach 4 through Reach 8) of Coyote Creek, which flows from south to north through the survey area (**Figure 2**). The survey area is associated with the Milpitas, San Jose West, and San Jose East, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles, spanning Township 6 South, Range 1 West, Section 24; Township 6 South, Range 1 East, Sections 19, 30, 32 and 33; and Township 7 South, Section 1 East, Sections 4, 5, 8, 9, 25, 16, 22 and 23 (**Figure 3**).

Driving Directions

The survey area can be accessed from multiple locations across the various reaches – directions to the northernmost end of the survey area in Reach 4 are provided. From San Francisco, head south on US-101 for approximately 37 miles, and then take exit 396B to merge onto CA-237 East towards Alviso/Milpitas. Stay on CA-237 for approximately 6 miles before using the middle lane to continue towards I-880 S. Once on I-880 S for a couple miles, take exit 7 for Montague Expressway West. Merge onto Montague Expressway and continue for approximately 0.3 mile before arriving at the bridge over Coyote Creek. The survey area will be to the left.

Other street crossings through or near the upstream (southern) reaches of the survey area include from north to south, Mabury Road, Julian Street, East Santa Clara Street, East San Antonio Street, East William Street, Story Road, and Tully Road. Most vehicle access points to the survey area are locked and gated. As a result, vehicle access would need to be coordinated with the contacts listed in this report prior to scheduling a site visit.

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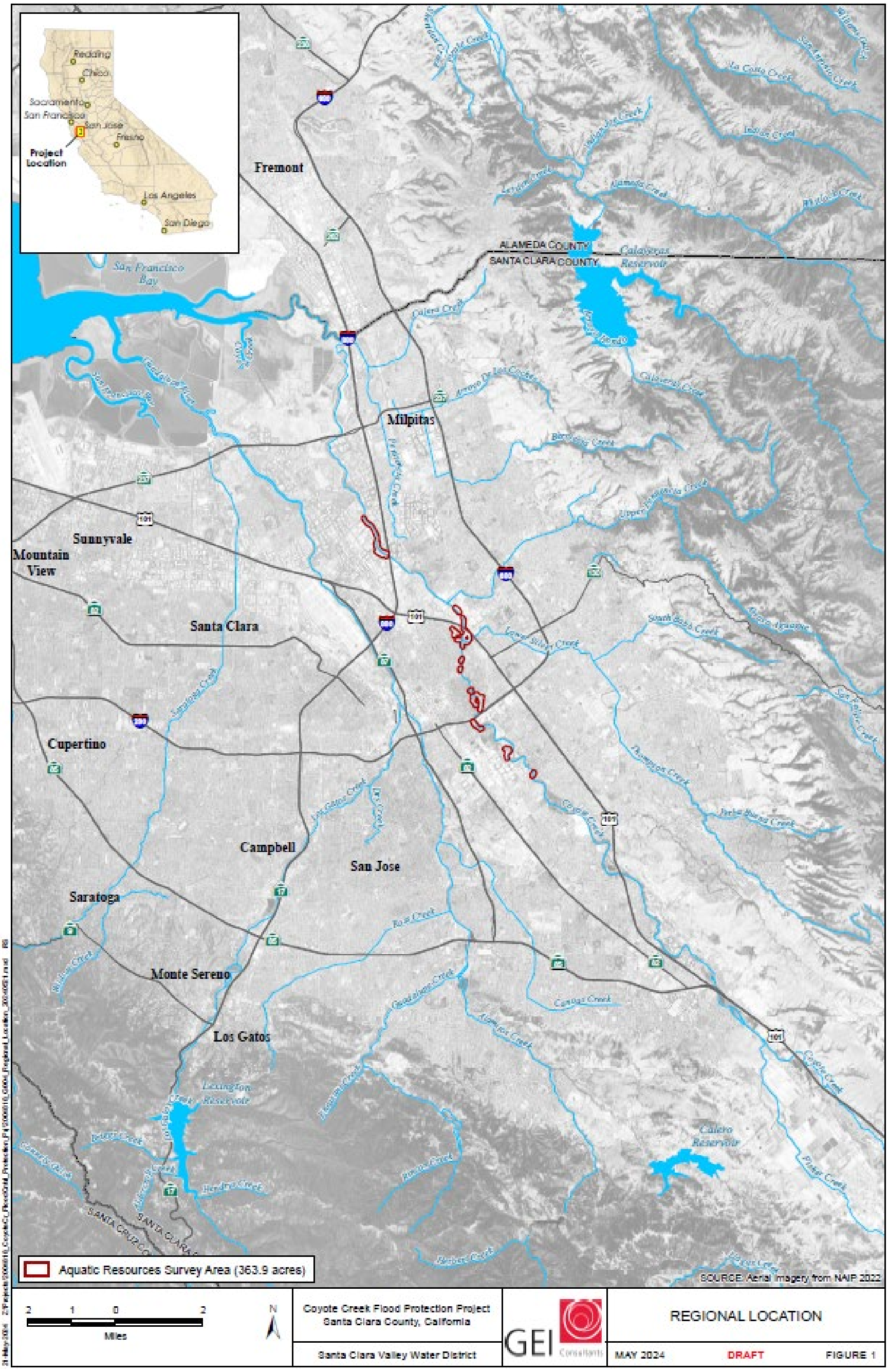


Figure 1. Regional Location

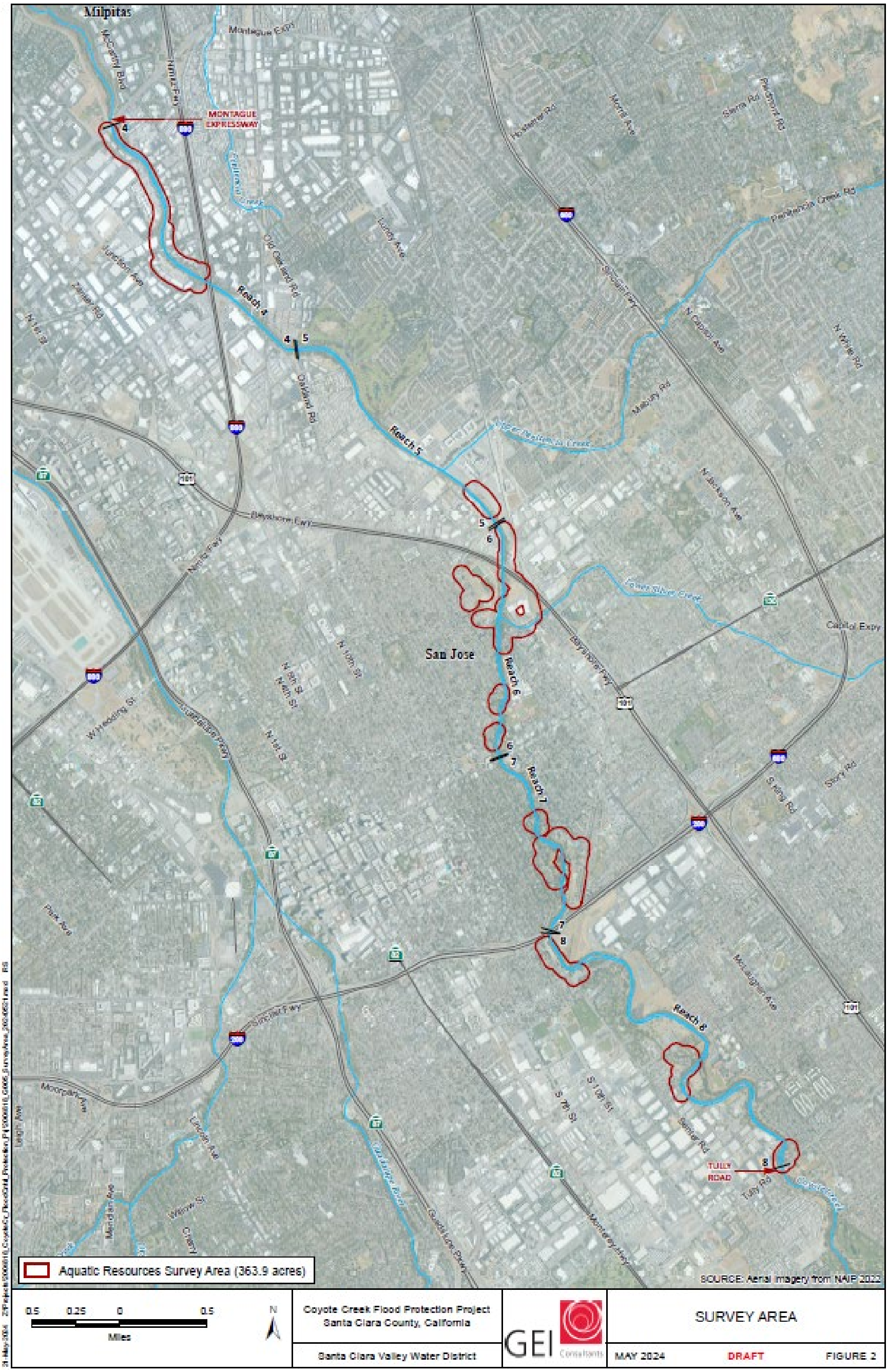


Figure 2. Aquatic Resources Survey Area

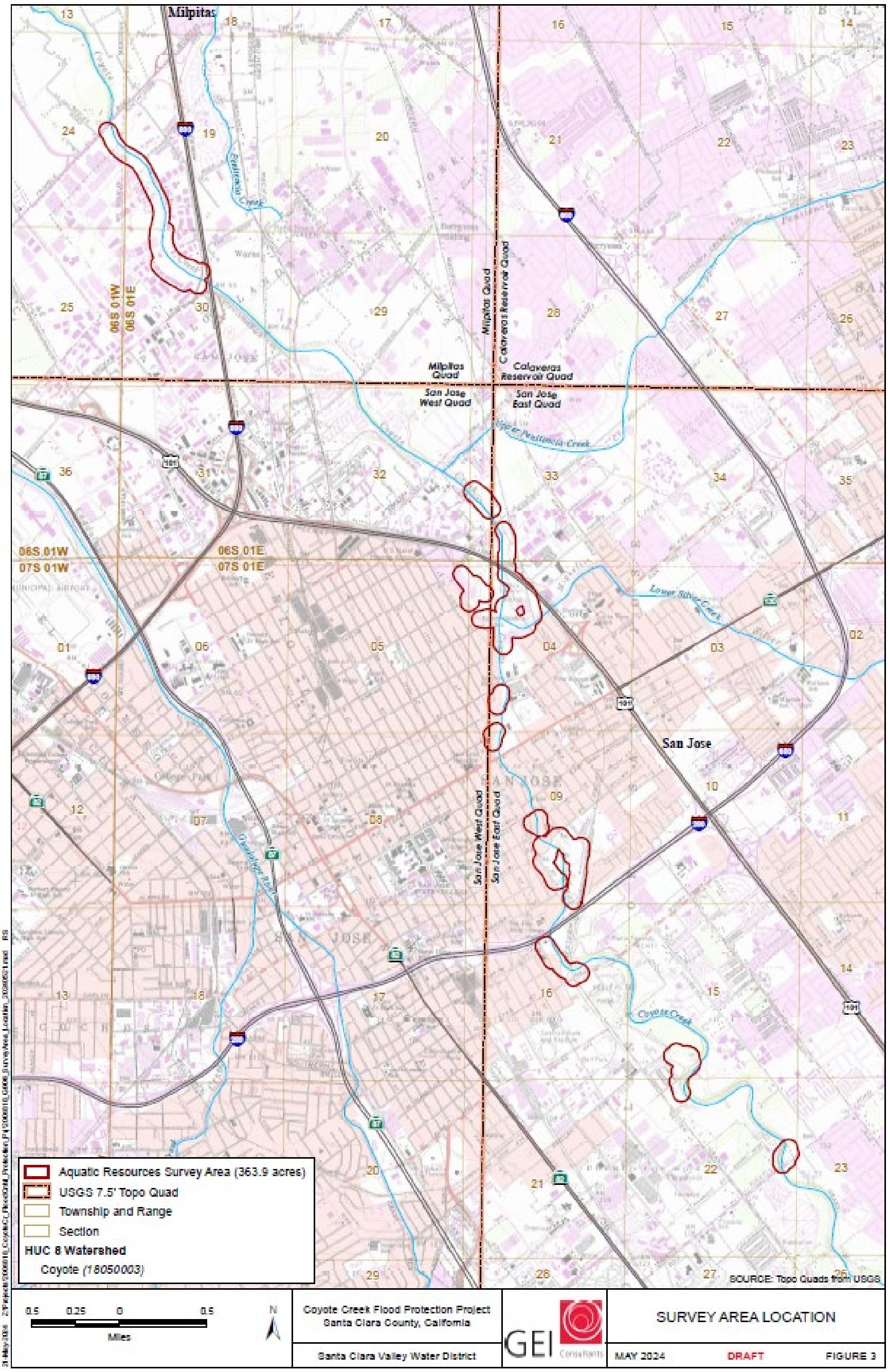


Figure 3. Survey Area Location

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Methodology

This section describes the methods used by GEI biologists to delineate and survey aquatic resources, and any deviations from standard methodologies.

Desktop Review

The desktop review consisted of collecting information related to aquatic resources in the vicinity of the survey area prior to the field investigations. GEI reviewed the following data sources for information on vegetative patterns, topography, drainage patterns, and potential or known aquatic resources in the survey area. Additionally, aquatic resources data from a previous delineation conducted by H.T. Harvey & Associates in 2022, for a project overlapping portions of the survey area, was reviewed.

- Milpitas, San Jose West, and San Jose East USGS 7.5-minute topographic quadrangle maps
- Current and historical aerial photography for vegetative, topographic, and hydrologic signatures (Google Earth 2024)
- U.S. Fish and Wildlife Service National Wetlands Inventory maps (2024)
- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (2024a)
- National Hydrography Dataset (USGS 2018)
- Delineation for portions of Coyote Creek (HT Harvey & Associates and Valley Water 2022)

Field Investigations

This aquatic resources delineation was conducted by GEI biologists Kristin Smith and Devin Barry on October 17 through 19, 2023. A follow-up survey was conducted by biologist Sarah Roy on February 29, 2024. Aquatic resource and land cover data collected during preliminary surveys conducted by GEI biologists in 2021 are also incorporated into this delineation. The delineation used the routine determination method as described in Part IV, Section D, of the *Corps of Engineers Wetland Delineation Manual* (USACE Manual; Environmental Laboratory 1987). The USACE Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Version 2.0* (Supplement; Environmental Laboratory 2008), and the USACE Interim Version of the *National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams* (Cold Regions Research and Engineering Laboratory 2022). For areas in which the USACE Manual and the Supplement differ, the Supplement was followed.

Level 2 (Onsite Inspection Necessary) of the routine determination method was chosen for this delineation (Environmental Laboratory 1987). This methodology involved collecting detailed data for aquatic resource features, including documentation of ordinary high-water mark (OHWM) indicators, coverage of vegetation by species, soils characterization, and documentation of signs of hydrology. The OHWM of linear drainage features was delineated by

collecting reference lines or points along their banks. In addition, detailed data for linear drainage features were collected and included indicators of the OHWM and vegetative cover. Features were evaluated for the presence of shelving, vegetation wracking, deposition, changes in soil character, scouring, water staining, and shifts in vegetation community to define the OHWM (Cold Regions Research and Engineering Laboratory 2022).

Dominant plants associated with aquatic resources and adjacent uplands were identified to species level, when possible, using the Jepson Manual, 2nd Edition (Baldwin et. al. 2012). Each plant species was then assigned a wetland indicator status based on the USACE 2022 National Wetland Plant List website (Version 3.6). The USACE assigns an indicator status to designate a plant species' likelihood of occurrence in wetlands or uplands (USACE 2020). A hydrophyte is a plant species that possesses physiological traits that allow the plant to grow and persist in soils subject to inundation and anaerobic soil conditions. Surveys were conducted during the late fall and winter outside of the growing season. As a result, some plants were only identifiable to genus. In instances where plants were identifiable only to genus, the wetland indicator status was assigned by reviewing the most common and/or conservative status for the species of that genus known from the region.

Soils were evaluated using paired data points close to the delineated boundary of each wetland and in areas that warranted additional investigation because they exhibited other wetland indicators (hydrophytic vegetation or hydrology), showed an odd signature on aerial imagery, or were mapped in the USFWS National Wetland Inventory. Soil pits 12 inches deep were dug at each data point, where possible, and assessed for hydric soil indicators such as the presence of redoximorphic concentrations.

Subsequent to evaluating vegetation and soils, hydrology was evaluated at each potential wetland. Positive signs of hydrology were determined by the presence of one or more primary and/or secondary indicators including, but not limited to, surface water, soil saturation, water staining, and deposition (Environmental Laboratory 2008).

Aquatic Resource Mapping

Because of limited access throughout the survey area resulting from a mix of difficult terrain, dense vegetation, and the frequent presence of encampments, the bounds of aquatic resources were mapped using a combination of methods. Spatial data collected in the field were mapped using an Eos Positioning Systems, Inc. Arrow 100 global navigation satellite system (commonly known as GNSS) antenna with submeter accuracy. Reference points and lines for the OHWM of linear drainages were collected in accessible locations across the survey area during the 2023 surveys and subsequently exported to the ArcGIS software program, then overlain on current aerial imagery and available topographic contours for the purpose of digitizing the extent of the features. Elevation contours were sourced from topographic Light Detection and Ranging (LiDAR) data.

In addition to using data points collected in the field during the 2023 survey, mapping from 2021 surveys and data from a previously delineation conducted by HT Harvey & Associates was used for portions of the survey area overlapping with existing mapping of Coyote Creek. The extent of features mapped during these previous delineations was reverified and utilized in the final aquatic resource maps.

A map book showing the aquatic resources delineation is included as **Appendix A**. Data for each aquatic resource were recorded and representative photographs were taken as part of this effort. Datasheets are provided in **Appendix B**, and representative photographs are provided in **Appendix C**.

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Existing Conditions

This section describes the existing physical and biological conditions of the survey area, including the area's climate, topography, hydrology, soils, vegetation, and level of human or natural disturbance.

Climate

Local climate data were obtained as a Climate Analysis for Wetlands Tables (WETS) from the USDA NRCS Climate Analysis for Wetlands by County (USDA 2024b). The survey area is characterized by a Mediterranean climate with hot, dry summers and cool, wet, rainy winters. As of the winter surveys, the 2023-2024 wet season was moderately wetter than the 20+ year average. **Table 1** shows the precipitation amounts recorded at the San Jose NRCS Weather Station in September 2023 through February 2024, compared with the annual average in the same months of 2000 through 2024. The NRCS climate report is provided in **Appendix D**.

Table 1. Wet Season Precipitation Amounts

Wet Season	Precipitation (inches) by Month at San Jose Weather Station						
	Sept	Oct	Nov	Dec	Jan	Feb	Total
2023-2024 actual	0.08	0.11	0.56	2.76	4.48	4.54	**12.53**
2000-2024 average	0.10	0.61	1.16	2.50	2.30	2.33	**9.00**

Topography

The survey area is in the Santa Clara Valley with mostly flat terrain. Topography in the survey area is primarily flat to gently sloping, ranging in elevation from approximately 35 to 140 feet above mean sea level. Topographically low points of the survey area are associated with the creek beds. In most instances the creeks have steeply sloping banks that transition into the surrounding flat urban sprawl. Topographically high points in the survey area are associated with the top of banks and surrounding uplands. The survey area elevation generally decreases from south to north.

Hydrology

The entire survey area is associated with the Coyote watershed (USGS Hydrologic Unit Code 18050003; Figure 3). The survey area is largely centered around the Coyote Creek channel and associated riparian corridor, with some extension into surrounding flatlands. Most of the surface water in the survey area flows into Coyote Creek, which then flows northwest, eventually draining into the San Francisco Bay. Although the creek is constrained by development, most of the channel is unlined and has earthen, vegetated banks. Stormwater in the urban area surrounding the survey area is collected in municipal stormwater collection systems and discharged into the creek.

Lower Silver Creek flows into Coyote Creek in Reach 6 of the survey area. All water flows south to north in Coyote Creek, draining north through Milpitas and into the San Francisco Bay. One additional main tributary, Upper Penitencia Creek, flows into Coyote Creek in Reach 5, but does not overlap with the survey area. Small ephemeral and intermittent tributaries flow into Coyote Creek at various locations and culvert outlets, but only a few of these overlap with the survey area.

Soils

The NRCS Web Soil Survey (USDA 2024b) identifies nine soil types in the survey area (**Appendix E**). Additional details on soils, including hydric soil ratings, can be found in the NRCS soils report provided in **Appendix F**. The majority of soils in the survey area are disturbed and have an urban lands component. None of the soils in the survey area are considered hydric.

102 – Urban land, 0 to 2 percent slopes, alluvial fans. This soil type is associated with disturbed or human transported material. It is not considered a hydric soil.

122 – Xerothrents. anthropogenic fill, 0 to 2 percent slopes. This soil type is poorly drained and associated with human transported material. It is not considered a hydric soil.

123 – Urban land-Xerothrents, anthropogenic fill complex, 0 to 2 percent slopes. This soil type is associated with disturbed or human transported material. It is not considered a hydric soil.

130 – Urban land-Still complex, 0 to 2 percent slopes. This soil type is a mix of disturbed or human transported material as well as alluvium derived from metamorphic, sedimentary, or metavolcanic rocks. It is not considered a hydric soil.

131 – Urban land-Elpaloalto complex, 0 to 2 percent slopes. This soil type is a mix of disturbed or human transported material as well as alluvium derived from metamorphic, sedimentary, or metavolcanic rocks. It is not considered a hydric soil.

169 – Urban land-Elder complex, 0 to 2 percent slopes, protected. This soil type is a mix of disturbed or human transported material as well as alluvium derived from metamorphic, sedimentary, or metavolcanic rocks. It is not considered a hydric soil.

171 – Elder fine sandy loam, 0 to 2 percent slopes, rarely flooded. Elder fine sandy loam is a somewhat excessively drained soil typically associated with streams, with parent materials of alluvium derived from metamorphic, sedimentary, or metavolcanic rocks. It is not considered a hydric soil.

173 – Caninecreek-Elder complex, 0 to 2 percent slopes, rarely flooded. This is a well-drained to somewhat excessively drained soil with a parent material of alluvium derived from metamorphic, sedimentary, or metavolcanic rocks. It is not considered a hydric soil.

174 – Urban land-Caninecreek-Elder complex, 0 to 2 percent slopes. The soil type is similar to the previous but with an urban component associated with disturbed or human transported material. It is not considered a hydric soil.

Vegetation Communities

Based on data collected during the 2021 and 2023 field surveys, the survey area supports a mix of eight developed and undeveloped land cover types, including urban – suburban; golf courses/urban parks; grain, row-crop, hay, and pasture, disked/short-term fallowed; coast live oak woodland and forest; mixed riparian woodland and forest; ornamental woodland; seasonal wetland; and riverine. These cover types have been defined and named in accordance with Santa Clara Valley Habitat Plan (VHP) conventions.

Each community is described below based on data collected in the field. These descriptions include the dominant and common associate plant species found in each community. A mapbook of vegetation communities is provided as **Appendix G,** and a list of plant species observed within the survey area during the 2023 delineation field effort is provided in **Appendix H**.

The vegetation communities described below and mapped in Appendix G do not necessarily align with aquatic resources mapped as part of this delineation (ephemeral channel, forested wetland, perennial channel, and seasonal wetland). Ephemeral channels are not mapped as their own cover type given these features do not have a sufficient hydroperiod to support unique vegetation. Forested wetland is within the mixed riparian woodland and forest cover type but is not called out as a unique vegetation type to align with land cover as defined by the Santa Clara Valley Habitat Plan. Riverine cover does align with the OHWM of the perennial channels. Seasonal wetland is also mapped as a standalone cover type based on Santa Clara Valley Habitat Plan conventions.

Grain, Row-crop, Hay and Pasture, Disked/Short-term Fallowed (0.77 acre)

One patch of agricultural area characterized as VHP cover type grain, row-crop, hay and pasture, disked/short-term fallowed is present at the northern end of the survey area, in Reach 4. This area is associated with a small farm along Montague Expressway. The portion of the property overlapping the survey area appears to be used for row crops. The edges of the agricultural field are characterized by annual grassland bordered with patchy stands of Northern California black walnut (*Juglans hindsii*).

Coast Live Oak Woodland and Forest (2.43 acres)

Coast live oak woodland and forest is located adjacent to riparian corridors and in flat undeveloped uplands adjacent to urban areas and parks in Reach 8. The tree canopy is dominated by coast live oak (*Quercus agrifolia*) with other associates including Fremont's cottonwood (*Populus fremontii*), Northern California black walnut, and red willow (*Salix laevigata*). Less frequently encountered tree species include box elder (*Acer negundo*), valley oak (*Q. lobata*), and interior live oak (*Q. wislizeni*). Scattered shrub species include California coffeeberry (*Frangula californica*), blue elderberry (*Sambucus mexicana*), and nonnative glossy privet (*Ligustrum lucidum*). Woody vines include nonnative English ivy (*Hedera helix*) with occasional patches of Himalayan blackberry (*Rubus armeniacus*). Annual grassland species such as wild oat, bromes, and annual hairgrass occur in the herbaceous understory.

Mixed Riparian Woodland and Forest (35.31 acres)

Mixed riparian forest and woodland occurs along the banks of Coyote Creek and Lower Silver Creek in all reaches of the survey area. The tree canopy is generally closed and multi-storied. Co-dominant tree species include red willow, black walnut, coast live oak, and Fremont's cottonwood. Other less frequently associated trees include white alder (*Alnus rhombifolia*), bigleaf maple (*Acer macropyllum*), California sycamore (*Platanus racemosa*), weeping willow (*Salix babylonica*), interior live oak, valley oak, and California bay laurel (*Umbellularia californica*). California buckeye (*Aesculus californica*), box elder, and Oregon ash (*Fraxinus latifolia*) occur infrequently along bank slopes. The shrub layer is dense to intermittent. Where present, this layer primarily consists of toyon (*Heteromeles arbutifolia*), hollyleaf cherry (*Prunus ilicifolia*), California rose (*Rosa californica*), poison oak (*Toxicodendron diverslobum*), and nonnative species such as tree-of-heaven (*Ailanthus altissima*), giant reed (*Arundo donax*), tree tobacco (*Nicotiana glauca*), and Himalayan blackberry. The herbaceous layer consists primarily of California mugwort (*Artemisia douglasiana*), nonnative periwinkle (*Vinca major*), and annual grasses. Fringing forested floodplain wetlands are present along Reach 4 of Coyote Creek. These areas are not mapped as their own cover type but are discussed in more detail in the Aquatic Resources section.

Ornamental Woodland (5.78 acres)

Ornamental woodland, consisting of planted eucalyptus (*Eucalyptus* ssp.) groves, incense cedar (*Calocedrus decurrens*), several species of pine (*Pinus* spp.), Peruvian pepper tree (*Schinus molle*), and English elm (*Ulmus minor*), occurs in isolated patches across all reaches of the survey area. This woodland is characterized by trees that were planted as landscaping adjacent to urban-suburban areas.

Seasonal Wetland (0.12 acre)

A single seasonal wetland occurs in the staging area adjacent to and outside of the riparian corridor of Coyote Creek in Reach 4. This wetland is highly disturbed and in an area that has been used for spoils and other material storage. The wetland sits in a topographically low area at the base of a gravel pile. A review of aerial imagery shows that this depression has ponded regularly over the last 10 years. The seasonal wetland is dominated by a combination of semi-hydrophytic species such as Italian ryegrass (*Festuca perennis)*, hyssop loosestrife (*Lythrum hyssopfolia*), curly dock (*Rumex crispus*), and tall flatsedge (*Cyperus eragrostis*). Some encroachment of upland species such as horseweed (*Erigeron canadensis*) and milk thistle (*Silybum marinum*) was observed. Surrounding upland vegetation is characterized as non-native annual grasses. Given the highly disturbed nature of this feature, it does not provide suitable habitat for special species that would typically be associated with seasonal wetland habitats.

Riverine (26.95 acres)

Both Coyote Creek and Lower Silver Creek are characterized as riverine land cover. Riverine extends between the ordinary high-water mark of the two creek banks and in many places has over-hanging riparian vegetation. For mapping purposes, riverine land cover was prioritized over adjacent land cover types, meaning all areas below the ordinary high-water mark were mapped as riverine. Some portions of the riverine channels are unvegetated and can be characterized as open water. Other areas support emergent or floating vegetation such as floating water

primrose (*Ludwigia peploides*), water cress (*Nasturtium officinale*), duckweed (*Lemna minor*), and smartweed (*Persicaria amphibia*). Some riparian trees are rooted below the ordinary high-water mark and are incorporated into this cover type. Riverine runs through the entire survey area and occurs across all reaches.

Urban-Suburban (226.21 acres)

Urban–suburban cover in the survey area includes developed areas such as residential and commercial structures, paved and unpaved roads, bridges, and other buildings. These areas are largely devoid of vegetation, except for sparsely distributed, primarily nonnative plants. Residential areas within this land cover type can support a variety of planted nonnative and native trees including eucalyptus, Mexican fan palm (*Washingtonia robusta*), Peruvian pepper tree, and pine. Urban–suburban land cover occurs in all project reaches and is the primary upland land cover in the survey area surrounding Coyote Creek.

Golf Courses/Urban Parks (66.28 acres)

Golf courses/urban parks occur between Coyote Creek and the urban–suburban surroundings in Reaches 6, 7, and 8. Vegetation consists of turf grasses or lawn and ornamental trees such as incense cedar, glossy privet, maidenhair tree (*Gingko biloba*), magnolia (*Magnolia virginiana*), and coast redwood (*Sequoia sempervirens*). Native trees occasionally present in the urban parks include oaks (*Quercus* ssp.) and California sycamore. Although the VHP cover type is golf courses/urban parks, all areas mapped as such in the survey area are better described only as urban parks. Other areas mapped as this land cover type include undeveloped lots and disturbed roadsides, as well as the banks of Coyote Creek that do not support riparian vegetation. These areas are subject to frequent disturbance and maintenance and are characterized by dense nonnative herbaceous cover.

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Aquatic Resources

The delineation identified a total of 29.45 acres of aquatic resources in the survey area, including two ephemeral channels, two forested wetlands, fourteen segments of perennial channel, and one seasonal wetland. **Table 2** summarizes the aquatic resources in the survey area. Datasheets describing these features and representative photos are included as Appendix B and Appendix C, respectively.

Table 2. Aquatic Resources in the Survey Area

Feature ID	Feature Class	Cowardin Code	Area (acres)	Length (linear feet)	Latitude	Longitude	Map Sheet
PC01a	Perennial Channel	R2	10.89	6075	-121.911008	37.390394	1,2,3
PC01b	Perennial Channel	R2	1.22	1225	-121.876400	37.365221	4
PC01c	Perennial Channel	R2	1.94	1800	-121.873787	37.360914	4,5
PC01d	Perennial Channel	R2	2.30	1705	-121.874050	37.355085	5,6,7
PC01e	Perennial Channel	R2	1.20	950	-121.873475	37.348880	8
PC01f	Perennial Channel	R2	1.16	830	-121.874092	37.345776	8
PC01g	Perennial Channel	R2	0.85	750	-121.869947	37.338713	9,10
PC01h	Perennial Channel	R2	1.08	955	-121.868159	37.336954	9,10
PC01i	Perennial Channel	R2	0.53	480	-121.867222	37.333899	9,10
PC01j	Perennial Channel	R2	0.25	245	-121.866869	37.332358	10
PC01k	Perennial Channel	R2	1.66	1490	-121.867069	37.327668	11
PC01l	Perennial Channel	R2	1.10	1500	-121.853824	37.317647	12
PC01m	Perennial Channel	R2	1.17	1055	-121.843891	37.311323	13
PC02	Perennial Channel	R2	1.61	1600	-121.872136	37.355451	6,7
Subtotal Perennial Channel			*26.95*	*20660*			
W02a	Forested Wetland	PFO	0.05	-	-121.909441	37.385327	1,2
W02b	Forested Wetland	PFO	2.32	-	-121.907019	37.383929	1,2
Subtotal Forested Wetland			*2.36*	-			
Total Potential Waters of the US			***29.31***	***20660***			
W01	Seasonal Wetland	PEM	0.12	-	-121.907089	37.383317	2
Subtotal Seasonal Wetland			*0.12*	-			
EC01	Ephemeral Channel	R6	0.003	26	-121.854328	37.317912	12
EC02	Ephemeral Channel	R6	0.01	72	-121.868272	37.336874	9,10
Subtotal Ephemeral Channel			*0.01*	*98*			
Total Potential Non-Jurisdictional Waters			***0.14***	***98***			

Note: Length is only listed for linear channel features. Total acreages may not equal the sum of their parts as shown in this table because of rounding.

Cowardin Codes: R2 = riverine, lower perennial; PFO = forested, palustrine; PEM = emergent, palustrine; R6 = riverine, ephemeral

The location and extent of each aquatic resource is shown in Appendix A, and each feature class is described in more detail below.

Potential Waters of the U.S.

The perennial channels (Coyote Creek and Lower Silver Creek) and adjacent forested wetland features in the survey area are likely Waters of the U.S. due to their continuous connection to downstream traditional navigable waters (lower reaches of Coyote Creek and San Francisco Bay[1]). These features are described in more detail below and total 29.31 acres.

Perennial Channel

Fourteen segments (PC01a-m and PC02) of perennial channel were mapped across all reaches of the survey area, totaling 26.95 acres and 20,660 linear feet. The perennial channel features are primarily associated with Coyote Creek (PC01a-m). One segment (PC02) is associated with Lower Silver Creek at its confluence with Coyote Creek in Reach 6 of the survey area.

Both Coyote Creek and Lower Silver Creek are highly constrained by urban development and subject to heavy ongoing human disturbance. Encampments and trash are present along the entire channel. Despite the surrounding urban development, the majority of the creek channels are unlined and characterized by earthen beds and banks with mature, albeit narrow, riparian corridors. Some portions of Lower Silver Creek are concrete lined along both the bed and banks. These areas have unvegetated banks; however, some emergent and floating vegetation has established in the creek bed.

Isolated patches of the creek channels support herbaceous, emergent, or floating vegetation. These areas are all below the mapped OHWM of the channel and are expected to regularly change in location and extent based on flow conditions. Some riparian vegetation is rooted below the channel, but for the most part, the OHWM is defined by a distinct shift in vegetation moving from bare ground or herbaceous cover into a denser riparian corridor that supports woody vegetation. Most of the creek channels have a defined OHWM, with relatively steep banks; however, one area in Reach 4 has a low terrace abutting the creek that is characterized as forested floodplain wetland (W02a and W02b), which is described in more detail below. The OHWM of the perennial channels was identified by the presence of several indicators, including scouring, shelving, wracking, sediment deposits, and change in vegetation. The OHWM of the creeks was identified during the October surveys prior to the rainy season when flows were below the OHWM and indicators were readily observable. Both perennial channels, Coyote Creek and Lower Silver Creek, have a continuous connection to the San Francisco Bay, likely making them Waters of the U.S.

Forested Wetland

Two forested wetlands (W02) were mapped in the survey area totaling 2.36 acres. These features are characterized as forested floodplain wetlands adjacent to Coyote Creek and landward of the OHWM in Reach 4. These areas are forested, with an open to closed canopy of riparian species. Willows (*Salix laevigata* [FACW], *S. babylonica* [FAC]) and Fremont cottonwood (*Populus fremontii* [FACW]) are rooted within the wetland boundary and contiguous with the surrounding riparian corridor. These areas differ from other portions of the riparian corridor both in that is topographically more flat or depressed than other banks along Coyote Creek and, in that it appears to support more hydrophytic herbaceous vegetation such as curly dock (*Rumex crispus* [FAC]), smartweed (*Persicaria* sp. [FACW]), and tall flatsedge (*Cyperus*

1 https://www.spn.usace.army.mil/Portals/68/docs/regulatory/1%20-%20Sect10waters.pdf

eragrostis [FACW]). Sample points were collected at the south western edge of forested wetland near the toe of the steep slope up to top of bank where herbaceous vegetation shifts to upland annual grassland species.

Water was present at the time of the February survey and is visible in aerial imagery from previous years, indicating this area ponds semi-regularly. Low swale-like inlets occur intermittently along the boundary of the forested wetlands and Coyote Creek, allowing water to enter the floodplain during periods of high flow. The center of the floodplain is low elevation, similar to that of the OHWM (around 35 feet); however, a slightly higher berm separates the majority of the floodplain from the creek channel. Water appears to backflow into the low swales that bisect the higher berm and fill the floodplain, but the wetlands overall have sufficient elevational separation from the creek to not be included within the OHWM. Soils were not sampled due to access concerns; however, this area was assumed to be a wetland due to the presence of vegetation and hydrology wetland indicators and it is possible hydric soils are present here based on topographic position, proximity to the creek, the presence of the other wetland indicators including a predominance of hydrophytic vegetation.

The forested wetlands have a direct hydrological connection (floodplain) to Coyote Creek (PC01a), which eventually drains into the San Francisco Bay. As a result, they are likely considered a Water of the U.S.

Potentially Non-Jurisdictional Waters

All other features in the survey area, including the ephemeral channels and seasonal wetland, likely do not meet the definition of Waters of the U.S. because they either lack relatively permanent flow (ephemeral channels), or are isolated features with no continuous connection to traditional navigable waters (seasonal wetland). These features total 0.14 acre and are described in more detail below. Although these features likely do not meet the definition of Waters of U.S. and as a result would not be regulated by the USACE, they would likely meet the definition of Waters of the State and therefore be subject to regulation by the Regional Water Quality Control Board.

Ephemeral Channel

Two ephemeral channels (EC01 and EC02) were mapped in the survey area totaling 0.01 acre and 98 linear feet. Channels ranged in width from 2 to 6 feet. Both channels are in the southern reaches of the survey area and are tributaries to Coyote Creek. They appear to flow for short periods after rain events and were largely unvegetated. No wetland or riparian vegetation was growing in the channel or along the banks. These channels drain runoff from surrounding developed land. The OHWM of these features was defined by a distinct bed and bank, including shelving and scouring. Although the ephemeral channels drain into Coyote Creek, they do not have relatively permanent flow. This likely excludes them as Waters of the U.S.

Seasonal Wetland

A single seasonal wetland (W01, 0.12 acre) was mapped in an upland staging area above the Coyote Creek banks and riparian corridor in Reach 4 of the survey area. This area is highly disturbed and in an area that has been used for spoils and other material storage. The wetland sits in a topographically low area at the base of a gravel pile and appears to have been created as a result of previous disturbance. A review of aerial imagery shows that this depression has

ponded regularly over the last 10 years and has changed in extent and configuration in response to activities as the site. Although this feature meets all three wetland indicators, it is better described as a disturbed ponded depression. Because it has been present for several years, it has had time to develop wetland indicators. The seasonal wetland is dominated by a combination of semi-hydrophytic species such as Italian ryegrass (*Festuca perennis* [FAC]), hyssop loosestrife (*Lythrum hyssopifolia* [FACW]), curly dock (*Rumex crispus* [FAC]), and tall flatsedge (*Cyperus eragrostis* [FACW]). Some encroachment of upland species such as horseweed (*Erigeron* sp. [UPL]) and milk thistle (*Silybum marianum* [UPL]) was observed; however, a clear transition into dominant upland annual grassland species occurs at the wetland edge.

Soils were underlain by a restrictive layer approximately 8 inches deep, which likely contributes to the ponding in this area. The soil profile was a mix of fill and sandy loam, with distinct redoximorphic concentrations. This area is not underlain my hydric soils as mapped in the NRCS web soil survey; however, hydric soil indicators have developed in this isolated area due the regular ponding over several years. Hydrologic indicators included ponded water present during the February 2024 site visit, and many instances of either inundation or saturation visible on aerial imagery over the last decade. Ponding or saturation visible on aerial imagery over the past decade is present in the months of December through April. Algal matting and the presence of aquatic species such as frogs and invertebrates were also observed during the 2024 survey.

This feature is hydrologically isolated from any other aquatic resources, including nearby Coyote Creek. As a result, it is likely not considered Waters of the U.S.

Conclusion

Thirteen segments of Coyote Creek, one stretch of Lower Silver Creek, and two forested wetlands bordering Coyote Creek, totaling 29.31 acres, that meet the current definition of Waters of the U.S. were delineated in the survey area. On May 25, 2023, the U.S. Supreme Court rendered a decision on the *Sackett vs. U.S. Environmental Protection Agency* (EPA) case regarding Waters of the U.S. In that decision, the U.S. Supreme Court determined that the Clean Water Act extends only to wetlands that have a continuous surface connection with a relatively permanent body of water, such that it's difficult to determine where the water ends, and the wetland begins. The EPA and USACE subsequently released the *Revised Definition of "Waters of the United States"; Conforming* rule (88 Federal Register 61964) on September 8, 2023, to reflect these changes. In addition, the amended rule confirmed that linear features with no relatively permanent flow would likely be excluded from the definition of Waters of the U.S.

Based on the U.S. Supreme Court decision and a review of site conditions, it is anticipated that Lower Silver Creek, Coyote Creek, and their adjacent forested wetlands would all be considered Waters of the U.S. under the final rule because of their continuous connection to downstream traditional navigable waters. None of the waterways overlapping the survey area are considered traditional navigable waters by USACE; however, the lower reaches of Coyote Creek and the San Francisco Bay are mapped as traditional navigable waters by the San Francisco USACE District.

All other aquatic resource features in the survey area, including the ephemeral channels and seasonal wetland, do not meet the current definition of Waters of the U.S. because they either lack relatively permanent flow or are isolated features with no direct connection to traditional navigable waters.

This aquatic resources delineation is subject to verification by USACE. GEI advises all parties to treat the information in this report as preliminary until USACE provides written verification of the extent of its jurisdiction in the survey area.

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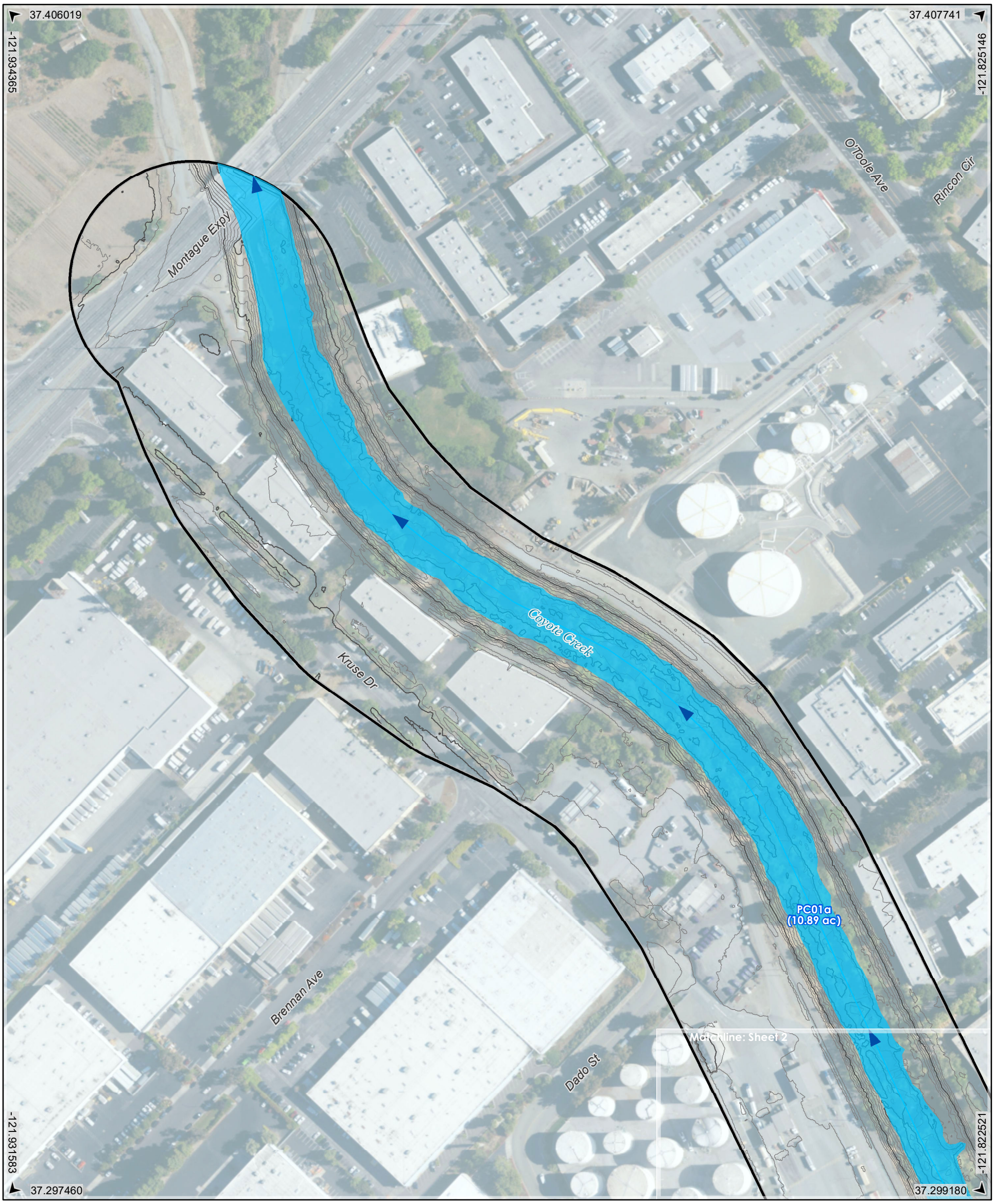
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Appendix A. Aquatic Resources Delineation Mapbook

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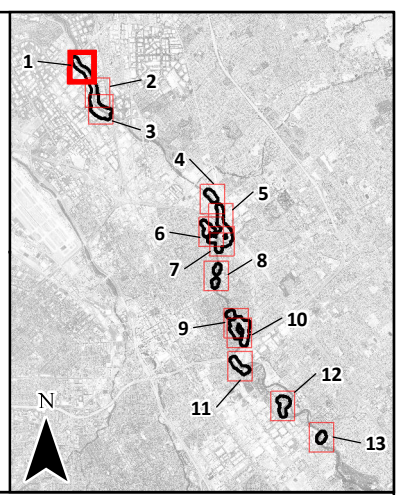
- Sample Point
- Culvert
- Flow Direction
- Major Contour (10 ft)
- Minor Contour (2 ft)
- Aquatic Resources Survey Area (363.9 acres)

Aquatic Resources

- Ephemeral Channel (0.01 acre; 98 LF)
- Forested Wetland (2.36 acres)
- Perennial Channel (26.95 acres; 20,660 LF)
- Seasonal Wetland (0.12 acre)

Coordinate System
NAD 1983 State Plane, California Zone III
Projection
Lambert Conformal Conic
Datum
North American 1983
Vertical Datum
NAVD88, U.S. Feet

DELINEATED BY:
Kristin Smith and Devin Barry, October 17-19, 2023,
and Sarah Roy, February 29, 2024



200 100 0 200
Feet

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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

GEI Consultants

AQUATIC RESOURCES
(SHEET 1 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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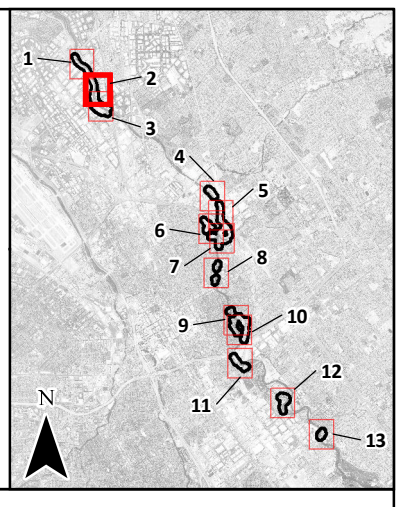
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Santa Clara County, California

Santa Clara Valley Water District

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AQUATIC RESOURCES
(SHEET 2 OF 13)

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-121.934365
37.407741
-121.825146
-121.931583
37.297460
37.299180
-121.822521

PC01a (10.89 ac)
W02a (0.05 ac)
W02b (2.32 ac)
W01 (0.12 ac)
SP01
SP02
SP03
SP04
Matchline: Sheet 2
Paragon Dr
Charcot Ave
O'Toole Wy
O'Toole Ln
O'Toole Ave
Nimitz Fwy
Coyote Creek
Hartog Dr
Junction Ave
E Brokaw Rd
Enterprise Dr
880

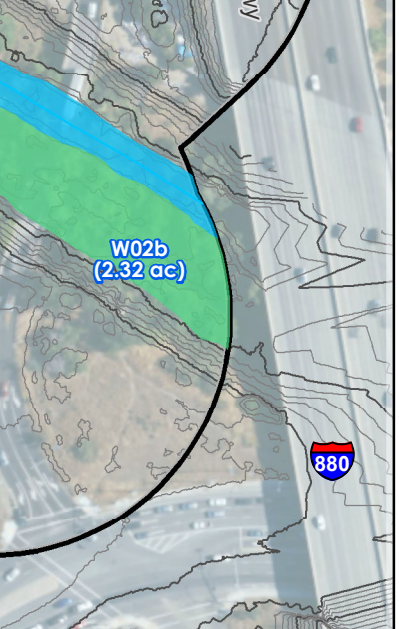
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North American 1983
Vertical Datum
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Kristin Smith and Devin Barry, October 17-19, 2023,
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Feet
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Coyote Creek Flood Protection Project
Santa Clara County, California

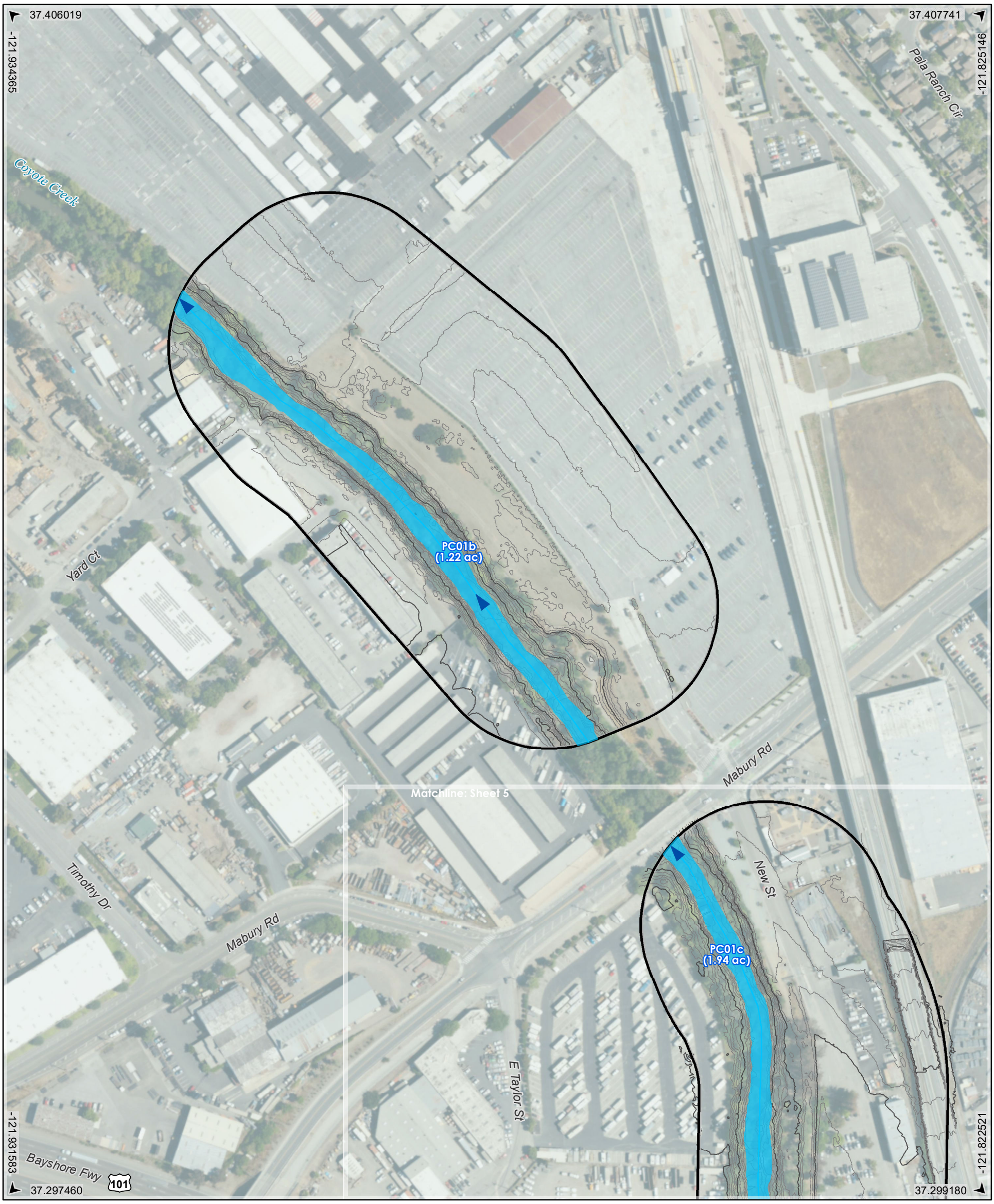
Santa Clara Valley Water District

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AQUATIC RESOURCES
(SHEET 3 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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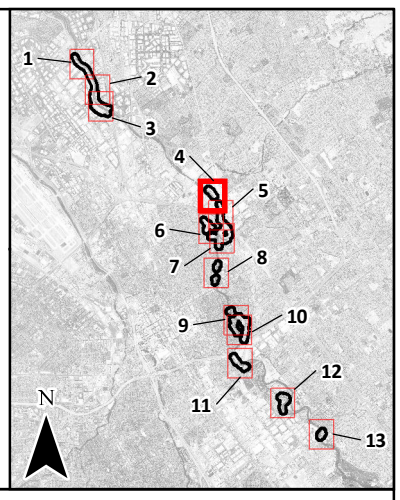
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Santa Clara County, California

Santa Clara Valley Water District

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AQUATIC RESOURCES
(SHEET 4 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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-121.934365
37.407741
-121.825146
Mabury Rd
Coyote Creek
New St
E Taylor St
Nicora Ave
Matchline: Sheet 4
PC01c
(1.94 ac)
101
Matchline: Sheet 8
Las Plumas Ave
Matchline: Sheet 7
N Marburg Way
New St
Jackson St
Bayshore Fwy
Eggo Way
PC01d
(2.3 ac)
37.297460
37.299180

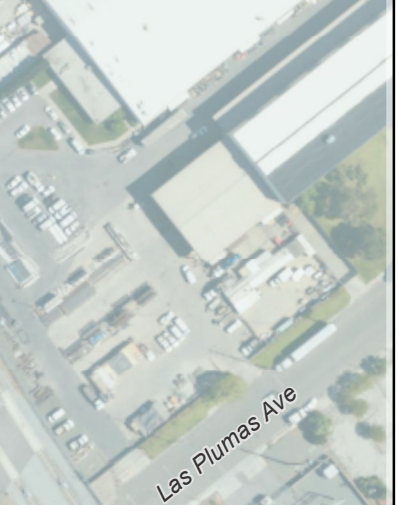
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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

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AQUATIC RESOURCES
(SHEET 5 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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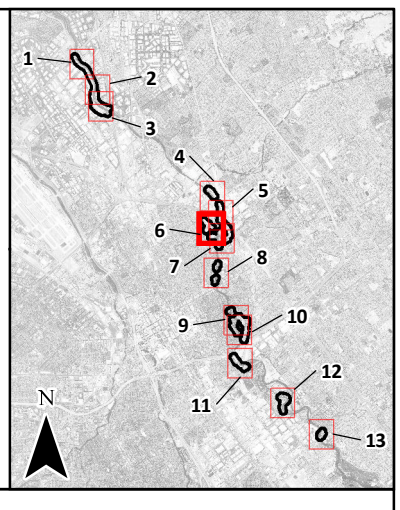
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North American 1983
Vertical Datum
NAVD88, U.S. Feet

DELINEATED BY:
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Feet

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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

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AQUATIC RESOURCES
(SHEET 6 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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37.406019
37.407741
-121.934365
-121.825146
101
N Marburg Way
Bayshore Fwy
PC01d
(2.3 ac)
Matchline: Sheet 5
Eggo Way
N 22nd St
E Empire St
PC02
(1.61 ac)
Lower Silver Creek
Matchline: Sheet 6
Coyote Creek
Wooster Ave
Tripp Ave
Coyote Creek Pl
Terrace Dr
N 21st St
Washington St
N 26th St
Permata Ct
Coyote Creek Ct
E Julian St
-121.931583
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37.297460
37.299180

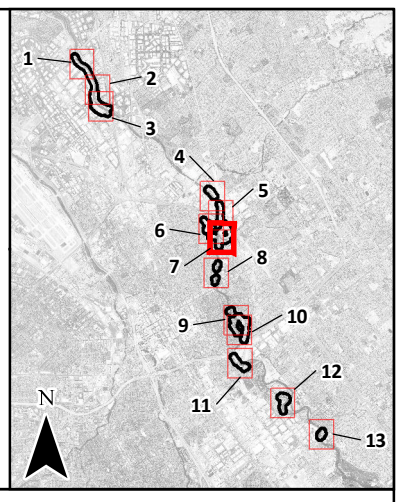
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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

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AQUATIC RESOURCES
(SHEET 7 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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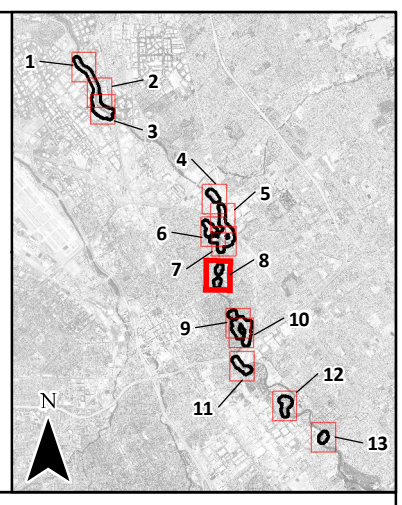
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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

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AQUATIC RESOURCES
(SHEET 8 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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-121.934365
37.407741
-121.825146
E San Carlos St
S 17th St
Brookwood Ave
S 18th St
S 19th St
S 20th St
S 21st St
Woodvale Ct
PC01g
(0.85 ac)
Matchline: Sheet 10
E San Salvador St
S 16th St
E William St
PC01h
(1.08 ac)
EC02
(0.01 ac)
Coyote Creek
Woodborough Dr
Woodborough Pl
S 14th St
S 15th St
PC01i
(0.53 ac)
-121.931583
37.297460
37.299180
-121.822521

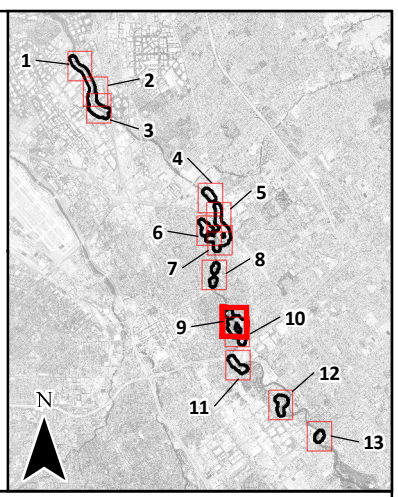
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Kristin Smith and Devin Barry, October 17-19, 2023,
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Feet
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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

GEI Consultants

AQUATIC RESOURCES
(SHEET 9 OF 13)

MAY 2024 DRAFT APPENDIX A

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37.406019 | -121.934365 | 37.407741 | -121.825146

PC01g (0.85 ac)
PC01h (1.08 ac)
EC02 (0.01 ac)
PC01i (0.53 ac)
PC01j (0.25 ac)

Brookwood Ave
S 19th St
S 21st St
E William St
Woodborough Dr
S 16th St
Woodborough Pl
S 22nd St
S 15th St
Forestdale Ave
S 14th St
Margaret St
S 13th St
Coyote Creek
280
Sinclair Fwy

Matchline: Sheet 9

37.297460 | -121.931583 | 37.299180 | -121.822521

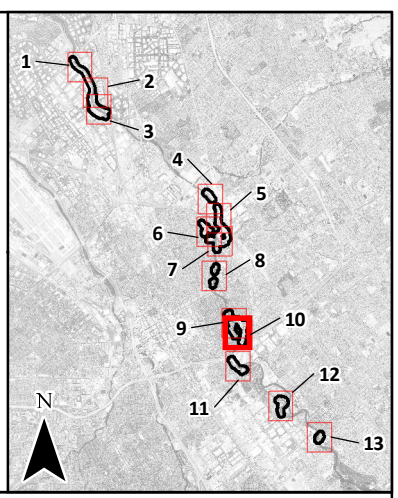
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Feet
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Coyote Creek Flood Protection Project
Santa Clara County, California

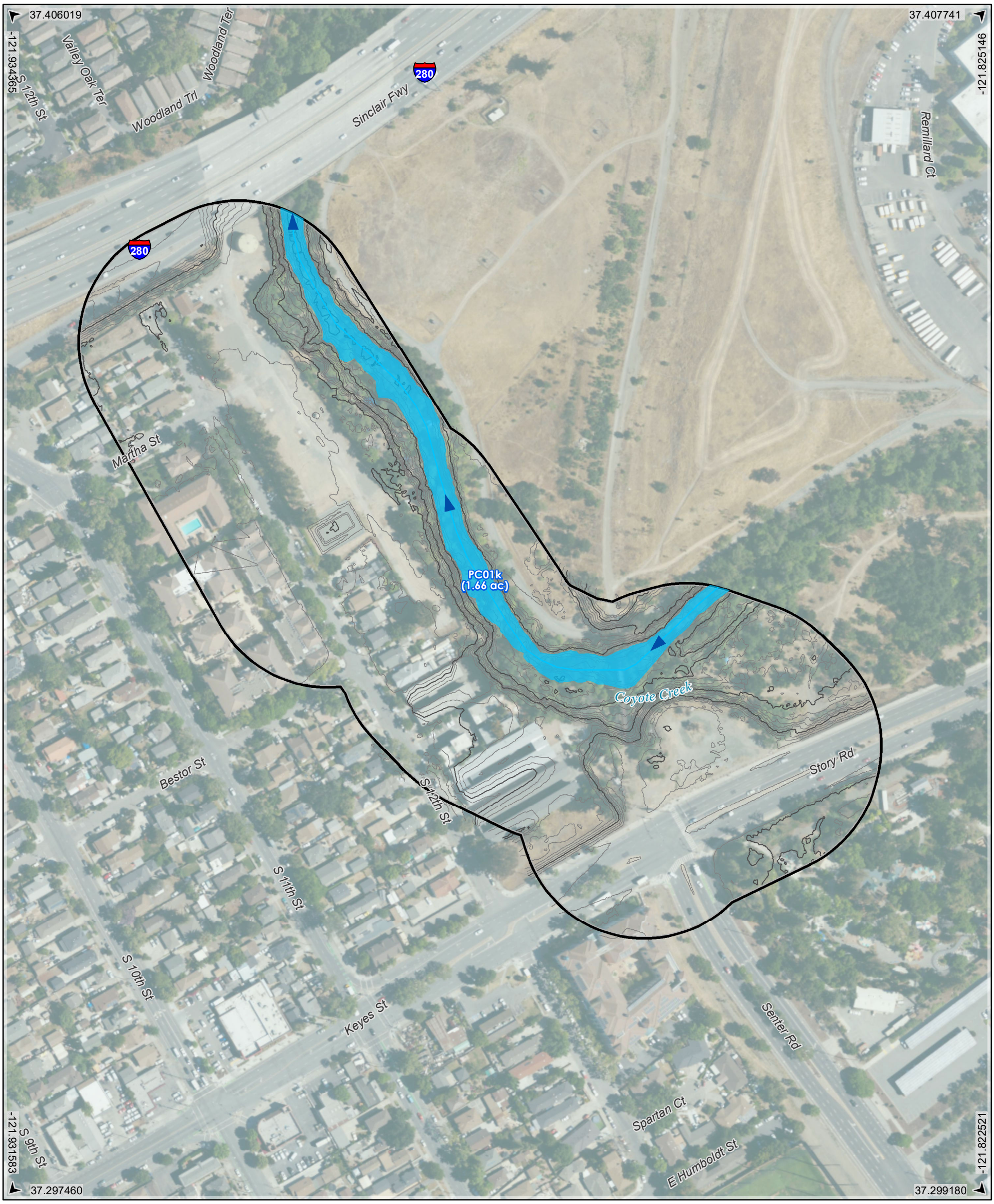
Santa Clara Valley Water District

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AQUATIC RESOURCES
(SHEET 10 OF 13)

MAY 2024 DRAFT APPENDIX A

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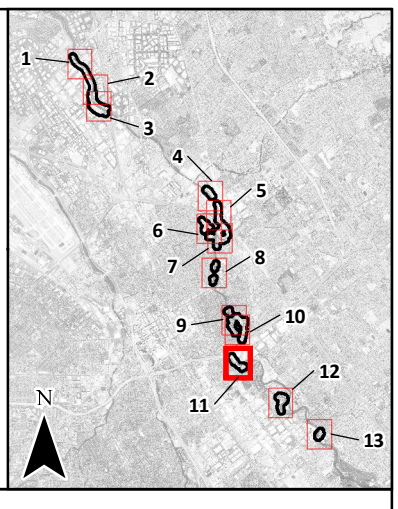
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Santa Clara County, California

Santa Clara Valley Water District

GEI Consultants

AQUATIC RESOURCES
(SHEET 11 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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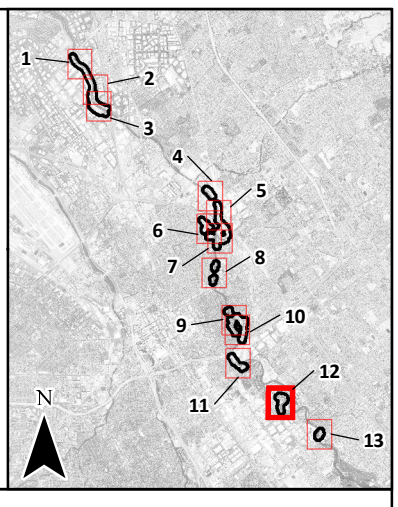
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Feet

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AQUATIC RESOURCES
(SHEET 12 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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37.407741 -121.825146

Warfield Way

Lucretia Ave

Galveston Ave

PC01m
(1.17 ac)

Kenoga Dr

Quinn Ave

Tully Rd

Rettus Ct

Albanese Cir

la Ragione Ave

Coyote Creek

Gier Ct

37.297460 -121.931583

37.299180 -121.822521

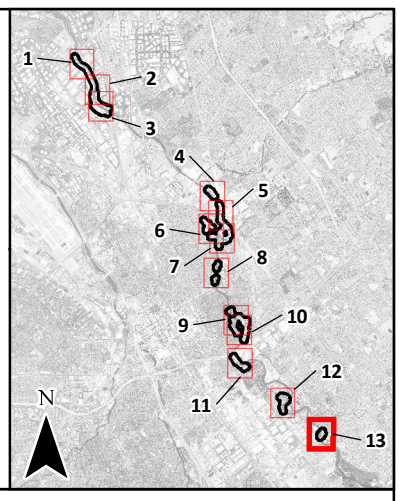
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Coyote Creek Flood Protection Project
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AQUATIC RESOURCES
(SHEET 13 OF 13)

MAY 2024 **DRAFT** APPENDIX A

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Appendix B. Data Forms

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U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

Form Approved -
OMB No. 0710-0025
Expires: 01-31-2025

AGENCY DISCLOSURE NOTICE

The public reporting burden for this collection of information, 0710-OHWM, is estimated to average 30 **minutes** per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

Project ID #: PC01	Site Name: Coyote Creek	Date and Time: 10/19/23, 11:00 am
Location (lat/long): see table in report	Investigator(s): K. Smith, D. Barry	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- gage data
- [X] LiDAR
- geologic maps
- climatic data
- satellite imagery
- [X] land use maps
- [X] aerial photos
- [X] topographic maps
- Other: _____

Describe land use and flow conditions from online resources. Were there any recent extreme events (floods or drought)?

Heavy anthropogenic impacts, semi-natural channel with riparian corridor; however, constrained by development. Upstream dam regulates flow.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Heavy anthropogenic disturbance from encampments, including trash and ground/vegetation disturbance. Width of channel at OHWM approximately 25-30 ft, water depth approximately 24 in.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [X] **Break in slope:** a
  - [X] *on the bank:* b
  - [X] *undercut bank:* x
  - *valley bottom:*
  - Other: _____
- [X] **Shelving:** x
  - [X] *shelf at top of bank:* a
  - *natural levee:*
  - *man-made berms or levees:*
  - *other berms:* _____

Channel bar:

- *shelving (berms) on bar:*
- *unvegetated:*
- *vegetation transition (go to veg. indicators)*
- *sediment transition (go to sed. indicators)*
- *upper limit of deposition on bar:*

Instream bedforms and other bedload transport evidence:

- *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
- *bedforms (e.g., pools, riffles, steps, etc.):*
- *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Secondary channels:

Sediment indicators

- **Soil development:**
- **Changes in character of soil:**
- **Mudcracks:**
- **Changes in particle-sized distribution:**
  - *transition from* _____ to _____
  - *upper limit of sand-sized particles*
  - *silt deposits:*

Vegetation Indicators

- [X] **Change in vegetation type and/or density:** x

  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***

  - [X] *vegetation absent to:* forbs
  - *moss to:*
  - [X] *forbs to:* deciduous trees
  - *graminoids to:*
  - *woody shrubs to:*
  - [X] *deciduous trees to:* woody shrubs
  - *coniferous trees to:*
- [X] **Vegetation matted down and/or bent:** x
- [X] **Exposed roots below intact soil layer:** x

Ancillary indicators

- [X] **Wracking/presence of organic litter:** x
- [X] **Presence of large wood:** b
- [X] **Leaf litter disturbed or washed away:** x
- **Water staining:**
- **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Some trees rooted below OHWM, but mostly above. Exposed roots.

Project ID #: PC01h

Step 4 Is additional information needed to support this determination? Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Channel is relatively deep and incised, some narrow terraces above OHWM. OHWM distinct based on combination of OHWM indicators listed above including shelving, exposed roots, sediment deposition and wracking. Shrubs and dense riparian vegetation begin at and only growing above OHWM.

Additional observations or notes

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes No If no, explain why not: _____

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
	see report

U.S. Army Corps of Engineers (USACE)

INTERIM DRAFT RAPID ORDINARY HIGH WATER MARK (OHWM) FIELD IDENTIFICATION DATA SHEET

The proponent agency is Headquarters USACE CECW-CO-R.

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Expires: 01-31-2025

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Project ID #: PC01	Site Name: Coyote Creek	Date and Time: 10/18/23, 10:00 am
Location (lat/long): see table in report	Investigator(s): K. Smith, D. Barry	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- [ ] gage data
- [x] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [x] land use maps
- [x] aerial photos
- [x] topographic maps
- [ ] Other: _____

Describe land use and flow conditions from online resources. Were there any recent extreme events (floods or drought)?

Near confluence with Silver Creek. Semi-natural channel with riparian corridor; however, constrained by development. Upstream dam regulates flow.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Heavy anthropogenic disturbance from transient camps, including trash and ground/vegetation disturbance. Terraforming. Width of channel at OHWM approximately 25 ft, water depth approximately 18-24 inches

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** a
  - [x] *on the bank:* b
  - *undercut bank:*
  - *valley bottom:*
  - Other: _____
- [x] **Shelving:** x
  - [x] *shelf at top of bank:* a
  - *natural levee:*
  - *man-made berms or levees:*
  - [x] *other berms:* camps
- [x] **Channel bar:** b
  - [x] *shelving (berms) on bar:* x
  - [x] *unvegetated:* b
  - [x] *vegetation transition (go to veg. indicators)*
  - *sediment transition (go to sed. indicators)*
  - *upper limit of deposition on bar:*

Instream bedforms and other bedload transport evidence:

- *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
- *bedforms (e.g., pools, riffles, steps, etc.):*
- *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Secondary channels:

Sediment indicators

- **Soil development:**
- **Changes in character of soil:**
- **Mudcracks:**
- **Changes in particle-sized distribution:**
  - *transition from* _____ to _____
  - *upper limit of sand-sized particles*
  - *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x

  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***

  - [x] *vegetation absent to:* forbs
  - *moss to:*
  - [x] *forbs to:* deciduous trees
  - *graminoids to:*
  - *woody shrubs to:*
  - [x] *deciduous trees to:* woody shrubs
  - *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [x] **Exposed roots below intact soil layer:** x

Ancillary indicators

- [x] **Wracking/presence of organic litter:** x
- **Presence of large wood:**
- [x] **Leaf litter disturbed or washed away:** x
- **Water staining:**
- **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Some trees rooted below OHWM, but mostly above. Exposed roots. Species include arroyo willow, cottonwood, English elm.

Project ID #: PC01

Step 4 Is additional information needed to support this determination? Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Channel is somewhat wider tan other areas along Coyote Creek, with some narrow terraces above OHWM. OHWM distinct based on combination of OHWM indicators listed above including shelving, exposed roots, sediment deposition and wracking. Shrubs and dense riparian vegetation begin at and only growing above OHWM.

Additional observations or notes

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes No If no, explain why not: _____

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
	see report

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Project ID #: PC01	Site Name: Coyote Creek	Date and Time: 10/19/23, 13:30 pm
Location (lat/long): see table in report	Investigator(s): K. Smith, D. Barry	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- [ ] gage data
- [x] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [x] land use maps
- [x] aerial photos
- [x] topographic maps
- [ ] Other: _____

Describe land use and flow conditions from online resources. Were there any recent extreme events (floods or drought)?

Semi-natural channel with riparian corridor; however, constrained by development. Upstream dam regulates flow.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Shape of channel mostly linear. Erosion below OHWM. Dense veg cover at and above OHWM. Several transient camps along channel above OHWM. Bridge a San Antonio - accumulated trash. Steep slopes. ~25 ft wide.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** a
  - [x] *on the bank:* x
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other: _____
- [x] **Shelving:** a
  - [x] *shelf at top of bank:* a
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [x] *other berms:* camps
- [x] **Channel bar:** a
  - [x] *shelving (berms) on bar:* x
  - [x] *unvegetated:* b
  - [x] *vegetation transition (go to veg. indicators)* x
  - *sediment transition (go to sed. indicators)*
  - *upper limit of deposition on bar:*

Instream bedforms and other bedload transport evidence:

deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)
bedforms (e.g., pools, riffles, steps, etc.):
erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)

Secondary channels:

Sediment indicators

- **Soil development:**
- **Changes in character of soil:**
- [x] **Mudcracks:** b
- **Changes in particle-sized distribution:**
  - *transition from* _____ to _____
  - *upper limit of sand-sized particles*
  - *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x

Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***

- [x] *vegetation absent to:* forbs
- *moss to:*
- [x] *forbs to:* deciduous trees
- *graminoids to:*
- *woody shrubs to:*
- [x] *deciduous trees to:* woody shrubs
- *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [x] **Exposed roots below intact soil layer:** x

Ancillary indicators

- [x] **Wracking/presence of organic litter:** x
- **Presence of large wood:**
- [x] **Leaf litter disturbed or washed away:** x
- **Water staining:**
- **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Some trees rooted below OHWM, but mostly above. Exposed roots. Species include arroyo willow, cottonwood, Northern California black walnut, box elder, and tree of heaven.

Project ID #: PC01

Step 4 Is additional information needed to support this determination? Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Narrow channel with steep banks, with some narrow terraces above OHWM. OHWM distinct based on combination of OHWM indicators listed above including shelving, exposed roots, sediment deposition and wracking. Shrubs and dense riparian vegetation begin at and only growing above OHWM.

Additional observations or notes

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes No If no, explain why not: _____

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
	see report

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Project ID #: PC01	Site Name: Coyote Creek	Date and Time: 10/19/23, 07:30 am
Location (lat/long): see table in report	Investigator(s): K. Smith, D. Barry	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- [ ] gage data
- [x] LiDAR
- [ ] geologic maps
- [ ] climatic data
- [ ] satellite imagery
- [x] land use maps
- [x] aerial photos
- [x] topographic maps
- [ ] Other: _____

Describe land use and flow conditions from online resources. Were there any recent extreme events (floods or drought)?

Semi-natural channel with riparian corridor; however, constrained by development. Upstream dam regulates flow. Anthropogenic disturbance.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Slow current, flows north. Large debris - vegetation and trash obstructing flow. Terraforming of slopes at OHWM from transient camps. Bridge at Williams. Width ~15 ft, water depth ~2 ft.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** a
  - [x] *on the bank:* x
  - [ ] *undercut bank:*
  - [ ] *valley bottom:*
  - [ ] Other: _____
- [x] **Shelving:** x
  - [x] *shelf at top of bank:* a
  - [ ] *natural levee:*
  - [ ] *man-made berms or levees:*
  - [x] *other berms:* terraforming
- [x] **Channel bar:** b
  - [x] *shelving (berms) on bar:* x
  - [x] *unvegetated:* b
  - [x] *vegetation transition (go to veg. indicators)* b
  - *sediment transition (go to sed. indicators)*
  - *upper limit of deposition on bar:*

Instream bedforms and other bedload transport evidence:

deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)
bedforms (e.g., pools, riffles, steps, etc.):
erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)

Secondary channels:

Sediment indicators

Soil development:

Changes in character of soil:

- [x] **Mudcracks:** b

Changes in particle-sized distribution:

transition from _____ to _____

upper limit of sand-sized particles

silt deposits:

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x

Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***

- [x] *vegetation absent to:* forbs
- *moss to:*
- [x] *forbs to:* deciduous trees
- *graminoids to:*
- *woody shrubs to:*
- [x] *deciduous trees to:* woody shrubs
- *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [x] **Exposed roots below intact soil layer:** x

Ancillary indicators

- [x] **Wracking/presence of organic litter:** x
- [x] **Presence of large wood:** b
- [x] **Leaf litter disturbed or washed away:** x

Water staining:

Weathered clasts or bedrock:

Other observed indicators? Describe:

Some trees rooted below OHWM, but mostly above. Exposed roots. Species include red willow, cottonwood, box elder, and tbuckeye.

Project ID #: PC01

Step 4 Is additional information needed to support this determination? Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Narrow channel with steep banks, with some narrow terraces above OHWM. OHWM distinct based on combination of OHWM indicators listed above including shelving, exposed roots, sediment deposition and wracking. Shrubs and dense riparian vegetation begin at and only growing above OHWM.

Additional observations or notes

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes No If no, explain why not: _____

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
	see report

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Project ID #: PC01	Site Name: Coyote Creek	Date and Time: 10/19/23, 13:00 pm
Location (lat/long): see table in report	Investigator(s): K. Smith, D. Barry	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- gage data
- [x] LiDAR
- geologic maps
- climatic data
- satellite imagery
- [x] land use maps
- [x] aerial photos
- [x] topographic maps
- Other: _____

Describe land use and flow conditions from online resources. Were there any recent extreme events (floods or drought)?

Semi-natural channel with riparian corridor; however, constrained by development. Upstream dam regulates flow. Residential area.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Shape linear to sinuous. Erosion along banks form camps. Steep slopes and exposed roots indicate incising on east bank. Large debris (trash) obstructing flow. Fallen tree from winter storms. Width ~ 20ft, water depth ~ 2ft.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [x] **Break in slope:** b
  - [x] *on the bank:* x
  - *undercut bank:*
  - *valley bottom:*
  - Other: _____
- [x] **Shelving:** a
  - *shelf at top of bank:*
  - *natural levee:*
  - *man-made berms or levees:*
  - [x] *other berms:* terraforming
- [x] **Channel bar:** b
  - [x] *shelving (berms) on bar:* b
  - [x] *unvegetated:* b
  - [x] *vegetation transition (go to veg. indicators)* b
  - *sediment transition (go to sed. indicators)*
  - *upper limit of deposition on bar:*

Instream bedforms and other bedload transport evidence:

- *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
- *bedforms (e.g., pools, riffles, steps, etc.):*
- *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*

Secondary channels:

Sediment indicators

- **Soil development:**
- **Changes in character of soil:**
- **Mudcracks:**
- **Changes in particle-sized distribution:**
  - *transition from* _____ to _____
  - *upper limit of sand-sized particles*
  - *silt deposits:*

Vegetation Indicators

- [x] **Change in vegetation type and/or density:** x

  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***

  - [x] *vegetation absent to:* forbs
  - *moss to:*
  - [x] *forbs to:* deciduous trees
  - *graminoids to:*
  - *woody shrubs to:*
  - [x] *deciduous trees to:* woody shrubs
  - *coniferous trees to:*
- [x] **Vegetation matted down and/or bent:** x
- [x] **Exposed roots below intact soil layer:** x

Ancillary indicators

- [x] **Wracking/presence of organic litter:** x
- **Presence of large wood:**
- [x] **Leaf litter disturbed or washed away:** x
- **Water staining:**
- **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Less riparian trees, more shrubby with blackberry and herbaceous vegetation. Some willow and cottonwood.

Project ID #: PC01

Step 4 Is additional information needed to support this determination? Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Narrow channel with steep banks, with some narrow terraces above OHWM. OHWM distinct based on combination of OHWM indicators listed above including shelving, exposed roots, sediment deposition and wracking. Shrubs and dense riparian vegetation begin at and only growing above OHWM.

Additional observations or notes

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes No If no, explain why not: _____

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
	see report

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AGENCY DISCLOSURE NOTICE

The public reporting burden for this collection of information, 0710-OHWM, is estimated to average 30 **minutes** per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

Project ID #: PC02	Site Name: Coyote Creek (Silver Creek)	Date and Time: 10/18/23, 13:00 pm
Location (lat/long): see table in report	Investigator(s): K. Smith, D. Barry	

Step 1 Site overview from remote and online resources

Check boxes for online resources used to evaluate site:

- gage data
- [X] LiDAR
- geologic maps
- climatic data
- satellite imagery
- [X] land use maps
- [X] aerial photos
- [X] topographic maps
- Other: _____

Describe land use and flow conditions from online resources. Were there any recent extreme events (floods or drought)?

Semi-natural channel; however, constrained by development. Less riparian vegetation than Coyote Creek. Annual grassland banks.

Step 2 Site conditions during field assessment. First look for changes in channel shape, depositional and erosional features, and changes in vegetation and sediment type, size, density, and distribution. Make note of natural or man-made disturbances that would affect flow and channel form, such as bridges, riprap, landslides, rockfalls etc.

Channel mostly linear. Erosional areas at OHWM. Terraforming by camps. Large trash occluding flow. Areas upstream concrete lined. width approximately 20 ft, depth of water approx 2 ft.

Step 3 Check the boxes next to the indicators used to identify the location of the OHWM.

OHWM is at a transition point, therefore some indicators that are used to determine location may be just below and above the OHWM. From the drop-down menu next to each indicator, select the appropriate location of the indicator by selecting either just below `b', at `x', or just above `a' the OHWM.

Go to page 2 to describe overall rationale for location of OHWM, write any additional observations, and to attach a photo log.

Geomorphic indicators

- [X] **Break in slope:** b
  - *on the bank:*
  - *undercut bank:*
  - *valley bottom:*
  - Other: _____
- [X] **Shelving:** x
  - *shelf at top of bank:*
  - *natural levee:*
  - *man-made berms or levees:*
  - [X] *other berms:* terraforming
- **Channel bar:**
  - *shelving (berms) on bar:*
  - [X] *unvegetated:* x
  - [X] *vegetation transition (go to veg. indicators)* x
  - *sediment transition (go to sed. indicators)*
  - *upper limit of deposition on bar:*
- **Instream bedforms and other bedload transport evidence:**
  - *deposition bedload indicators (e.g., imbricated clasts, gravel sheets, etc.)*
  - *bedforms (e.g., pools, riffles, steps, etc.):*
  - *erosional bedload indicators (e.g., obstacle marks, scour, smoothing, etc.)*
- **Secondary channels:**

Sediment indicators

- **Soil development:**
- **Changes in character of soil:**
- **Mudcracks:**
- **Changes in particle-sized distribution:**
  - *transition from* _____ to _____
  - *upper limit of sand-sized particles*
  - *silt deposits:*

Vegetation Indicators

- [X] **Change in vegetation type and/or density:** x

  Check the appropriate boxes and select the general vegetation change *(e.g., graminoids to woody shrubs).* ***Describe the vegetation transition looking from the middle of the channel, up the banks, and into the floodplain.***

  - [X] *vegetation absent to:* forbs
  - *moss to:*
  - [X] *forbs to:* graminoids
  - [X] *graminoids to:* woody shrubs
  - *woody shrubs to:*
  - *deciduous trees to:*
  - *coniferous trees to:*
- **Vegetation matted down and/or bent:**
- **Exposed roots below intact soil layer:**

Ancillary indicators

- [X] **Wracking/presence of organic litter:** x
- **Presence of large wood:**
- [X] **Leaf litter disturbed or washed away:** x
- **Water staining:**
- **Weathered clasts or bedrock:**

Other observed indicators? Describe:

Project ID #: PC02

Step 4 Is additional information needed to support this determination? Yes ☒ No If yes, describe and attach information to datasheet:

Step 5 Describe rationale for location of OHWM

Narrow channel with steep banks. OHWM distinct based on combination of OHWM indicators listed above including shelving, sediment deposition, water staining, and wracking.

Additional observations or notes

Attach a photo log of the site. Use the table below, or attach separately.

Photo log attached? ☒ Yes No If no, explain why not: _____

List photographs and include descriptions in the table below.

Number photographs in the order that they are taken. Attach photographs and include annotations of features.

Photo Number	Photograph description
	see report

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Coyote Creek City/County: San Jose/Santa Clara Sampling Date: 02/29/2024

Applicant/Owner: Valley Water State: CA Sampling Point: SP01

Investigator(s): S.Roy Section, Township, Range: S30, 06S, 01E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR): C Lat: See Map Long: See Map Datum: NAD 83

Soil Map Unit Name: 169- Urbanland-Elder complex, 0 to 2% slopes, protected NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

See notes on vegetation - discussion around hydrophytic vegetation. Low topography area within stockpiling area. Piles of rock and vegetated mounds present throughout sample area. Sample point is contained within cobble access road that is highly disturbed. Ponding is present during survey. Seasonal wetland in spoils area.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Festuca perennis	15	Yes	FAC
2. Erigeron sp.	10	Yes	UPL
3. Xanthium strumarium	5	No	FAC
4. Rumex crispus	5	No	FAC
5. Cyperus eragrostis	2	No	FACW
6. see notes regarding other wetland species			
7.			
8.			
	37	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 63 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	2	x 2 =	4
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	37 (A)		129 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤ 3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

✓ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

Plants difficult to ID due to season and heavy ponding - earlier surveys in 2023 identified more Lythrum hyssopifolia and Cyperus eragrostis, both wetland species. Not as visible during 2024 due to ponding and dieback, but presence of these species would tip vegetation hydrophytic. Area mostly unvegetated during 2024 survey due to ponding. Erigeron (UPL) species visible in 2024 because of remnant tall inflorescence - likely bias towards UPL (especially in dominance test). Other species not present, instead unvegetated/mud. Significant algae matting present. Frog observed within pond. Area is highly disturbed. Because of earlier season notes (also out of growing season) it is assumed vegetation would be hydrophytic if observed during high growing season.

SOIL

Sampling Point: SP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5YR 3/1	75	5Y 4/1	25	D	M	Sandy Loam	small roots present throughout
2-7	2.5YR 3/1	85	10YR 4/6	15	C	M	Sandy Loam	
7-8	2.5YR 3/2	85	2.5Y 5/6	15	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock or cement

Depth (inches): 8in

Hydric Soil Present? Yes ✓ No ___

Remarks:

Sample taken in topographically low area. Soil was wet with large cobbles/rocks present throughout profile. Restrictive layer present, which is likely cause for ponding.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ✓ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ✓ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 2in

Water Table Present? Yes ✓ No ___ Depth (inches): 2in

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 2in

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerial imagery indicates ponding has occurred regularly over past decade (Feb-April months)

Remarks:

Ponding present with frog and invertebrates (shells) present during survey. Algae mat present at top inch of sample with moss present at fringe of ponded area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Coyote Creek City/County: San Jose/Santa Clara Sampling Date: 02/29/2024

Applicant/Owner: Valley Water State: CA Sampling Point: SP02

Investigator(s): S.Roy Section, Township, Range: S30, 06S, 01E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): convex Slope (%): 0-1

Subregion (LRR): C Lat: See Map Long: See Map Datum: NAD 83

Soil Map Unit Name: 169- Urbanland-Elder complex, 0 to 2% slopes, protected NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Adjacent from stockpile mounds, within disturbed grassy area. Topographically flat. Large boulders to cobbles mixed within area. Paired upland point with SP01 (seasonal wetland).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Festuca perennis	93	Yes	FAC
2. Erigeron sp.	5	No	UPL
3. Malva sp.	1	No	UPL
4. Vicia sp.	1	No	UPL
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	93	x 3 =	279
FACU species	0	x 4 =	0
UPL species	7	x 5 =	35
Column Totals:	100 (A)		314 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Dominance test passes; however, only because FAC dominance. All other species present are UPL. Therefore, not hydrophytic. Area is highly disturbed. Rock and vegetated stockpiles are present throughout area. Upland indicator status assumed for Malva and Vicia since the majority of the genus' indicator status is upland.

SOIL

Sampling Point: SP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	98	7.5YR 4/6	2	C	M	Clay Loam	small roots present throughout

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock or cement

Depth (inches): 8in

Hydric Soil Present? Yes _____ No ✓

Remarks:

Redox minor and is only near rocks/cobbles that are present within profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Coyote Creek City/County: San Jose/Santa Clara Sampling Date: 02/29/2024

Applicant/Owner: Valley Water State: CA Sampling Point: SP03

Investigator(s): S.Roy Section, Township, Range: S30, 06S, 01E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): 0-1

Subregion (LRR): C Lat: See Map Long: See Map Datum: NAD 83

Soil Map Unit Name: 171- Elder fine sandy loam, 0 to 2% slopes, rarely flooded NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Forested floodplain adjacent to Coyote Creek. Steep slope from upland staging area down to lowland terrace where forested wetland occurs. Stream and ponding present at terrace during survey. Encampments present. Access limited.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix laevigata	25	Yes	FACW
2. Populus fremontii	15	Yes	FAC
3. Salic babylonica	5	No	FAC
4.			
	45	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Unk grass - likely Festuca perennis	55	Yes	FAC
2. Rumex crispus	15	No	FAC
3. Persicaria sp.	5	No	FACW
4. Cyperus sp.	5	No	FACW
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. Rubus ursinus	5	Yes	FAC
2.			
	5	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	95	x 3 =	285
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	130 (A)		355 (B)

Prevalence Index = B/A = 2.7

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is <3.0[1]

— Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

— Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

Vegetation is matted down, standing water present at terrace. Low connection to Coyote Creek is present farther down study area near Charcot Avenue.

SOIL

Sampling Point: SP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
								Unable to access

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ **No** _____

Remarks:

Unable to access terrace due to safety. Soils are presumed hydric due to other strong indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ✓ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ✓ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ✓ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): _____

Water Table Present? Yes ✓ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerial imagery indicates area inundates during wet season (Feb-April months)

Remarks:

Indicators of hydrology present. Unable to access surface water to gauge depth.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Coyote Creek City/County: San Jose/Santa Clara Sampling Date: 02/29/2024

Applicant/Owner: Valley Water State: CA Sampling Point: SP04

Investigator(s): S.Roy Section, Township, Range: S30, 06S, 01E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): 0-1

Subregion (LRR): C Lat: See Map Long: See Map Datum: NAD 83

Soil Map Unit Name: 171- Elder fine sandy loam, 0 to 2% slopes, rarely flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Paired upland point for SP03 (forested wetland). Taken on top of bank from slope, adjacent to lowland terrace.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus fremontii	5	Yes	FAC
2. Acer macrophyllum	2	Yes	FAC
3.			
4.			
	7	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5')			
1. Toxicodendron diversilobum	5	Yes	FACU
2.			
3.			
4.			
5.			
	5	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Festuca perennis	75	Yes	FAC
2. Sorghum halepense	10	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	85	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. Rubus ursinus	10	Yes	FAC
2. Hedera helix	5	Yes	FACU
	5	= Total Cover	

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	92	x 3 =	276
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	112 (A)		356 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is <3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Dominance test passes; however, only because FAC dominance. All other species present are FACU. Therefore, not hydrophytic. Dead trees present near sample point. Human disturbance is present. Sample point is adjacent to gravel access road.

SOIL

Sampling Point: SP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					Clay	no redox

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

No hydric soil indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators of hydrology observed.

Appendix C. Photo Log

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PH-001 East. Northern end of survey area (Reach 4) looking into Coyote Creek channel. One of the most open sections of channel in survey area.



PH-001 North. Northern end of survey area looking towards Montague Expressway.



PH-001 South. Northern end of survey area looking down trail bordering Coyote Creek.



PH-001 West. Northern end of survey area looking towards adjacent urban development.



PH-103 North. Forested floodplain wetland (W02a) east of I-880 in Reach 4. Water present.



PH-103 Northeast. Forested floodplain wetland (W02a). Water present.



PH-101 West. Stockpile area east of I-880 in Reach 4. Seasonal wetland (W01) to the left.



PH-101. Seasonal wetland (W01) soil pit.



PH-101 North. Stockpile area. Road adjacent to seasonal wetland. Riparian corridor along Coyote Creek in the background.



PH-101 North. Seasonal wetland (W01) in stockpile area. Highly disturbed.



PH-026 West. Open upland area north of Berryessa Road in Reach 5.



PH-026 North. Parking lot adjacent to open upland area representative of urban – suburban cover



PH-026 East. Open upland area. Riparian along Coyote Creek in the background.



PH-026 West. Open upland area. Riparian along Coyote Creek in the background



PH-025 North. Example of urban uplands adjacent to Coyote Creek riparian corridor (to the left) in Reach 5.



PH-025 East. Example of urban uplands adjacent to Coyote Creek riparian corridor.



PH-025 South. Access road along top of bank adjacent to Coyote Creek (to the right).



PH-025 West. Riparian woodland along Coyote Creek.



PH-030 South. Coyote Creek with riparian corridor Reach 6. Steep banks evident.



PH-030 West. Coyote Creek upper banks (above OHWM).



PH-030 North. Riparian woodland along Coyote Creek.



PH-030 East. Coyote Creek with clear OHWM scour, vegetation shift, and wracking, on opposite bank.



PH-043 North. Coyote Creek upper banks below Highway 101 in Reach 6.



PH-043 East. Coyote Creek upper banks.



PH-043 South. Encampments along Coyote Creek upper banks.



PH-043 West. Coyote Creek upper banks. Looking toward creek.



PH-035 North. Urban park area in Reach 6.



PH-035 Representative of urban park land cover type.



PH-035 South. Urban park.



PH-035 West. Urban park. With housing development beyond.



PH-059 South. Confluence of Coyote and Lower Silver creeks in Reach 6.



PH-059 East. Looking upstream Lower Silver Creek near confluence with Coyote Creek.



PH-059 West. Coyote Creek near confluence with Lower Silver Creek.



PH-059 North. Coyote Creek near confluence with Lower Silver Creek.



PH-054 North. Lined portion of Lower Silver Creek. OHWM at center where deposition line present (red line).



PH-054 East. Lined portion of Lower Silver Creek. Looking upstream. Vegetation established in channel.



PH-054 South. Lined portion of Lower Silver Creek. Looking upstream. Vegetation established in channel.



PH-054 West. Looking downstream Lower Silver Creek where channel is not concrete lined, but still channelized.



PH-055 South. Riparian corridor along Coyote Creek in Reach 6.



PH-055 West. Upland riparian corridor along Coyote Creek.



PH-055 North. Coyote Creek and riparian corridor.



PH-055 East. Coyote Creek and riparian corridor.



PH-093 North. Coyote Creek channel in Reach 6.



PH-093 East. Coyote Creek channel. Clear OHWM scour on opposite bank. Steep banks representative of much of survey area.



PH-093 South. Coyote Creek channel.



PH-093 West. Coyote Creek banks. OHWM line in middle of photo above soil cracking.



PH-100 South. Coyote Creek channel in Reach 6.



PH-100 West. Uplands along Coyote Creek channel.



PH-100 North. Coyote Creek channel.



PH-100 East. Coyote Creek channel. Approximate OHWM line drawn in.



PH-097 North. Coyote Creek channel in Reach 7.



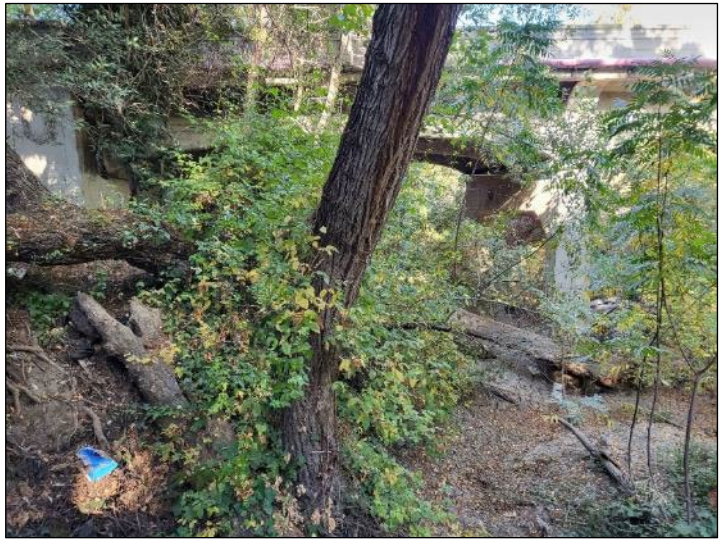
PH-097 East. Coyote Creek channel. OHWM aligns with scour – hard to see with overhanging vegetation.



PH-097 South. Coyote Creek channel.



PH-097 West. Steep banks along Coyote Creek channel.



PH-087 West. Riparian area along Coyote Creek channel in Reach 7.



PH-087 North. Riparian area looking towards Coyote Creek channel.



PH-087 East. Riparian area along Coyote Creek channel.



PH-087 South. Riparian area along Coyote Creek channel.



PH-084 South. Riparian area along Coyote Creek channel in Reach 7.



PH-084 West. Riparian area along Coyote Creek channel.



PH-084 North. Riparian area along Coyote Creek channel.



PH-084 East. Coyote Creek. OHWM difficult to see with dense vegetation.



PH-083 North. Steep banks of Coyote Creek in Reach 7.



PH-065 West. Coyote Creek in Reach 8. OHWM aligns with scour and vegetation shift.



PH-065 South. Coyote Creek.



PH-065 East. Banks of Coyote Creek



PH-065 North. Coyote Creek



PH-071 North. Coyote Creek in Reach 8.



PH-071 East. Coyote Creek



PH-071 South. Coyote Creek



PH-071 West. Coyote Creek at outlet of ephemeral channel.



PH-068 North. Southernmost survey area. Coyote Creek.



PH-068 East. Southernmost survey area. Coyote Creek.



PH-068 South. Southernmost survey area. Coyote Creek.



PH-068 West. Southernmost survey area. Coyote Creek.

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Feet

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Coyote Creek Flood Protection Project
Santa Clara County, California

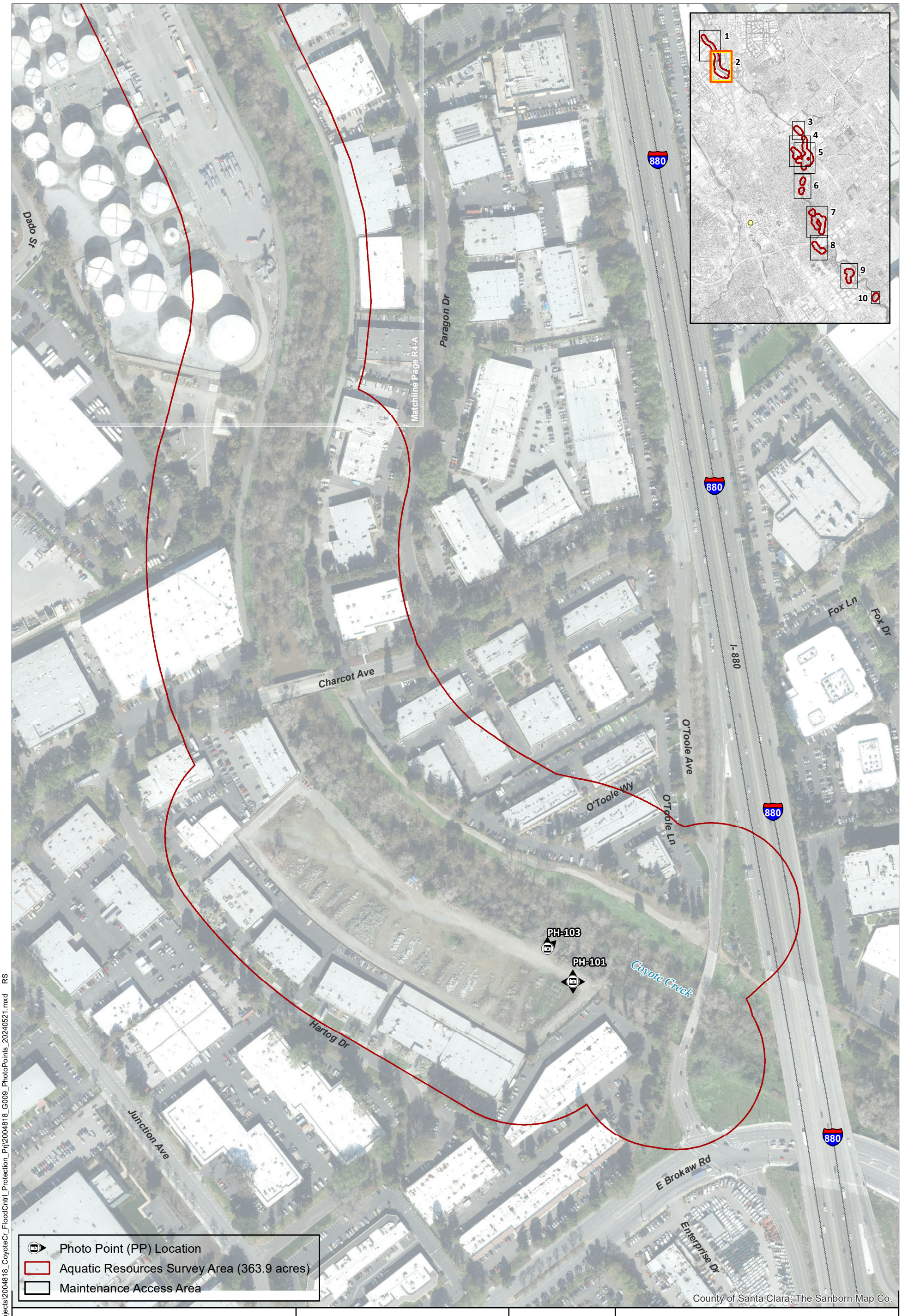
Santa Clara Valley Water District

GEI Consultants

PHOTO POINTS
(SHEET 1 OF 10)

MAY 2024 **DRAFT** APPENDIX C

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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

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PHOTO POINTS
(SHEET 2 OF 10)

MAY 2024 **DRAFT** APPENDIX C

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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

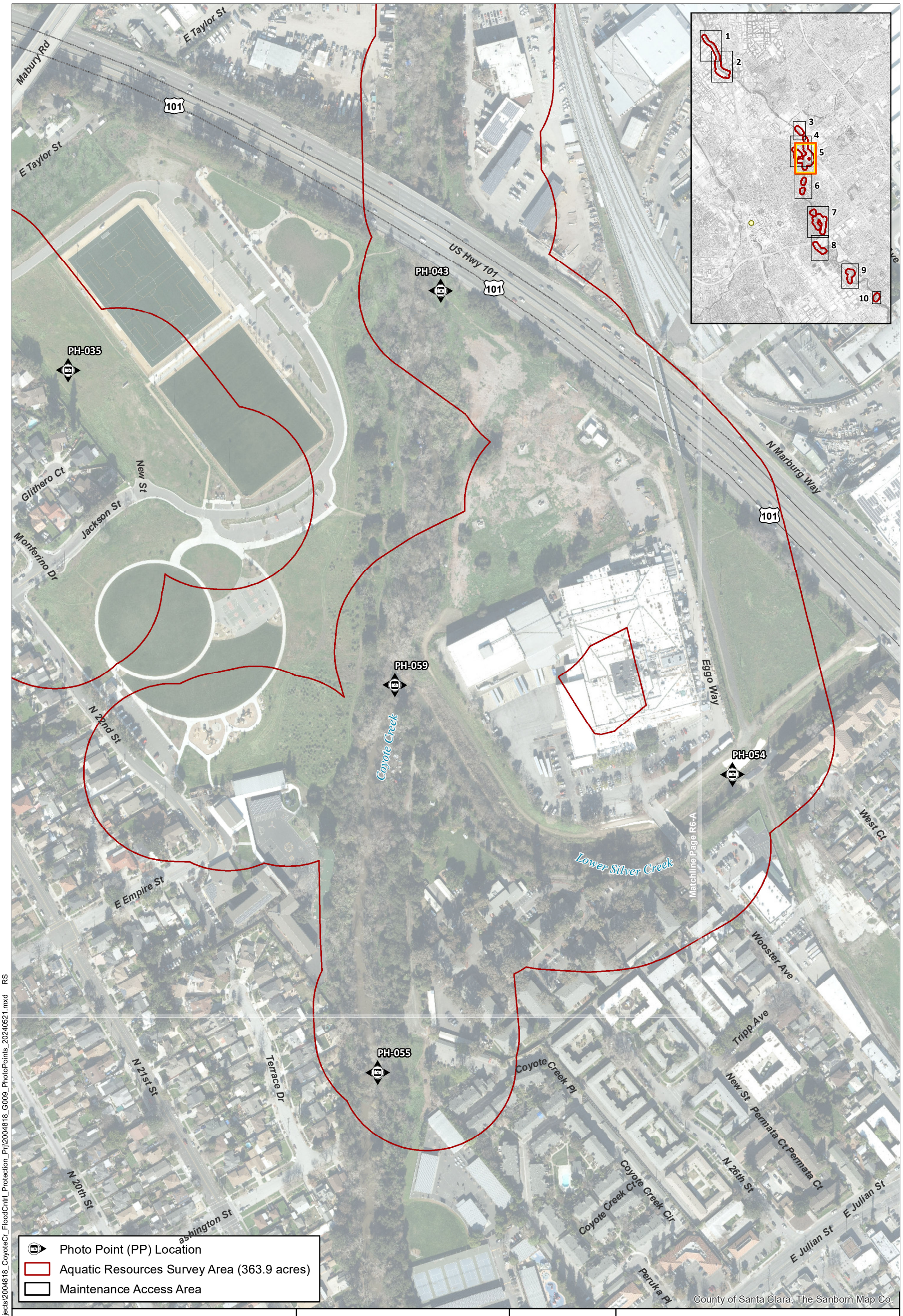
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PHOTO POINTS
(SHEET 3 OF 10)

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10
101
Matchline Page R5-A
Matchline Page R6-B
Mabury Rd
Coyote Creek
New St
E Taylor St
Nicora Ave
PH-030
N 23rd St
US Hwy 101
PH-043
N Marburg Way
Houghton Ct
PH-035
Calumet Ct
Monterino Dr
Glithero Ct
New St
Jackson St
Eggo Way
PH-059
N 22nd St
N 21st St
N 20th St
Wooster Ave
Lower Silver Creek
Empire St
Terrace Dr
Photo Point (PP) Location
Aquatic Resources Survey Area (363.9 acres)
Maintenance Access Area
County of Santa Clara; The Sanborn Map Co.
250 125 0 250
Feet
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Coyote Creek Flood Protection Project
Santa Clara County, California
Santa Clara Valley Water District
GEI Consultants
PHOTO POINTS
(SHEET 4 OF 10)
MAY 2024
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(SHEET 5 OF 10)

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Coyote Creek Flood Protection Project
Santa Clara County, California

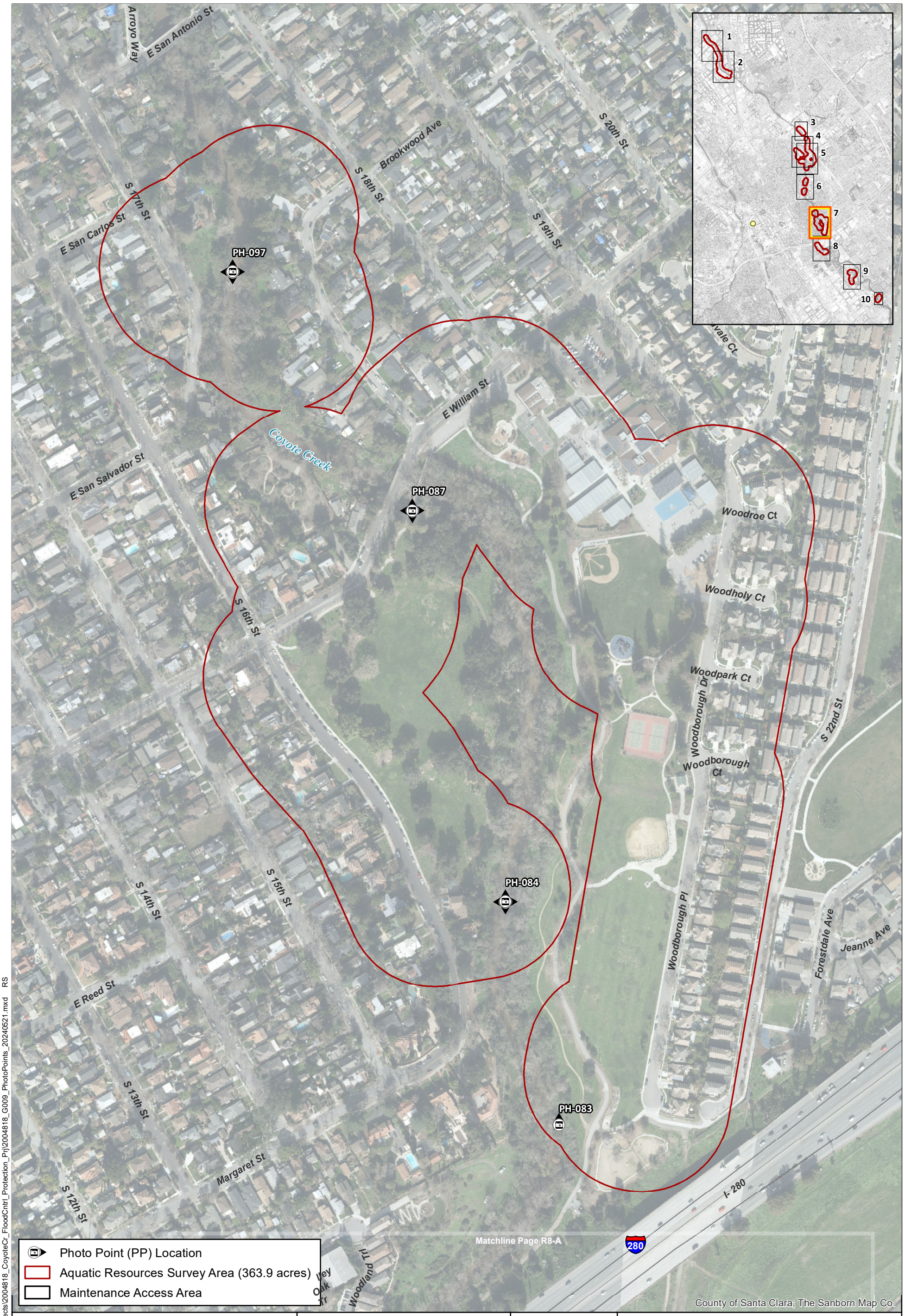
Santa Clara Valley Water District

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PHOTO POINTS
(SHEET 6 OF 10)

MAY 2024 **DRAFT** APPENDIX C

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PHOTO POINTS
(SHEET 7 OF 10)

MAY 2024 **DRAFT** APPENDIX C

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Santa Clara County, California

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PHOTO POINTS
(SHEET 8 OF 10)

MAY 2024 **DRAFT** APPENDIX C

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Coyote Creek Flood Protection Project
Santa Clara County, California

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PHOTO POINTS
(SHEET 9 OF 10)

MAY 2024 **DRAFT** APPENDIX C

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Feet

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Santa Clara County, California

Santa Clara Valley Water District

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PHOTO POINTS
(SHEET 10 OF 10)

MAY 2024 **DRAFT** APPENDIX C

21-May-2024 Z:\Projects\2004818_CoyoteCr_FloodCntrl_Protection_Prj\2004818_G009_PhotoPoints_20240521.mxd RS

Appendix D. Climate Analysis for Wetlands (WETS) Table

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WETS Table

WETS Station: SAN JOSE, CA								
Requested years: 2000 - 2024								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	60.2	42.3	51.2	2.30	0.90	2.70	5	-
Feb	62.7	43.6	53.2	2.33	0.91	2.73	5	-
Mar	66.0	46.0	56.0	1.85	0.91	2.26	5	-
Apr	69.2	48.4	58.8	0.97	0.36	1.17	3	-
May	73.9	52.5	63.2	0.28	0.00	0.28	1	-
Jun	79.1	56.2	67.6	0.10	0.00	0.05	0	-
Jul	80.9	58.3	69.6	0.00	0.00	0.00	0	-
Aug	81.2	59.1	70.1	0.00	0.00	0.00	0	-
Sep	81.0	57.7	69.3	0.10	0.00	0.08	0	-
Oct	75.6	53.2	64.4	0.61	0.11	0.54	1	-
Nov	66.5	46.0	56.2	1.16	0.63	1.42	3	-
Dec	59.8	42.5	51.1	2.50	1.01	3.04	6	-
Annual:					9.63	13.76		
Average	71.4	50.5	60.9	-	-	-	-	-
Total	-	-	-	12.20			30	-

GROWING SEASON DATES

Years with missing data:	24 deg = 1	28 deg = 1	32 deg = 2
Years with no occurrence:	24 deg = 24	28 deg = 23	32 deg = 8
Data years used:	24 deg = 24	28 deg = 24	32 deg = 23
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	No occurrence	No occurrence	12/26 to 1/8: 378 days
70 percent *	No occurrence	No occurrence	No occurrence
* Percent chance of the growing season occurring between the Beginning and Ending dates.			

STATS TABLE - total precipitation (inches)

Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1897	1.68	3.43	2.64	0.91	0.16	0.42	0.00	0.00		1.01	0.37		10.62
1898	0.93	1.93	0.52	0.20	0.44	0.01	0.00	0.00	1.13	0.61	0.45		6.22
1899	1.78	0.21	4.17	0.48	0.65	0.05	0.00	0.00	0.00	3.26	2.70		13.30
1900	2.05	0.44	1.36	1.66	0.96	0.02	0.02	0.00	0.17		4.36		11.04
1901	3.98	5.47	0.75	2.37	0.82	T	0.00	T	0.44	1.00	1.06		15.89
1902	0.81	4.42	2.65	1.29	0.88	0.06	0.00	0.00	0.00	0.95	2.18		13.24
1903	2.74	1.27	4.99	0.84	0.00	T	0.00	0.00	0.00	0.12	0.99		10.95
1904	1.28	3.01	2.73	1.74	0.26	0.01	0.00	0.25	1.94	1.43	1.20		13.85
1905	2.70	2.65	2.73	1.01	1.77	T	0.00	0.00	T	0.00	2.17		13.03
1906	2.86	2.31	4.47			0.00	0.00	0.00	0.13	0.01	0.98		10.76

1907	4.61	1.88	7.75	0.46	0.08	0.42	T	0.00	0.06	0.98	0.13		16.37
1908	2.63	2.46	1.14	0.23	0.67	0.01	0.00	0.00	0.09	0.19	1.11		8.53
1909	7.69	4.87	2.77	0.00	0.00	0.05	0.00	0.00	0.75	0.72	1.27		18.12
1910	2.31	0.83	2.84	0.41	T	0.02	T	0.00	0.09	0.20	0.28		6.98
1911	12.38	2.03	6.26	0.45	0.21	0.07	0.00	0.00	0.00	0.81	0.18	2.03	24.42
1912	1.36	0.30	2.80	1.95	0.70	0.46	T	0.00	0.71	0.21	0.29	0.43	9.21
1913	2.29	0.09	1.17	0.38	0.77	0.01	0.09	0.08	T	0.02	4.10	3.00	12.00
1914	6.23	3.94	0.90	0.65	0.19	0.25	0.00	0.00	0.00	0.50	1.36	3.73	17.75
1915	4.85	7.02	1.49	1.07	2.69	0.00	0.00	0.04	0.00	0.00	0.19	4.37	21.72
1916	8.71	1.83	1.10	0.06	0.01	T	T	0.01	0.78	0.84	0.41	3.48	17.23
1917	0.98	4.88	0.77	0.26	0.22	0.00	T	0.00	0.01	0.00	0.54	0.55	8.21
1918	0.70	2.63	4.48	0.45	T	0.00	0.00	0.00	6.33	0.15	2.24	1.28	18.26
1919	1.06	4.87	2.87	0.06	0.01	T	T	0.01	0.25	0.28	0.09	2.48	11.98
1920	0.10	1.04	3.43	0.92	T	0.21	0.00	0.00	0.02	1.71	1.84	3.58	12.85
1921	4.75	1.10	0.80	0.40	0.82	T	0.00	0.00	0.21	0.21	1.65	4.66	14.60
1922	2.46	3.01	1.74	0.32	0.50	0.01	T	T	0.00	1.55	2.72	4.68	16.99
1923	1.93	1.02	0.31	1.52	0.02	0.10	0.00	0.01	0.62	0.29	0.30	0.71	6.83
1924	1.70	0.62	1.87	0.38	0.05	0.00	0.00	T	T	1.72	1.25	1.92	9.51
1925	0.86	3.09	1.88	1.55	1.96	0.01	0.02	0.00	0.01	0.48	0.96	1.33	12.15
1926	3.11	5.35	0.12	2.88	0.21	0.00	0.00	T	0.00	0.31	3.44	1.17	16.59
1927	2.07	4.01	1.58	1.03	0.08	0.19	T	T	0.02	0.83	1.25	2.01	13.07
1928	0.98	1.78	2.12	0.96	0.15	0.01	0.00	0.00	0.00	0.01	2.47	2.40	10.88
1929	0.86	0.61	1.31	0.92	0.11	1.45	0.00	0.00	0.00	T	0.00	0.78	6.04
1930	3.49	1.86	2.93	0.76	1.01	T	0.00	0.01	0.05	0.23	0.73	0.49	11.56
1931													
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1998								M0.00	0.00	0.05	0.55	1.84	0.27	2.71
1999	2.77	2.60	1.63	1.45	0.02	0.08	0.00	0.06	0.05	0.06	1.13	0.45	10.30
2000	4.79	4.56	1.60	0.63	0.29	M0.26	0.04	0.01	0.10	2.14	0.45	0.27	15.14
2001	2.57	3.98	1.37	1.17	0.00	0.13	0.00	T	0.18	0.10	2.21	2.96	14.67

2002	0.69	0.77	1.55	0.41	0.44	0.00	0.00	0.00	0.00	T	1.84	6.37	12.07
2003	0.61	1.53	0.68	2.77	0.67	0.00	T	T	0.02	0.01	1.83	3.69	11.81
2004	1.51	2.92	0.35	0.27	0.07	0.00	0.00	0.00	0.06	1.89	0.44	3.11	10.62
2005	2.57	3.63	2.46	1.69	1.02	0.15	T	0.00	0.02	0.10	0.36	3.03	15.03
2006	2.35	1.56	4.55	2.14	0.45	T	T	0.00	0.00	0.31	1.04	1.54	13.94
2007	0.84	3.04	0.46	0.74	0.09	0.00	0.01	0.00	T	1.28	0.55	1.29	8.30
2008	5.60	1.81	0.15	0.03	0.00	0.00	0.00	T	T	0.19	1.05	1.53	10.36
2009	1.30	5.16	1.89	0.30	0.09	0.01	T	0.02	0.21	2.41	0.28	2.16	13.83
2010	4.58	2.12	2.05	2.99	0.35	0.00	0.00	T	T	0.25	1.76	3.05	17.15
2011	0.96	3.15	4.32	0.20	0.40	1.51	T	0.00	T	0.77	0.70	0.08	12.09
2012	0.90	0.67	1.98	1.88	T	0.15	0.00	0.00	0.01	0.35	2.58	4.24	12.76
2013	0.69	0.37	0.87	0.26	0.01	0.04	T	0.00	0.66	0.00	0.77	0.13	3.80
2014	0.12	2.65	1.35	0.64	T	0.01	T	T	0.36	0.62	1.57	7.74	15.06
2015	0.01	1.74	0.19	0.88	0.50	0.10	T	0.02	0.01	0.05	2.42	2.23	8.15
2016	4.09	0.31	3.96	1.53	0.32	0.00	0.00	T	T	1.56	1.31	1.51	14.59
2017	5.61	5.27	1.46	1.68	T	0.02	0.00	T	0.04	0.22	1.28	0.07	15.65
2018	3.20	0.40	2.71	1.23	T	0.00	T	0.00	0.00	0.03	1.92	1.53	11.02
2019	2.89	5.61	2.81	0.20	1.44	0.00	0.00	0.00	0.13	0.01	0.99	2.02	16.10
2020	0.80	0.00	2.06	1.20	0.13	T	0.00	0.01	0.00	0.00	0.13	0.84	5.17
2021	2.83	0.32	1.15	0.05	0.00	0.00	0.00	0.00	0.00	2.16	0.13	4.35	10.99
2022	T	0.01	0.35	0.29	MT	0.01	T	T	0.51	0.00	1.71	3.51	6.39
2023	3.52	2.02	4.02	0.11	0.44	0.09	0.00	T	0.08	0.11	0.56	2.76	13.71
2024	4.48	4.54											9.02

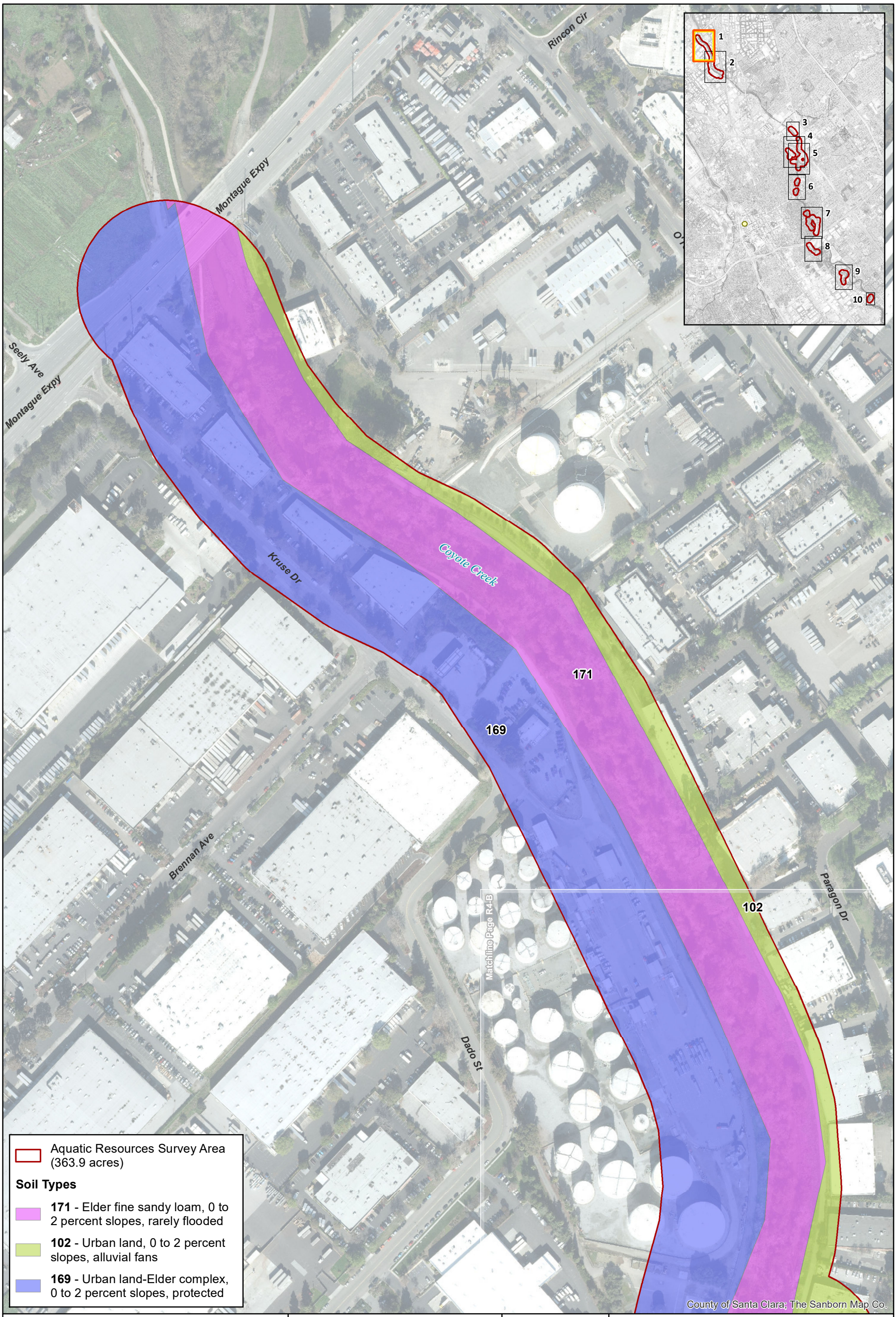
Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.

Data missing for all days in a month or year is blank.

Creation date: 2024-03-01

Appendix E. Soil Mapbook

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Coyote Creek Flood Protection Project
Santa Clara County, California

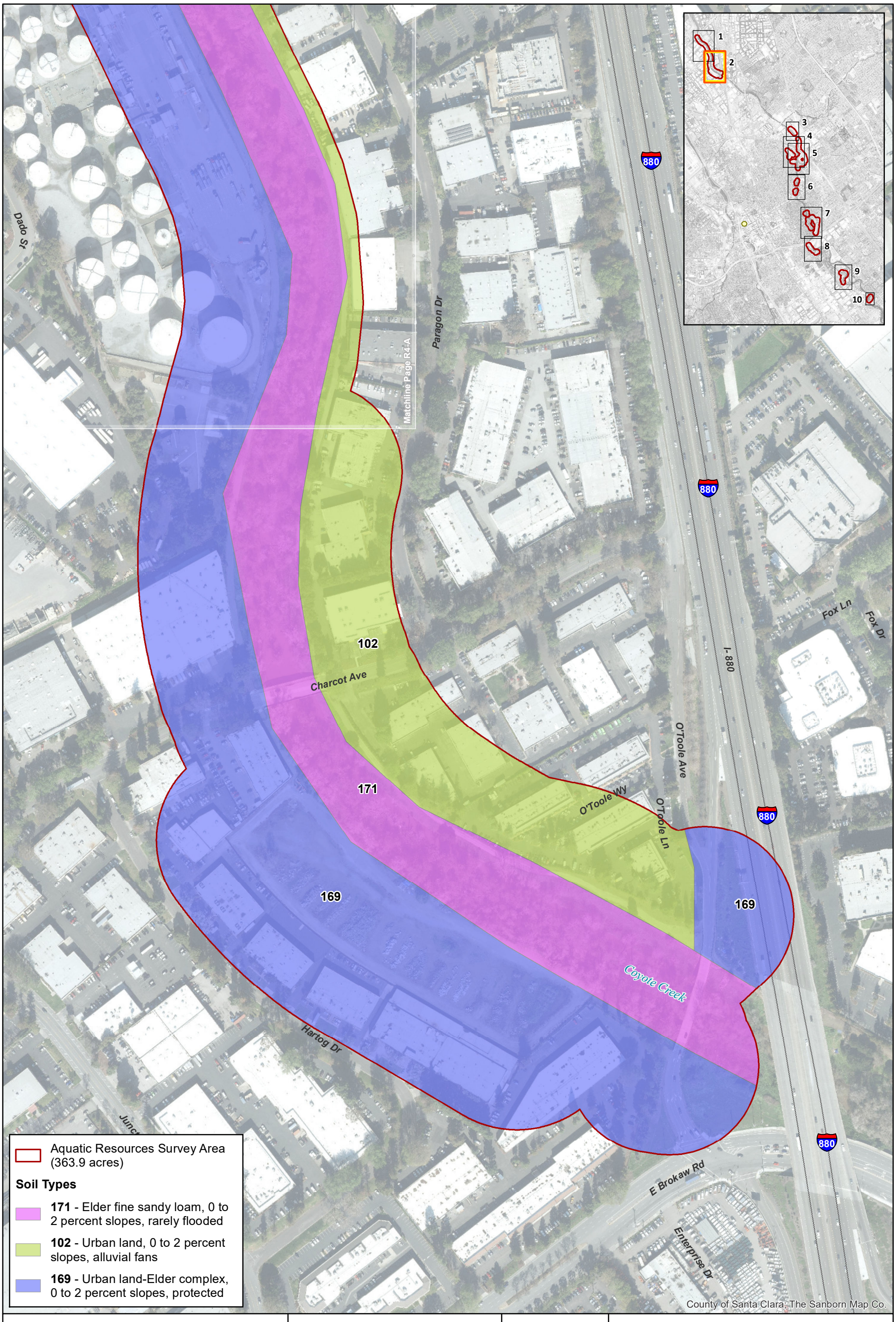
Santa Clara Valley Water District

GEI Consultants

SOILS
(SHEET 1 OF 10)

MAY 2024 DRAFT APPENDIX E

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Feet

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Coyote Creek Flood Protection Project
Santa Clara County, California

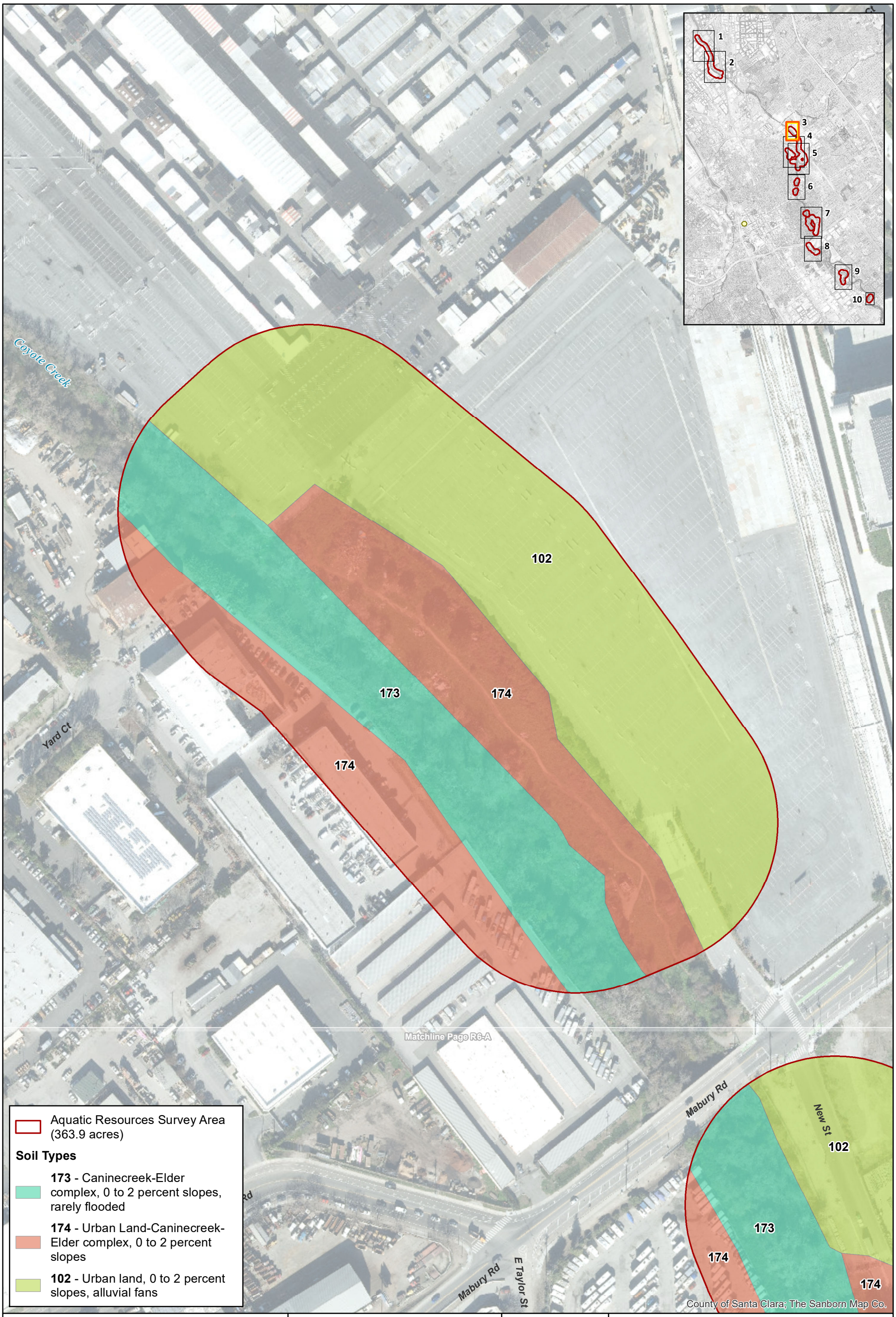
Santa Clara Valley Water District

GEI Consultants

SOILS
(SHEET 2 OF 10)

MAY 2024 DRAFT APPENDIX E

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Coyote Creek Flood Protection Project
Santa Clara County, California

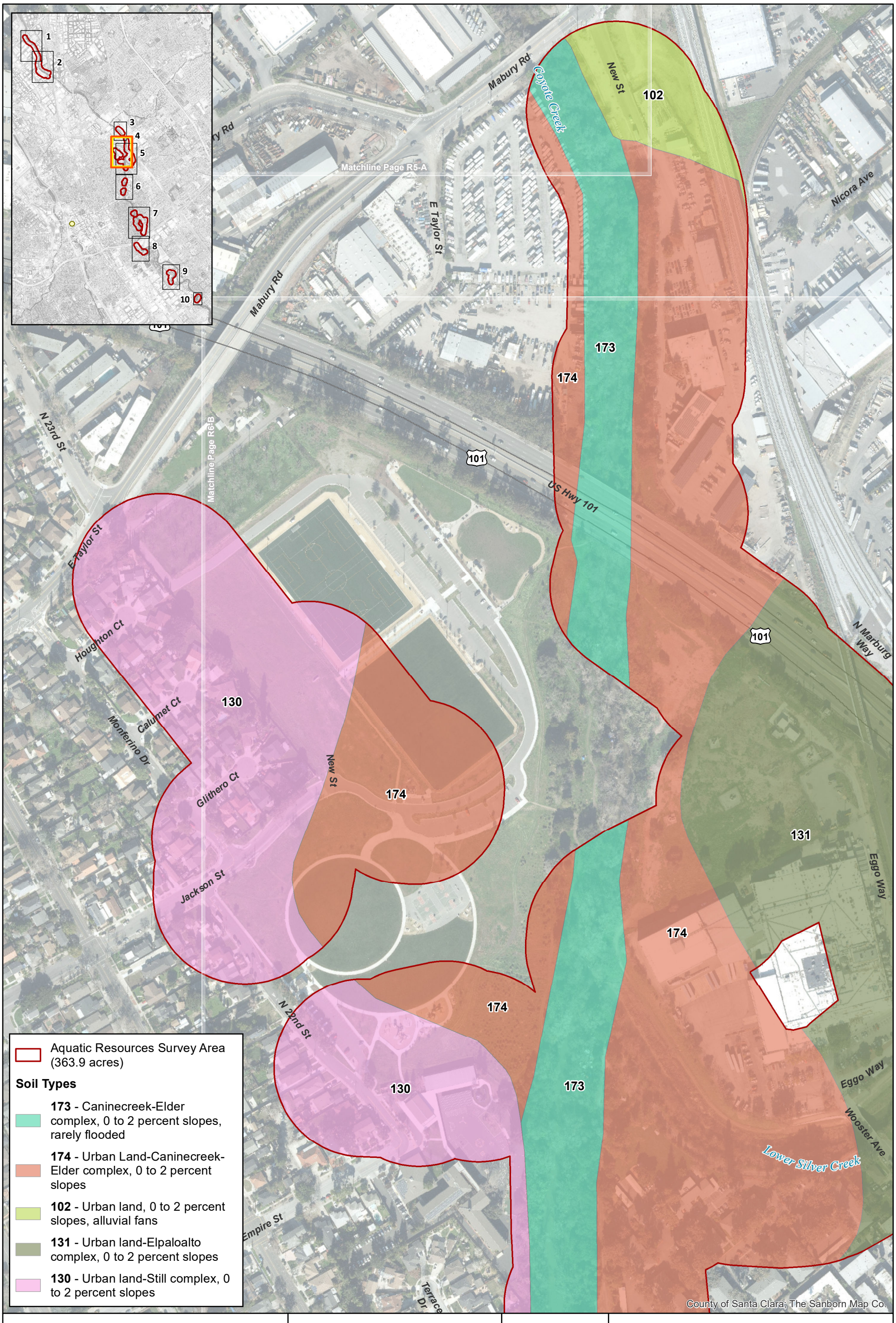
Santa Clara Valley Water District

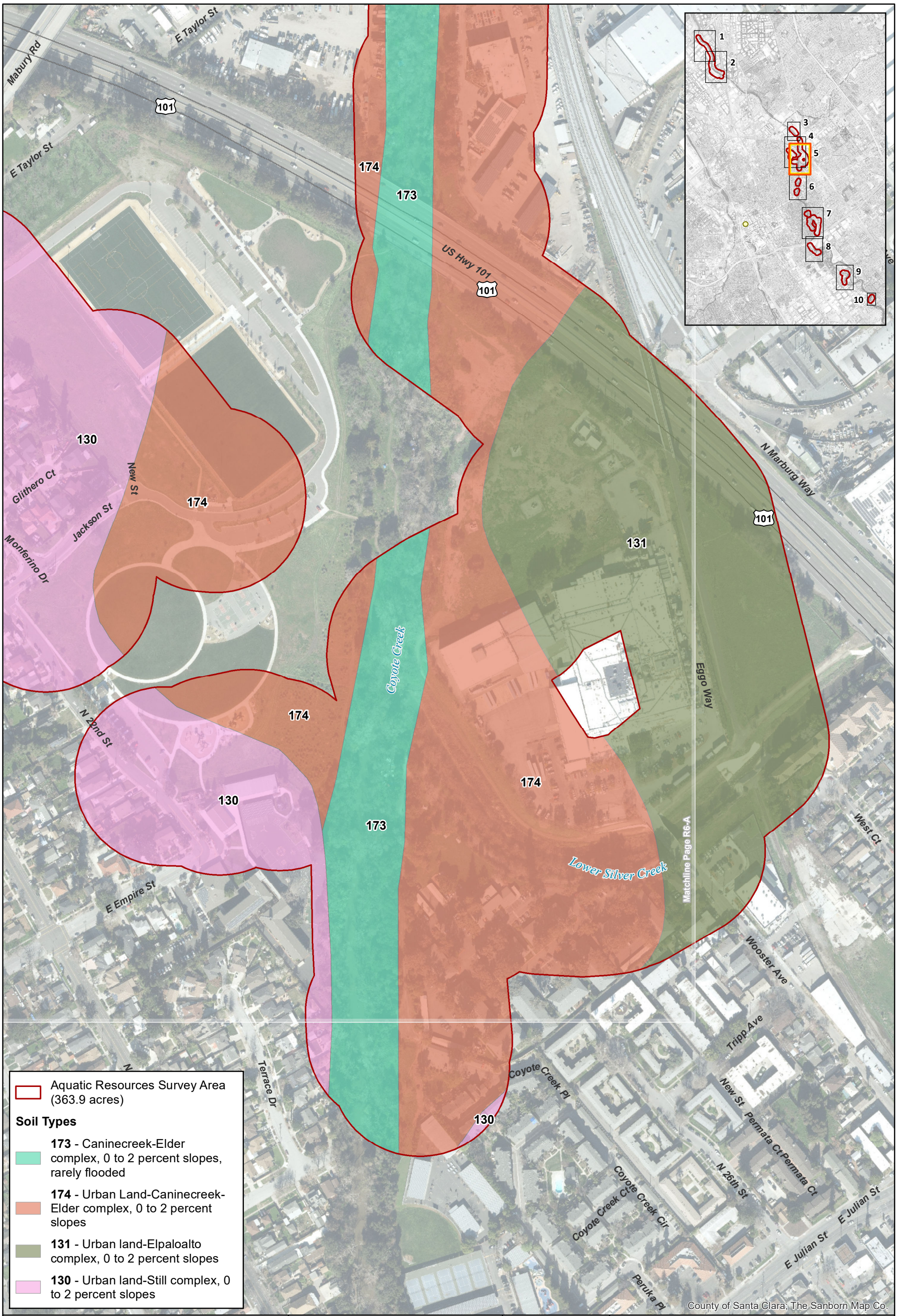
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SOILS
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MAY 2024 DRAFT APPENDIX E

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Matchline Page R5-A
Matchline Page R6-B
Mabury Rd
Coyote Creek
New St
102
E Taylor St
Nicora Ave
173
174
101
US Hwy 101
N 23rd St
E Taylor St
Houghton Ct
Calumet Ct
Monterrino Dr
Glithero Ct
Jackson St
130
New St
174
131
Eggo Way
N Marburg Way
N 22nd St
Empire St
Terrace Dr
Lower Silver Creek
Wooster Ave
Aquatic Resources Survey Area (363.9 acres)
Soil Types
173 - Caninecreek-Elder complex, 0 to 2 percent slopes, rarely flooded
174 - Urban Land-Caninecreek-Elder complex, 0 to 2 percent slopes
102 - Urban land, 0 to 2 percent slopes, alluvial fans
131 - Urban land-Elpaloalto complex, 0 to 2 percent slopes
130 - Urban land-Still complex, 0 to 2 percent slopes
County of Santa Clara; The Sanborn Map Co.
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Coyote Creek Flood Protection Project
Santa Clara County, California
Santa Clara Valley Water District
GEI Consultants
SOILS
(SHEET 4 OF 10)
MAY 2024
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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

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SOILS
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Coyote Creek Flood Protection Project
Santa Clara County, California

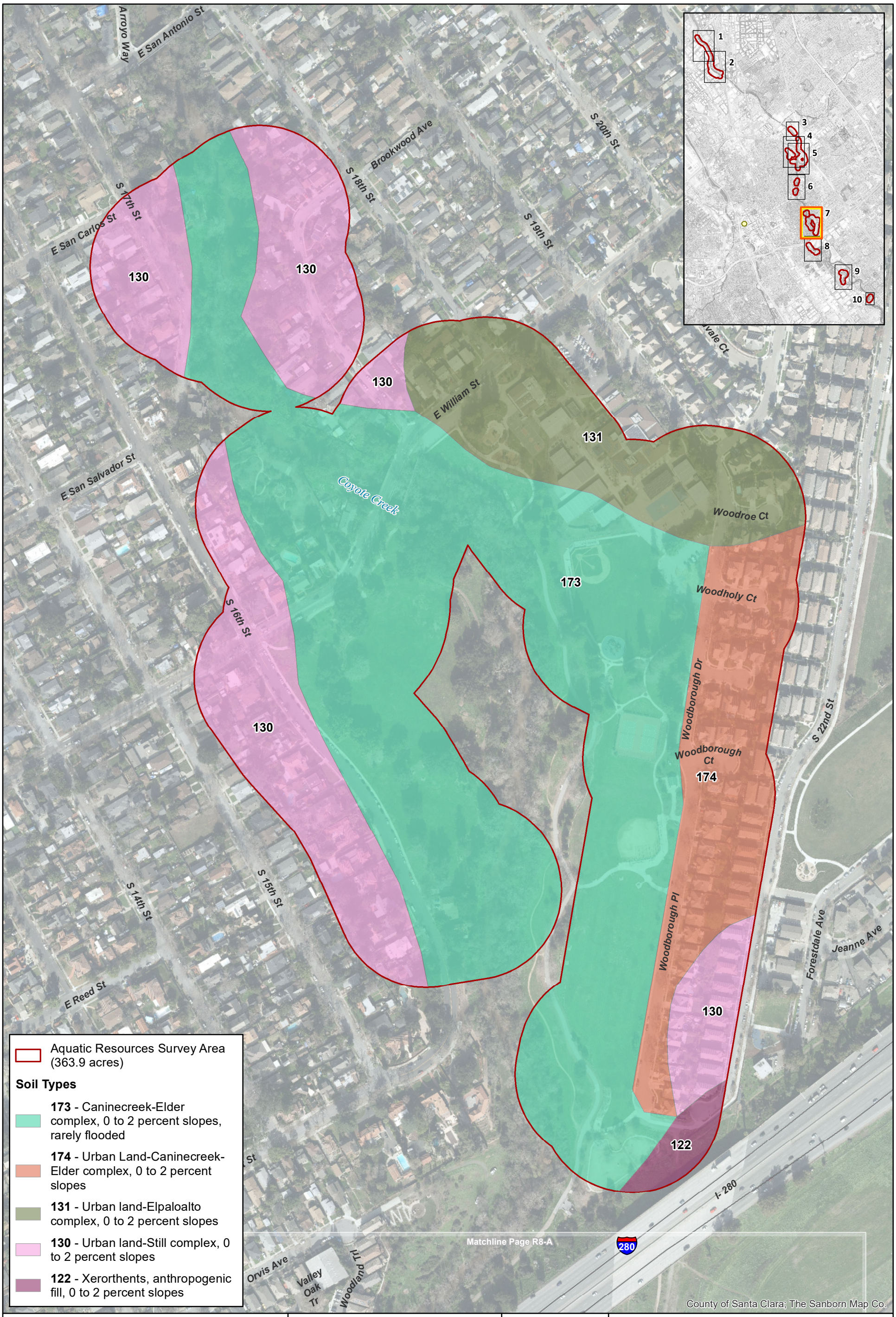
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SOILS
(SHEET 6 OF 10)

MAY 2024 DRAFT APPENDIX E

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Aquatic Resources Survey Area (363.9 acres)

Soil Types

- **173** - Caninecreek-Elder complex, 0 to 2 percent slopes, rarely flooded
- **174** - Urban Land-Caninecreek-Elder complex, 0 to 2 percent slopes
- **131** - Urban land-Elpaloalto complex, 0 to 2 percent slopes
- **130** - Urban land-Still complex, 0 to 2 percent slopes
- **122** - Xerorthents, anthropogenic fill, 0 to 2 percent slopes

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Coyote Creek Flood Protection Project
Santa Clara County, California

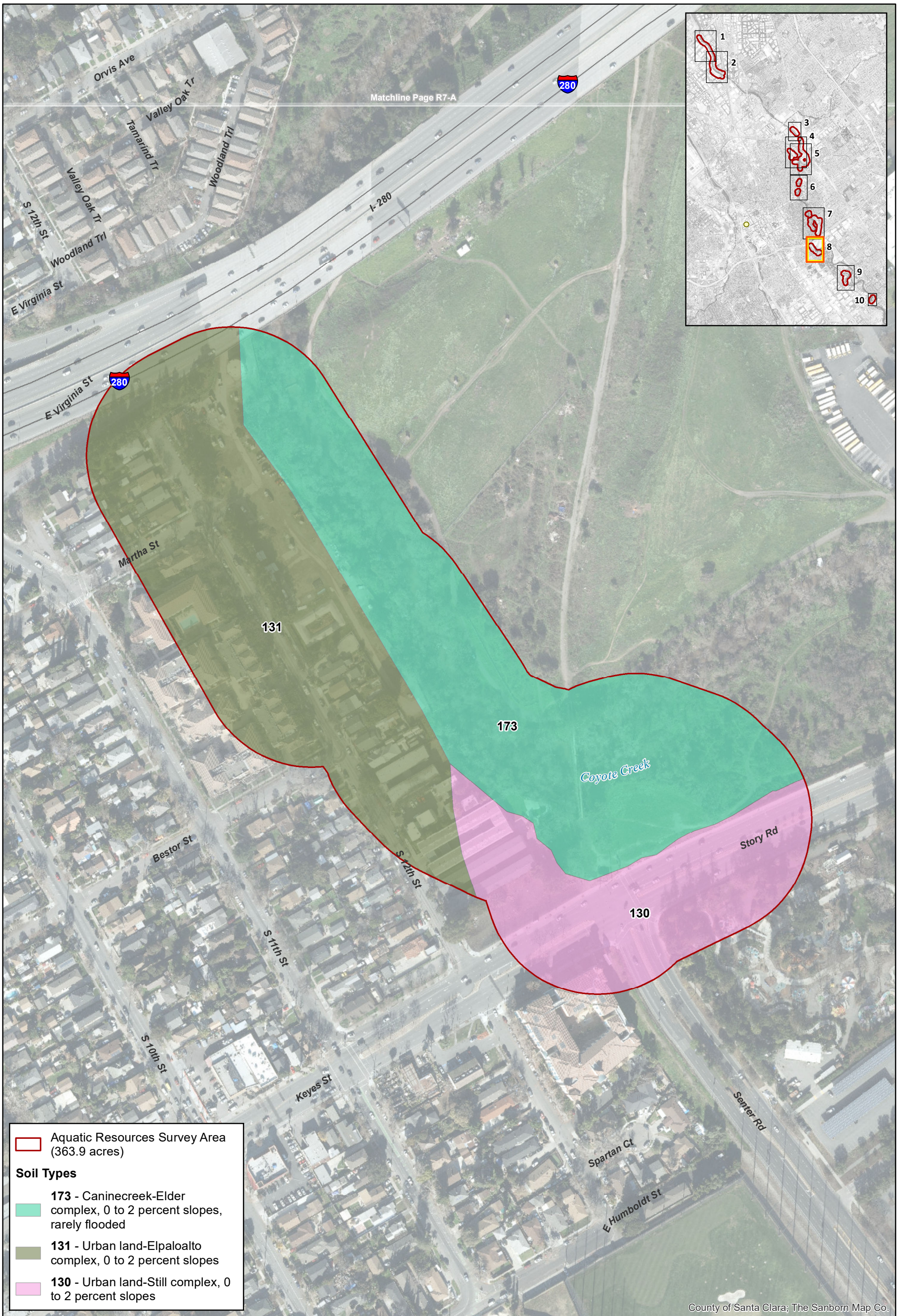
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SOILS
(SHEET 7 OF 10)

MAY 2024 **DRAFT** APPENDIX E

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Coyote Creek Flood Protection Project
Santa Clara County, California

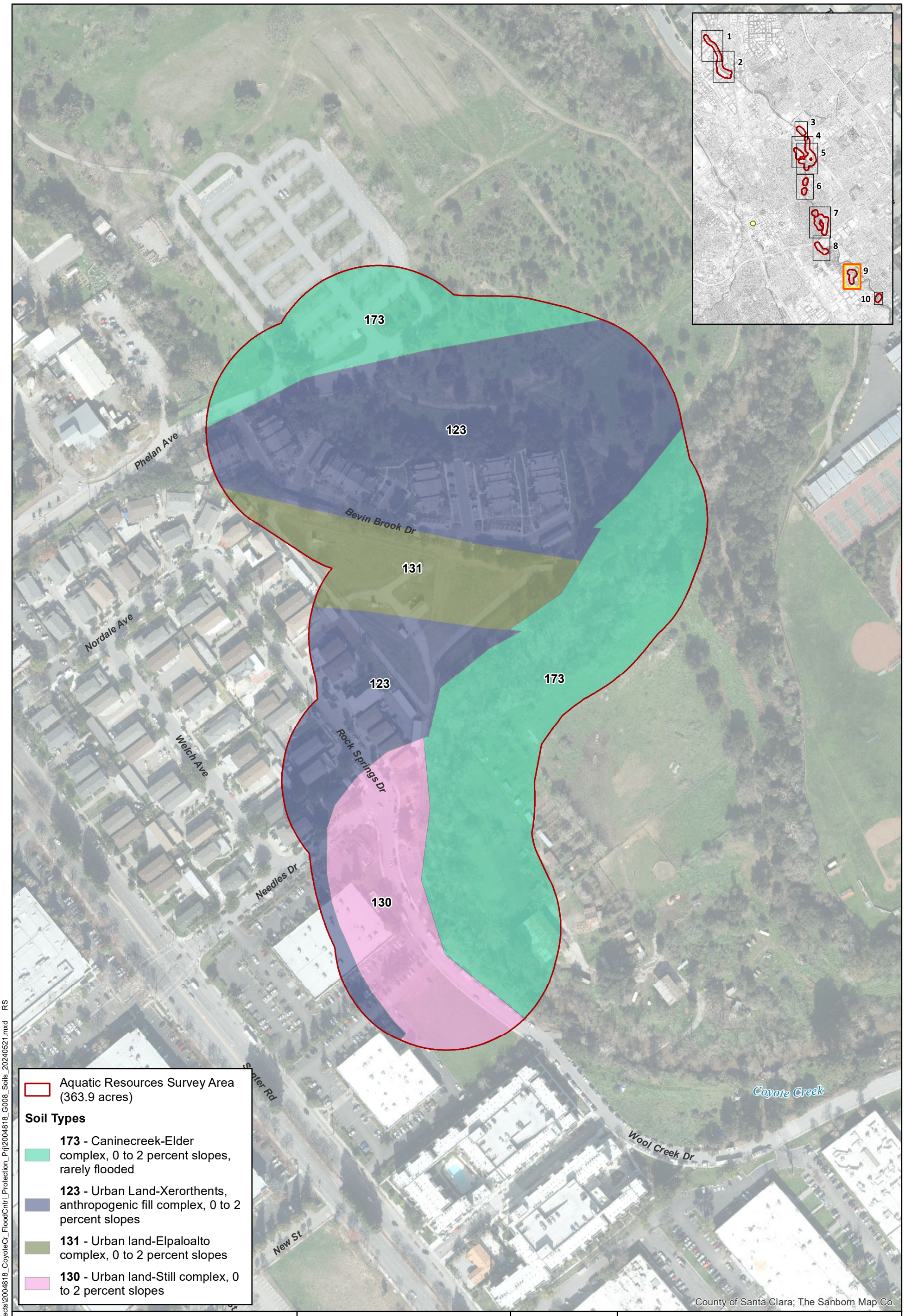
Santa Clara Valley Water District

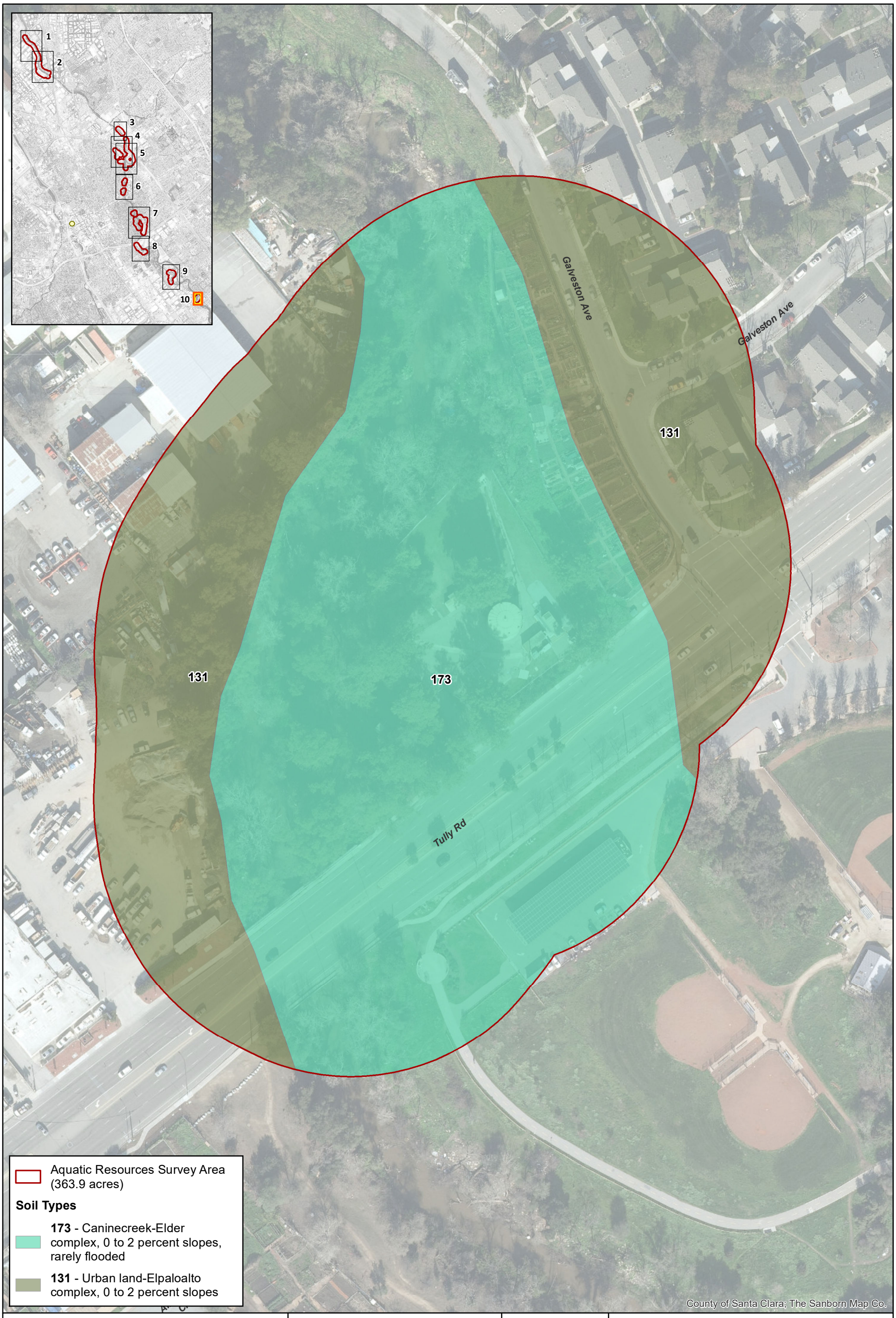
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SOILS
(SHEET 8 OF 10)

MAY 2024 DRAFT APPENDIX E

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131
123
173
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Phelan Ave
Bevin Brook Dr
Nordale Ave
Welch Ave
Rock Springs Dr
Needles Dr
Senter Rd
New St
Coyote Creek
Wool Creek Dr
Aquatic Resources Survey Area (363.9 acres)
Soil Types
173 - Caninecreek-Elder complex, 0 to 2 percent slopes, rarely flooded
123 - Urban Land-Xerorthents, anthropogenic fill complex, 0 to 2 percent slopes
131 - Urban land-Elpaloalto complex, 0 to 2 percent slopes
130 - Urban land-Still complex, 0 to 2 percent slopes
County of Santa Clara; The Sanborn Map Co.
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Coyote Creek Flood Protection Project
Santa Clara County, California
Santa Clara Valley Water District
GEI Consultants
SOILS
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MAY 2024
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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

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SOILS
(SHEET 10 OF 10)

MAY 2024 **DRAFT** APPENDIX E

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Appendix F. NRCS Soil Report

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United States Department of Agriculture

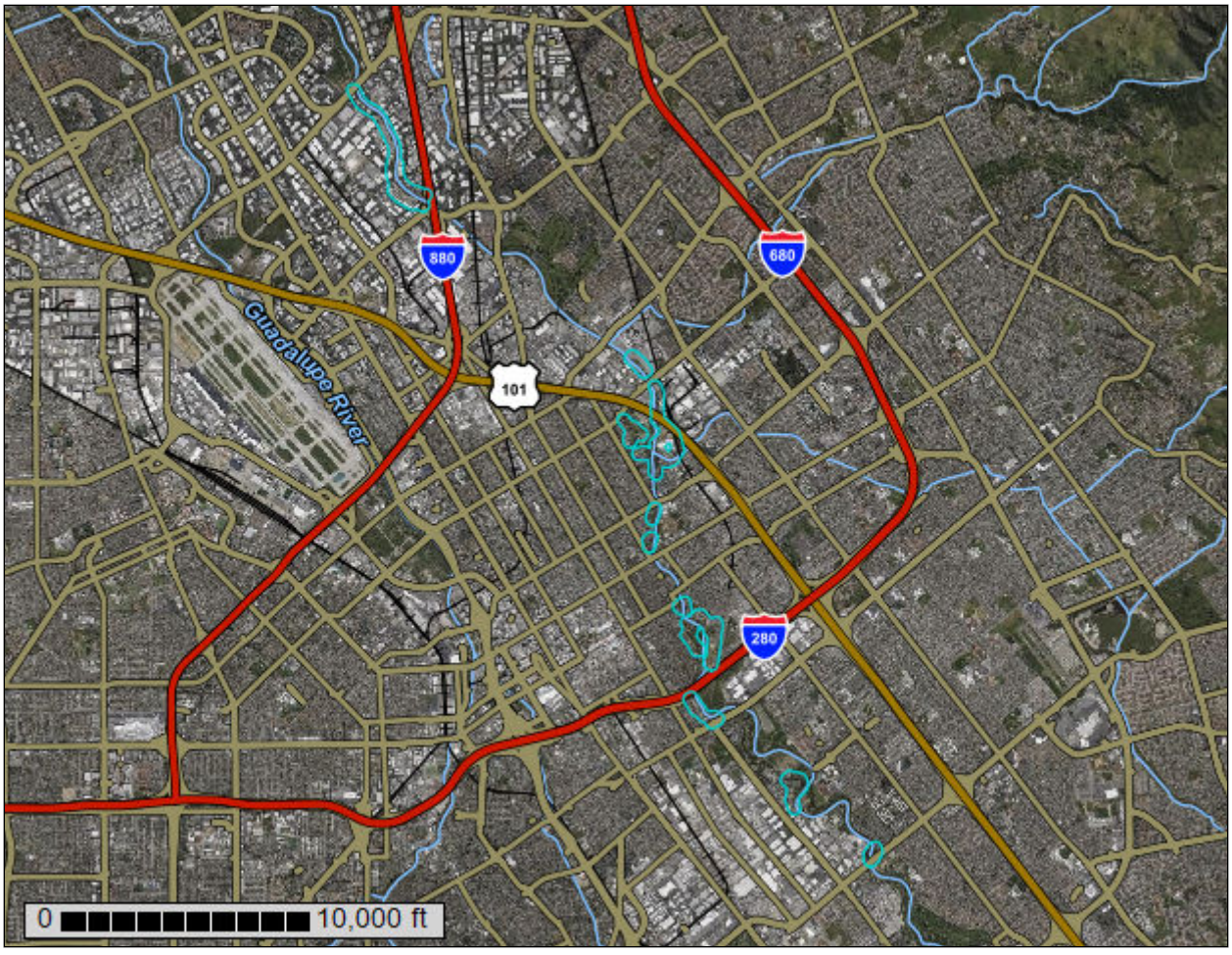
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Santa Clara Area, California, Western Part

CCFPP



March 4, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

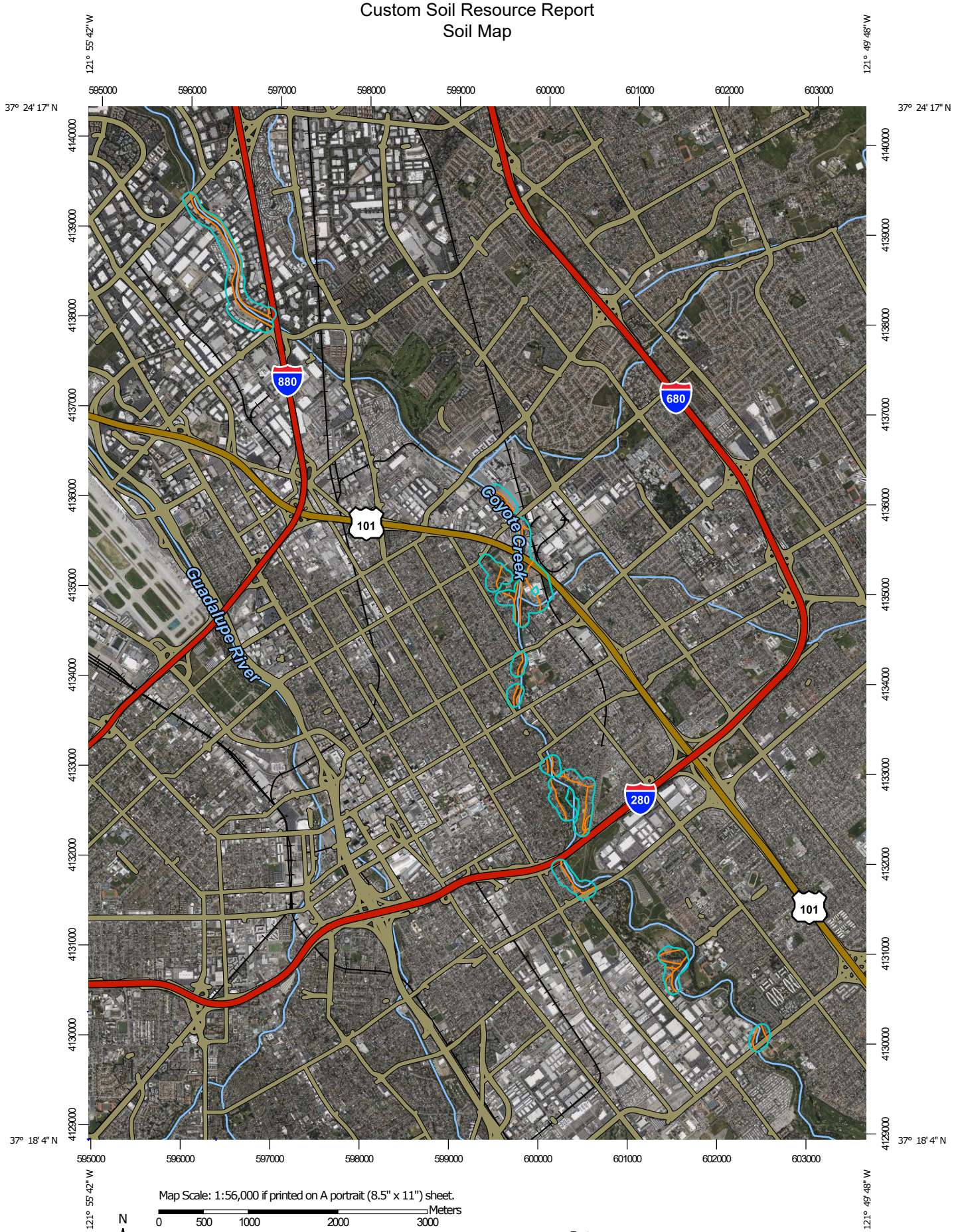
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
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Background

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MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 12, Sep 11, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
102	Urban land, 0 to 2 percent slopes, alluvial fans	25.7	7.1%
122	Xerorthents, anthropogenic fill, 0 to 2 percent slopes	0.8	0.2%
123	Urban Land-Xerorthents, anthropogenic fill complex, 0 to 2 percent slopes	12.1	3.3%
130	Urban land-Still complex, 0 to 2 percent slopes	59.8	16.5%
131	Urban land-Elpaloalto complex, 0 to 2 percent slopes	48.4	13.3%
169	Urbanland-Elder complex, 0 to 2 percent slopes, protected	48.6	13.4%
171	Elder fine sandy loam, 0 to 2 percent slopes, rarely flooded	26.7	7.3%
173	Caninecreek-Elder complex, 0 to 2 percent slopes, rarely flooded	87.5	24.1%
174	Urban Land-Caninecreek-Elder complex, 0 to 2 percent slopes	53.6	14.8%
Totals for Area of Interest		**363.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties

and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Santa Clara Area, California, Western Part

102—Urban land, 0 to 2 percent slopes, alluvial fans

Map Unit Setting

National map unit symbol: 2l7vm
Elevation: 0 to 300 feet
Mean annual precipitation: 14 to 30 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, basins: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Basins

Setting

Landform: Basin floors, alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human transported material

Minor Components

Xerorthents, anthropogenic fill

Percent of map unit: 2 percent
Landform: Basin floors, alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

122—Xerorthents, anthropogenic fill, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1qsvg
Elevation: 0 to 280 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Xerorthents, anthropogenic fill, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerorthents, Anthropogenic Fill

Setting

Landform: Basin floors, alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Human transported material

Typical profile

^A - 0 to 2 inches: sandy clay loam
^C1 - 2 to 10 inches: sandy clay loam
^C2 - 10 to 20 inches: sandy clay loam
^C3 - 20 to 30 inches: very gravelly sandy clay loam
^C4 - 30 to 39 inches: gravelly sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 0.2 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

123—Urban Land-Xerorthents, anthropogenic fill complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2l8df
Elevation: 0 to 350 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 70 percent
Xerorthents, anthropogenic fill, and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human transported material

Description of Xerorthents, Anthropogenic Fill

Setting

Landform: Alluvial fans, basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Human transported material

Typical profile

^A - 0 to 2 inches: sandy clay loam
^C1 - 2 to 10 inches: sandy clay loam
^C2 - 10 to 20 inches: sandy clay loam
^C3 - 20 to 30 inches: very gravelly sandy clay loam
^C4 - 30 to 39 inches: gravelly sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 0.2 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

130—Urban land-Still complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1nszl
Elevation: 20 to 410 feet

Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 70 percent
Still and similar soils: 25 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human transported material

Description of Still

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

A1 - 0 to 2 inches: sandy loam
A2 - 2 to 12 inches: very fine sandy loam
Bw1 - 12 to 20 inches: silt loam
Bw2 - 20 to 33 inches: silt loam
2Ab1 - 33 to 37 inches: loam
2Ab2 - 37 to 51 inches: loam
2Bwb1 - 51 to 62 inches: loam
2Bwb2 - 62 to 72 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.5 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

Minor Components

Elpaloalto
Percent of map unit: 5 percent
Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

131—Urban land-Elpaloalto complex, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: 1nszz
Elevation: 10 to 390 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 70 percent
Elpaloalto and similar soils: 23 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human transported material

Description of Elpaloalto

Setting
Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile
Oi - 0 to 8 inches: slightly decomposed plant material

A - 8 to 17 inches: clay loam
Bw1 - 17 to 26 inches: silty clay loam
Bw2 - 26 to 35 inches: silty clay loam
Bw3 - 35 to 47 inches: silty clay loam
Bw4 - 47 to 71 inches: silty clay loam
C - 71 to 94 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to slightly saline (0.4 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water supply, 0 to 60 inches: Very high (about 13.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R014XG917CA - Dry Loamy Fan
Hydric soil rating: No

Minor Components

Still

Percent of map unit: 5 percent
Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hangerone, drained

Percent of map unit: 2 percent
Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

169—Urbanland-Elder complex, 0 to 2 percent slopes, protected

Map Unit Setting

National map unit symbol: 2mfbn

Elevation: 0 to 310 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 70 percent
Elder, protected, and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human transported material

Description of Elder, Protected

Setting

Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 5 inches: fine sandy loam
A2 - 5 to 18 inches: fine sandy loam
A3 - 18 to 31 inches: fine sandy loam
A4 - 31 to 51 inches: fine sandy loam
Ab1 - 51 to 55 inches: fine sandy loam
Ab2 - 55 to 67 inches: fine sandy loam
Ab3 - 67 to 85 inches: fine sandy loam
Bw - 85 to 87 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): 1

Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

Minor Components

Caninecreek, gravelly substratum, protected
Percent of map unit: 8 percent
Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Water
Percent of map unit: 2 percent
Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Unranked

171—Elder fine sandy loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting
National map unit symbol: 1qsvn
Elevation: 0 to 430 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Elder, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elder, Rarely Flooded

Setting
Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material

A1 - 1 to 5 inches: fine sandy loam
A2 - 5 to 18 inches: fine sandy loam
A3 - 18 to 31 inches: fine sandy loam
A4 - 31 to 51 inches: fine sandy loam
Ab1 - 51 to 55 inches: fine sandy loam
Ab2 - 55 to 67 inches: fine sandy loam
Ab3 - 67 to 85 inches: fine sandy loam
Bw - 85 to 87 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

Minor Components

Caninecreek, gravelly substratum, rarely flooded

Percent of map unit: 8 percent
Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Water

Percent of map unit: 2 percent
Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Unranked

173—Caninecreek-Elder complex, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 216bh

Elevation: 50 to 240 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Caninecreek, gravelly substratum, rarely flooded, and similar soils: 50 percent
Elder, rarely flooded, and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Caninecreek, Gravelly Substratum, Rarely Flooded

Setting

Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

A1 - 0 to 7 inches: fine sandy loam
A2 - 7 to 14 inches: fine sandy loam
A3 - 14 to 19 inches: fine sandy loam
2Ab - 19 to 28 inches: fine sandy loam
2Cb1 - 28 to 36 inches: fine sandy loam
2Cb2 - 36 to 46 inches: fine sandy loam
3C - 46 to 59 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline to slightly saline (0.2 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

Description of Elder, Rarely Flooded

Setting

Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 5 inches: fine sandy loam
A2 - 5 to 18 inches: fine sandy loam
A3 - 18 to 31 inches: fine sandy loam
A4 - 31 to 51 inches: fine sandy loam
Ab1 - 51 to 55 inches: fine sandy loam
Ab2 - 55 to 67 inches: fine sandy loam
Ab3 - 67 to 85 inches: fine sandy loam
Bw - 85 to 87 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 5 percent
Landform: Streams
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Unranked

Water

Percent of map unit: 5 percent
Landform: Streams
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Unranked

174—Urban Land-Caninecreek-Elder complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2mh3k
Elevation: 20 to 90 feet
Mean annual precipitation: 14 to 24 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 275 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 70 percent
Elder, protected, and similar soils: 15 percent
Caninecreek, gravelly substratum, protected, and similar soils: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed and human transported material

Description of Elder, Protected

Setting

Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 5 inches: fine sandy loam
A2 - 5 to 18 inches: fine sandy loam
A3 - 18 to 31 inches: fine sandy loam
A4 - 31 to 51 inches: fine sandy loam
Ab1 - 51 to 55 inches: fine sandy loam
Ab2 - 55 to 67 inches: fine sandy loam
Ab3 - 67 to 85 inches: fine sandy loam
Bw - 85 to 87 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

Description of Caninecreek, Gravelly Substratum, Protected

Setting

Landform: Streams
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from metamorphic and sedimentary rock and/or alluvium derived from metavolcanics

Typical profile

A1 - 0 to 7 inches: fine sandy loam
A2 - 7 to 14 inches: fine sandy loam
A3 - 14 to 19 inches: fine sandy loam
2Ab - 19 to 28 inches: fine sandy loam
2Cb1 - 28 to 36 inches: fine sandy loam
2Cb2 - 36 to 46 inches: fine sandy loam
3C - 46 to 59 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to slightly saline (0.2 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R014XG906CA - Dry Loamy Bottom
Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit (CCFPP)

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

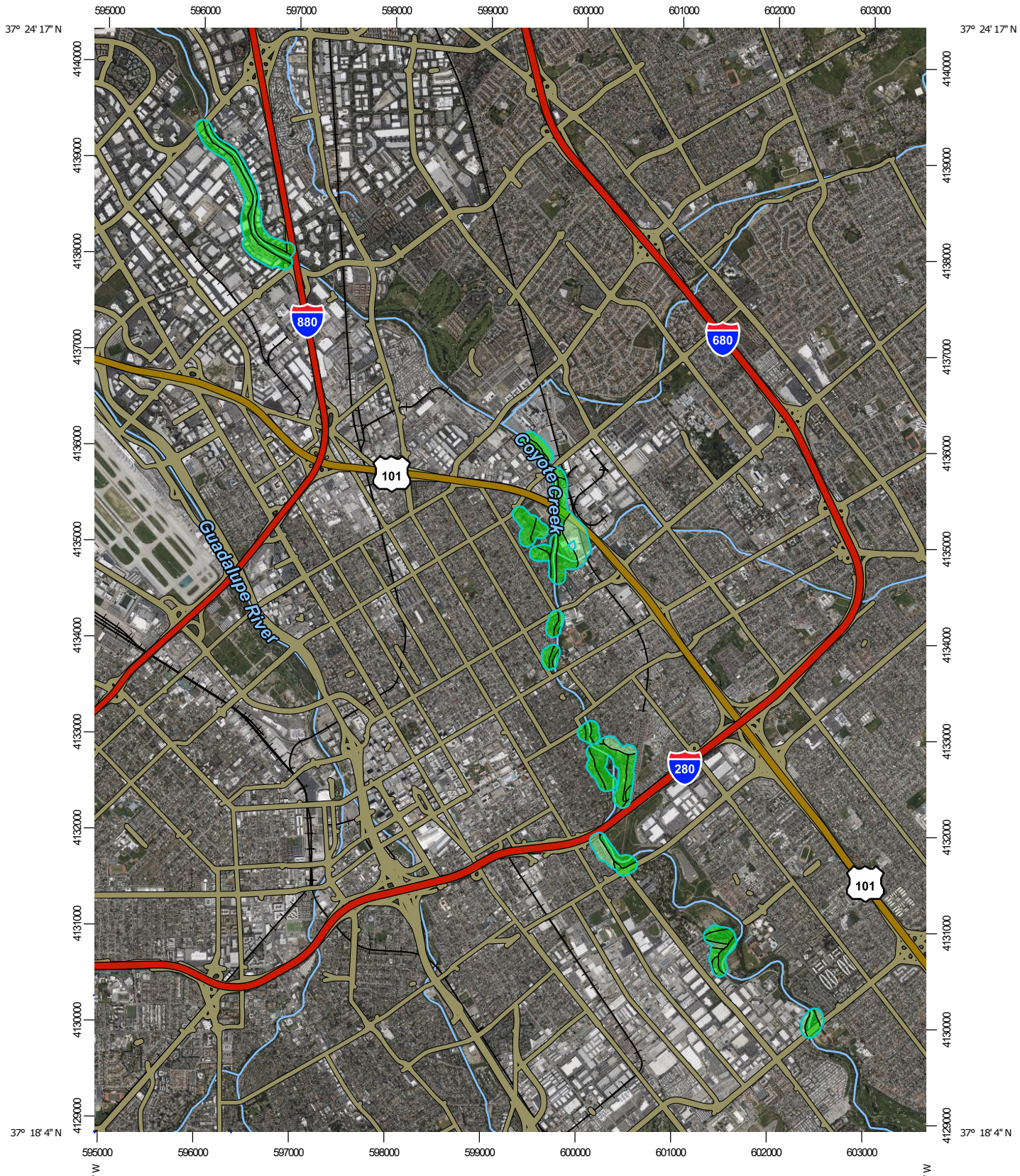
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Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.


121° 55' 42" W
121° 49' 48" W
37° 24' 17" N
37° 18' 4" N
595000
596000
597000
598000
599000
600000
601000
602000
603000
4140000
4139000
4138000
4137000
4136000
4135000
4134000
4133000
4132000
4131000
4130000
4129000
880
680
101
280
Guadalupe River
Coyote Creek
Map Scale: 1:56,000 if printed on A portrait (8.5" x 11") sheet.
Meters
0 500 1000 2000 3000
Feet
0 2500 5000 10000 15000
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 12, Sep 11, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydric Rating by Map Unit (CCFPP)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
102	Urban land, 0 to 2 percent slopes, alluvial fans	0	25.7	7.1%
122	Xerorthents, anthropogenic fill, 0 to 2 percent slopes	0	0.8	0.2%
123	Urban Land-Xerorthents, anthropogenic fill complex, 0 to 2 percent slopes	0	12.1	3.3%
130	Urban land-Still complex, 0 to 2 percent slopes	0	59.8	16.5%
131	Urban land-Elpaloalto complex, 0 to 2 percent slopes	2	48.4	13.3%
169	Urbanland-Elder complex, 0 to 2 percent slopes, protected	0	48.6	13.4%
171	Elder fine sandy loam, 0 to 2 percent slopes, rarely flooded	0	26.7	7.3%
173	Caninecreek-Elder complex, 0 to 2 percent slopes, rarely flooded	0	87.5	24.1%
174	Urban Land-Caninecreek-Elder complex, 0 to 2 percent slopes	0	53.6	14.8%
Totals for Area of Interest			**363.3**	**100.0%**

Rating Options—Hydric Rating by Map Unit (CCFPP)

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

References

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United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

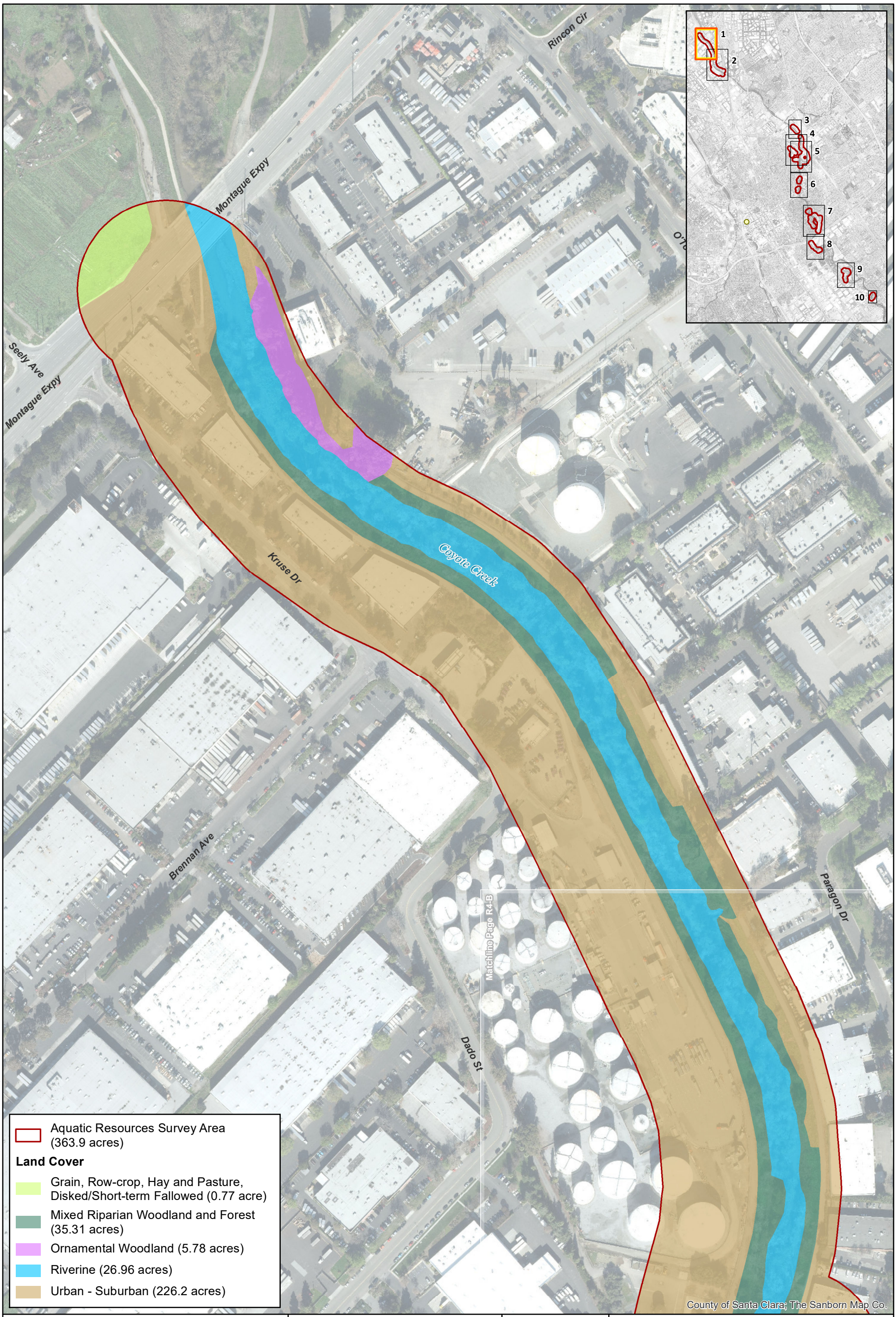
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Appendix G. Vegetation Communities Mapbook

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Santa Clara County, California

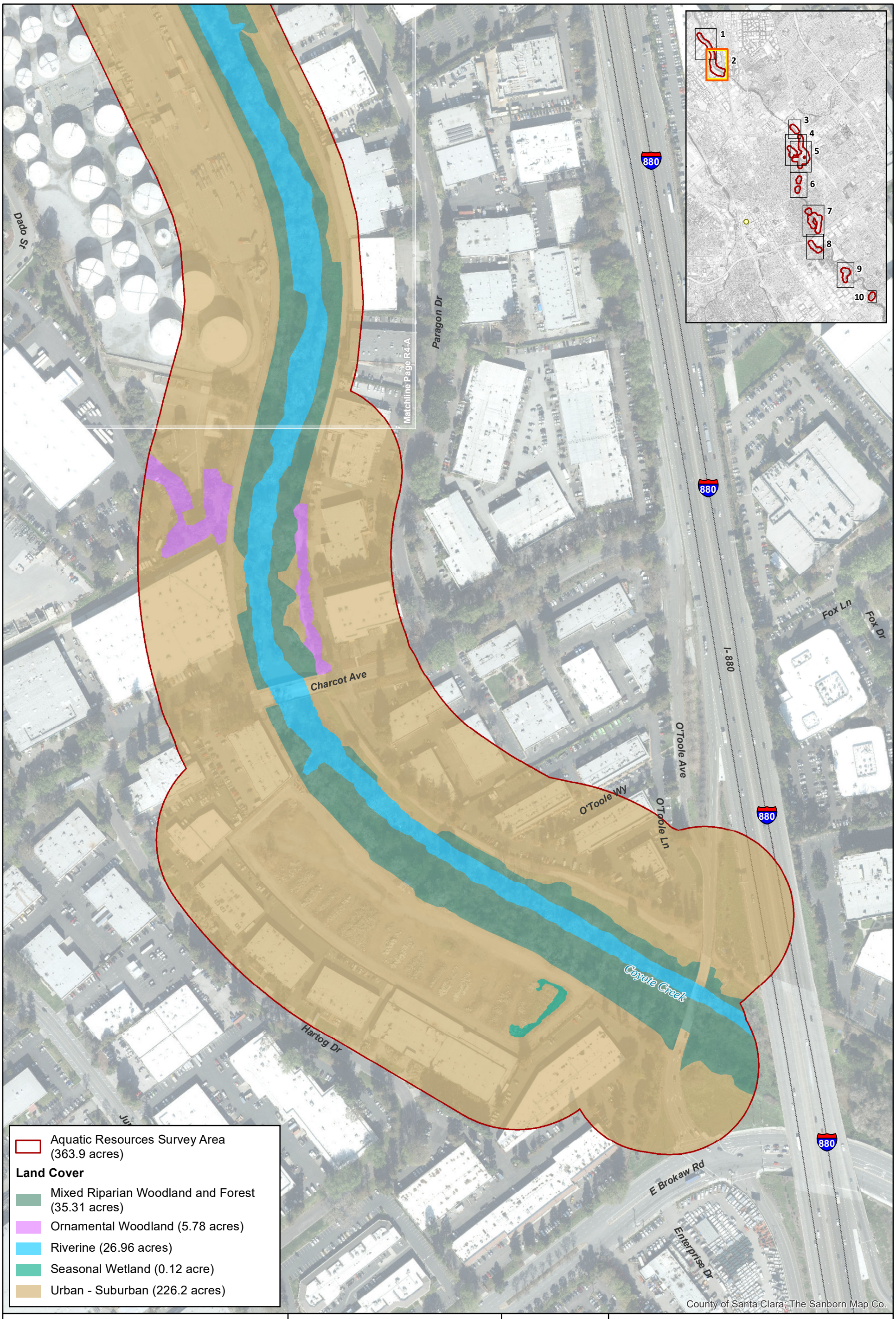
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VEGETATION COMMUNITIES
(SHEET 1 OF 10)

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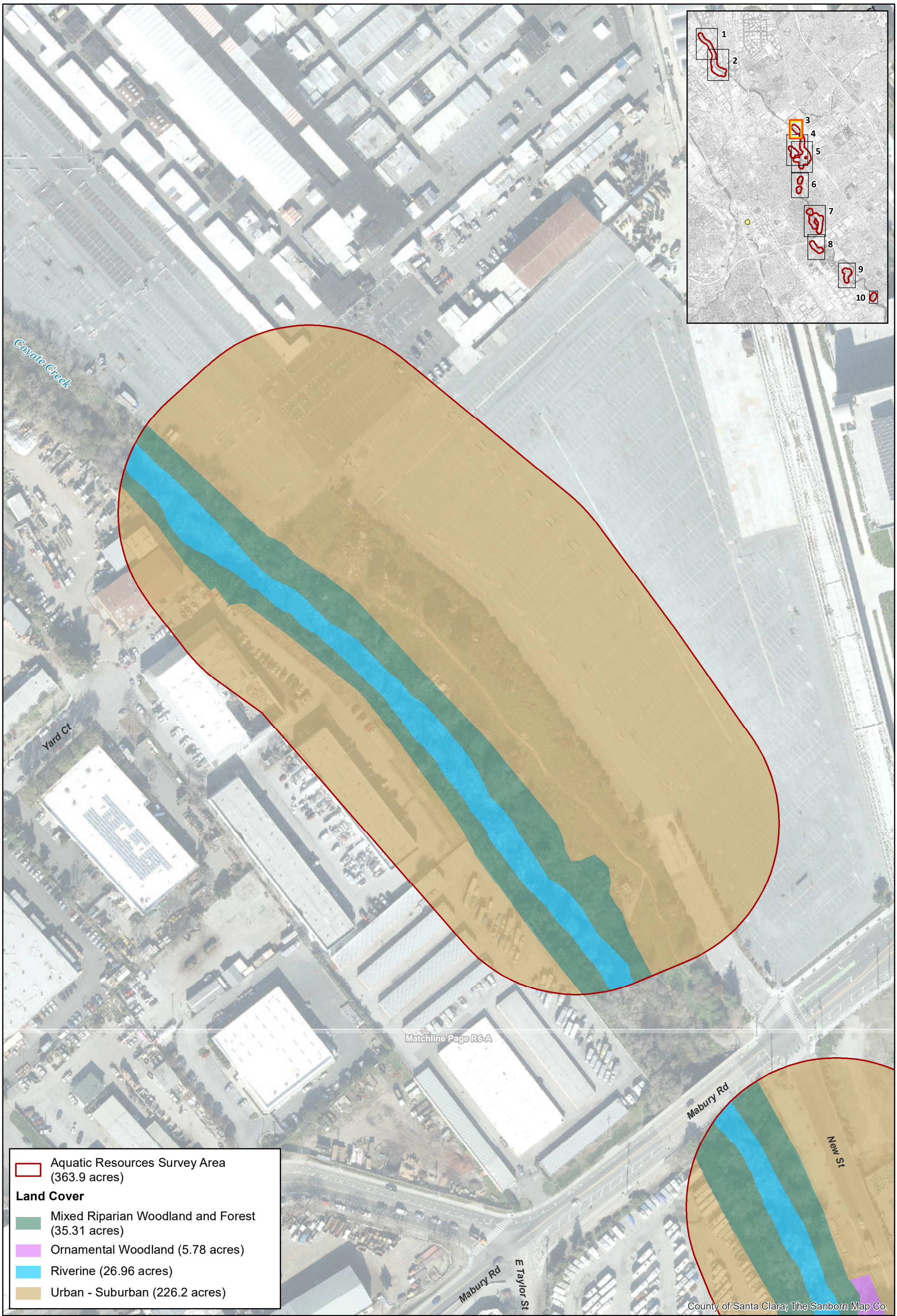
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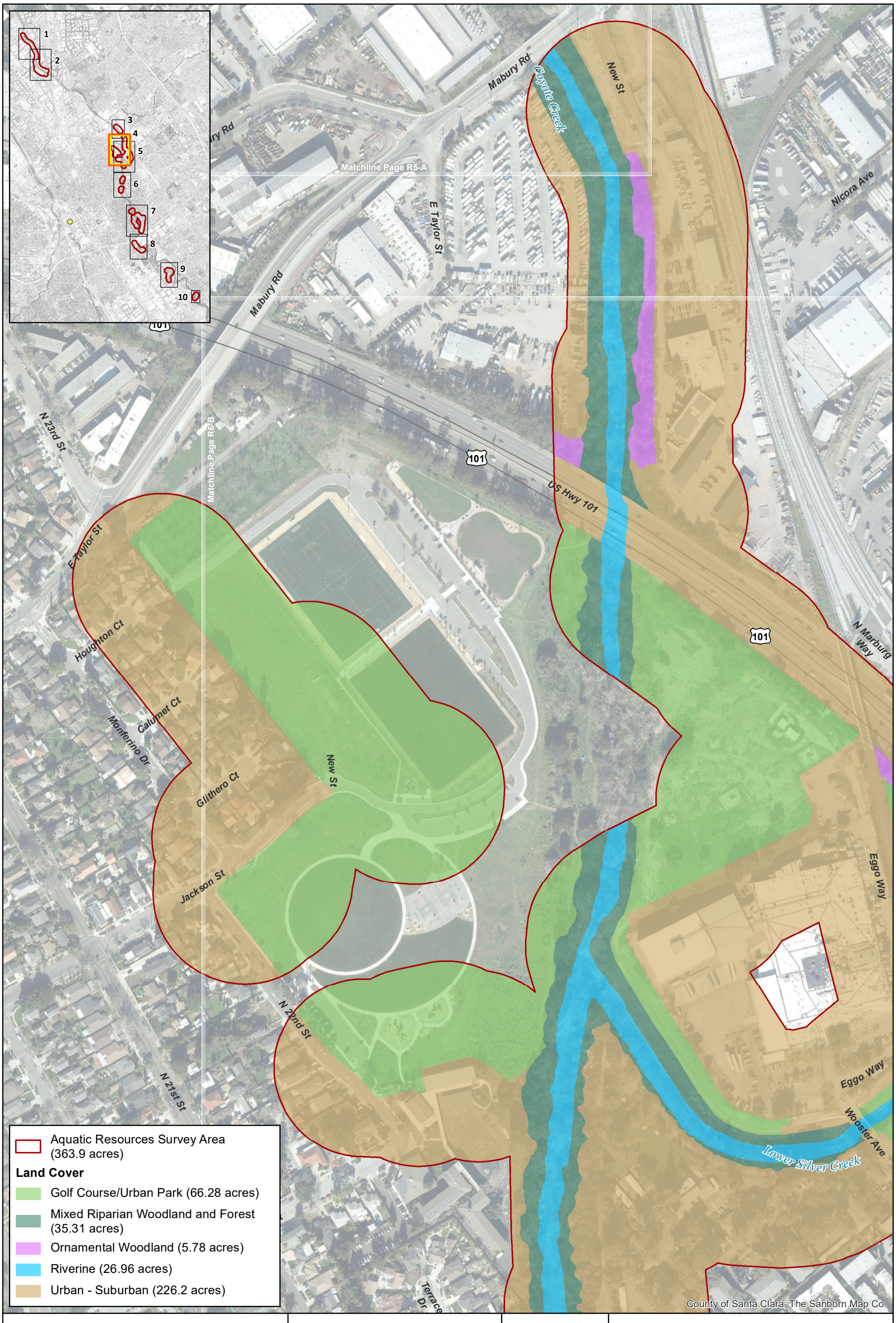
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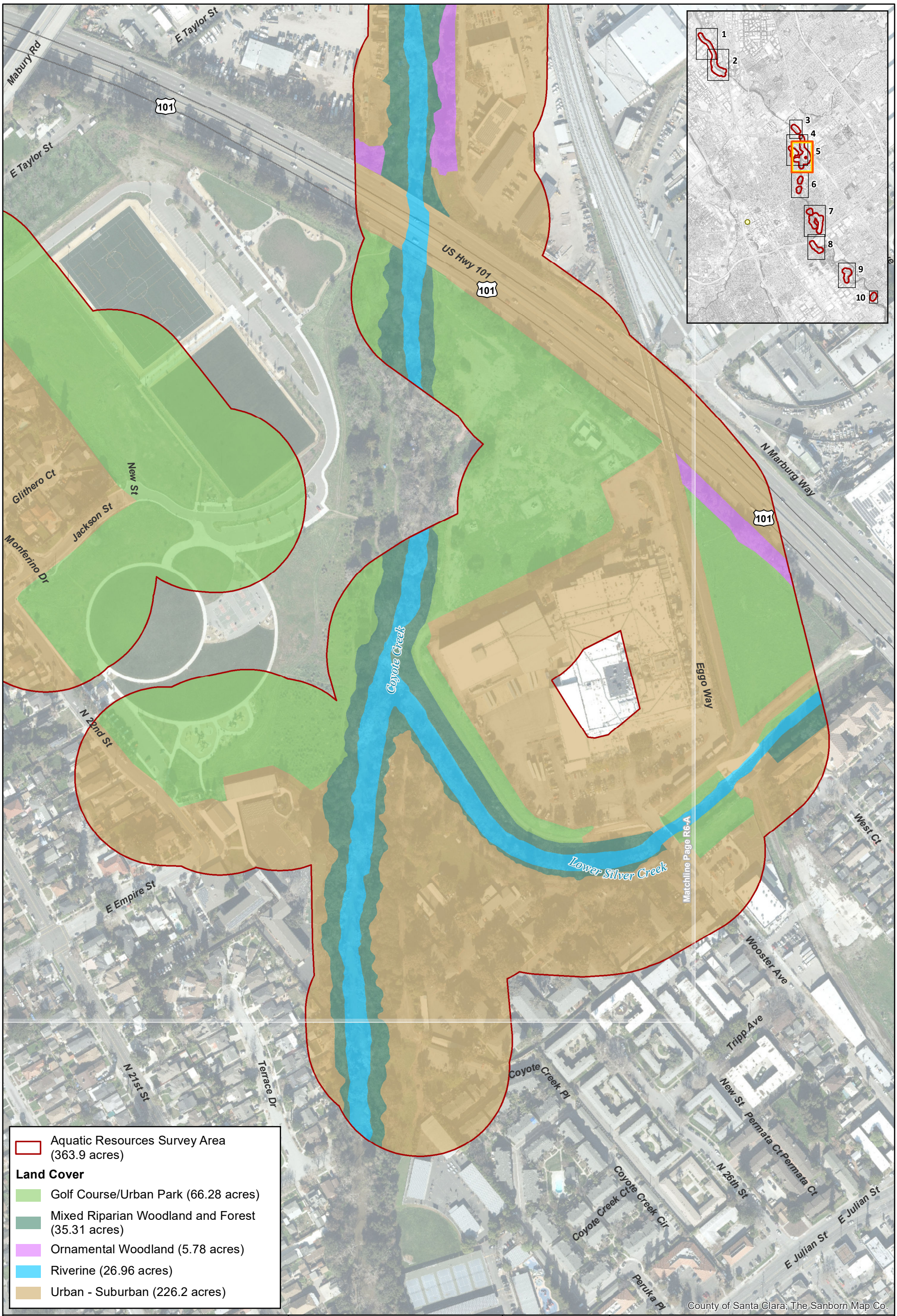
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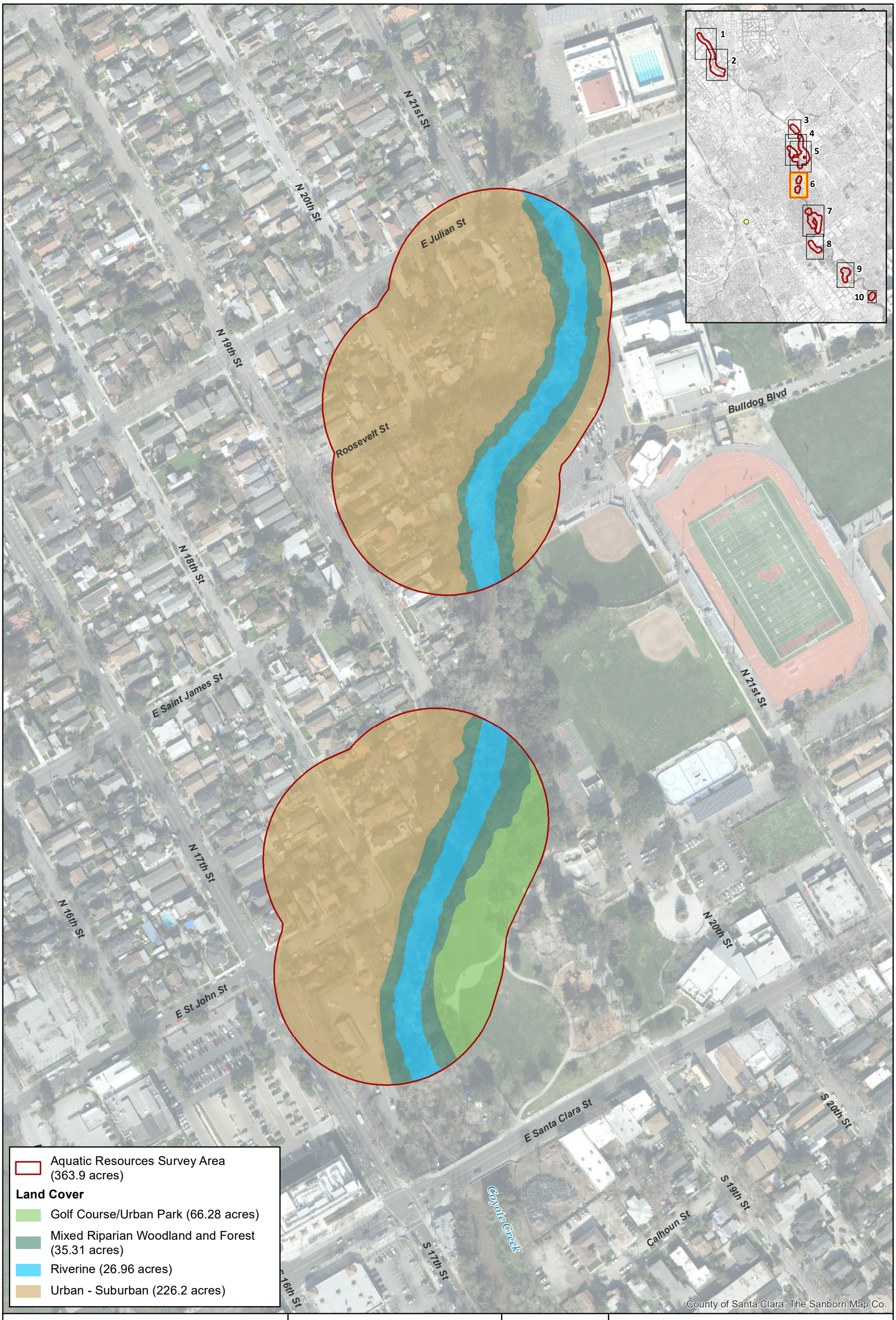
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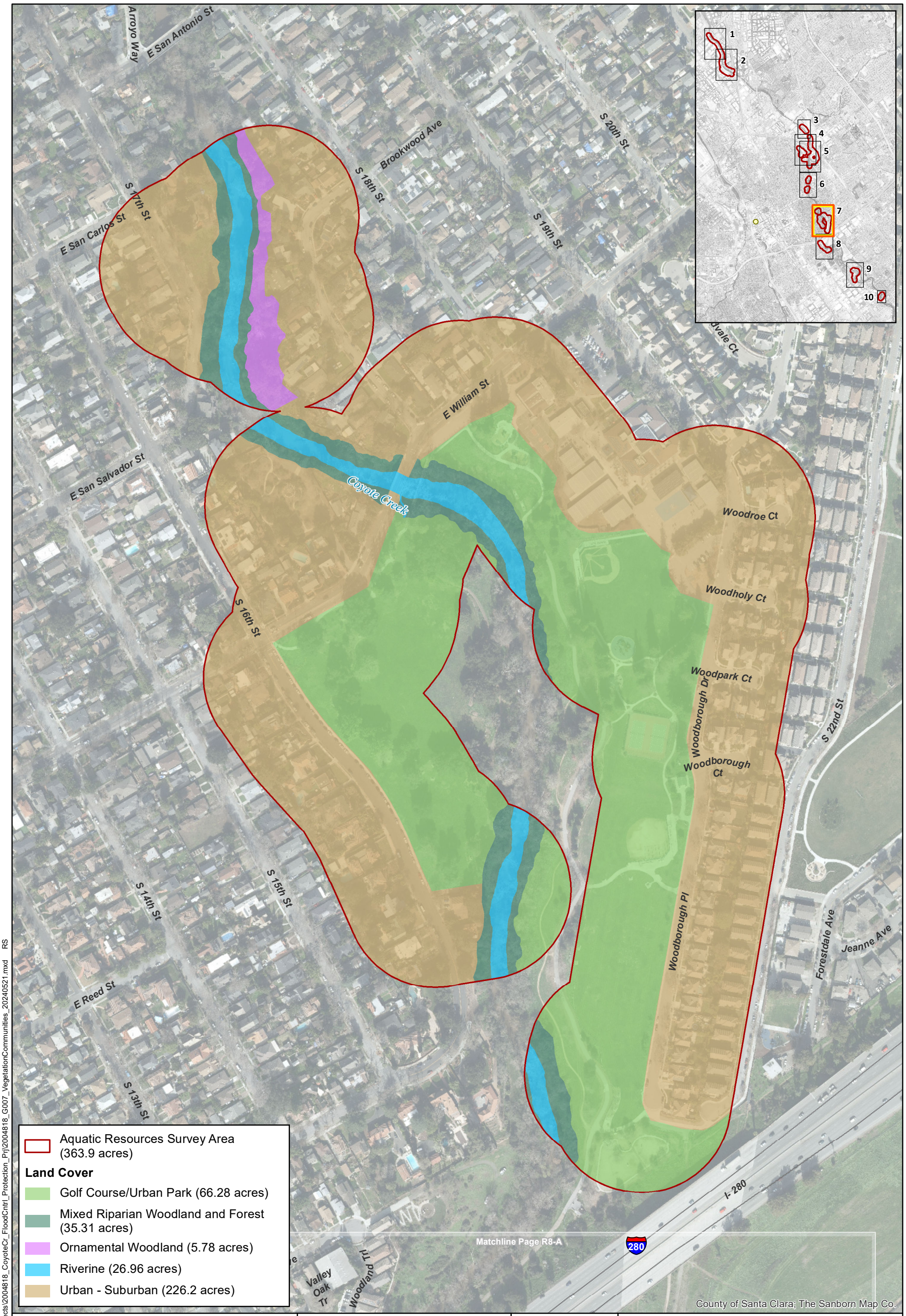
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Santa Clara County, California

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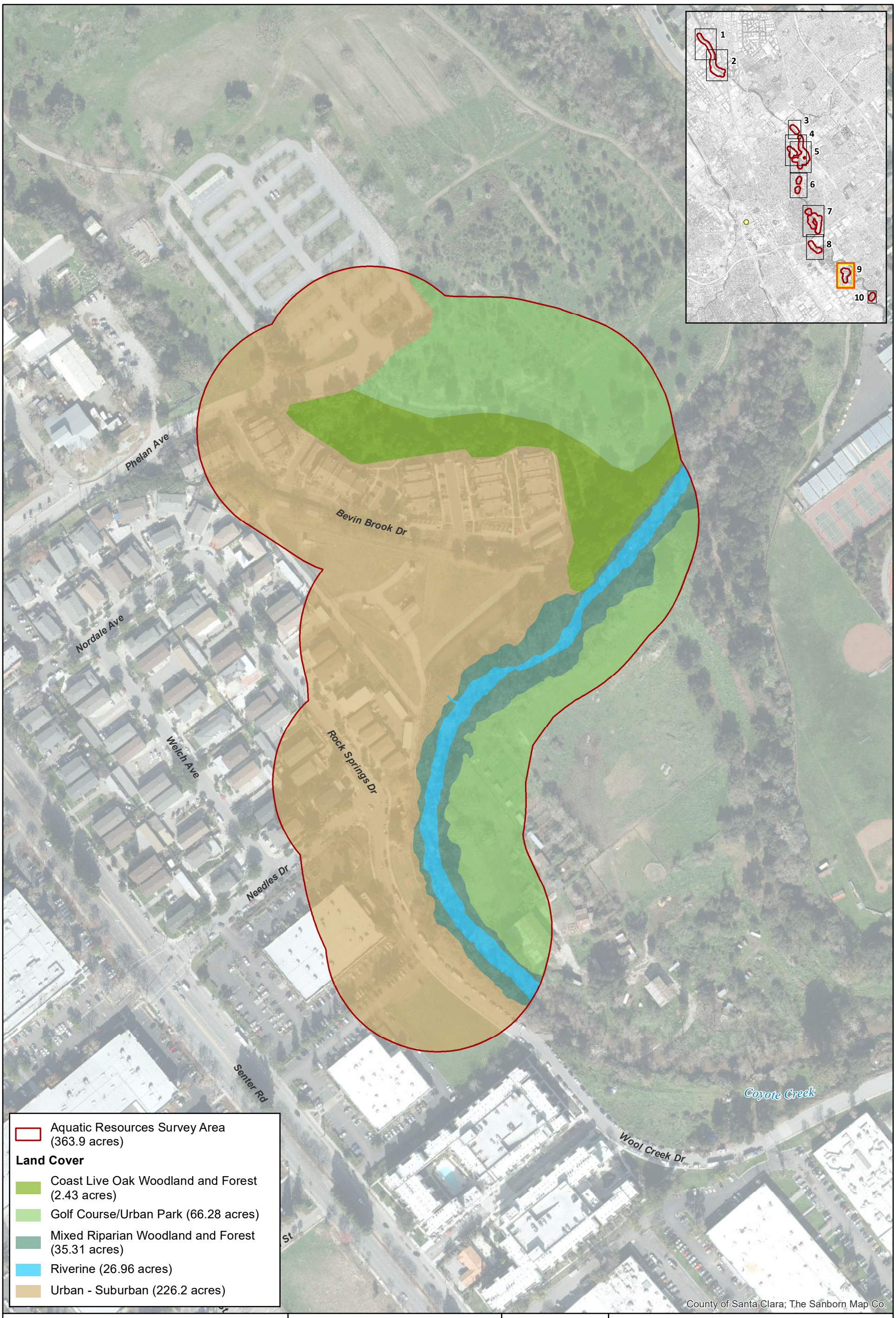
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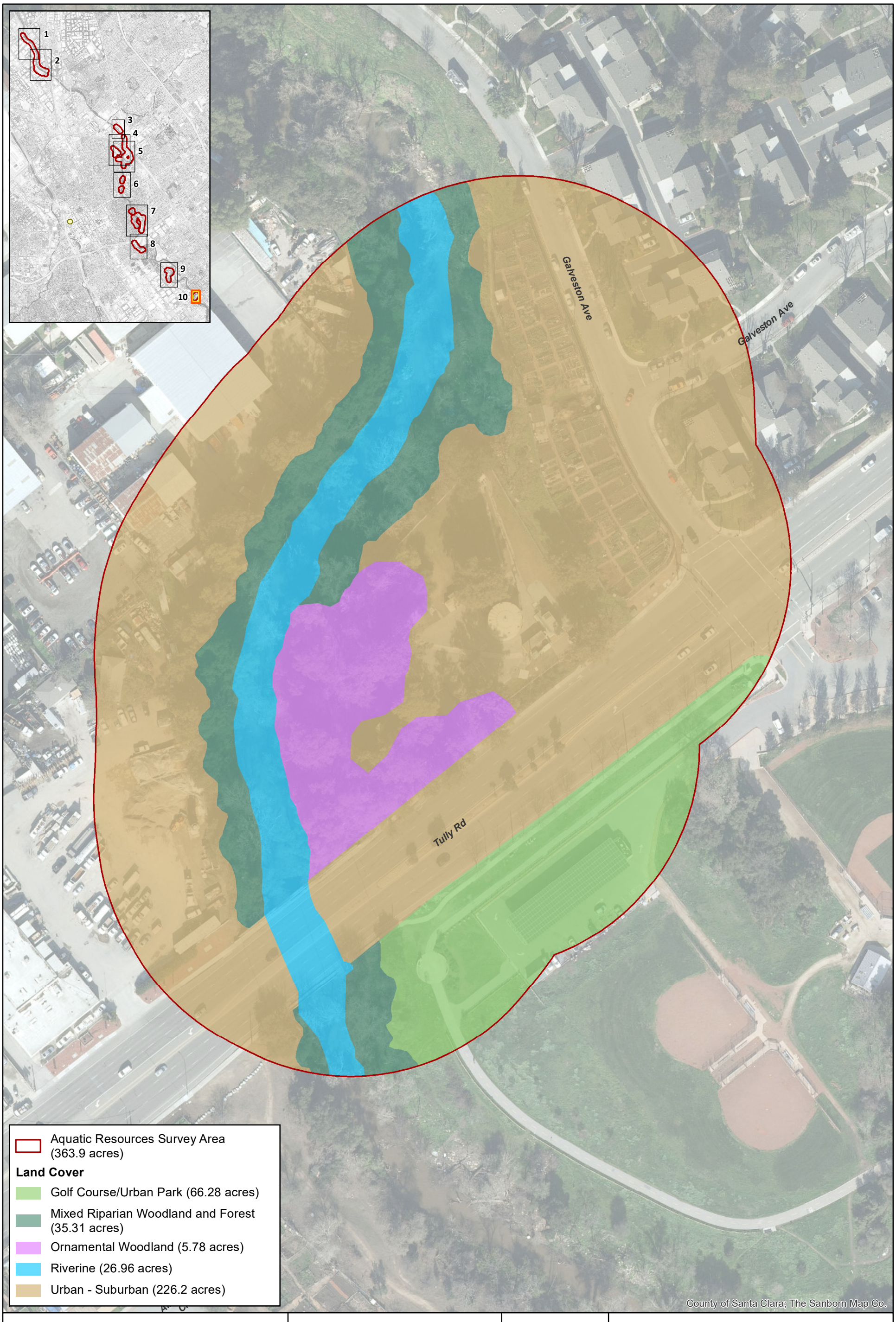
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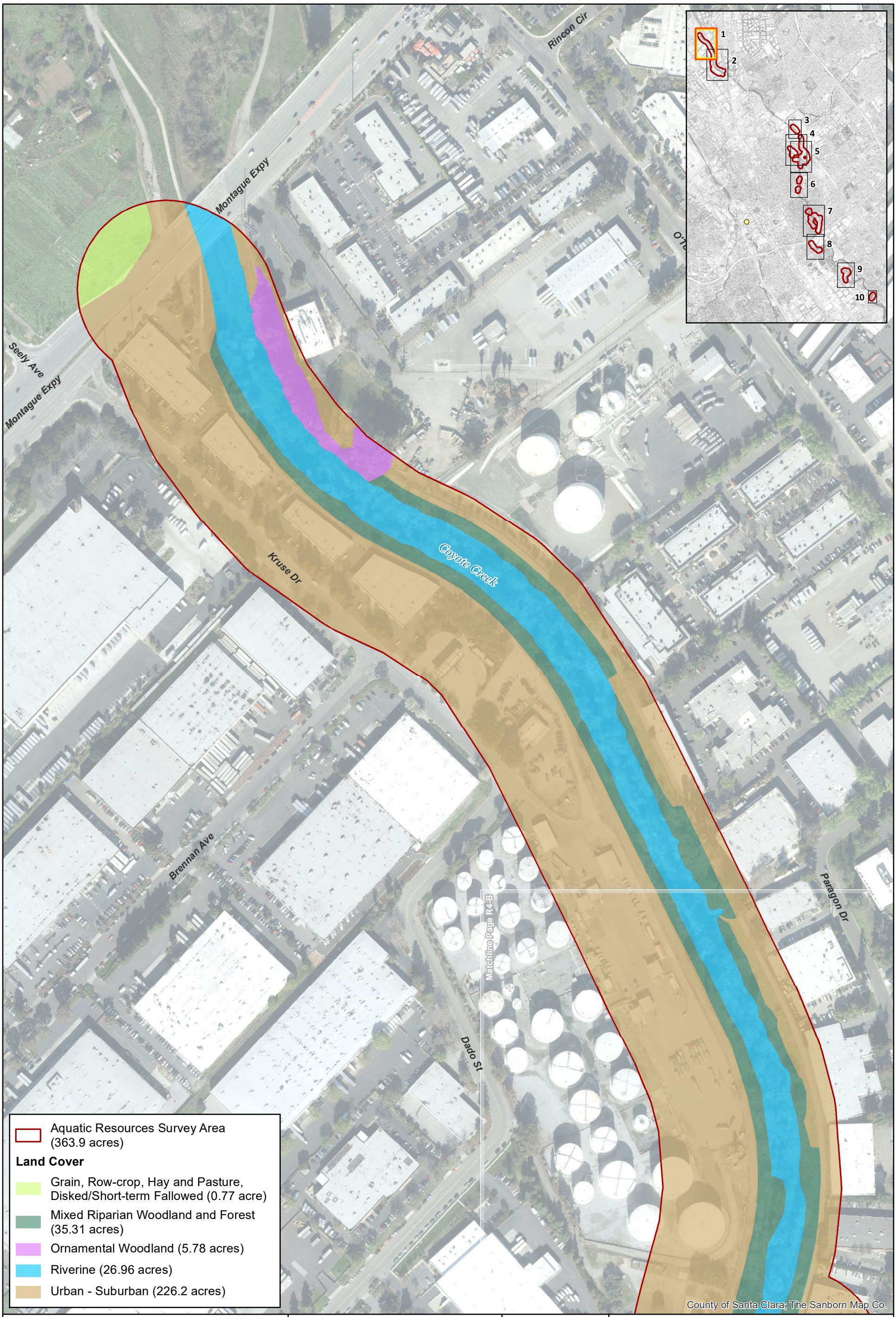
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Appendix H. Observed Plant List

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Santa Clara County, California

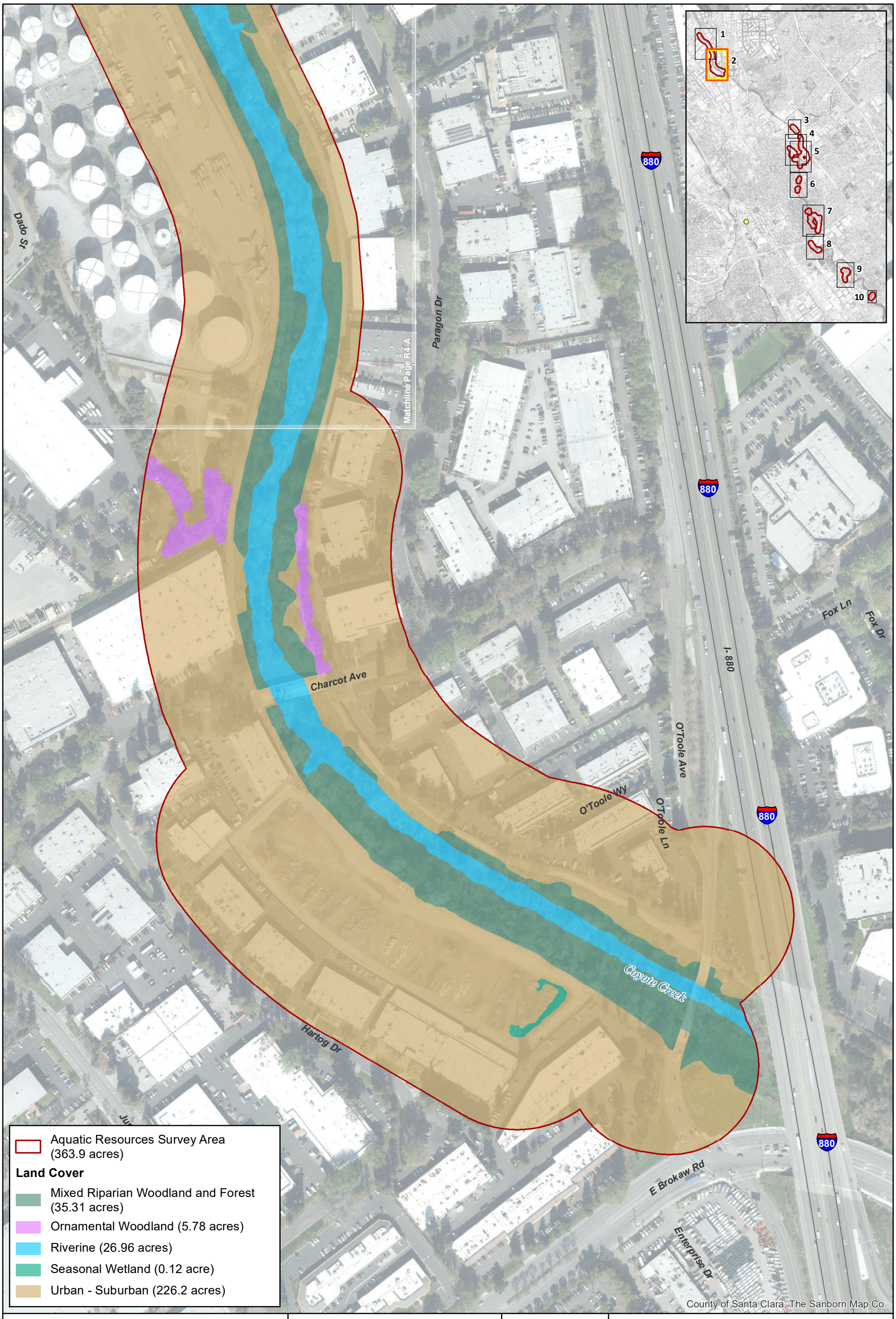
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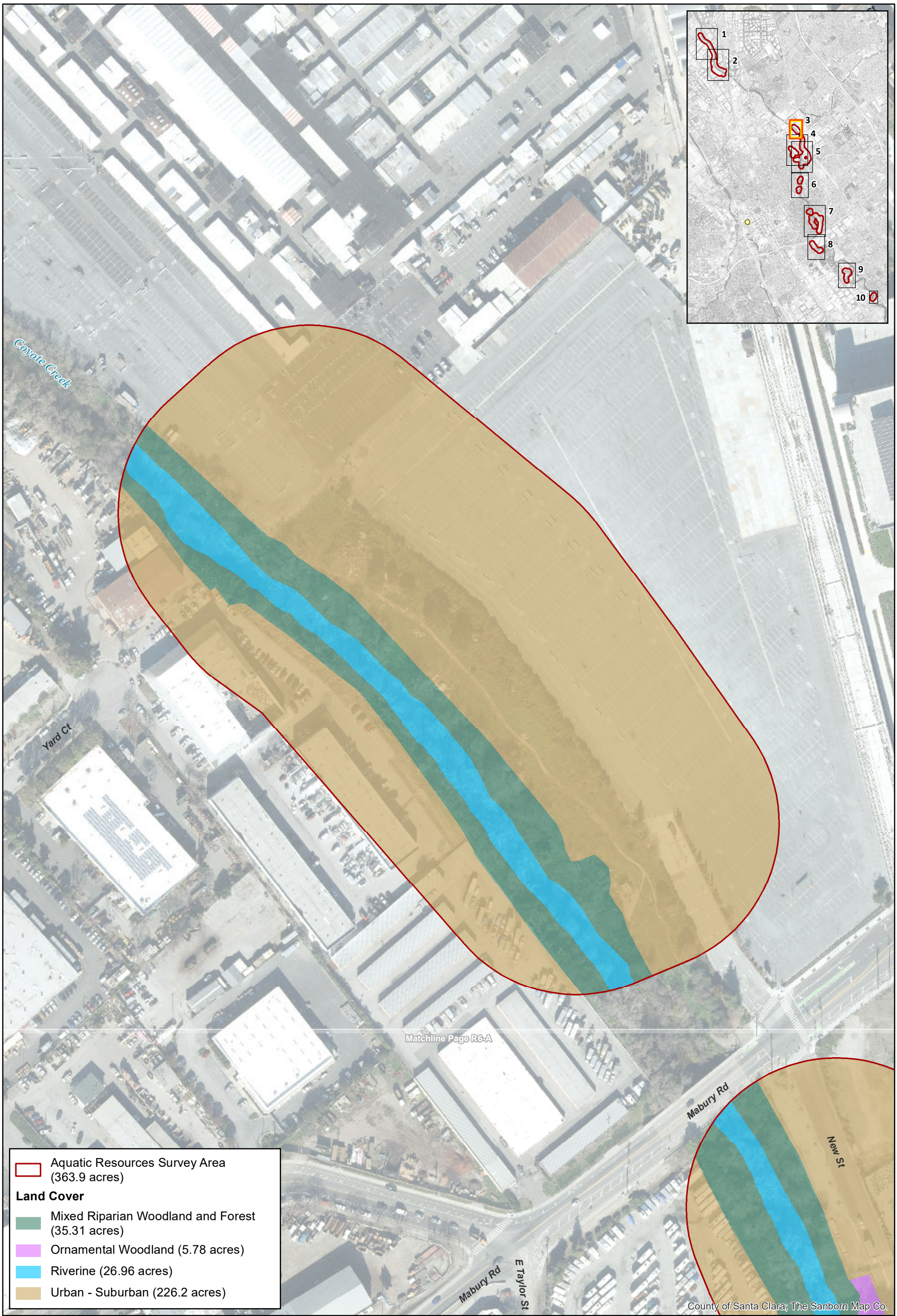
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VEGETATION COMMUNITIES
(SHEET 2 OF 10)

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Santa Clara County, California

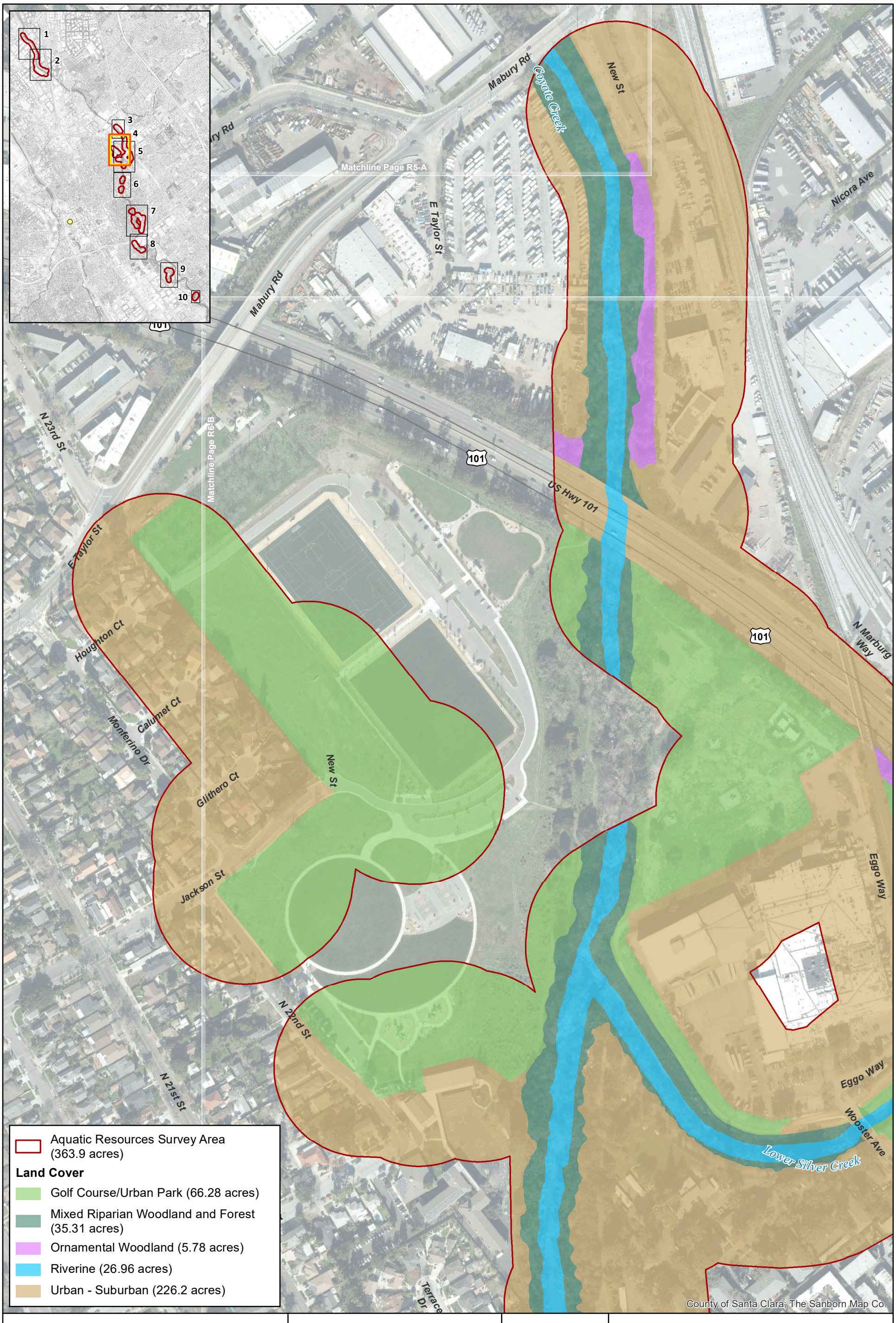
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VEGETATION COMMUNITIES
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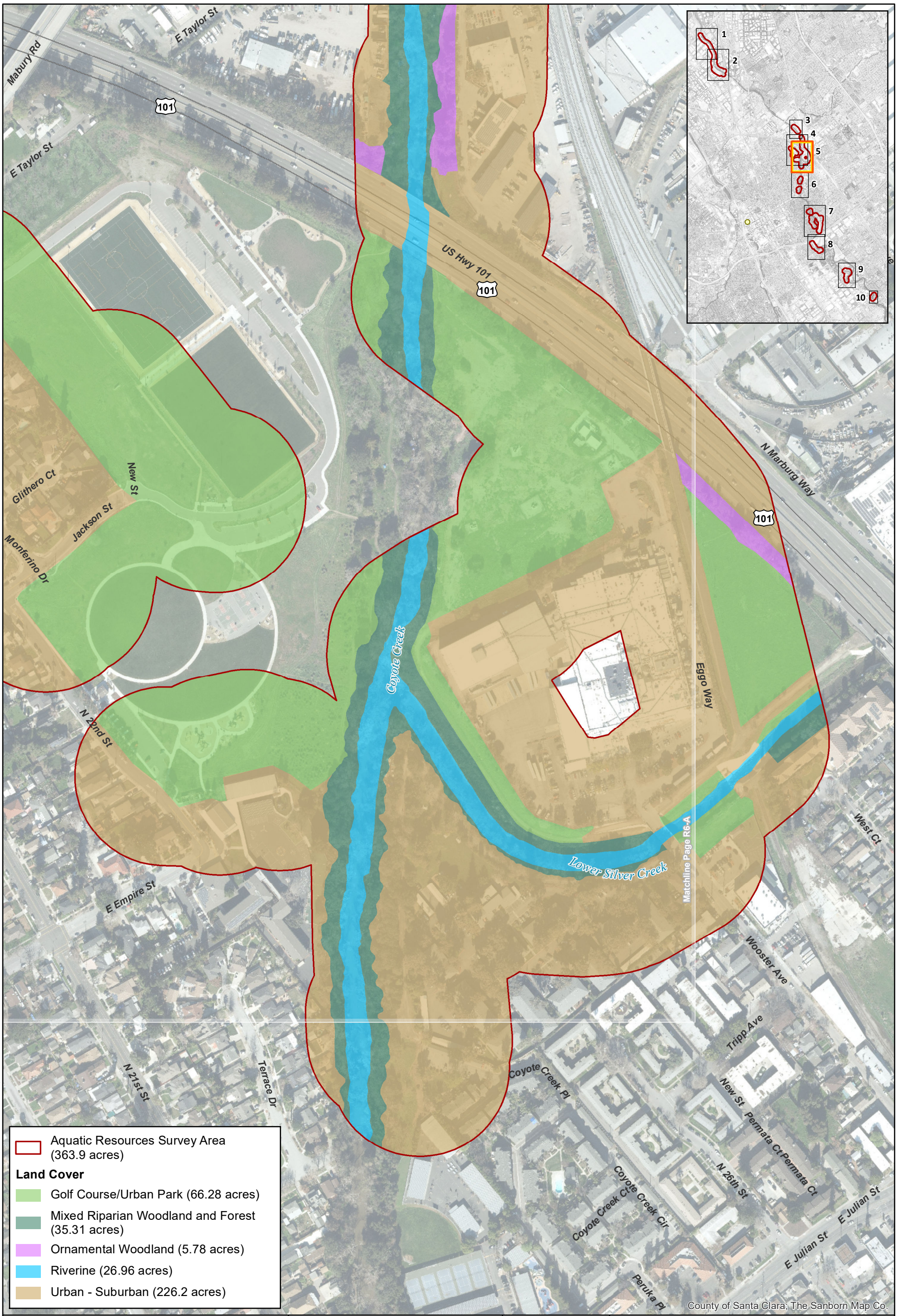
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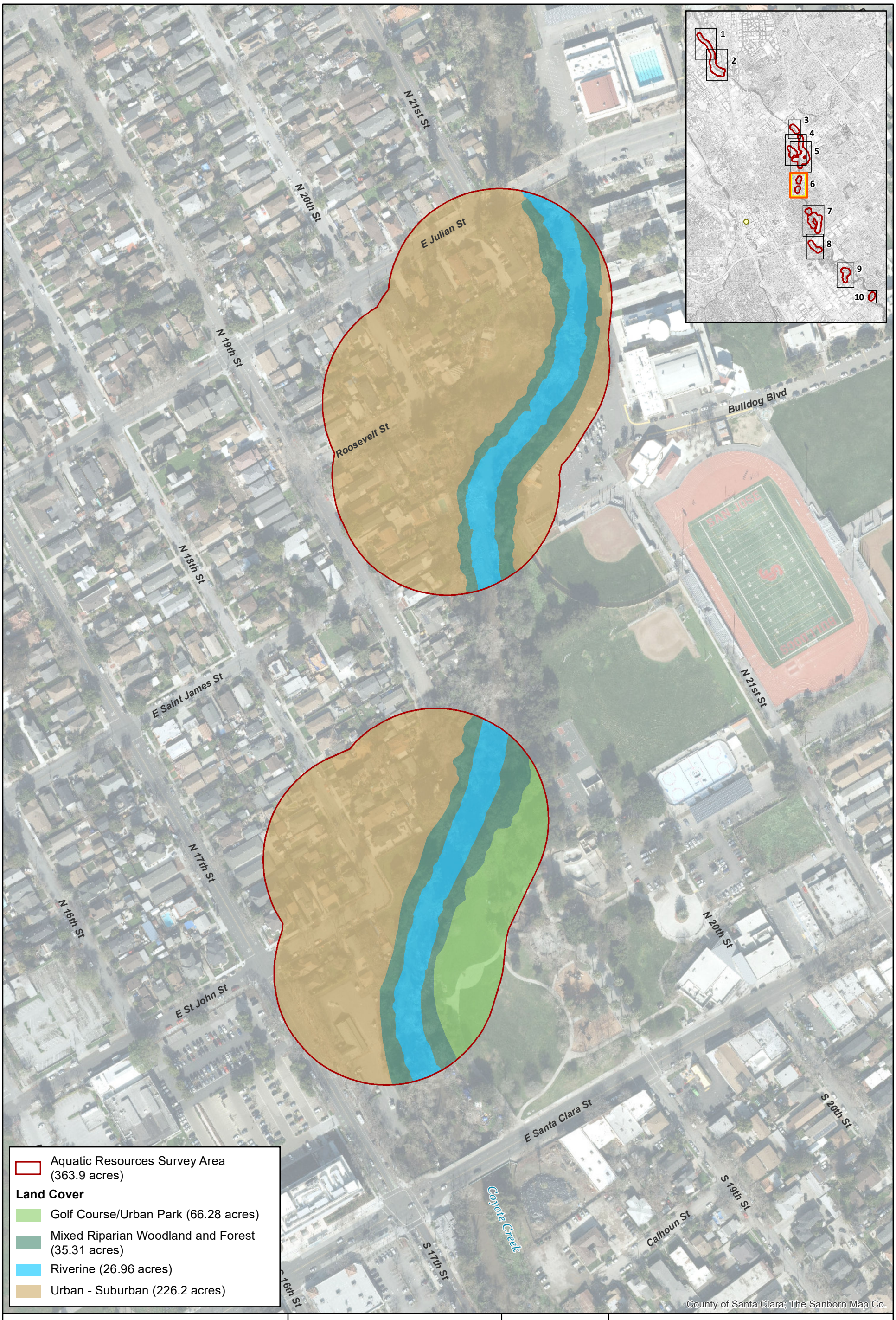
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VEGETATION COMMUNITIES
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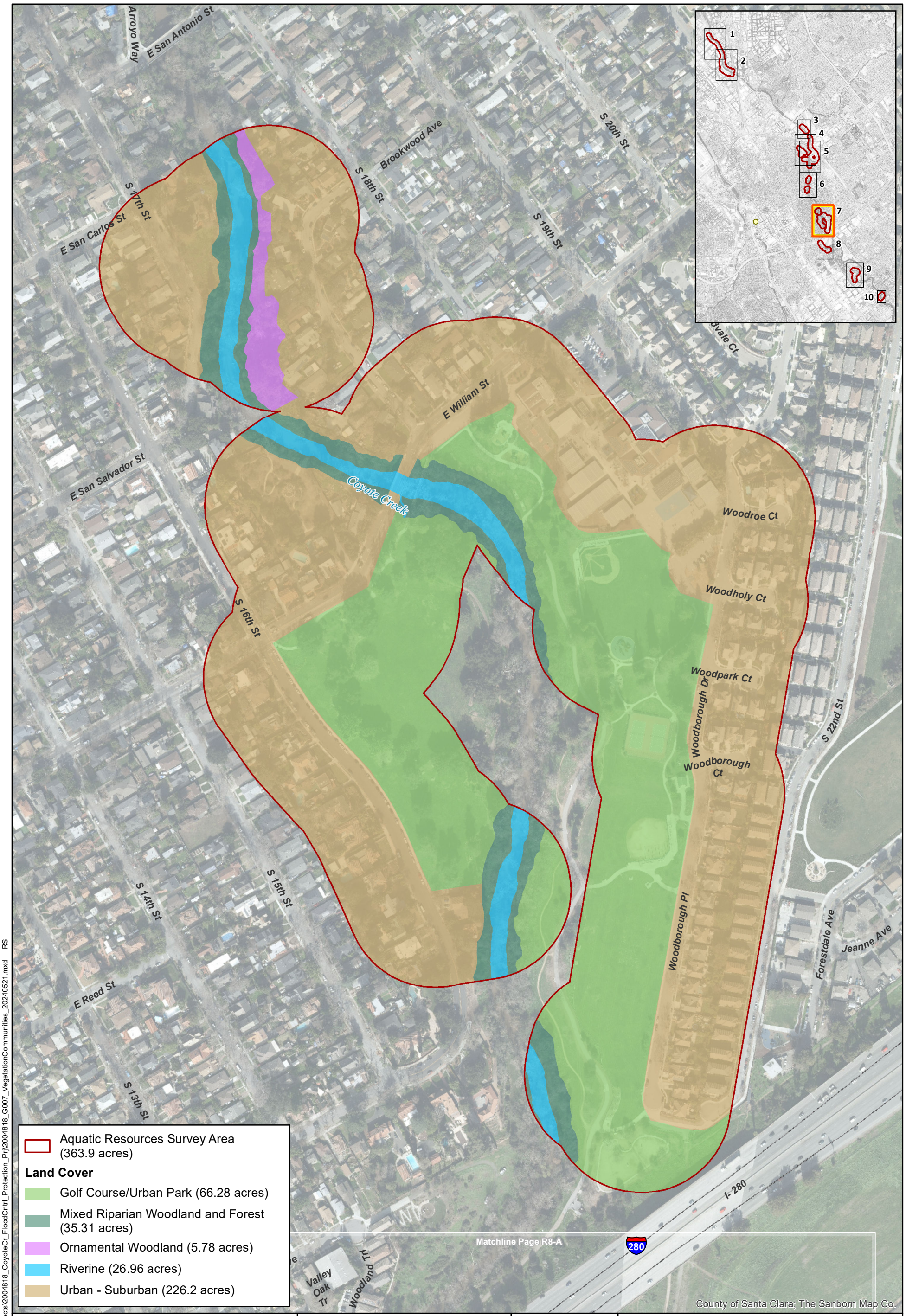
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VEGETATION COMMUNITIES
(SHEET 6 OF 10)

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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

GEI Consultants

VEGETATION COMMUNITIES
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MAY 2024 **DRAFT** APPENDIX G

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Santa Clara County, California

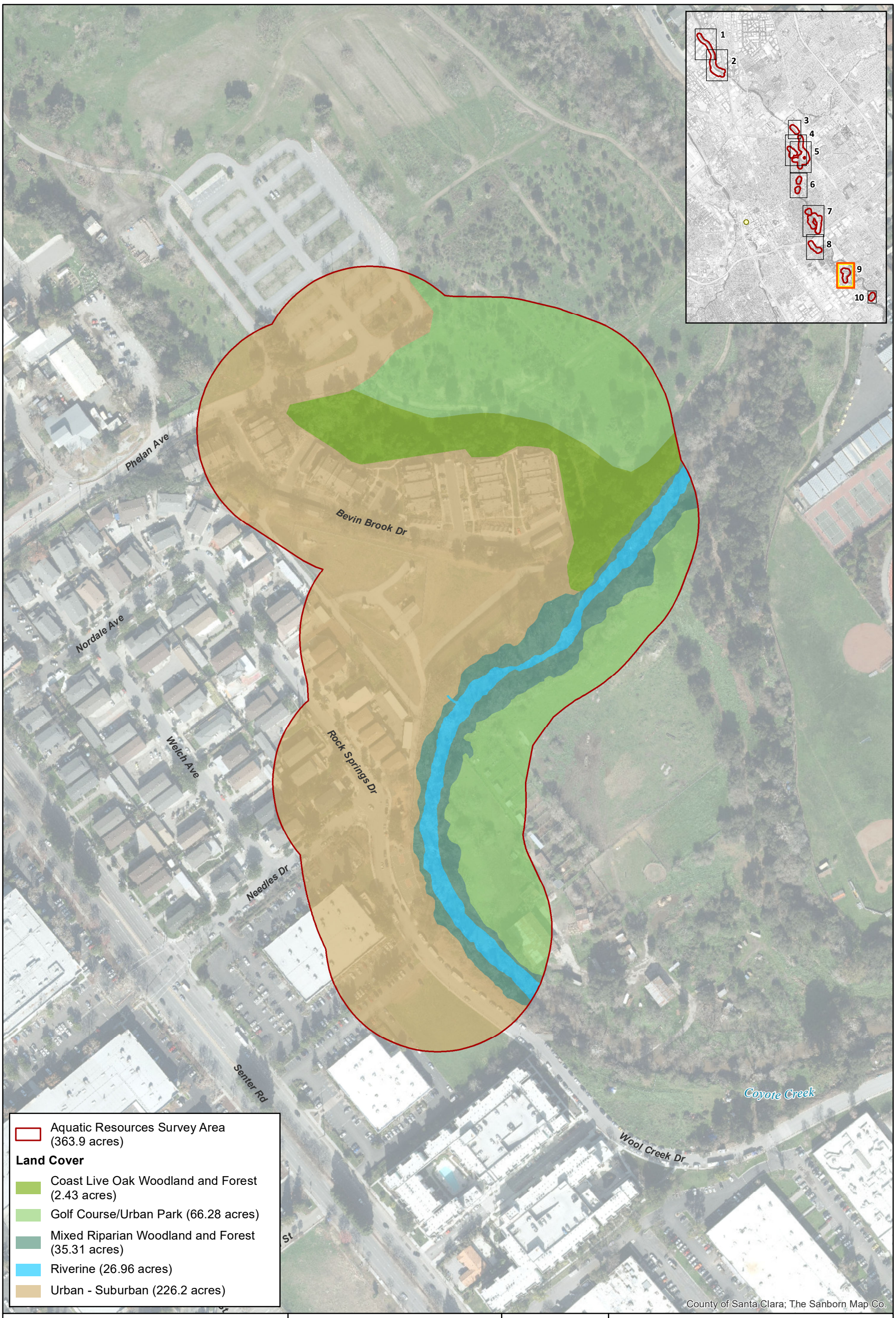
Santa Clara Valley Water District

GEI Consultants

VEGETATION COMMUNITIES
(SHEET 8 OF 10)

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Coyote Creek Flood Protection Project
Santa Clara County, California

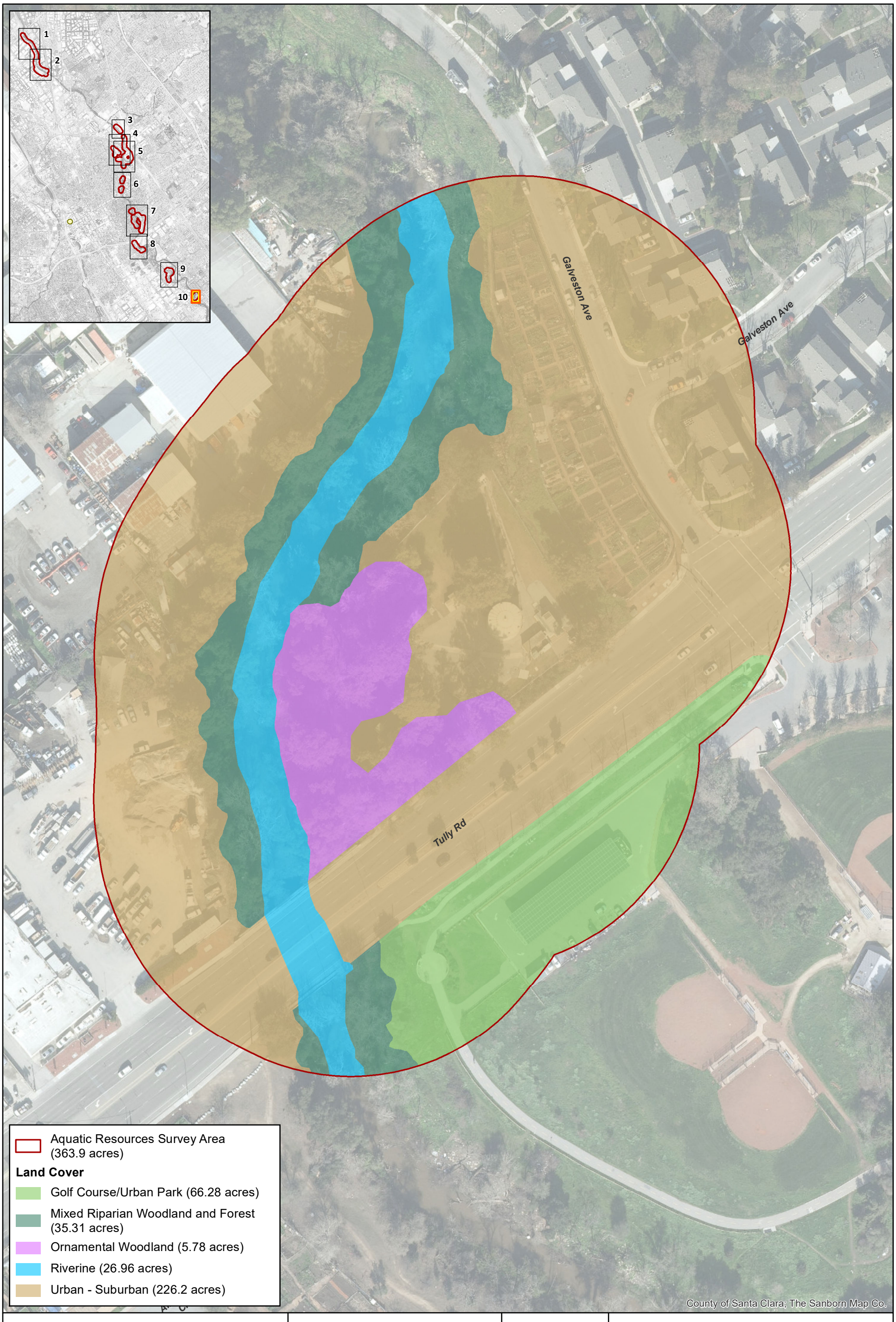
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VEGETATION COMMUNITIES
(SHEET 9 OF 10)

MAY 2024 **DRAFT** APPENDIX G

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Coyote Creek Flood Protection Project
Santa Clara County, California

Santa Clara Valley Water District

GEI Consultants

VEGETATION COMMUNITIES
(SHEET 10 OF 10)

MAY 2024 **DRAFT** APPENDIX G

21-May-2024 Z:\Projects\2004818_CoyoteCr_FloodCntrl_Protection_Prj\2004818_G007_VegetationCommunities_20240521.mxd RS

Special-status Species Potential to Occur Table (D2)

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Table D.2. Special-Status Species Evaluated within the Biological Study Area

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Plants							
Amsinckia lunaris	bent-flowered fiddleneck	–	–	–	1B.2	Coastal bluff scrub, cismontane woodland, and grassland. Elevation: 10–1,640 feet. Blooming period: March–June (CNPS 2024).	None. Suitable habitat not present. Woodland and grassland-like habitats, such as levee slopes and margins between developed areas are regularly maintained or highly disturbed. Additionally, there are no recorded occurrences of this species on the valley floor (CDFW 2024a, CCH2 2024).
Androsace elongota ssp. *acuta*	California androsace	–	–	–	4.2	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and grassland. Elevation: 490–4,280 feet. Blooming period: March (CNPS 2024).	None. BSA is below the elevation range for this species.
Arctostaphylos silvicola	Bonny Doon manzanita	–	–	–	1B.2	Chaparral, closed-cone coniferous forest, lower montane coniferous forest. Elevation: 395-1,970 feet. Blooming periods: January-March (CNPS 2024).	None. BSA is below the elevation range for this species.
Astragalus tener var. *tener*	alkali milk-vetch	–	–	–	1B.2	Alkaline soils in playas, adobe clay grassland, and vernal pools. Elevation: 5–195 feet. Blooming period: March–June (CNPS 2024).	None. Suitable habitat not present. Alkaline and/or clay soils not present.
Atriplex depressa	Brittlescale	–	–	–	1B.2	Alkaline or clay soils in chenopod scrub, meadows, seeps, playas, vernal pools, and grassland. Elevation: 3–1,049 feet. Blooming period: April–October (CNPS 2024).	None. Suitable habitat not present. Alkaline and/or clay soils not present.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Atriplex minuscula	lesser saltscale	–	–	–	1B.1	Alkaline and sandy soils in chenopod scrub, playas, and grassland. Elevation: 49–656 feet. Blooming period: May–October (CNPS 2024).	None. Suitable habitat not present. Alkaline sandy soils not present.
Balsamorhiza macrolepis	big-scale balsamroot	–	–	–	1B.2	Occasionally in serpentine soils in chaparral, cismontane woodland, and grassland. Elevation: 295–5,100 feet. Blooming period: March–June (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023). BSA is below the elevation range for this species.
Boechera rubicundula	Mt. Day rockcress	–	–	–	1B.1	Rocky slopes in chaparral. Elevation: 3,935 feet. Blooming period: April-May (CNPS 2024).	None. Suitable habitat not present. BSA is below the elevation range for this species.
Calyptridium parryi var. *hesseae*	Santa Cruz Mountains pussypaws	–	–	–	1B.1	Sandy and gravelly soils in openings of chaparral and cismontane woodland. Elevation: 1,000–5,020 feet. Blooming period: May–August (CNPS 2024).	None. BSA is below the elevation range for this species.
Castilleja affinis var. *neglecta*	Tiburon paintbrush	x	E	T	1B.2	Serpentinite grassland. Elevation: 196–1,312 feet. Blooming period: April–June. (synonym of *C. affinis*, and *C. a.* ssp. *neglecta*) (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023).
Castilleja rubicundula var. *rubicundula*	pink creamsacs	–	–	–	1B.2	Serpentine soils in meadows seeps, grassland, cismontane woodland, and openings of chaparral. Elevation: 65–2,985 feet. Blooming period: April–June (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Ceanothus ferrisiae	coyote ceanothus	x	E	_	1B.1	Serpentinite in chaparral, coastal scrub, grassland. Elevation: 393–1,510 feet. Blooming period: January–May (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023). BSA is below the elevation range for this species.
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	_	_	_	1B.1	Alkaline soils in grassland. Elevation: 0–755 feet. Blooming period: May–November (CNPS 2024).	None. Suitable habitat not present. All grassland-like habitats, such as levee slopes and margins between areas of development are regularly maintained or highly disturbed. One historic occurrence overlaps BSA but is now considered extirpated. All known regional populations associated with alkaline areas bordering SF Bay and in the Livermore area (CDFW 2024a, CCH2 2024).
Chlorogalum pomeridianum var. *minus*	dwarf soaproot	_	_	_	1B.2	Serpentine soils in chaparral. Elevation: 1,000–3,280 feet. Blooming period: May–August (CNPS 2024).	None. BSA is below the elevation range for this species. No serpentine rock types are present in the BSA (DOC 2023).
Chloropyron maritimum ssp. *Palustre*	Point Reyes salty bird's-beak	_	_	_	1B.2	Coastal salt marshes and swamps. Elevation: 0–35 feet. Blooming period: June–October (CNPS 2024).	None. Suitable habitat not present. BSA does not support salt marsh.
Chorizanthe pungens var. *hartwegiana*	Ben Lomond spineflower	_	E	_	1B.1	Maritime ponderosa pine sandhills in lower montane coniferous forest. Elevation 295–2,000 feet. Blooming period: April–July (CNPS 2024).	None. Suitable habitat not present. Species endemic to Ben Lomond area.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Chorizanthe robusta var. *robusta*	robust spineflower	_	E	_	1B.1	Sandy/gravelly soils in maritime chaparral, coastal dunes and scrub, and openings of cismontane woodland. Elevation: 5–985 feet. Blooming period: April–September (CNPS 2024).	None. Suitable habitat not present. Sandy/gravelly soils absent and not dunes, chaparral or undisturbed woodland present.
Cirsium fontinale var. *campylon*	Mt. Hamilton thistle	x	_	_	1B.2	Serpentine seeps in chaparral, cismontane woodland, and grassland. Elevation: 325–2,920 feet. Blooming period: February, April–October (CNPS 2024).	None. BSA is below the elevation range for this species. No serpentine rock types are present in the BSA (DOC 2023).
Clarkia concinna ssp. *automixa*	Santa Clara red ribbons	_	_	_	4.3	Chaparral and cismontane woodland. Elevation: 295–4,920 feet. Blooming period: April–July (CNPS 2024).	None. Suitable habitat not present. BSA is below the elevation range for this species.
Collinsia multicolor	San Francisco collinsia	_	_	_	1B.2	Sometimes in serpentine soils in coastal scrub and closed-cone coniferous forest. Elevation: 95–820 feet. Blooming period: February–May (CNPS 2024).	None. Suitable habitat not present. No serpentine rock types are present in the BSA (DOC 2023).
Delphinium californicum ssp. *interius*	Hospital Canyon larkspur	_	_	_	1B.2	Coastal scrub, mesic soils in cismontane woodland, and openings of chaparral. Elevation: 635–3,595 feet. Blooming period: April–May (CNPS 2024).	None. Suitable habitat not present. BSA is below the elevation range for this species.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Dirca occidentalis	western leatherwood	–	–	–	1B.2	Mesic soils in broadleaf upland and riparian forests, closed-cone and north coast coniferous forests, chaparral, and cismontane and riparian woodlands. Elevation: 80–1,395 feet. Blooming period: January–April (CNPS 2024).	None. Low quality habitat may be present in riparian area; however, there are no recorded occurrences of this species in the valley floor, instead distribution limited to foothills (CDFW 2024a, CCH2 2024).
Dudleya abramsii ssp. *setchellii*	Santa Clara Valley dudleya	x	E	–	1B.1	Serpentinite, rocky substrates, in cismontane woodland, grassland. Elevation: 196–1,493 feet. Blooming period: April–October (synonym of *Dudleya setchellii*) (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023).
Eleocharis parvula	small spikerush	–	–	–	4.3	Marshes and swamps. Elevation: 5–9,910 feet. Blooming period: (April) June–September (CNPS 2024).	None. No recorded occurrences of this species in the Santa Clara Valley, nearest occurrence in Oakland (CCH2 2024). Suitable habitat not present – Coyote Creek mostly narrow with steep banks and no persistent marshy patches.
Eryngium aristulatum var. *hooveri*	Hoover's button-celery	–	–	–	1B.1	Vernal pools. Elevation: 9–147 feet. Blooming period: July–August (CNPS 2024).	None. Suitable habitat (vernal pools) not present.
Extriplex joaquinana	San Joaquin spearscale	–	–	–	1B.2	Alkaline soils in chenopod scrub, meadows, seeps, playas, and grassland. Elevation: 0–2,740 feet. Blooming period: April–October (synonym of *Atriplex joaquiniana*) (CNPS 2024).	None. Suitable habitat and soils not present.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Fritillaria liliacea	fragrant fritillary	x	_	_	1B.2	Often in serpentine soils in cismontane woodland, grassland, coastal prairie and scrub. Elevation: 5–1,345 feet. Blooming period: February–April (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023). No recorded occurrences of this species in the valley floor, instead distribution mostly limited to foothills (CDFW 2024a, CCH2 2024).
Hoita strobilina	Loma Prieta hoita	x	_	_	1B.1	Usually serpentinite, mesic areas in chaparral, cismontane woodland, and riparian woodland. Elevation: 98–2,851 feet. Blooming period: May–October (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023). No recorded occurrences of this species in the valley floor, instead distribution mostly limited to foothills (CDFW 2024a, CCH2 2024).
Lasthenia conjugens	Contra Costa goldfields	_	E	_	1B.1	Mesic soils in vernal pools, grassland, alkaline playas, and cismontane woodland. Elevation: 0–1,540 feet. Blooming period: March–June (CNPS 2024).	None. Suitable habitat not present. One historic occurrence overlaps BSA but is now considered extirpated. No existing populations in the area (CDFW 2024a, CCH2 2024).
Leptosyne hamiltonii	Mt. Hamilton coreopsis	_	_	_	1B.2	Rocky soils in cismontane woodland. Elevation: 1,800–4,265 feet. Blooming period: March–May (synonym of *Coreopsis hamiltonii*) (CNPS 2024).	None. Suitable habitat not present. BSA is below species elevation range.
Lessingia micradenia var. *glabrata*	smooth lessingia	x	_	_	1B.2	Serpentinite, chaparral, cismontane woodland, grassland. Elevation: 393–1,378 feet. Blooming period: April–November (CNPS 2024).	None. BSA is below species elevation range. No serpentine rock types are present in the BSA (DOC 2023).
Lomatium observatorium	Mt. Hamilton lomatium	_	_	_	1B.2	Cismontane woodland. Elevation: 3,995–4,365 feet. Blooming period: March–May (CNPS 2024).	None. BSA is below species elevation range.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Malacothamnus arcuatus	arcuate bush-mallow	–	–	–	1B.2	Chaparral and cismontane woodland. Elevation: 45–1,165 feet. Blooming period: April–September (CNPS 2024).	None. Suitable habitat not present. All woodland habitats disturbed or maintained.
Malacothamnus hallii	Hall's bush-mallow	–	–	–	1B.2	Chaparral and coastal scrub. Elevation: 30–2,495 feet. Blooming period: April–October (CNPS 2024).	None. Suitable habitat (chaparral and scrub) not present.
Monolopia gracilens	woodland woollythreads	–	–	–	1B.2	Serpentine soils in the openings of chaparral and broadleafed upland and north coast coniferous forests, grassland, and cismontane woodland. Elevation: 325–3,935 feet. Blooming period: February–July (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023). BSA is below species elevation range.
Navarretia prostrata	prostrate vernal pool navarretia	–	–	–	1B.2	Mesic coastal scrub, meadows and seeps, alkaline grassland, and vernal pools. Elevation: 49–3,968 feet. Blooming period: April–July (CNPS 2024).	None. Suitable habitats and soils not present.
Pedicularis dudleyi	Dudley's lousewort	–	–	R	1B.2	Maritime chaparral, cismontane woodland, grassland, and north coast coniferous forest. Elevation: 195–2,955 feet. Blooming period: April–June (CNPS 2024).	None. Species distribution limited to coastal foothills/mountains (CDFW 2024a, CCH2 2024).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Penstemon rattanii var. *kleei*	Santa Cruz Mountains beardtongue	–	–	–	1B.2	Chaparral, lower montane coniferous forest, and North Coast coniferous forest. Elevation: 1,310–3,610 feet. Blooming period: May–June (CNPS 2024).	None. BSA is below species elevation range. Suitable habitat not present.
Pentachaeta bellidiflora	white-rayed pentachaeta	–	FE	SE	1B.1	Cismontane woodland and grassland with serpentine soils. Elevation: 110–2,035 feet. Blooming period: March–May (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023).
Piperia candida	white-flowered rein orchid	–	–	–	1B.2	Serpentine soils in broadleafed upland and lower montane and north coast coniferous forests. Elevation: 95–4,300 feet. Blooming period: (March) May–September (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023). Suitable habitat not present.
Phacelia phacelioides	Mt. Diablo phacelia	–	–	–	1B.2	Rocky soils chaparral and cismontane woodland. Elevation: 1,640–4,495 feet. Blooming period: April–May (CNPS 2024).	None. BSA is below species elevation range. Suitable habitat not present.
Plagiobothrys glaber	hairless popcornflower	–	–	–	1A	Alkaline soils in meadows and seeps and coastal salt marshes and swamps. Elevation: 45–590 feet. Blooming period: March–May (CNPS 2024).	None. Suitable habitat and soils not present. Species considered extinct.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Puccinellia simplex	California alkali grass	–	–	–	1B.2	Alkaline and vernal mesic soils in sinks, flats, and lake margins of chenopod scrub, meadows, seeps, grassland, and vernal pools. Elevation: 5–3,050 feet. Blooming period: March–May (CNPS 2024).	None. Suitable habitats and soils not present.
Ravenella exigua	chaparral harebell	–	–	–	1B.2	Rocky, usually serpentine soil in chaparral. Elevation: 900–4,100 feet. Blooming period: May–June. (synonym of *Campanula exigua*) (CNPS 2024).	None. Suitable habitat not present. BSA is below species elevation range. No serpentine rock types are present in the BSA (DOC 2023).
Sagittaria sanfordii	Sanford's arrowhead	–	–	–	1B.2	Fresh water marshes and swamps that are typically shallow. Elevation: 0–2,132 feet. Blooming period: May–October (CNPS 2024).	None. Species distribution limited to Central Valley and coastal foothills (CDFW 2024a, CCH2 2024).
Sanicula saxatilis	rock sanicle	–	–	R	1B.2	Rocky, scree, and talus soils in chaparral, grassland, and broadleafed upland forest. Elevation: 2,030–3,855 feet. Blooming period: April–May (CNPS 2024).	None. Suitable habitat not present. BSA is below species elevation range.
Senecio aphanactis	chaparral ragwort	–	–	–	2B.2	Chaparral, cismontane woodland, coastal scrub, and alkaline flats. Elevation: 49–2,624 feet. Blooming period: January–April (CNPS 2024).	None. Suitable habitat not present. Woodland habitats are part of urban parks and regularly maintained or highly disturbed. Other habitats are not present in the BSA.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Spergularia macrotheca var. *longistyla*	long-styled sand-spurrey	_	_	_	1B.2	Alkaline soils in meadows, seeps, marshes and swamps. Elevation: 0–835 feet. Blooming period: February–May (CNPS 2024).	None. Suitable habitat not present.
Streptanthus albidus ssp. *albidus*	Metcalf Canyon jewelflower	x	E	_	1B.1	Serpentinite soils in grassland. Elevation: 147–2,625 feet. Blooming period: April–July (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023).
Streptanthus albidus ssp. *peramoenus*	most beautiful jewelflower	x	_	_	1B.2	Serpentinite soils in chaparral, cismontane woodland, grassland. Elevation: 311–3,281 feet. Blooming period: March–October (CNPS 2024).	None. No serpentine rock types are present in the BSA (DOC 2023).
Stuckenia filiformis ssp. *alpina*	northern slender pondweed	_	_	_	2B.2	Shallow freshwater marshes and swamps. Elevation: 980–7,055 feet. Blooming period: May–July (CNPS 2024).	None. BSA is below elevational range.
Suaeda californica	California seablite	_	E	_	1B.1	Coastal salt marshes and swamps. Elevation: 0–50 feet. Blooming period: July–October (CNPS 2024).	None. Suitable habitat not present. BSA does not support salt marsh habitats.
Trifolium buckwestiorum	Santa Cruz clover	_	_	_	1B.1	Gravelly soils and margins in broad-leafed upland forest, cismontane woodland, and coastal prairie. Elevation: 345–2,000 feet. Blooming period: April–October (CNPS 2024).	None. BSA is below species elevation range.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Trifolium hydrophilum	saline clover	–	–	–	1B.2	Marshes, swamps, vernal pools, and grassland with mesic or alkaline soils. Elevation: 0–985 feet. Blooming period: April–June (CNPS 2024).	None. Historic occurrences in San Jose over 100 years old and assumed extirpated (CCH2 2024). Suitable habitat not present. Wetland or other mesic areas are highly disturbed.
Invertebrates							
Bombus crotchii	Crotch's bumble bee	–	–	CE	–	Open grasslands and scrub habitats. Nesting biology is poorly known (The Xerces Society 2018); known nests to date have been in abandoned rodent burrows, though only six nests have been found in total, all in 2023 (Shawn Lockwood, pers. comm. 2024).	Low; occurrences known from the project vicinity (CDFW 2024a, iNaturalist 2024[1]). Individuals could occur throughout the BSA and Santa Clara County observations have occurred March-August.
Bombus occidentalis	western bumble bee	–	–	CE	–	Meadows and grasslands; nests primarily in underground cavities such as abandoned burrows and sometimes above ground in logs and similar structures (The Xerces Society 2018).	Absent; BSA is outside species current range (CDFW 2023).
Danaus plexippus	monarch butterfly	–	C	–	–	Variety of habitats with suitable nectar plants. Requires milkweed for egg laying and larval feeding; overwinters in wind-protected groves of large trees along the coast (USFWS 2020a).	Moderate; occurrences known from the project vicinity (Western Monarch and Milkweed Occurrence Database 2024) but no overwintering locations or suitable overwintering habitat occurs in the BSA or elsewhere in Santa Clara County. Individuals could occur throughout the BSA, typically from March through October.

[1] All iNaturalist occurrences were verified by a Valley Water biologist with extensive Crotch's bumble bee survey and identification experience.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Euphydryas editha bayensis	Bay checkerspot butterfly	x	T	_	_	Restricted to native grasslands on outcrops of serpentine soil that support larval host plants California plantain (*Plantago erecta*), dense flower owl's-clover (*Castilleja densiflora*), or purple owl's clover (*Castilleja exserta*) (USFWS 2009a).	Absent; BSA is outside species range (USFWS 2024).
Lepidurus packardi	vernal pool tadpole shrimp	_	E	_	_	Ephemeral freshwater vernal pools and other seasonal wetlands (USFWS 2007a).	Absent; not known to occur in Santa Clara County (CDFW 2024a, USFWS 2005a).
Trimerotropis infantilis	Zayante band-winged grasshopper	_	E	_	_	Restricted to pine forest and chaparral habitats on sandy Zayante soils in Santa Cruz County (USFWS 2009b).	Absent; BSA is outside species distribution (USFWS 2001).
Fish							
Acipenser medirostris	green sturgeon – southern DPS	_	T, CH	_	_	Spawns in deep pools with gravel, cobble, or boulder substrate in cool sections of primarily the Sacramento River, but also Feather and Yuba Rivers. Occurs in marine habitats during non-spawning season. (NMFS 2021)	Absent; BSA is upstream of the known range, and the species has not been detected south of the Dumbarton Bridge. Potential occurrence does not extend beyond the tidally influenced portion of Coyote Creek, if at all; green sturgeon does not spawn in Coyote Creek and designated critical habitat does not extend upstream to the project reaches (NOAA Fisheries 2024b).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Acipenser transmontanus	white sturgeon	_	_	SSC	_	Primarily occurs in estuaries of large rivers; migrates to spawn in fresh water and makes long ocean movements between river systems; commonly aggregate in deep, soft-bottomed areas of estuaries (Moyle et al. 2015).	Absent; BSA is upstream of this species range, which does not extend beyond the tidally influenced portion of Coyote Creek; white sturgeon does not spawn in Coyote Creek.
Cottus gulosus	Riffle sculpin	_	_	SSC	_	Restricted to permanent, cool headwater streams dominated by riffles and rocky substrates (Moyle et al. 2015).	Absent; occurs in tributary streams (e.g. Upper Penitencia Creek), but BSA does not provide cool, headwater habitat required by this species.
Entosphenus tridentatus	Pacific lamprey	_	_	SSC	_	Anadromous fish that migrates from riverine spawning habitats to marine waters. In Santa Clara County, upstream migration typically occurs between January and June, and downstream migration between December and May. Adults spawn in low gradient, gravel-bottomed streams. Ammocoetes (larvae) burrow into silty substrates where they filter-feed and grow in freshwater for up to 6 years before outmigrating.	Moderate; most recently detected moving both up- and downstream in Coyote Creek between Metcalf Road and Highway 101 in April 2023 (Valley Water 2024). Spawning is not known or expected to occur in the BSA, but lamprey could be present year-round, including adults during pre-spawning holding and upstream migration, larvae during rearing, and juveniles during outmigration.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Hesperoleucus venustus subditus	southern coastal roach	–	–	SSC	–	Generally found in small, warm streams, including intermittent streams, but also occur in larger cooler streams; tolerant of a relatively wide range of temperatures and dissolved oxygen levels (Moyle et al. 2015, University of California 2024).	Moderate; low numbers have been detected in Coyote Creek downstream of Anderson Dam and upstream of the BSA (Valley Water 2021, 2023). Adults or juveniles could occur year-round in the BSA.
Lavinia exilicauda exilicauda	Sacramento hitch	–	–	SSC	–	Occurs in slow, warm, lowland, waters in lakes and streams; occurs in fresh- to brackish water up to 9 parts per thousand (University of California 2024).	High; regularly detected in Coyote Creek upstream of Ogier Ponds during Valley Water's annual monitoring efforts since 2019 (Valley Water 2024b). Monitoring efforts have been limited lower in the system; however, the species was known to occur in the system historically (Snyder 1905). Adults or juveniles could occur year-round in the BSA.
Oncorhynchus kisutch	Coho salmon – central California coast ESU	–	E, EFH	E	–	Occurs in marine, estuary, and freshwater habitats; requires stable gravel substrates in cold, clean freshwater streams for spawning.	Absent; last documented from the San Francisco estuary in the early to mid-1980s (CDFW 2015).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Oncorhynchus mykiss	steelhead – Central California Coast DPS	_	T, CH	SSC	_	Anadromous fish that occurs in marine, estuary, and freshwater habitats. Spawning substrate includes gravels 1-13 cm diameter (Moyle et al. 2015). Upstream migration typically occurs from December through April, and outmigration from February through May.	High; documented in Coyote Creek up to Anderson Dam. Spawning and rearing are known to occur in Coyote Creek upstream of Metcalf Road and the BSA. Migration through the BSA could occur and adults may be present December through April-, as well as smolts during outmigration between February and May, or rearing juveniles year-round.
Oncorhynchus tshawytscha	Chinook salmon – Central Valley fall/ late fall-run ESU	_	SC, EFH	SSC[2]	_	Anadromous fish that occurs in marine, estuary, and freshwater habitats. Spawning substrate includes large gravel and small cobble (Moyle et al. 2015). Upstream migration typically occurs from mid-October through January, and outmigration from February through June.	High; documented in Coyote Creek up to Metcalf Dam. Genetic analysis indicates Chinook salmon in Santa Clara County originated as strays from the Feather River Hatchery (Garcia-Rossi and Hedgecock 2002). Spawning could occur in the BSA in areas with suitable substrate and flow and individuals may be present mid-October through June, including adults during upstream migration and spawning, or smolts during outmigration.
Spirinchus thaleichthys	longfin smelt – San Francisco Bay-Delt DPS	_	C	T	_	Nearshore waters to estuaries and lower portions of freshwater streams (USFWS 2022).	Absent; distribution is limited to tidally-influenced estuarine reaches of Coyote Creek downstream of the project area.

[2] The Central Valley fall/late fall-run evolutionarily significant unit is considered a state Species of Special Concern, but this designation refers to populations spawning in the Sacramento and San Joaquin rivers and their tributaries (CDFW 2024b).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Amphibians							
Ambystoma californiense	California tiger salamander – Central California DPS	x	T	T	_	Breeds in vernal pools and ponds, including livestock ponds and other modified ephemeral and permanent ponds in grassland, oak savanna, and edges of mixed woodland and forest. Spends most of the year underground in small mammal burrows (USFWS 2017a).	Absent; BSA does not support vernal pools or other suitable aquatic breeding habitat in grassland or other open upland habitats along Coyote Creek.
Aneides niger	Santa Cruz black salamander	_	_	SSC	_	Typically moist streamsides and shallow standing water or seeps in mesic forests of the Coast Range fog belt (Thomson et al. 2016).	Absent; BSA is outside species range (Thomson et al. 2016).
Dicamptodon ensatus	California giant salamander	_	_	SSC	_	Typically mesic coastal oak and coniferous forests, sometimes coastal chaparral; breeding and larval development occur in cold streams (Thomson et al. 2016).	Absent; BSA is at edge of species range (Thomson et al. 2016) and does not provide suitable cold stream aquatic habitat for breeding.
Rana boylii	foothill yellow-legged frog – central coast DPS	x	T	SE	_	Shallow flowing streams and rivers with at least cobble-sized substrate. Breeding typically occurs at the margins of wide shallow channels with reduced flow variation near tributary confluences (Thomson et al. 2016.)	Absent; species has been documented in upper portions of the watershed (Middle Fork Coyote Creek); however, lower Coyote Creek provides poor conditions for this species (flow, substrate, urbanization, bullfrogs and non-native predatory fish) and species is presumed extirpated from lowland agricultural and urban portions of Santa Clara County, including the BSA (ICF 2012).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Rana draytonii	California red-legged frog	x	T	SSC	_	Occurs primarily in ponds, but also in marshes, streams, and lagoons. Also occurs in various upland habitats with moist refuges (e.g., burrows, logs, rocks) (Thomson et al. 2016).	Low; BSA provides poor-quality habitat due to urban setting and potential presence of bullfrogs and non-native predatory fish. No documented occurrences from Coyote Creek channel downstream of Anderson Dam; occurrences along lower Coyote Creek are limited to off-channel tributaries, ponds (e.g., in Coyote Canal, stock ponds, mitigation site ponds), quarry pits, and Anderson Dam spillway plunge pool (CDFW 2024a); considered extirpated from urbanized lowland Santa Clara County, including BSA, but Coyote Creek is mapped as breeding habitat in the VHP (ICF 2012).
Reptiles							
Anniella pulchra	northern California legless lizard	_	_	SSC	_	Moist, sandy/ loose loamy soil under sparse vegetation in chaparral, coastal scrub and coastal dunes (CDFW 2024a).	Absent; BSA does not provide chaparral, coastal scrub, or coastal dune habitat.
Actinemys marmorata	northwestern pond turtle	x	PT	SSC	_	Permanent and ephemeral aquatic habitats; requires at least moderately undisturbed upland habitat for nesting and overwintering, in soils loose enough for excavation (Thomson et al. 2016).	High; occurrences known from Coyote Creek near BSA (CDFW 2024a). Individuals could occur year-round throughout the BSA, but potentially suitable nesting habitat is likely limited to Reaches 5, 6, and 7.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Masticophis lateralis euryxanthus	Alameda whipsnake	_	T	T	_	Mixed chaparral, coastal scrub, and annual grassland and oak woodlands that are adjacent to scrub habitats, rock outcrops or river corridors (USFWS 2002).	Absent; BSA is outside species range which is primarily limited to Alameda and Contra Costa Counties; Santa Clara County occurrences are restricted to hills in the northeastern portion of the County (CDFW 2024a).
Phrynosoma blainvillii	coast horned lizard	_	_	SSC	_	Woodland and scrub habitats with open areas, low vegetation cover, and sandy soils for burial (CDFW 2024).	Absent; BSA does not provide suitable habitat; the few occurrences documented in Santa Clara County are from chaparral, grassland, and oak woodland in eastern and southern portions of the county (CDFW 2024a).
Birds							
Agelaius tricolor	tricolored blackbird	x	_	T	_	Nests colonially in cattails and tules, riparian scrub, grain crops, and other low, dense vegetation in relatively undisturbed areas; forages in grasslands and fields.	Absent; BSA does not provide suitable nesting habitat and foraging quality is very poor; historical nesting colonies nearest the BSA are not known to have been active since the 1990s; nearest known colony active since 2000 is approximately 9 miles south of the BSA (CDFW 2024a).
Ammodramus savannarum	grasshopper sparrow	_	_	SSC	_	Variety of grassland habitats; prefers short to middle-height, moderately open grasslands with scattered shrubs (Shuford and Gardali 2008).	Absent; BSA is outside current breeding range (Shuford and Gardali 2008) and open grassland in the BSA is too limited in extent and too isolated from large expanses of open habitat to support this species (even for foraging by migrants).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Aquila chrysaetos	golden eagle	_	_	FP	_	Prefers rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, cliffs, and rock outcrops (Polite et al. 1990). Primarily nests on cliffs in steep canyons, but also in large trees in open areas.	Absent as breeder; could occur occasionally in BSA at any time of year, but BSA does not provide suitable nesting habitat and foraging quality is poor.
Athene cunicularia	burrowing owl	x	_	SSC	_	Preferred habitat, such as open grassland, is typified by short, sparse vegetation with few shrubs, gentle topography and well-drained soils. Also occurs in agricultural areas, ruderal fields, vacant lots, etc. if vegetation structure is suitable, there are useable mammal burrows or artificial burrows, and foraging habitat is present in proximity (CDFG 2012).	Absent as breeder; known to occur at the San Jose Airport along the Guadalupe River to the west, near the Bay shore downstream of the BSA, and at Meadow Fair Park approximately 1.5 miles east of the BSA (CDFW 2024a). Habitat quality in the BSA is poor and possible use of the BSA is likely limited to itinerant burrowing owls moving through or briefly stopping. Potentially suitable habitat occurs primarily in Reaches 5, 6, and 7.
Buteo swainsoni	Swainson's hawk	_	_	T	_	Breeds in grasslands, riparian areas, savannahs, and agricultural or ranch lands with suitable nest trees. Requires adjacent foraging habitat such as grasslands and suitable agricultural crops (CDFW 2024a).	Absent as breeder; may occur in the BSA as a transient during migration and the breeding season (March-October). Rarely nests in Santa Clara County; nearest known nest sites are more than 12 miles to the south in Coyote Valley, where active nests have occurred at four locations in 2013-2021 (CDFW 2024a).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Charadrius nivosus nivosus	western snowy plover	_	T	SSC	_	Coastal populations nest on sandy or gravelly dune-backed beaches, sand spits, and on estuarine salt pans and lagoons (USFWS 2005b).	Absent; BSA does not provide suitable nesting or foraging habitat.
Circus hudsonius	northern harrier	_	_	SSC	_	Nests on the ground in patches of dense, tall vegetation in undisturbed areas. Breed and forage in a variety of open habitats such as marshes, wet meadows, rivers and streams, grasslands, pastures, croplands, sagebrush flats (Shuford and Gardali 2008).	Absent as breeder; BSA provides poor foraging habitat and is not suitable for nesting, but individuals could occur occasionally as transients at any time of year.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	_	T	E	_	Requires riparian woodland with dense cover; primarily old-growth cottonwood forests with willow understory. Breeding in northern California is limited to the Sacramento Valley along the Sacramento and Feather Rivers (USFWS 2019).	Absent; BSA is outside the breeding range; only extant northern California breeding population is along the Sacramento River (USFWS 2019) and the only known, documented occurrence in the San Francisco Bay Area is from Milpitas in 1899 (CDFW 2024a).
Coturnicops noveboracensis	yellow rail	_	_	SSC	_	Nests in marshes and meadows with moist soil or shallow standing water. Winters in wet meadows and tidal marshes (Shuford and Gardali 2008).	Absent; BSA does not provide suitable marsh or meadow habitat.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Cypseloides niger	black swift	_	_	SSC	_	Nests behind or beside permanent or semi-permanent waterfalls, on perpendicular cliffs near water, and in sea caves (Shuford and Gardali 2008).	Absent; no nest colonies known from the region and only known Santa Clara County occurrence is of a single individual in 1973 (CDFW 2024a); BSA does not provide suitable nesting habitat and unlikely to occur in the BSA as a migrant.
Elanus leucurus	white-tailed kite	_	_	FP	_	Nests in woodland, savannah, and other open areas with trees near foraging habitat. Forages in open grasslands, meadows, farmlands, and emergent wetlands (CWHR Program Staff 2005).	Moderate; BSA provides potentially suitable nest sites and foraging habitat. Could occur throughout the BSA at any time of year.
Geothlypis trichas sinuosa	saltmarsh common yellowthroat	_	_	SSC	_	Primarily occurs in tidal and nontidal freshwater, brackish, and salt marsh; also occurs in weedy ruderal riparian habitats with dense understory vegetation.	Absent; BSA begins at upstream end of lower Coyote Creek distribution, which extends to the vicinity of Montague Expressway (SFBBO 2012); BSA lacks preferred marsh habitat.
Haliaeetus leucocephalus	bald eagle	_	_	E, FP	_	Occurs primarily along seacoasts, rivers, and large lakes and streams. Nests in mature or old-growth trees, snags (dead trees), cliffs, rock promontories, occasionally on electrical and communication towers, typically within sight of water body where the eagles usually forage (USFWS 2007b).	Absent as breeder; nearest nesting location is downstream of the BSA at Curtner Elementary School in Milpitas (CDFW 2024a), BSA does not provide suitable nesting habitat and foraging habitat quality is poor, but individuals could occur occasionally at any time of year.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Icteria virens	yellow-breasted chat	–	–	SSC	–	Occurs primarily in early-successional riparian habitat with a well-developed shrub layer and an open canopy along borders of streams, creeks, sloughs, and rivers (Shuford and Gardali 2008).	Absent as breeder; BSA provides poor-quality habitat and is unsuitable for nesting, but migrant and dispersing individuals could occur rarely. Only known breeding documentation along Coyote Creek was approximately 2 miles upstream of the BSA and documented nesting habitat in Santa Clara County supports dense willow and bramble understory (Bousman 2007).
Lanius ludovicianus	loggerhead shrike	–	–	SSC	–	Occurs in shrublands and open woodlands with grass cover and bare ground. Requires large shrubs or trees for nesting and thorny vegetation or barbed wire fences for impaling prey (Shuford and Gardali 2008).	Absent as breeder; BSA provides poor quality habitat and nesting is currently only known to occur in the southern portion of Santa Clara County. Non-breeding individuals could occur occasionally in the BSA at any time of year.
Laterallus jamaicensis coturniculus	California black rail	–	–	T, FP	–	Saline to freshwater emergent wetlands, including scattered locations in San Francisco Bay (CWHR Program Staff 1999a).	Absent; BSA does not provide suitable wetland/marsh habitat.
Melospiza melodia pusillula	Alameda song sparrow	–	–	SSC	–	Restricted to tidal salt marshes, mainly on the fringes of south San Francisco Bay (Shuford and Gardali 2008).	Absent; BSA does not provide tidal marsh habitat.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Progne subis	purple martin	_	_	SSC	_	Can occur in a variety of habitats but has very specific nesting requirements, including concentrations of nesting cavities in low-elevation woodland or coniferous forest, relatively open-air space above accessible nest sites, and relatively abundant aerial insect prey (Shuford and Gardali 2008).	Absent as breeder; the species has always been rare in Santa Clara County, and records show a contraction in the range, now limited to a segment of Summit Ridge in the Santa Cruz Mountains (Bousman 2007). There is low potential for migrants to occur in the BSA.
Rallus obsoletus obsoletus	California Ridgway's rail	_	E	E, FP	_	Restricted to tidal marshes on the fringes of San Pablo Bay, San Francisco Bay, Monterey Bay, and Morro Bay. Requires intricate network of sloughs with small natural berms along tidal channels, preferably with cordgrass and pickleweed (USFWS 2017b).	Absent; BSA does not provide suitable tidal marsh habitat.
Riparia riparia	bank swallow	_	_	T	_	A colonial nester in riparian and lakeside bluffs or cliffs with fine-textured or sandy soils into which the nest cavities are dug. Also nests in earthen banks and sand and gravel pits (CWHR Program Staff 1999b).	Absent as breeder; BSA does not provide suitable nesting habitat. Bank swallows were documented nesting in the Pacheco Creek-Pajaro River basin in the 1930s but there are no other breeding records in Santa Claras County. Could occur as a rare spring/fall migrant (Bousman 2007).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Rynchops niger	black skimmer	_	_	SSC	_	Prefers calm, shallow water of back bays, lagoons, and estuaries for foraging, and sand bars, beaches, or dikes for roosting and nesting (Shuford and Gardali 2008).	Absent; BSA does not provide suitable foraging or nesting habitat.
Setophaga petechia	yellow warbler	_	_	SSC	_	Riparian vegetation in close proximity to water along streams and in wet meadows (Shuford and Gardali 2008).	Moderate; fairly common spring/summer migrant in BSA but nesting habitat quality is marginal and, if present, few pairs are likely to nest in the BSA. On the Santa Clara Valley floor, riparian corridors in which the species has been documented nesting typically support multi-story vegetation with a substantial understory of vines, blackberries, and forbs; creek sections where understory vegetation is reduced because of grazing or urban development, or where the larger trees had been removed, are generally not used for nesting (Bousman 2007).
Sternula antillarum browni	California least tern	_	E	E, FP	_	Nests and roosts on fine-grain sandy or pebbly beaches and pebbly levees at water treatment plants or evaporation ponds. Forages over near shore ocean waters and in shallow estuaries and lagoons (USFWS 2006).	Absent; BSA does not provide suitable foraging or nesting habitat.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Vireo bellii pusillus	least Bell's vireo	_	E	E	_	Prefers structurally diverse, early successional woodlands along watercourses, including cottonwood-willow forest, oak woodland, and mule fat scrub (USFWS 1998)	Absent; BSA is outside species range (USFWS 2024); only known breeding and suspected breeding occurrences in Santa Clara County are from the southeastern portion (ICF 2012).
Mammals							
Antrozous pallidus	pallid bat		_	SSC	_	Occurs in a wide variety of habitats but most common in open, dry habitats with rocky areas for roosting. Roosts primarily in caves, crevices, and mines, and occasionally in hollow trees and buildings. Very sensitive to disturbance. May roost alone or in groups up to 100s of individuals. Prefer to forage over open grasslands or oak habitats. Typically travel 1-3 miles to water sources and foraging sites at night (Harris et al. 1990).	Low; a long-term colony has persisted near Anderson Reservoir, approximately 15 miles southeast of the upstream extent of the BSA. Given the urban nature of the project site and extent of nighttime lighting, this species is unlikely to occur in the BSA.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Corynorhinus townsendii	Townsend's big-eared bat		_	SSC	_	Prefers mesic habitats but known to occur in all non-alpine habitats of California. Roosting occurs in caves, tunnels, mines, buildings, or other structures (CWHR Program Staff 2000). Distribution is associated with cavernous roosting features (WBWG 2017). May forage in edge habitats along streams or wooded habitats at night. Very sensitive to disturbance.	Low; cavernous roosting features are not present in the BSA. The species is unlikely to occur in the BSA due to the urban nature of the BSA and extent of nighttime lighting.
Lasiurus frantzii	western red bat		_	SSC	_	Solitary rooster, primarily in tree foliage with appropriate structure. Individuals have low roost site fidelity and are not known to breed in Santa Clara County. Forages in and among vegetation, including oak woodlands and riparian corridors; may forage in urban areas (e.g., streetlights). Associated with mature trees (cottonwood/sycamore riparian, eucalyptus, orchards, or other non-native trees).	Moderate: absent as a breeder; the species was detected visually/acoustically on Coyote Creek at East Santa Clara Street (south end of Reach 6) using the creek channel as a movement corridor (H.T. Harvey & Associates 2019). Low numbers could occur transitioning through the habitat at night or roosting short-term during the day in suitable habitat.

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat		_	SSC	_	Scrub and wooded areas with evergreen/live oaks and other thick-leaved trees and shrubs providing adequate food resources. Nests are typically placed on the ground in dense brush, often poison oak or blackberry, or against logs or tree trunks, and sometimes elevated in trees (Kelly 1990).	Moderate; known occurrences along urban creeks in the region are generally in western and southern Santa Clara County, including the Guadalupe Watershed and multiple occurrences along Coyote Creek upstream of the BSA (CDFW 2024a); BSA supports potentially suitable habitat, but suitability may be somewhat limited by high flashy creek flows in the BSA in addition to presence of unhoused encampments and limited areas of forest and woodland with adequate understory cover.
Reithrodontomys raviventris	salt-marsh harvest mouse		E	E, FP	_	Salt and brackish marshes with dense stands of pickleweed adjacent to upland, salt-tolerant vegetation in the San Francisco, San Pablo, and Suisun Bay areas (USFWS 2010a).	Absent: BSA does not provide salt or brackish marsh habitat.
Sorex vagrans halicoetes	salt-marsh wandering shrew		_	SSC	_	Confined to small remnant stands of salt marsh found around the southern arm of the San Francisco Bay in San Mateo, Santa Clara, Alameda and Contra Costa counties (Bolster 1998).	Absent; BSA does not provide suitable habitat (USGS 2017).
Taxidea taxus	American badger		_	SSC	_	Most abundant in drier open stages of shrub, forest, and herbaceous habitats, with friable soils (Ahlborn and White 1990).	Absent; BSA does not provide adequate contiguous suitable habitat; recent occurrences known from approximately 2.5 miles southeast of BSA are adjacent to extensive grassland areas (CDFW 2024a).

Scientific Name	Common Name	VHP	Federal Status	State Status	CRPR	General Habitat Characteristics	Potential to Occur in Biological Study Area
Vulpes macrotis mutica	San Joaquin kit fox	x	E	T	_	Occurs in grassland and scrub habitats characterized by sparse or absent vegetation cover; prefers areas with open, level, sandy ground (USFWS 2010b).	Absent; BSA is outside species range (USFWS 2020b).

Notes:
Santa Clara Valley Habitat Plan
(x) Covered Species

Federal Status
(C) Candidate for listing as threatened or endangered
(CH) Designated Critical Habitat
(E) Endangered
(EFH) Essential Fish Habitat
(SC) Species of Concern
(PT) Proposed Threatened
(T) Threatened
State Status
(CE) Candidate for listing as endangered
(CT) Candidate for listing as threatened
(E) Endangered
(T) Threatened
(R) Rare
(SSC) Species of Special Concern
(FP) Fully Protected

California Native Plant Society (CNPS) Rare Plant Ranks
Rareness Ranks
(1A) Presumed Extinct in California
(1B) Rare, Threatened, or Endangered in California and Elsewhere
(2) Rare, Threatened, or Endangered in California, but Mor Common Elsewhere
(3) More Species Information Needed*
(4) Limited Distribution*
Threat Ranks
(0.1) Seriously threatened in California
(0.2) Fairly threatened in California

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Special-status Species Database Lists (D3)

List

Page

CDFW California Natural Diversity Database D3-1
CNPS Rare Plant Inventory D3-4
CDFW California Natural Diversity Database D3-7

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Newark (3712251) OR Niles (3712158) OR La Costa Valley (3712157) OR Calaveras Reservoir (3712147) OR Mt. Day (3712146) OR Lick Observatory (3712136) OR San Jose East (3712137) OR San Jose West (3712138) OR Morgan Hill (3712126) OR Santa Teresa Hills (3712127) OR Los Gatos (3712128) OR Castle Rock Ridge (3712221) OR Cupertino (3712231) OR Milpitas (3712148) OR Mountain View (3712241))
 AND Taxonomic Group IS (Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Amsinckia lunaris bent-flowered fiddleneck	PDBOR01070	None	None	G3	S3	1B.2
Arctostaphylos silvicola Bonny Doon manzanita	PDERI041F0	None	None	G1	S1	1B.2
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T1	S1	1B.2
Atriplex depressa brittlescale	PDCHE042L0	None	None	G2	S2	1B.2
Atriplex minuscula lesser saltscale	PDCHE042M0	None	None	G2	S2	1B.1
Balsamorhiza macrolepis big-scale balsamroot	PDAST11061	None	None	G2	S2	1B.2
Boechera rubicundula Mt. Day rockcress	PDBRA40100	None	None	G1	S1	1B.1
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	PDPOR09052	None	None	G3G4T2	S2	1B.1
Castilleja affinis var. neglecta Tiburon paintbrush	PDSCR0D013	Endangered	Threatened	G4G5T1T2	S1S2	1B.2
Castilleja rubicundula var. rubicundula pink creamsacs	PDSCR0D482	None	None	G5T2	S2	1B.2
Ceanothus ferrisiae Coyote ceanothus	PDRHA041N0	Endangered	None	G1	S1	1B.1
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T2	S2	1B.1
Chlorogalum pomeridianum var. minus dwarf soaproot	PMLIL0G042	None	None	G5T3	S3	1B.2
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2	S2	1B.2
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	PDPGN040M1	Endangered	None	G2T1	S1	1B.1
Chorizanthe robusta var. robusta robust spineflower	PDPGN040Q2	Endangered	None	G2T1	S1	1B.1
Cirsium fontinale var. campylon Mt. Hamilton thistle	PDAST2E163	None	None	G2T2	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Clarkia concinna ssp. automixa Santa Clara red ribbons	PDONA050A1	None	None	G5?T3	S3	4.3
Collinsia multicolor San Francisco collinsia	PDSCR0H0B0	None	None	G2	S2	1B.2
Delphinium californicum ssp. interius Hospital Canyon larkspur	PDRAN0B0A2	None	None	G3T3	S3	1B.2
Dirca occidentalis western leatherwood	PDTHY03010	None	None	G2	S2	1B.2
Dudleya abramsii ssp. setchellii Santa Clara Valley dudleya	PDCRA040Z0	Endangered	None	G4T2	S2	1B.1
Eryngium aristulatum var. hooveri Hoover's button-celery	PDAPI0Z043	None	None	G5T1	S1	1B.1
Extriplex joaquinana San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Hoita strobilina Loma Prieta hoita	PDFAB5Z030	None	None	G2?	S2?	1B.1
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Leptosyne hamiltonii Mt. Hamilton coreopsis	PDAST2L0C0	None	None	G2	S2	1B.2
Lessingia micradenia var. glabrata smooth lessingia	PDAST5S062	None	None	G2T2	S2	1B.2
Lomatium observatorium Mt. Hamilton lomatium	PDAPI1B2J0	None	None	G1	S1	1B.2
Malacothamnus arcuatus arcuate bush-mallow	PDMAL0Q0E0	None	None	G2Q	S2	1B.2
Malacothamnus hallii Hall's bush-mallow	PDMAL0Q0F0	None	None	G2	S2	1B.2
Monolopia gracilens woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2
Navarretia prostrata prostrate vernal pool navarretia	PDPLM0C0Q0	None	None	G2	S2	1B.2
Pedicularis dudleyi Dudley's lousewort	PDSCR1K180	None	Rare	G2	S2	1B.2
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	PDSCR1L5B1	None	None	G4T2	S2	1B.2
Pentachaeta bellidiflora white-rayed pentachaeta	PDAST6X030	Endangered	Endangered	G1	S1	1B.1
Phacelia phacelioides Mt. Diablo phacelia	PDHYD0C3Q0	None	None	G2	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Piperia candida white-flowered rein orchid	PMORC1X050	None	None	G3?	S3	1B.2
Plagiobothrys glaber hairless popcornflower	PDBOR0V0B0	None	None	GX	SX	1A
Puccinellia simplex California alkali grass	PMPOA53110	None	None	G2	S2	1B.2
Ravenella exigua chaparral harebell	PDCAM020A0	None	None	G2	S2	1B.2
Sagittaria sanfordii Sanford's arrowhead	PMALI040Q0	None	None	G3	S3	1B.2
Sanicula saxatilis rock sanicle	PDAPI1Z0H0	None	Rare	G2	S2	1B.2
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2
Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0	None	None	G3	S3	4.2
Spergularia macrotheca var. longistyla long-styled sand-spurrey	PDCAR0W062	None	None	G5T2	S2	1B.2
Streptanthus albidus ssp. albidus Metcalf Canyon jewelflower	PDBRA2G011	Endangered	None	G2T1	S1	1B.1
Streptanthus albidus ssp. peramoenus most beautiful jewelflower	PDBRA2G012	None	None	G2T2	S2	1B.2
Stuckenia filiformis ssp. alpina northern slender pondweed	PMPOT03091	None	None	G5T5	S2S3	2B.2
Suaeda californica California seablite	PDCHE0P020	Endangered	None	G1	S1	1B.1
Trifolium buckwestiorum Santa Cruz clover	PDFAB402W0	None	None	G2	S2	1B.1
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2

Record Count: 53

CALIFORNIA
NATIVE PLANT SOCIETY

CNPS Rare Plant Inventory

Search Results

82 matches found. Click on scientific name for details

Search Criteria: Quad is one of
[**3712148:3712138:3712128:3712127:3712137:3712221:3712231:3712241:3712147:3712157:3712158:3712251:3712126:3712136:3712146**]

▲ SCIENTIFIC NAME	COMMON NAME	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	CA RARE PLANT RANK
Acanthomintha lanceolata	Santa Clara thorn-mint	annual herb	Mar-Jun	None	None	4.2
Amsinckia lunaris	bent-flowered fiddleneck	annual herb	Mar-Jun	None	None	1B.2
Androsace elongata ssp. *acuta*	California androsace	annual herb	Mar-Jun	None	None	4.2
Arabis blepharophylla	coast rockcress	perennial herb	Feb-May	None	None	4.3
Arctostaphylos silvicola	Bonny Doon manzanita	perennial evergreen shrub	Jan-Mar	None	None	1B.2
Astragalus tener var. *tener*	alkali milk-vetch	annual herb	Mar-Jun	None	None	1B.2
Atriplex depressa	brittlescale	annual herb	Apr-Oct	None	None	1B.2
Atriplex minuscula	lesser saltscale	annual herb	May-Oct	None	None	1B.1
Balsamorhiza macrolepis	big-scale balsamroot	perennial herb	Mar-Jun	None	None	1B.2
Boechera rubicundula	Mt. Day rockcress	perennial herb	Apr-May	None	None	1B.1
Calandrinia breweri	Brewer's calandrinia	annual herb	(Jan)Mar-Jun	None	None	4.2
Calochortus umbellatus	Oakland star-tulip	perennial bulbiferous herb	Mar-May	None	None	4.2
Calyptridium parryi var. *hesseae*	Santa Cruz Mountains pussypaws	annual herb	May-Aug	None	None	1B.1
Calystegia collina ssp. *venusta*	South Coast Range morning-glory	perennial rhizomatous herb	Apr-Jun	None	None	4.3
Castilleja affinis var. *neglecta*	Tiburon paintbrush	perennial herb (hemiparasitic)	Apr-Jun	FE	CT	1B.2
Castilleja rubicundula var. *rubicundula*	pink creamsacs	annual herb (hemiparasitic)	Apr-Jun	None	None	1B.2
Ceanothus ferrisiae	Coyote ceanothus	perennial evergreen shrub	Jan-May	FE	None	1B.1
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	annual herb	(Apr)May-Oct(Nov)	None	None	1B.1
Chlorogalum pomeridianum var. *minus*	dwarf soaproot	perennial bulbiferous herb	May-Aug	None	None	1B.2
Chloropyron maritimum ssp. *palustre*	Point Reyes salty bird's-beak	annual herb (hemiparasitic)	Jun-Oct	None	None	1B.2
Chorizanthe douglasii	Douglas' spineflower	annual herb	Apr-Jul	None	None	4.3
Chorizanthe pungens var. *hartwegiana*	Ben Lomond spineflower	annual herb	Apr-Jul	FE	None	1B.1
Chorizanthe robusta var. *robusta*	robust spineflower	annual herb	Apr-Sep	FE	None	1B.1

Cirsium fontinale var. *campylon*	Mt. Hamilton thistle	perennial herb	(Feb)Apr-Oct	None	None	1B.2
Clarkia breweri	Brewer's clarkia	annual herb	Apr-Jun	None	None	4.2
Clarkia concinna ssp. *automixa*	Santa Clara red ribbons	annual herb	(Apr)May-Jun(Jul)	None	None	4.3
Clarkia lewisii	Lewis' clarkia	annual herb	(Feb)May-Jul	None	None	4.3
Collinsia multicolor	San Francisco collinsia	annual herb	(Feb)Mar-May	None	None	1B.2
Convolvulus simulans	small-flowered morning-glory	annual herb	Mar-Jul	None	None	4.2
Cypripedium fasciculatum	clustered lady's-slipper	perennial rhizomatous herb	Mar-Aug	None	None	4.2
Delphinium californicum ssp. *interius*	Hospital Canyon larkspur	perennial herb	Apr-Jun	None	None	1B.2
Dirca occidentalis	western leatherwood	perennial deciduous shrub	Jan-Mar(Apr)	None	None	1B.2
Dudleya abramsii ssp. *setchellii*	Santa Clara Valley dudleya	perennial herb	Apr-Oct	FE	None	1B.1
Eleocharis parvula	small spikerush	perennial herb	(Apr)Jun-Aug(Sep)	None	None	4.3
Eriogonum argillosum	clay buckwheat	annual herb	Mar-Jun	None	None	4.3
Eriogonum umbellatum var. *bahiiforme*	bay buckwheat	perennial herb	Jul-Sep	None	None	4.2
Eriophyllum jepsonii	Jepson's woolly sunflower	perennial herb	Apr-Jun	None	None	4.3
Eryngium aristulatum var. *hooveri*	Hoover's button-celery	annual/perennial herb	(Jun)Jul(Aug)	None	None	1B.1
Erysimum franciscanum	San Francisco wallflower	perennial herb	Mar-Jun	None	None	4.2
Extriplex joaquinana	San Joaquin spearscale	annual herb	Apr-Oct	None	None	1B.2
Fritillaria agrestis	stinkbells	perennial bulbiferous herb	Mar-Jun	None	None	4.2
Fritillaria liliacea	fragrant fritillary	perennial bulbiferous herb	Feb-Apr	None	None	1B.2
Galium andrewsii ssp. *gatense*	phlox-leaf serpentine bedstraw	perennial herb	Apr-Jul	None	None	4.2
Grindelia hirsutula var. *maritima*	San Francisco gumplant	perennial herb	Jun-Sep	None	None	3.2
Hoita strobilina	Loma Prieta hoita	perennial herb	May-Jul(Aug-Oct)	None	None	1B.1
Iris longipetala	coast iris	perennial rhizomatous herb	Mar-May(Jun)	None	None	4.2
Isocoma menziesii var. *diabolica*	Satan's goldenbush	perennial shrub	Aug-Oct	None	None	4.2
Lasthenia conjugens	Contra Costa goldfields	annual herb	Mar-Jun	FE	None	1B.1
Leptosiphon ambiguus	serpentine leptosiphon	annual herb	Mar-Jun	None	None	4.2
Leptosiphon aureus	bristly leptosiphon	annual herb	Apr-Jul	None	None	4.2
Leptosiphon grandiflorus	large-flowered leptosiphon	annual herb	Apr-Aug	None	None	4.2
Leptosyne hamiltonii	Mt. Hamilton coreopsis	annual herb	Mar-May	None	None	1B.2
Lessingia hololeuca	woolly-headed lessingia	annual herb	Jun-Oct	None	None	3
Lessingia micradenia var. *glabrata*	smooth lessingia	annual herb	(Apr-Jun)Jul-Nov	None	None	1B.2
Lessingia tenuis	spring lessingia	annual herb	May-Jul	None	None	4.3
Lomatium observatorium	Mt. Hamilton lomatium	perennial herb	Mar-May	None	None	1B.2

Lomatium parvifolium	small-leaved lomatium	perennial herb	Jan-Jun	None	None	4.2
Malacothamnus arcuatus var. *arcuatus*	arcuate bush-mallow	perennial deciduous shrub	Apr-Sep	None	None	1B.2
Malacothamnus hallii	Hall's bush-mallow	perennial deciduous shrub	(Apr)May-Sep(Oct)	None	None	1B.2
Mielichhoferia elongata	elongate copper moss	moss		None	None	4.3
Monolopia gracilens	woodland woollythreads	annual herb	(Feb)Mar-Jul	None	None	1B.2
Navarretia prostrata	prostrate vernal pool navarretia	annual herb	Apr-Jul	None	None	1B.2
Pedicularis dudleyi	Dudley's lousewort	perennial herb	Apr-Jun	None	CR	1B.2
Penstemon rattanii var. *kleei*	Santa Cruz Mountains beardtongue	perennial herb	(Mar)May-Jun	None	None	1B.2
Pentachaeta bellidiflora	white-rayed pentachaeta	annual herb	Mar-May	FE	CE	1B.1
Phacelia phacelioides	Mt. Diablo phacelia	annual herb	Apr-May	None	None	1B.2
Piperia candida	white-flowered rein orchid	perennial herb	(Mar-Apr)May-Sep	None	None	1B.2
Plagiobothrys chorisianus var. *hickmanii*	Hickman's popcornflower	annual herb	Apr-Jun	None	None	4.2
Plagiobothrys glaber	hairless popcornflower	annual herb	Mar-May	None	None	1A
Puccinellia simplex	California alkali grass	annual herb	Mar-May	None	None	1B.2
Ravenella exigua	chaparral harebell	annual herb	May-Jun	None	None	1B.2
Sagittaria sanfordii	Sanford's arrowhead	perennial rhizomatous herb (emergent)	May-Oct(Nov)	None	None	1B.2
Sanicula saxatilis	rock sanicle	perennial herb	Apr-May	None	CR	1B.2
Senecio aphanactis	chaparral ragwort	annual herb	Jan-Apr(May)	None	None	2B.2
Sidalcea malachroides	maple-leaved checkerbloom	perennial herb	(Mar)Apr-Aug	None	None	4.2
Spergularia macrotheca var. *longistyla*	long-styled sand-spurrey	perennial herb	Feb-May	None	None	1B.2
Streptanthus albidus ssp. *albidus*	Metcalf Canyon jewelflower	annual herb	Apr-Jul	FE	None	1B.1
Streptanthus albidus ssp. *peramoenus*	most beautiful jewelflower	annual herb	(Mar)Apr-Sep(Oct)	None	None	1B.2
Stuckenia filiformis ssp. *alpina*	northern slender pondweed	perennial rhizomatous herb (aquatic)	May-Jul	None	None	2B.2
Suaeda californica	California seablite	perennial evergreen shrub	Jul-Oct	FE	None	1B.1
Trifolium buckwestiorum	Santa Cruz clover	annual herb	Apr-Oct	None	None	1B.1
Trifolium hydrophilum	saline clover	annual herb	Apr-Jun	None	None	1B.2

Showing 1 to 82 of 82 entries

Suggested Citation:

California Native Plant Society, Rare Plant Program. 2024. Rare Plant Inventory (online edition, v9.5). Website https://www.rareplants.cnps.org [accessed 29 April 2024].

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

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 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Accipiter striatus sharp-shinned hawk	ABNKC12020	None	None	G5	S4	WL
Acipenser medirostris pop. 1 green sturgeon - southern DPS	AFCAA01031	Threatened	None	G2T1	S1	SSC
Adela oplerella Opler's longhorn moth	IILEE0G040	None	None	G2	S2	
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S2	SSC
Ambystoma californiense pop. 1 California tiger salamander - central California DPS	AAAAA01181	Threatened	Threatened	G2G3T3	S3	WL
Ammodramus savannarum grasshopper sparrow	ABPBXA0020	None	None	G5	S3	SSC
Aneides niger Santa Cruz black salamander	AAAAD01070	None	None	G3	S3	SSC
Anniella pulchra Northern California legless lizard	ARACC01020	None	None	G3	S2S3	SSC
Anodonta californiensis California floater	IMBIV04220	None	None	G3	S2?	
Antrozous pallidus pallid bat	AMACC10010	None	None	G4	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Ardea alba great egret	ABNGA04040	None	None	G5	S4	
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S2	SSC
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G2G3	S1S2	
Bombus crotchii Crotch's bumble bee	IIHYM24480	None	Candidate Endangered	G2	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Bombus occidentalis western bumble bee	IIHYM24252	None	Candidate Endangered	G3	S1	
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S4	
Calasellus californicus An isopod	ICMAL34010	None	None	G2	S3	
Charadrius nivosus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S3	SSC
Circus hudsonius northern harrier	ABNKC11011	None	None	G5	S3	SSC
Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S2	SSC
Cypseloides niger black swift	ABNUA01010	None	None	G4	S3	SSC
Danaus plexippus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	Candidate	None	G4T1T2Q	S2	
Dicamptodon ensatus California giant salamander	AAAAH01020	None	None	G2G3	S2S3	SSC
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	AMAFD03061	None	None	G4T1	S2	
Dipodomys venustus venustus Santa Cruz kangaroo rat	AMAFD03042	None	None	G4T1	S1	
Egretta thula snowy egret	ABNGA06030	None	None	G5	S4	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	Proposed Threatened	None	G3G4	S3	SSC
Erethizon dorsatum North American porcupine	AMAFJ01010	None	None	G5	S3	
Euphydryas editha bayensis Bay checkerspot butterfly	IILEPK4055	Threatened	None	G5T1	S3	
Falco mexicanus prairie falcon	ABNKD06090	None	None	G5	S4	WL
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Gonidea angulata western ridged mussel	IMBIV19010	None	None	G3	S2	
Hesperoleucus venustus subditus southern coastal roach	AFCJB19032	None	None	GNRT2	S2	SSC
Icteria virens yellow-breasted chat	ABPBX24010	None	None	G5	S4	SSC
Lanius ludovicianus loggerhead shrike	ABPBR01030	None	None	G4	S4	SSC
Lasiurus cinereus hoary bat	AMACC05032	None	None	G3G4	S4	
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3T1	S2	FP
Lepidurus packardi vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G3	S3	
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Masticophis lateralis euryxanthus Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
Melospiza melodia pusillula Alameda song sparrow	ABPBXA301S	None	None	G5T2T3	S2	SSC
Microcina homi Hom's micro-blind harvestman	ILARA47020	None	None	G1	S2	
Microcina jungi Jung's micro-blind harvestman	ILARA47030	None	None	G1	S1	
Myotis evotis long-eared myotis	AMACC01070	None	None	G5	S3	
Myotis yumanensis Yuma myotis	AMACC01020	None	None	G5	S4	
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	AMAFF08082	None	None	G5T2T3	S2S3	SSC
Nycticorax nycticorax black-crowned night heron	ABNGA11010	None	None	G5	S4	
Oncorhynchus kisutch pop. 4 coho salmon - central California coast ESU	AFCHA02034	Endangered	Endangered	G5T2Q	S2	
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	AFCHA0209G	Threatened	None	G5T3Q	S3	SSC
Pandion haliaetus osprey	ABNKC01010	None	None	G5	S4	WL
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G4	S4	SSC
Progne subis purple martin	ABPAU01010	None	None	G5	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G3T1	S2	FP
Rana boylii pop. 4 foothill yellow-legged frog - central coast DPS	AAABH01054	Threatened	Endangered	G3T2	S2	
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys raviventris salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S3	FP
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S3	
Rynchops niger black skimmer	ABNNM14010	None	None	G5	S2	SSC
Sorex vagrans halicoetes salt-marsh wandering shrew	AMABA01071	None	None	G5T1	S1	SSC
Spirinchus thaleichthys longfin smelt	AFCHB03010	Proposed Endangered	Threatened	G5	S1	
Sternula antillarum browni California least tern	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Trimerotropis infantilis Zayante band-winged grasshopper	IIORT36030	Endangered	None	G1	S1	
Tryonia imitator mimic tryonia (=California brackishwater snail)	IMGASJ7040	None	None	G2	S2	
Vulpes macrotis mutica San Joaquin kit fox	AMAJA03041	Endangered	Threatened	G4T2	S3	

Record Count: 72

Appendix E. Cultural Resources Report (Confidential)

Appendix F. Hazardous Substance Liability Assessments

Due to the file size of this appendix, a thumb drive is included with the printed version of this Draft EIR. For the electronic version of this Draft EIR, this appendix may be downloaded at the following Valley Water website address: https://www.valleywater.org/public-review-documents.

Appendix G. Noise Modeling Technical Appendix

Noise Measurement Data and Summaries

- Short-Term (ST) Measurement Summary
- Long-Term (LT) 1 Measurement Hourly Data
- Long-Term (LT) 1 CNEL Calculation
- Long-Term (LT) 2 Measurement Hourly Data
- Long-Term (LT) 2 CNEL Calculation
- Long-Term (LT) 3 Measurement Hourly Data
- Long-Term (LT) 3 CNEL Calculation
- Long-Term (LT) 4 Measurement Hourly Data
- Long-Term (LT) 4 CNEL Calculation

Construction Noise Modeling

- L-Wall/T-Wall Construction (Leq)
- L-Wall/T-Wall Construction (Lmax)
- I-Wall Construction (Leq)
- I-Wall Construction (Lmax)
- Passive Barrier Construction (Leq)
- Passive Barrier Construction (Lmax)
- Berm Construction (Leq)
- Berm Construction (Lmax)
- Nighttime Construction – Concrete Pour (Leq)
- Nighttime Construction – Concrete Pour (Lmax)
- Multiple Construction Types (Conservatively High Scenario)- Leq
- Multiple Construction Types (Conservatively High Scenario)- Lmax
- Temporary Increase in Noise Calculations
- I-Wall Construction with Silent Pile Driver (Leq)
- I-Wall Construction with Silent Pile Driver (Lmax)
- Multiple Construction Types With Silent Pile Driver (Conservatively High Scenario) – Leq
- Multiple Construction Types With Silent Pile Driver (Conservatively High Scenario) - Lmax
- Summary of Mitigation and Associated Noise Levels
- Construction Equipment Reference Noise Levels

Construction Vibration Modeling

- Construction Vibration Impact Distances
- Vibration Impact Summary
- Vibration Conversion Calculation

Noise Measurement Data and Summaries

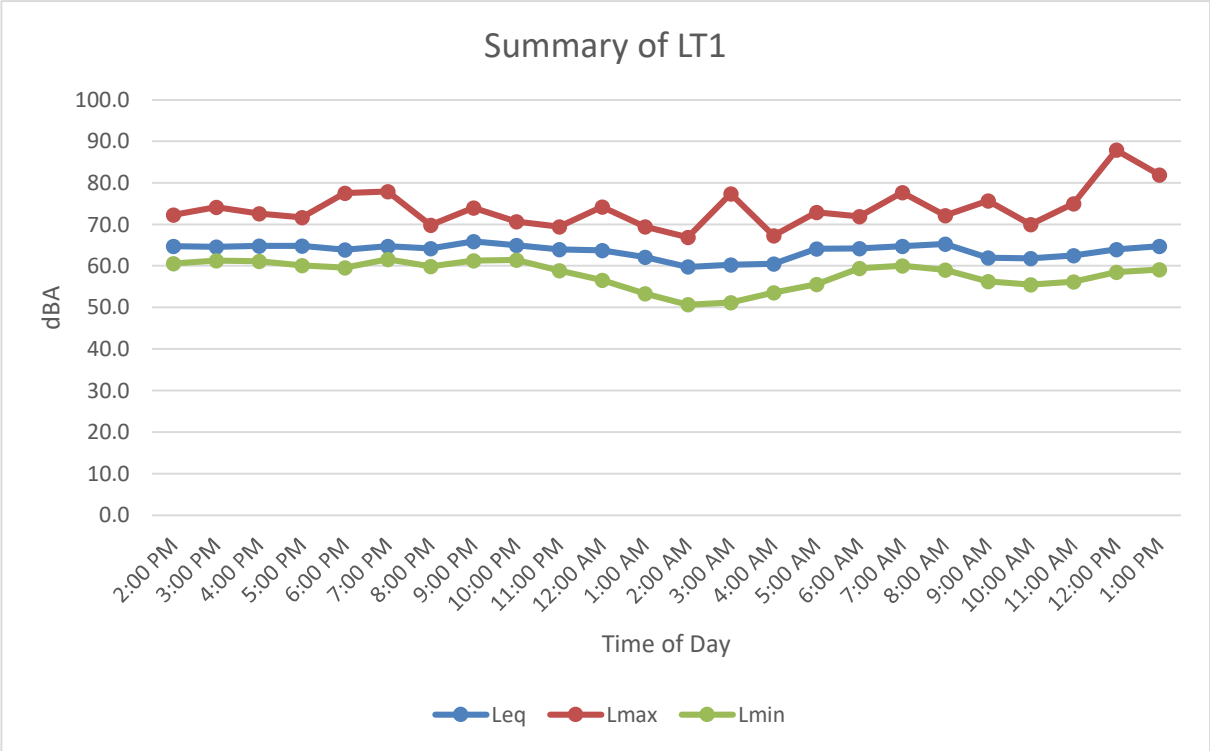
Short-Term (ST) Measurement Summary
Long-Term (LT) 1 Measurement Hourly Data
Long-Term (LT) 1 CNEL Calculation
Long-Term (LT) 2 Measurement Hourly Data
Long-Term (LT) 2 CNEL Calculation
Long-Term (LT) 3 Measurement Hourly Data
Long-Term (LT) 3 CNEL Calculation
Long-Term (LT) 4 Measurement Hourly Data
Long-Term (LT) 4 CNEL Calculation

Short-Term (ST) Measurement Summary

Measurement ID	Date	Start Time	End Time	Duration	Leq	Lmax	Lmin	Surrounding Areas	Primary Noise Sources
ST1	12/5/2023	2:37:17 PM	3:08:35 PM	00:31:19.9	52.8	74.3	42.8	Apartment Complex	Normal living noise, cars starting/parking,
ST2	12/5/2023	3:42:35 PM	4:13:46 PM	00:31:11.2	48.9	62.9	42.3	Park	E William road and S 16th street, dogs playing/barking, people talking
ST3	12/5/2023	4:25:18 PM	5:00:02 PM	00:34:43.3	57.5	72.1	51.0	Park in residential neighborhood	Traffic on woodborough drive, dogs, people talking, sports practice
ST4	12/6/2023	11:12:15 AM	11:42:55 AM	00:30:39.9	51.6	73.6	42.3	Community Garden in residential neighborhood	traffic on galveston avenue and Tully Road, gardening activities
ST5	12/6/2023	12:00:44 PM	12:32:46 AM	00:32:01.8	49.3	78.1	39.8	Apartment Complex	People talking, parking their car, starting
ST6	1/18/2024	2:44:41 PM	3:04:50 PM	0:20:09	58.2	72.9	55.2	Bike trail and creek	people walking/biking, I heard a peacock

Long-Term (LT) 1 Measurement Hourly Data

Date	Time	SPL Weight	Freq Weight	Leq	Lmax	Lmin
12/4/2023	2:00 PM	Slow	dBA	64.7	72.3	60.6
12/4/2023	3:00 PM	Slow	dBA	64.6	74.1	61.3
12/4/2023	4:00 PM	Slow	dBA	64.8	72.6	61.1
12/4/2023	5:00 PM	Slow	dBA	64.8	71.7	60.1
12/4/2023	6:00 PM	Slow	dBA	63.9	77.5	59.6
12/4/2023	7:00 PM	Slow	dBA	64.7	77.9	61.6
12/4/2023	8:00 PM	Slow	dBA	64.2	69.8	59.9
12/4/2023	9:00 PM	Slow	dBA	65.9	74.0	61.3
12/4/2023	10:00 PM	Slow	dBA	65.0	70.7	61.4
12/4/2023	11:00 PM	Slow	dBA	64.0	69.4	58.9
12/5/2023	12:00 AM	Slow	dBA	63.7	74.2	56.6
12/5/2023	1:00 AM	Slow	dBA	62.1	69.4	53.3
12/5/2023	2:00 AM	Slow	dBA	59.8	66.9	50.7
12/5/2023	3:00 AM	Slow	dBA	60.3	77.4	51.2
12/5/2023	4:00 AM	Slow	dBA	60.5	67.3	53.6
12/5/2023	5:00 AM	Slow	dBA	64.1	72.9	55.6
12/5/2023	6:00 AM	Slow	dBA	64.2	71.9	59.4
12/5/2023	7:00 AM	Slow	dBA	64.7	77.7	60.0
12/5/2023	8:00 AM	Slow	dBA	65.3	72.1	59.0
12/5/2023	9:00 AM	Slow	dBA	62.0	75.7	56.3
12/5/2023	10:00 AM	Slow	dBA	61.8	70.0	55.5
12/5/2023	11:00 AM	Slow	dBA	62.5	75.0	56.2
12/5/2023	12:00 PM	Slow	dBA	64.0	87.9	58.5
12/5/2023	1:00 PM	Slow	dBA	64.7	81.9	59.1



Long Term (LT) 1 CNEL Calculation

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: **Watson Park LT 1**
Measurement Date: 12/4/23 to 12/5/23
Project Name: Coyote Creek Flood Protection

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dBA /10)	Computation of CNEL: Period of 24-Hour Day (1=included, 0=not) Day	Evening	Night	Sound Power Breakdown by Period of Day Day	Evening	Night
0:00	63.7	2,344,229	0	0	1	0	0	2,344,229
1:00	62.1	1,621,810	0	0	1	0	0	1,621,810
2:00	59.8	954,993	0	0	1	0	0	954,993
3:00	60.3	1,071,519	0	0	1	0	0	1,071,519
4:00	60.5	1,122,018	0	0	1	0	0	1,122,018
5:00	64.1	2,570,396	0	0	1	0	0	2,570,396
6:00	64.2	2,630,268	0	0	1	0	0	2,630,268
7:00	64.7	2,951,209	1	0	0	2,951,209	0	0
8:00	65.3	3,388,442	1	0	0	3,388,442	0	0
9:00	62.0	1,584,893	1	0	0	1,584,893	0	0
10:00	61.8	1,513,561	1	0	0	1,513,561	0	0
11:00	62.5	1,778,279	1	0	0	1,778,279	0	0
12:00	64.0	2,511,886	1	0	0	2,511,886	0	0
13:00	64.7	2,951,209	1	0	0	2,951,209	0	0
14:00	64.7	2,951,209	1	0	0	2,951,209	0	0
15:00	64.6	2,884,032	1	0	0	2,884,032	0	0
16:00	64.8	3,019,952	1	0	0	3,019,952	0	0
17:00	64.8	3,019,952	1	0	0	3,019,952	0	0
18:00	63.9	2,454,709	1	0	0	2,454,709	0	0
19:00	64.7	2,951,209	0	1	0	0	2,951,209	0
20:00	64.2	2,630,268	0	1	0	0	2,630,268	0
21:00	65.9	3,890,451	0	1	0	0	3,890,451	0
22:00	65.0	3,162,278	0	0	1	0	0	3,162,278
23:00	64.0	2,511,886	0	0	1	0	0	2,511,886
		Sum of Sound Power during Period wo/penalty				31,009,333	9,471,929	17,989,397
		Log Factor for CNEL Penalty (i.e., 10*log(x))				1	3	10
		Sound Power during Period with penalty				31,009,333	28,415,786	179,893,971

Total Daily Sound Power, with penalties	239,319,091
Hours per Day	24
Average Hourly Sound Power, with penalties	9,971,629
CNEL	70.0

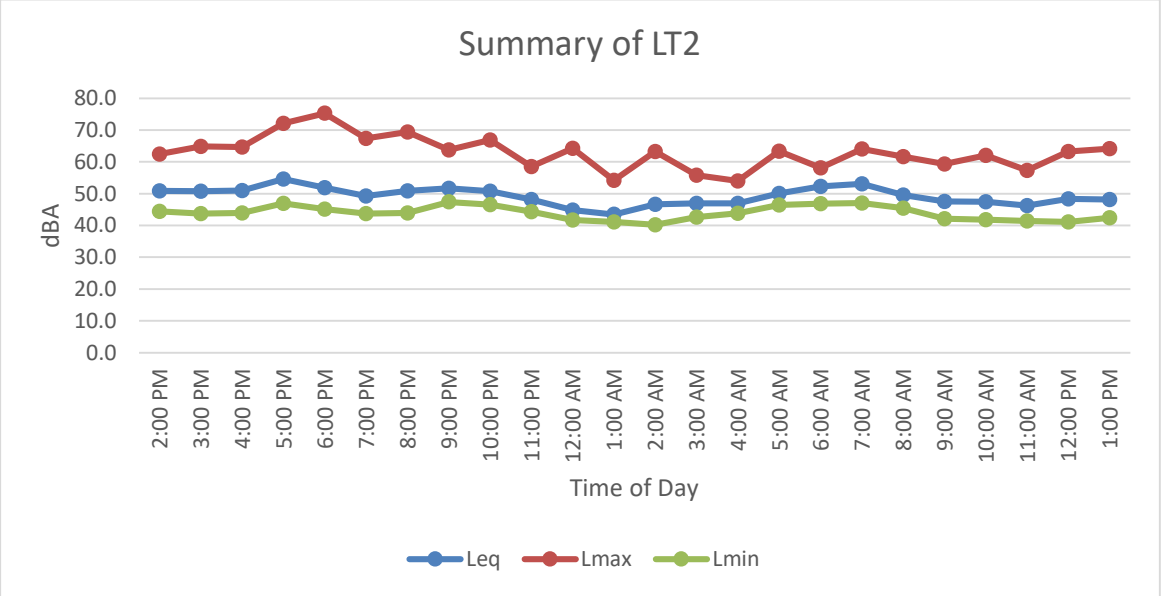
Ldn computation on next page.

Notes:
Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.
Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.
Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:
California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Long-Term (LT) 2 Measurement Hourly Data

Date	Time	Freq Weight	Leq	Lmax	Lmin
12/4/2024	2:00 PM	dBA	50.9	62.4	44.4
12/4/2024	3:00 PM	dBA	50.8	64.9	43.7
12/4/2024	4:00 PM	dBA	51.0	64.7	43.9
12/4/2024	5:00 PM	dBA	54.6	72.1	46.9
12/4/2024	6:00 PM	dBA	51.9	75.3	45.1
12/4/2024	7:00 PM	dBA	49.3	67.4	43.7
12/4/2024	8:00 PM	dBA	50.9	69.4	43.9
12/4/2024	9:00 PM	dBA	51.7	63.8	47.4
12/4/2024	10:00 PM	dBA	50.8	66.9	46.5
12/4/2024	11:00 PM	dBA	48.1	58.5	44.3
12/5/2024	12:00 AM	dBA	44.8	64.3	41.7
12/5/2024	1:00 AM	dBA	43.5	54.2	41.1
12/5/2024	2:00 AM	dBA	46.6	63.2	40.2
12/5/2024	3:00 AM	dBA	46.9	55.8	42.6
12/5/2024	4:00 AM	dBA	46.9	54.0	43.8
12/5/2024	5:00 AM	dBA	50.1	63.3	46.4
12/5/2024	6:00 AM	dBA	52.3	58.1	46.8
12/5/2024	7:00 AM	dBA	53.1	64.1	47.0
12/5/2024	8:00 AM	dBA	49.6	61.6	45.4
12/5/2024	9:00 AM	dBA	47.5	59.3	42.1
12/5/2024	10:00 AM	dBA	47.4	62.0	41.8
12/5/2024	11:00 AM	dBA	46.2	57.3	41.4
12/5/2024	12:00 PM	dBA	48.3	63.2	41.1
12/5/2024	1:00 PM	dBA	48.1	64.2	42.4



Long-Term (LT) 2 CNEL Calculation

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site:	**Roosevelt Park- LT 2**
Measurement Date:	12/4/23 to 12/5/23
Project Name:	Coyote Creek Flood Protection

			Computation of CNEL					
			Period of 24-Hour Day (1=included, 0=not)			Sound Power Breakdown by Period of Day		
Hour of Day (military time)	**Sound Level Leq (dBA)**	**Sound Power =10*Log(dBA /10)**	**Day**	**Evening**	**Night**	**Day**	**Evening**	**Night**
0:00	44.8	30,200	0	0	1	0	0	30,200
1:00	43.5	22,387	0	0	1	0	0	22,387
2:00	46.6	45,709	0	0	1	0	0	45,709
3:00	46.9	48,978	0	0	1	0	0	48,978
4:00	46.9	48,978	0	0	1	0	0	48,978
5:00	50.1	102,329	0	0	1	0	0	102,329
6:00	52.3	169,824	0	0	1	0	0	169,824
7:00	53.1	204,174	1	0	0	204,174	0	0
8:00	49.6	91,201	1	0	0	91,201	0	0
9:00	47.5	56,234	1	0	0	56,234	0	0
10:00	47.4	54,954	1	0	0	54,954	0	0
11:00	46.2	41,687	1	0	0	41,687	0	0
12:00	48.3	67,608	1	0	0	67,608	0	0
13:00	48.1	64,565	1	0	0	64,565	0	0
14:00	50.9	123,027	1	0	0	123,027	0	0
15:00	50.8	120,226	1	0	0	120,226	0	0
16:00	51.0	125,893	1	0	0	125,893	0	0
17:00	54.6	288,403	1	0	0	288,403	0	0
18:00	51.9	154,882	1	0	0	154,882	0	0
19:00	49.3	85,114	0	1	0	0	85,114	0
20:00	50.9	123,027	0	1	0	0	123,027	0
21:00	51.7	147,911	0	1	0	0	147,911	0
22:00	50.8	120,226	0	0	1	0	0	120,226
23:00	48.1	64,565	0	0	1	0	0	64,565
		Sum of Sound Power during Period wo/penalty				1,392,854	356,052	653,197
		Log Factor for CNEL Penalty (i.e., 10*log(x))				1	3	10
		Sound Power during Period with penalty				1,392,854	1,068,155	6,531,968

Total Daily Sound Power, with penalties	8,992,977
Hours per Day	24
Average Hourly Sound Power, with penalties	374,707
CNEL	55.7

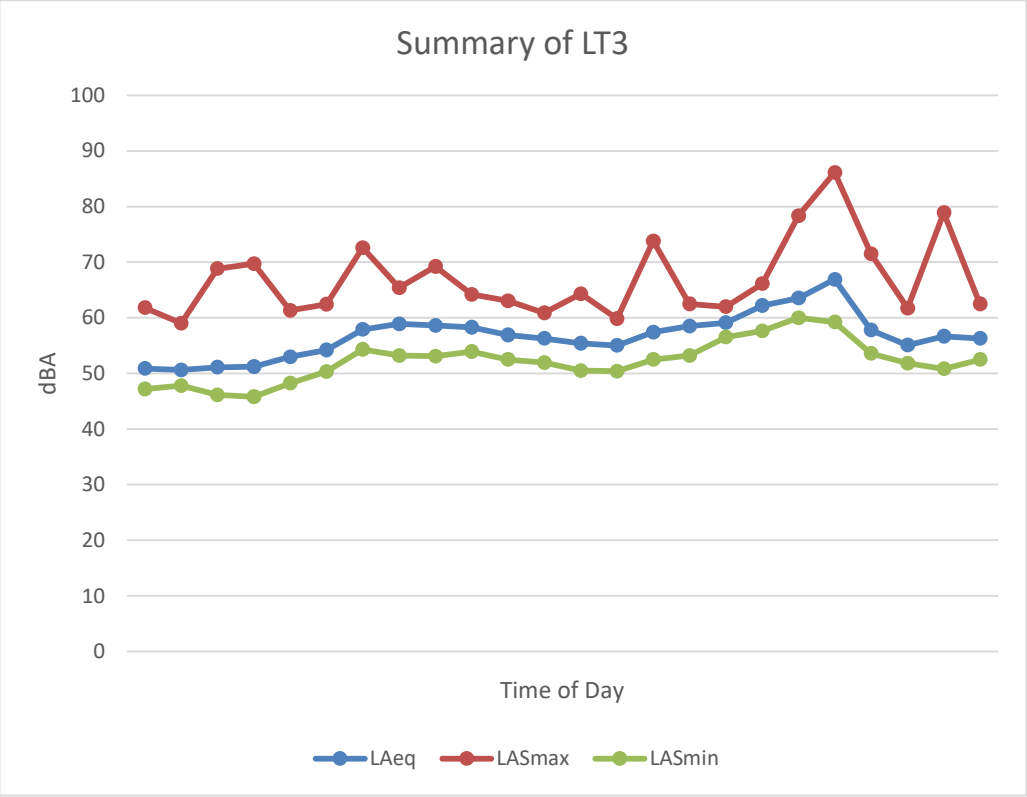
Ldn computation on next page.

Notes:
Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.
Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.
Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:
California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Long-Term (LT) 3 Measurement Hourly Data

Start Date	Start Time	End Time	Duration	SPL Time Weight	Freq Weight	LAeq	LASmax	LASmin
1/17/2024	1:00:00 PM	2:00:00 PM	1:00:00	Slow	dBA	50.9	61.8	47.2
1/17/2024	2:00:00 PM	3:00:00 PM	1:00:00	Slow	dBA	50.6	59	47.8
1/17/2024	3:00:00 PM	4:00:00 PM	1:00:00	Slow	dBA	51.1	68.8	46.1
1/17/2024	4:00:00 PM	5:00:00 PM	1:00:00	Slow	dBA	51.2	69.7	45.8
1/17/2024	5:00:00 PM	6:00:00 PM	1:00:00	Slow	dBA	53	61.3	48.2
1/17/2024	6:00:00 PM	7:00:00 PM	1:00:00	Slow	dBA	54.2	62.4	50.3
1/17/2024	7:00:00 PM	8:00:00 PM	1:00:00	Slow	dBA	57.9	72.6	54.3
1/17/2024	8:00:00 PM	9:00:00 PM	1:00:00	Slow	dBA	58.9	65.4	53.2
1/17/2024	9:00:00 PM	10:00:00 PM	1:00:00	Slow	dBA	58.6	69.2	53.1
1/17/2024	10:00:00 PM	11:00:00 PM	1:00:00	Slow	dBA	58.3	64.2	53.9
1/17/2024	11:00:00 PM	12:00:00 AM	1:00:00	Slow	dBA	56.9	63	52.5
1/18/2024	12:00:00 AM	1:00:00 AM	1:00:00	Slow	dBA	56.3	60.9	51.9
1/18/2024	1:00:00 AM	2:00:00 AM	1:00:00	Slow	dBA	55.4	64.3	50.5
1/18/2024	2:00:00 AM	3:00:00 AM	1:00:00	Slow	dBA	55	59.8	50.4
1/18/2024	3:00:00 AM	4:00:00 AM	1:00:00	Slow	dBA	57.4	73.8	52.5
1/18/2024	4:00:00 AM	5:00:00 AM	1:00:00	Slow	dBA	58.5	62.5	53.2
1/18/2024	5:00:00 AM	6:00:00 AM	1:00:00	Slow	dBA	59.1	62	56.5
1/18/2024	6:00:00 AM	7:00:00 AM	1:00:00	Slow	dBA	62.2	66.1	57.6
1/18/2024	7:00:00 AM	8:00:00 AM	1:00:00	Slow	dBA	63.5	78.3	60
1/18/2024	8:00:00 AM	9:00:00 AM	1:00:00	Slow	dBA	66.9	86.1	59.2
1/18/2024	9:00:00 AM	10:00:00 AM	1:00:00	Slow	dBA	57.8	71.5	53.6
1/18/2024	10:00:00 AM	11:00:00 AM	1:00:00	Slow	dBA	55.1	61.7	51.8
1/18/2024	11:00:00 AM	12:00:00 PM	1:00:00	Slow	dBA	56.7	78.9	50.8
1/18/2024	12:00:00 PM	1:00:00 PM	1:00:00	Slow	dBA	56.3	62.5	52.5



Long-Term (LT) 3 CNEL Calculation

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site:	**Charcot Ave LT3**
Measurement Date:	1/17/24 to 1/18/24
Project Name:	Coyote Creek Flood Protection

			Computation of CNEL					
Hour of Day (military time)	**Sound Level Leq (dBA)**	**Sound Power =10*Log(dBA /10)**	**Period of 24-Hour Day (1=included, 0=not)**			**Sound Power Breakdown by Period of Day**		
			Day	**Evening**	**Night**	**Day**	**Evening**	**Night**
0:00	56.3	426,580	0	0	1	0	0	426,580
1:00	55.4	346,737	0	0	1	0	0	346,737
2:00	55.0	316,228	0	0	1	0	0	316,228
3:00	57.4	549,541	0	0	1	0	0	549,541
4:00	58.5	707,946	0	0	1	0	0	707,946
5:00	59.1	812,831	0	0	1	0	0	812,831
6:00	62.2	1,659,587	0	0	1	0	0	1,659,587
7:00	63.5	2,238,721	1	0	0	2,238,721	0	0
8:00	66.9	4,897,788	1	0	0	4,897,788	0	0
9:00	57.8	602,560	1	0	0	602,560	0	0
10:00	55.1	323,594	1	0	0	323,594	0	0
11:00	56.7	467,735	1	0	0	467,735	0	0
12:00	56.3	426,580	1	0	0	426,580	0	0
13:00	50.9	123,027	1	0	0	123,027	0	0
14:00	50.6	114,815	1	0	0	114,815	0	0
15:00	51.1	128,825	1	0	0	128,825	0	0
16:00	51.2	131,826	1	0	0	131,826	0	0
17:00	53.0	199,526	1	0	0	199,526	0	0
18:00	54.2	263,027	1	0	0	263,027	0	0
19:00	57.9	616,595	0	1	0	0	616,595	0
20:00	58.9	776,247	0	1	0	0	776,247	0
21:00	58.6	724,436	0	1	0	0	724,436	0
22:00	58.3	676,083	0	0	1	0	0	676,083
23:00	56.9	489,779	0	0	1	0	0	489,779
		Sum of Sound Power during Period wo/penalty				9,918,023	2,117,278	5,985,310
		Log Factor for CNEL Penalty (i.e., 10*log(x))				1	3	10
		Sound Power during Period with penalty				9,918,023	6,351,834	59,853,100

Total Daily Sound Power, with penalties	76,122,957
Hours per Day	24
Average Hourly Sound Power, with penalties	3,171,790
CNEL	65.0

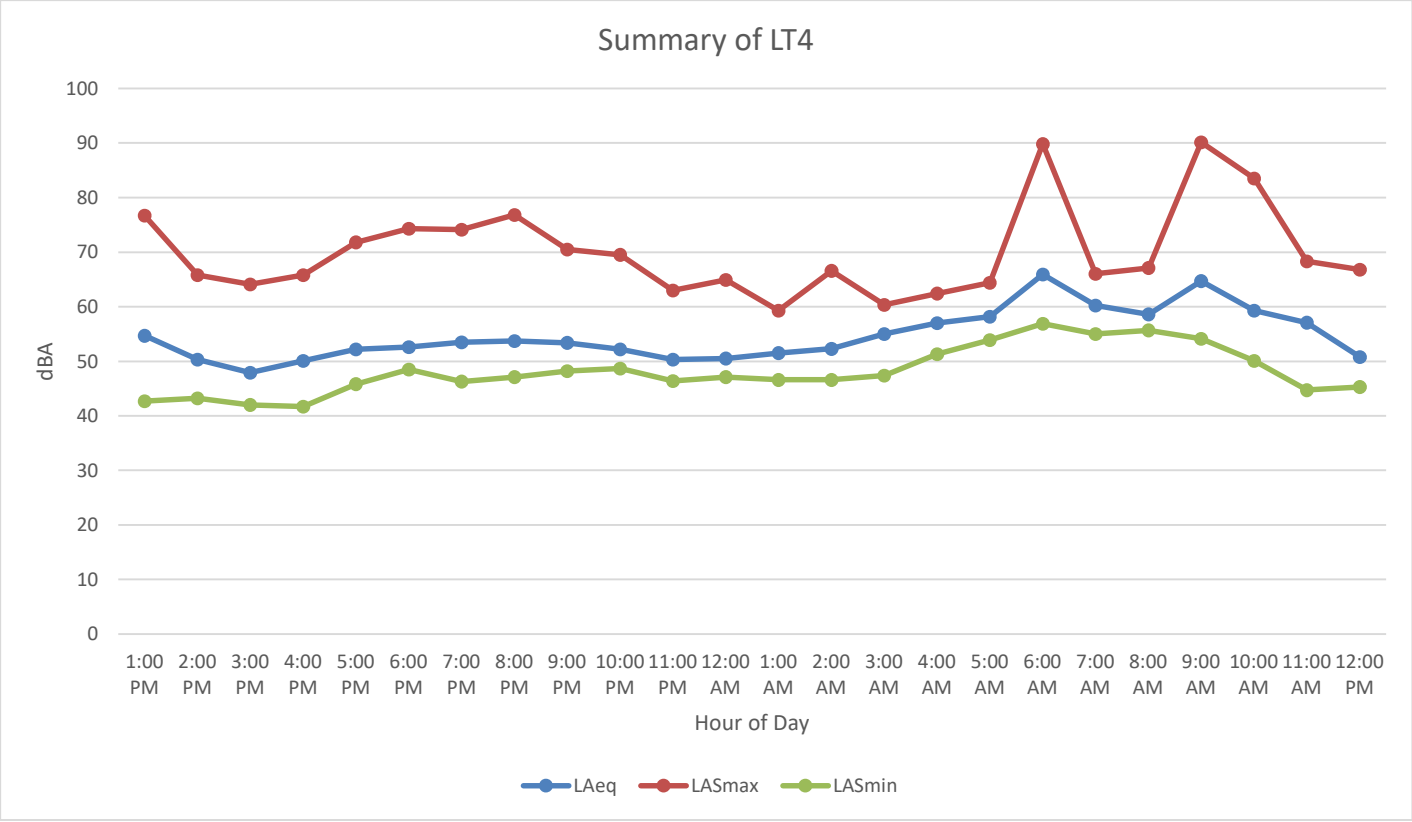
Ldn computation on next page.

Notes:
Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.
Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.
Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:
California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Long-Term (LT) 4 Measurement Hourly Data

Start Date	Start Time	End Time	Duration	SPL Time Weight	Freq Weight	Start Time	LAeq	LASmax	LASmin
1/17/2024	1:00:00 PM	2:00:00 PM	1:00:00	Slow	dBA	1:00 PM	54.7	76.7	42.7
1/17/2024	2:00:00 PM	3:00:00 PM	1:00:00	Slow	dBA	2:00 PM	50.3	65.8	43.2
1/17/2024	3:00:00 PM	4:00:00 PM	1:00:00	Slow	dBA	3:00 PM	47.9	64.1	42
1/17/2024	4:00:00 PM	5:00:00 PM	1:00:00	Slow	dBA	4:00 PM	50.1	65.8	41.7
1/17/2024	5:00:00 PM	6:00:00 PM	1:00:00	Slow	dBA	5:00 PM	52.2	71.8	45.8
1/17/2024	6:00:00 PM	7:00:00 PM	1:00:00	Slow	dBA	6:00 PM	52.6	74.3	48.5
1/17/2024	7:00:00 PM	8:00:00 PM	1:00:00	Slow	dBA	7:00 PM	53.5	74.1	46.3
1/17/2024	8:00:00 PM	9:00:00 PM	1:00:00	Slow	dBA	8:00 PM	53.7	76.8	47.1
1/17/2024	9:00:00 PM	10:00:00 PM	1:00:00	Slow	dBA	9:00 PM	53.4	70.5	48.2
1/17/2024	10:00:00 PM	11:00:00 PM	1:00:00	Slow	dBA	10:00 PM	52.2	69.5	48.7
1/17/2024	11:00:00 PM	12:00:00 AM	1:00:00	Slow	dBA	11:00 PM	50.3	63	46.4
1/18/2024	12:00:00 AM	1:00:00 AM	1:00:00	Slow	dBA	12:00 AM	50.5	64.9	47.1
1/18/2024	1:00:00 AM	2:00:00 AM	1:00:00	Slow	dBA	1:00 AM	51.5	59.3	46.6
1/18/2024	2:00:00 AM	3:00:00 AM	1:00:00	Slow	dBA	2:00 AM	52.3	66.6	46.6
1/18/2024	3:00:00 AM	4:00:00 AM	1:00:00	Slow	dBA	3:00 AM	55	60.3	47.4
1/18/2024	4:00:00 AM	5:00:00 AM	1:00:00	Slow	dBA	4:00 AM	57	62.4	51.3
1/18/2024	5:00:00 AM	6:00:00 AM	1:00:00	Slow	dBA	5:00 AM	58.2	64.4	53.9
1/18/2024	6:00:00 AM	7:00:00 AM	1:00:00	Slow	dBA	6:00 AM	65.9	89.8	56.9
1/18/2024	7:00:00 AM	8:00:00 AM	1:00:00	Slow	dBA	7:00 AM	60.2	66	55
1/18/2024	8:00:00 AM	9:00:00 AM	1:00:00	Slow	dBA	8:00 AM	58.6	67.1	55.7
1/18/2024	9:00:00 AM	10:00:00 AM	1:00:00	Slow	dBA	9:00 AM	64.7	90.1	54.1
1/18/2024	10:00:00 AM	11:00:00 AM	1:00:00	Slow	dBA	10:00 AM	59.3	83.5	50.1
1/18/2024	11:00:00 AM	12:00:00 PM	1:00:00	Slow	dBA	11:00 AM	57.1	68.3	44.7
1/18/2024	12:00:00 PM	1:00:00 PM	1:00:00	Slow	dBA	12:00 PM	50.8	66.8	45.3



Long-Term (LT) 4 CNEL Calculation

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Measurement Site: **17th Street LT4**
Measurement Date: 1/17/24 to 1/18/24
Project Name: Coyote Creek Flood Protection

Hour of Day (military time)	Sound Level Leq (dBA)	Sound Power =10*Log(dBA /10)	Computation of CNEL: Period of 24-Hour Day (1=included, 0=not) Day	Evening	Night	Sound Power Breakdown by Period of Day Day	Evening	Night
0:00	50.5	112,202	0	0	1	0	0	112,202
1:00	51.5	141,254	0	0	1	0	0	141,254
2:00	52.3	169,824	0	0	1	0	0	169,824
3:00	55.0	316,228	0	0	1	0	0	316,228
4:00	57.0	501,187	0	0	1	0	0	501,187
5:00	58.2	660,693	0	0	1	0	0	660,693
6:00	65.9	3,890,451	0	0	1	0	0	3,890,451
7:00	60.2	1,047,129	1	0	0	1,047,129	0	0
8:00	58.6	724,436	1	0	0	724,436	0	0
9:00	64.7	2,951,209	1	0	0	2,951,209	0	0
10:00	59.3	851,138	1	0	0	851,138	0	0
11:00	57.1	512,861	1	0	0	512,861	0	0
12:00	50.8	120,226	1	0	0	120,226	0	0
13:00	54.7	295,121	1	0	0	295,121	0	0
14:00	50.3	107,152	1	0	0	107,152	0	0
15:00	47.9	61,660	1	0	0	61,660	0	0
16:00	50.1	102,329	1	0	0	102,329	0	0
17:00	52.2	165,959	1	0	0	165,959	0	0
18:00	52.6	181,970	1	0	0	181,970	0	0
19:00	53.5	223,872	0	1	0	0	223,872	0
20:00	53.7	234,423	0	1	0	0	234,423	0
21:00	53.4	218,776	0	1	0	0	218,776	0
22:00	52.2	165,959	0	0	1	0	0	165,959
23:00	50.3	107,152	0	0	1	0	0	107,152
		Sum of Sound Power during Period wo/penalty				7,121,190	677,071	6,064,950
		Log Factor for CNEL Penalty (i.e., 10*log(x))				1	3	10
		Sound Power during Period with penalty				7,121,190	2,031,213	60,649,505

Total Daily Sound Power, with penalties	69,801,908
Hours per Day	24
Average Hourly Sound Power, with penalties	2,908,413
CNEL	64.6

Ldn computation on next page.

Notes:
Computation of the CNEL based on 1-hour Leq measurements for each hour of a day are based on equation 2-27 on pg. 2-57 of Caltrans 2009.
Computation of the Ldn based on 1-hour Leq measurements for each hour of a day are based on equation 2-26 on pg. 2-56 of Caltrans 2009.
Log factors for the Ldn and CNEL penalties are provided in Table 2-12 on pg. 2-52 of Caltrans 2009.

Source:
California Deaprtment of Transportation (Caltrans), Divisiong of Environmental Analysis. 2009 (November). *2009 Technical Noise Supplement* . Sacramento, CA. Available: <http://www.dot.ca.gov/hq/env/noise/>. Accessed September 24, 2010.

Construction Noise Modeling

L-Wall/T-Wall Construction (Leq)

L-Wall/T-Wall Construction (Lmax)

I-Wall Construction (Leq)

I-Wall Construction (Lmax)

Passive Barrier Construction (Leq)

Passive Barrier Construction (Lmax)

Berm Construction (Leq)

Berm Construction (Lmax)

Nighttime Construction – Concrete Pour (Leq)

Nighttime Construction – Concrete Pour (Lmax)

Multiple Construction Types (Conservatively High Scenario)- Leq

Multiple Construction Types (Conservatively High Scenario)- Lmax

Temporary Increase in Noise Calculations

I-Wall Construction with Silent Pile Driver (Leq)

I-Wall Construction with Silent Pile Driver (Lmax)

Multiple Construction Types With Silent Pile Driver (Conservatively High Scenario) – Leq

Multiple Construction Types With Silent Pile Driver (Conservatively High Scenario) - Lmax

Summary of Mitigation and Associated Noise Levels

Construction Equipment Reference Noise Levels

L Wall/T Wall Construction (Leq)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	33	90.0
resident. Nighttime threshold	103	80.0
comm/industrial daytime threshold	10	100.0
comm/industrial nighttime threshold	10	100.0
R7-FW11 (NSR 20)	14	97.4
R7-FW17 (NSR 20)	12	98.7
R7-FW22 (NSR 25)	8	102.2
R8-FW15 (NSR 33)	179	75.2

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Excavator	85	0.4
Dozer	85	0.4
Roller	85	0.2
Concrete Pump Truck	82	0.2
Generator	82	0.5

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Excavator	81.0
Dozer	81.0
Roller	78.0
Concrete Pump Truck	75.0
Generator	79.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
86.3

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

* = commercial/industrial use

L Wall/T Wall Construction (Lmax)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	60	90.0
resident. Nighttime threshold	189	80.0
comm/industrial daytime threshold	19	100.0
comm/industrial nighttime threshold	19	100.0
R7-FW11 (NSR 20)	14	102.6
R7-FW17 (NSR 20)	12	103.9
R7-FW22 (NSR 25)	8	107.5
R8-FW15 (NSR 33)	179	80.5

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Excavator	85	1
Dozer	85	1
Roller	85	1
Concrete Mixer Truck	85	1
Generator	82	1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Excavator	85.0
Dozer	85.0
Roller	85.0
Concrete Mixer Truck	85.0
Generator	82.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
91.5

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

I Wall Construction (Leq)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	44	90.0
resident. Nighttime threshold	138	80.0
comm/industrial daytime threshold	14	100.0
comm/industrial nighttime threshold	14	100.0
R6-FW5 (NSR 12)	24	95.2
R6-FW6 (NSR 13)	159	78.8
R6-FW9 (NSR 11)	7	105.9
R6-FW9 (NSR 10)	163	78.6
R6-FW16 (NSR 9)	253	74.7
R6-FW8 (NSR 14)	8	104.7
R6-FW10 (NSR 15)	8	104.7
R6-FW10 (NSR 16)	9	103.7
R6-FW21 (NSR 16)	11	102.0
R6-FW21 (NSR 17)	39	91.0
R6-FW20 (NSR 18)	79	84.8
R6-FW20 (NSR 19)	23	95.6
R8-FW13 (NSR 28)	8	104.7
R7-FW12Alt (NSR 22)	30	93.3

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Impact Pile Driver	95	0.2
Crane	85	0.16
Generator	82	0.5

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Impact Pile Driver	88.0
Crane	77.0
Generator	79.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
88.8

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

I Wall Construction (Lmax)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	95	90.0
resident. Nighttime threshold	302	80.0
comm/industrial daytime threshold	30	100.0
comm/industrial nighttime threshold	30	100.0
R6-FW5 (NSR 12)	24	102.0
R6-FW6 (NSR 13)	159	85.6
R6-FW9 (NSR 11)	7	112.7
R6-FW9 (NSR 10)	163	85.3
R6-FW16 (NSR 9)	253	81.5
R6-FW8 (NSR 14)	8	111.5
R6-FW10 (NSR 15)	8	111.5
R6-FW10 (NSR 16)	9	110.5
R6-FW21 (NSR 16)	11	108.8
R6-FW21 (NSR 17)	39	97.8
R6-FW20 (NSR 18)	79	91.6
R6-FW20 (NSR 19)	23	102.4
R8-FW13 (NSR 28)	8	111.5
R7-FW12Alt (NSR 22)	30	100.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Impact Pile Driver	95	1
Crane	85	1
Generator	82	1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Impact Pile Driver	95.0
Crane	85.0
Generator	82.0
Combined Predicted Noise Level (L_{eq} dBA at 50 feet)	
95.6	

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Passive Barrier Construction (Leq)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	31	90.0
resident. Nighttime threshold	99	80.0
comm/industrial daytime threshold		100.0
comm/industrial nighttime threshold		100.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Excavator	85	0.4
Roller	85	0.2

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Excavator	81.0
Roller	78.0
Concrete Mixer Truck	81.0
Generator	79.0
Combined Predicted Noise Level (L_{eq} dBA at 50 feet)	
86.0	

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

* = commercial/industrial use

Passive Barrier Construction (Lmax)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	53	90.0
resident. Nighttime threshold	166	80.0
comm/industrial daytime threshold	17	100.0
comm/industrial nighttime threshold	17	100.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Excavator	85	1
Roller	85	1
Concrete Mixer Truck	85	1
Generator	82	1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Excavator	85.0
Roller	85.0
Concrete Mixer Truck	85.0
Generator	82.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
90.4

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Berm Construction (Leq)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	34	90.0
resident. Nighttime threshold	108	80.0
comm/industrial daytime threshold	11	100.0
comm/industrial nighttime threshold	11	100.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Backhoe	80	0.4
Dozer	85	0.4
Roller	85	0.2
Pneumatic Tools	85	0.5
Generator	82	0.5

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Backhoe	76.0
Dozer	81.0
Roller	78.0
Pneumatic Tools	82.0
Generator	79.0
Combined Predicted Noise Level (L_{eq} dBA at 50 feet)	
	86.7

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Berm Construction (Lmax)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	55	90.0
resident. Nighttime threshold	174	80.0
comm/industrial daytime threshold	17	100.0
comm/industrial nighttime threshold	17	100.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Backhoe	80	1
Dozer	85	1
Roller	85	1
Pneumatic Tools	85	1
Generator	82	1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Backhoe	80.0
Dozer	85.0
Roller	85.0
Pneumatic Tools	85.0
Generator	82.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
90.8

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Nighttime Construction Concrete Pour (Leq)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. Nighttime threshold	72	80
comm/industrial nighttime threshold	7	100
R4-FW4 (NSR 4)	7	100
R4-FW3 (Residential Uses)	1984	51.2
R6-FW5 (NSR 12)	24	89.5
R6-FW5 (NSR 9)	1211	55.5

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Concrete Mixer Truck	85	0.4
Pickup Truck	55	0.4
Generator	82	0.5

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Concrete Mixer Truck	81.0
Pickup Truck	51.0
Generator	79.0
Combined Predicted Noise Level (L_{eq} dBA at 50 feet)	
83.1	

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

* = commercial/industrial use

Nighttime Construction Concrete Pour (Lmax)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. Nighttime threshold	109	80.0
comm/industrial nighttime threshold	11	100.0
R4-FW4 (NSR 4)	7	103.8
R4-FW3 (Residential Uses)	1984	54.8
R6-FW5 (NSR 12)	24	93.1
R6-FW5 (NSR 9)	1211	59.1

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Concrete Mixer Truck	85	1
Pickup Truck	55	1
Generator	82	1
		1
		1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Concrete Mixer Truck	85.0
Pickup Truck	55.0
Generator	82.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
86.8

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Multiple Construction Types (Conservatively High Scenario) Leq

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	48	90.0
resident. Nighttime threshold	152	80.0
comm/industrial daytime threshold	15	100.0
comm/industrial nighttime threshold	15	100.0
R4-PB1 (NSR 2)	38	92.0
R4-PB2 (NSR 3)	34	93.0
R4-FW1 (NSR 1)	21	97.2
R4-FW2 (NSR 2)	24	96.0
R4-FW3 (NSR 3)	17	99.0
R4-FW4 (NSR 4)	7	106.7
R4-FW4 (NSR 5)	48	90.0
R6-PB3 (NSR 8)	90	84.5
R6-PB3 (NSR 7)	99	83.7
R6-PB3 (NSR 6)	168	79.1
R6-B1 (NSR 8)	90	84.5
R6-FW7 (NSR 8)	4	111.6
R7-FW12 (NSR 21)	100	83.6
R7-FW12 (NSR 22)	10	103.6
R7-PB4 (NSR 24)	50	89.6
R7-PB4 (NSR 23)	70	86.7
R7-FW22 (NSR 25)	8	105.6
R7-PB5 (NSR 27)	44	90.8
R7-PB5 (NSR 26)	67	87.1
R8-FW14 (NSR 32)	18	98.5
R8-FW 14 (NSR 31)	53	89.1
R8-B3 (NSR 30)	13	101.3
R8-B3 (NSR 29)	53	89.1

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Concrete Pump Truck	82	0.2
Generator	82	0.5
Crane	85	0.16
Excavator	85	0.4
Impact Pile Driver	95	0.2

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Concrete Pump Truck	75.0
Generator	79.0
Crane	77.0
Excavator	81.0
Impact Pile Driver	88.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
89.6

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Multiple Construction Types (Conservatively High Scenario) Lmax

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	101	90.0
resident. Nighttime threshold	321	80.0
comm/industrial daytime threshold	32	100.0
comm/industrial nighttime threshold	32	100.0
R4-PB1 (NSR 2)	38	98.5
R4-PB2 (NSR 3)	34	99.5
R4-FW1 (NSR 1)	21	103.7
R4-FW2 (NSR 2)	24	102.5
R4-FW3 (NSR 3)	17	105.5
R4-FW4 (NSR 4)	7	113.2
R4-FW4 (NSR 5)	48	96.5
R6-PB3 (NSR 8)	90	91.0
R6-PB3 (NSR 7)	99	90.2
R6-PB3 (NSR 6)	168	85.6
R6-B1 (NSR 8)	90	91.0
R6-FW7 (NSR 8)	4	118.1
R7-FW12 (NSR 21)	100	90.1
R7-FW12 (NSR 22)	10	110.1
R7-PB4 (NSR 24)	50	96.1
R7-PB4 (NSR 23)	70	93.2
R7-FW22 (NSR 25)	8	112.1
R7-PB5 (NSR 27)	44	97.3
R7-PB5 (NSR 26)	67	93.6
R8-FW14 (NSR 32)	18	105.0
R8-FW 14 (NSR 31)	53	95.6
R8-B3 (NSR30)	13	107.8
R8-B3 (NSR 29)	53	95.6

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Concrete Pump Truck	82	1
Generator	82	1
Crane	85	1
Excavator	85	1
Impact Pile Driver	95	1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Concrete Pump Truck	82.0
Generator	82.0
Crane	85.0
Excavator	85.0
Impact Pile Driver	95.0
Combined Predicted Noise Level (L_{eq} dBA at 50 feet)	
96.1	

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Temporary Increase in Noise Calculations

	Noise Level dBA Leq	FT	Construction Noise at SR	Combined (Existing + Project)	Change	Threshold
Reference Noise Level (LT3)[1]	59.2	370				
Calculated noise level	67.9	50				
SR 1	62.7	166	97.2	97.2	34.5	10
SR 2	69.2	37	96.0	96.0	26.8	5
SR 3	65.4	88	99.0	99.0	33.6	5
SR 4	59.2	370	107	107.0	47.8	10
SR 5	57.8	512	90.0	90.0	32.2	10
Reference Noise Level (LT1)[2]	64.1	325				
Calculated noise level	72.2	50				5
SR 6	59.2	995	79.1	79.2	19.9	10
SR 7	59.9	849	83.7	83.7	23.8	10
SR 8	59.9	849	112	112.0	52.1	10
SR 9	59.9	859	74.7	74.8	15.0	10
Reference Noise Level (LT1)[3]	64.1	484				
Calculated noise level	74.0	50				
SR 12	64.7	421	95.2	95.2	30.5	10
SR 13	69.1	153	78.8	79.2	10.1	5
SR 14	66.1	307	105	105.0	38.9	5
Reference Noise Level (ST 1)[4]	52.8					
SR 10	52.8	---	78.6	78.6	25.8	10
SR 11	52.8	---	106	106.0	53.2	10
SR 15	52.8	---	105	105.0	52.2	10
SR 16	52.8	---	104	104.0	51.2	10
SR 17	52.8	---	91.0	91.0	38.2	10
Reference Noise Level (LT 2)[5]	50.6					
SR 18	50.6	---	84.8	84.8	34.2	10
SR 19	50.6	---	95.6	95.6	45.0	10
Reference Noise Level (LT 4)[6]	57.7					
SR 20	57.7	---	98.7	98.7	41.0	10
Reference Noise Level (ST 2)[7]	42.3	210				
Calculated noise level	48.5	50				10
SR 21	49.2	43	83.6	83.6	34.4	10
SR 22	39.9	362	104	104.0	64.1	10
SR 23	49.5	40	86.7	86.7	37.2	10
SR 24	44.2	135	89.6	89.6	45.4	10
Reference Noise Level (ST 3)[8]	51.0					
SR 25	51.0	---	106.0	106.0	55.0	10
SR 26	51.0	---	87.1	87.1	36.1	10
SR 27	51.0	---	90.8	90.8	39.8	10
Reference Noise Level (ST 6)[9]	55.2	455				
Calculated noise level	64.8	50				10
SR 28	57.6	262	105.0	105.0	47.4	10
Reference Noise Level (ST 5)[10]	39.8					
SR 29	39.8	---	89.1	89.1	49.3	10
SR 30	39.8	---	101.0	101.0	61.2	10
SR 31	39.8	---	89.1	89.1	49.3	10
SR 32	39.8	---	98.5	98.5	58.7	10
Reference Noise Level (ST 6)[11]	42.3	492				
Calculated noise level	52.2	50				
SR 33	61.4	109	75.2	75.4	14.0	10
Reference Noise Level (LT 4)[12]	54.8					
Residences along Silk Lane Rd.	54.8	---	51.2	56.4	1.6	10
Residences along Jackson St (SR 9)	54.8	---	55.5	58.1	3.3	10

Sources

Attenuation Formula (line source)

Lp(R2)=Lp(R1)-10*Log(R2/R1)

			8
Lp(R1)	=	reference noise level at known distance	5
Lp(R2)	=	noise level at second location	soft
R1	=	reference level distance	6.5
R2	=	distance to second location	
			0.633928571

Notes:

1. 12-hour Long-term Leq measurement (LT3) conducted 370 feet from the centerline of Charcot Avenue
2. 12-hour Long-term Leq measurement (LT1) conducted 325 feet from the centerline of E. Taylor Street
3. 12-hour Long-term Leq measurement (LT 1) conducted 484 feet from the centerline of US 101
4. Short-term Leq measurement (ST 1) is assumed to be representative of noise levels at all nearby sensitive receptors (SR 10, 11, 15, 16, 17)
5. 12-hour Long-term Leq measurement (LT 2) is assumed to be representative of noise levels at all nearby sensitive receptors (SR 18, 19)
6. 12-hour Long-term Leq measurement (LT 4) is assumed to be representative of noise levels at nearby sensitive receptors (SR 20, 21)
7. Short-term Leq measurement (ST 2) conducted 210 feet from the centerline of E. William Street
8. Short-term Leq measurement (ST 3) is assumed to be representative of noise levels at nearby sensitive receptors (SR 25, 26, 27)
9. Short-term Leq measurement (ST 6) conducted 455 feet from the centerline of Story Road
10. Short-term Leq measurement (ST 5) is assumed to be representative of noise levels at nearby sensitive receptors (SR 29, 30, 31, 32)
11. Short-term Leq measurement (ST 4) conducted 492 feet from the centerline of Tully Road
12. Nighttime average Leq measurement (LT4) is assumed to be representative of nighttime noise levels at residences along Silk Lane Road and at SR 9 along Jackson Road

I Wall Construction with Silent Pile Driver (Leq)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	18	90.0
resident. Nighttime threshold	57	80.0
comm/industrial daytime threshold	6	100.0
comm/industrial nighttime threshold	6	100.0
R6-FW9 (NSR 11)	7	98.2
R6-FW8 (NSR 14)	8	97.1
R6-FW10 (NSR 15)	8	97.1
R6-FW10 (NSR 16)	9	96.0
R6-FW21 (NSR 16)	11	94.3
R6-FW21 (NSR 17)	39	83.3
R6-FW20 (NSR 19)	23	87.9
R8-FW13 (NSR 28)	15	91.6
R7-FW12Alt (NSR 22)	30	85.6

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Impact Pile Driver	64	0.2
Crane	85	0.16
Generator	82	0.5

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Impact Pile Driver	57.4
Crane	77.0
Generator	79.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
81.2

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

I Wall Construction with Silent Pile Driver (Lmax)

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	95	90.0
resident. Nighttime threshold	302	80.0
comm/industrial daytime threshold	30	100.0
comm/industrial nighttime threshold	30	100.0
R6-FW9 (NSR 11)	7	112.7
R6-FW8 (NSR 14)	8	111.5
R6-FW10 (NSR 15)	8	111.5
R6-FW10 (NSR 16)	9	110.5
R6-FW21 (NSR 16)	11	108.8
R6-FW21 (NSR 17)	39	97.8
R6-FW20 (NSR 19)	23	102.4
R8-FW13 (NSR 28)	15	106.1
R7-FW12Alt (NSR 22)	30	100.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Impact Pile Driver	95	1
Crane	85	1
Generator	82	1
		1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Impact Pile Driver	95.0
Crane	85.0
Generator	82.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
95.6

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Multiple Construction Types with Silent Pile Driver (Conservatively High Scenario) Leq

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	27	90.0
resident. Nighttime threshold	85	80.0
comm/industrial daytime threshold	9	100.0
comm/industrial nighttime threshold	9	100.0
R4-FW4 (NSR 4)	7	101.7
R6-FW7 (NSR 8)	4	106.6
R7-FW12 (NSR 22)	10	98.6
R7-FW22 (NSR 25)	8	100.6
R7-PB5 (NSR 27)	44	85.7
R8-B3 (NSR 30)	13	96.3
R8-FW14 (NSR 32)	18	93.5

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Excavator	85	0.4
Concrete Pump Truck	82	0.2
Generator	82	0.5
Crane	85	0.16
Impact Pile Driver	64	1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Excavator	81.0
Concrete Pump Truck	75.0
Generator	79.0
Crane	77.0
Impact Pile Driver	64.4
Combined Predicted Noise Level (L_{eq} dBA at 50 feet)	
84.6	

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Multiple Construction Types with Silent Pile Driver (Conservatively High Scenario) Lmax

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
resident. daytime threshold	101	90.0
resident. Nighttime threshold	321	80.0
comm/industrial daytime threshold	32	100.0
comm/industrial nighttime threshold	32	100.0
R4-FW4 (NSR 4)	7	113.2
R6-FW7 (NSR 8)	4	118.1
R7-FW12 (NSR 22)	10	110.1
R7-FW22 (NSR 25)	8	112.1
R7-PB5 (NSR 27)	44	97.3
R8-B3 (NSR 30)	13	107.8
R8-FW14 (NSR 32)	18	105.0

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Excavator	85	1
Concrete Pump Truck	82	1
Generator	82	1
Crane	85	1
Impact Pile Driver	95	1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Excavator	85.0
Concrete Pump Truck	82.0
Generator	82.0
Crane	85.0
Impact Pile Driver	95.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
96.1

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Summary of Mitigation and Associated Noise Levels

Site ID	Flood Risk Reduction Improvement Type	Design Type	Closest Noise Sensitive Receptor (NSR)	Distance of Construction Activities to Receptor (feet)	Receptor Type	Adjacent Improvements	Conservatively High Scenario Applied?	Existing Soundwall?	Room for Temporary Sound Wall?	Constructio n Noise Leq (dBA) at Receptor	Construction Noise Lmax (dBA) at Receptor	Applicable Threshold Exceeded?	Reduction from Existing Wall (dB)	Noise Levels with Wall	Threshold Exceeded?	Construction Noise Leq (dBA) at Receptor with Silent Pile Driver	Reduction from use of Silent Pile Driver (dBA)	Applicable Threshold Exceeded?	Reduction from Sound Curtain (dB)	Noise Levels with Mitigation	Threshold Exceeded?
R4-PB1	Passive barriers with floodwalls	Hinged passive barrier segments connected by sheet pile I-wall floodwall segments	NSR 2	38	Commercial/ Industrial	BR4-FW1; BR4-PB1-FW1	Yes	No	Yes	92.0	99	No	N/A	N/A	N/A	-					
R4-PB2	Passive barriers with floodwalls	Hinged passive barrier segments connected by sheet pile I-wall floodwall segments	NSR 3	34	Commercial/ Industrial	R4-FW3; R4-PB2-FW1	Yes	No	Yes	93.0	99	No	N/A	N/A	N/A	-					
R4-FW1	Floodwall	Sheet pile I-Wall floodwall	NSR 1	21	Commercial/ Industrial	R4-PB1-A	Yes	No; chainlink fence	Yes	97.2	104	No	N/A	N/A	N/A	-					
R4-FW2	Floodwall	Sheet pile I-Wall floodwall	NSR 2	24	Commercial/ Industrial	R4-PB1-C	Yes	No; chainlink fence	Yes	96.0	103	No	N/A	N/A	N/A	-					
R4-FW3	Floodwall	Sheet pile I-Wall floodwall	NSR 3	17	Commercial/ Industrial	R4-PB2-A	Yes	No	Yes	99.0	106	No	N/A	N/A	N/A	-					
R4-FW4	Floodwall	Sheet pile I-Wall floodwall	NSR 4	7	Commercial/ Industrial	R4-PB2-B	Yes	No	Yes	107	113	**Yes**	N/A	N/A	N/A	102	-5	**Yes**	10	92	No
R4-FW4	Floodwall	Sheet pile I-Wall floodwall	NSR 5	48	Commercial/ Industrial	R4-PB2-B	Yes	No	Yes	90.0	96	No	N/A	N/A	N/A	-					
R6-FW5	Floodwall	Sheet pile I-Wall floodwall	NSR 12	24	Commercial/ Industrial	N/A	No	No	Yes	95.2	102	No	N/A	N/A	N/A	-					
R6-FW6	Floodwall	Sheet pile I-Wall floodwall	NSR 13	159	Commercial/ Industrial	N/A	No	No	Yes	78.8	85.6	No	N/A	N/A	N/A	-					
R6-B1	Berm and floodwall	compacted earthen berm connected to concrete T-Wall floodwall	NSR 6	168	Residential	R6-B1-FW1; R6-FW7; R6-B2	Yes	No	Yes	79.1	No	N/A	N/A	N/A							
R6-PB3	Passive barrier	Hinged Passive Barrier	NSR 8	90	Residential	R6-B1-FW1; R6-FW7; R6-B1	Yes	Yes	Yes	84.5	91.0	No	5	79.5	No	-					
R6-PB3	Passive barrier	Hinged Passive Barrier	NSR 7	99	Residential	R6-B1-FW1; R6-FW7; R6-B2	Yes	Yes	Yes	83.7	90.2	No	5	78.7	No	-					
R6-B1	Berm and floodwall	compacted earthen berm connected to concrete T-Wall floodwall	NSR 8	90	Residential	R6-B1-FW1; R6-PB3	Yes	Yes	Yes	84.5	110.1	No	5	79.5	No	-					
R6-FW7	Floodwall	Sheet pile I-Wall floodwall connected to a sound wall	NSR 8	4	Residential	R6-PB3; R6-SW1	Yes	Yes	No	112	118	Yes	5	107	Yes	107	-5	**Yes**	N/A	107	Yes
R6-FW9	Floodwall	Sheet pile I-Wall floodwall	NSR 11	7	School	N/A	No	No	no	106	113	Yes	N/A	N/A	N/A	98.2	-7.7				
R6-FW9	Floodwall	Sheet pile I-Wall floodwall	NSR 10	163	Residential	N/A	No	No	Yes	78.6	85.3	No	N/A	N/A	N/A	-					
R6-FW16	Floodwall	Sheet pile I-Wall floodwall	NSR 9	253	Residential	N/A	No	No	Yes	74.7	81.5	No	N/A	N/A	N/A	-					
R6-FW8	Floodwall	Sheet pile I-Wall floodwall	NSR 14	8	Commercial/ Industrial	N/A	No	No	No	105	112	Yes	N/A	N/A	N/A	97.1	-7.7	No			
R6-FW10	Floodwall	Sheet pile I-Wall floodwall	NSR 15	8	Residential	R6-FW21	No	No	No	105	112	Yes	N/A	N/A	N/A	97.1	-7.7	**Yes**	N/A	97.1	Yes
R6-FW10	Floodwall	Sheet pile I-Wall floodwall	NSR 16	9	Residential	R6-FW21	No	No	No	104	111	Yes	N/A	N/A	N/A	96.0	-7.7	**Yes**	N/A	96	Yes
R6-FW21	Floodwall	Sheet pile I-Wall floodwall	NSR 16	11	Residential	R6-FW10	No	No	No	102	109	Yes	N/A	N/A	N/A	94.3	-7.7	**Yes**	N/A	94.3	Yes
R6-FW21	Floodwall	Sheet pile I-Wall floodwall	NSR 17	39	Residential	R6-FW10	No	No	No	91.0	97.8	Yes	N/A	N/A	N/A	83.3	-7.7	No			
R6-FW20	Floodwall	Sheet pile I-Wall floodwall	NSR 18	79	Residential	N/A	No	No	No	84.8	91.6	No	N/A	N/A	N/A	-					
R6-FW20	Floodwall	Sheet pile I-Wall floodwall	NSR 19	23	Residential	N/A	No	No	No	95.6	102	Yes	N/A	N/A	N/A	87.9	-7.7	No			
R7-FW11	Floodwall	Concrete L-Wall Floodwall	NSR 20	14	Residential	R7-FW17	No	No	No	97.4	103	Yes	N/A	N/A	N/A	N/A					
R7-FW17	Floodwall	Concrete T-Wall floodwall	NSR 20	12	Residential	R7-FW11	No	No	No	98.7	104	Yes	N/A	N/A	N/A	N/A					
R7-FW12	Floodwall and Passive Barrier	Sheet pile I-Wall floodwall segments connected with hinged passive barrier segments	NSR 21	100	Residential	R7-PB5-A; R7-FW12-PB-A	Yes	No	Yes	83.6	95.6	No	N/A	N/A	N/A	-					
R7-FW12	Floodwall and Passive Barrier	Sheet pile I-Wall floodwall segments connected with hinged passive barrier segments	NSR 22	10	Recreational	R7-PB5-A; R7-FW12-PB-A	Yes	No	Yes	104	110	Yes	N/A	N/A	N/A	98.6	-5.0	**No**			
R7-FW12Alt	Floodwall	Sheet pile I-Wall Floodwall	NSR 22	30	Recreational	R7-FW12	No	No	Yes	93.3	100.0	No	N/A	N/A	N/A	85.6	-7.7	No			
R7-PB4	Passive Barrier and Floodwall	Hinged passive barriers connected to a sheet pile I-wall floodwall	NSR 23	70	Residential	N/A	Yes	No	86.7	93.2	No	N/A	N/A	N/A							
R7-PB4	Passive Barrier and Floodwall	Hinged passive barriers connected to a sheet pile I-wall floodwall	NSR 24	50	Residential	R7-FW22	Yes	No	Yes	89.6	96.1	No	N/A	N/A	N/A	-					
R7-FW22	Floodwall	Concrete L-Wall Floodwall	NSR 25	8	Residential	R7-PB4-H	Yes	No	No	106	112	Yes	N/A	N/A	N/A	101	-5.0	**Yes**	N/A	101	Yes
R7-PB5	Passive Barrier and Floodwall	Hinged passive barriers connected to a sheet pile I-wall floodwall	NSR 27	44	Residential	N/A	Yes	No	Yes	90.8	97.3	Yes	N/A	N/A	N/A	85.7	-5.0	No			
R7-PB5	Passive Barrier and Floodwall	Hinged passive barriers connected to a sheet pile I-wall floodwall	NSR 26	67	Residential	N/A	Yes	No	Yes	87.1	93.6	No	N/A	N/A	N/A	-					
R8-FW13	Floodwall	Sheet pile I-Wall floodwall	NSR 28	8	Residential	N/A	No	No	No	105	112	Yes	N/A	N/A	N/A	91.6	-13	**Yes**	N/A	91.6	Yes
R8-FW14	Floodwall	Sheet pile I-Wall floodwall	NSR 31	53	Residential	R8-B3	Yes	No	Yes	89.1	95.6	No	N/A	N/A	N/A	-					
R8-FW14	Floodwall	Sheet pile I-wall floodwall	NSR 32	18	Residential	R8-B3	Yes	No	Yes	98.5	105	Yes	N/A	N/A	N/A	93.5	-5.0	**Yes**	10	83.5	No
R8-B3	Berm and floodwall	Compacted earthen berm connected to concrete L-Wall floodwall	NSR 30	13	Residential	R8-FW14	Yes	No	No	101	108	Yes	N/A	N/A	N/A	96.3	-5.0	**Yes**	N/A	96.3	Yes
R8-B3	Berm and floodwall	Compacted earthen berm connected to concrete L-Wall floodwall	NSR 29	53	Residential	R8-FW14	Yes	No	No	89.1	96	No	N/A	N/A	N/A	-					
R8-FW15	Floodwall	Concrete T-Wall floodwall	NSR 33	179	Residential	N/A	No	No	No	75.2	80	No	N/A	N/A	N/A	-					

Notes:
N/A = not applicable (i.e., no adjacent improvements or a sound curtain is not feasible)

Construction Equipment Reference Noise Levels

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	na	0	74.0	67.0	100		
Blasting	na	94	na	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	na	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS s	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	na	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Jac	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	na	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer	20	90	90	212	84.0	77.0	100	84.0	77.0
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozzl	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	na	0	74.0	71.0	100		
Tractor	40	84	na	0	78.0	74.0	100		
Vacuum Excavator (Vac-tru	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacuum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0
Giken Silent Pile Driver			64						

Source:
FHWA Roadway Construction Noise Model, January 2006. Table 9.1
U.S. Department of Transportation
CA/T Construction Spec. 721.560

Construction Vibration Modeling

Construction Vibration Impact Distances

Vibration Impact Summary

Vibration Conversion Calculation

Construction Vibration Impact Distances

KEY: Orange cells are for input.

Grey cells are intermediate calculations performed by the model.

Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.

— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.

— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (VdB)	@	distance (ft)	vibration level (VdB)	@	distance (ft)
Impact pile driver	112	@	25	74.9	@	430
Vibratory Roller	94	@	25	74.9	@	108
Large bulldozer	87	@	25	74.8	@	64
Loaded Truck	86	@	25	74.8	@	59
Small Bulldozer	58	@	25	74.6	@	7
Silent Pile Driver						

The Lv metric (VdB) is used to assess the likelihood for vibration to result in human annoyance.

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level vibration level (PPV)	@	distance (ft)	Attenuated Noise Level at Receptor vibration level (PPV)	@	distance (ft)
City of San Jose Criteria - 0.20 PPV in/sec						
Impact Pile Driver	1.518	@	25	0.20	@	95
Giken Silent Pile Driver	0.090	@	8	0.25	@	4
Vibratory Roller	0.210	@	25	0.20	@	26
Large Bulldozer	0.089	@	25	0.1915	@	15
Loaded Truck	0.076	@	25	0.1814	@	14
Small Bulldozer	0.003	@	25	0.1326	@	2
City of San Jose Criteria - 0.08 PPV in/sec						
Impact Pile Driver	1.518	@	25	0.0799		178
Giken Silent Pile Driver	0.090	@	8	0.0754		9
Vibratory Roller	0.210	@	25	0.0789		48
Large Bulldozer	0.089	@	25	0.0793		27
Loaded Truck	0.076	@	25	0.0760		25
Small Bulldozer	0.003	@	25	0.0722		3
VdB Threshold (75 VdB)						
				0.0228	@	20
				75.1055	@	7

The PPV metric (in/sec) is used for assessing the likelihood for the potential of structural damage.

0.2 and 0.12 are the FTA impact criteria for structural damage to Category III and Category IV buildings, respectively

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 185 of FTA 2018. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Washington, D.C. Accessed: December 20, 2020. Page Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Vibration Impact Summary

Vibration - Structural Damage

Noise Source	Element Type	Distance to 0.20 in/sec Threshold (structural convention) (ft)	Sites within Distance to criteria	Distance to 0.08 in/sec PPV for historical/weakened buildings (ft)	Sites within Distance to criteria
Impact Pile Driver	I-Walls	95	R4-PB1; R4-PB2; R4-FW1, R4-FW2, R4-FW3, R4-FW4, R6-FW5, R6-FW7, R6-FW9, R6-FW8, R6-FW10, R6-FW21, R6-FW20, R7-FW12, R7-FW12Alt, R7-PB4, R7-PB5, R8-FW13, R8-FW14, R8FW14	178	R7-PB4-FW1
Giken Pile Driver	I-Walls	5	R4-PB1-FW2	9	N/A
Vibratory Roller	Passive Barrier, Berms, T-Walls, L-Walls	26	R7-FW11; R7-FW17; R7-FW12; R7-FW22; R8-B3	48	N/A
Large Bulldozer	T-Walls, L-Walls, and berms	15	R7-FW11; R7-FW17; R7-FW22; R8-B3	27	N/A
Loaded Trucks	T-Walls, L-Walls, passive barriers, and berms	14	R4-FW4; R7-FW11; F7-FW17;R7-FW12; R7-FW22	25	N/A
Small Bulldozer	Floodwalls and Berms	2	N/A	3	N/A

Vibration - Human Response

Noise Source	Element Type	Distance to 75 VdB Threshold (ft)	Sites within Distance to criteria
Impact pile driver	I-Walls	540	All I-Wall Sites
Vibratory Roller	Passive Barrier, Berms, T-Walls, L-Walls	108	R4-PB1; R4-PB2; R6-PB3; R6-B1; R7-FW12; R7-FW17; R7-FW11; R7-PB4; R7-FW22; R7-PB5; R8-B3
Large Bulldozer	T-Walls, L-Walls, and berms	63	R7-FW11; F7-FW17; R7-FW22; R7-PB4; R7-PB5; R8-B3
Loaded Truck	T-Walls, L-Walls, passive barriers, and berms	40	R4-PB1, R4-PB2, R7-FW11; R7-FW17; R7-FW12; R7-FW22; R8-B3
Small Bulldozer	T-Walls, L-Walls, and berms	7	N/A

Vibration Conversion Calculation

Conversion From PPV (in/sec) to VdB/Lv

asessments to root-mean-square (RMS) velocity and VdB. The user inputs the reference or modeled PPV value to convert to

Key: User Input

Model Output

Equipment Modeled	PPV (in/sec)	VdB	RMS*
Impact Pile Driver	0.022768399	75	0.0056921

Equation 5-1:

Vibration velocity level in decibels is defined as:

Lv (VdB)	**=**	**20*log (V/Vref)**
Lv	=	velocity level, VdB
V	=	rms velocity amplitude
Vref	=	1X10^-6 in/sec

Notes

*calculation applies crest factor of 4, per FTA 2018 pg 184

Source:

Federal Transit Administration (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. Equation 5-1

Appendix H. Hydraulic and Hydrologic Technical Appendix

Appendix H1 – Valley Water Technical Memorandum: Hydrology Approach for Environmental Impact Report

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TECHNICAL MEMORANDUM

PROJECT:	Coyote Creek Flood Protection Project (CCFPP)	**DATE**:	June 12, 2024
SUBJECT:	Recommended Hydraulic Modeling Approach for Environmental Impact Report		
PREPARED BY:	Melissa Reardon		

1. INTRODUCTION

An Environmental Impact Report (EIR) is being prepared for the Coyote Creek Flood Protection Project (CCFPP) for compliance with the California Environmental Quality Act (CEQA). In the EIR, impacts to hydrology, including changes in water surface elevation and flooding extents, must be evaluated. A separate memorandum[1] describes the scenarios to be evaluated and the recommended hydrology approach to evaluating the EIR scenarios. A total of nine scenarios are recommended to be evaluated for the CCFPP EIR; these nine scenarios reflect five different time periods with different assumptions about the construction of projects in the CCFPP reaches of Coyote Creek as well as operations and outlet capacity at Anderson Dam. The five time periods are: pre-project 2017 California Department of Water Resources Division of Safety of Dams (DSOD) conditions, time at Notice of Preparation (NOP), post-Anderson Dam Tunnel Project (ADTP), during Anderson Dam Seismic Retrofit Project (ADSRP) construction, and post-ADSRP with Fish and Aquatic Habitat Collaborative Effort (FAHCE) rule curves in place. Three projects are scheduled to be constructed before the CCFPP is constructed and are included in some of the EIR scenarios: the Coyote Creek Flood Management Measures Project (CCFMMP) and two City of San Jose trails projects, the City of San Jose Mabury-Empire Trails Project and Phelan Avenue-Tully Road Trail Project, herein referred to as the CSJ Trails Projects. A summary of the nine EIR scenarios is provided in Table 1.

This memorandum describes the recommended hydraulic modeling approach to develop water surface elevations and floodplains for the nine scenarios listed in Table 1 for the CCFPP EIR.

[1] Santa Clara Valley Water District. "Coyote Creek Flood Protection Project (CCFPP): Hydrology Approach for Environmental Impact Report" Draft Technical Memorandum. Prepared by Melissa Reardon. November 2023.

Table 1. Summary of Recommended Scenarios for Hydrology Impact Analysis

EIR Scenario No.	Description	Release out of Anderson Dam during 100-year event (cfs)	CCFMMP Status	CCFPP Status	CSJ Trails Projects Status
1	2017 DSOD conditions at Anderson Dam and Reservoir; existing conditions (72-hr storm)	10,211	Not Built	Not Built	Not Built
1a	2017 DSOD conditions at Anderson Dam and Reservoir; existing conditions (24-hr storm)	0	Not Built	Not Built	Not Built
2	2023 NOP conditions at Anderson Dam and Reservoir; existing conditions (24-hr storm)	500	Not Built	Not Built	Not Built
2a	2023 NOP conditions at Anderson Dam and Reservoir; CCFPP in place (24-hr storm)	500	Built	Built	Not Built
3	2023 ADTP conditions at Anderson Dam and Reservoir; CCFMMP and CSJ Trails Projects in place (24-hr storm)	2,500	Built	Not Built	Built
3a	2023 ADTP conditions at Anderson Dam and Reservoir; CCFMMP, CCFPP and CSJ Trails Projects in place (24-hr storm)	2,500	Built	Built	Built
4	2028 ADSRP conditions at Anderson Dam and Reservoir; CCFMMP, CCFPP, and CSJ Trails Project in place (24-hr storm)	4,140	Built	Built	Built
5	2032 FAHCE conditions at Anderson Dam and Reservoir; CCFMMP, CCFPP, and CSJ Trails Project in place (72-hr storm)	8,999	Built	Built	Built
5a	2032 FAHCE conditions at Anderson Dam and Reservoir; CCFMMP, CCFPP, and CSJ Trails Projects in place (24-hr storm)	0	Built	Built	Built

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2. RECOMMENDED HYDRAULIC MODEL

Because both water surface elevations and floodplains are required for the EIR analysis, it is recommended that a 1D-2D model is used for the hydraulic analysis. A 1D-2D model will also be able to provide other outputs, such as spatial distributions in both the creek itself and on the floodplain. It is recommended that the hydraulic model used for the EIR analysis be based on the Valley Water HEC-RAS (version 6.3.1) 1D-2D model calibrated to the flood event in February 2017[2]. This section describes the development of the recommended existing conditions geometry and the flow files pertinent to the EIR analysis. Geometries incorporating CCFMMP, the CSJ Trails Projects, and CCFPP were developed by AECOM and are described in a separate memorandum[3].

2.1. Existing Conditions Geometry

The following sections describe the components of the existing conditions geometry; some sections are almost identical to the memorandum developed for the calibrated 1D-2D model because no changes were made. A summary of the model information is provided in Table 2. The main two changes between the calibration geometry and the existing conditions geometry are the presence of 1) the Rocksprings floodwall and 2) a higher berm just upstream of the South Bay Mobile Home Park in the existing conditions geometry, both of which were constructed after the February 2017 flood event.

Table 2. Model Information

Type of Model	**Unsteady, 1D-2D, existing conditions**
Vertical Datum	NAVD88
Horizontal Projection	California FIPS III 0403 State Plane Coordinates
Cross Section Orientation	Cross sections face downstream
Georeferencing	Model is georeferenced. Cross section georeferencing is improved compared to the 1D only model but could use additional refinement in some areas.
River Stationing	District GIS Stationing
Extent	Edenvale Gage to San Francisco Bay

2.1.1. 1D Cross Sections

The Coyote Creek cross sections from the full calibrated 1D model[4] were used as the basis for 1D channel cross sections in the existing conditions 1D-2D model. For the 1D-2D model, many

[2] Santa Clara Valley Water District. "Coyote Creek Edenvale to SF Bay: Combined Coyote HEC-RAS 1D-2D Model Calibration" Technical Memorandum. Prepared by Melissa Reardon. March 2022.
[3] AECOM. "Modeling Efforts in Support of Environmental Impact Report" Technical Memorandum. Prepared by Seth Gentlzer, Grace Tandus, Tony Tran, and Rich Gallegos. June 2024.
[4] Santa Clara Valley Water District. "Coyote Creek Anderson Reservoir to SF Bay: Combined Coyote HEC-RAS 1D Model" Technical Memorandum. Prepared by Melissa Reardon. August 2021.

of the cross sections were shortened to include only the main channel compared to the full calibrated 1D model. The floodplain areas previously included in the full calibrated 1D model were modeled as 2D flow areas, as described in Section 2.1.6. The cross section cutlines were also shifted to improve the 1D cross section georeferencing such that the 1D cross section better matched the 2D terrain cross section at the cutline.

Although the 2D flow areas extend to the San Francisco Bay, the 1D cross sections only extend to just downstream of Highway 237. Downstream of Montague Expressway, the creek has 100-year flood protection from the Lower Coyote Creek Flood Protection Project, a project that was completed in collaboration with the U.S. Army Corps of Engineers in 1997. To accurately model flows upstream of Montague Expressway, the 1D channel was extended downstream to Highway 237 because more complex hydraulics (i.e., split flow) occurs immediately downstream of Montague Expressway. Downstream of Montague Expressway, any flows at or below the 100-year event are assumed to be contained within the channel.

Table 3 summarizes the sources of data for each reach of Coyote Creek and Table 4 provides additional detail on surveys collected for the model. These tables are reproduced for the Edenvale to San Francisco Bay reach from the full calibrated 1D model memorandum for the reader's convenience.

Table 3. Cross Section Data Sources

Model Reach	**Data Sources**
Montague to Bay	Combination of field-point survey and LiDAR data
I-280 to Montague	Field survey with cross sections every 200 feet (ft), photogrammetry survey (2 ft contours). Additional survey information collected in 2019 near Williams St Park and at Charcot Ave bridge and cross sections extended with 2006 LiDAR
Anderson Reservoir to I-280	Field surveys and LiDAR

Table 4. Cross Section Survey Dates

Location	**Survey Date**
HWY 237 and Ranch Road	2011
Montague Expressway to I-280	2003
I-280 to Capitol Expressway	May 2014
Capitol Expressway to HWY 101	November 2013
Silver Creek Valley Rd to Anderson Reservoir	October 2014
Williams St Park area and Charcot Ave Bridge	2019

The 1D cross sections on Lower Silver Creek extend from I-680 to the confluence with Coyote Creek. The station-elevation data for these cross sections were unchanged from the previous

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1D-2D[5] model, but some of the georeferencing was improved for the cross sections downstream of Hwy 101. The cross sections match the as-builts for the Lower Silver Creek Flood Protection Project Reaches 1-3. They are generally consistent with the cross sections for Reaches 1-3 in the Lower Silver Creek and Lake Cunningham Flood Protection Project Letter of Map Revision (LOMR) HEC-RAS model. For example, some cross sections were interpolated in the 1D-2D model and therefore are not found in the LOMR model.

2.1.2. 1D Bridge Data and Parameters

Similar to the cross section data, the Coyote Creek bridge data and modeling parameters are identical to those in the full calibrated 1D model. Additional information about bridge data and parameters can be found in the full calibrated 1D model memorandum.[6]

The bridge data on Lower Silver Creek were unchanged from the previous 1D-2D[7] model and are generally consistent with the bridge data in the Lower Silver Creek and Lake Cunningham Flood Protection Project LOMR HEC-RAS model. For example, the Plata Arroyo pedestrian bridge is in the LOMR model but is not included in the Coyote Creek 1D-2D model. However, it is not anticipated that the addition of the Plata Arroyo pedestrian bridge and other pedestrian bridges would impact the water surface profile since the soffits are generally a few feet above the 100-year water surface elevation.

2.1.3. 1D Manning's n Values

The Manning's n values in the Coyote Creek 1D channel were generally unchanged from the values in the full calibrated 1D model. However, between Mabury Road and Old Oakland Road (RS 90306 to 81955) they were reduced by 10% during calibration to better match the flooding extents on the west side of the creek between Mabury Road and Old Oakland Road. This is deemed reasonable given that the equations being solved for the 1D-2D model are different from those for the full calibrated 1D model.

The Manning's n values in the Lower Silver Creek 1D channel were unchanged from the previous 1D-2D[8] model and are generally consistent with the Manning's n values from the Lower Silver Creek and Lake Cunningham Flood Protection Project LOMR HEC-RAS model.

2.1.4. 2D Terrain

The terrain for the 1D-2D model is based on the 2020 LiDAR data collected by the County of Santa Clara. The 2020 LiDAR bare earth rasters (1 ft x 1 ft) that encompass the Coyote Creek

[5] Santa Clara Valley Water District. "Coyote Creek: Coyote Creek 2017 Condition Modeling" Technical Memorandum. Prepared by Robert Chan. April 2018.
[6] Santa Clara Valley Water District. "Coyote Creek Anderson Reservoir to SF Bay: Combined Coyote HEC-RAS 1D Model" Technical Memorandum. Prepared by Melissa Reardon. August 2021.
[7] Santa Clara Valley Water District. "Coyote Creek: Coyote Creek 2017 Condition Modeling" Technical Memorandum. Prepared by Robert Chan. April 2018.
[8] Ibid.

watershed were combined using the New Mosaic to Raster tool in ArcMap. The combined raster has a cell size of 5 ft x 5 ft.

2.1.5. 2D Manning's n Values

The Manning's n values for the 2D flow areas were developed using the most recent (2016) National Land Cover Database (NLCD) raster, the most recent (2020) Santa Clara County buildings shapefile, and the Valley Water streets shapefile. The NLCD raster provides land cover data across the United States at a 30 m resolution with 16 different land use classes. All but one of the land use types (perennial snow/ice) occur in Santa Clara County.

Buildings were represented in the model with a very high Manning's n value (n = 10) in the 2D flow areas using the Santa Clara County Buildings shapefile developed from 2020 LiDAR data.

Since the Valley Water streets shapefile generally only represents the centerline of roads rather than the area of the road, a road polygon shapefile was developed using assumed buffer widths for different road classes; the assumed buffer width of each road class is shown in Table 5. The ArcMap Buffer Tool was used to create three polygons with the assumed buffer widths.

Table 5. Assumed Buffer Widths by Road Class

Road Class	Assumed Road Type	Assumed Buffer Width (ft)
1	Highways	40
2 and 3	Large Arterials	30
4 and 5	Small Arterials	15

In HEC-RAS Mapper, the three road polygon shapefiles, the building polygon shapefile, and the NLCD raster were combined to make a Manning's n layer. Table 6 below identifies the Manning's n value assigned to each land use type in the final Manning's n layer. The Manning's n values for 2016 NLCD land cover types are generally consistent with the Manning's n values recommended by the National Resources Conservation Service (NRCS) for dam breach analysis in Kansas.[9]

These values were generally within the range of Manning's n values in the HEC-RAS 2D User Manual[10] for the NLCD land cover types. One notable exception was the Manning's n values for developed land. In the HEC-RAS 2D User Manual, the Manning's n value increases with increasing development density. In the absence of detailed information about building locations, this is reasonable because water is increasingly slowed by the presence of buildings. However, in this model, the buildings are represented by a very high Manning's n value at specific building locations from the 2020 LiDAR data. As a result, the area identified as developed by the NLCD that it outside of these building locations is likely more representative of grassy areas between

[9] Janssen, Curtis, Kansas State Conservation Engineer. Manning's n Values for Various Land Covers to Use for Dam Breach Analysis by NRCS in Kansas. July 2016.
[10] U.S. Army Corps of Engineers, Hydrologic Engineering Center. HEC-RAS 2D User's Manual. Version 6.0. Downloaded September 2021. (HEC-RAS 6.0 released May 2021)

buildings (e.g., lawns) or other lower roughness surfaces. Therefore, it was deemed more reasonable to use an n value of 0.04 for developed areas outside of buildings.

Table 6. Manning's n value per Land Cover Type

Land Use Type	Data Source	Manning's n Value
Road	Buffer polygons of Valley Water streets shapefile	0.025
Building	2020 Santa Clara County building shapefile	10
Open Water	2016 NLCD	0.04
Developed, Open Space	2016 NLCD	0.04
Developed, Low Intensity	2016 NLCD	0.04
Developed, Medium Intensity	2016 NLCD	0.04
Developed, High Intensity	2016 NLCD	0.04
Barren Land (Rock/Sand/Clay)	2016 NLCD	0.025
Deciduous Forest	2016 NLCD	0.16
Evergreen Forest	2016 NLCD	0.16
Mixed Forest	2016 NLCD	0.16
Shrub/Scrub	2016 NLCD	0.1
Grassland/Herbaceous	2016 NLCD	0.035
Pasture/Hay	2016 NLCD	0.03
Cultivated Crops	2016 NLCD	0.035
Woody Wetlands	2016 NLCD	0.12
Emerging Herbaceous Wetlands	2016 NLCD	0.07

2.1.6. 2D Flow Areas

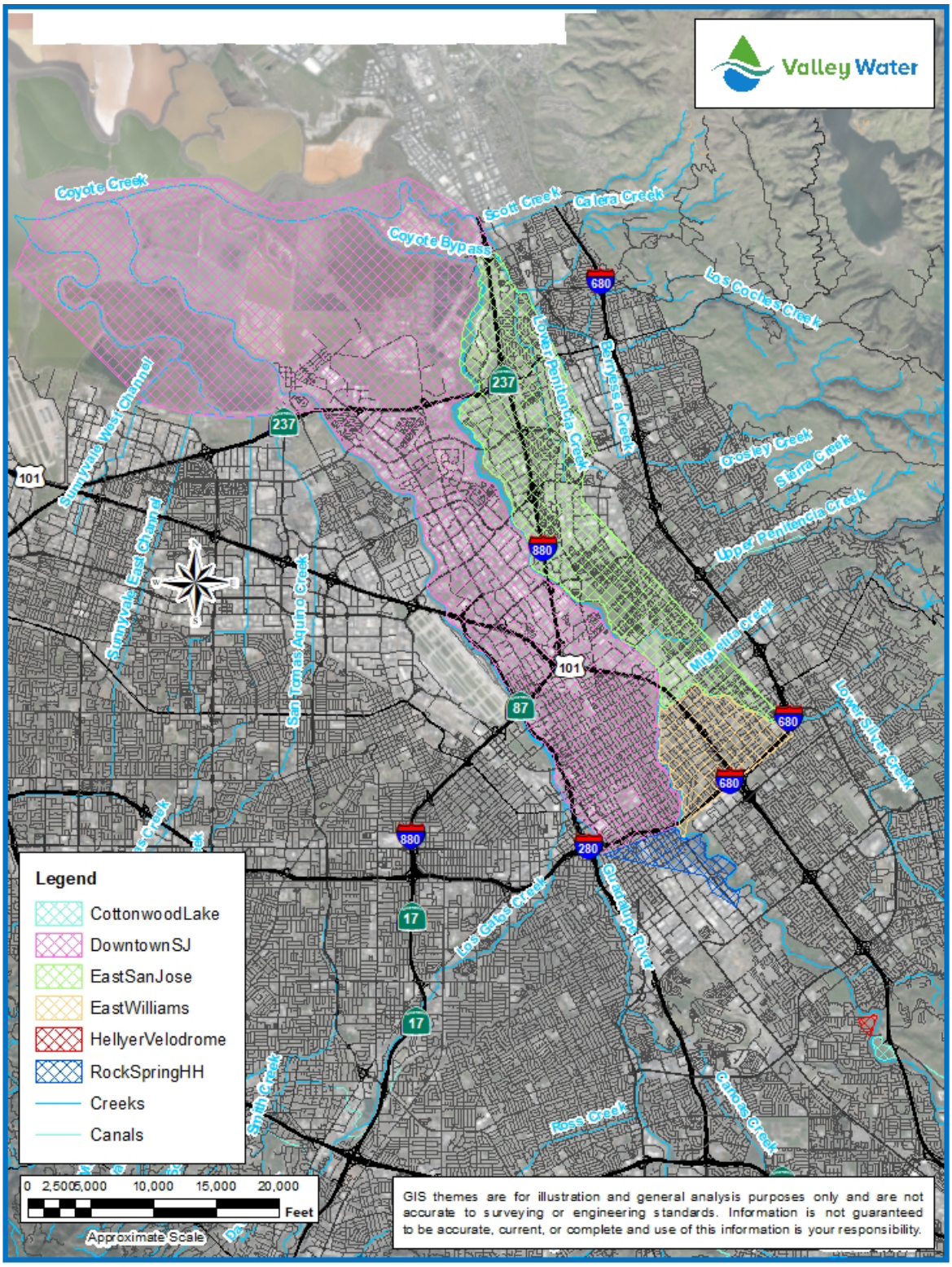
The 2D flow areas are based on the 2D flow areas developed for the previous 1D-2D model[11] for this reach of Coyote Creek. Revisions were made to the boundaries of the 2D flow areas, primarily between Edenvale gage and Montague Expressway, so that the edge of the 2D flow areas were adjacent to local high points based on the 2020 LiDAR combined terrain. Several 2D area breaklines were added and some of the existing 2D area breaklines were revised to better capture local high elevations (e.g., berms). A summary of each of the 2D flow areas is shown in Table 7 below and Figure 1 shows the extents of the 2D flow areas.

[11] Santa Clara Valley Water District. "Coyote Creek: Coyote Creek 2017 Condition Modeling" Technical Memorandum. Prepared by Robert Chan. April 2018.

Table 7. 2D Area Statistics for Existing Conditions Geometry

2D Flow Area	Number of Cells	Max Cell Area (ft^2)	Min Cell Area (ft^2)	Average Cell Area (ft^2)
Cottonwood Lake	8,775	895.39	122.03	228.03
Hellyer Velodrome	5,842	446.39	132.56	228.01
RockSpringHH	228,561	339.28	51.29	100.32
DowntownSJ	363,622	7,196.24	113.55	2,470.87
EastWilliams	99,893	1,731.98	199.25	624.58
EastSanJose	98,108	5,145.99	271.38	2,490.91

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Document Name: EXCond 2D Flow Areas Map

Figure 1. 2D Flow Area Extents

2.1.7. 1D-2D Lateral Structures

Lateral structures between the 1D channel and 2D floodplain were generally set based on the highest ground elevation based on the 2D terrain that water must reach before it reaches the floodplain. However, some lateral structures represent known flood protection elements that are not captured by LiDAR, including the Lower Silver Creek Flood Protection Project[12] floodwalls and the Rocksprings floodwall[13].

2.2. Flow Files

Seven peak flow distributions were identified in the EIR hydrology approach memo[14] for the five different time periods (2017 DSOD, 2023 NOP, 2023 ADTP, 2028 ADSRP, and 2032 FAHCE), as summarized in Table 8. A location map of the index locations in Table 8 is shown in Figure 2. For the EIR analysis, unsteady flow hydrographs must be developed as input to the HEC-RAS 1D-2D model that most closely reflects these flow distributions. The following sections describe the development of the flow files for the five time periods.

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[12] As-builts for this reach of Lower Silver Creek are contained in four plan sets, as listed below:

1. Santa Clara Valley Water District. Map and Construction Plan for Lower Silver Creek Reaches 1 and 2: Coyote Creek to McKee Road, Coyote Watershed Project No. 4026-03. As-Builts dated August 16, 2006.
2. Santa Clara Valley Water District. Map and Construction Plan for Lower Silver Creek Flood Protection and Creek Retoration Project, Reach 3, Phase 1: McKee Road to Alum Rock Ave, Coyote Watershed Project No. 4026-01. As-Builts dated November 10, 2006.
3. Santa Clara Valley Water District. Map and Construction Plan for Lower Silver Creek Flood Protection and Creek Restoration Project, Reach 3, Phase 2: Upstream of Lausett Avenue (Station 100+00) to Interstate 680, Coyote Watershed Project No. 4026-01. As-Builts dated November 12, 2006.
4. Santa Clara Valley Water District. Map and Construction Plan for Lower Silver Creek Flood Protection and Creek Restoration Project, Reach 3, Phase 3, Volume II of IV: Downstream of Alum Rock Avenue (Sta 86+00) to Upstream of Lausett Avenue (Sta 100+00), Coyote Watershed Project No. 4026-01. As-Builts dated November 10, 2006.
5. Santa Clara Valley Water District. Map and Construction Plan for Lower Silver Creek Flood Protection and Creek Restoration Project, Reach 3, Phase 3, Volume IV of IV: Downstream of Alum Rock Avenue (Sta 86+00) to Upstream of Lausett Avenue (Sta 100+00), Coyote Watershed Project No. 4026-01. As-builts dated August 17, 2006.

[13] Santa Clara Valley Water District. Map and Construction Plan for SCVWD Maintenance Staff for Mid-Coyote Creek Rock Springs Area Flood Protection Measures, San Jose, California. 100% Plan. November 11, 2017.

[14] Santa Clara Valley Water District. “Coyote Creek Flood Protection Project (CCFPP): Hydrology Approach for Environmental Impact Report” Draft Technical Memorandum. Prepared by Melissa Reardon. October 2023.

Table 8. Summary of Estimated Peak 100-year Flows on Coyote Creek for EIR Scenarios

Location	2017 DSOD 72-hr 100-yr Flows (cfs)	2017 DSOD 24-hr 100-yr Flows (cfs)	2023 NOP 24-hr 100-yr Flows (cfs)	2023 ADTP 24-hr 100-yr Flows (cfs)	2028 ADSRP 24-hr 100-yr Flows (cfs)	2032 FAHCE 72-hr 100-yr Flows (cfs)	2032 FAHCE 24-hr 100-yr Flows (cfs)
Coyote Creek d/s Dam Spillway	10,211	0	500	2,500	4,140	8,999	0
Coyote Creek d/s Upper Silver Creek	11,491	2,850	3,350	5,350	6,990	10,279	2,850
Coyote Creek at I-280	11,751	3,590	4,090	6,090	7,730	10,539	3,590
Coyote Creek at East William St	11,761	3,630	4,130	6,130	7,770	10,549	3,630
Coyote Creek u/s Lower Silver Creek	11,631	3,590	4,090	6,090	7,730	10,419	3,590
Coyote Creek d/s Lower Silver Creek @ 101	12,811	5,670	6,170	8,170	9,810	11,599	5,670
Coyote Creek u/s Upper Penitencia Creek	12,811	5,680	6,180	8,180	9,820	11,599	5,680
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	13,341	7,760	8,260	10,260	11,900	12,129	7,760
Coyote Creek at I-880	13,411	7,880	8,380	10,380	12,020	12,199	7,880

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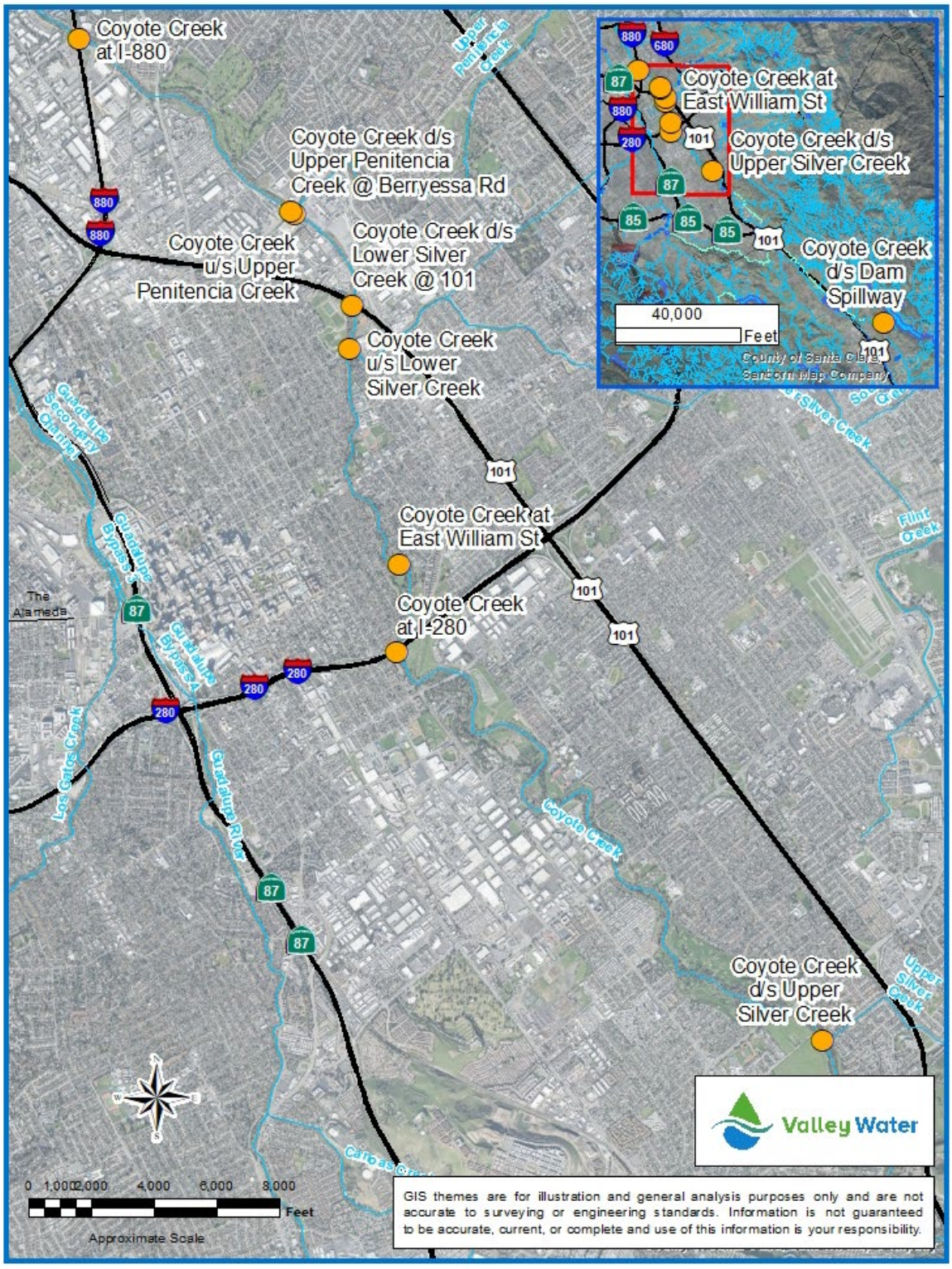


Figure 2. Map of Flow Change Index Locations

2.2.1. 24-hr 100-yr Flow Files

As described in the CCFPP EIR hydrology approach memo, the 24-hr 100-year flow distributions are based on the estimated highest peak 100-year flows from the watershed downstream of Anderson Dam with an assumed prevailing flow based on the operational conditions at Anderson Dam. To develop the flows from the watershed downstream of Anderson Dam, hydrologic and hydraulic models were run for storms centered on three major tributaries downstream of Anderson Dam: Fisher Creek, Lower Silver Creek, and Upper Penitencia Creek. The highest 100-year flows on Coyote Creek within the CCFPP reaches resulted from the Fisher Creek- and Lower Silver Creek-centered storms, as shown in Table 9.

Table 9. Maximum Local Storm Flows

Location	Fisher Creek Centered 24hr Storm Flow (cfs)	Lower Silver Creek Centered 24hr Storm Flow (cfs)	Upper Penitencia Creek Centered 24hr Storm Flow (cfs)	Maximum 24hr Local Flow (cfs)
Coyote Creek d/s Dam Spillway	0	0	0	0
Coyote Creek d/s Upper Silver Creek	2,850	2,570	2,390	2,850
Coyote Creek at I-280	3,590	3,430	3,200	3,590
Coyote Creek at East William St	3,630	3,480	3,250	3,630
Coyote Creek u/s Lower Silver Creek	3,590	3,470	3,240	3,590
Coyote Creek d/s Lower Silver Creek @ 101	4,570	5,670	4,600	5,670
Coyote Creek u/s Upper Penitencia Creek	4,580	5,680	4,610	5,680
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	6,140	7,760	6,690	7,760
Coyote Creek at I-880	6,250	7,880	6,830	7,880

Note: Controlling storm shown in red; Source: Table 3 in Reference 14

Between Upper Silver Creek and Lower Silver Creek, flows are highest with the Fisher Creek centered storm, but the flows with the Lower Silver Creek centered storm are only 100-300 cfs lower at the same locations. Downstream of Lower Silver Creek, the Lower Silver Creek centered storm resulted in the highest flows on Coyote Creek. Because the Lower Silver Creek centered storm resulted in flows that closely matched the maximum 24-hr flows, the hydrographs from the Lower Silver Creek centered storm models were used as the basis for the 24-hr 100-year flow files.

First, a HEC-RAS flow file was developed that reasonably represented the Lower Silver Creek centered 24-hr local peak flow distribution with no flows from Anderson Dam. Several different models were used to develop the Lower Silver Creek centered 24-hr flows in Table 9, as

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described in the associated memorandum[15]. These include: a 1D-2D HEC-RAS model of Coyote and Fisher Creeks between Anderson Reservoir and Hwy 280[16], an Integrated Catchment Model (ICM) for Lower Silver Creek and its tributaries[17], and a HEC-HMS model based on the Coyote Creek 100-year HEC-HMS model[18] with revisions to reflect future storage on Upper Penitencia Creek.

To better match the maximum peak flows in the fourth column of Table 9 upstream of Lower Silver Creek, two revisions were made to the inflow hydrographs from the Coyote and Fisher Creek HEC-RAS model. First, a constant 200 cfs was added to the upstream boundary condition to reduce the difference between the peak flows using the Lower Silver Creek centered storm and the maximum 24-hr peak flows. Second, the flows upstream of Tully Road at RS 120600 were reduced by a constant 200 cfs to offset the artificial increase at the upstream boundary condition.

A summary of the inflow source data for the flow file representing the 24-hr 100-yr event with no flow from Anderson Dam is shown in Table 10. For model stability, a minimum flow of 1,200 cfs was applied at the upstream boundary condition for Coyote Creek at Edenvale and a minimum flow of 100 cfs was applied at the upstream boundary condition for Lower Silver Creek at I-680.

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[15] Santa Clara Valley Water District. “Coyote Design Flows: Design Flows for Mid Coyote Project Team (Addendum 3)” Technical Memorandum. Prepared by Jack Xu. May 2022.
[16] Environmental Science Associates. Prepared for Santa Clara Valley Open Space Authority. Coyote Valley Water Resource Investment Strategy: Restoration Design Concept Evaluation. June 2021.
[17] Wood Rodgers. Prepared for Santa Clara Valley Water District. Lower Silver Creek Watershed Flood Study. September 27, 2016.
[18] Santa Clara Valley Water District. Coyote Creek Hydrology Study: Final (Addendum #1). Hydraulics, Hydrology, and Geomorphology Unit. Prepared by Jack Xu. May 2017.

Table 10. Inflow Data Sources for 24-hr 100-yr Event with no flow from Anderson Dam

Creek	Location	HEC-RAS River Station (ft)	Type of HEC-RAS Inflow	Data Source*
Coyote Creek	Edenvale	Coyote Creek; RS 144474	Upstream Boundary Condition	Coyote-Fisher 1D-2D HEC-RAS result plus input lateral flow at RS 144474** plus constant 200 cfs
Coyote Creek	Edenvale to Hwy 280	Coyote Creek; RS 129918, 121200, 120600, 109200, 105000	Lateral Inflows	Coyote-Fisher 1D-2D HEC-RAS input flow file; for RS 120600, flows were reduced by a constant 200 cfs
Coyote Creek	Hwy 280 to Hwy 237	Coyote Creek; RS 101231, 93443, 88730, 88139, 85508, 78845, 72626, 67828.43, 63295.25, 61409.26, 59096.62, 57898.8	Lateral Inflows	Coyote Revised HEC-HMS results
Upper Silver Creek	Confluence with Coyote Creek	Coyote Creek; RS 129505	Lateral Inflow	Coyote-Fisher 1D-2D HEC-RAS input flow file
Lower Silver Creek	Hwy 680 [RS 12440]	Lower Silver; RS 12440	Upstream Boundary Condition	Lower Silver Creek ICM model results
Upper Penitencia	Confluence with Coyote Creek	Coyote Creek; RS 88139	Lateral Inflow	Coyote Revised HEC-HMS results

** Note that all models use the Lower Silver Creek centered storm*
*** In the Coyote-Fisher 1D-2D model, the increase in the peak flow due to the lateral inflow at RS 144474 was observed at the cross section downstream of RS 144474, rather than at RS 144474 itself. For the EIR model, the lateral inflow hydrograph was added to the RS 144474 output hydrograph to create the upstream boundary condition.*

To create the five flow files for different conditions at Anderson Dam, a constant flow equal to the prevailing flow was added to the upstream boundary condition at Edenvale (RS 144474). Table 11 identifies the prevailing flow[19] for each of the five conditions and Figure 3 shows the resultant hydrographs at RS 144474. Note that the initial flow shown in Figure 3 is higher than the prevailing flow show in Table 11 due to flow contributions between Anderson Dam, where

[19] Santa Clara Valley Water District. "Coyote Creek Flood Protection Project (CCFPP): Hydrology Approach for Environmental Impact Report" Draft Technical Memorandum. Prepared by Melissa Reardon. October 2023.

the prevailing flow begins, and Edenvale, which is approximately 15 miles downstream of Anderson Dam.

Table 11. Prevailing Flows for 24-hr 100-yr Scenarios

Scenario	Prevailing Flow (cfs)
2017 DSOD	0
2023 NOP	500
2023 ADTP	2,500
2028 ADSRP	4,140
2032 FAHCE	0

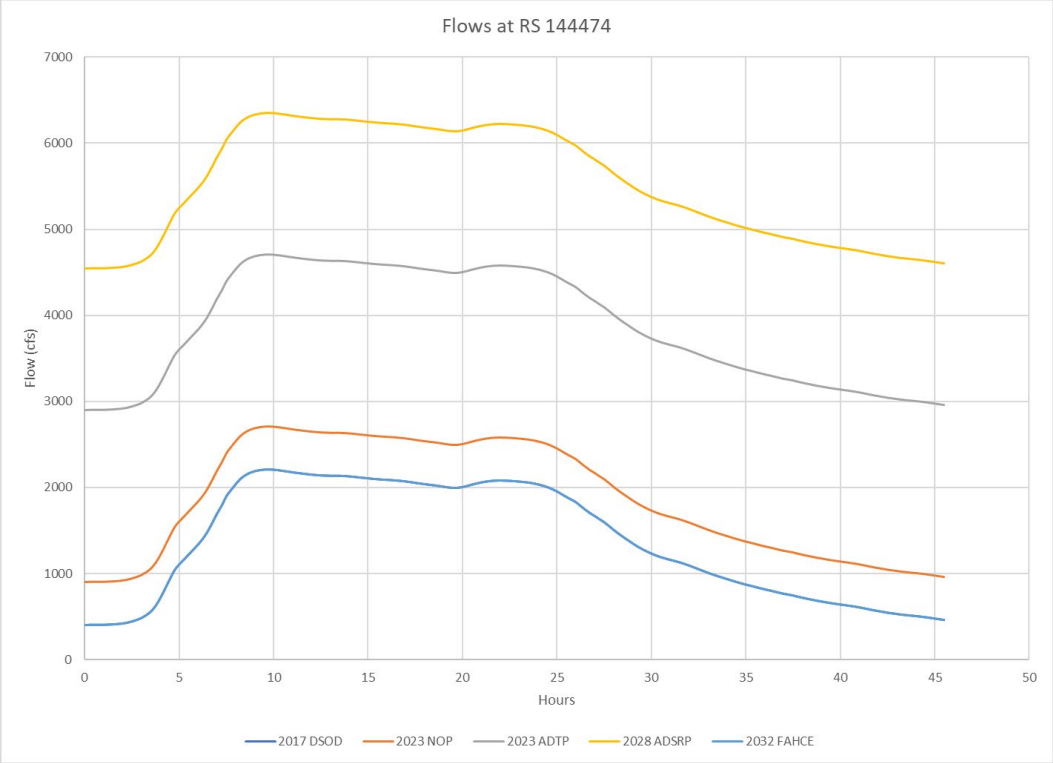


Figure 3. Hydrographs at Edenvale (RS 144474) for 24-hr 100-yr Flow Files

**Note that 2017 DSOD and 2032 FAHCE hydrographs are the same so only the 2032 FAHCE line color is visible in Figure 3.*

2.2.2. 72-hr 100-yr Flow Files

As described in the EIR hydrology approach memo, the 72-hr 100-year flow distributions are based on the previously modeled 100-year flow distribution on Coyote Creek[20] with revisions to the flow at Coyote Creek at Edenvale (RS 144474) to reflect 2017 DSOD and 2032 FAHCE 100-year releases. Two upstream boundary conditions and two lateral inflow hydrographs were developed for the future cumulative 100-year flow file. The two upstream boundary conditions are at Coyote Creek at Edenvale and Lower Silver Creek downstream of I-680. The two lateral inflow hydrographs are at Upper Silver Creek at the confluence with Coyote Creek and Upper Penitencia Creek at the confluence with Coyote Creek.

Inflow hydrographs for the four locations were based on results from the Valley Water 100-year HEC-HMS model for Coyote Creek[21]. The HEC-HMS model locations that were used for the inflow hydrographs are shown in Table 12. The hydrographs for Upper Silver Creek, Lower Silver Creek, and Upper Penitencia Creek were unchanged from the HEC-HMS model to the HEC-RAS unsteady flow file. A minimum flow of 100 cfs was applied to the Lower Silver Creek boundary condition hydrograph for model stability.

Table 12. Inflow Data Sources for 72-hr 100-yr Flow Files

Creek	**Location**	**HEC-RAS River Station (ft)**	**Type of HEC-RAS Inflow**	**Valley Water 100-yr HEC-HMS Model Location**
Coyote Creek	Edenvale	Coyote Creek; RS 144474	Upstream Boundary Condition	COY_COY4D
Upper Silver Creek	Upper Silver Creek at Coyote Creek	Coyote Creek; RS 129505	Lateral Inflow	US_R1 + UPPSIL_5
Lower Silver Creek	Lower Silver Creek at I-680	Lower Silver Creek; RS 12440	Upstream Boundary Condition	LS_COYUS
Upper Penitencia Creek	Upper Penitencia Creek at Coyote Creek	Coyote Creek; RS 88139	Lateral Inflow	UP_R1 + UPRPEN_6

For Coyote Creek at Edenvale, however, a multiplier was applied to scale the hydrograph such that the peak flow was more consistent with estimated flows downstream of Anderson Reservoir under 2017 DSOD and 2032 FAHCE scenarios. Based on the ADSRP DEIR[22], the estimated 100-year peak flow releases from Anderson Dam are 10,211 cfs and 8,999 cfs, respectively.

[20] Santa Clara Valley Water District. Coyote Creek Hydrology Study: Final (Addendum #1). Hydraulics, Hydrology, and Geomorphology Unit. Prepared by Jack Xu. May 2017.
[21] Ibid.
[22] Santa Clara Valley Water District. “Anderson Dam Seismic Retrofit Project: Potential Flood Impacts for ADSRP” Technical Memorandum. Prepared by Jack Xu. August 2023. Appendix K of the ADSRP DEIR (September 2023).

This is less than the peak flow downstream of Anderson Reservoir in the Valley Water 100-year HEC-HMS model (13,260 cfs).

Based on the peak flows on Coyote Creek downstream of Anderson Reservoir and at Edenvale from the Valley Water 100-yr HEC-HMS model[23], peak flows at Edenvale are approximately 1,100 cfs higher than peak flows downstream of Anderson Reservoir. It is assumed that the incremental increase in flows downstream of Anderson Reservoir is not significantly impacted by a reduction in flows out of Anderson Reservoir, so the incremental change of 1,100 cfs was added to the anticipated release from Anderson Dam. For each scenario, a multiplier was used to reduce the peak flow from the Valley Water 100-year HEC-HMS model hydrograph to the respective estimated flow at Edenvale and a minimum flow of 1,200 cfs was applied for model stability. The estimated peak flows and associated multipliers are summarized in Table 13.

Table 13. 2017 DSOD and 2032 FAHCE Estimated Peak Flows and Multipliers at Edenvale

Scenario	Estimated 100-yr Release from Anderson Dam (cfs)	Estimated peak flow at Edenvale (cfs)	Multiplier
2017 DSOD	10,211 cfs	11,311 cfs	0.85
2032 FAHCE	8,999 cfs	10,099 cfs	0.76

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[23] Santa Clara Valley Water District. Coyote Creek Hydrology Study: Final (Addendum #1). Hydraulics, Hydrology, and Geomorphology Unit. Prepared by Jack Xu. May 2017.

Appendix H2 - Valley Water Technical Memorandum: Recommended Hydraulic Modeling Approach for Environmental Impact Report

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TECHNICAL MEMORANDUM

PROJECT:	Coyote Creek Flood Protection Project (CCFPP)	**DATE**:	January 3, 2024
SUBJECT:	Hydrology Approach for Environmental Impact Report		
PREPARED BY:	Melissa Reardon		

1. INTRODUCTION

An Environmental Impact Report (EIR) is being prepared for the Coyote Creek Flood Protection Project (CCFPP or Project) for compliance with the California Environmental Quality Act (CEQA). In the EIR, impacts to hydrology, including changes in water surface elevation and flooding extents, must be evaluated. This memorandum describes the scenarios to be evaluated in the EIR and the recommended hydrology approach to evaluating the Project scenarios in the EIR.

2. ANDERSON DAM SEISMIC RETROFIT PROJECT (ADSRP) DRAFT EIR (DEIR) AND CCFPP EIR BASE SCENARIOS

The purpose of the EIR is to identify and evaluate the impacts of a given project. According to CEQA Guidelines Section 15125, ordinarily the appropriate baseline will be the actual environmental conditions existing at the time of CEQA analysis - typically when the NOP is published, and the future cumulative conditions are evaluated to understand the cumulative impact of the Project when added to impacts of reasonably foreseeable probable projects. CEQA Guidelines Section 15130 provides that “An EIR shall discuss cumulative impacts of a project when the project’s incremental effect is cumulatively considerable, as defined in Guidelines Section 15065(a)(3).” That section defines “cumulatively considerable” to mean “that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.”

Normally, a total of four scenarios would be evaluated for the CCFPP: existing conditions at the time of submission of the Notice of Preparation (NOP) with no Project, existing conditions at the time of NOP submission with the Project, future cumulative conditions (i.e., with all reasonably foreseeable probable projects in place) with no Project, and future cumulative conditions with the Project. are These four conditions would normally be evaluated with the same 100-year flow event. However, due to the changes in operations, storage, and outlet capacity at Anderson

Reservoir and Dam over the foreseeable future as a result of the FERC Order Compliance Project (FOCP) and Anderson Dam Seismic Retrofit Project (ADSRP), the 100-yr flows through the CCFPP reach of Coyote Creek will change over time. These 100-yr flows will also differ from conditions seen in the 2017 flood event and the effective Federal Emergency Management Agency (FEMA) 100-year flows.

Five base scenarios were developed to be consistent with the ADSRP Draft EIR (DEIR) and to be consistent with CEQA Guidelines Section 15125(a). These base scenarios reflect the aforementioned changes in operations, storage, and outlet capacity at Anderson Dam and Reservoir over the foreseeable future. Four base scenarios were based on the four hydrologic scenarios described in the ADSRP DEIR, as described in the following paragraphs. The fifth base scenario reflects existing conditions at the time of the NOP for the CCFPP EIR (2023).

Appendix K of the ADSRP Draft EIR (DEIR)[1] identifies four hydrologic scenarios that reflect changing conditions at Anderson Dam over the span of ADSRP: 2017 California Department of Water Resources Division of Safety of Dams (DSOD), 2023 Anderson Dam Tunnel Project (ADTP), 2028 ADSRP, and 2032 Fish and Aquatic Habitat Collaborative Effort (FAHCE). The 2017 DSOD base scenario represents operational conditions that existed from 2009 to 2019 with seismic restrictions in place for both Anderson and Coyote Reservoirs, as required by the DSOD. Anderson Dam's existing outlet is estimated to have a maximum release capacity of approximately 500 cubic feet per second (cfs) at full head.

The 2023 ADTP base scenario represents operational conditions that are expected to occur after the ADTP (part of the FOCP) is completed when the CCFPP becomes operational, where the outlet will have a maximum discharge of 2,500 cfs. Currently, Anderson Reservoir is under the FERC 2020 Deadpool Order (FERC Order), which restricts the reservoir to the deadpool elevation. This restriction is expected to continue after ADTP through the completion of construction of the ADSRP seismic improvements.

The 2028 ADSRP base scenario represents operational conditions that are expected to exist during construction of the ADSRP while the emergency spillway is offline. Anderson Reservoir will remain drained below deadpool to facilitate construction and the maximum outlet capacity at Anderson Dam would be between 6,000 cfs and 6,800 cfs, depending on the reservoir pool elevation.

Lastly, the 2032 FAHCE base scenario represents the anticipated operational conditions after ADSRP is completed and the FAHCE rule curves for reservoir releases are in place. Anderson Reservoir would no longer be held at deadpool and will be operated to a maximum discharge of approximately 1,500 cfs. To be consistent with the ADSRP DEIR, these four base scenarios were used as the basis for developing scenarios for the CCFPP EIR. An additional base scenario was included for impacts other than flood flows. to reflect existing conditions at the

[1] Santa Clara Valley Water District. Appendix K of ADSRP DEIR (September 2023). 1) "Anderson Dam Seismic Retrofit Project: Potential Flood Impacts for ADSRP" Technical Memorandum. Prepared by Jack Xu and Darshan Baral. August 2023. 2) Anderson Dam Seismic Retrofit Project: Post-ADSRP Operations Technical Memorandum. August 2023.

time of the NOP for the CCFPP EIR, (2023), to be consistent with CEQA Guidelines Section 15125(a). The five base scenarios are identified in Table 1.

Table 1. Base CCFPP EIR Scenarios

Base Scenario	Anderson Reservoir Operations	Anderson Dam Outlet Capacity
2017 DSOD	Consistent with 2009-2019 operations with DSOD restrictions	~500 cfs
2023 NOP	Hold reservoir at deadpool	~500 cfs
2023 ADTP	Hold reservoir at deadpool	2,500 cfs
2028 ADSRP	Hold reservoir at deadpool	6,000-6,800 cfs
2032 FAHCE	Consistent with FAHCE rule curves	1,500 cfs

3. HYDROLOGIC SETTING

For each of the five base scenarios identified in Table 1, different peak flows are anticipated for the CCFPP reach of Coyote Creek during a 100-year event. This is driven by differences in anticipated releases from Anderson Dam and the relative magnitude of these releases compared to peak flows from the watershed downstream of Anderson Dam.

Historically, the largest recorded flows on Coyote Creek were a result of spills from Coyote and Anderson Dams. In hydrologic models of Coyote Creek[2], a 72-hr storm centered on Anderson and Coyote Reservoirs has been used to estimate the peak flows on Coyote Creek for a 100-year event to account for reservoir attenuation and travel time from the reservoirs to the lower part of Coyote Creek. Hydrologic modeling results indicate that two flow peaks occur in the CCFPP reach in response to a 72-hr 100-year event, as exemplified in Figure 1. The first peak reflects the response of the local watershed (i.e., the watershed downstream of Anderson Dam) to the 100-year storm and the second peak reflects spills from Anderson Dam.

As a result of changing conditions at Anderson Dam over the course of ADSRP, as described in the previous section, Anderson Dam is not anticipated to spill during the 2023 NOP, 2023 ADTP, and 2028 ADSRP conditions for the 100-year event. The second peak, as shown in Figure 1, is anticipated to be significantly reduced under these scenarios, potentially to a flow less than that of the local watershed response.

The local watershed response is modeled with a 24-hr storm due to the reduced travel time and the lack of reservoirs within the watershed downstream of Anderson Dam. However, the peak flows in Coyote Creek resulting from the local watershed response are sensitive to the location of the center of the 24-hour storm in the local watershed. A previous analysis[3] identified the highest peak 100-year flows on Coyote Creek from the local watershed without spills at

[2] Santa Clara Valley Water District. Coyote Creek Hydrology Study: Final (Addendum #1). Hydraulics, Hydrology, and Geomorphology Unit. Prepared by Jack Xu. May 2017.
[3] Santa Clara Valley Water District. “Coyote Design Flows: Design Flows for Mid Coyote Project Team (Addendum 3)” Technical Memorandum. Prepared by Jack Xu. May 2022.

Anderson Dam. These flows range from 2,850 to 7,880 cfs as shown in Table 2. A map of the index locations in Table 2 and later tables in this memorandum is shown in Figure 2.

It is important to note that the flow distribution in Table 2 assumed that future detention on Upper Penitencia Creek was in place such that flows to Coyote Creek were reduced to a peak flow of approximately 2,000 cfs. At the time of EIR preparation, the future detention project was on hold, but updated 1D-2D modeling of Upper Penitencia Creek for the 24-hr 100-year event indicates that the maximum flow to Coyote Creek with the existing Upper Penitencia Creek geometry is less than 2,000 cfs due to spilling upstream of the confluence. Therefore, use of the hydrographs developed from the previous analysis for the highest peak 100-year flows on Coyote Creek from the local watershed were deemed slightly conservative but reasonable.

It is also important to note that the peak flows from Anderson Dam under the five scenarios will differ from the effective FEMA 100-year flows due to differences in assumptions about the operations at Anderson Dam. The effective FEMA 100-year flows are based on a study that assumed that Anderson Reservoir was 89% full at the start of the 100-year event and the existing outlet was in place with a capacity of approximately 500 cfs. As discussed in Section 2, the outlet capacity and assumed storage in Anderson Reservoir for the scenarios evaluated for the CCFPP EIR will not match the assumed conditions for the effective FEMA 100-year flows. Therefore, the effective FEMA 100-year flows were not used for any of the CCFPP EIR scenarios.

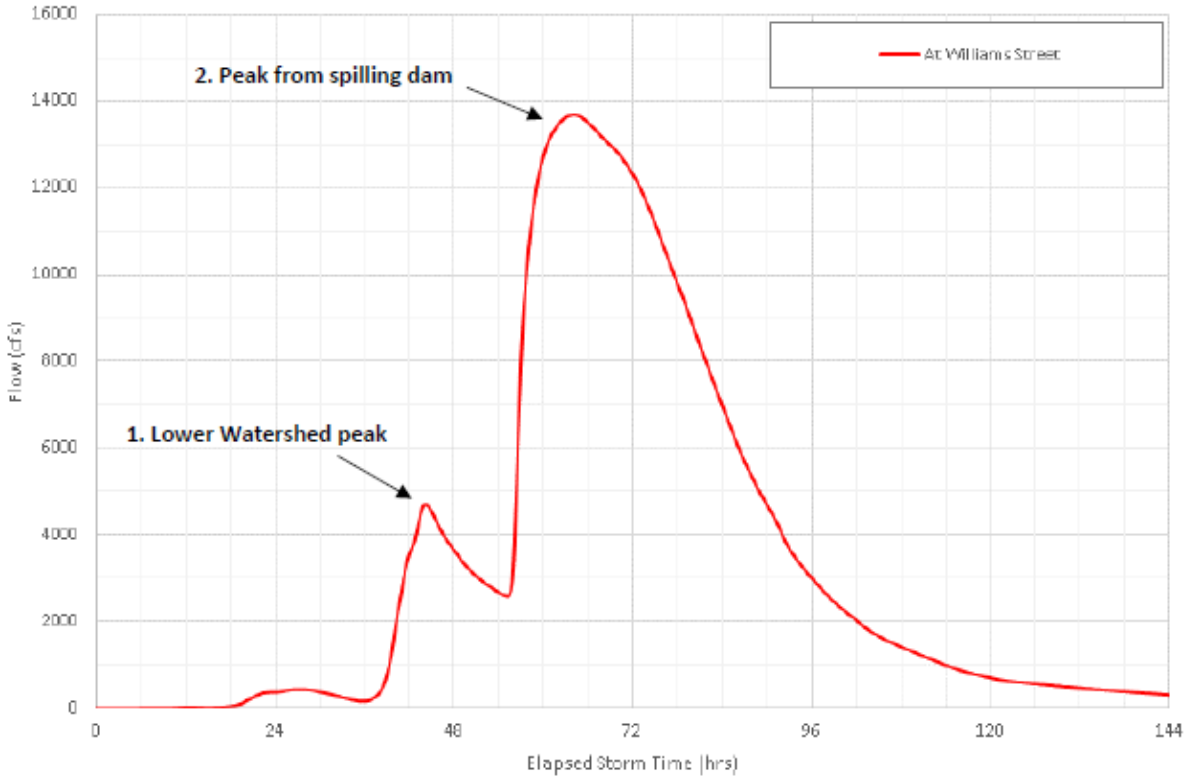


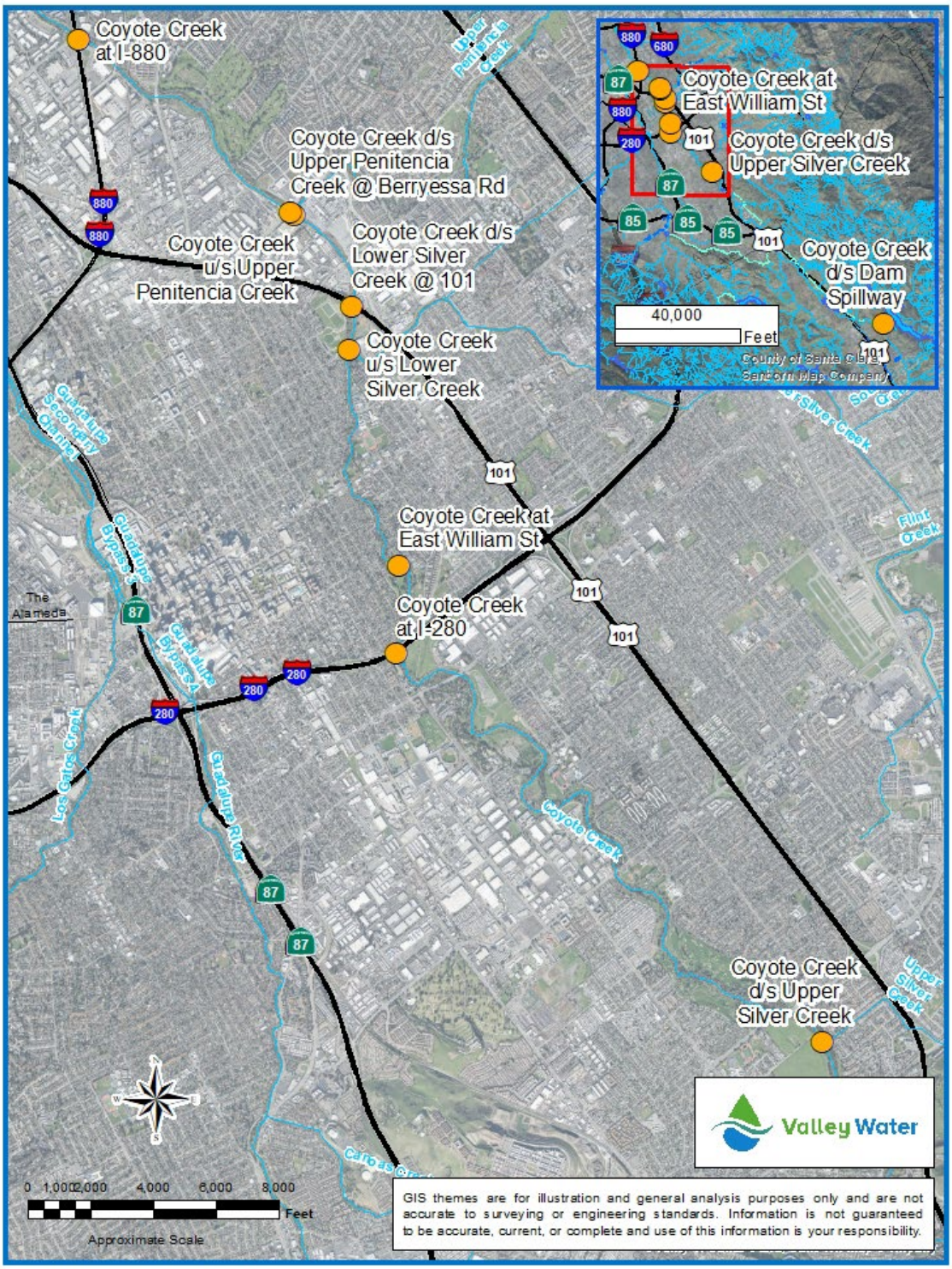
Figure 1. Example pre-ADSRP hydrograph for Coyote Creek at William St (Source: Figure 3.5 in CCFMMP and CCFPP Planning Study Report[4])

Table 2. Estimated Local Peak 100-year Flows on Coyote Creek (Source: Table 2 in "Design Flows for Mid Coyote Project Team" Technical Memorandum[5])

Location	**Local Storm 24-hr 100-yr Flows (cfs)***
Coyote Creek d/s Dam Spillway	0
Coyote Creek d/s Upper Silver Creek	2,850
Coyote Creek at I-280	3,590
Coyote Creek at East William St	3,630
Coyote Creek u/s Lower Silver Creek	3,590
Coyote Creek d/s Lower Silver Creek @ 101	5,670
Coyote Creek u/s Upper Penitencia Creek	5,680
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	7,760
Coyote Creek at I-880	7,880

** Note that local peak flows reflect spills on Fisher Creek, stormwater system storage on Lower Silver Creek, and future detention on Upper Penitencia as described in the source technical memorandum, but flows are assumed to be fully contained on Coyote Creek once they reach Hwy 280.*

[4] Santa Clara Valley Water District. Planning Study Report for Coyote Creek Flood Protection: Montague Expressway to Tully Road (Coyote Creek Flood Management Measures Project No. 91864005 & Coyote Creek Flood Protection Project No. 26174043). Prepared by Dámaris Villalobos-Galindo. March 2022.
[5] Santa Clara Valley Water District. "Coyote Design Flows: Design Flows for Mid Coyote Project Team (Addendum 3)" Technical Memorandum. Prepared by Jack Xu. May 2022.



Document Name: Flow Change Locations

Figure 2. Map of Flow Change Index Locations

4. CONTROLLING FLOW DISTRIBUTIONS

As noted in Section 3, due to the changes in operations, storage, and the outlet capacity at Anderson Reservoir and Dam, the 72-hr storm may not result in the highest peak flows on Coyote Creek for the five base scenarios identified in Table 1. The 72-hr and 24-hr 100-year flow distributions were developed for each of the five base scenarios by combining an assumed prevailing flow from Anderson Dam for each scenario with an assumed incremental change in flows along Coyote Creek. The storm duration resulting in the higher of the two flow distributions for the CCFPP reach of Coyote Creek was considered the controlling storm.

The 72-hr flow distributions were based on the flow distribution resulting from the Valley Water 72-hr HEC-HMS model[6] for Coyote Creek, as shown in Table 3. For each scenario, the flow distribution was scaled based on the assumed prevailing flow from Anderson Dam (i.e., d/s Dam Spillway). It was assumed that the incremental change in peak flows along Coyote Creek (i.e., due to local watershed inflow) shown in Table 3 would be the same for each of the five base scenarios.

Table 3. Valley Water 72-hr 100-year HEC-HMS Flows

Location	**Valley Water 72-hr 100-yr HEC-HMS Flows (cfs)**
Coyote Creek d/s Dam Spillway	13,430
Coyote Creek d/s Upper Silver Creek	13,690
Coyote Creek at I-280	13,700
Coyote Creek at East William St	13,570
Coyote Creek u/s Lower Silver Creek	14,750
Coyote Creek d/s Lower Silver Creek @ 101	14,750
Coyote Creek u/s Upper Penitencia Creek	15,280
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	15,350
Coyote Creek at I-880	13,430

The 24-hr flow distributions were based on the highest peak local watershed flow distribution shown in Table 2. For each scenario, the distribution was scaled by adding the assumed prevailing flow to the flows listed in Table 2.

[6] Santa Clara Valley Water District. Coyote Creek Hydrology Study: Final (Addendum #1). Hydraulics, Hydrology, and Geomorphology Unit. Prepared by Jack Xu. May 2017. HEC-HMS (Hydrologic Engineering Center – Hydrologic Modeling System) is a software program developed by the U.S. Army Corps of Engineers to simulate watershed, channel, and water control structure behavior in response to rainfall events.

4.1. 2017 DSOD Scenario

The prevailing flow for 2017 DSOD 72-hr 100-year event is assumed to be 10,211 cfs. This is the estimated peak flow out of Anderson Dam during a 2017 DSOD 100-year event based on a stochastic analysis[7] conducted for the ADSRP DEIR.

The prevailing flow for the 2017 DSOD 24-hr 100-year event is assumed to be 0 cfs because hydrologic modeling[8] showed that Anderson Dam does not release water (i.e., 0 cfs from Anderson Dam) for the 24-hr 100-yr storms.

The 72-hr and 24-hr 100-year flow distributions for the 2017 DSOD scenario are shown in Table 4. Because the 72-hr flows are higher than the 24-hr flows in the CCFPP reach of Coyote Creek (i.e., downstream of Upper Silver Creek), the 72-hr flow distribution will result in the higher water surface elevations on Coyote Creek and the 72-hr storm is considered the controlling event.

Table 4. 2017 DSOD 72-hr and 24-hr 100-year Flows

Location	2017 DSOD 72-hr 100-yr Flows (cfs)	2017 DSOD 24-hr 100-yr Flows (cfs)
Coyote Creek d/s Dam Spillway	10,211	0
Coyote Creek d/s Upper Silver Creek	11,491	2,850
Coyote Creek at I-280	11,751	3,590
Coyote Creek at East William St	11,761	3,630
Coyote Creek u/s Lower Silver Creek	11,631	3,590
Coyote Creek d/s Lower Silver Creek @ 101	12,811	5,670
Coyote Creek u/s Upper Penitencia Creek	12,811	5,680
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	13,341	7,760
Coyote Creek at I-880	13,411	7,880

4.2. 2023 NOP Scenario

The prevailing flow for the 2023 NOP 72-hr and 24-hr 100-yr events is assumed to be 500 cfs based on the approximate capacity of the existing outlet at Anderson Dam. Because Anderson Dam would remain under the 2020 FERC Order restriction in the 2023 NOP scenario, it is unlikely that Anderson Reservoir would fill such that spills over Anderson Dam would occur. Instead, water would fill Anderson Reservoir and slowly be released through the existing outlet.

This is consistent with recent rainy conditions that occurred during the 2022 - 2023 winter rainy season that were experienced while Anderson Reservoir and Dam were operated consistent with the 2020 FERC Order. During the 2022-2023 winter rainy season, a series of atmospheric rivers filled Anderson Reservoir, which had been held at deadpool prior to the rain. The major

[7] Santa Clara Valley Water District. “Anderson Dam Seismic Retrofit Project: Potential Flood Impacts for ADSRP” Technical Memorandum. Prepared by Jack Xu and Darshan Baral. August 2023. Appendix K of ADSRP DEIR (September 2023).
[8] Santa Clara Valley Water District. Coyote Creek Hydrology Study: Final (Addendum #1). Hydraulics, Hydrology, and Geomorphology Unit. Prepared by Jack Xu. May 2017.

rains started in late December 2022 and the last significant atmospheric river occurred in March 2023. From January 1 to June 1, 2023, releases from Anderson Dam were between 300 and 500 cfs[9] and the storage in Anderson Reservoir ranged from 3-56% full[10]. Given the long duration over which Anderson Reservoir was releasing over 300 cfs during the 2022-2023 winter, it is reasonable to assume that there would be a prevailing flow of 500 cfs in Coyote Creek during either a 72-hr or 24-hr 100-year event in the 2023 NOP scenario.

The 72-hr and 24-hr 100-yr flow distributions for the 2023 NOP scenario are shown in Table 5. Because the 24-hr flows are higher than the 72-hr flows in the CCFPP reach of Coyote Creek (i.e., downstream of Upper Silver Creek), the 24-hr flow distribution will result in the higher water surface elevations on Coyote Creek and the 24-hr storm is considered the controlling event.

Table 5. 2023 NOP 72-hr and 24-hr 100-year Flows

Location	**2023 NOP 72-hr 100-yr Flows (cfs)**	**2023 NOP 24-hr 100-yr Flows (cfs)**
Coyote Creek d/s Dam Spillway	500	500
Coyote Creek d/s Upper Silver Creek	1,780	3,350
Coyote Creek at I-280	2,040	4,090
Coyote Creek at East William St	2,050	4,130
Coyote Creek u/s Lower Silver Creek	1,920	4,090
Coyote Creek d/s Lower Silver Creek @ 101	3,100	6,170
Coyote Creek u/s Upper Penitencia Creek	3,100	6,180
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	3,630	8,260
Coyote Creek at I-880	3,700	8,380

4.3. 2023 ADTP Scenario

The prevailing flow for the 72-hr 100-year event for the 2023 ADTP scenario is assumed to be 2,500 cfs based on the estimated 100-year peak flow out of Anderson Dam from the ADSRP DEIR stochastic analysis[11] for the 2023 ADTP scenario.

[9] U.S. Geological Survey, 2016, National Water Information System data available on the World wide Web (USGS Water Data for the Nation), accessed October 5, 2023, at URL https://waterdata.usgs.gov/monitoring-location/11170000/#parameterCode=00060&showMedian=false&startDT=2023-01-01&endDT=2023-06-01.

[10] Santa Clara Valley Water District. Surface Water Data Portal. Anderson Reservoir (Reservoir Sensor 4002). https://alert.valleywater.org/?p=sensor&sid=4002&disc=f. Accessed 10/5/23.

[11] Santa Clara Valley Water District. “Anderson Dam Seismic Retrofit Project: Potential Flood Impacts for ADSRP” Technical Memorandum. Prepared by Jack Xu and Darshan Baral. August 2023. Appendix K of ADSRP DEIR (September 2023).

The prevailing flow for the 24-hr 100-year event for the 2023 ADTP scenario is also assumed to be 2,500 cfs. This is based on a coincident analysis[12], which evaluates the risk of a coincident peak flow in the local watershed and flow from Anderson Dam.

The 72-hr and 24-hr 100-year flow distributions for the 2023 ADTP scenario are shown in Table 6. Because the 24-hr flows are higher than the 72-hr flows within the CCFPP reach of Coyote Creek (i.e., downstream of Upper Silver Creek), the 24-hr flow distribution will result in the higher water surface elevations on Coyote Creek and the 24-hr storm is considered the controlling event.

Table 6. 2023 ADTP 72-hr and 24-hr 100-year Flows

Location	2023 ADTP 72-hr 100-yr Flows (cfs)	2023 ADTP 24-hr 100-yr Flows (cfs)
Coyote Creek d/s Dam Spillway	2,500	2,500
Coyote Creek d/s Upper Silver Creek	3,780	5,350
Coyote Creek at I-280	4,040	6,090
Coyote Creek at East William St	4,050	6,130
Coyote Creek u/s Lower Silver Creek	3,920	6,090
Coyote Creek d/s Lower Silver Creek @ 101	5,100	8,170
Coyote Creek u/s Upper Penitencia Creek	5,100	8,180
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	5,630	10,260
Coyote Creek at I-880	5,700	10,380

4.4. 2028 ADSRP Scenario

The prevailing flow for the 72-hr 100-yr event for the 2028 ADSRP scenario is assumed to be 5,185 cfs based on the estimated 100-year peak flow out of Anderson Dam in the ADSRP DEIR stochastic analysis[13] for the 2029 ADSRP scenario.

The prevailing flow for the 24-hr 100-yr event for the 2028 ADSRP scenario is assumed to be 4,140 cfs based on a coincident analysis[14], which evaluates the risk of a coincident peak flow in the local watershed and flow from Anderson Dam.

The 72-hr and 24-hr 100-yr flow distributions for the 2028 ADSRP scenario are shown in Table 7. Because the 24-hr flows are higher than the 72-hr flows within the CCFPP reach of Coyote Creek (i.e., downstream of Upper Silver Creek), the 24-hr flow distribution will result in the

[12] Santa Clara Valley Water District. “Coyote Creek Flood Protection Project: Coincident High Flows on Coyote Creek during Anderson Dam Construction” Technical Memorandum. Prepared by Jack Xu. August 2023.
[13] Santa Clara Valley Water District. “Anderson Dam Seismic Retrofit Project: Potential Flood Impacts for ADSRP” Technical Memorandum. Prepared by Jack Xu and Darshan Baral. August 2023. Appendix K of ADSRP DEIR (September 2023).
[14] Santa Clara Valley Water District. “Coyote Creek Flood Protection Project: Coincident High Flows on Coyote Creek during Anderson Dam Construction” Technical Memorandum. Prepared by Jack Xu. August 2023.

higher water surface elevations on Coyote Creek and the 24-hr storm is considered the controlling event.

Table 7. 2028 ADSRP 72-hr and 24-hr 100-year Flows

Location	2028 ADSRP 72-hr 100-yr Flows (cfs)	2028 ADSRP 24-hr 100-yr Flows (cfs)
Coyote Creek d/s Dam Spillway	5,185	4,140
Coyote Creek d/s Upper Silver Creek	6,465	6,990
Coyote Creek at I-280	6,725	7,730
Coyote Creek at East William St	6,735	7,770
Coyote Creek u/s Lower Silver Creek	6,605	7,730
Coyote Creek d/s Lower Silver Creek @ 101	7,785	9,810
Coyote Creek u/s Upper Penitencia Creek	7,785	9,820
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	8,315	11,900
Coyote Creek at I-880	8,385	12,020

4.5. 2032 FAHCE Scenario

The prevailing flow for the 72-hr 100-yr event for the 2032 FAHCE scenario is assumed to be 8,999 cfs. This is the estimated peak flow out of Anderson Dam during a 100-year event based on a stochastic analysis[15] conducted for the ADSRP DEIR for the 2032 FAHCE scenario.

The prevailing flow for the 24-hr 100-yr event for the 2032 FAHCE scenario is assumed to be 0 cfs. It is assumed that Anderson Reservoir would be operated similarly for flood conditions under both 2017 DSOD and 2032 FAHCE conditions. Because the previous hydrologic modeling results[16] for 24-hr 100-yr storms did not show any flows from Anderson Dam, it is assumed that the prevailing flow would also be no flow (i.e., 0 cfs) under the 2032 FAHCE scenario.

The 72-hr and 24-hr 100-yr flow distributions for the 2032 FAHCE+ scenario are shown in Table 8. Because the 72-hr flows are higher than the 24-hr flows within the CCFPP reach of Coyote Creek (i.e., downstream of Upper Silver Creek), the 72-hr flow distribution will result in the higher water surface elevations on Coyote Creek and the 72-hr storm is considered the controlling event.

[15] Santa Clara Valley Water District. “Anderson Dam Seismic Retrofit Project: Potential Flood Impacts for ADSRP” Technical Memorandum. Prepared by Jack Xu and Darshan Baral. August 2023. Appendix K of ADSRP DEIR (September 2023).
[16] Santa Clara Valley Water District. Coyote Creek Hydrology Study: Final (Addendum #1). Hydraulics, Hydrology, and Geomorphology Unit. Prepared by Jack Xu. May 2017.

Table 8. 2032 FAHCE 72-hr and 24-hr 100-year Flows

Location	2032 FAHCE 72-hr 100-yr Flows (cfs)*	2032 FACHCE 24-hr 100-yr Flows (cfs)
Coyote Creek d/s Dam Spillway	8,999	0
Coyote Creek d/s Upper Silver Creek	10,279	2,850
Coyote Creek at I-280	10,539	3,590
Coyote Creek at East William St	10,549	3,630
Coyote Creek u/s Lower Silver Creek	10,419	3,590
Coyote Creek d/s Lower Silver Creek @ 101	11,599	5,670
Coyote Creek u/s Upper Penitencia Creek	11,599	5,680
Coyote Creek d/s Upper Penitencia Creek @ Berryessa Rd	12,129	7,760
Coyote Creek at I-880	12,199	7,880

5. RECOMMENDED SCENARIOS FOR CCFPP EIR ANALYSIS

In addition to the changing hydrologic setting as described in Section 4, several projects outside of ADSRP are anticipated to be built on Coyote Creek between the 2023 NOP and 2032 FAHCE scenarios. Specifically, the Coyote Creek Flood Management Measures Project (CCFMMP) and two City of San Jose trails projects (City of San Jose Mabury-Empire Trail Project[17] and City of San Jose Phelan-Tully Road Trail Project[18]) will be constructed before construction of CCFPP begins. At the time of EIR preparation, all three projects were anticipated to be constructed by the time ADTP is complete. To be consistent with CEQA Guidelines, the ADSRP DEIR, and the varying controlling hydrologic conditions described in Section 4, EIR Scenarios 1, 2, 2a, 3, 3a, 4, and 5 were recommended to be analyzed as outlined in Table 9, in either the EIR direct impact analysis or the EIR cumulative impact analysis.

As noted in Section 4, the controlling storms were selected based on the highest resulting flows on Coyote Creek, and therefore the largest impact on Coyote Creek itself. However, for the tributaries, it is important to look at both the 24-hr and the 72-hr storms due to the differences in timing between the peak flows on the tributaries and the peak flow on Coyote Creek and the potential differences in backwater effects. For scenarios in which the 24-hr storm is controlling

[17] City of San Jose Department of Public Works, City Facilities Architectural Services Division. Plans for the Construction of 8087 – Trail: Coyote Creek (Mabury Road to Empire Street). January 2023. The Mabury-Empire Trail Project includes construction of a multi-use trail between Mabury Road and Empire Street in the riparian corridor of Coyote Creek and a pedestrian bridge between Hwy 101 and Mabury Road. Construction of the trail and pedestrian bridge will change the channel geometry between Mabury Road and Empire Street before CCFPP is constructed, which will in turn affect the CCFPP EIR hydraulic analysis.

[18] City of San Jose Department of Public Works, City Facilities Architectural Services Division. Plans for the Construction of 8675 – Trail: Coyote Creek (Phelan Avenue to Tully Road). July 2023. The Phelan-Tully Road Trail Project includes construction of a multi-use trail and tree plantings between Phelan Avenue and Tully Road. Construction of the trail and tree plantings will change the floodplain geometry and land cover before CCFPP is constructed, which will in turn affect the CCFPP EIR hydraulic analysis.

on Coyote Creek, no additional analyses are needed. However, for scenarios in which the 72-hr storm is controlling on Coyote Creek, additional scenarios are recommended to evaluate the impact on the tributaries. For this reason, EIR Scenarios 1a and 5a are included as recommended scenarios in Table 8.

It is important to note that unlike the other eight scenarios in Table 8, Scenario 2a is not likely to occur based on the construction schedule for ADTP, CCFMMP, and the City of San Jose Trails Projects. The ADTP and CCFMMP are currently under construction and NOP flows with CCFMMP and CCFPP completed would only occur if there were significant delays to ADTP. In addition, both of the CSJ Trails Projects are anticipated to be constructed before CCFPP is built. Instead, it is included for informational purposes in this appendix as one way to depict impacts of the CCFPP compared to existing (2023 NOP) conditions.

Table 9. Recommended Scenarios for Hydrology Impact Analysis

EIR Scenario No.	Description	Flow out of Anderson during 100-year event (cfs)	CCFMMP Status	CCFPP Status	CSJ Mabury-Empire Trails Project Status	CSJ Phelan-Tully Trails Project Status
1	2017 DSOD conditions at Anderson Dam and Reservoir; existing conditions (72-hr storm)	10,211	Not Built	Not Built	Not Built	Not Built
1a	2017 DSOD conditions at Anderson Dam and Reservoir; existing conditions (24-hr storm)	0	Not Built	Not Built	Not Built	Not Built
2	2023 NOP conditions at Anderson Dam and Reservoir; existing conditions (24-hr storm)	500	Not Built	Not Built	Not Built	Not Built
2a	2023 NOP conditions at Anderson Dam and Reservoir; CCFPP in place (24-hr storm)	500	Built	Built	Not Built	Not Built

EIR Scenario No.	Description	Flow out of Anderson during 100-year event (cfs)	CCFMMP Status	CCFPP Status	CSJ Mabury-Empire Trails Project Status	CSJ Phelan-Tully Trails Project Status
3	2023 ADTP conditions at Anderson Dam and Reservoir; CCFMMP and CSJ Trails Projects in place (24-hr storm)	2,500	Built	Not Built	Built	Built
3a	2023 ADTP conditions at Anderson Dam and Reservoir; CCFMMP, CCFPP and CSJ Trails Projects in place (24-hr storm)	2,500	Built	Built	Built	Built
4	2028 ADSRP conditions at Anderson Dam and Reservoir; CCFMMP, CCFPP, and CSJ Trails Project in place (24-hr storm)	4,140	Built	Built	Built	Built
5	2032 FAHCE conditions at Anderson Dam and Reservoir; CCFMMP, CCFPP, and CSJ Trails Project in place (72-hr storm)	8,999	Built	Built	Built	Built

EIR Scenario No.	Description	Flow out of Anderson during 100-year event (cfs)	CCFMMP Status	CCFPP Status	CSJ Mabury-Empire Trails Project Status	CSJ Phelan-Tully Trails Project Status
5a	2032 FAHCE conditions at Anderson Dam and Reservoir; CCFMMP, CCFPP, and CSJ Trails Projects in place (24-hr storm)	0	Built	Built	Built	Built

Appendix H3 – AECOM Technical Memorandum: Modeling Efforts in Support of Environmental Impact Report

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Project name:
Coyote Creek Flood Protection Project

Project ref:
60652041

To:
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From:
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Rich Gallegos, PE (AECOM)

Date:
June 10, 2024

Technical Memorandum

Subject: Modeling Efforts in Support of Environmental Impact Report (EIR)

Summary

AECOM understands that meeting environmental regulations requires a comprehensive assessment of the performance and potential impacts of both the Coyote Creek Flood Mitigation Measures Project (CCFMMP; Project A) and the Coyote Creek Flood Protection Project (CCFPP; Project B) under various flow scenarios. This entails comparing baseline and proposed hydrologic conditions across multiple flow scenarios to simulate flows along Coyote Creek before, during and after the completion of the improvements at Anderson Dam and Reservoir. Utilizing the existing conditions 1D-2D hydraulic model (SCVWD 2024a) and Valley Water's hydrology (SCVWD 2024b), AECOM conducted flood modeling scenarios. The results were used to generate figures illustrating flooding extents, velocities, water depths, and changes between specific scenarios.

Model Updates

In Spring 2023, Valley Water identified seven preliminary additional elements needed to maintain or reduce the floodplain given flows during a 100-year event. These additional elements are defined as flood protection infrastructure, such as flood walls, partial barriers, head walls, or berms, which were not originally included in the 100% design of Project A or the 60% design of Project B. These features were used as a starting point and were incorporated into the geometry of the Valley Water 1D-2D model. AECOM then used the 1D-2D model to refine the number of additional elements, their alignment, and length to best meet the project objectives.

It should be noted that the additional elements were identified to meet regulatory requirements using the floodplains resulting from 100-year hydrographs, rather than the 20-year design flows. The peak flows at Edenvale of 11,311 cubic feet per second (cfs) for baseline conditions and 10,099 cfs for post-ADSRP conditions (SCVWD 2024b) are larger than the maximum project design flow of 9,500 cfs at Berryessa Road.

After iteration, refinement, and coordination with Valley Water, 6 additional features were identified and are currently being added to the CCFPP at the 90% design phase.

Outside of adding elements (as 2D connections and/or lateral structures), AECOM has made a few additional modifications to the 1D-2D model geometry, as coordinated with Valley Water and listed below:

- Project A floodwall elevations have been updated to reflect the conformed plans.
- Project B floodwall alignments have been updated to reflect the latest design alignments and elevations, as the design progresses toward 90%.
- The City of San Jose (CSJ) trails have been added to the geometry. These trails are located near Mabury Road in Reach 6 and near Phelan Avenue in Reach 8. The trails were incorporated into the terrain. Part of the Phelan Trail is inside the 1D area and so the trail was incorporated into the 1D cross sections in that area.

Model Development

As stated previously, the 1D-2D hydraulic model and hydrology used were provided by Valley Water and a detailed description of model selection, development, and calibration can be found in *Recommended Hydraulic Modeling Approach for Environmental Import Report* (SCVWD 2024a) and *Hydrology Approach for Environmental Impact Report* (SCVWD 2024b). Roughness values in the 1D-2D model were set based on the calibration described in *Combined Coyote HEC-RAS 1D-2D Model Calibration* (SCVWD 2022).

This section provides a brief overview of the model, and Table 2 summarizes key model attributes.

Table 1. Overall Model Details

Type of Model	Unsteady, 1D-2D, existing conditions
Vertical Datum	NAVD88
Horizontal Projection	California FIPS III 0403 State Plan Coordinates
Cross Section Orientation	Cross sections face downstream
River Stationing	District GIS stationing
Extents	Edenvale gage to San Francisco Bay

**SCVWD 2024a*

Four flow scenarios were included in this analysis. These hydrologic scenarios reflect the changing conditions at Anderson Dam over the span of ADSRP: 2017 California Department of Water Resources Division of Safety of Dams (DSOD), 2023 Anderson Dam Tunnel Project (ADTP), 2028 ADSRP, and 2032 (Fish and Aquatic Habitat Collaborative Effort) FAHCE and are described in detail in Valley Water's, *Hydrology Approach for Environmental Impact Report* (SCVWD 2024b).

Unsteady flow files for the following scenarios were provided by Valley Water and are summarized in Table 2 below.

Table 2. Model Flow Scenarios

Scenario	Peak Flow out of Anderson during the 100-yr storm (cfs)
2017 DSOD conditions at Anderson Dam and Reservoir; existing conditions (72-hr storm)	10,211
2017 DSOD conditions at Anderson Dam and Reservoir; existing conditions (24-hr storm)	0
2023 ADTP conditions at Anderson Dam and Reservoir (24-hr storm)	2,500
2023 ADTP conditions at Anderson Dam and Reservoir (24-hr storm)	2,500
2028 ADSRP conditions at Anderson Dam and Reservoir (24-hr storm)	4,140
2032 FAHCE conditions at Anderson Dam and Reservoir (72-hr storm)	8,999
2032 FAHCE conditions at Anderson Dam and Reservoir (24-hr storm)	0

**SCVWD 2024b*

Environmental Impact Report (EIR) Modeling Scenario Details

The rationale for these scenarios is explained in the Valley Water TMs: *Hydrology Approach for Environmental Impact Report (*SCVWD 2024b) and *Recommended Hydraulic Modeling Approach for Environmental Import Report* (SCVWD 2024a).

- ***Post-Project Condition (Scenario 3A) compared to Operational Baseline Condition (Scenario 3) (Post-Anderson Dam Tunnel Project (ADTP) Scenarios***): Operational Baseline Condition (Scenario 3) serves as a baseline with **CCFMMP and CSJ Trails Improvements**, while Post-Project Condition (Scenario 3A) incorporates proposed features for **CCFMMP, CCFPP and CSJ Trails Improvements** These scenarios use flows associated with the 2023 ADTP 24-hour storm.
- ***Scenario 4 compared to 1 (Anderson Dam Seismic Retrofit Project (ADSRP) Construction Scenarios):*** Scenario 1 serves as a baseline with no proposed elements incorporated, while Scenario 4 incorporates proposed features for **CCFMMP, CCFPP and CSJ Trails Improvements**. Scenario 1 uses flows associated with the 2017 DSOD 72-hour storm, while Scenario 4 uses flows associated with the 2028 ADSRP 24-hour storm.
- ***Scenario 5 compared to 1 (Cumulative Pre- and Post-ADSRP Flows):*** Scenario 1 serves as a baseline with no proposed elements incorporated, while Scenario 5 incorporates proposed features for **CCFMMP, CCFPP and CSJ Trails Improvements.** Scenario 1 uses flows associated with the 2017 DSOD 72-hour storm, while Scenario 5 uses flows associated with the 2032 FAHCE-72 hour storm.
- ***Scenario 5A compared to 1A (24-hour Pre- and Post-ADSRP Flows):*** Scenario 1A serves as a baseline with no proposed elements incorporated, while Scenario 5A incorporates proposed features for **CCFMMP, CCFPP and CSJ Trails Improvements**. Scenario 1A uses flows associated with the 2017 DSOD 24-hour storm, while Scenario 5A uses flows associated with the 2032 FAHCE 24-hour storm.

Table 3 on the following page summarizes the inputs and details for each of the scenarios mentioned above.

Table 3. Scenario Details

EIR Scenario No.	Description	Flow out of Anderson during 100-year event (cfs)	CCFMMP Status	CCFPP Status	CSJ Mabury-Empire Trails Project Status	CSJ Phelan-Tully Trails Project Status
1	2017 DSOD conditions at Anderson Dam and Reservoir; existing conditions (72-hr storm)	10,211	Not Built	Not Built	Not Built	Not Built
1a	2017 DSOD conditions at Anderson Dam and Reservoir; existing conditions (24-hr storm)	0	Not Built	Not Built	Not Built	Not Built
3	2023 ADTP conditions at Anderson Dam and Reservoir; **CCFMMP and CSJ Trails Projects** in place (24-hr storm)	2,500	Built	Not Built	Built	Built
3a	2023 ADTP conditions at Anderson Dam and Reservoir; **CCFMMP, CCFPP and CSJ Trails Projects** in place (24-hr storm)	2,500	Built	Built	Built	Built
4	2028 ADSRP conditions at Anderson Dam and Reservoir; **CCFMMP, CCFPP, and CSJ Trails Project** in place (24-hr storm)	4,140	Built	Built	Built	Built
5	2032 FAHCE conditions at Anderson Dam and Reservoir; **CCFMMP, CCFPP, and CSJ Trails Project** in place (72-hr storm)	8,999	Built	Built	Built	Built
5a	2032 FAHCE conditions at Anderson Dam and Reservoir; **CCFMMP, CCFPP, and CSJ Trails Projects** in place (24-hr storm)	0	Built	Built	Built	Built

**SCVWD 2024b*

For each scenario comparison, six different figures were created. These figures are described below.

- Figure 1 (Flooding Extents): This figure is an overlay of the flood extents (where depth > 1 foot) for baseline and proposed conditions.
- Figure 2 (Baseline Maximum Water Depths): This figure shows the maximum depth of water (where depths > 1 foot) for the baseline condition. This figure can be paired with Figure 3 to understand the magnitude of changes in flooding depth with project implementation.
- Figure 3 (Change in Maximum Water Depth): This figure compares the baseline and proposed water depths (where depth > 1 foot) by subtracting the baseline condition results from the proposed condition results such that all negative values indicate water depths being decreased with project implementation and all positive values indicate water depths increasing with project implementation.
- Figure 4 (Baseline Maximum Velocity): This figure shows the maximum water velocity (where depth > 1 foot) for the baseline condition. This figure can be paired with Figure 5 to understand the magnitude of changes in velocity with project implementation.
- Figure 5 (Change in Maximum Velocities): This figure compares the baseline and proposed condition velocities (where depth > 1 foot) by subtracting the baseline condition results from the proposed condition results such that all negative values indicate velocities decreasing with project implementation and all positive values indicate velocities increasing with project implementation.
- Figure 6 (Change in All Maximum Water Depths): This figure is similar to Figure 3 but uses the entire modeling output dataset, including depths where flooding is less than 1 foot.
- Figure 7 (Proposed Maximum Velocity): This figure shows the maximum water velocity (where depth > 1 foot) for the proposed condition. This figure can be paired with Figure 5 to understand the magnitude of changes in velocity with project implementation.

Hydrology for each flow scenario was provided to AECOM by Valley Water (SCVWD 2024b). These flows were then used within the aforementioned 1D-2D model. After each scenario was run in HEC-RAS, results were exported as raster datasets to GIS and were then used to develop the figures.

At the depicted scale in the figures, it should be noted that certain values seen in the color-coded legend may not be readily discernible on the figure itself. This is because there are very few data points that correspond to those values, typically no more than 50 data points out of the 5,000,000+ points that make up the entire data set.

Erosion Analysis

Erosion analysis is a critical aspect of hydraulic engineering, focusing on understanding and mitigating the wear and degradation of open channels due to flowing water. The purpose of this erosion analysis is to review changes in velocities of Coyote Creek with the implementation of the CCFPP improvements for the modeled EIR scenarios and determine if there are any substantial impacts and risk increase that may result in new erosion.

Permissible Channel Velocity

The permissible velocity is the maximum velocity at which water can flow without causing significant erosion of the creek. Exceeding this threshold increases the risk of erosion, with the rate and severity of erosion increasing as velocities rise above permissible levels. The relationship between flow velocity and shear stress, which causes erosion, is often nonlinear. A small increase (0-10%) in velocity results in a proportionally smaller increase in shear stress, especially at lower velocities. Thus, a 10% increase in velocity translates to a slightly higher shear stress, but not necessarily a proportionally higher erosion rate. Natural waterways often experience brief periods where velocities exceed permissible limits. Short durations of slightly higher velocities may not have a significant cumulative effect on erosion. For this analysis, classifying a 0-10% increase above the permissible velocity or delta in maximum velocity magnitude as a minor risk of increased erosion is based on engineering design practices and the nonlinear response of erosion to velocity increases.

A permissible channel velocity of 7.5 ft/s was determined for Coyote Creek within the project limits based on the existing vegetation survey completed. Vegetation is dominated by mature riparian woodlands (willows, cottonwood, oaks, alder, bay, bigleaf maple, etc.), open shrub and sparse to moderate herbaceous/grass understory with dense vine (ivy, periwinkle) cover in some areas.

A baseline permissible velocity of 5.0 ft/s was multiplied by a factor of 1.5. The baseline permissible velocity of 5.0 ft/s is supported by the National Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG) classification and open channel design criteria. The HSG for Coyote Creek is identified as Group A, a copy of the NRCS web soil survey is included as an attachment. Group A soils have a high infiltration rate when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. An acceptable velocity for non-cohesive soils that are well vegetated is 5.0 ft/s (Mile High Flood District, Volume 2).

Furthermore, in soil mechanics, the presence of tree roots has been shown to significantly increase soil shear strength due to root reinforcement. Research studies, such as those by Stokes and Spanos (1994), have found that tree roots can increase soil shear strength by up to 50% or more, depending on factors such as root density, depth, and species. The multiplier of 1.5 for root reinforcement is a common value used in soil mechanics and erosion control literature to represent the increase in soil shear strength provided by well-established tree roots. The permissible channel velocity of 7.5 ft/s is also in-line with Caltrans's Highway Design Manual (HDM) Table 865.2, "Permissible Shear and Velocity for Selected Lining Materials" for vegetation boundary class A/B turf.

Erosion Impact Analysis Summary

Figures 4, 5, and 7 along with the modeling results were reviewed and used to populate Tables 4 through 7. These tables summarize the average maximum and maximum channel velocities by project reach for both the baseline and proposed conditions for the EIR comparison scenarios. The delta in maximum channel velocity between the proposed and baseline conditions and whether an increase in substantial risk of erosion may occur was reviewed and discussed further for each comparison scenario.

For all four EIR comparison scenarios, the average maximum channel velocities are within the permissible channel velocity and were consistent between the baseline and proposed conditions. Generally, the overall magnitude of maximum channel velocities for each project reach were consistent between the baseline and proposed conditions. For example, if Coyote Creek under the baseline condition experienced a maximum velocity of 5 ft/s, then in the proposed condition, the creek did not experience a higher maximum velocity greater than 5 ft/s in the same vicinity. However, there may be an increase in the length and area the creek experiences the maximum velocity of 5 ft/s. At these locations is where the greatest difference in delta between the baseline and proposed conditions maximum velocities are observed and shown in Figure 5. Note, these maximum deltas and increases in maximum velocities between comparison scenarios are limited to short segments of the creek channel at any location. There are a few identified locations for a few of the comparison scenarios where an increase in maximum velocity between the baseline and proposed conditions occurred and are discussed further below. Decreases in maximum velocities are mainly due to flood reduction because of the CCFMMP and CCFPP improvements.

EIR Scenario Comparison Post-Project Condition (3A) to Operational Baseline Condition (3) (Table 4)

The Post-Project Condition increased and decreased the maximum velocities throughout the project up to 1.0 ft/s as compared to the Operational Baseline Condition within the channel corridor. Larger decreases outside the channel corridor are observed due to flood reduction from the improvements and are shown in Figure 5.

The CCFPP improvements of the Post-Project Condition do not substantially increase the risk of erosion when compared to the operational baseline condition because the average maximum channel velocities for the entire project and the maximum channel velocities for project Reaches 6 to 8 are within the permissible velocity even with a maximum channel velocity increase of 1.0 ft/s observed at A-R6-FW4 and B-R6-FW5. Also, the maximum channel velocities downstream of Reach 6 are higher than the permissible velocity in some areas for both scenarios, but there is no substantial increase (>10%) in the overall magnitude of maximum channel velocities between scenarios. The only increase in maximum channel velocity downstream of Reach 6 is at A-R5-FW2, where a +0.5 ft/s (+5.2%) increase between comparison scenarios and is limited to a short segment (~185 ft) of the creek channel adjacent to the proposed floodwall. The maximum channel velocities in Reach 4 are also within the permissible velocity in the vicinity of the CCFPP improvements.

EIR Scenario Comparison 4 to 1 (Table 5)

Scenario 4 increased and decreased the maximum velocities throughout the project up to 2.0 ft/s as compared to Scenario 1 within the channel corridor. Isolated larger delta increases up to 4.0 ft/s (increase from 7.0 ft/s to 11.0 ft/s) were observed near A-R5-FW1 due to Coyote Creek channel experiencing a higher velocity during Scenario 4 for a short segment of channel (~200 ft) as compared to Scenario 1 where wide shallow flooding occurs downstream of Berryessa Road. However, within this vicinity, the maximum channel velocity of 11.1 ft/s was observed for both scenarios. For this short segment of channel, there is a minor level of risk of increased erosion as the velocity exceeds 0-10% above the permissible velocity between comparison scenarios. The risk of erosion increases as the permissible velocity is exceeded above 10%. Larger decreases outside the channel corridor are observed due to flood reduction from the improvements and are shown in Figure 5.

Scenario 4 does not substantially increase the risk of erosion when compared to Scenario 1 because the average maximum channel velocities are within the permissible velocity for both scenarios. Also, where maximum channel velocities are higher than the permissible velocity throughout the project, this is true for both scenarios. There is no substantial increase (>10%) in the overall magnitude of maximum channel velocities between scenarios. One location was identified where Scenario 4 increased the maximum channel velocity when compared to Scenario 1. This location was at improvement B-R6-FW19 (+0.5 ft/s / +9.1%) and only occurs for a short segment of channel (~165 ft). The increase in maximum velocity at B-R6-FW19 from 5.5 ft/s to 6.0 ft/s is still within the permissible velocity.

EIR Scenario Comparison 5 to 1 (Table 6)

Scenario 5 increased and decreased the maximum velocities throughout the project up to 2.0 ft/s as compared to Scenario 1 within the channel corridor. Larger decreases outside the channel corridor are observed due to flood reduction from the improvements and are shown in Figure 5.

Scenario 5 does not substantially increase the risk of erosion when compared to Scenario 1 because the average maximum channel velocities are within the permissible velocity for both scenarios. Also, where maximum channel velocities are higher than the permissible velocity throughout the project, this is true for both scenarios. There are locations where an increase in maximum velocity between comparison scenarios are observed but are not considered substantial as the increases are less than +0.5 ft/s and less than a 10% increase. These maximum velocity increases observed throughout the project, except for Reach 5, are still within the permissible velocity. These minor increases for A-R5-FW1 and A-R5-FW2 are +1.8% and +2.7% between Scenario 5 and 1 and in both scenarios exceed the permissible velocity for a short length (~150 ft) of channel.

There is one location where a substantial increase (>10%) in the overall magnitude of maximum channel velocity between scenarios was observed. This location was at improvement B-R6-FW19 (+2.0 ft/s / +36%) and only occurs for a short segment of channel (~150 ft). The increase in maximum velocity at B-R6-FW19 from 5.5 ft/s to 7.5 ft/s is still within the permissible velocity.

EIR Scenario Comparison 5A to 1A (Table 7)

Scenario 5A increased and decreased the maximum velocities throughout the project up to 2.0 ft/s as compared to Scenario 1A within the channel corridor. Similarly to Scenario 4 to 1, larger delta increases up to 2.0 ft/s (increase from 8.0 ft/s to 10.0 ft/s) are observed at A-R5-FW1 due to Coyote Creek channel experiencing the higher velocity during Scenario 5A for a short segment of channel (~200 ft) as compared to Scenario 1A where wide shallow flooding occurs downstream of Berryessa Road. However, within this vicinity, the maximum channel velocity of 10.3 ft/s is observed for both scenarios. For this short segment of channel, there is a minor level of risk of increased erosion as the velocity exceeds 0-10% above the permissible velocity between comparison scenarios. The risk of erosion increases as the permissible velocity is exceeded above 10%. Larger decreases outside the channel corridor are observed due to flood reduction from the improvements and are shown in Figure 5.

Scenario 5A does not substantially increase the risk of erosion when compared to Scenario 1A because the average maximum channel velocities are within the permissible velocity for both scenarios for the entire project and the maximum channel velocities for project Reaches 6 to 8 are within the permissible velocity even with the largest and substantial maximum channel velocity increase of 0.9 ft/s (+28%) observed at B-R6-FW19. The maximum channel velocities in Reach 4 are also within the permissible velocity in the vicinity of the CCFPP improvements. There were no substantial increases (>10%) in maximum velocities observed in Reach 5 between comparison scenarios.

Tables 4-7 are on the following pages.

Table 4 - EIR Scenario Post-Project Condition (3A) Compared to Operational Baseline Condition (3) (Post-Anderson Dam Tunnel Project (ADTP) Scenerios)

Project Reach	3A to 3 Figure Page #	Downstream Limit	Upstream Limit	Average Max Channel Velocity (ft/s)		Maximum Velocity (ft/s)			Comments
				Scenerio 3	Scenerio 3A	Scenerio 3 Channel	Scenerio 3A Channel	Delta 3A-3 Channel	
N/A	10 & 11	Hightway 237	Montague Expressway	4.0-6.0	4.0-6.0	9.8-13.5	9.8-13.5	-1.0-1.0	Maximum velocities at HWY 237 and Montague Expressway
Reach 4	6, 7 & 10	Montague Expressway	Old Oakland Road	5.0-8.0	5.0-8.0	7.7-9.8	7.7-9.8	-1.0-1.0	Maximum velocities D/S of Old Oakland Rd to I-880
Reach 4	7 & 10	B-R4-FW1		N/A	N/A	7.3	7.3	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW2		N/A	N/A	5.2	5.3	0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW3		N/A	N/A	7.3	7.3	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW4		N/A	N/A	6.5	6.4	-0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-L2		N/A	N/A	6.5	6.4	-0.1	Maximum veloicties at channel adjacent to L2
Reach 5	5, 6, 9 & 10	Old Oakland Road	Mabury Road	5.0-7.0	5.0-7.0	9.8-11.5	9.8-11.5	-1.0-1.0	Maximum velocities D/S of Berryessa Rd along A-R5-FW1
Reach 5	5, 6 & 10	A-R5-FW1		N/A	N/A	11.5	11.5	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 5	5 & 10	A-R5-FW2		N/A	N/A	9.5	10.0	0.5	Maximum veloicties at channel adjacent to Floodwall
Reach 5	5 & 10	A-R5-FW3		N/A	N/A	0.0	0.0	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4, 5, 9 & 10	Mabury Road	East Santa Clara Street	4.0-6.0	4.0-6.0	6.2-7.7	6.2-7.7	-1.0-1.0	Maximum velocities upstream of Mabury Rd to US 101
Reach 6	4, 5, 9 & 10	A-R6-FW4		N/A	N/A	6.4	7.4	1.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4, 5, 9 & 10	B-R6-FW5		N/A	N/A	6.4	7.4	1.0	Maximum velocities just D/S of Mabury Trail Bridge
Reach 6	4 & 9	B-R6-FW6		N/A	N/A	4.2	4.4	0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4, 5 & 9	B-R6-FW7		N/A	N/A	4.9	4.9	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4, 5 & 9	B-R6-FW7-PB		N/A	N/A	0.0	0.0	0.0	Maximum veloicties adjacent to Passive Barrier
Reach 6	4 & 9	B-R6-FW8		N/A	N/A	5.6	5.6	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW9		N/A	N/A	5.2	5.2	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW10		N/A	N/A	6.4	6.4	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW16		N/A	N/A	0.3	0.3	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW19		N/A	N/A	5.6	5.6	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW20		N/A	N/A	4.4	4.3	-0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW21		N/A	N/A	3.8	3.8	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3, 4 & 9	East Santa Clara Street	Interstate 280	3.2-5.0	3.2-5.0	4.0-6.2	4.0-6.2	-1.0-1.0	Maximum velocity just U/S of Calhoun St
Reach 7	3 & 9	A-R7-FW5		N/A	N/A	5.9	5.9	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	A-R7-FW6		N/A	N/A	4.1	4.1	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	A-R7-FW7		N/A	N/A	3.3	3.3	0.0	Maximum Velocities just D/S I-280
Reach 7	3 & 9	B-R7-FW11		N/A	N/A	5.0	5.0	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	B-R7-FW12		N/A	N/A	2.6	2.8	0.2	Maximum veloicties adjacent to Floodwall
Reach 7	3 & 9	B-R7-FW18		N/A	N/A	2.7	2.7	0.0	Maximum veloicties adjacent to Floodwall
Reach 7	3 & 9	B-R7-PB4		N/A	N/A	4.5	4.5	0.0	Maximum veloicties at channel adjacent to Passive Barrier
Reach 7	3 & 9	B-R7-PB5		N/A	N/A	4.5	4.5	0.0	Maximum veloicties at channel adjacent to Passive Barrier
Reach 8	1,2,3,8 & 9	Interstate 280	Tully Road	3.5-4.5	3.5-4.5	4.0-6.2	4.0-6.2	-1.0-1.0	Maximum velocities just D/S of Tully Rd
Reach 8	2 & 9	B-R8-FW13		N/A	N/A	4.6	4.6	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1, 2 & 9	B-R8-FW14		N/A	N/A	5.2	5.3	0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1 & 8	B-R8-FW15		N/A	N/A	5.7	5.8	0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1, 2 & 9	B-R8-FW22 B3		NA	NA	4.8	4.8	0.0	Maximum veloicties at channel adjacent to B3

Table 5 - EIR Scenario 4 Compared to 1 (Anderson Dam Seismic Retrofit Project (ADSRP) Construction Scenarios)

Project Reach	4 to 1 Figure Page #	Downstream Limit	Upstream Limit	Average Max Channel Velocity (ft/s)		Maximum Velocity (ft/s)			Comments
				Scenerio 1	Scenerio 4	Scenerio 1 Channel	Scenerio 4 Channel	Delta 4-1 Channel	
N/A	10 & 11	Hightway 237	Montague Expressway	4.0-6.0	4.0-6.0	9.8-13.5	9.8-13.5	-1.0-1.5	Maximum velocities at HWY 237 and Montague Expressway
Reach 4	6, 7 & 10	Montague Expressway	Old Oakland Road	5.0-7.0	5.0-7.0	9.8-11.1	9.8-11.3	-1.0-1.0	Maximum velocities D/S of Old Oakland Rd to I-880
Reach 4	7 & 10	B-R4-FW1		N/A	N/A	7.2	7.5	0.3	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW2		N/A	N/A	5.2	5.5	0.3	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW3		N/A	N/A	7.2	7.5	0.3	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW4		N/A	N/A	7.3	6.6	-0.7	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-L2		N/A	N/A	7.3	6.6	-0.7	Maximum veloicties at channel adjacent to L2
Reach 5	5, 6, 9 & 10	Old Oakland Road	Mabury Road	5.0-7.0	5.0-7.0	9.8-11.1	9.8-11.3	-2.0-4.0	Maximum velocities D/S of Berryessa Rd along A-R5-FW1
Reach 5	5, 6 & 10	A-R5-FW1		N/A	N/A	11.1	11.1	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 5	5 & 10	A-R5-FW2		N/A	N/A	11.0	10.5	-0.5	Maximum veloicties at channel adjacent to Floodwall
Reach 5	5 & 10	A-R5-FW3		N/A	N/A	0.0	0.0	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4, 5, 9 & 10	Mabury Road	East Santa Clara Street	4.0-5.5	4.0-5.5	7.7-9.8	7.7-9.8	-1.0-1.5	Maximum velocities upstream of Mabury Rd to US 101
Reach 6	4, 5, 9 & 10	A-R6-FW4		N/A	N/A	8.8	8.2	-0.6	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4, 5, 9 & 10	B-R6-FW5		N/A	N/A	8.8	8.2	-0.6	Maximum velocities just D/S of Mabury Trail Bridge
Reach 6	4 & 9	B-R6-FW6		N/A	N/A	5.6	4.2	-1.4	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4, 5 & 9	B-R6-FW7		N/A	N/A	2.3	2.0	-0.3	Maximum veloicties adjacent to Floodwall
Reach 6	4, 5 & 9	B-R6-FW7-PB		N/A	N/A	0.2	0.0	-0.2	Maximum veloicties adjacent to Passive Barrier
Reach 6	4 & 9	B-R6-FW8		N/A	N/A	7.0	6.1	-0.9	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW9		N/A	N/A	1.3	1.3	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW10		N/A	N/A	6.2	5.5	-0.7	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW16		N/A	N/A	0.4	0.2	-0.2	Maximum veloicties adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW19		N/A	N/A	5.5	6.0	0.5	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW20		N/A	N/A	5.0	4.8	-0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW21		N/A	N/A	5.2	3.2	-2.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3, 4 & 9	East Santa Clara Street	Interstate 280	4.0-5.0	4.0-5.0	7.7-9.8	7.7-9.8	-2.0-2.0	Maximum velocity just U/S of Calhoun St
Reach 7	3 & 9	A-R7-FW5		N/A	N/A	7.8	6.8	-1.1	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	A-R7-FW6		N/A	N/A	6.1	5.3	-0.8	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	A-R7-FW7		N/A	N/A	5.2	3.4	-1.8	Maximum Velocities just D/S I-280
Reach 7	3 & 9	B-R7-FW11		N/A	N/A	6.2	5.5	-0.7	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	B-R7-FW12		N/A	N/A	2.5	1.1	-1.4	Maximum veloicties adjacent to Floodwall
Reach 7	3 & 9	B-R7-FW18		N/A	N/A	1.3	1.1	-0.2	Maximum veloicties adjacent to Floodwall
Reach 7	3 & 9	B-R7-PB4		N/A	N/A	4.1	3.5	-0.6	Maximum veloicties at channel adjacent to Passive Barrier
Reach 7	3 & 9	B-R7-PB5		N/A	N/A	4.1	3.5	-0.6	Maximum veloicties at channel adjacent to Passive Barrier
Reach 8	1,2,3,8 & 9	Interstate 280	Tully Road	4.0-5.0	4.0-5.0	7.0-8.0	6.2-7.7	-2.0-2.0	Maximum velocities just D/S of Tully Rd
Reach 8	2 & 9	B-R8-FW13		N/A	N/A	8.0	6.0	-2.0	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1, 2 & 9	B-R8-FW14		N/A	N/A	5.1	4.8	-0.3	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1 & 8	B-R8-FW15		N/A	N/A	6.6	6.2	-0.4	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1, 2 & 9	B-R8-FW22 B3		NA	NA	6.1	5.3	-0.8	Maximum veloicties at channel adjacent to B3

Table 6 - EIR Scenario 5 Compared to 1 (Cumulative Pre- and Post-ADSRP Flows)

Project Reach	5 to 1 Figure Page #	Downstream Limit	Upstream Limit	Average Max Channel Velocity (ft/s)		Maximum Velocity (ft/s)			Comments
				Scenerio 1	Scenerio 5	Scenerio 1 Channel	Scenerio 5 Channel	Delta 5-1 Channel	
N/A	10 & 11	Hightway 237	Montague Expressway	5.0-6.2	5.0-6.2	9.8-13.5	9.8-13.5	-1.0-1.0	Maximum velocities at HWY 237 and Montague Expressway
Reach 4	6, 7 & 10	Montague Expressway	Old Oakland Road	4.0-7.0	4.0-7.0	5.0-9.8	5.0-9.8	-1.0-1.0	Maximum velocities D/S of Old Oakland Rd to I-880
Reach 4	7 & 10	B-R4-FW1		N/A	N/A	7.2	7.5	0.3	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW2		N/A	N/A	5.2	5.4	0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW3		N/A	N/A	7.2	7.5	0.3	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW4		N/A	N/A	7.3	6.4	-0.9	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-L2		N/A	N/A	7.3	6.4	-0.9	Maximum veloicties at channel adjacent to L2
Reach 5	5, 6, 9 & 10	Old Oakland Road	Mabury Road	5.0-6.2	5.0-6.2	9.8-11.6	9.8-11.9	-2.0-2.0	Maximum velocities D/S of Berryessa Rd along A-R5-FW1
Reach 5	5, 6 & 10	A-R5-FW1		N/A	N/A	11.1	11.3	0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 5	5 & 10	A-R5-FW2		N/A	N/A	11.0	11.3	0.3	Maximum veloicties at channel adjacent to Floodwall
Reach 5	5 & 10	A-R5-FW3		N/A	N/A	0.0	0.0	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4, 5, 9 & 10	Mabury Road	East Santa Clara Street	4.0-6.2	4.0-6.2	5.0-9.8	5.0-9.8	-1.0-2.0	Maximum velocities upstream of Mabury Rd to US 101
Reach 6	4, 5, 9 & 10	A-R6-FW4		N/A	N/A	8.8	8.7	-0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4, 5, 9 & 10	B-R6-FW5		N/A	N/A	8.8	8.7	-0.1	Maximum velocities just D/S of Mabury Trail Bridge
Reach 6	4 & 9	B-R6-FW6		N/A	N/A	5.6	5.6	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4, 5 & 9	B-R6-FW7		N/A	N/A	2.3	1.9	-0.4	Maximum veloicties adjacent to Floodwall
Reach 6	4, 5 & 9	B-R6-FW7-PB		N/A	N/A	0.2	0.0	-0.2	Maximum veloicties adjacent to Passive Barrier
Reach 6	4 & 9	B-R6-FW8		N/A	N/A	7.0	6.3	-0.7	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW9		N/A	N/A	1.3	1.2	-0.1	Maximum veloicties adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW10		N/A	N/A	6.2	6.4	0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW16		N/A	N/A	0.4	.13	-0.3	Maximum veloicties adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW19		N/A	N/A	5.5	7.5	2.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW20		N/A	N/A	5.0	5.4	0.4	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW21		N/A	N/A	5.2	5.2	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3, 4 & 9	East Santa Clara Street	Interstate 280	5.0	5.0	4.0-9.8	3.2-9.8	-1.0-1.0	Maximum velocity just U/S of Calhoun St
Reach 7	3 & 9	A-R7-FW5		N/A	N/A	7.8	7.5	-0.3	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	A-R7-FW6		N/A	N/A	6.1	6.0	-0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	A-R7-FW7		N/A	N/A	5.2	5.2	0.0	Maximum Velocities just D/S I-280
Reach 7	3 & 9	B-R7-FW11		N/A	N/A	6.2	6.4	0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	B-R7-FW12		N/A	N/A	2.5	2.1	-0.4	Maximum veloicties adjacent to Floodwall
Reach 7	3 & 9	B-R7-FW18		N/A	N/A	1.3	1.2	-0.1	Maximum veloicties adjacent to Floodwall
Reach 7	3 & 9	B-R7-PB4		N/A	N/A	4.1	3.7	-0.4	Maximum veloicties at channel adjacent to Passive Barrier
Reach 7	3 & 9	B-R7-PB5		N/A	N/A	4.1	3.7	-0.4	Maximum veloicties at channel adjacent to Passive Barrier
Reach 8	1,2,3,8 & 9	Interstate 280	Tully Road	4.0-5.5	4.0-5.5	5.0-9.8	5.0-9.8	-2.0-1.0	Maximum velocities just D/S of Tully Rd
Reach 8	2 & 9	B-R8-FW13		N/A	N/A	8.0	6.5	-1.5	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1, 2 & 9	B-R8-FW14		N/A	N/A	5.1	5.1	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1 & 8	B-R8-FW15		N/A	N/A	6.6	7.0	0.4	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1, 2 & 9	B-R8-FW22 B3		NA	NA	6.1	6.1	0.0	Maximum veloicties at channel adjacent to B3

Table 7 - EIR Scenario 5A Compared to 1A (24-hour Pre- and Post-ADSRP Flows)

Project Reach	5A to 1A Figure Page #	Downstream Limit	Upstream Limit	Average Max Channel Velocity (ft/s)		Maximum Velocity (ft/s)			Comments
				Scenerio 1A	Scenerio 5A	Scenerio 1A Channel	Scenerio 5A Channel	Delta 5A-1A Channel	
N/A	10 & 11	Hightway 237	Montague Expressway	4.0-5.0	4.0-5.0	9.8-11.5	9.8-11.5	-1.0-1.0	Maximum velocities at HWY 237 and Montague Expressway
Reach 4	6, 7 & 10	Montague Expressway	Old Oakland Road	4.0-7.0	4.0-7.0	7.7-9.8	7.7-9.8	-1.0-1.0	Maximum velocities D/S of Old Oakland Rd to I-880
Reach 4	7 & 10	B-R4-FW1		N/A	N/A	6.7	6.8	0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW2		N/A	N/A	4.6	4.7	0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW3		N/A	N/A	6.7	6.8	0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-FW4		N/A	N/A	5.7	5.7	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 4	7 & 10	B-R4-L2		N/A	N/A	5.7	5.7	0.0	Maximum veloicties at channel adjacent to L2
Reach 5	5, 6, 9 & 10	Old Oakland Road	Mabury Road	4.0-6.2	4.0-6.2	9.8-11.5	9.8-11.5	-2.0-2.0	Maximum velocities D/S of Berryessa Rd along A-R5-FW1
Reach 5	5, 6 & 10	A-R5-FW1		N/A	N/A	10.5	10.3	-0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 5	5 & 10	A-R5-FW2		N/A	N/A	8.3	8.1	-0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 5	5 & 10	A-R5-FW3		N/A	N/A	0.0	0.0	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4, 5, 9 & 10	Mabury Road	East Santa Clara Street	2.4-3.2	2.4-3.2	5.0-6.2	5.0-6.2	-1.0-1.2	Maximum velocities upstream of Mabury Rd to US 101
Reach 6	4, 5, 9 & 10	A-R6-FW4		N/A	N/A	6.1	6.1	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4, 5, 9 & 10	B-R6-FW5		N/A	N/A	6.1	6.1	0.0	Maximum velocities just D/S of Mabury Trail Bridge
Reach 6	4 & 9	B-R6-FW6		N/A	N/A	3.3	3.3	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4, 5 & 9	B-R6-FW7		N/A	N/A	2.4	2.3	-0.1	Maximum veloicties adjacent to Floodwall
Reach 6	4, 5 & 9	B-R6-FW7-PB		N/A	N/A	0.0	0.0	0.0	Maximum veloicties adjacent to Passive Barrier
Reach 6	4 & 9	B-R6-FW8		N/A	N/A	5.2	5.2	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW9		N/A	N/A	0.0	0.0	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW10		N/A	N/A	4.2	4.4	0.2	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW16		N/A	N/A	0.2	0.2	0.0	Maximum veloicties adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW19		N/A	N/A	3.2	4.1	0.9	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW20		N/A	N/A	3.6	3.6	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 6	4 & 9	B-R6-FW21		N/A	N/A	5.1	5.1	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3, 4 & 9	East Santa Clara Street	Interstate 280	1.5-3.2	1.5-3.2	4.0-5.0	4.0-5.0	-1.0-1.0	Maximum velocity just U/S of Calhoun St
Reach 7	3 & 9	A-R7-FW5		N/A	N/A	3.9	3.9	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	A-R7-FW6		N/A	N/A	3.3	3.3	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	A-R7-FW7		N/A	N/A	2.5	2.5	0.0	Maximum Velocities just D/S I-280
Reach 7	3 & 9	B-R7-FW11		N/A	N/A	3.3	3.4	0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 7	3 & 9	B-R7-FW12		N/A	N/A	0.2	0.2	0.0	Maximum veloicties adjacent to Floodwall
Reach 7	3 & 9	B-R7-FW18		N/A	N/A	1.0	0.8	-0.2	Maximum veloicties adjacent to Floodwall
Reach 7	3 & 9	B-R7-PB4		N/A	N/A	2.4	2.5	0.1	Maximum veloicties at channel adjacent to Passive Barrier
Reach 7	3 & 9	B-R7-PB5		N/A	N/A	2.4	2.5	0.1	Maximum veloicties at channel adjacent to Passive Barrier
Reach 8	1,2,3,8 & 9	Interstate 280	Tully Road	3.2-5.0	3.2-5.0	6.0	6.0	-1.0-1.0	Maximum velocities just D/S of Tully Rd
Reach 8	2 & 9	B-R8-FW13		N/A	N/A	3.2	3.2	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1, 2 & 9	B-R8-FW14		N/A	N/A	5.1	5.1	0.0	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1 & 8	B-R8-FW15		N/A	N/A	5.0	5.1	0.1	Maximum veloicties at channel adjacent to Floodwall
Reach 8	1, 2 & 9	B-R8-FW22 B3		NA	NA	3.8	3.8	0.0	Maximum veloicties at channel adjacent to B3

Limitations

The services presented herein were conducted in a manner consistent with the standard of care commonly used as state-of-practice in the engineering profession at this time and location. No other warranties, expressed or implied, are included or intended in this document. Some background information, modeling files, and other data used by AECOM in preparing this document have been furnished by the client or third parties. AECOM has relied on this information as furnished and is neither responsible for nor has confirmed the accuracy of this information. Regulatory framework regarding local, state, and federal regulations and permitting for this project shall be covered in the EIR by GEI and no additional scour evaluation of existing roadway or pedestrian creek crossing structures were evaluated with this analysis and memorandum.

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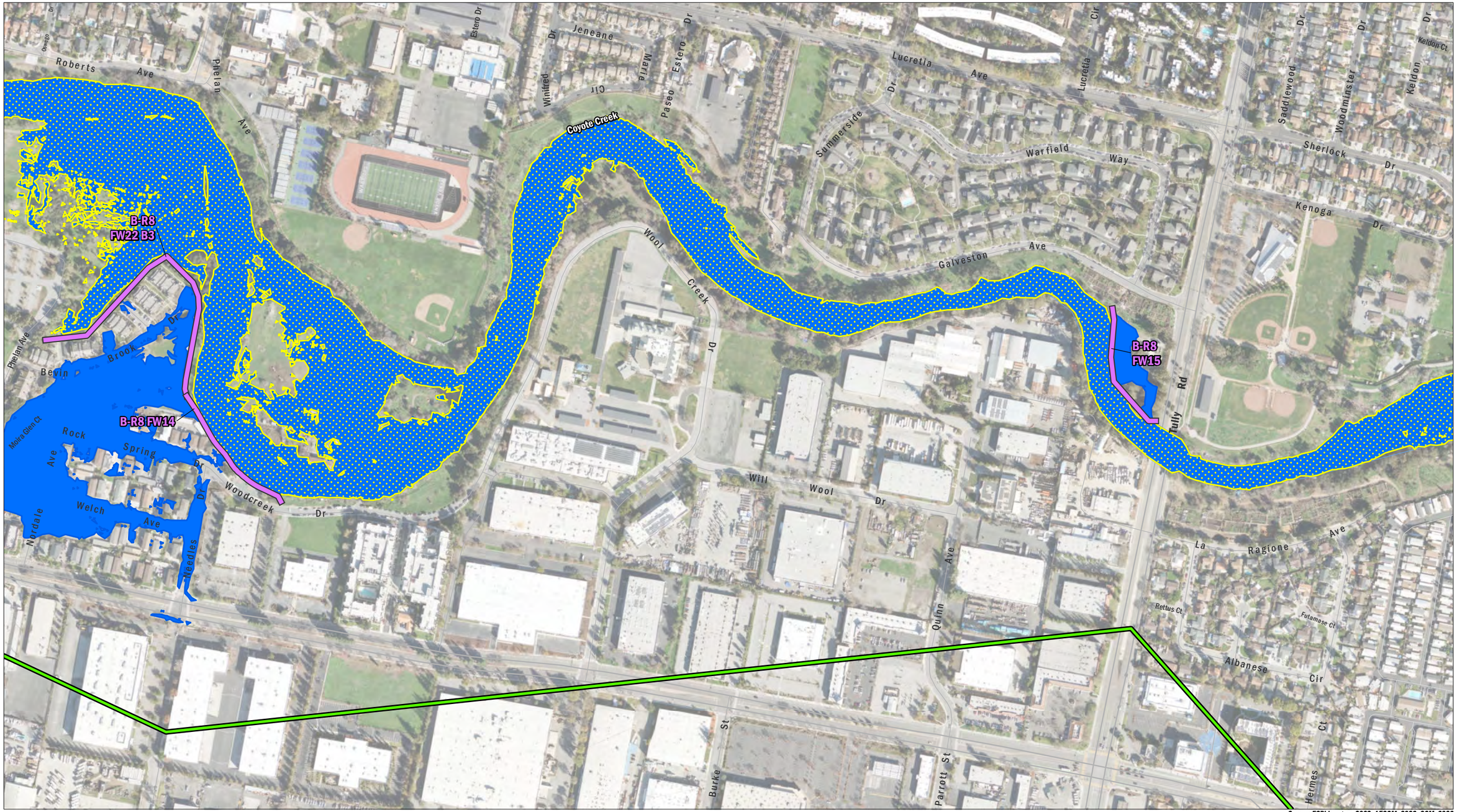
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Attachment 1
Post-Project Condition (Scenario 3A)
Versus
Operational Baseline Condition (Scenario 3)
Comparison Figures



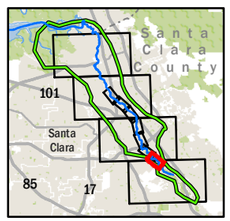
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0 500
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Modeled Flood Extents
Operational Baseline Conditions
Post-Project Conditions



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Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 1 of 11



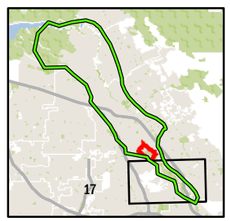
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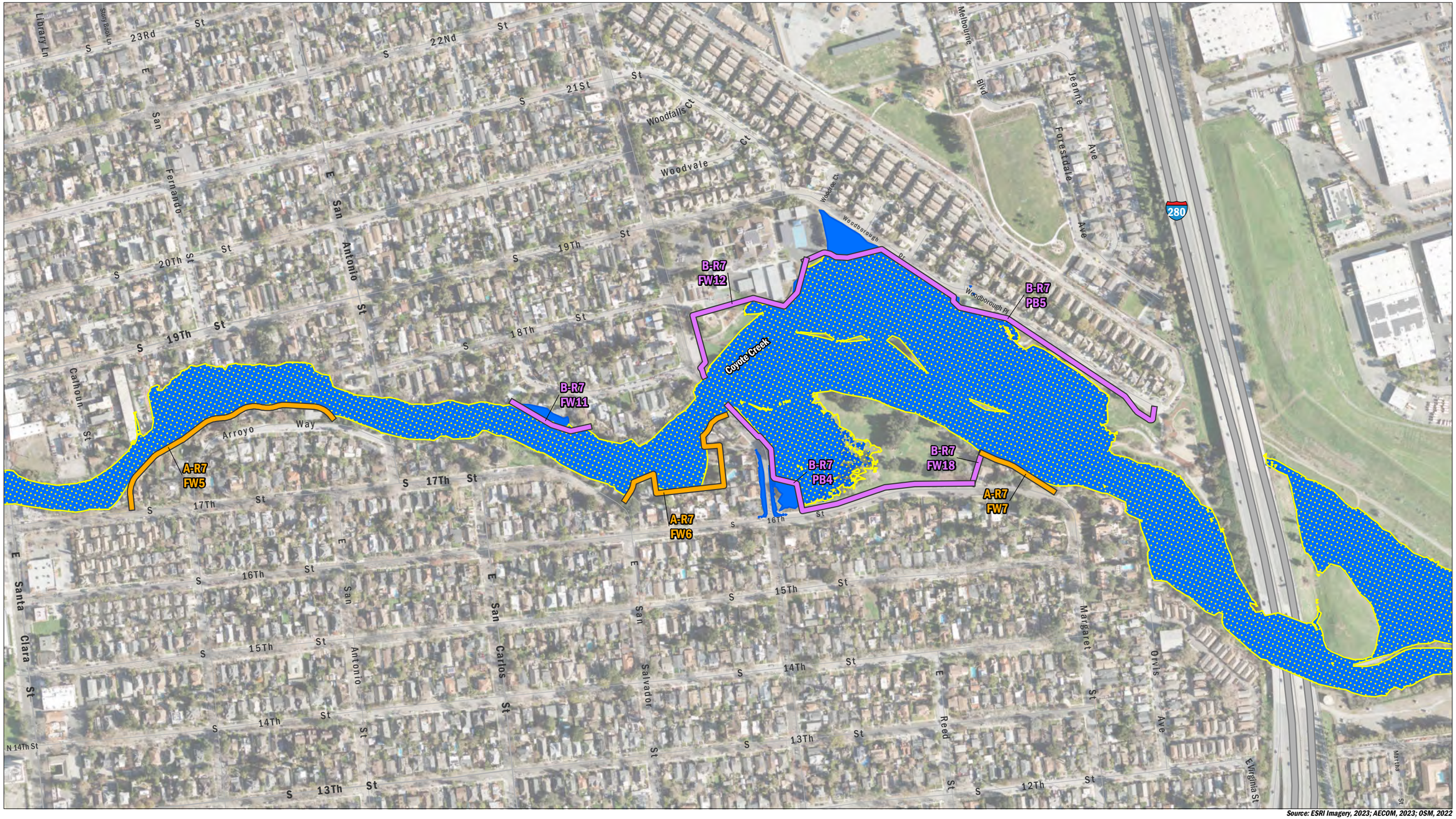
Modeled Flood Extents
Operational Baseline Conditions
Post-Project Conditions



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Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Modeled Flood Extents
Operational Baseline Conditions
Post-Project Conditions

AECOM
Coyote Creek
EIR Modeling

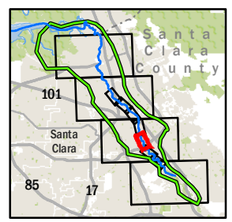
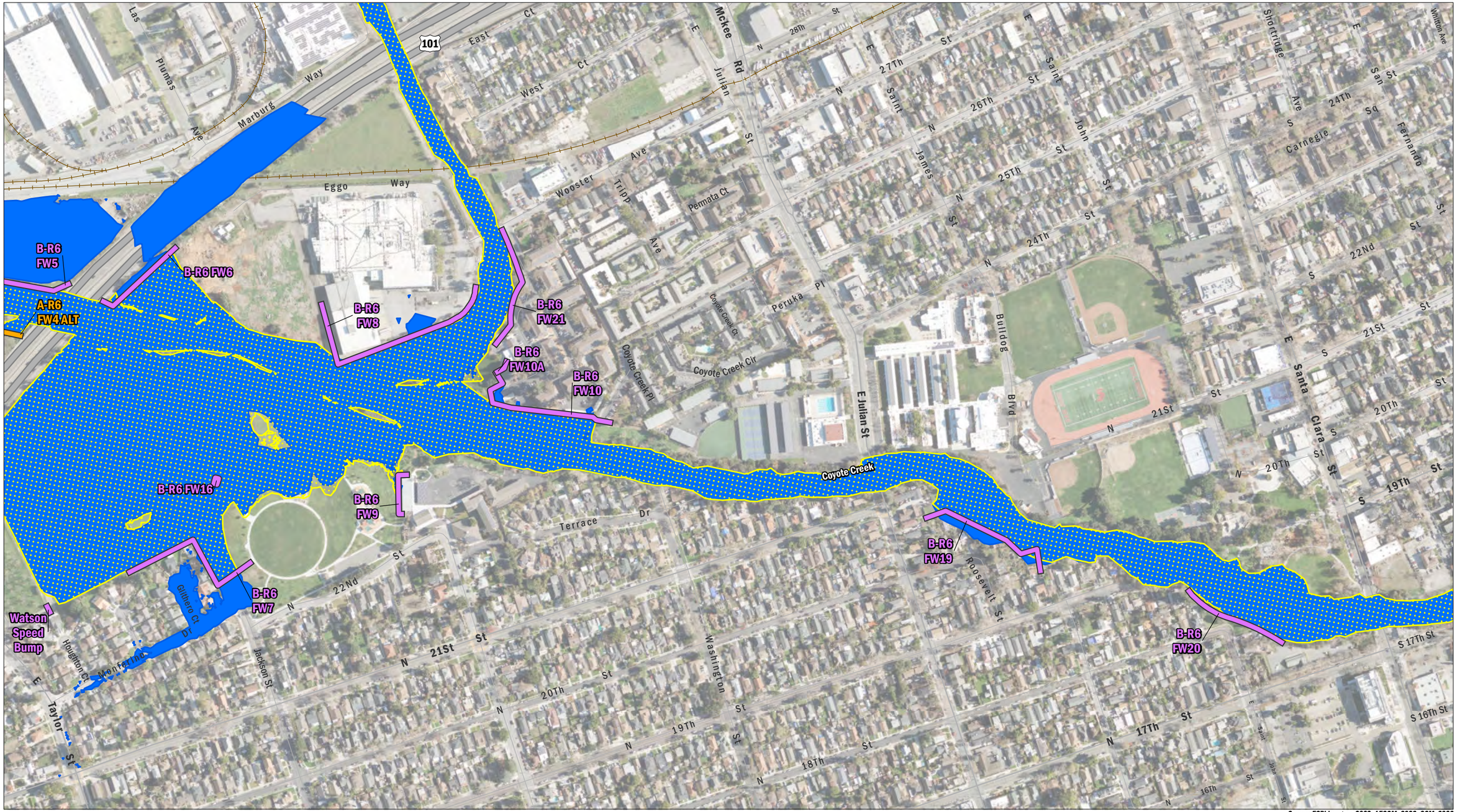


FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 3 of 11



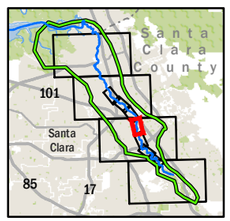
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Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Modeled Flood Extents
Operational Baseline Conditions
Post-Project Conditions



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FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Modeled Flood Extents

- Operational Baseline Conditions
- Post-Project Conditions

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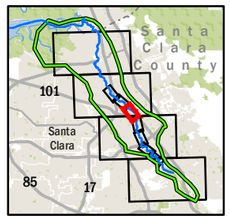
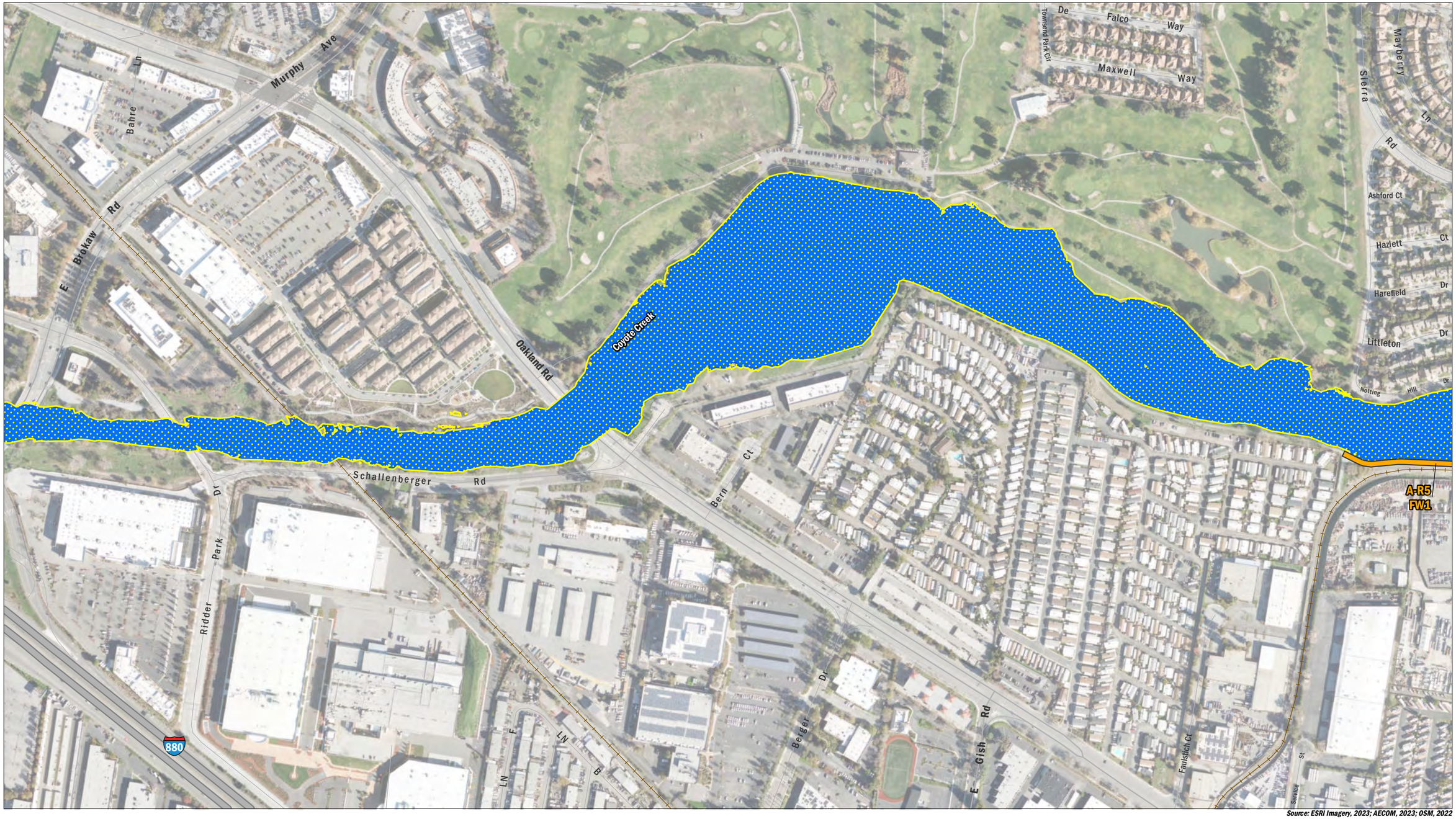


FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



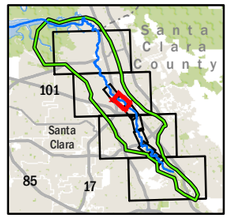
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Created Date: 6/10/2024

CCFMMP
Model Boundary

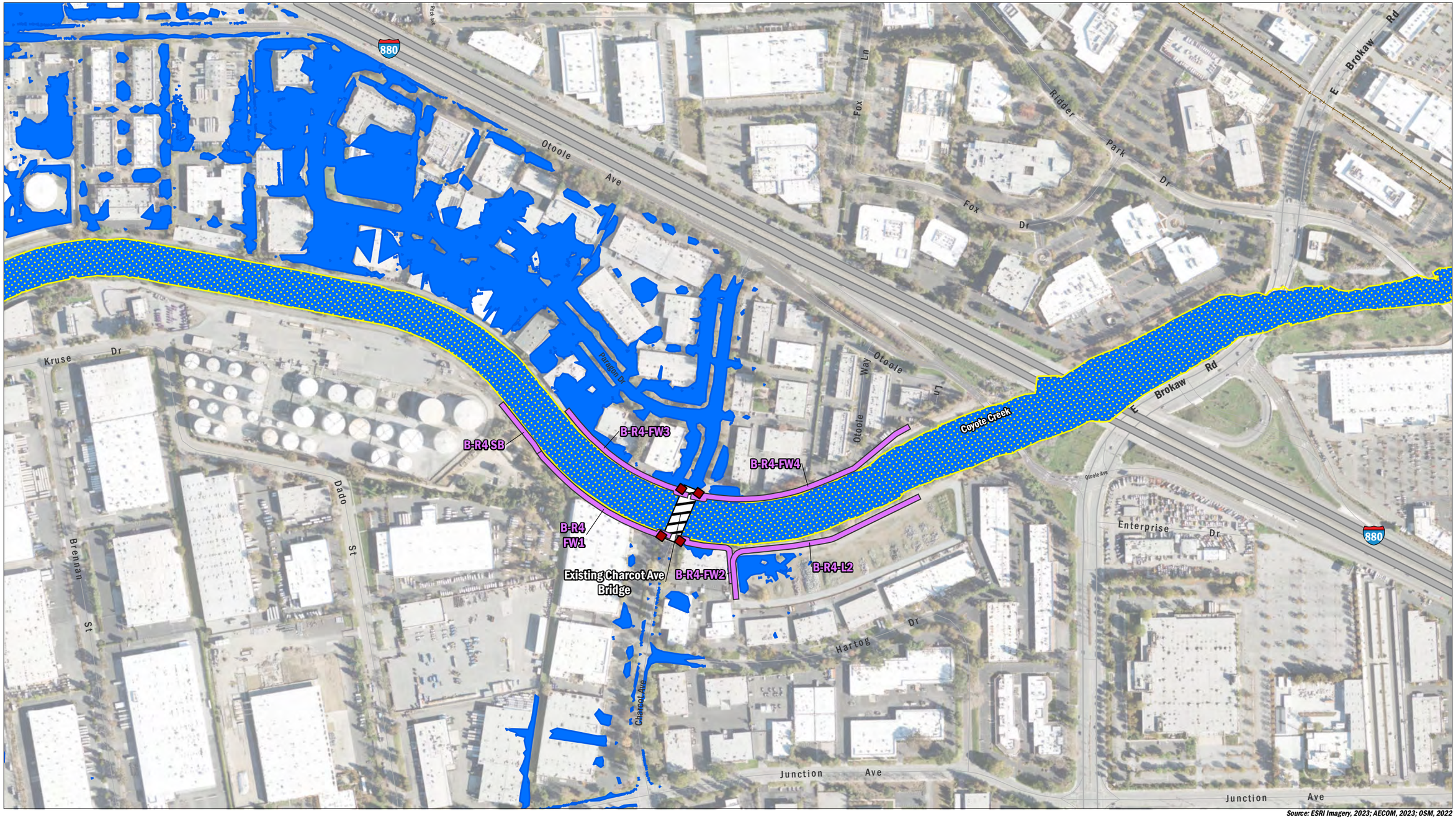
Modeled Flood Extents
Operational Baseline Conditions
Post-Project Conditions



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

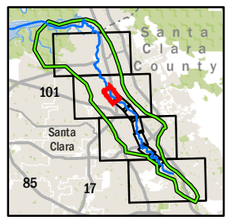
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Created Date: 6/10/2024

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Modeled Flood Extents

- Operational Baseline Conditions
- Post-Project Conditions



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Modeled Flood Extents
Operational Baseline Conditions
Post-Project Conditions

AECOM
Coyote Creek
EIR Modeling

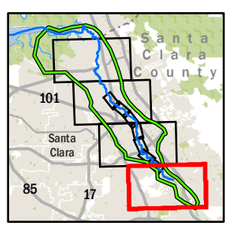
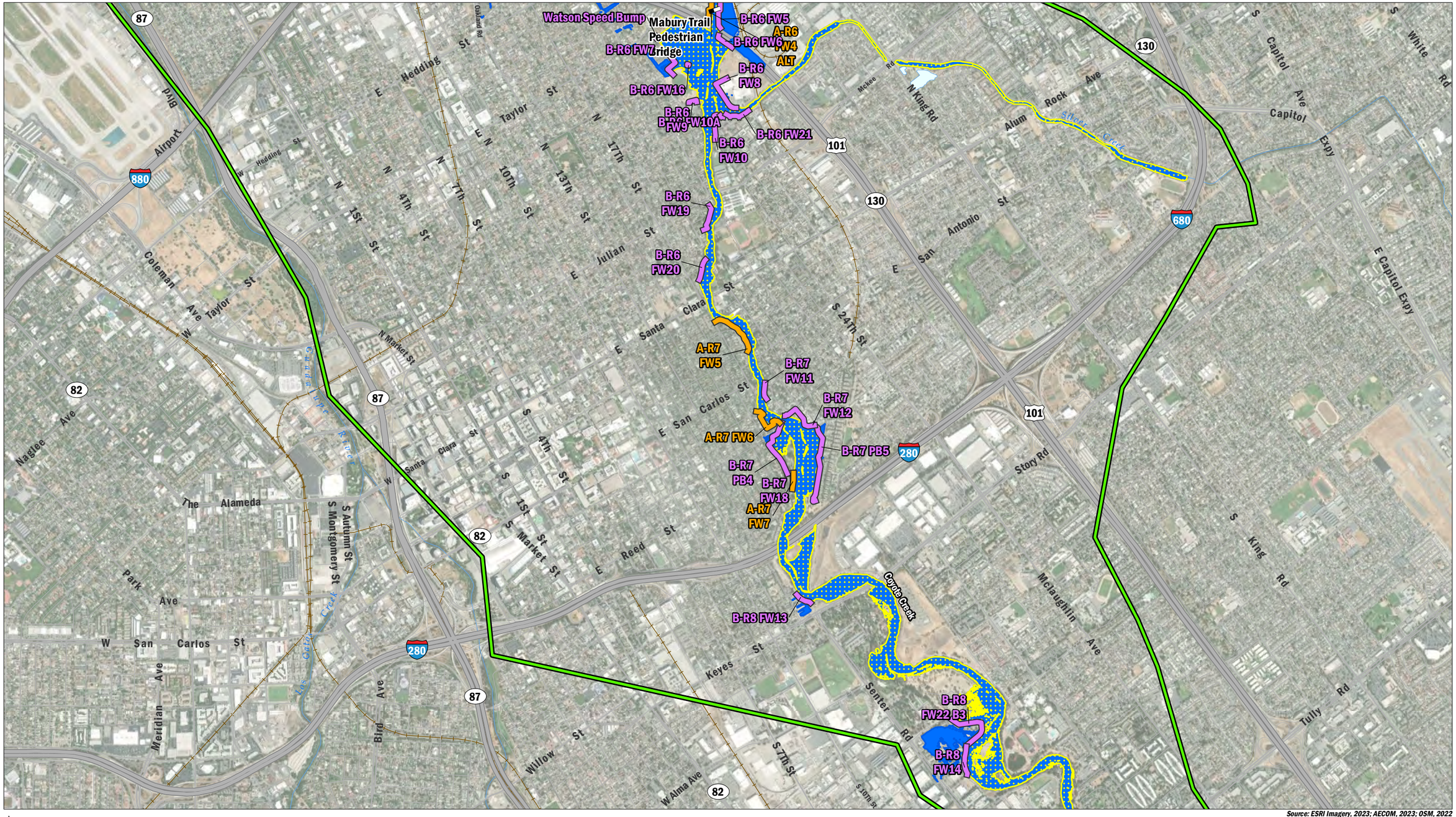


FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Modeled Flood Extents
- Operational Baseline Conditions
- Post-Project Conditions

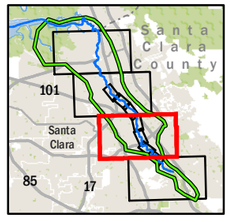
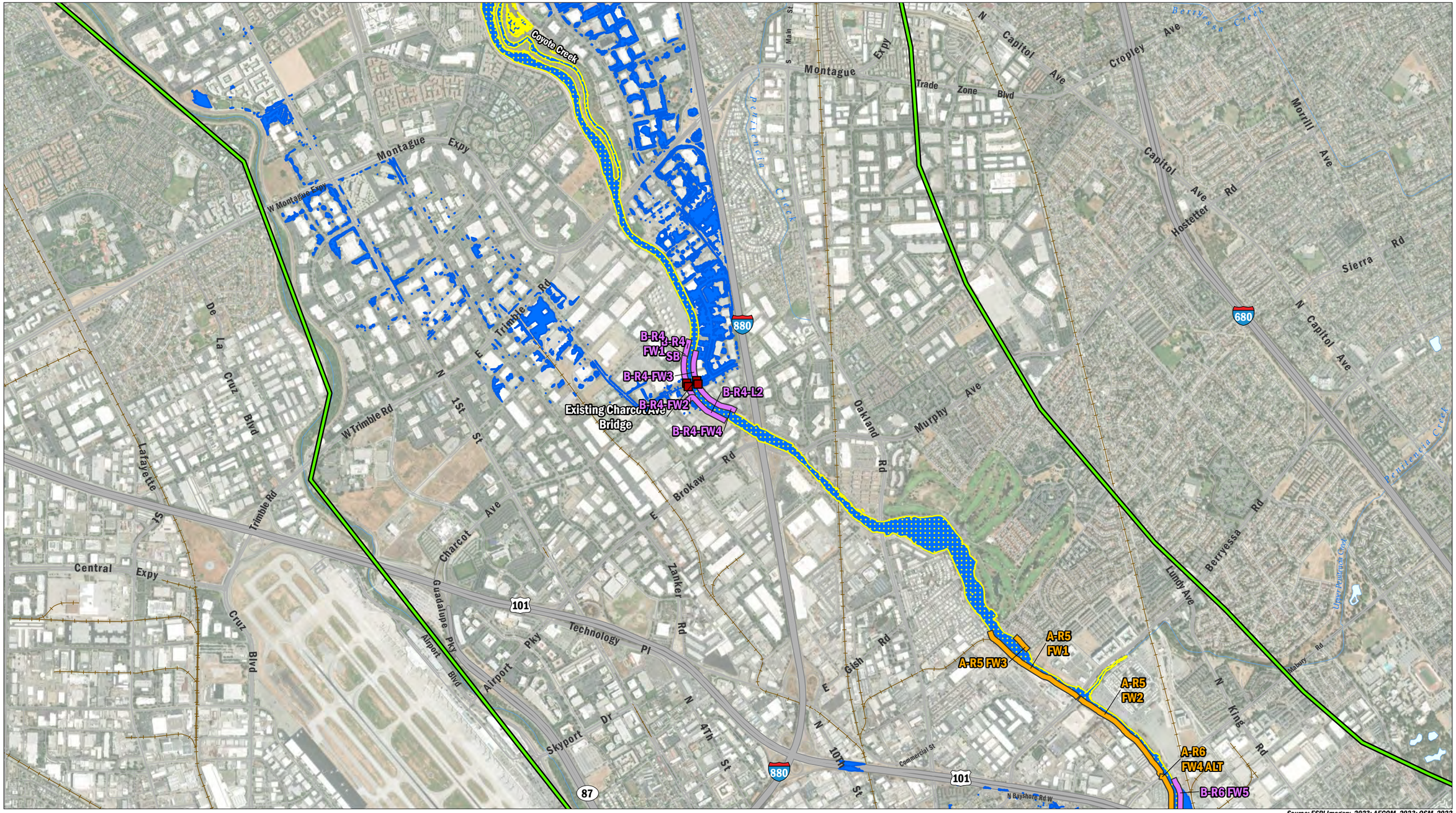


FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 9 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Modeled Flood Extents
- Operational Baseline Conditions
- Post-Project Conditions

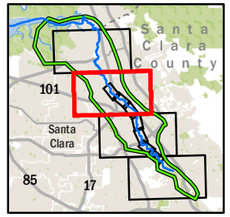
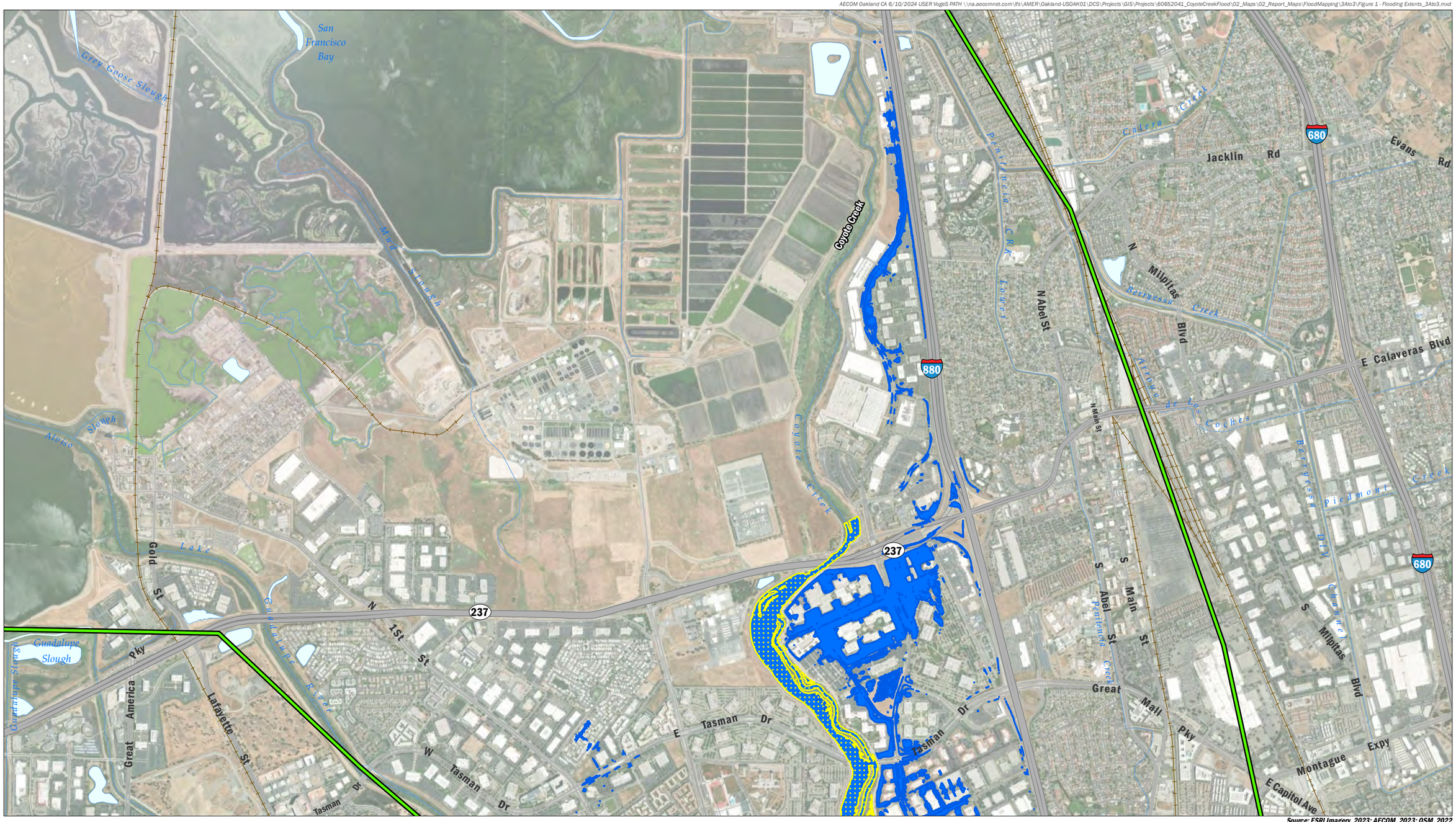


FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

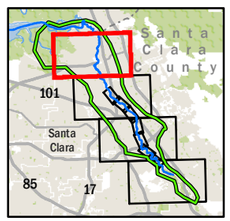
N

0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

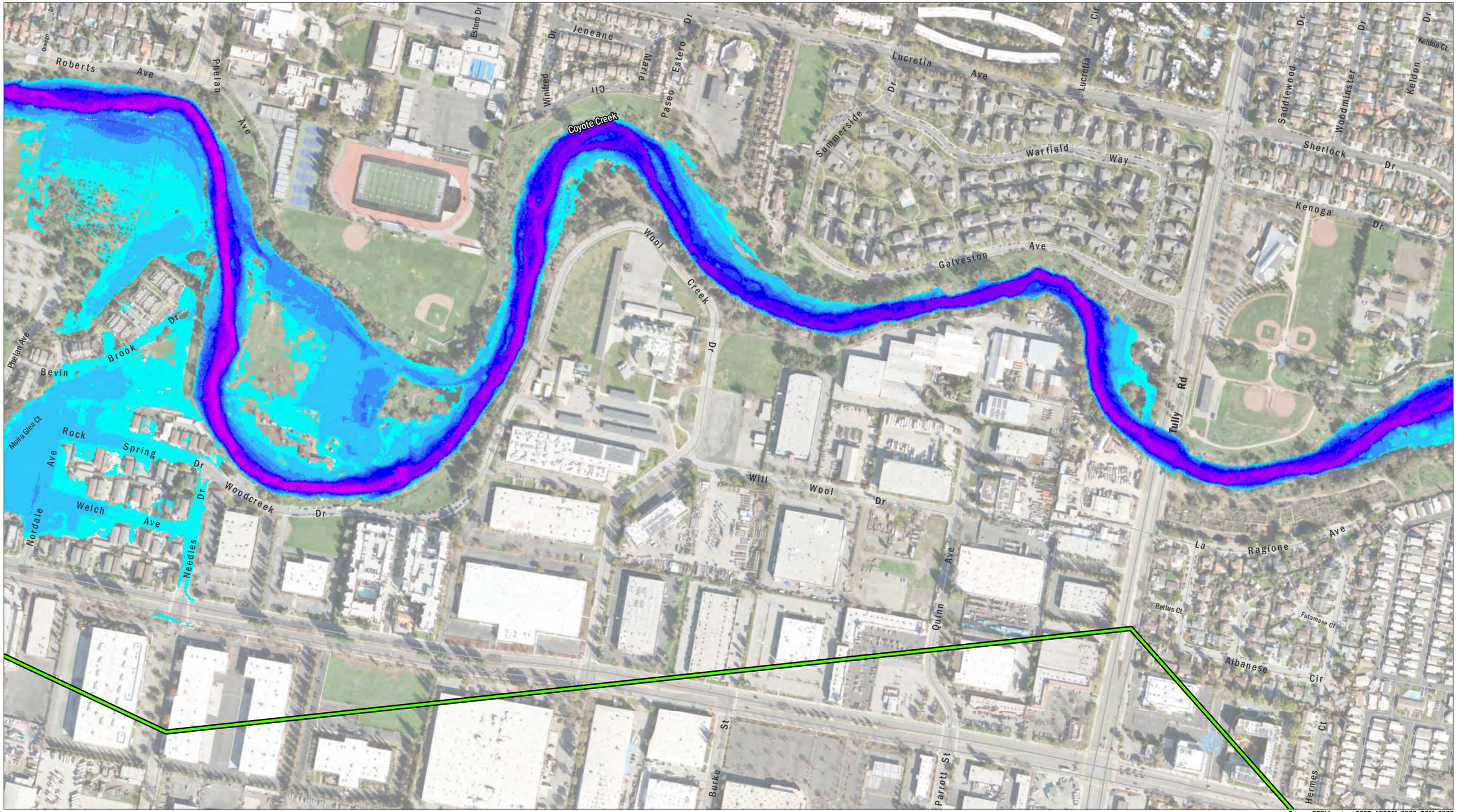
Modeled Flood Extents
- Operational Baseline Conditions
- Post-Project Conditions



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

Model Boundary

Maximum Water Depth Operational Baseline Conditions

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

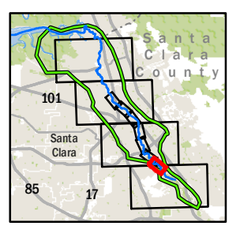
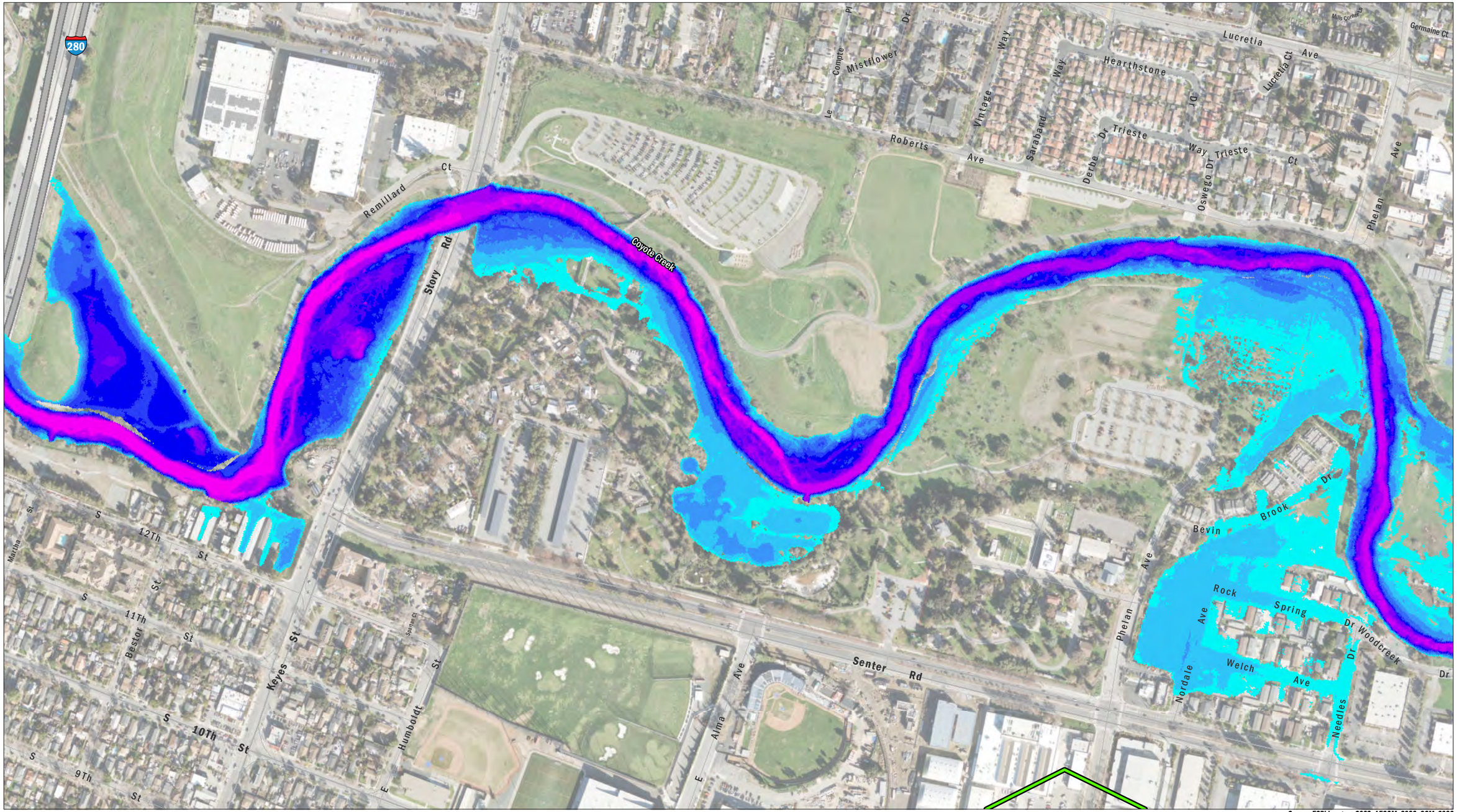


FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

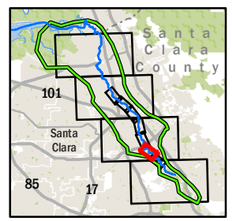
Created Date: 5/29/2024

Model Boundary

Maximum Water Depth Operational Baseline Conditions

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

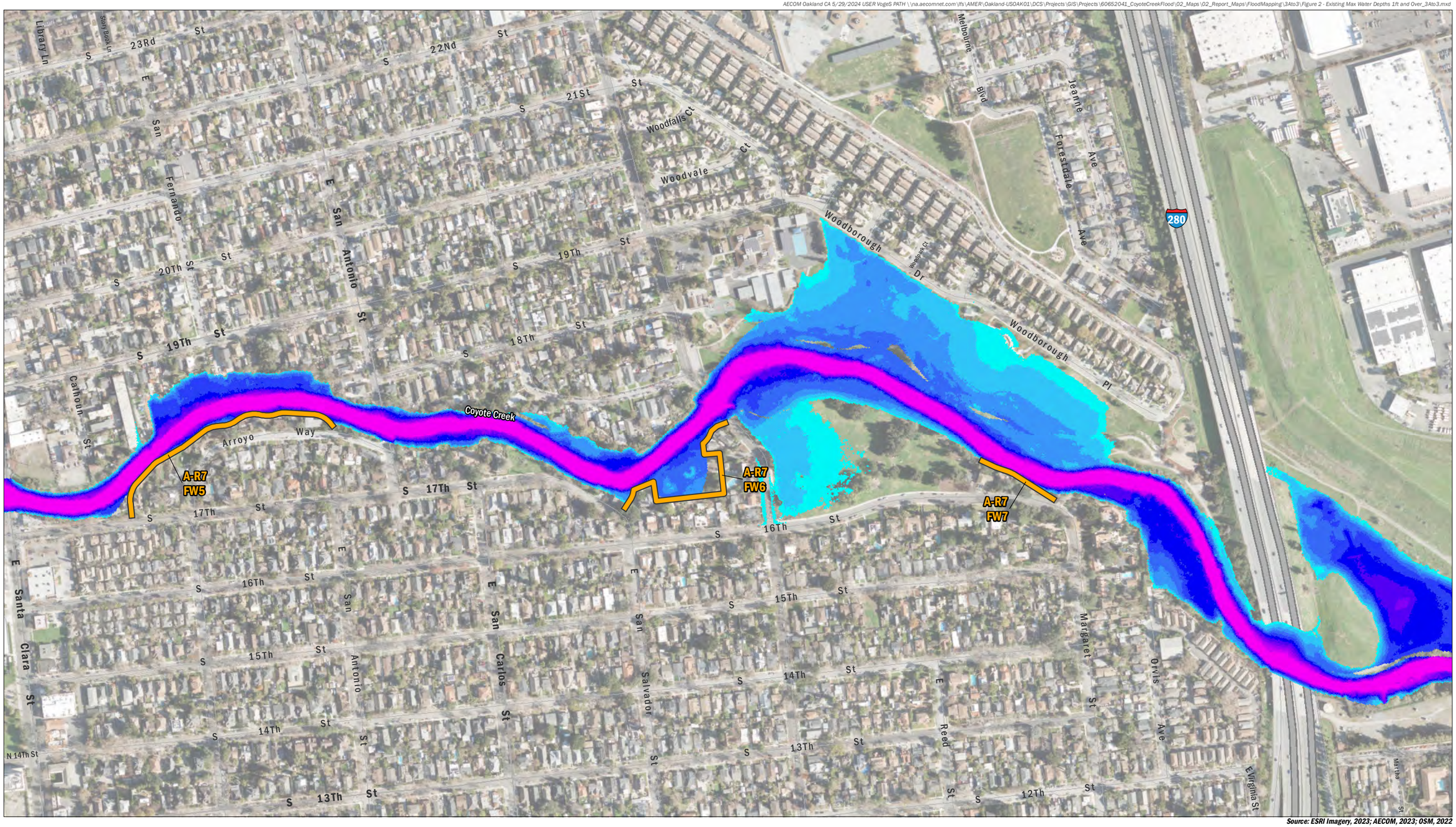


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Water Depth Operational Baseline Conditions
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

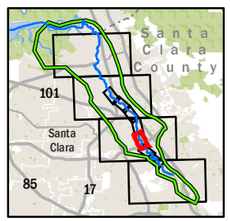
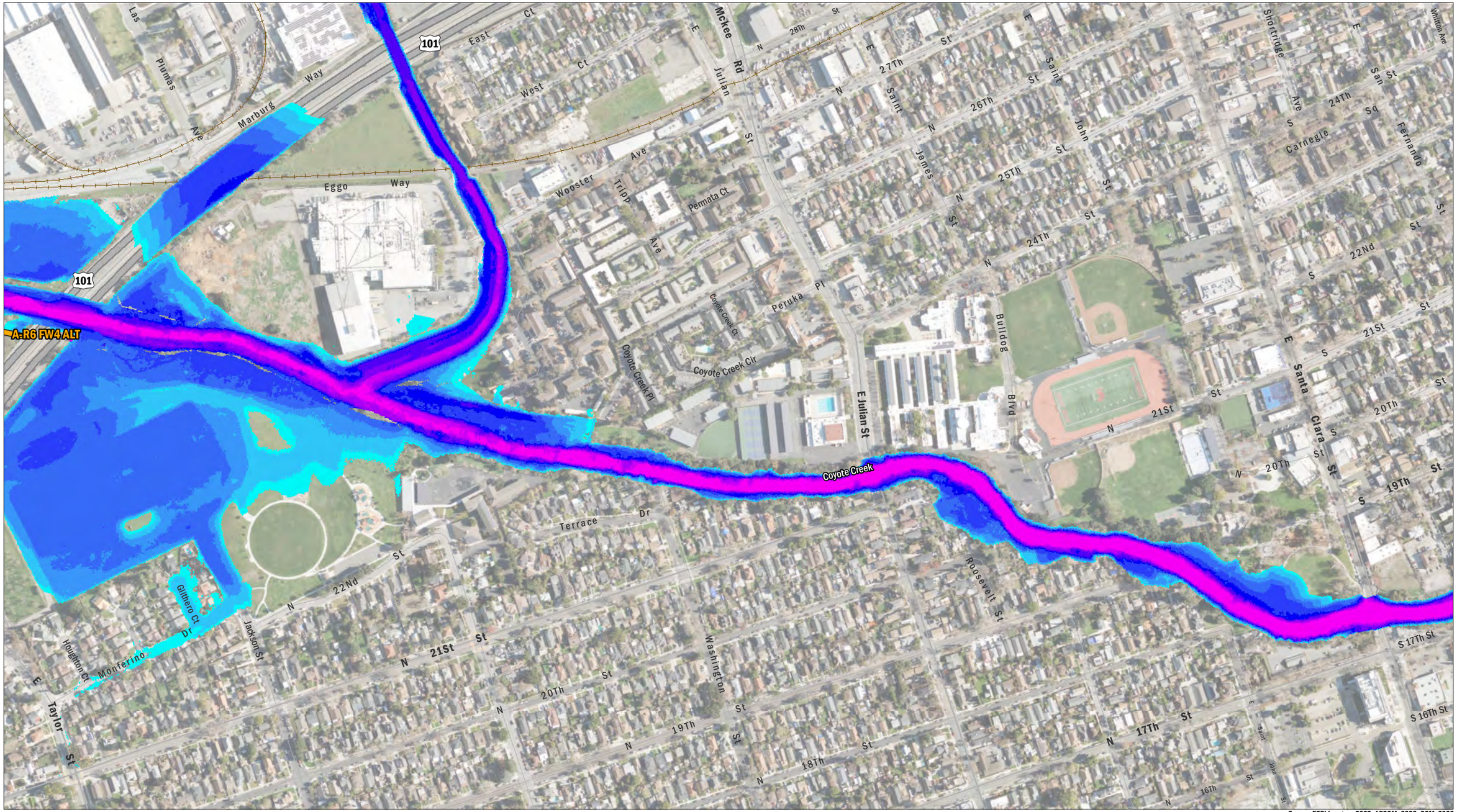


FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Water Depth Operational Baseline Conditions
Depth (ft)
- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

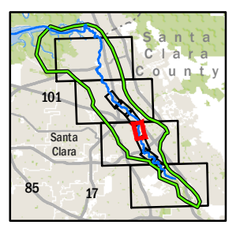
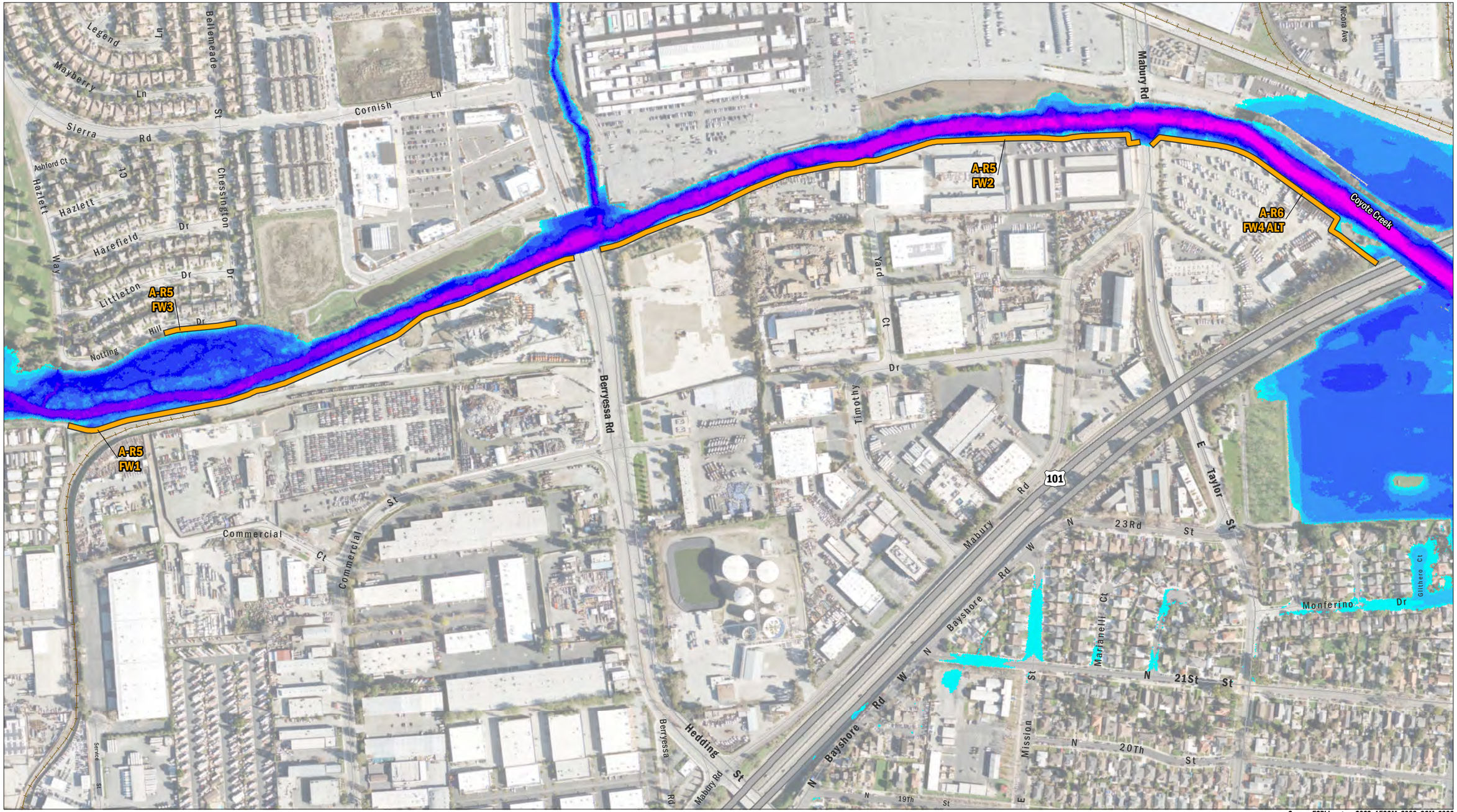


FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Water Depth Operational Baseline Conditions
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

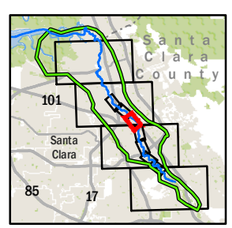
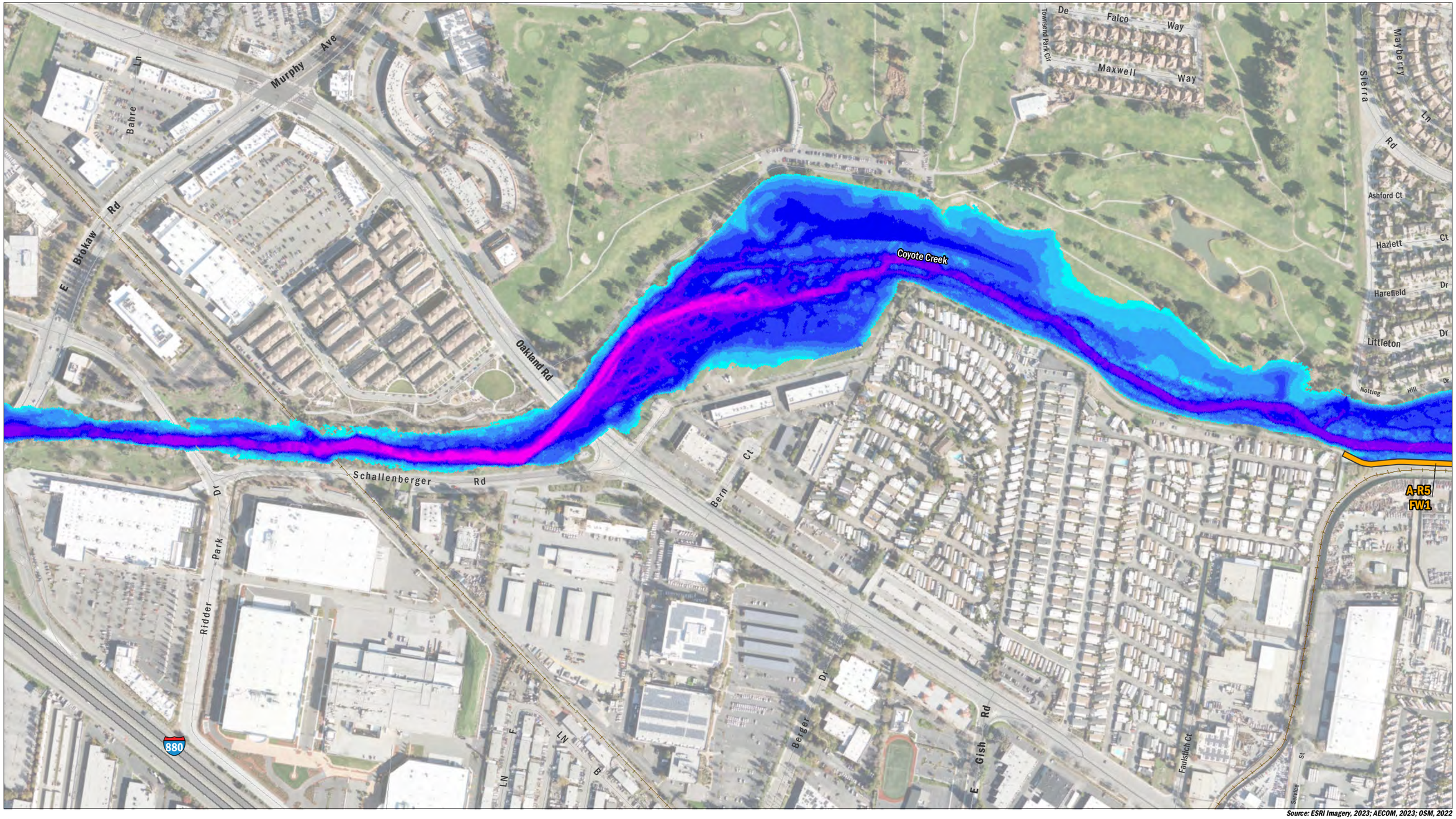


FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

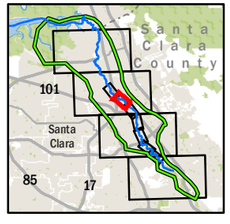
CCFMMP

Model Boundary

Maximum Water Depth Operational Baseline Conditions

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

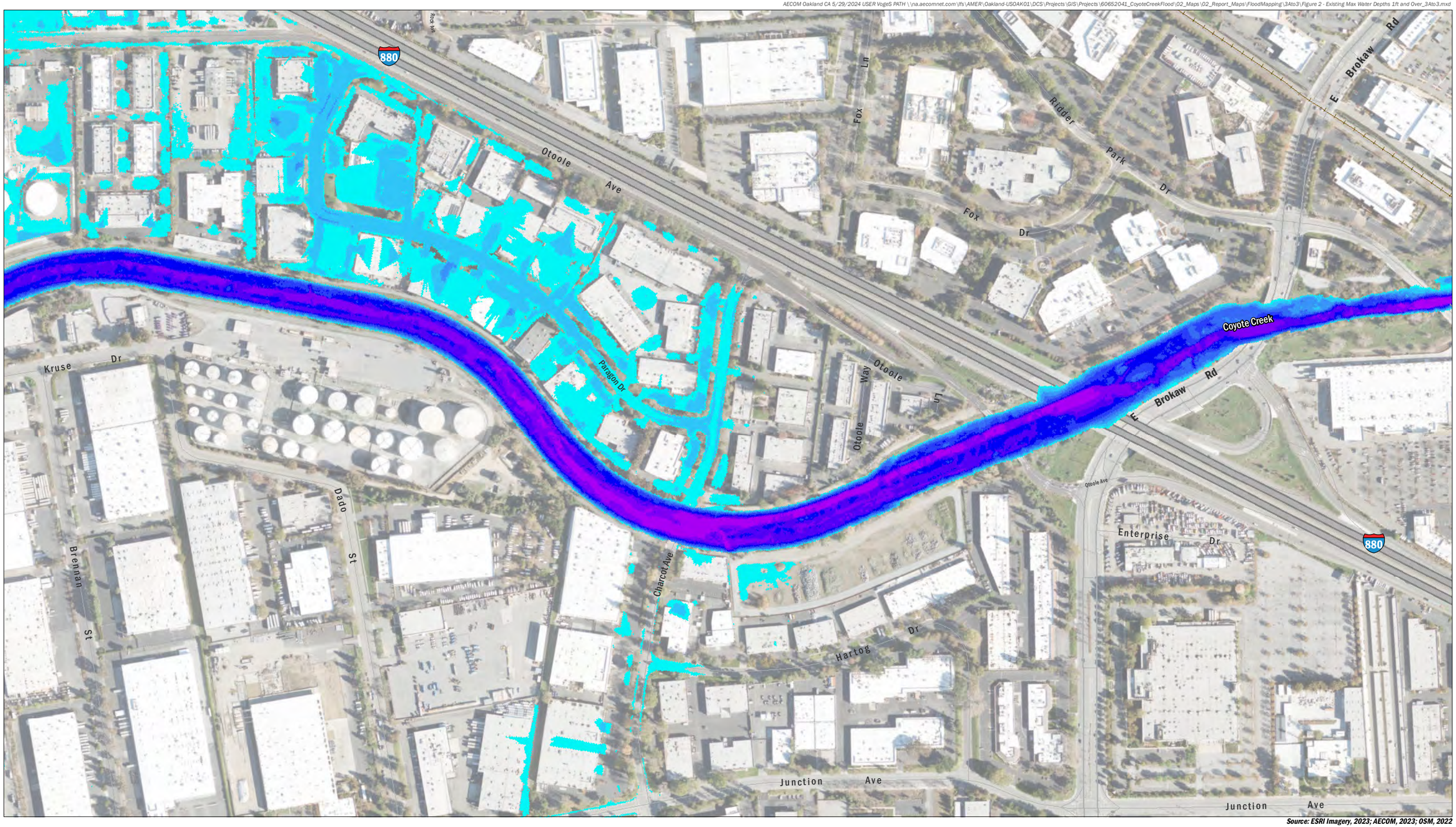


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

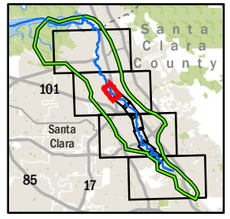
Created Date: 5/29/2024

Model Boundary

Maximum Water Depth Operational Baseline Conditions

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Operational Baseline Conditions

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

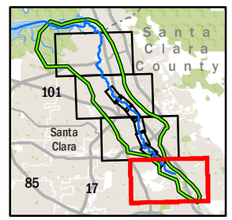
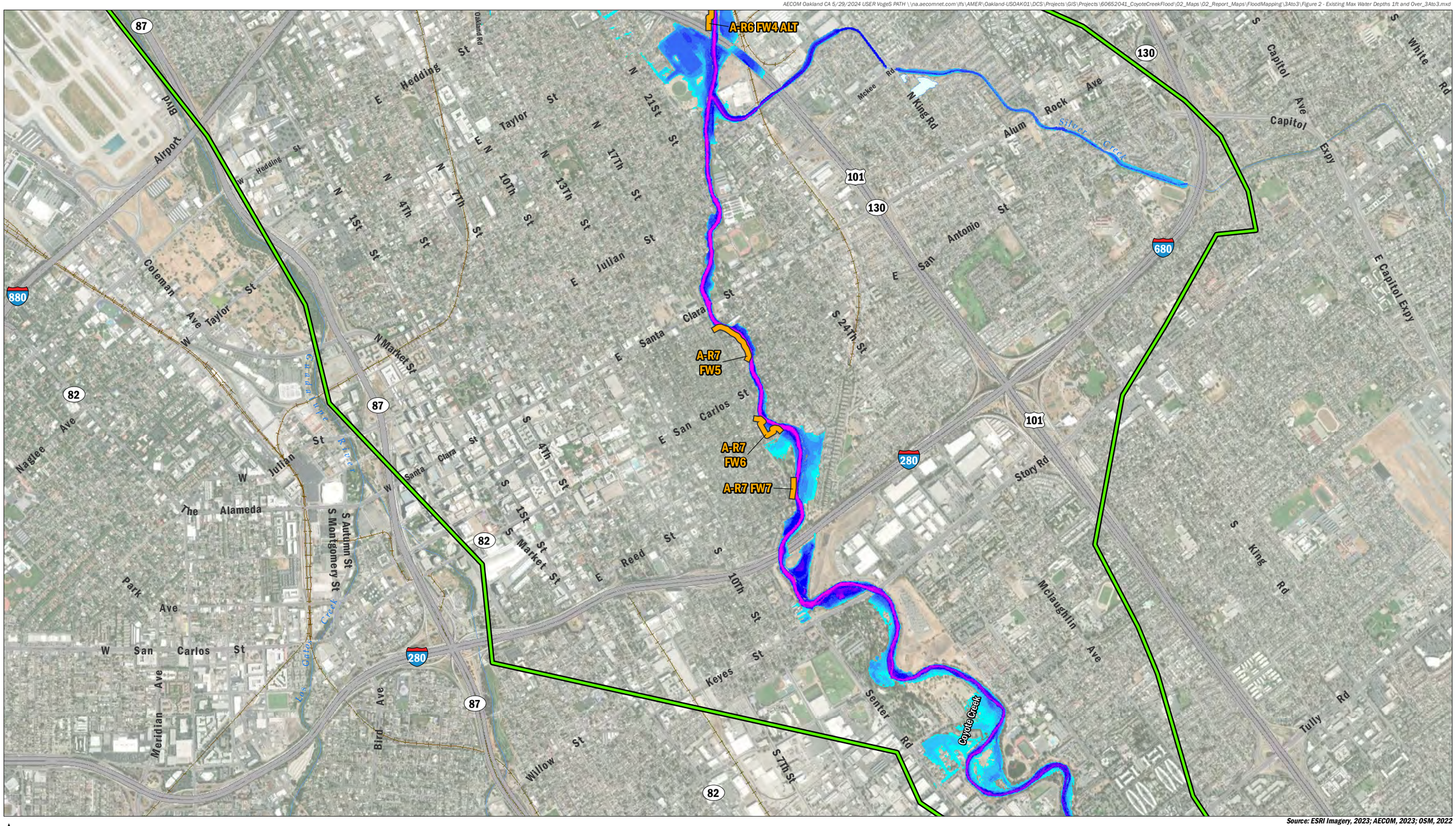


FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Water Depth Operational Baseline Conditions
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

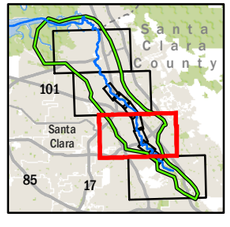
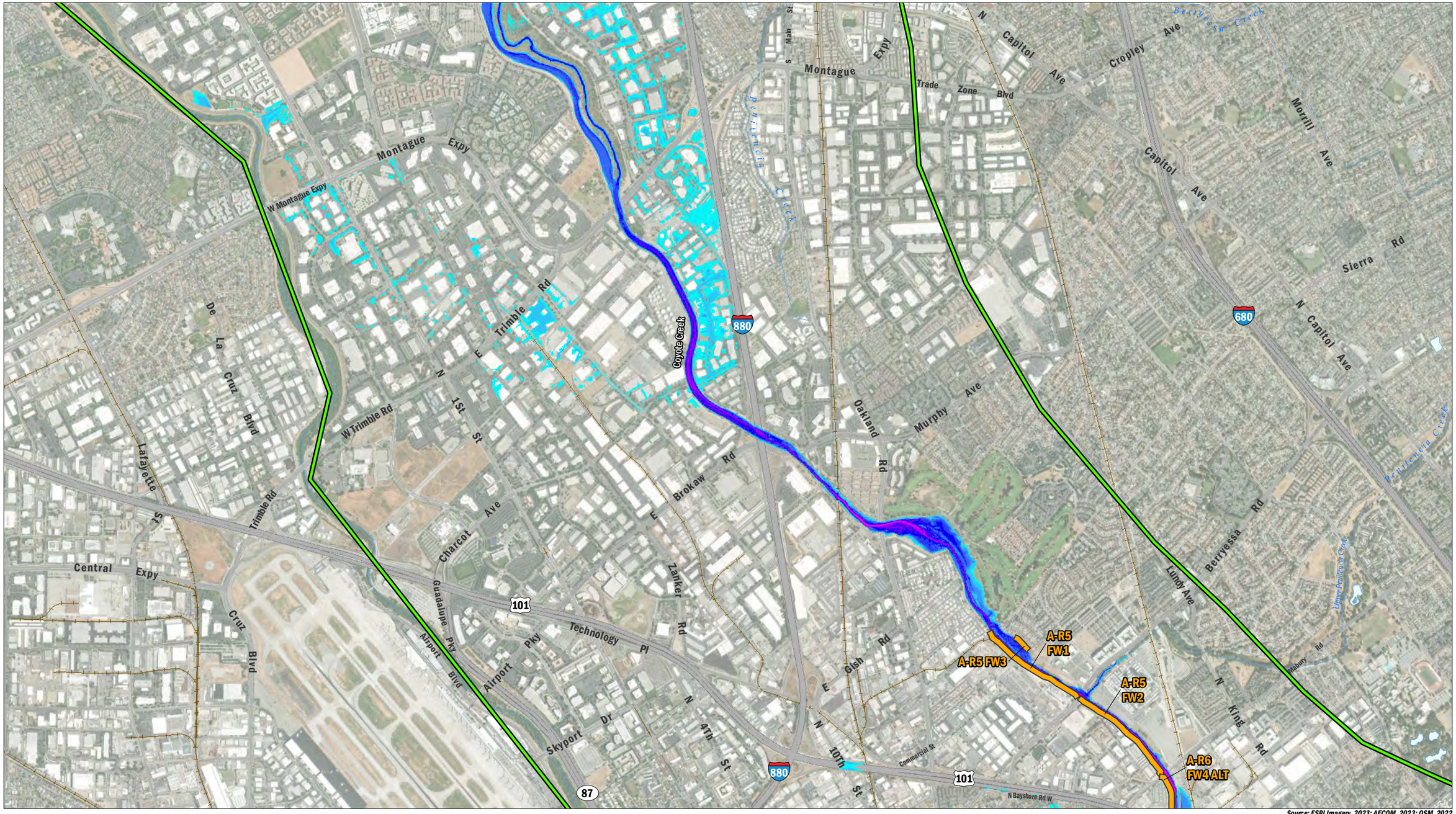


FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Water Depth Operational Baseline Conditions
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

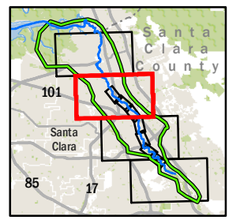


FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 5/29/2024

Model Boundary

Maximum Water Depth Operational Baseline Conditions

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 27.2

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

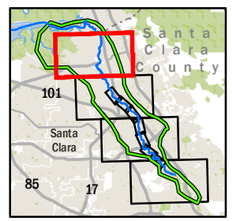
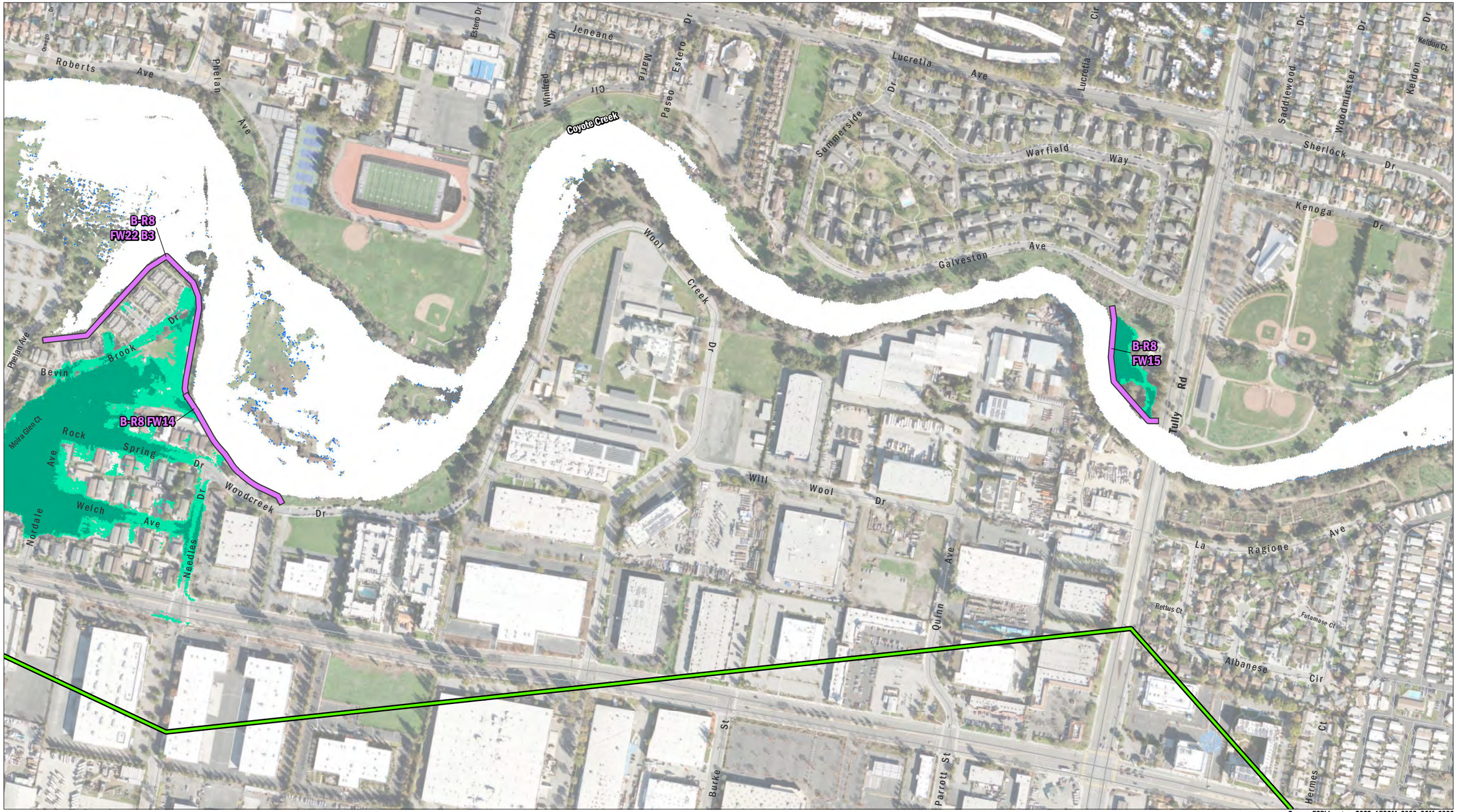


FIGURE 2

Existing Max. Water Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions
Depth (ft)

- -6.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

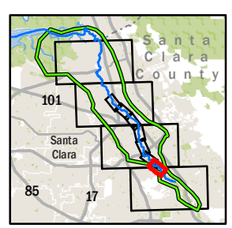


FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

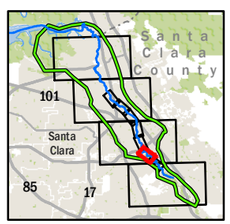
CCFPP

Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

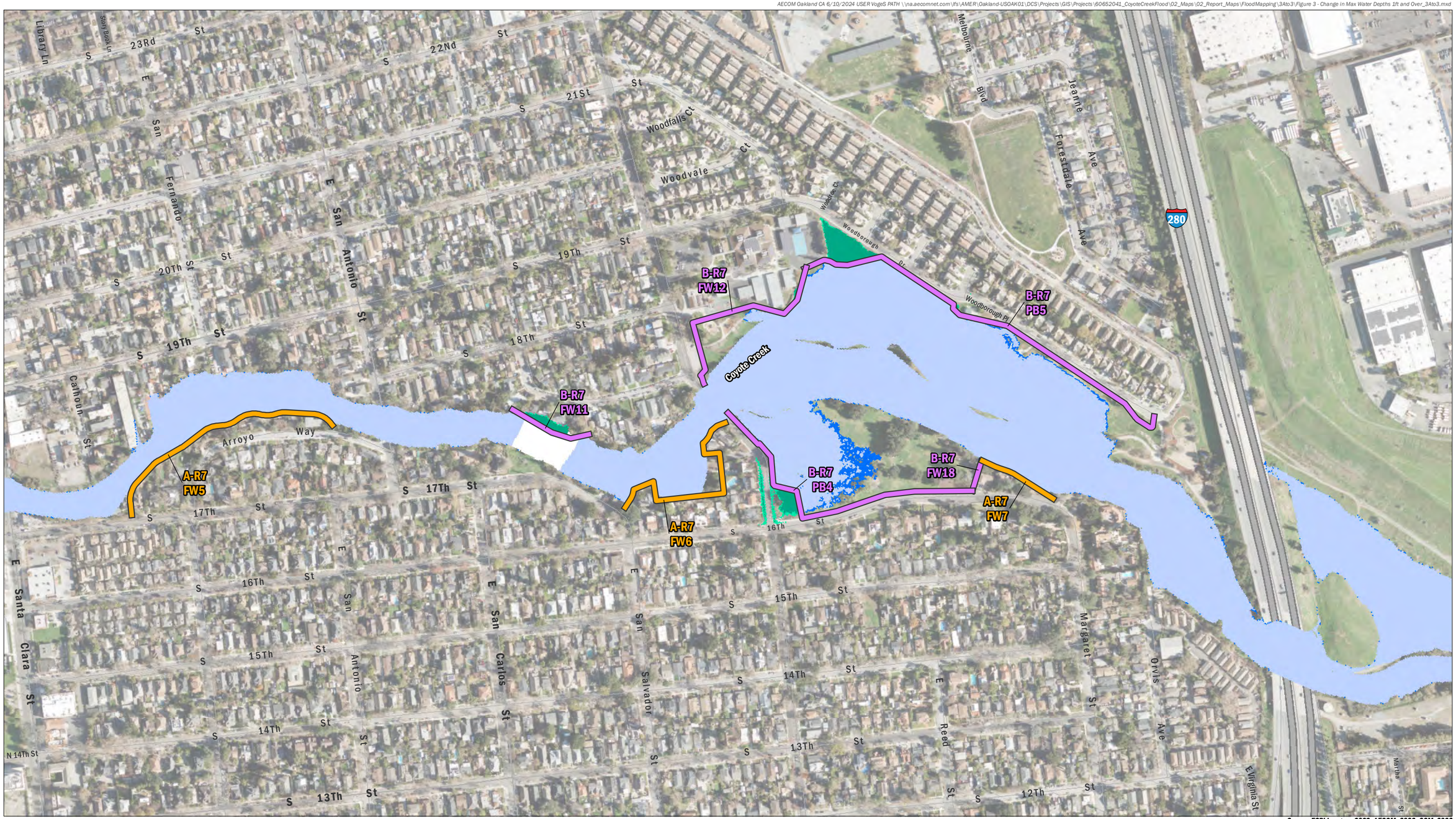


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

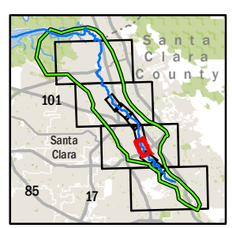
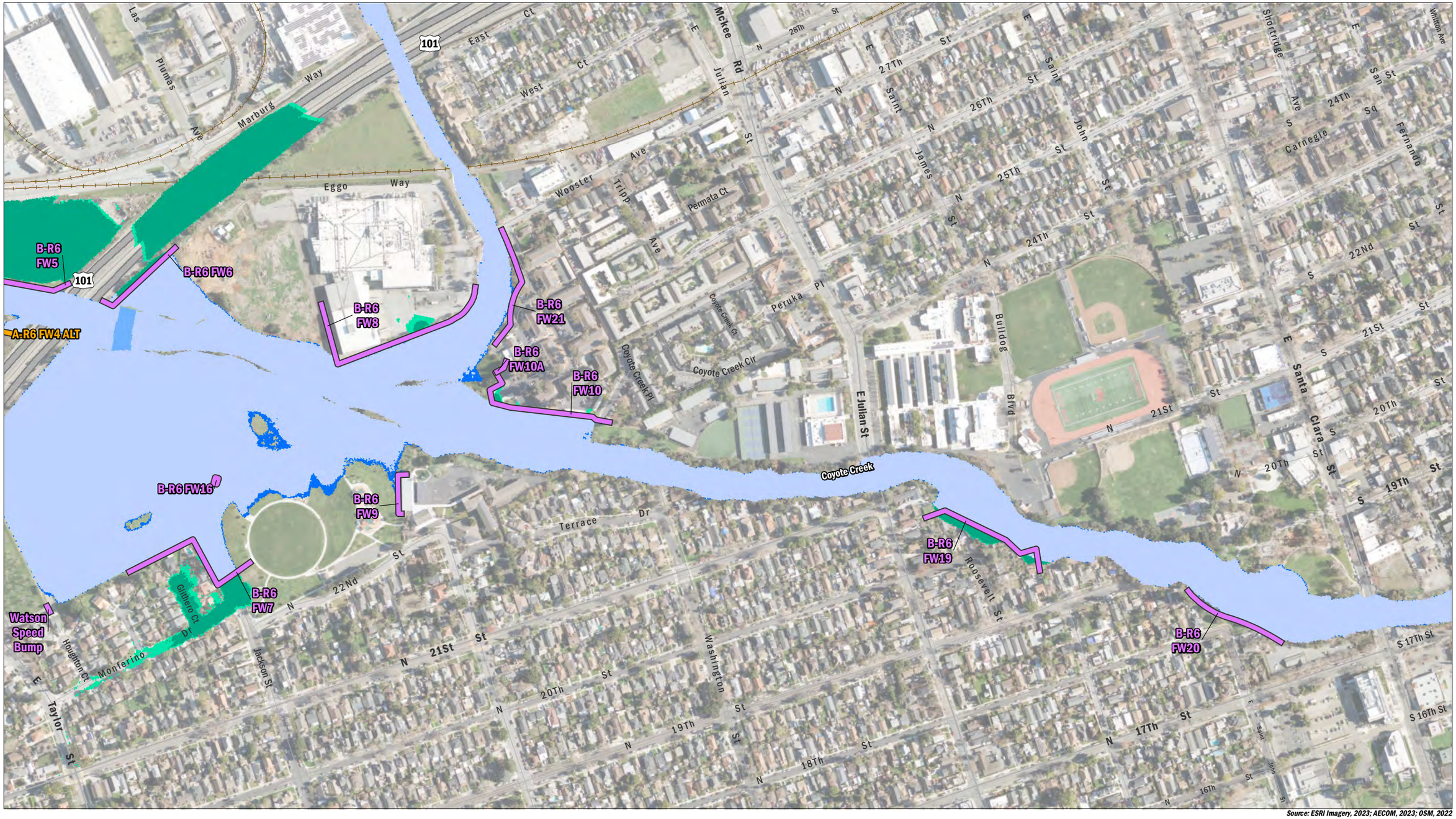


FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

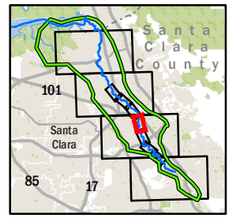


FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

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- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

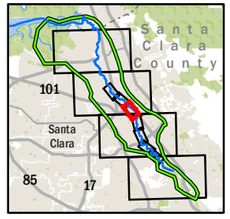


FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP

Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
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AECOM
Coyote Creek
EIR Modeling

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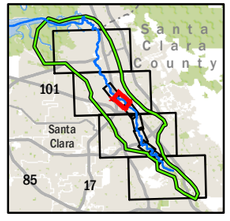
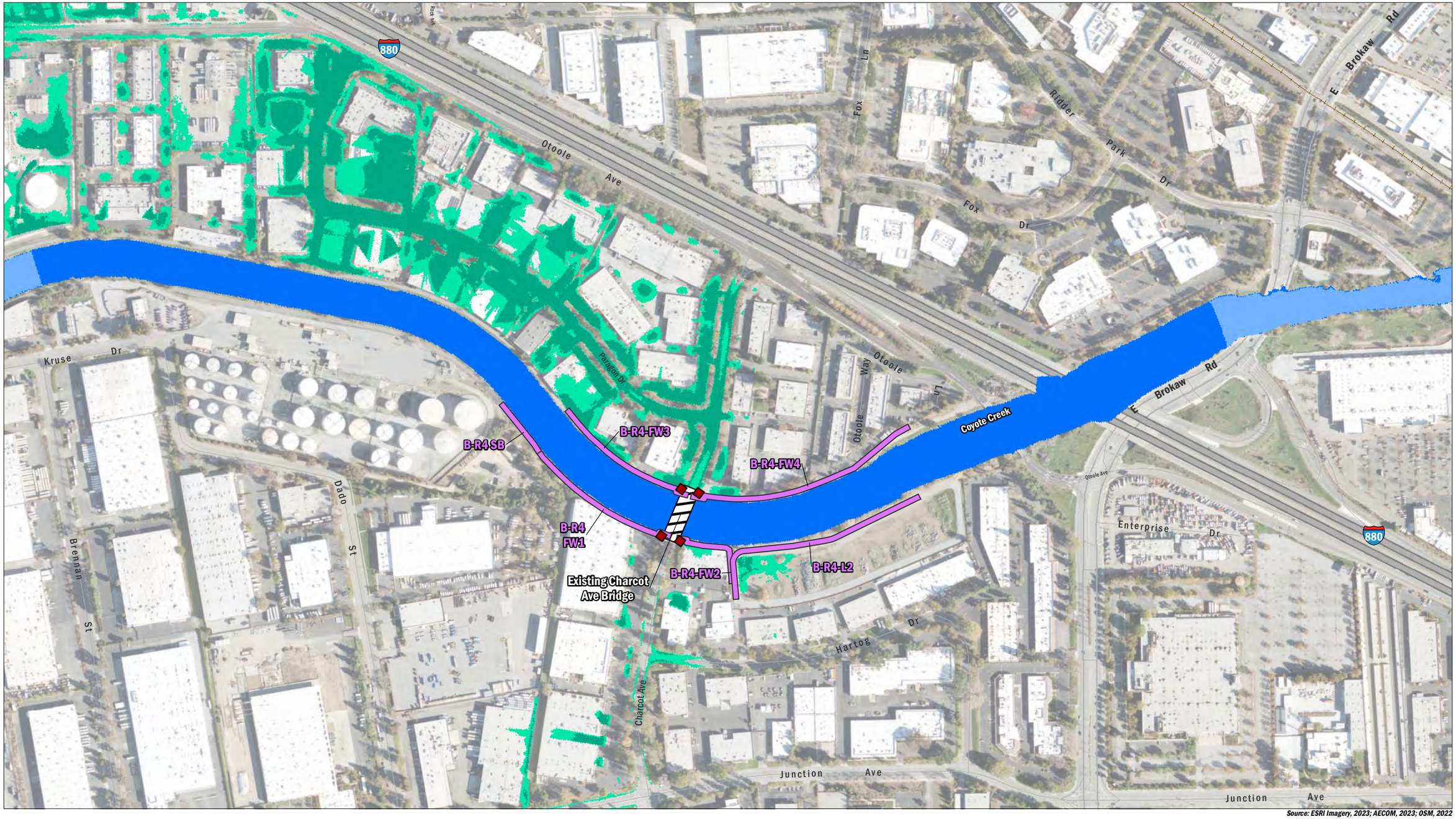


FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

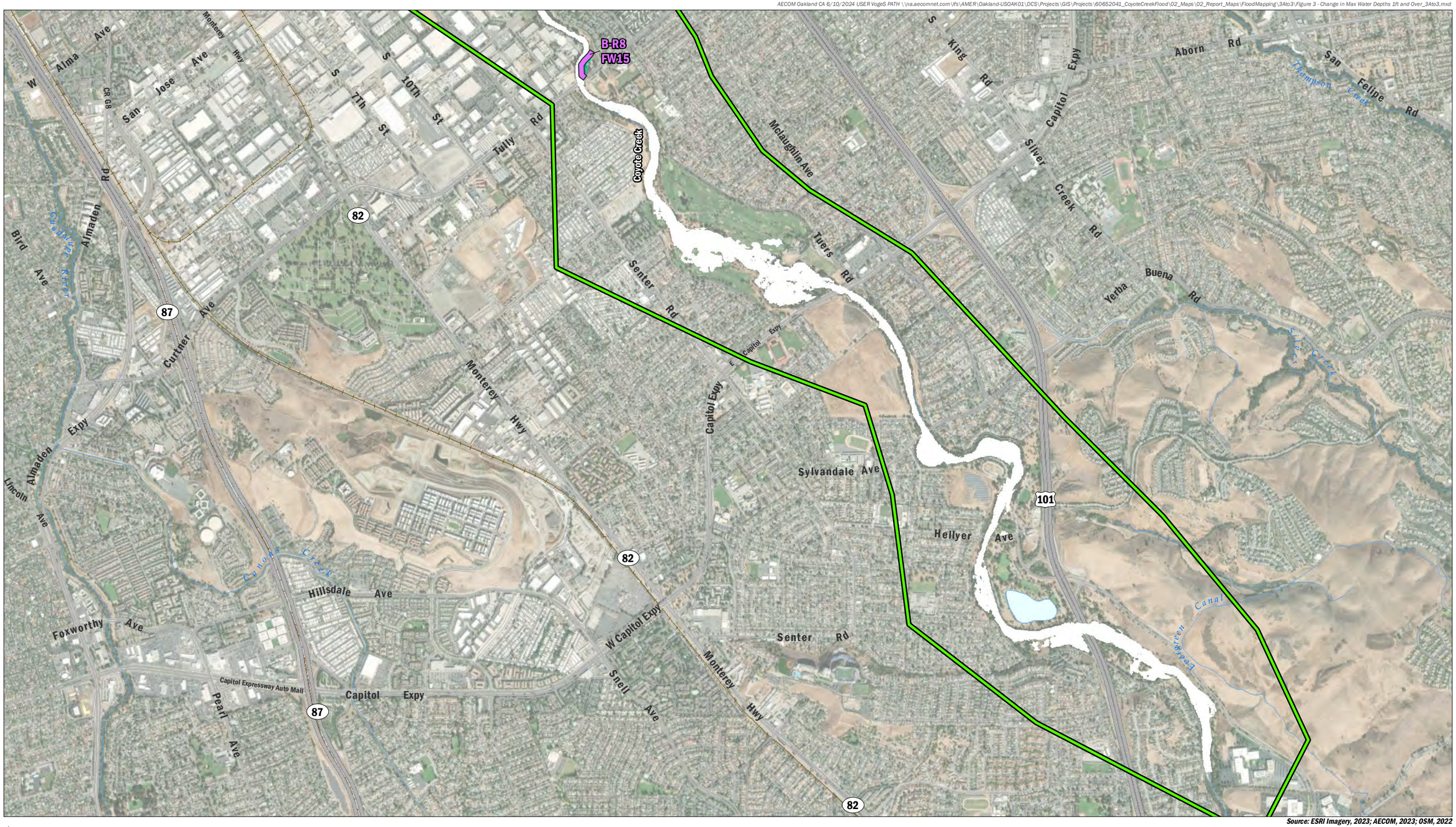
Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1.5
- -1.5 - -1
- -1 - -0.5
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- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

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CCFPP
Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

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- -1.5 - -1
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- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

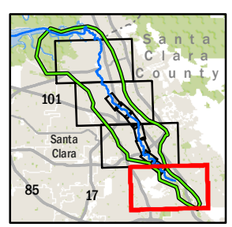
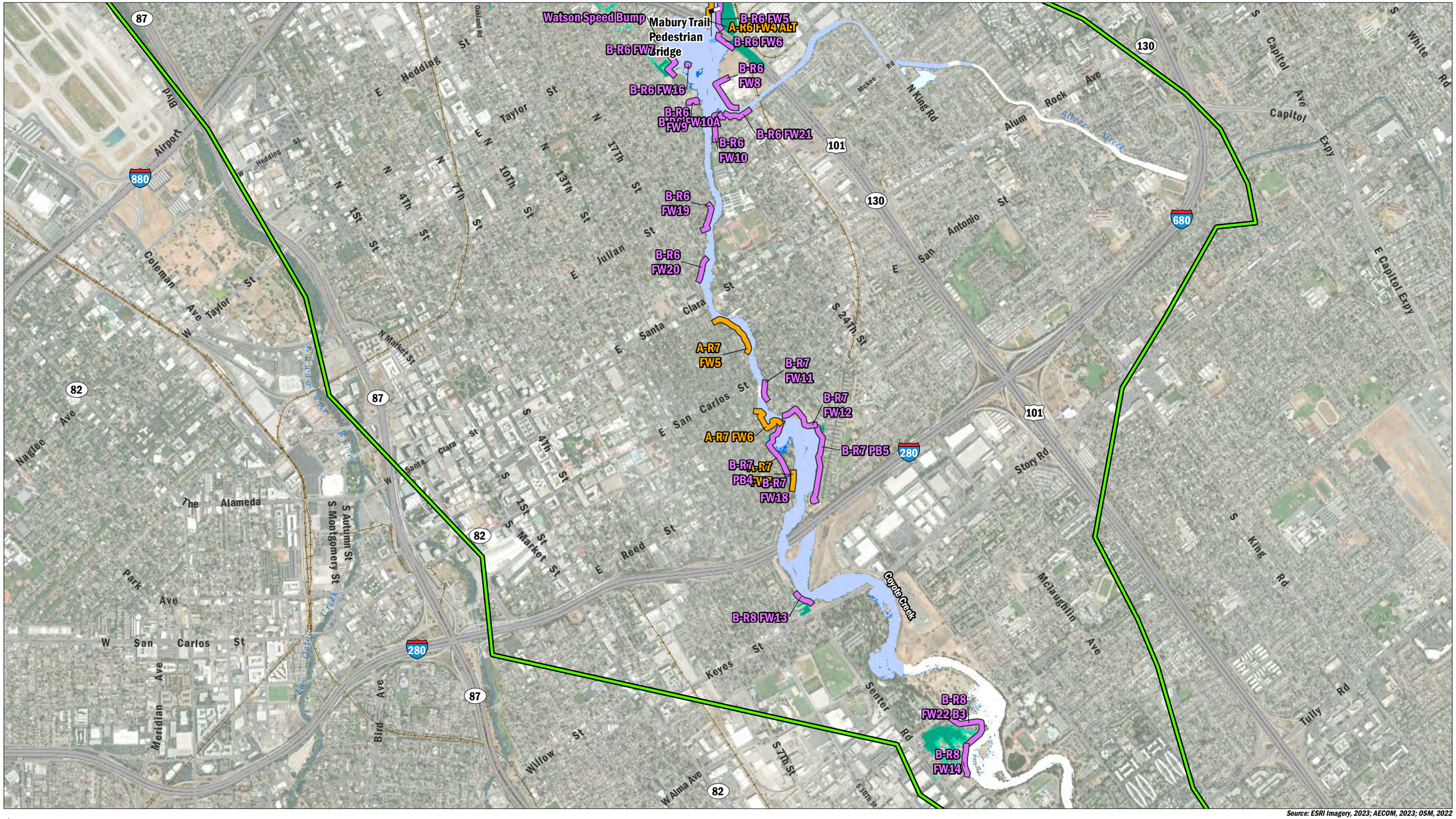


FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

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- CCFMMP
- CCFPP
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- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

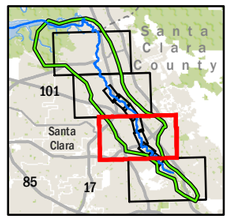
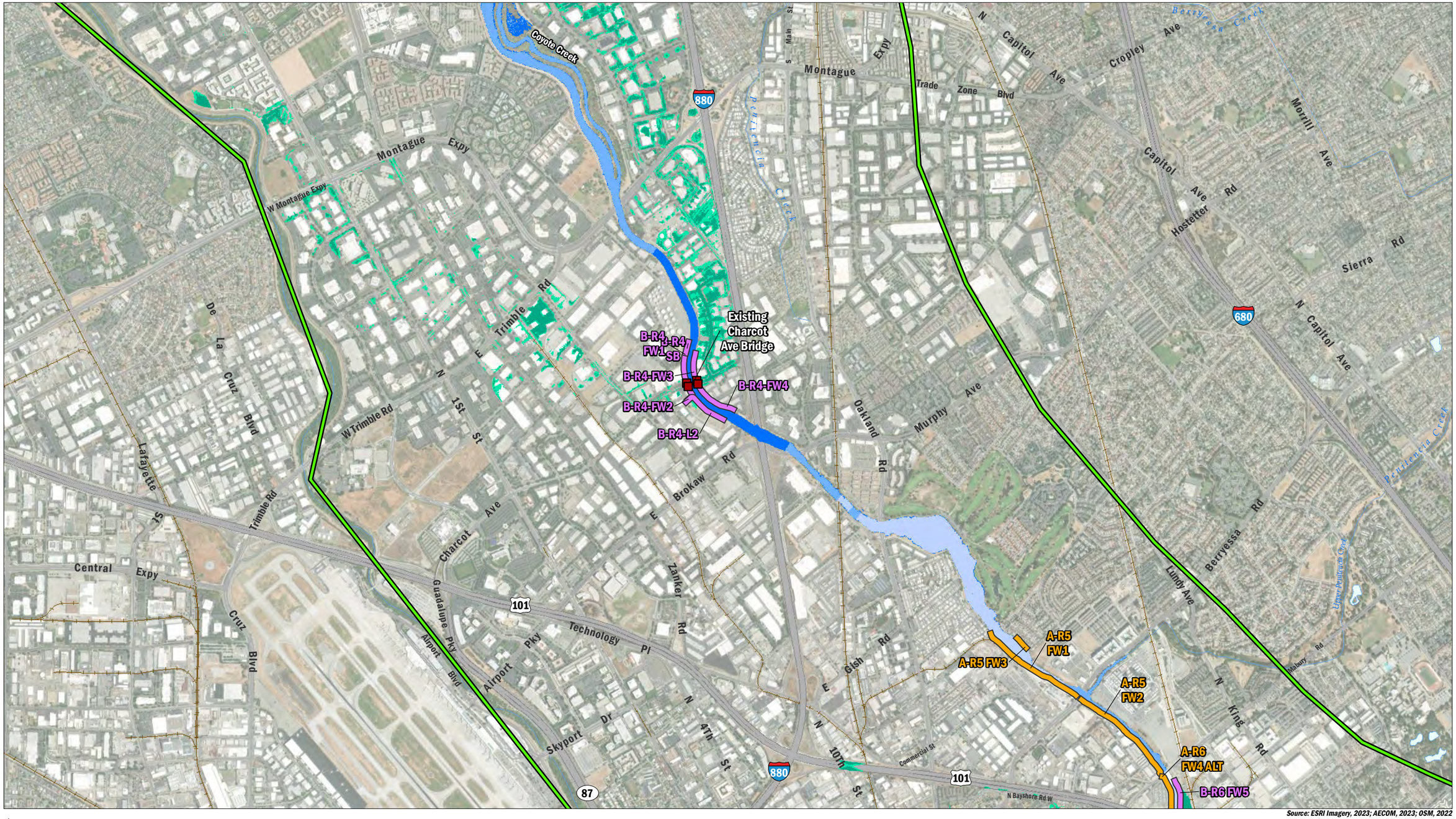


FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

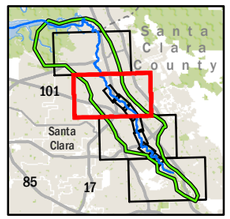


FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions

AECOM Oakland CA 6/10/2024 USER VogeS PATH \\na.aecomnet.com\fs\AMER\Oakland-USOAK01\DCS\Projects\GIS\Projects\60652041_CoyoteCreekFlood\02_Maps\02_Report_Maps\FloodMapping\3Ato3\Figure 3 - Change in Max Water Depths 1ft and Over_3Ato3.mxd



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

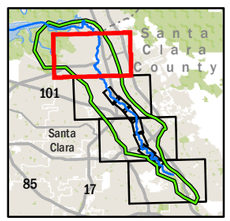
Created Date: 6/10/2024

Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

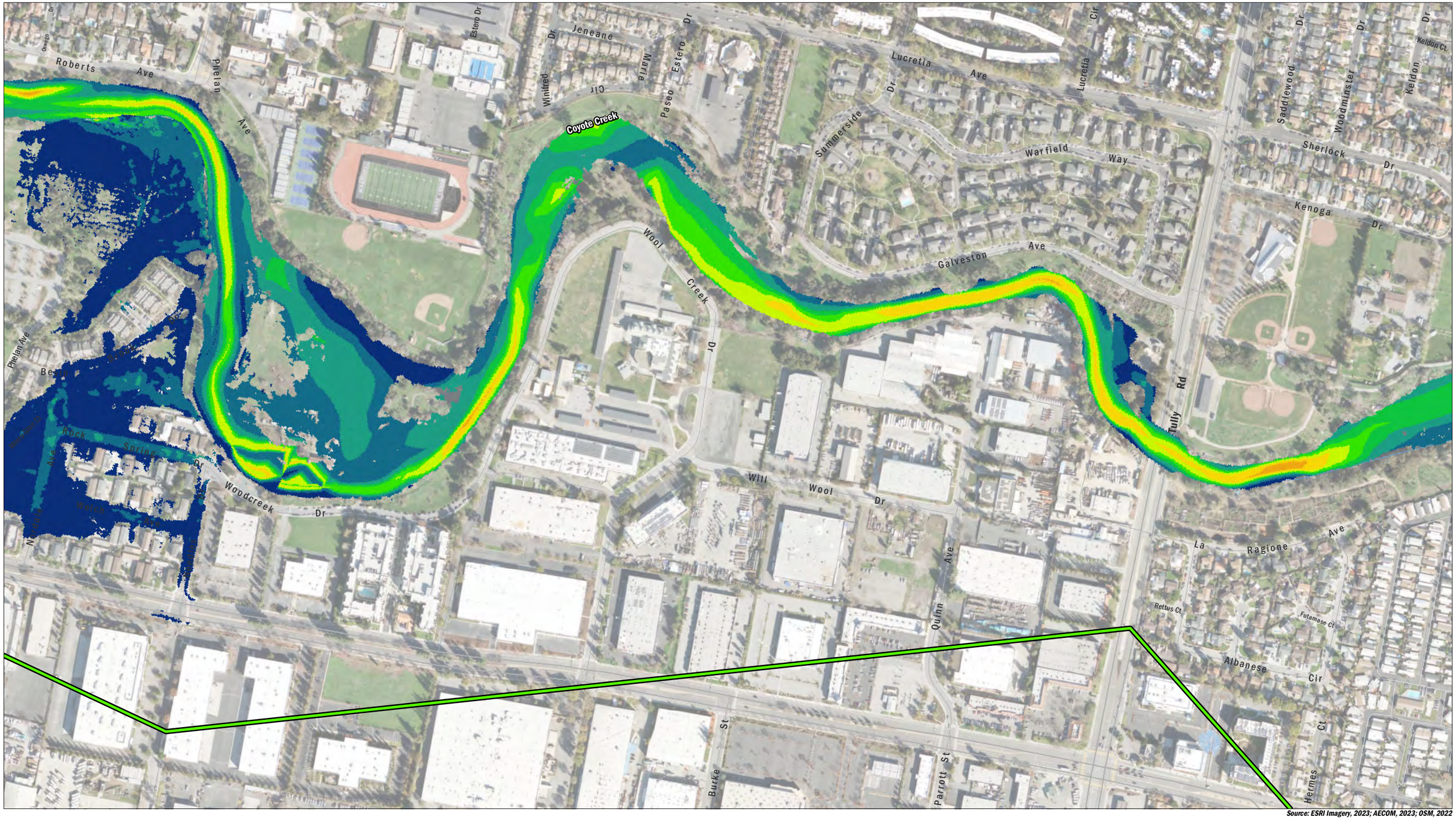


AECOM
Coyote Creek
EIR Modeling

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FIGURE 3

Change in Max. Water Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

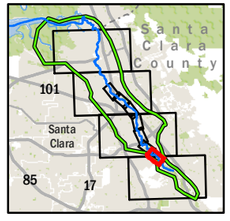
Created Date: 5/29/2024

Model Boundary

Maximum Velocity Operational Baseline Conditions

Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 14.8



AECOM
Coyote Creek
EIR Modeling

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FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



0 500 Feet

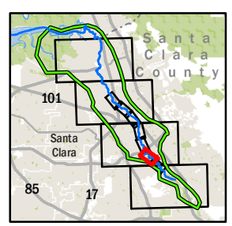
Created Date: 5/29/2024

Model Boundary

Maximum Velocity Operational Baseline Conditions

Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 14.8

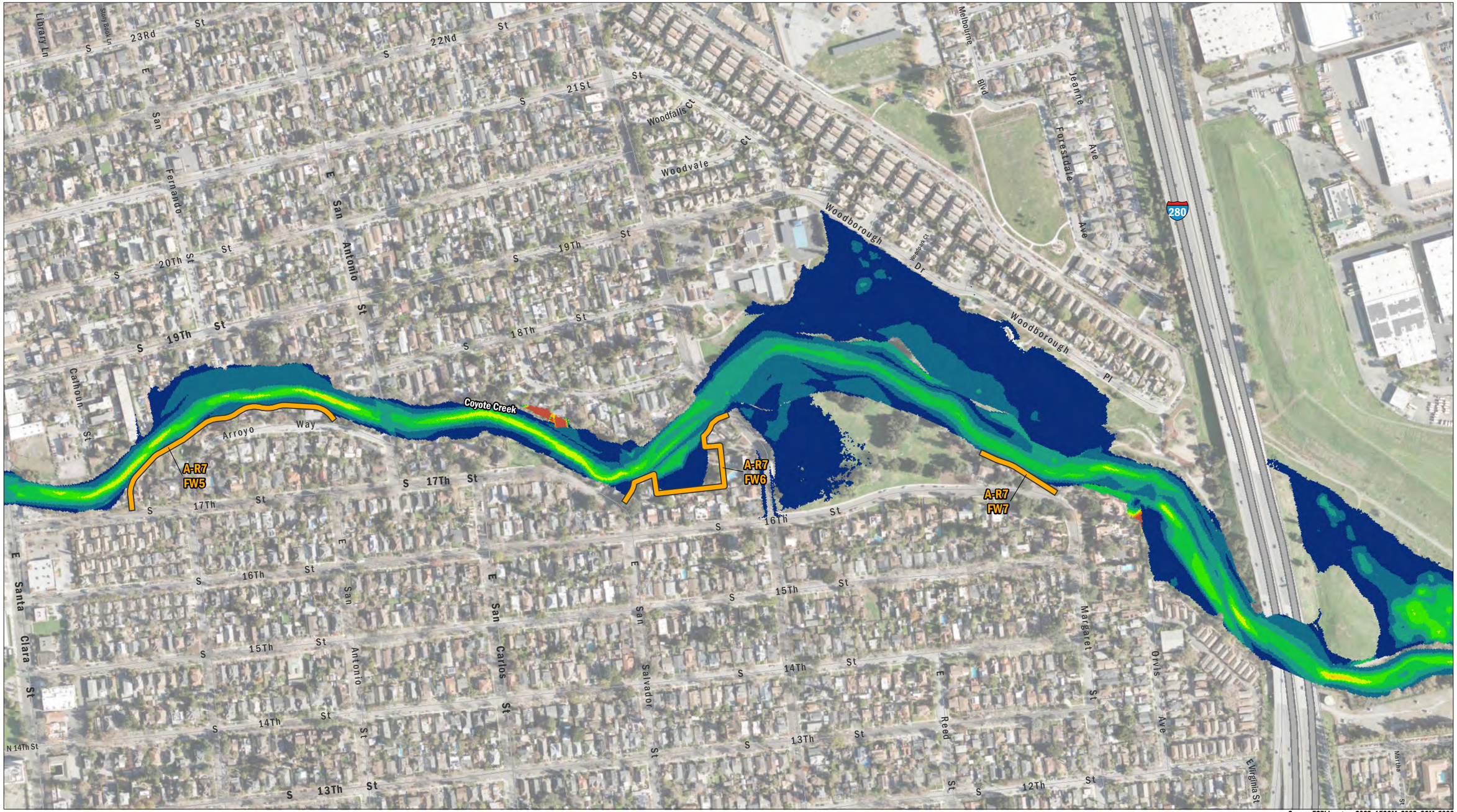


AECOM
Coyote Creek
EIR Modeling

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FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

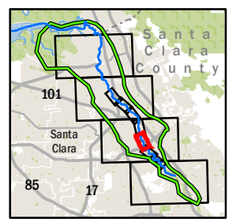
Created Date: 5/29/2024

CCFMMP
Model Boundary

Maximum Velocity Operational Baseline Conditions

Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
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- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 14.8

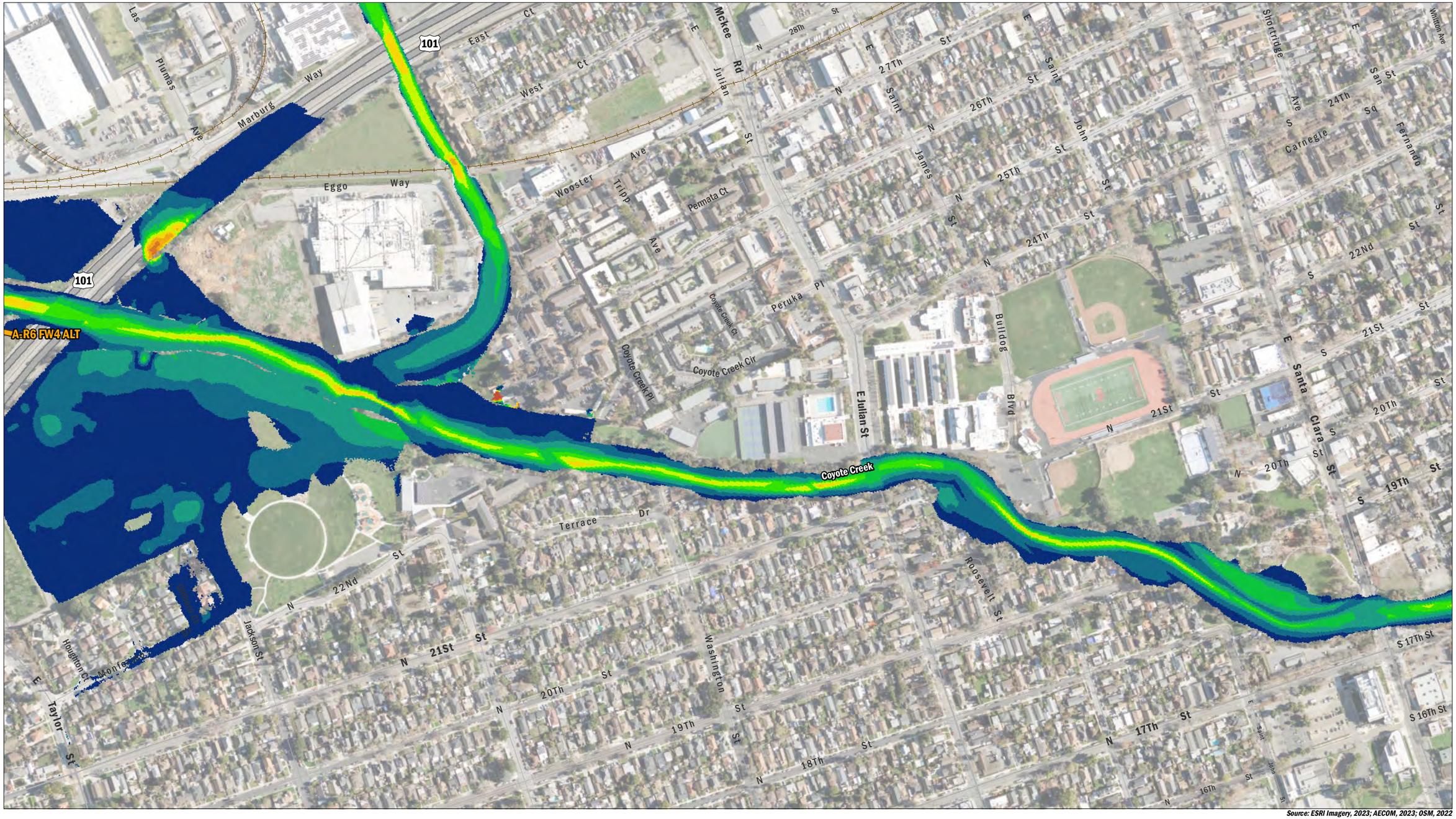


AECOM
Coyote Creek
EIR Modeling

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FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

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CCFMMP
Model Boundary

Maximum Velocity Operational Baseline Conditions
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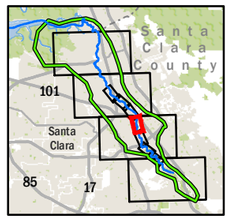


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



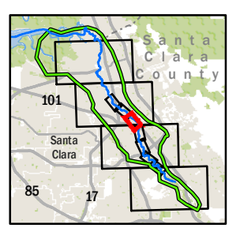
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

CCFMMP
Model Boundary

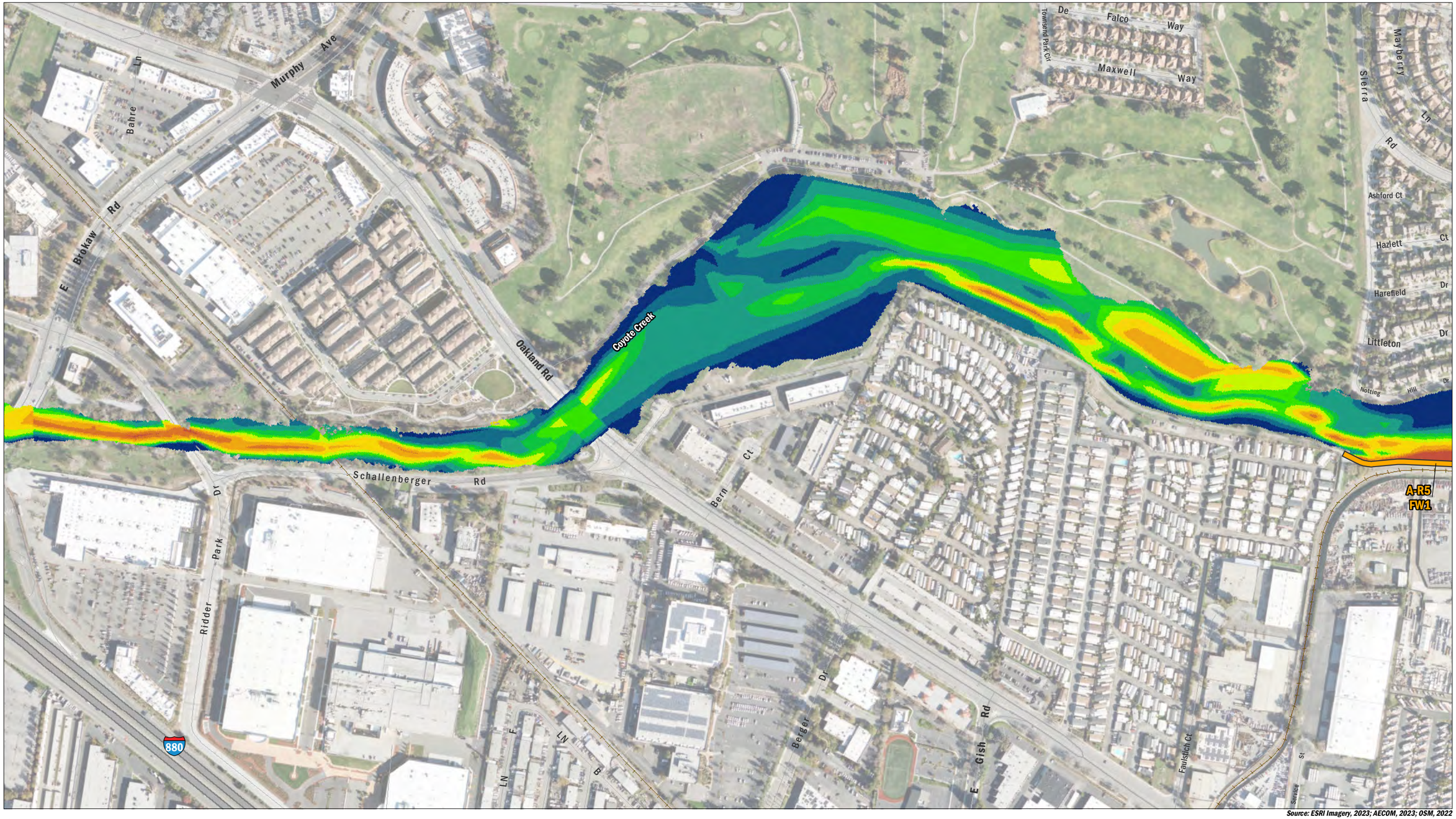
Maximum Velocity Operational Baseline Conditions
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- 3.2 - 4
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AECOM
Coyote Creek
EIR Modeling

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FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

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CCFMMP
Model Boundary

Maximum Velocity Operational Baseline Conditions
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- 1.5 - 2.4
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- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 14.8

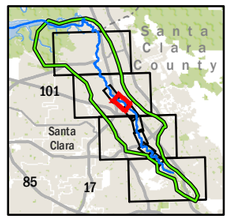
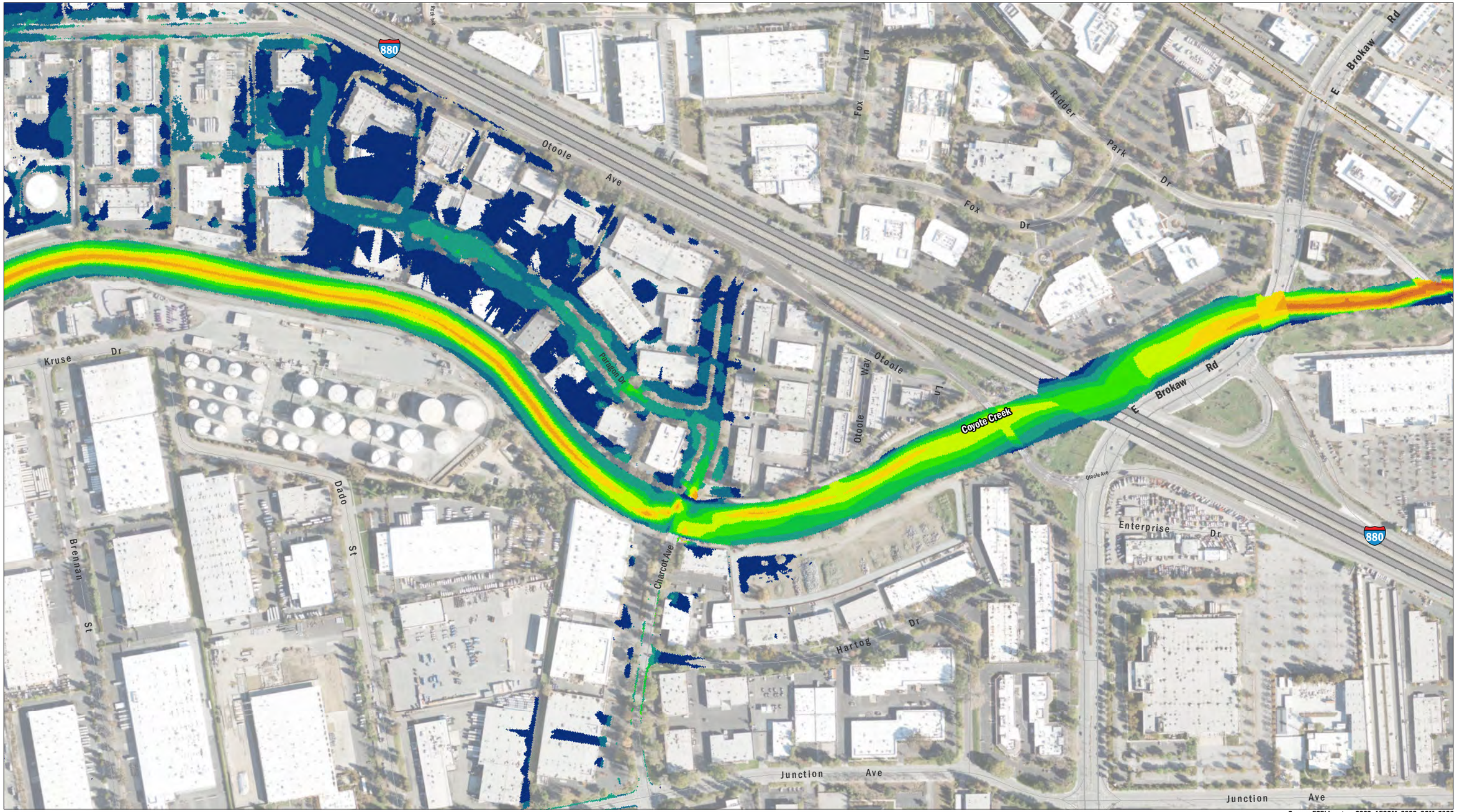


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/29/2024

Model Boundary

Maximum Velocity Operational Baseline Conditions

Velocity (ft/s)

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AECOM
Coyote Creek
EIR Modeling

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FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/29/2024

Model Boundary

Maximum Velocity Operational Baseline Conditions

Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
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AECOM
Coyote Creek
EIR Modeling

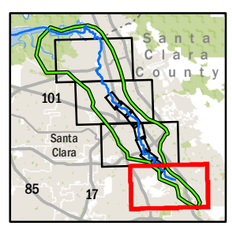
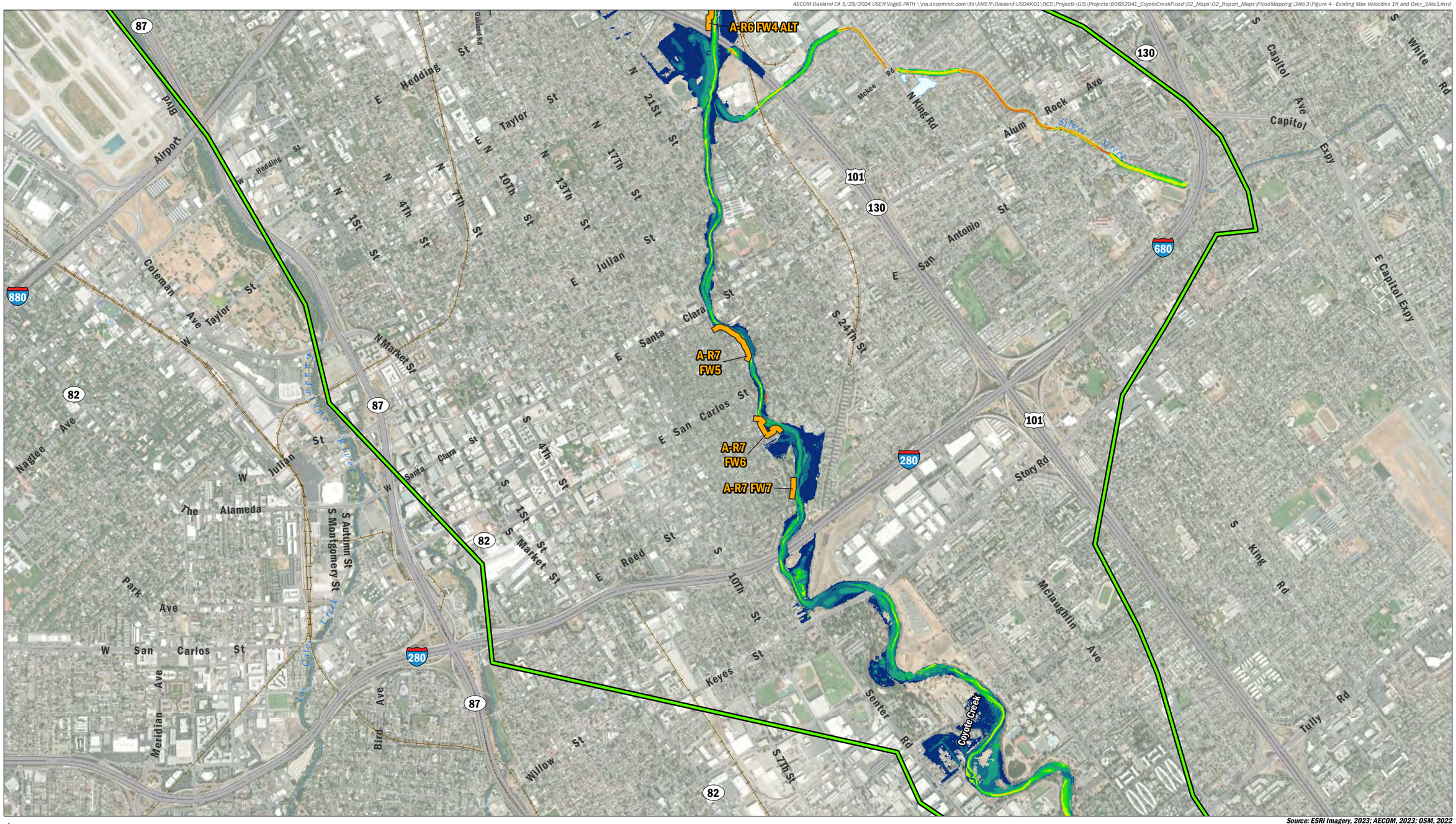


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
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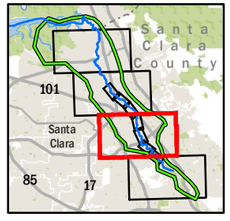


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/29/2024

AECOM
Coyote Creek
EIR Modeling

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CCFMMP
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- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 14.8

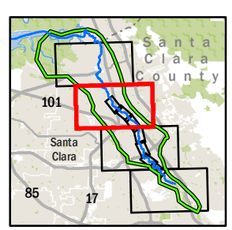


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 5/29/2024

Model Boundary

Maximum Velocity Operational Baseline Conditions

Velocity (ft/s)

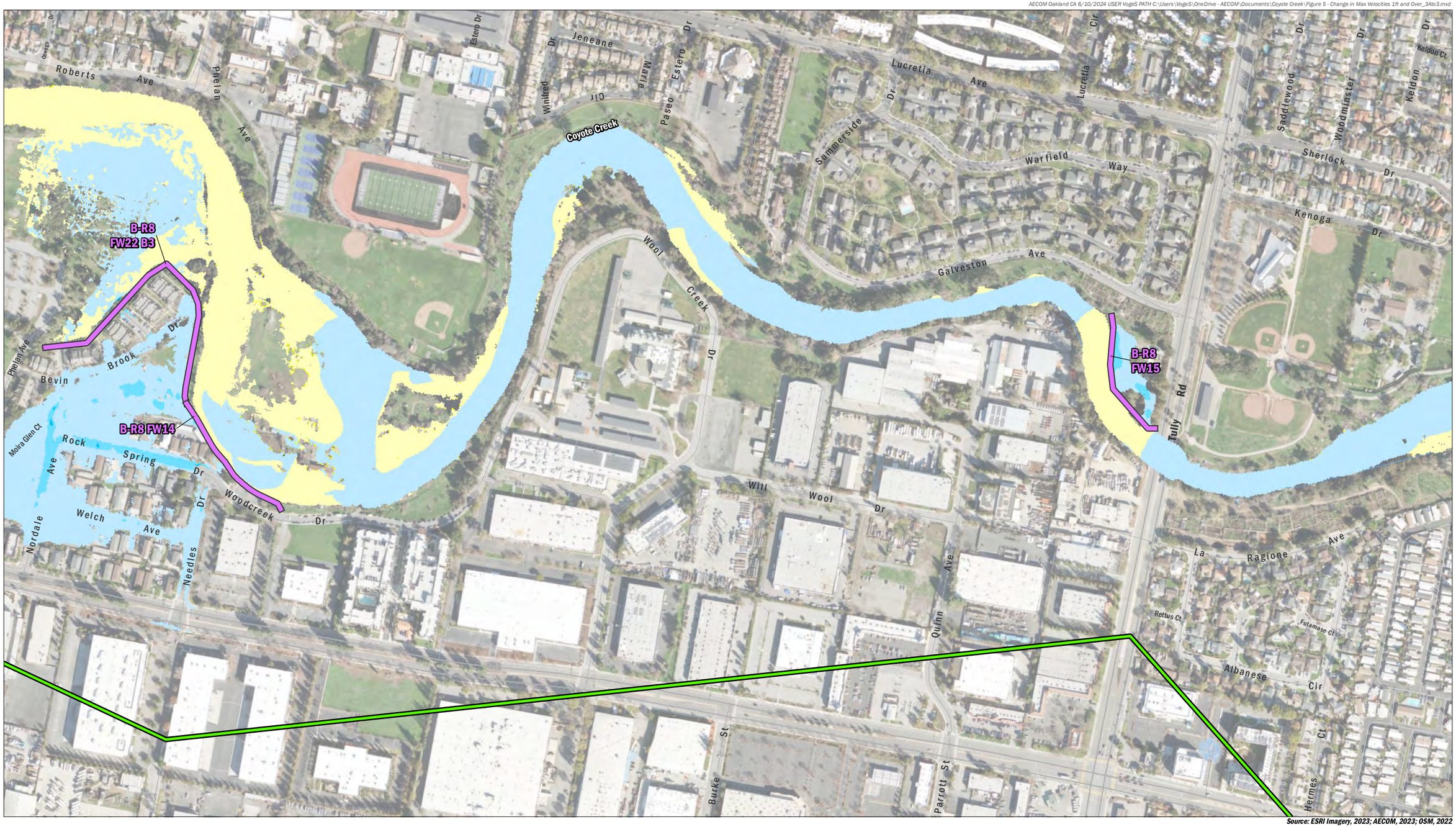
- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 14.8

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Operational Baseline Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

-4.9 - -3
-3 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 3
3 - 4
4 - 5.3

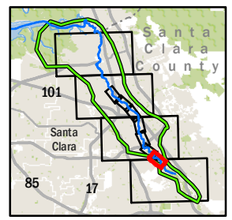


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

- -4.9 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5.3

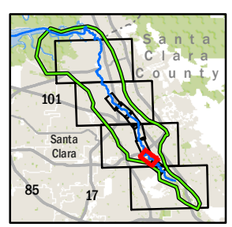
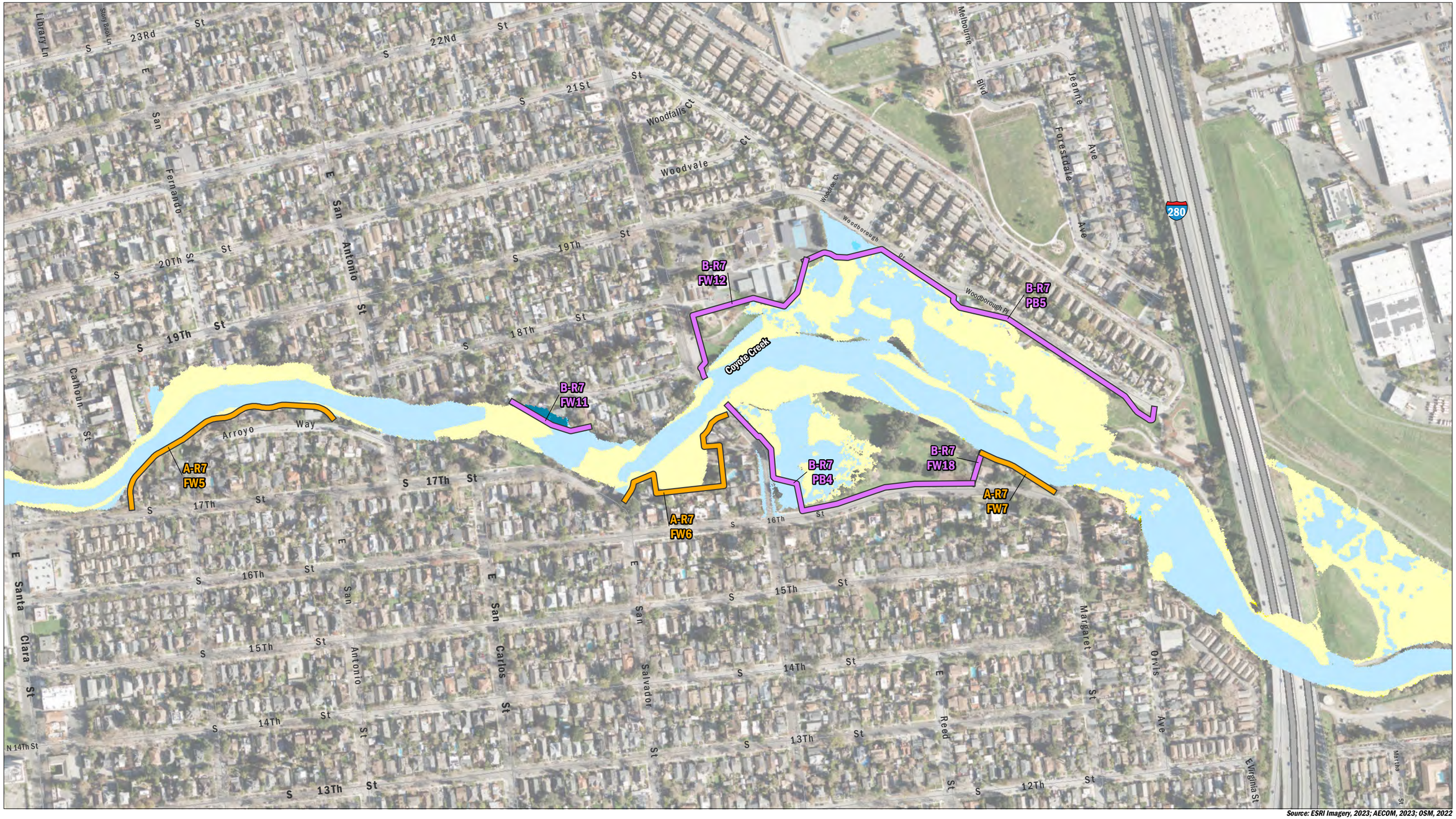


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

- -4.9 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5.3

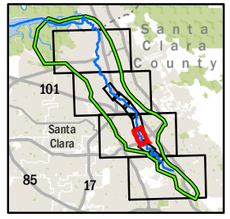
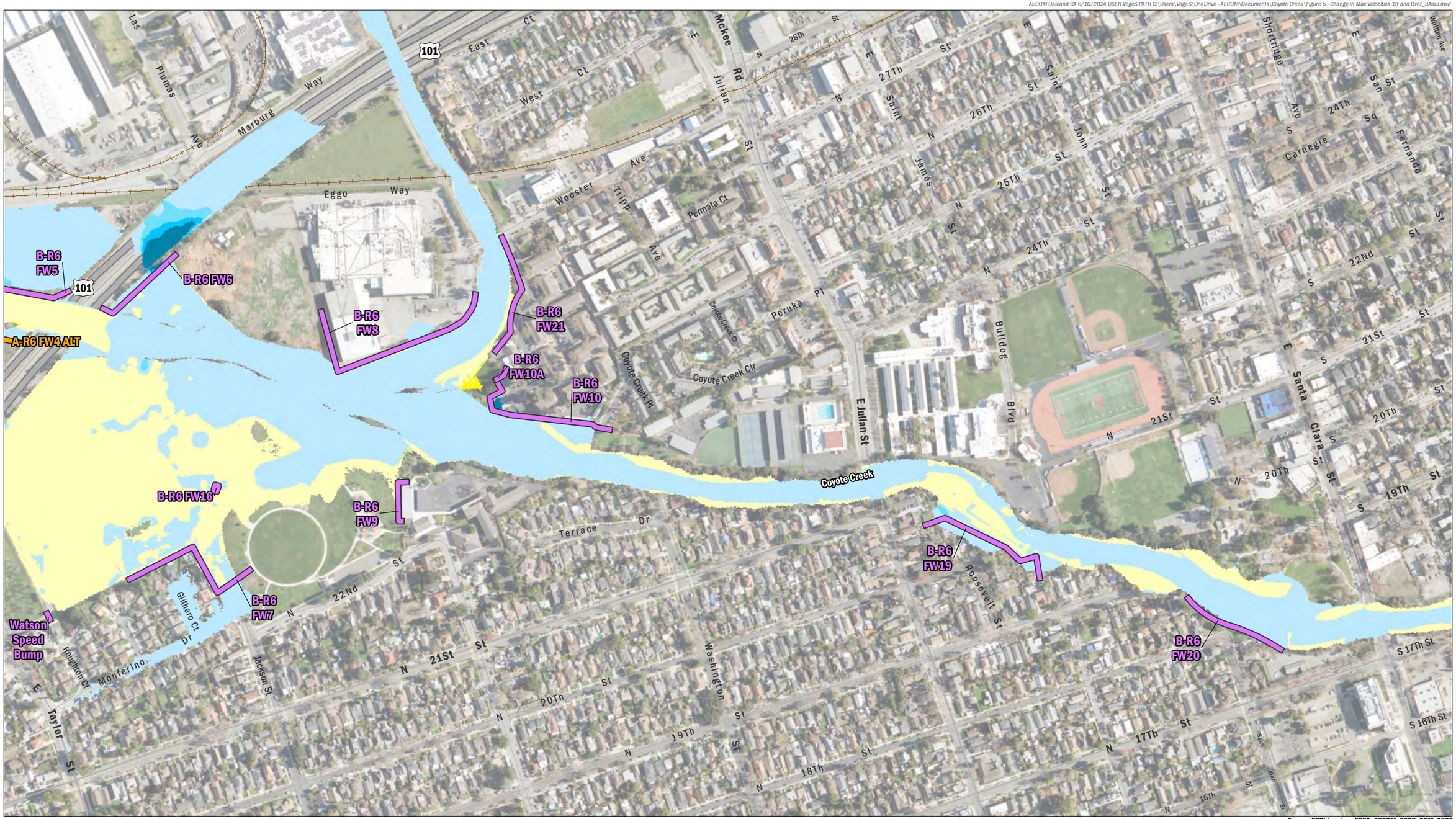


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

- -4.9 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5.3

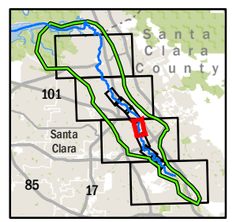


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

- -4.9 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5.3

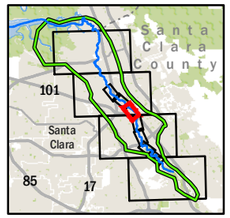
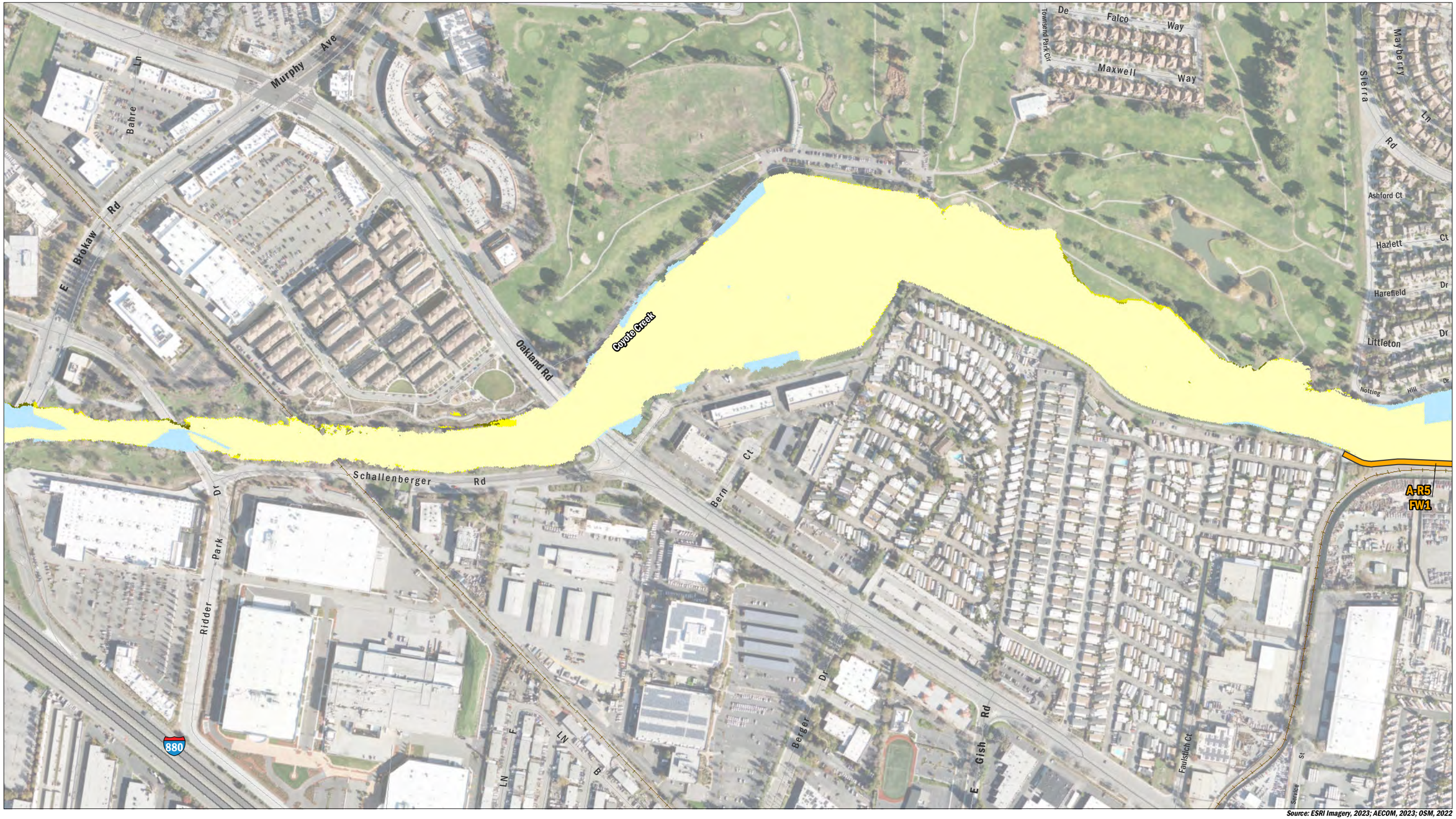


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

-4.9 - -3
-3 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 3
3 - 4
4 - 5.3

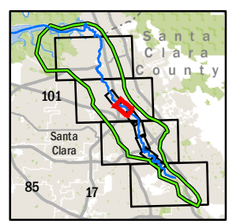
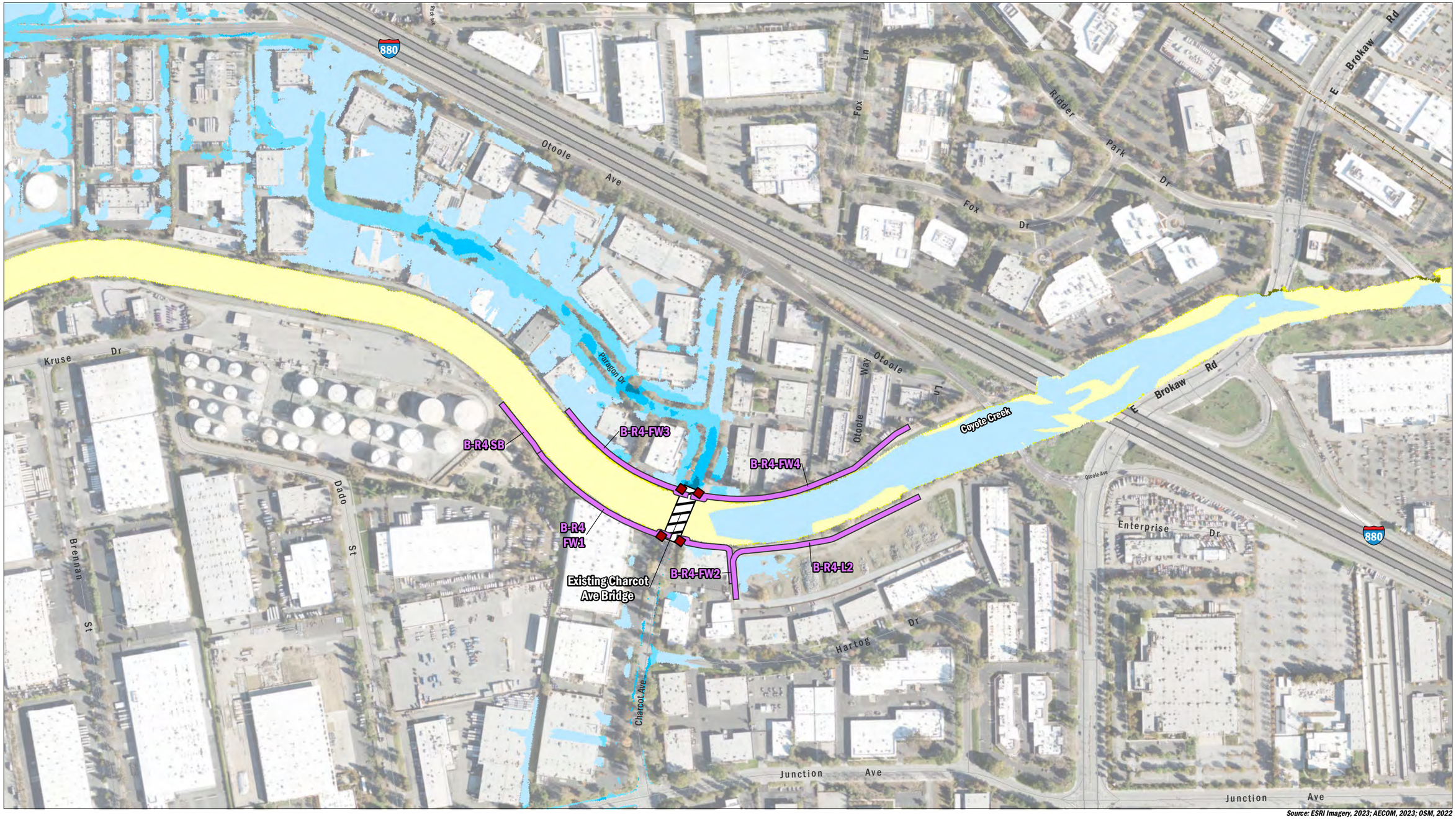


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 6 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave
- Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

- -4.9 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5.3

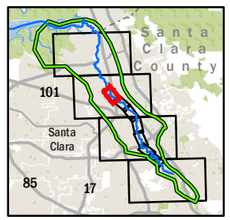
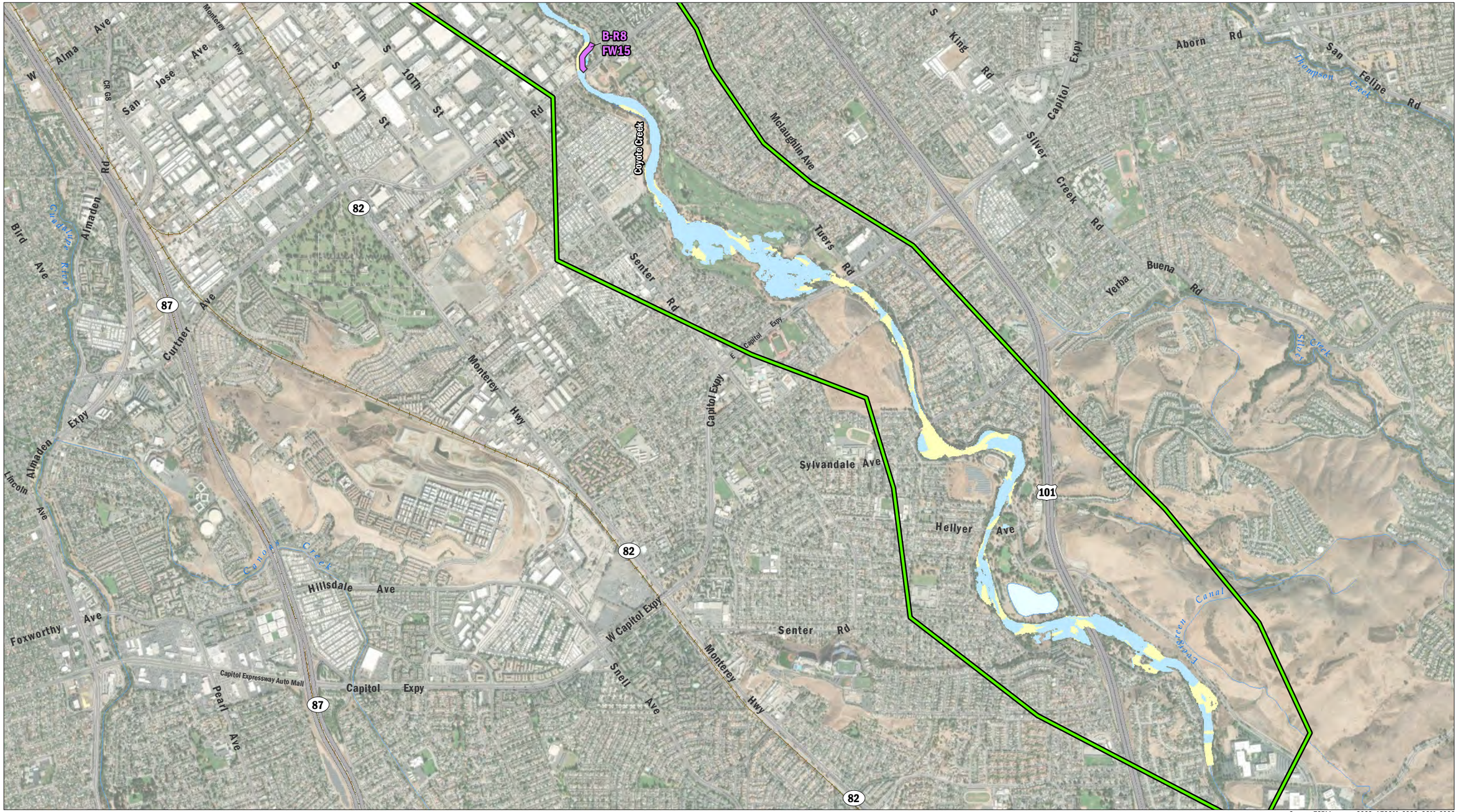


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

-4.9 - -3
-3 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 3
3 - 4
4 - 5.3

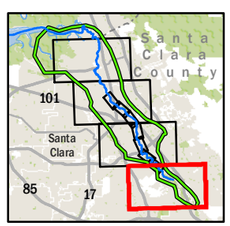
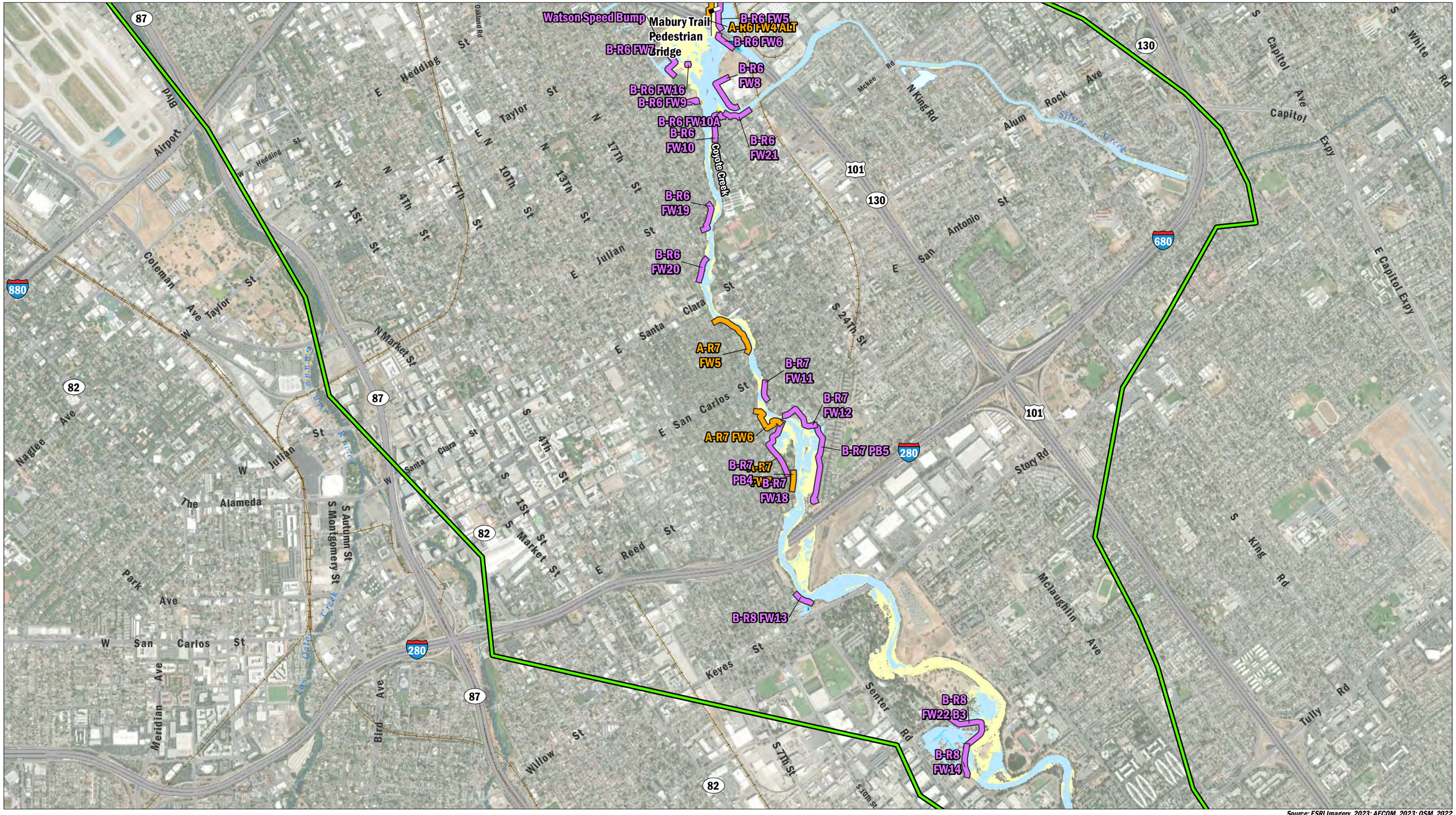


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

- -4.9 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5.3

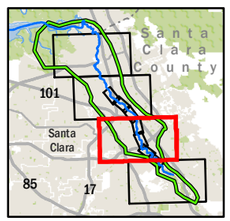
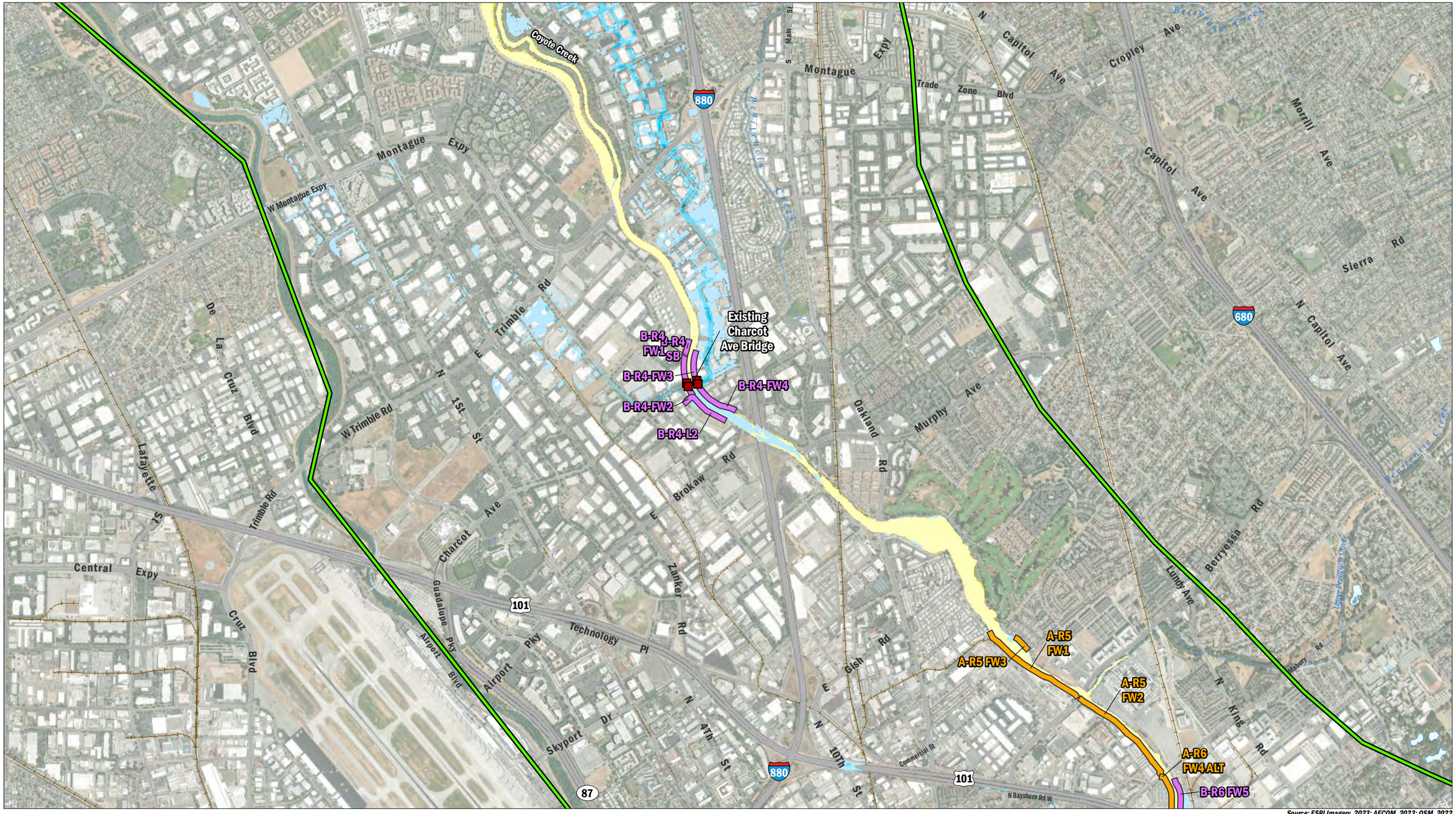


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave
- Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

- -4.9 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5.3

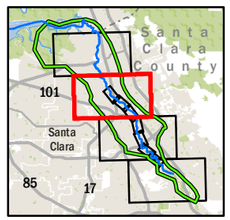


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

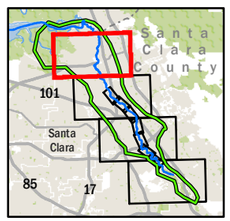
0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

Maximum Velocity Post-Project Conditions minus Operational Baseline Conditions
Velocity (ft/s)

- -4.9 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5.3

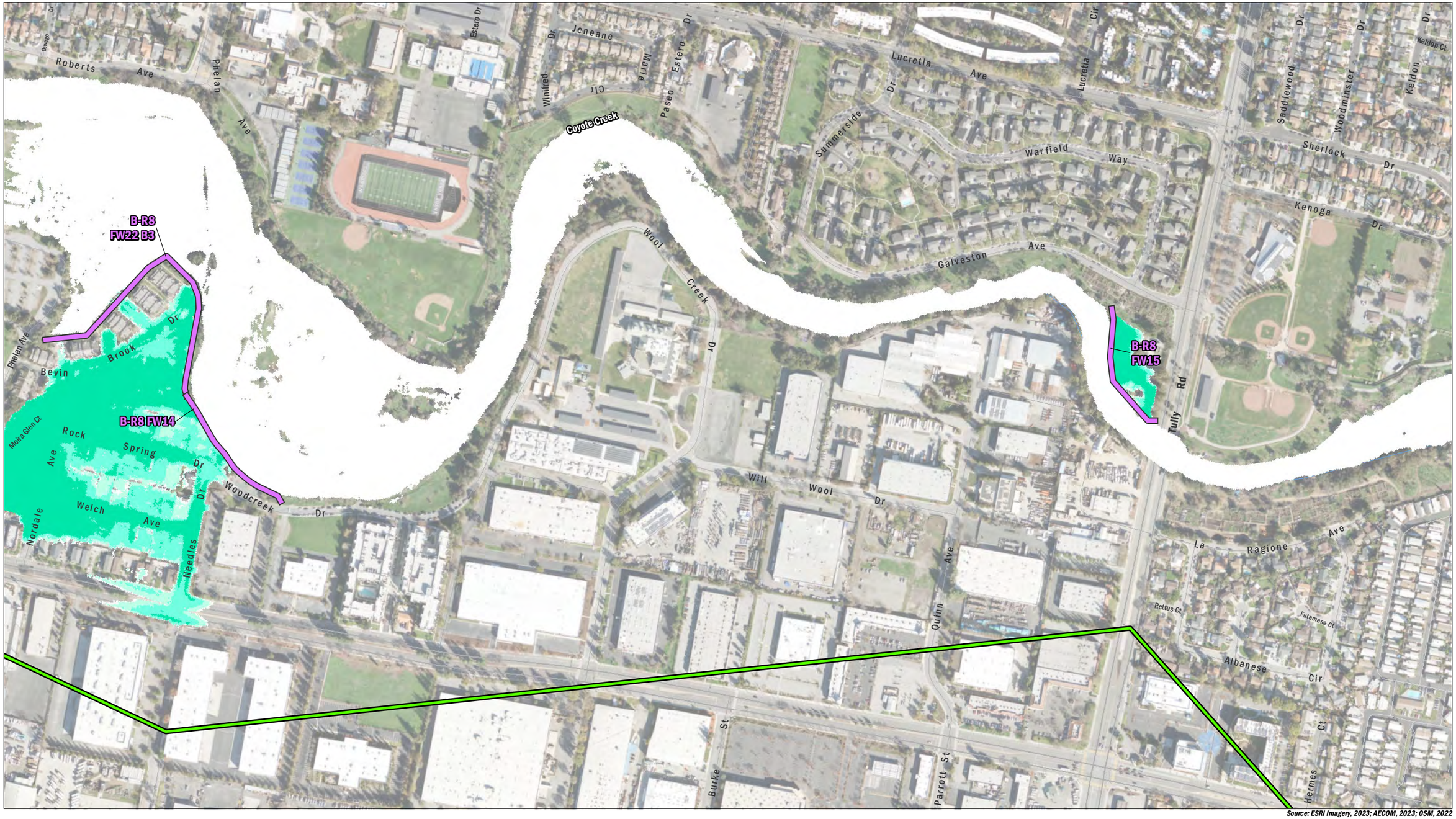


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

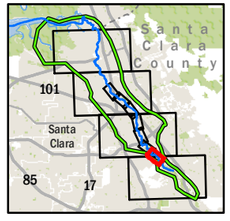


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

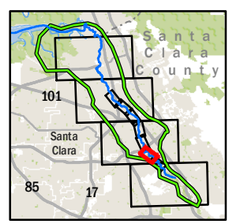
CCFPP

Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

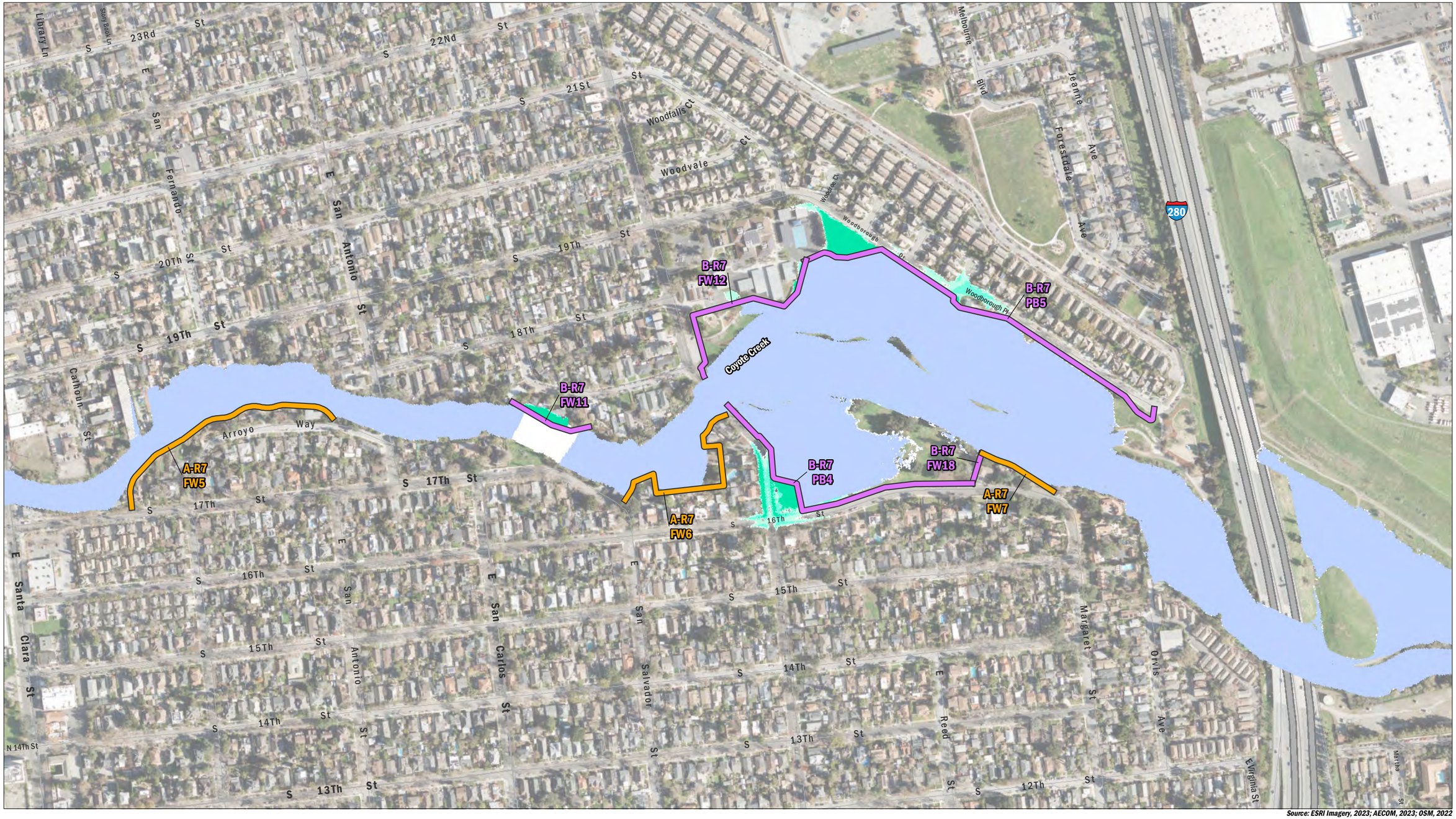


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

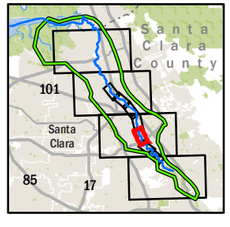
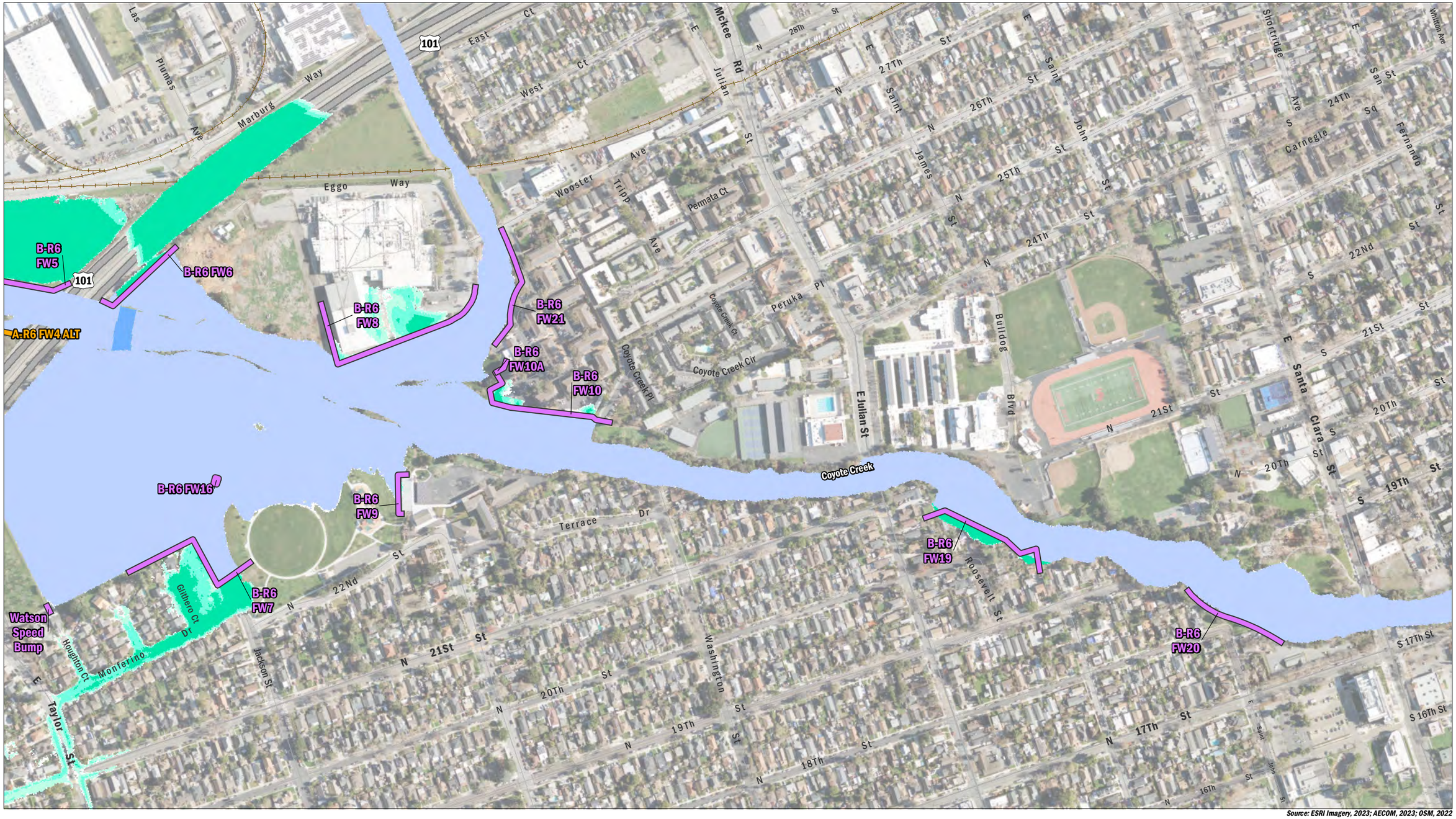


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

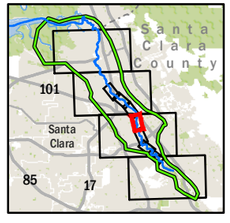


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

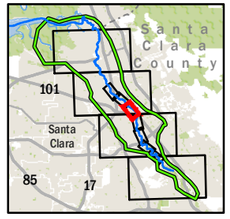


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions
Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

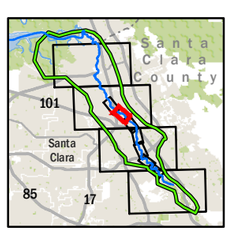
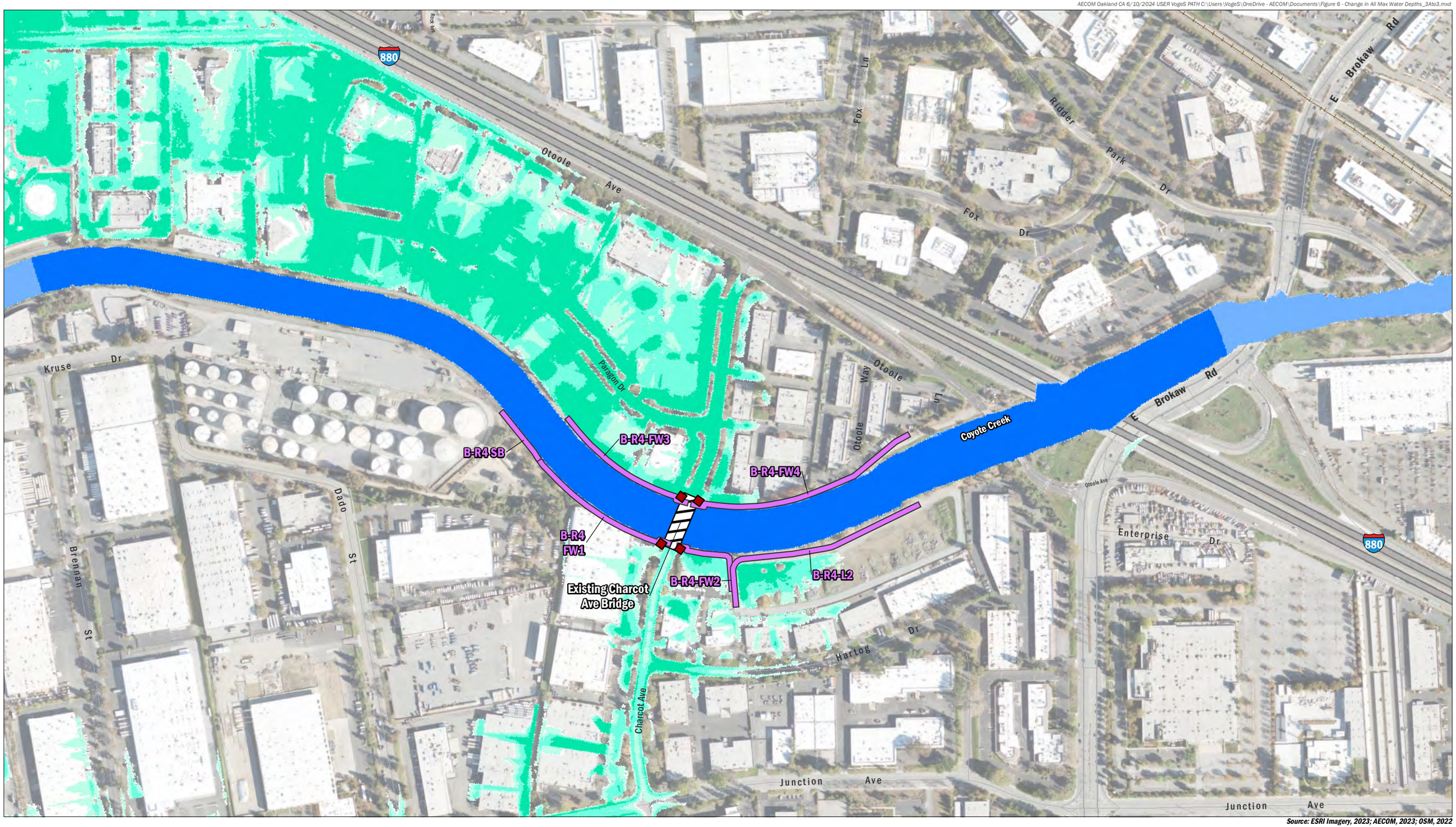


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions
Page 6 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

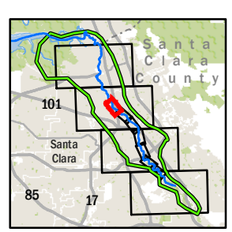
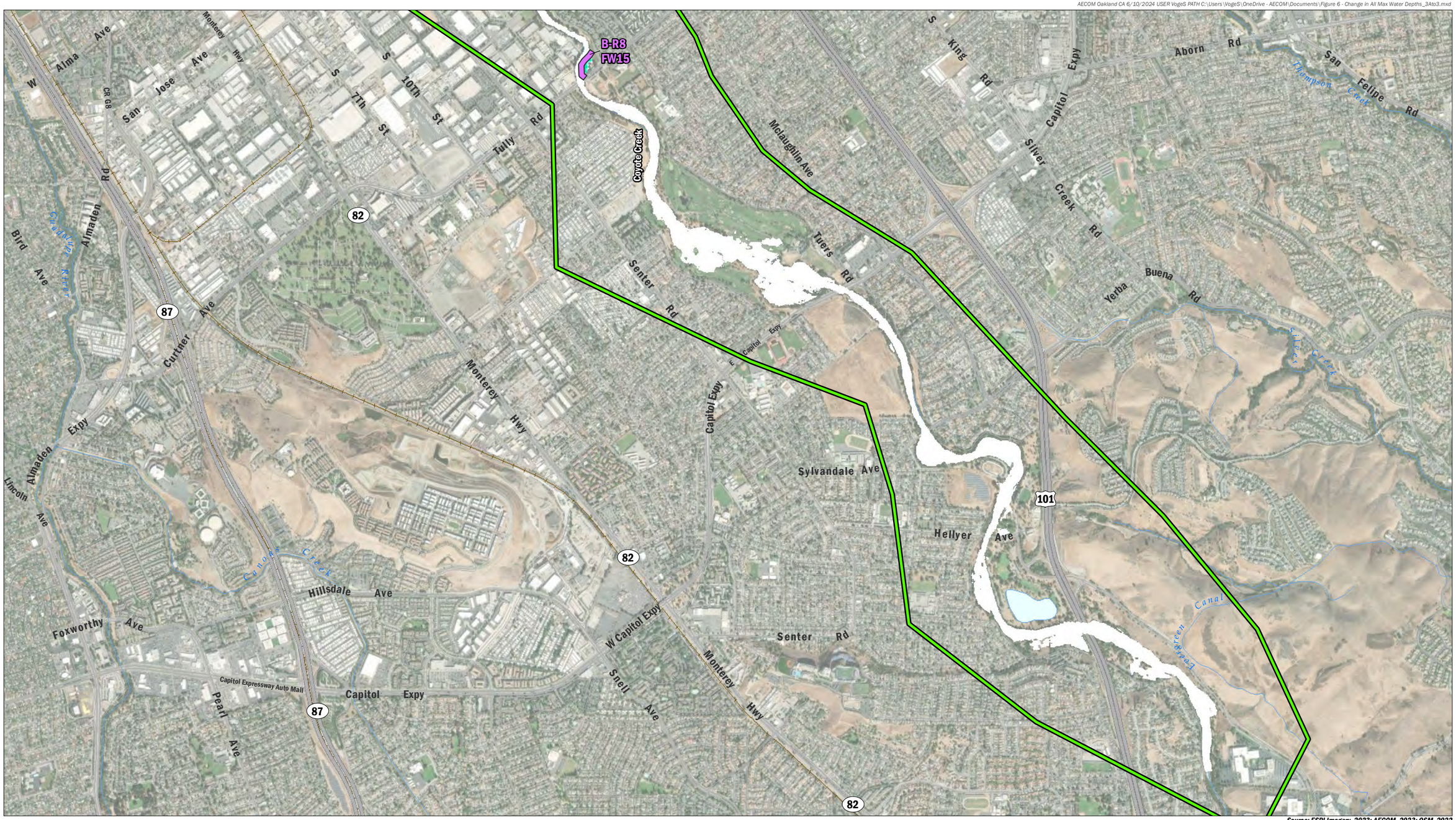


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions
Depth (ft)
-6.1 - -1
-1 - -0.5
-0.5 - -0.1
-0.1 - 0.1
0.1 - 0.5
0.5 - 1
1 - 1.3

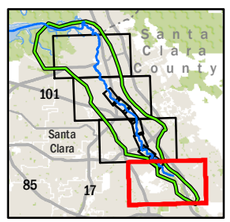
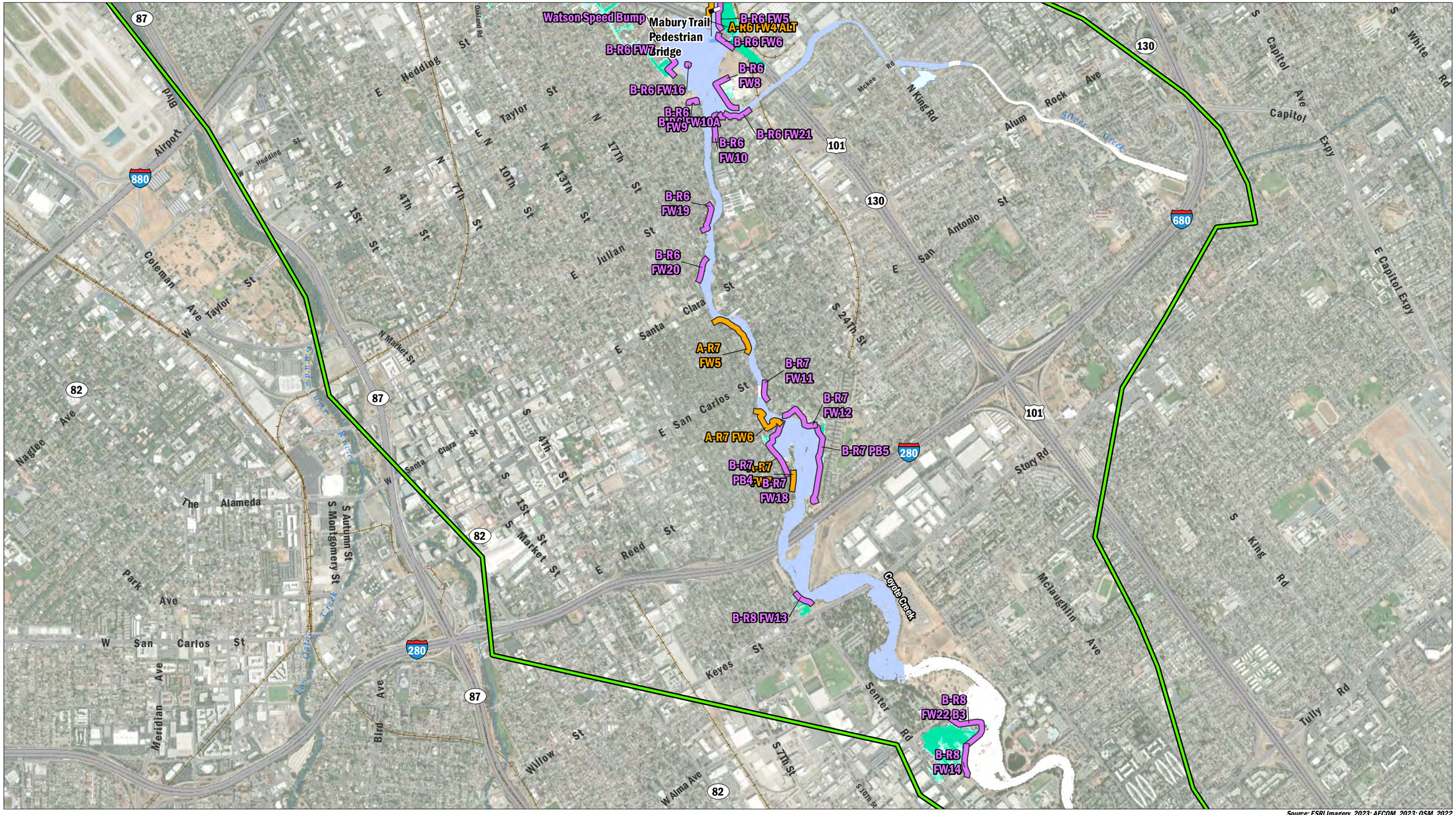


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

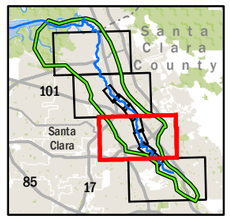
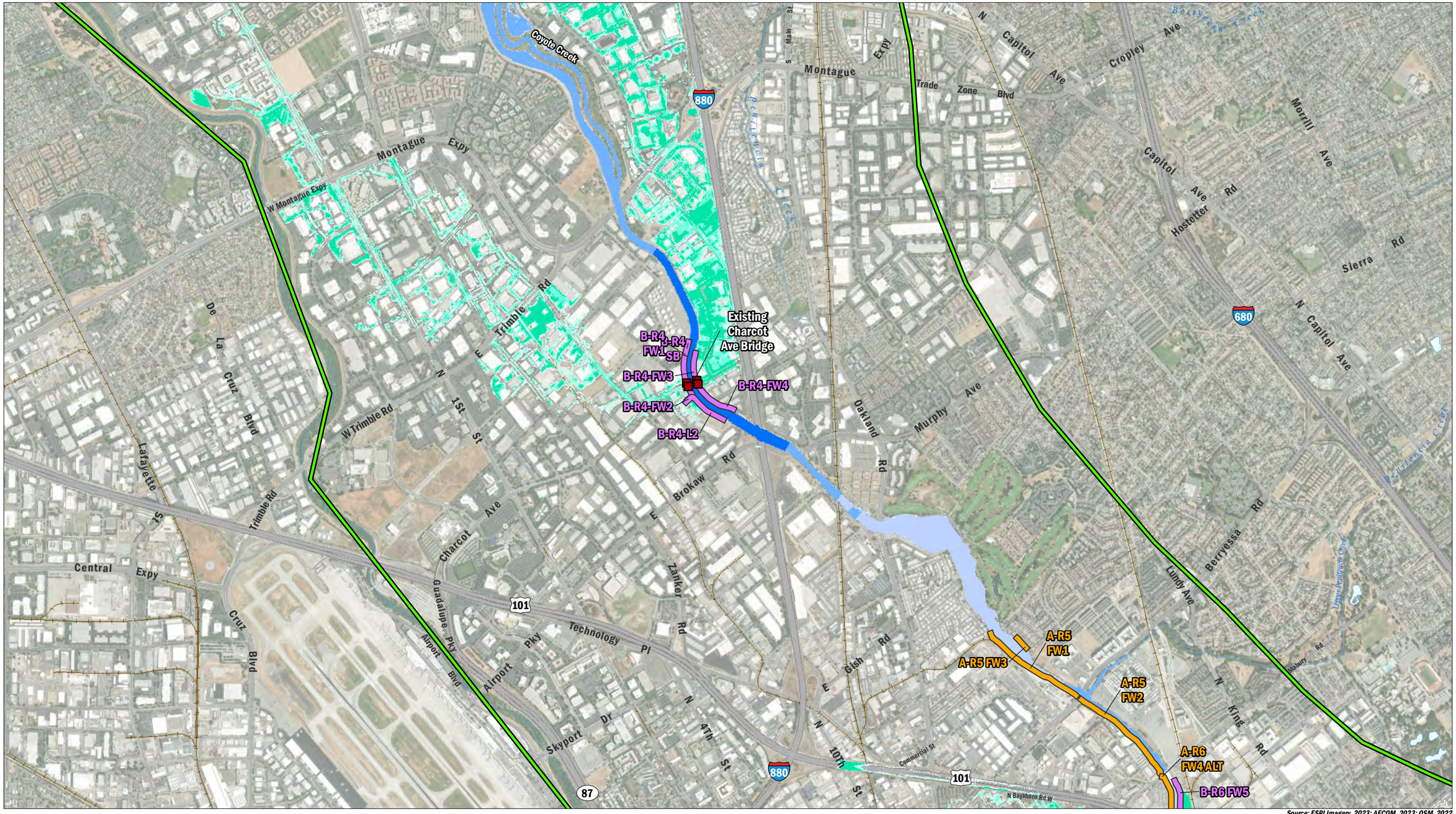


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

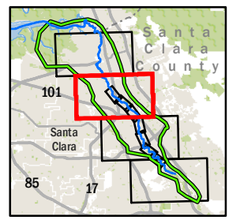
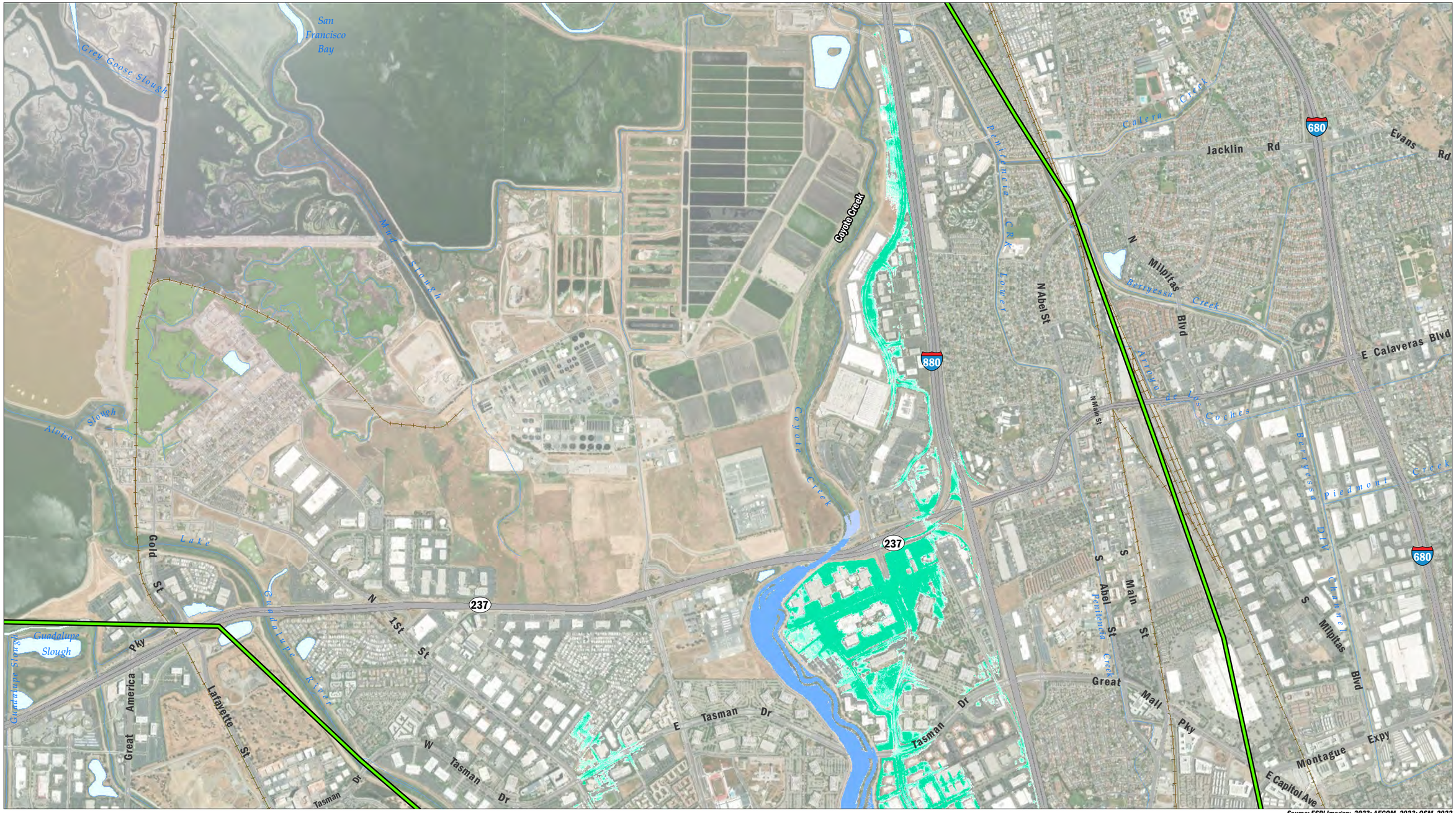


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Post-Project Conditions minus Operational Baseline Conditions

Depth (ft)

- -6.1 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 1.3

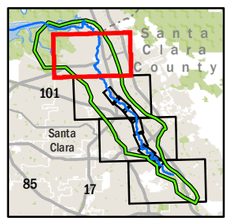
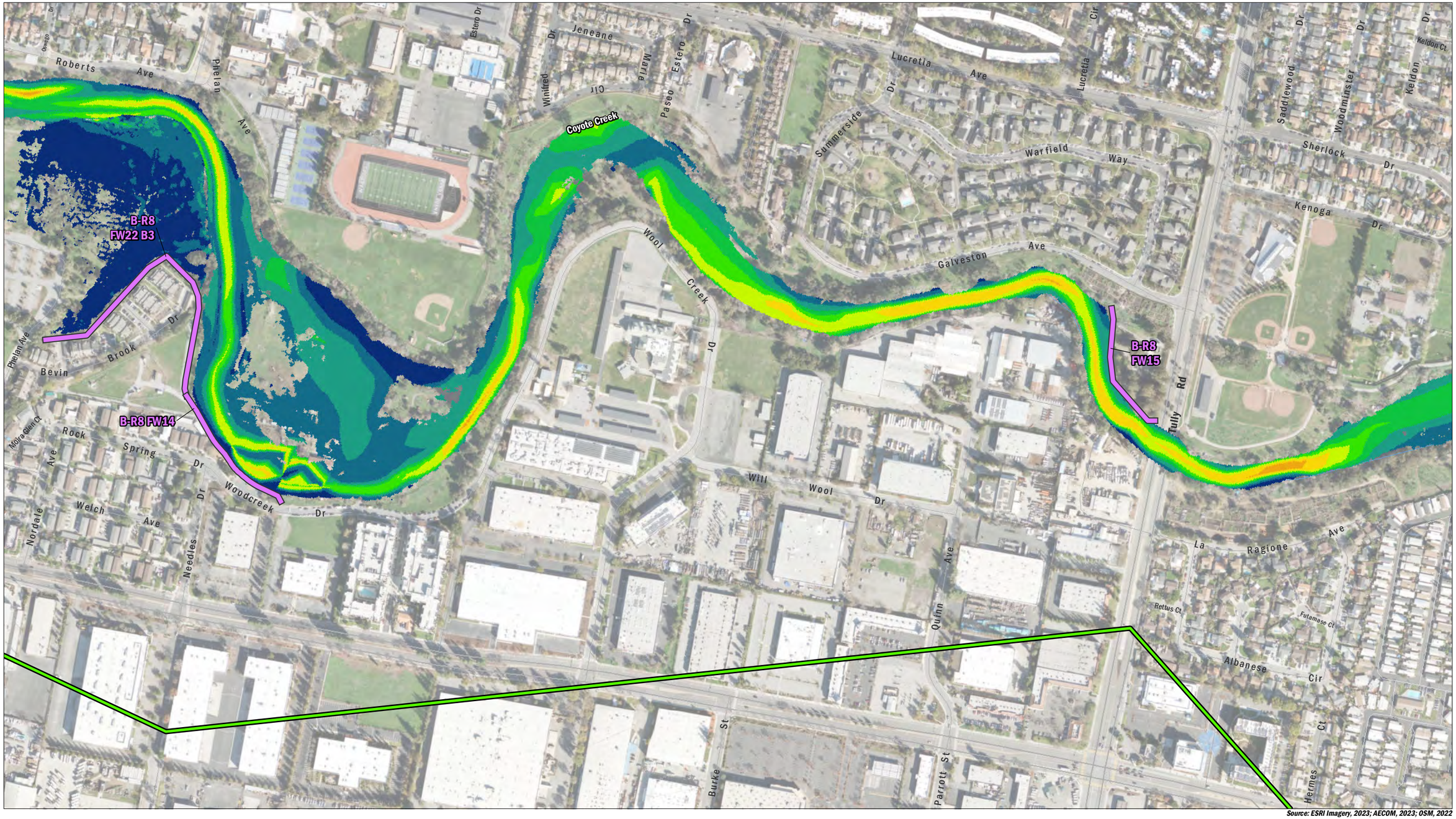


FIGURE 6

Change in All Max. Water Depths Operational Baseline Conditions compared to Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

AECOM
Coyote Creek
EIR Modeling

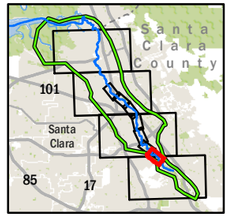
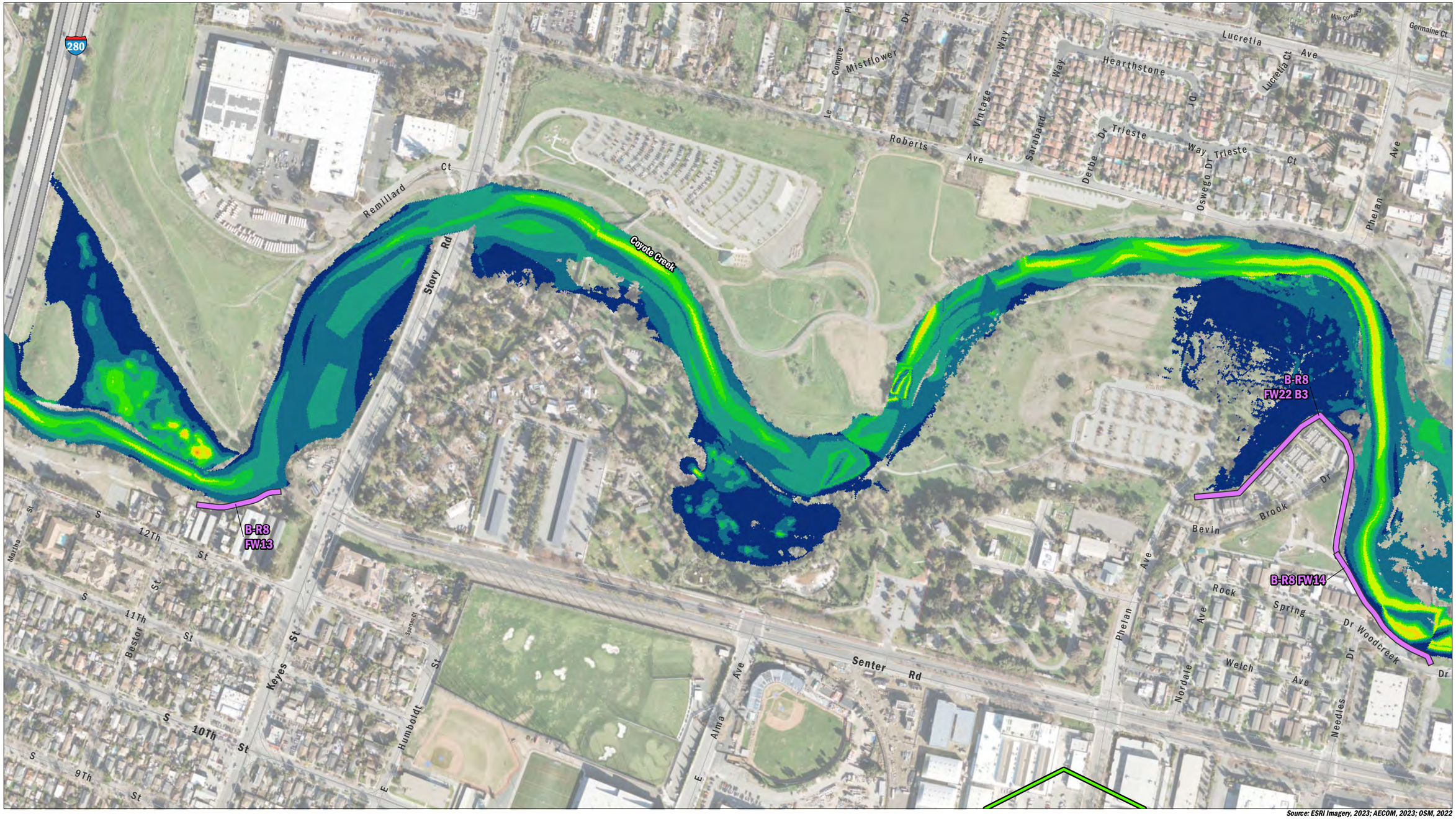


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

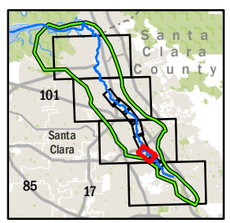
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

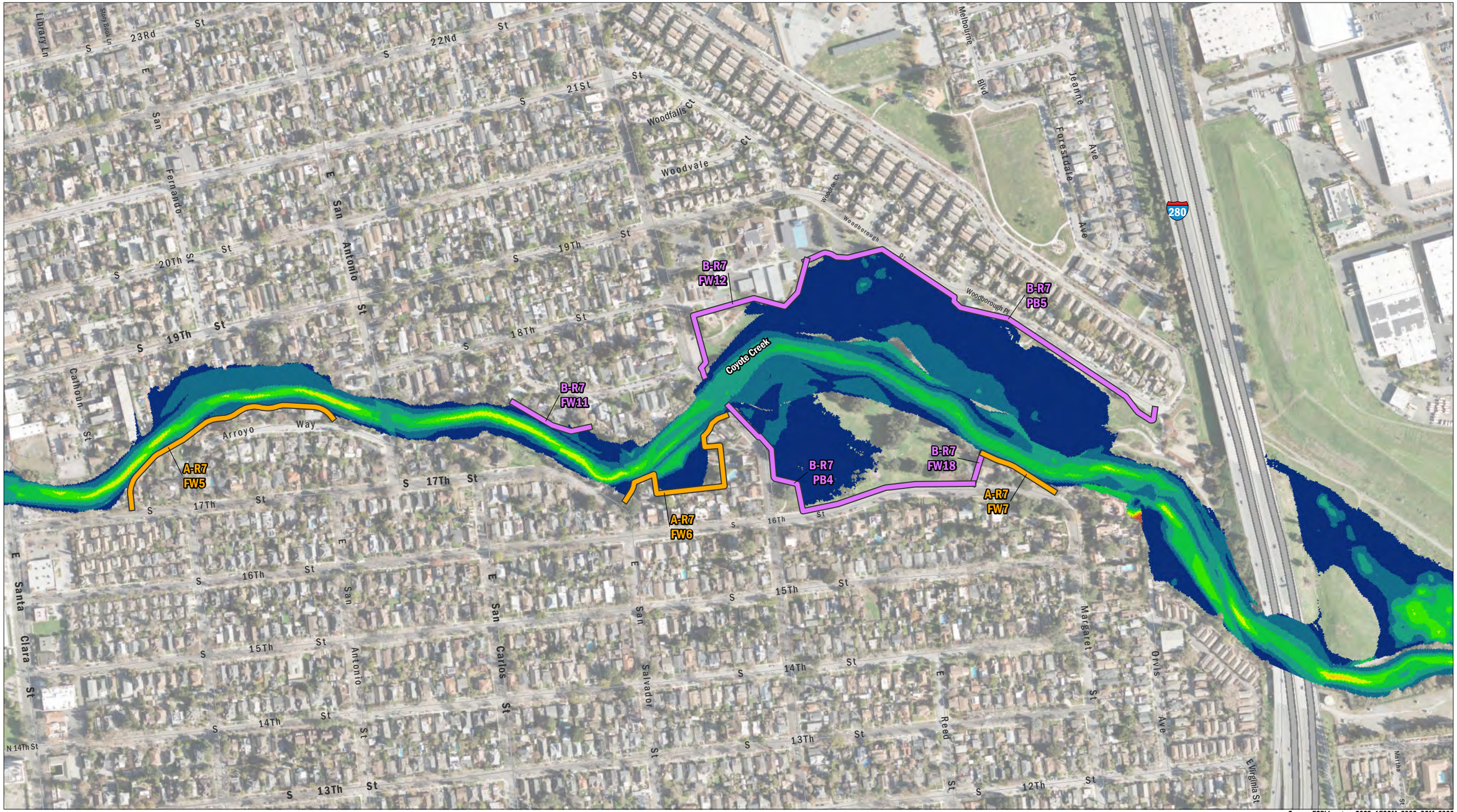


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

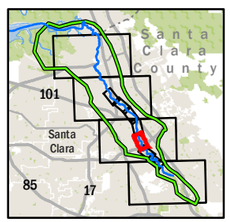
0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.5

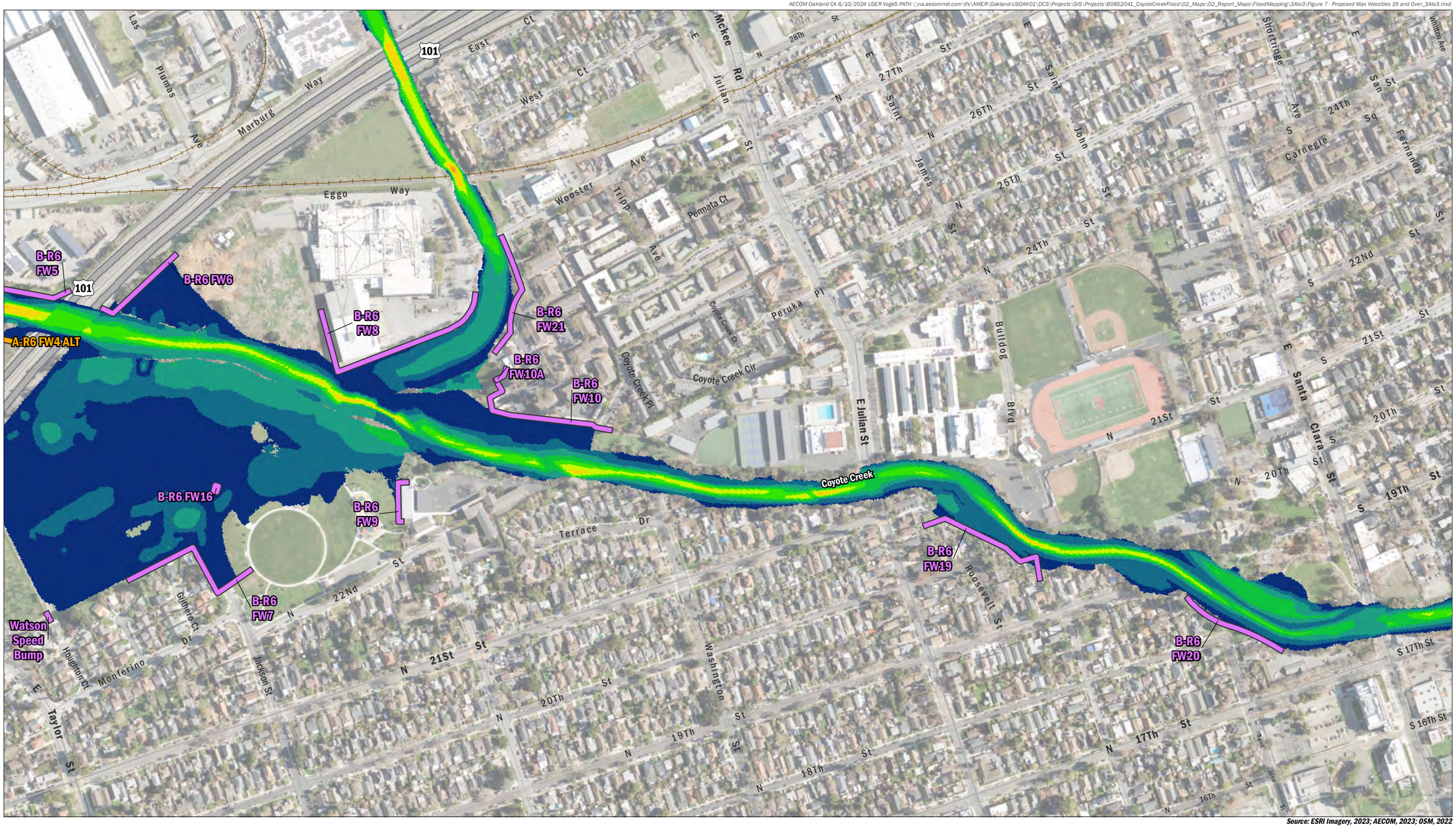


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

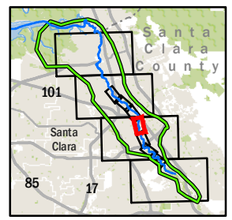


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

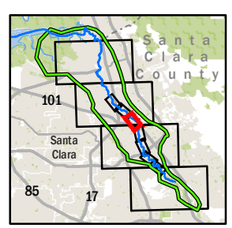
0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.5

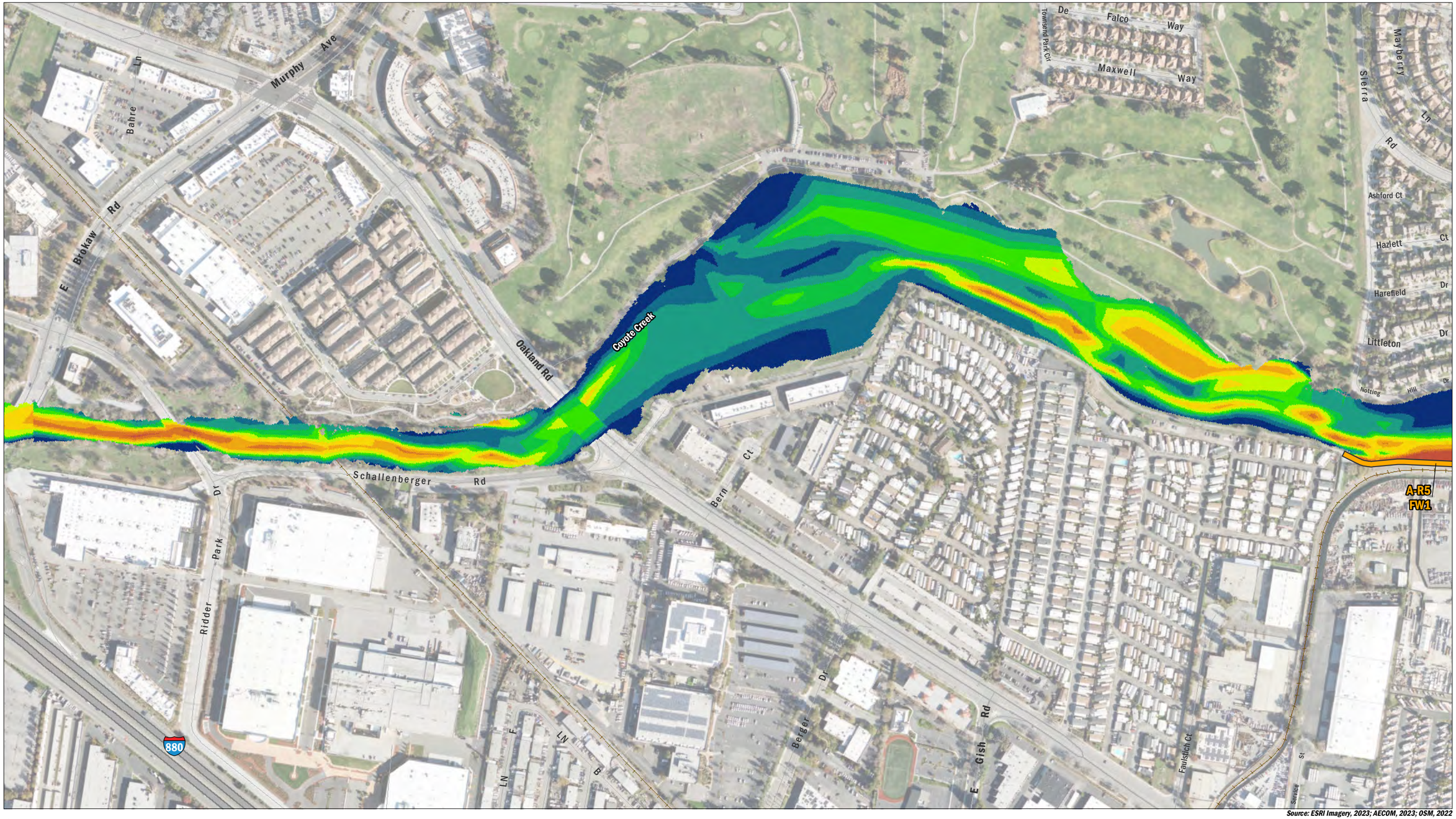


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

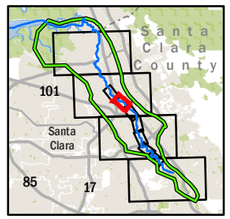
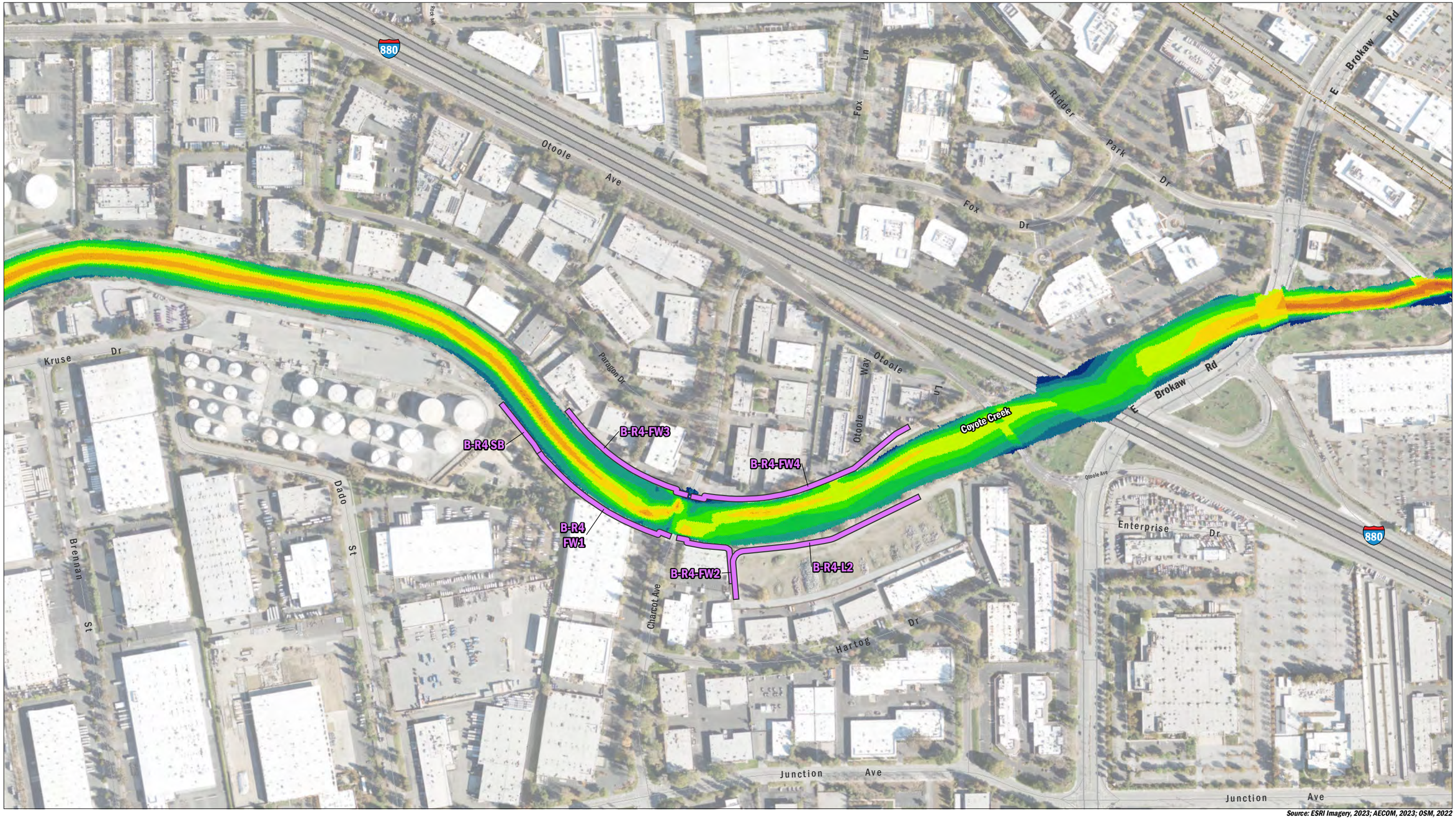


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 6 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP

Model Boundary

Maximum Velocity Post-Project Conditions

Velocity (ft/s)

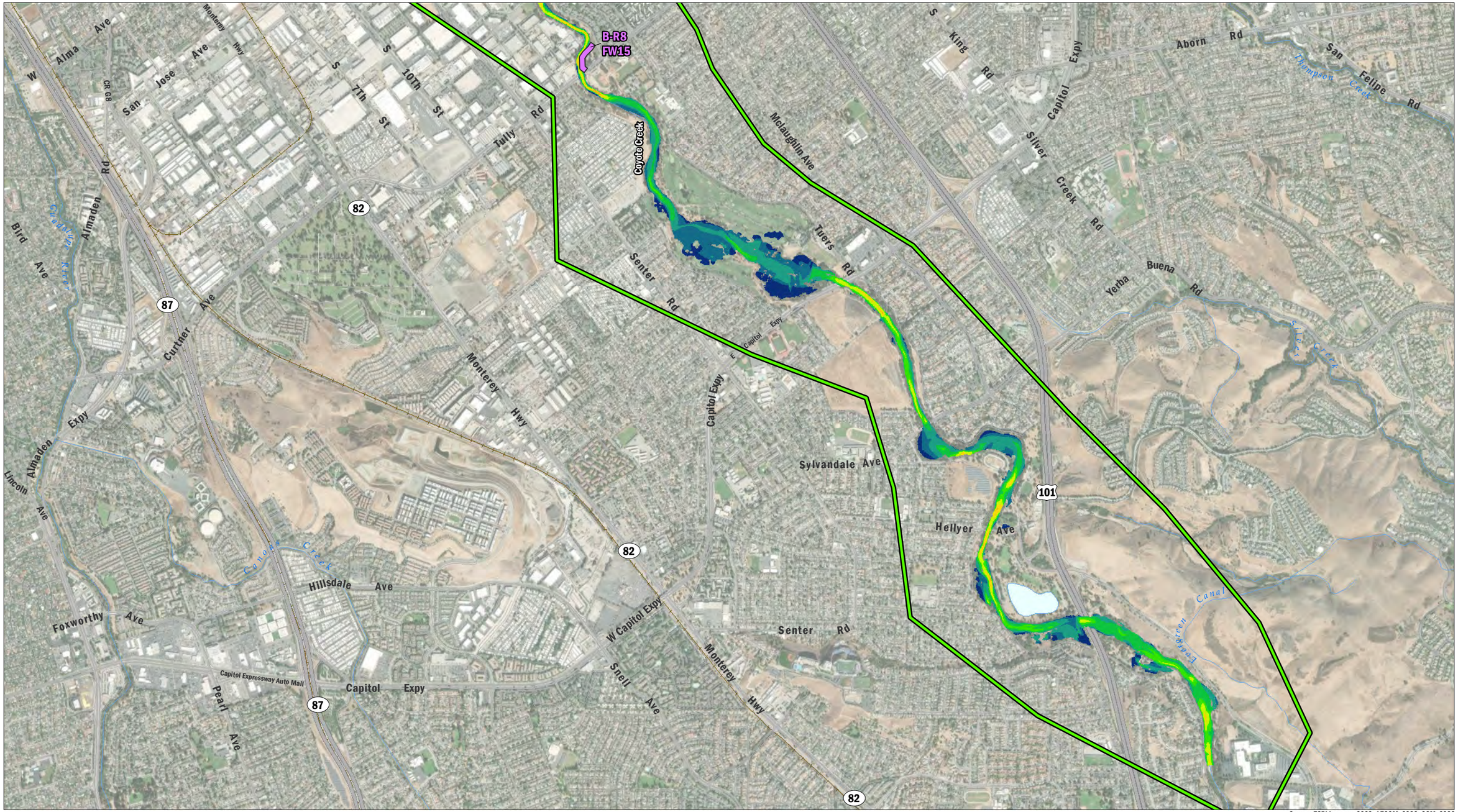
- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

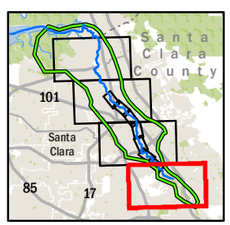
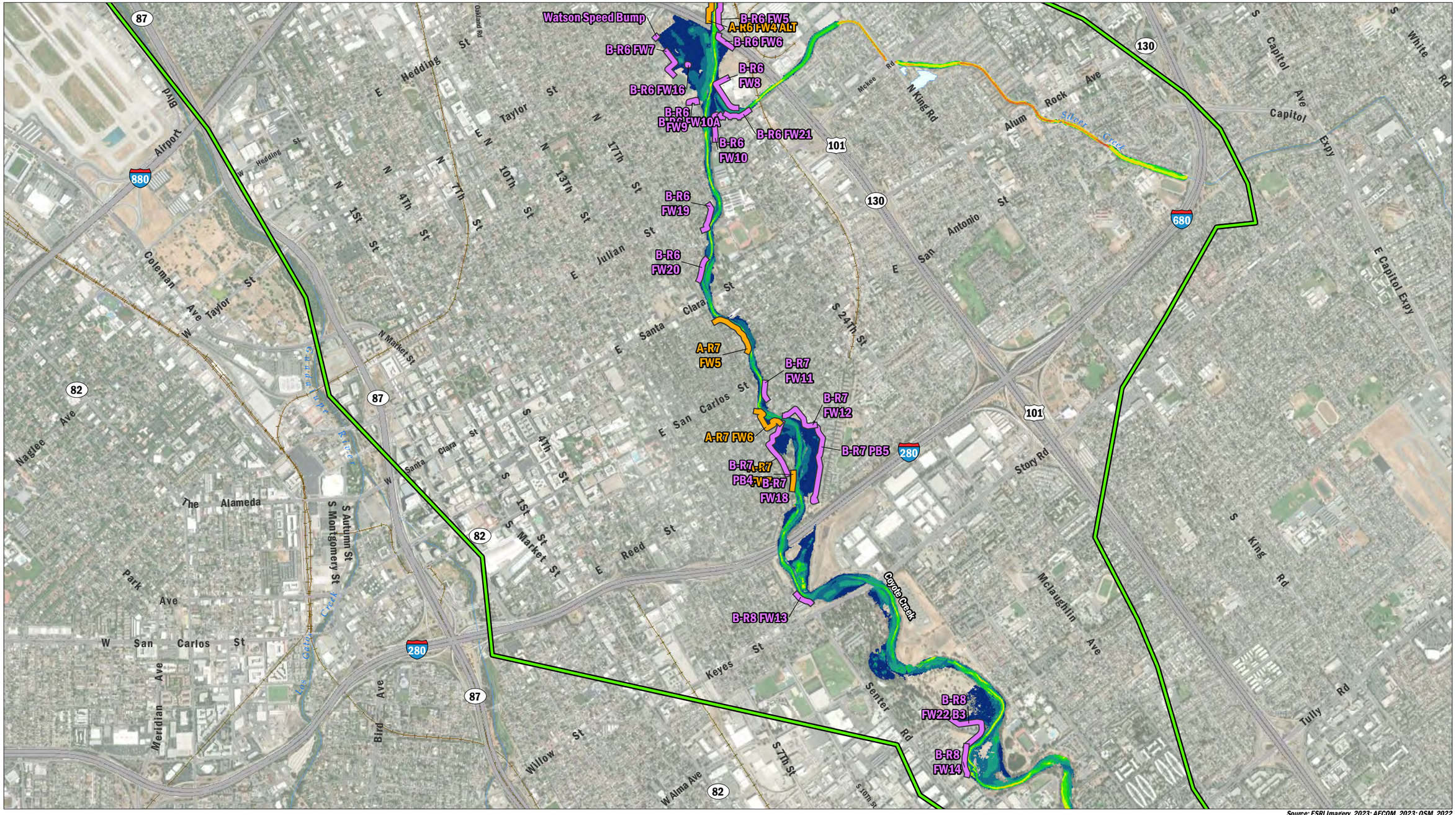


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

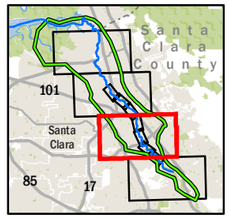


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 9 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

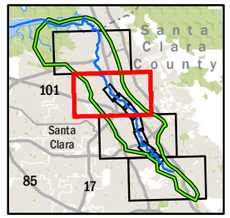


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

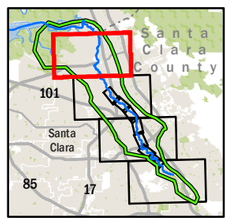
0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

Maximum Velocity Post-Project Conditions
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5



AECOM
Coyote Creek
EIR Modeling

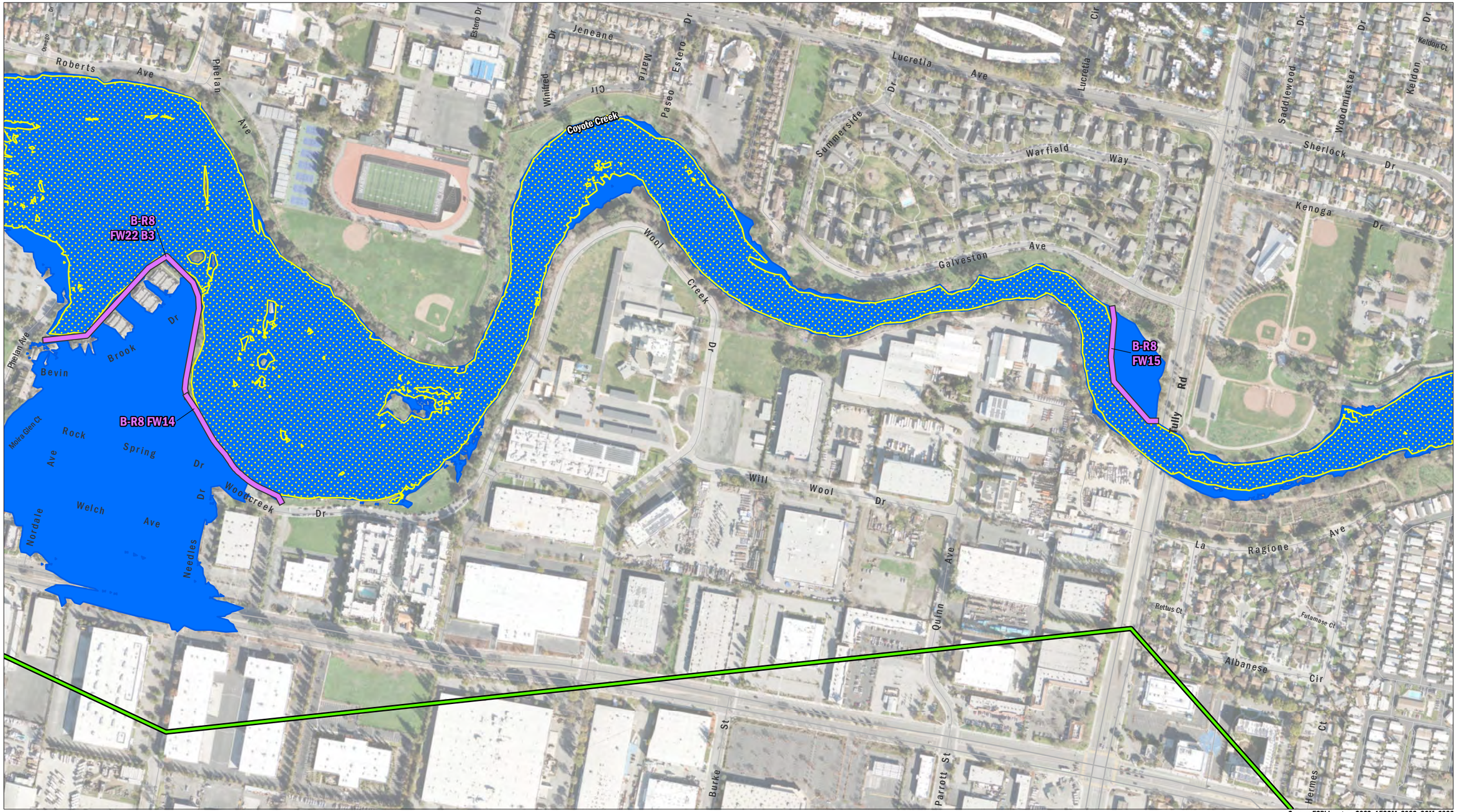
Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Post-Project Conditions
Page 11 of 11

Attachment 2

Scenario 4 Versus Scenario 1 Comparison Figures



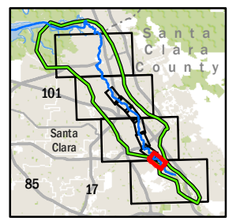
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

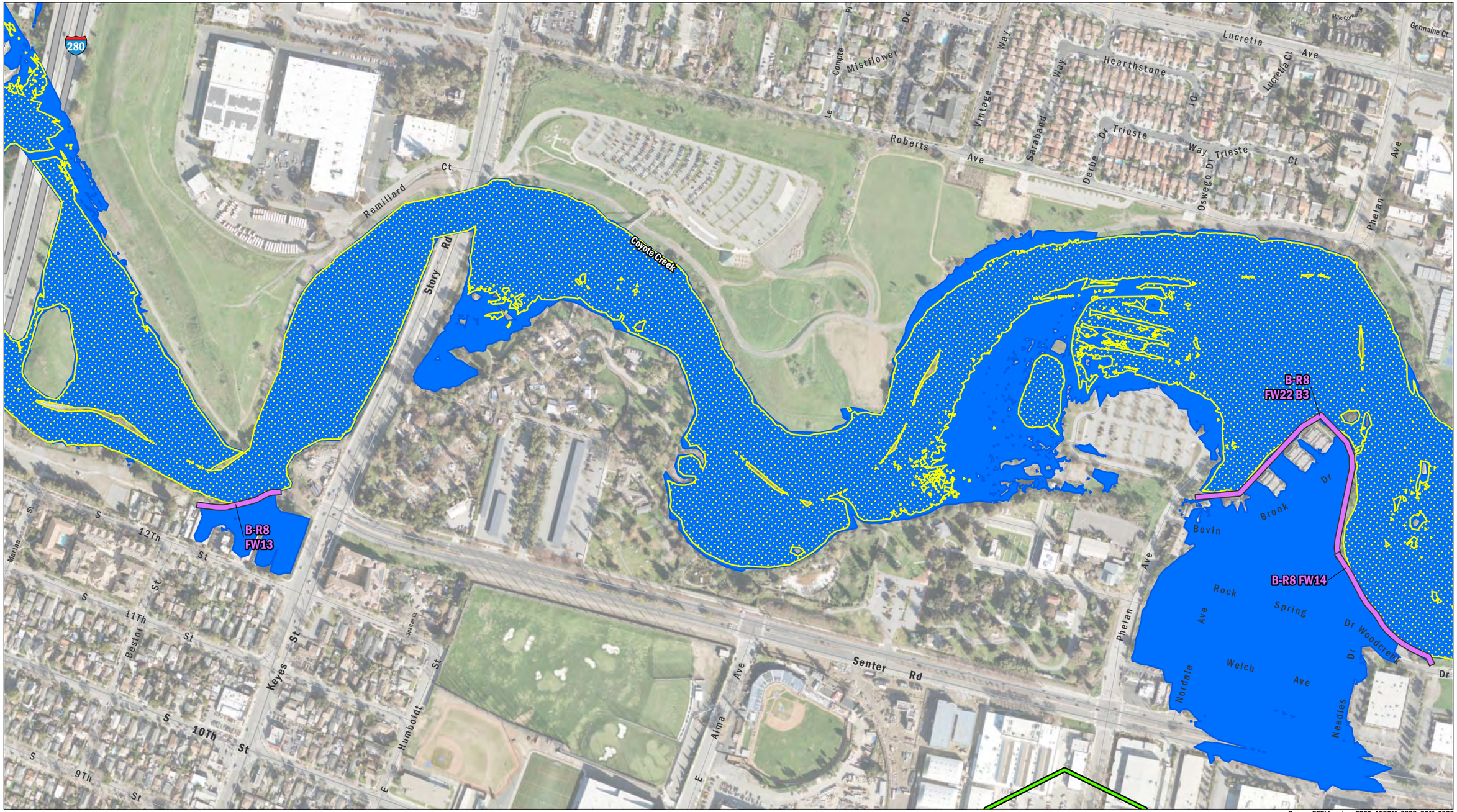
Modeled Flood Extents
Scenario 1
Scenario 4



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1



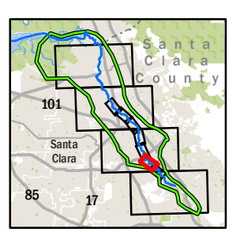
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

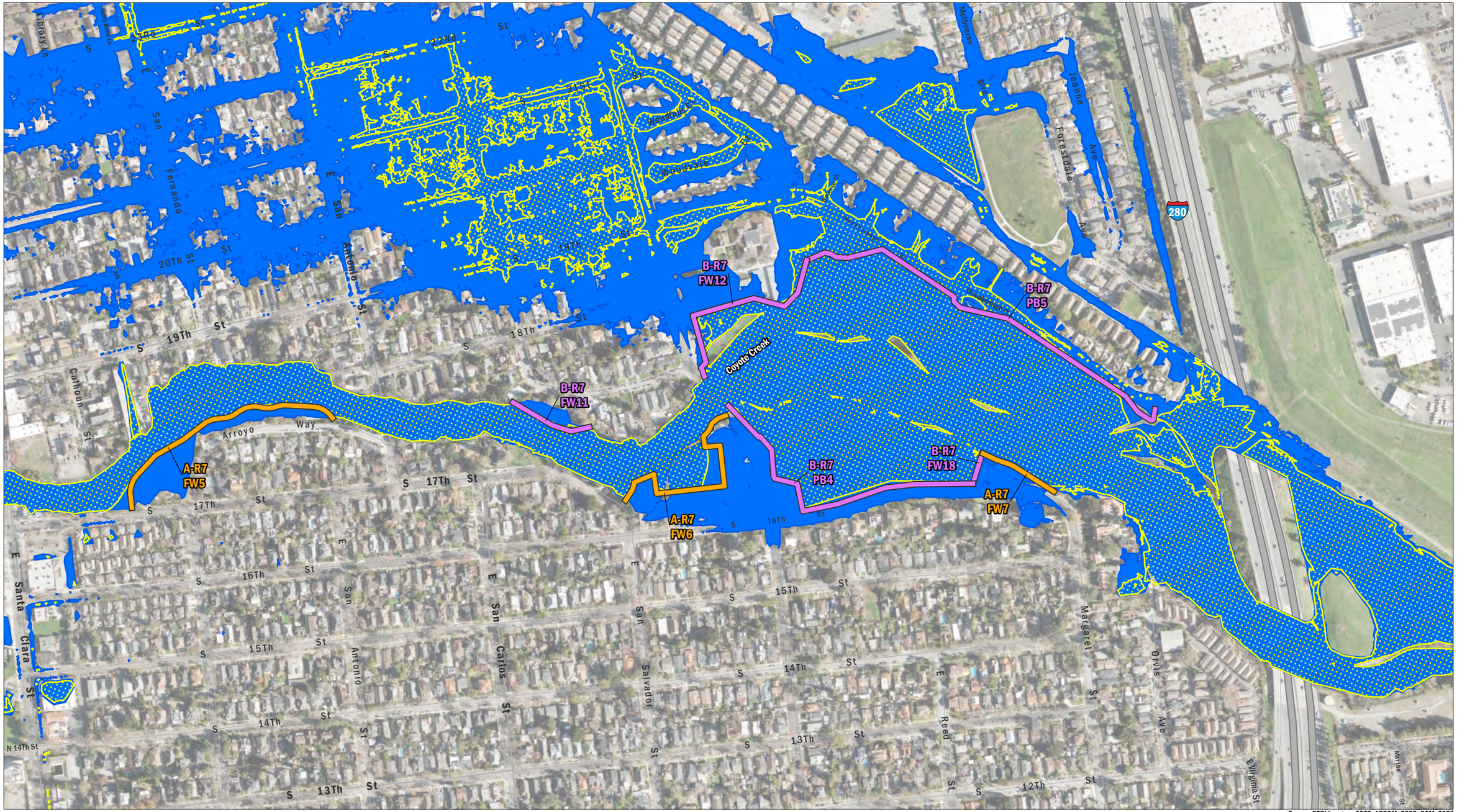
CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 4



AECOM
Coyote Creek
EIR Modeling

FIGURE 1
Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 4

AECOM
Coyote Creek
EIR Modeling

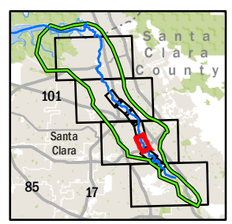
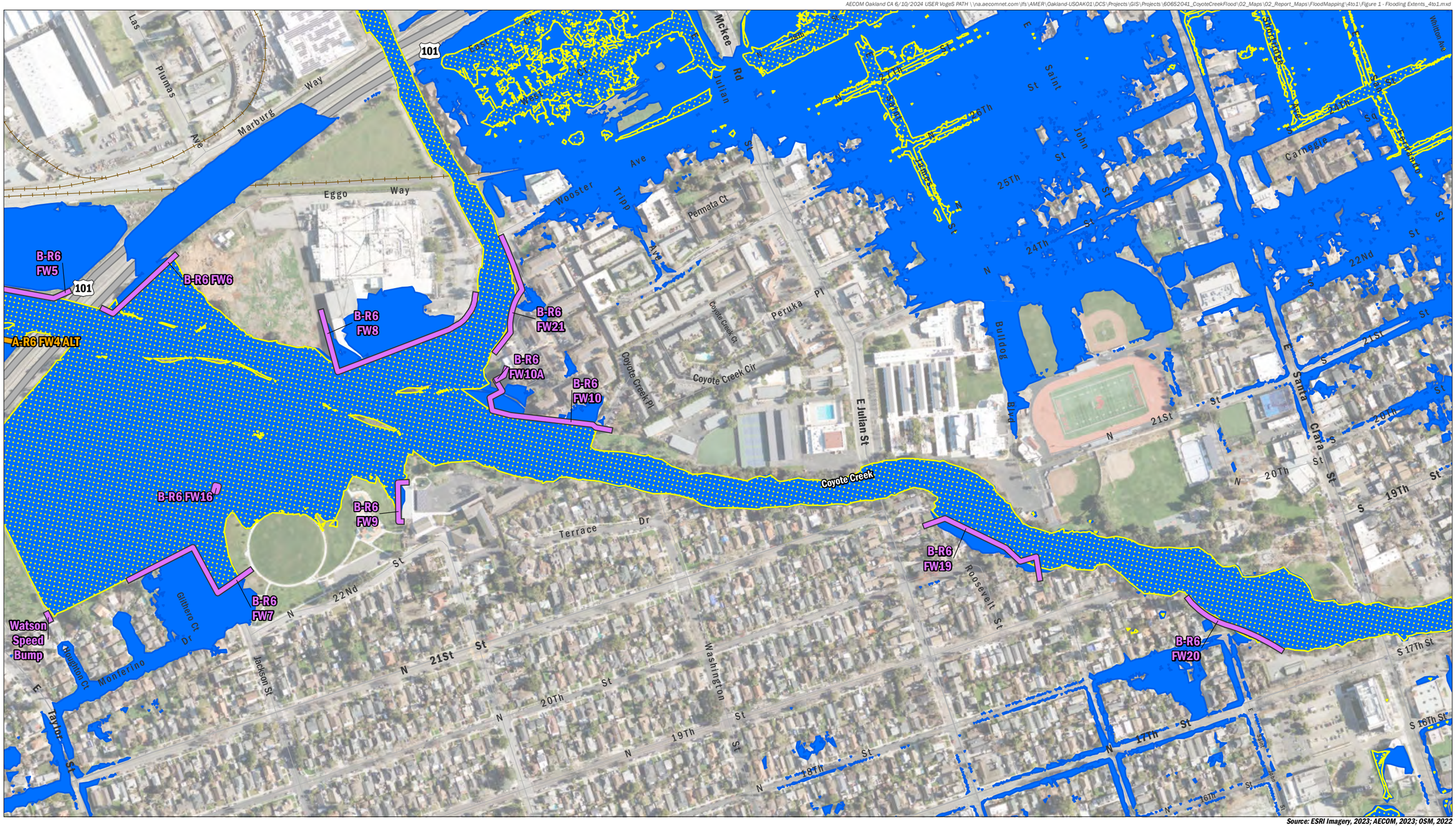


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 4

AECOM
Coyote Creek
EIR Modeling

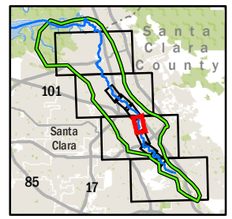
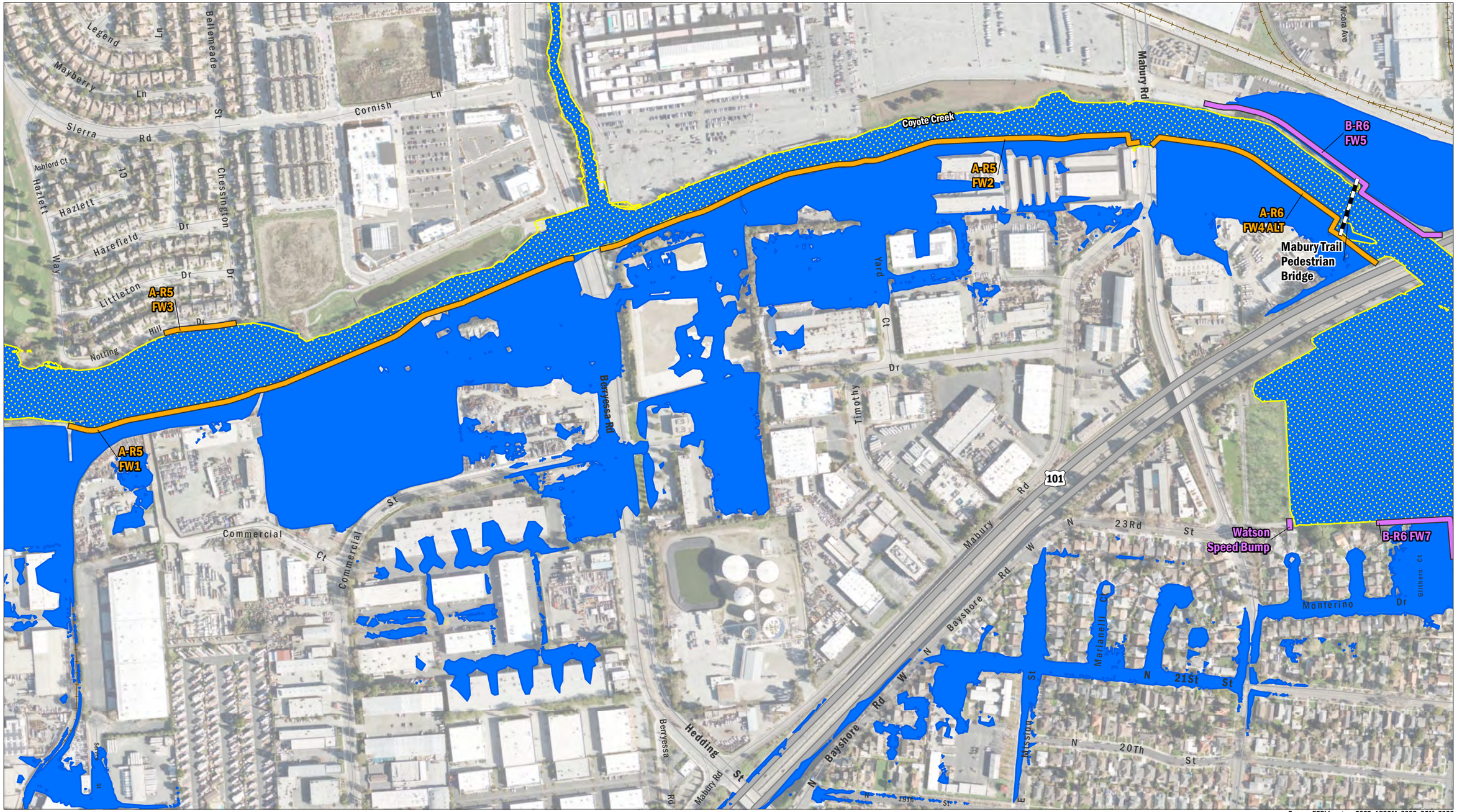


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

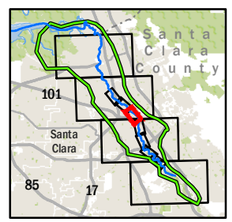
0 500 Feet

Created Date: 6/10/2024

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Modeled Flood Extents

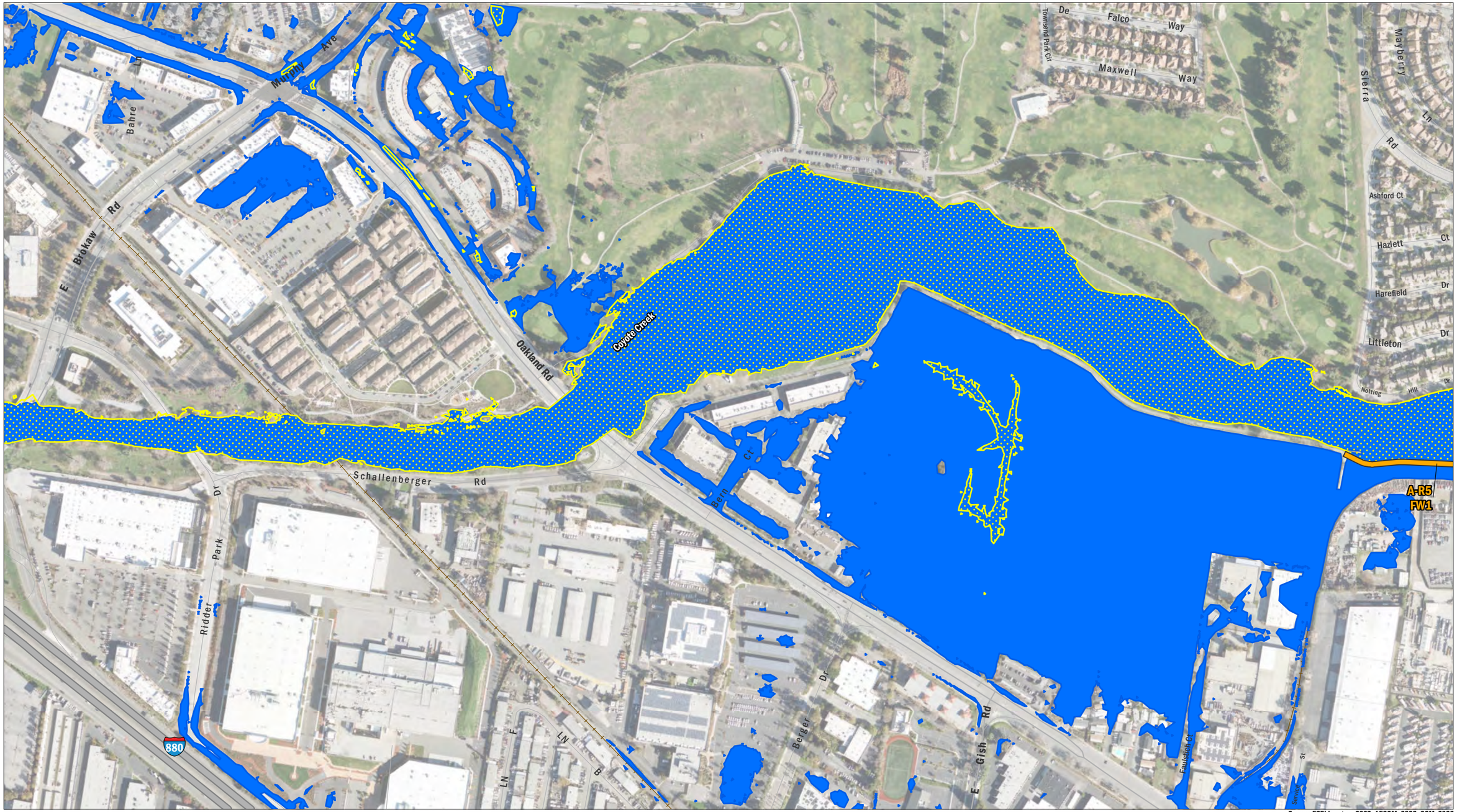
- Scenario 1
- Scenario 4



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1
Page 5 of 11



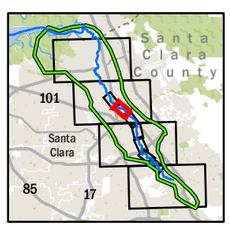
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

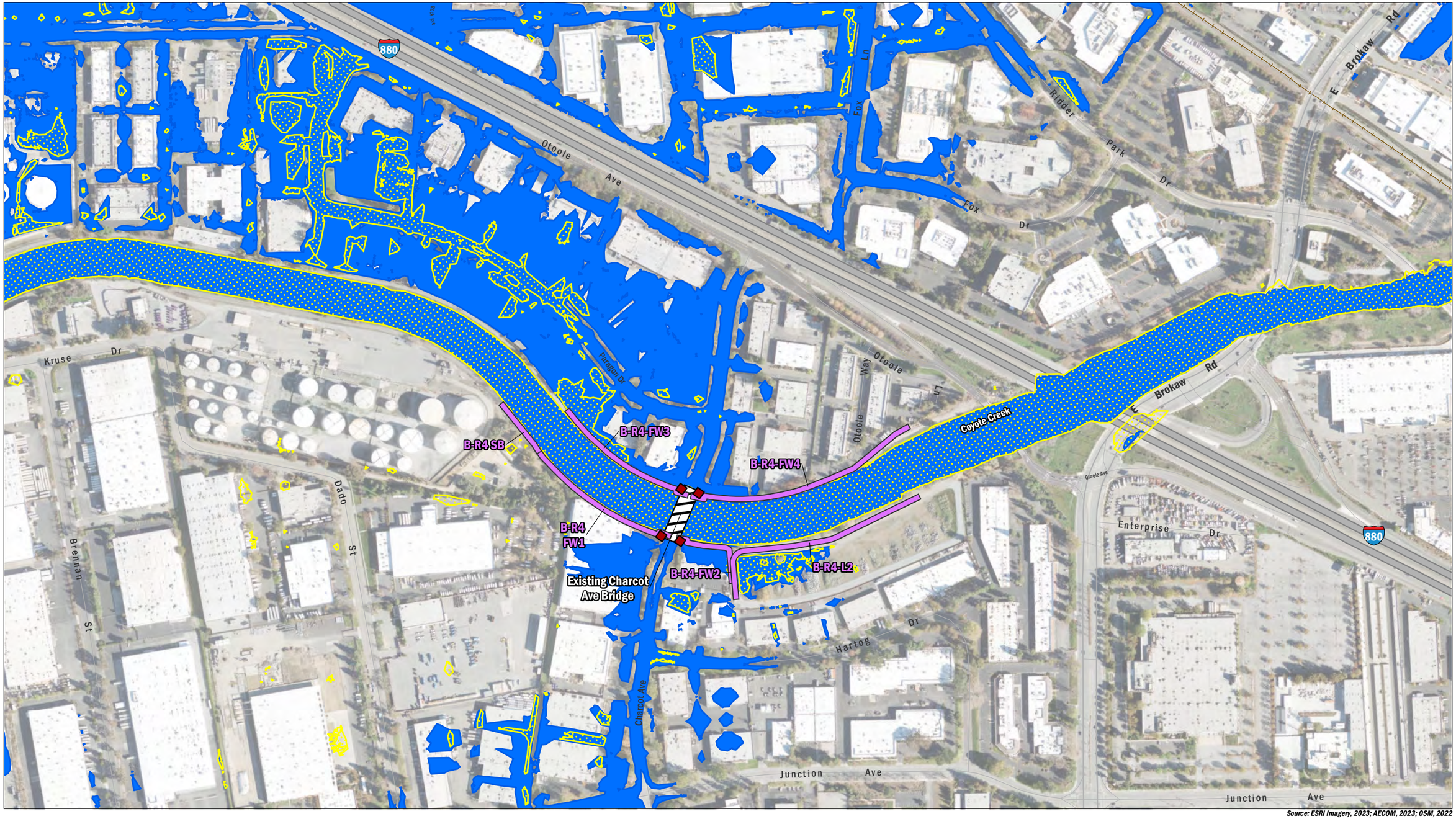
Modeled Flood Extents
Scenario 1
Scenario 4



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

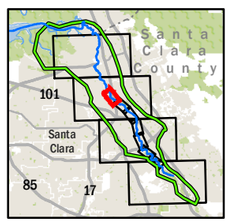


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1
Page 7 of 11

B-R8
FW15

Coyote Creek

Thompson Creek

Silver Creek

Guadalupe River

Canoas Creek

Penitencia Creek Canal

Evergreen Creek

Alma Ave
W Alma Ave
Monterey Hwy
CR G8
San Jose Ave
S 7th St
S 10th St
Tully Rd
S King Rd
Capitol Expy
Aborn Rd
San Felipe Rd
Mclaughlin Ave
Silver Creek Rd
Bird Ave
Almaden Rd
Almaden Expy
Curtner Ave
Senter Rd
Tuers Rd
Yerba Buena Rd
Capitol Expy
Monterey Hwy
Sylvandale Ave
Hellyer Ave
Lincoln Ave
Foxworthy Ave
Hillsdale Ave
W Capitol Expy
Capitol Expressway Auto Mall
Pearl Ave
Snell Ave
Senter Rd
Monterey Hwy

82
87
101

Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 4

AECOM
Coyote Creek
EIR Modeling

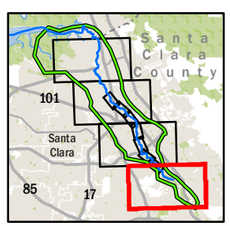
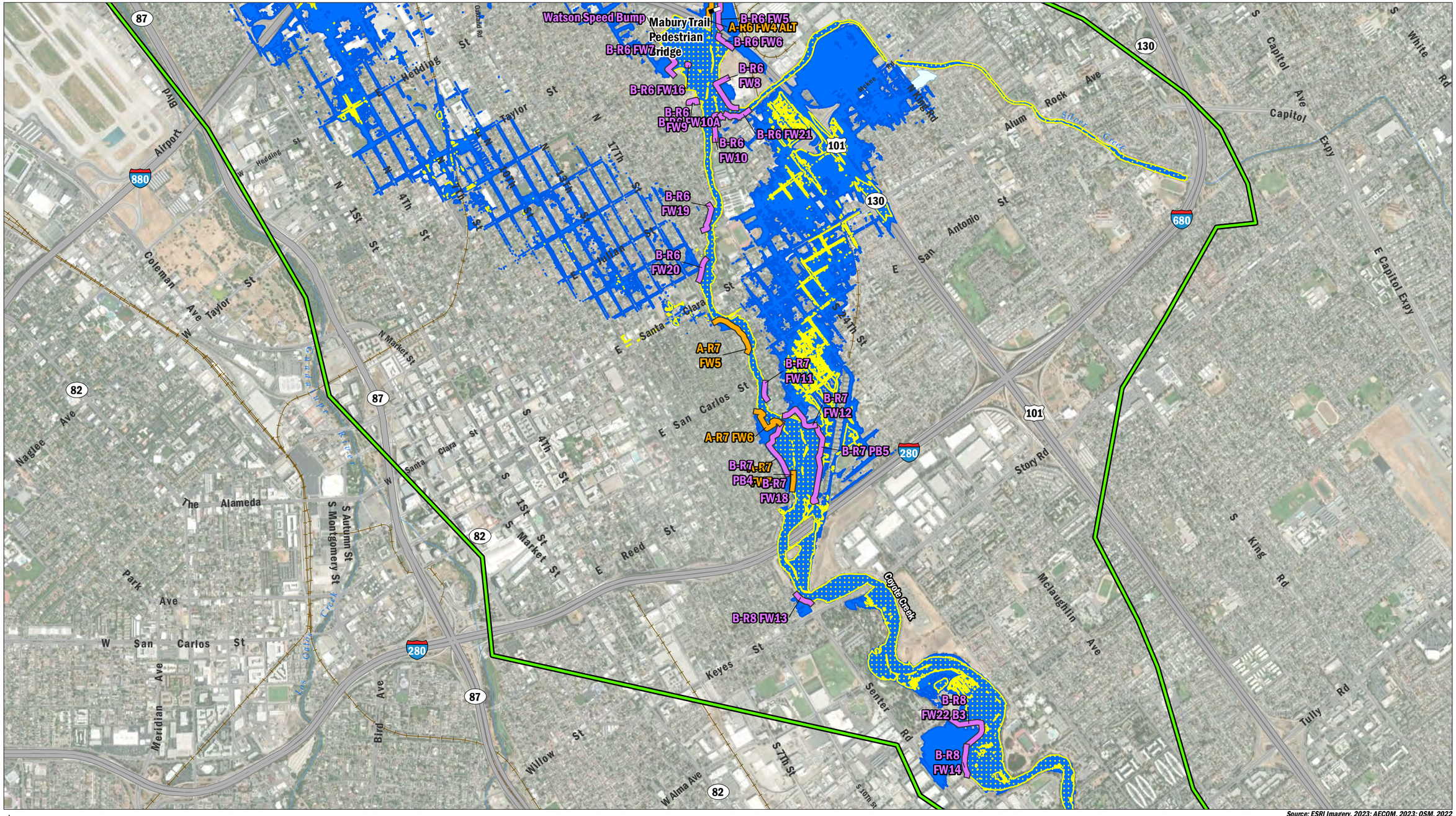


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Modeled Flood Extents
- Scenario 1
- Scenario 4

AECOM
Coyote Creek
EIR Modeling

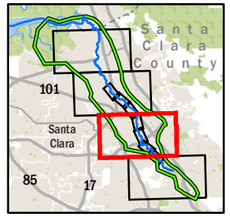
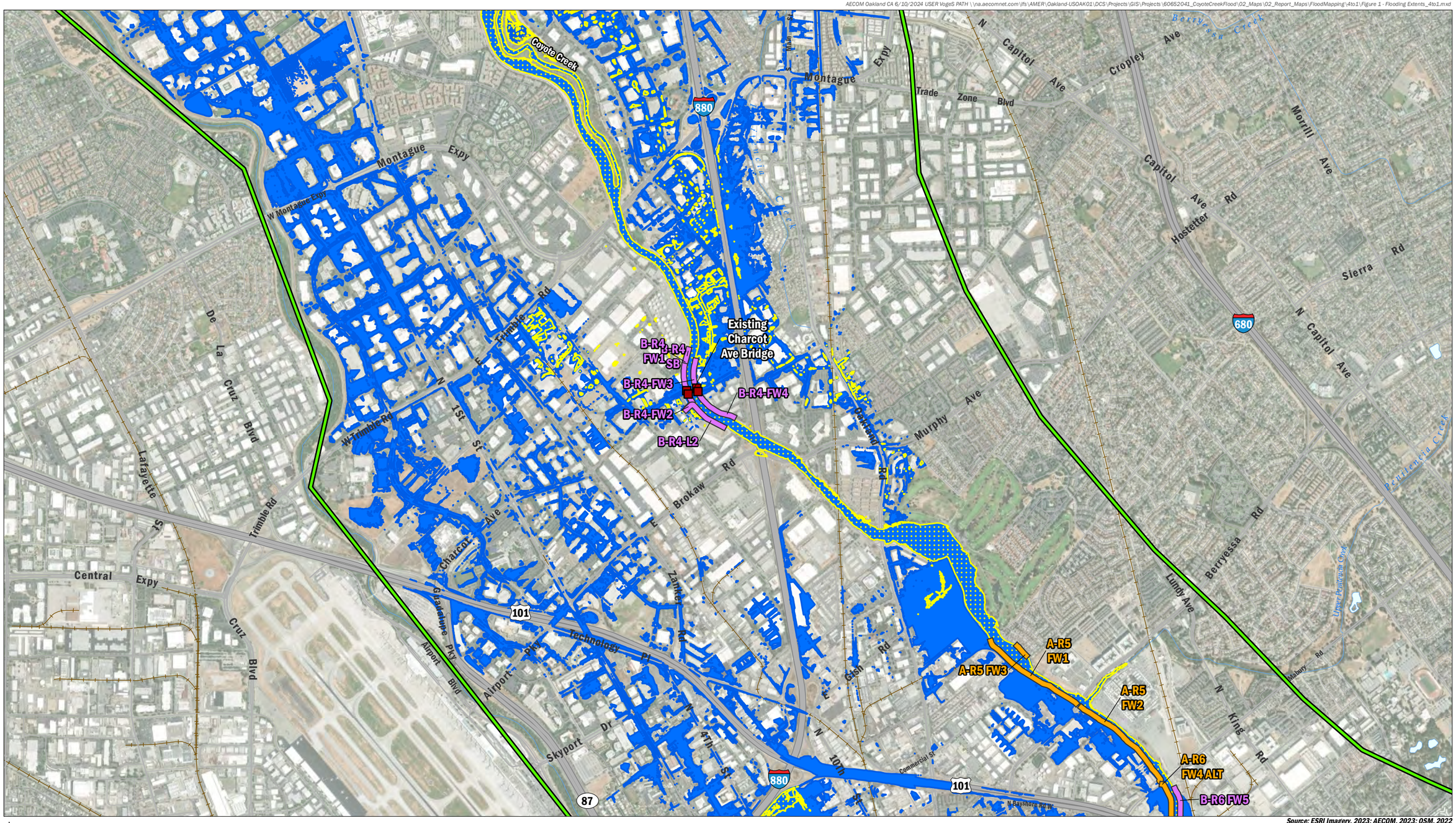


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1
Page 9 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Modeled Flood Extents
- Scenario 1
- Scenario 4

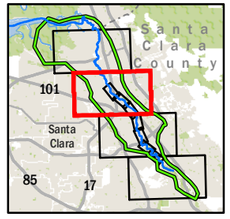
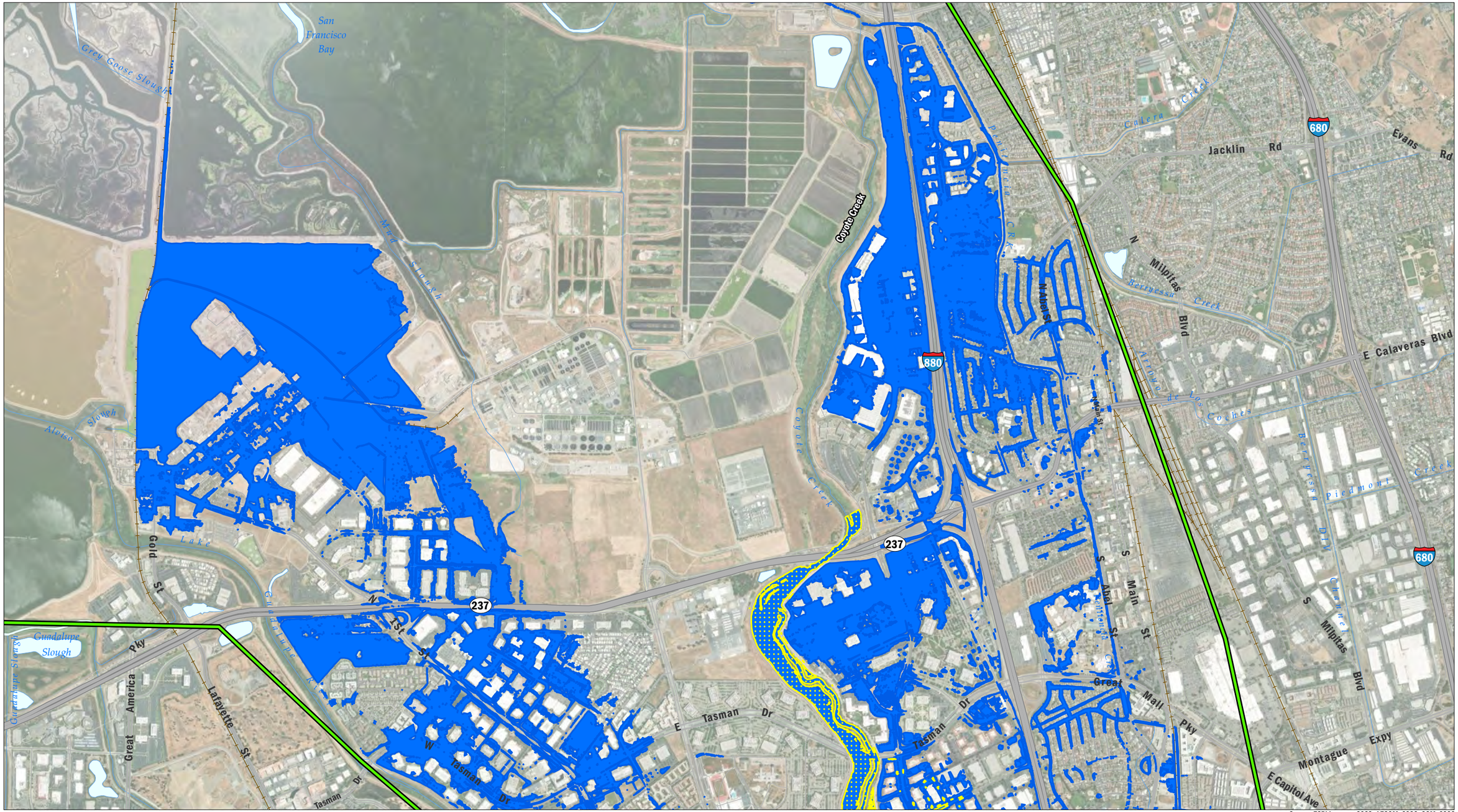


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

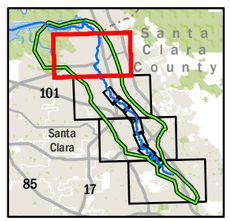
N

0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

Modeled Flood Extents
- Scenario 1
- Scenario 4

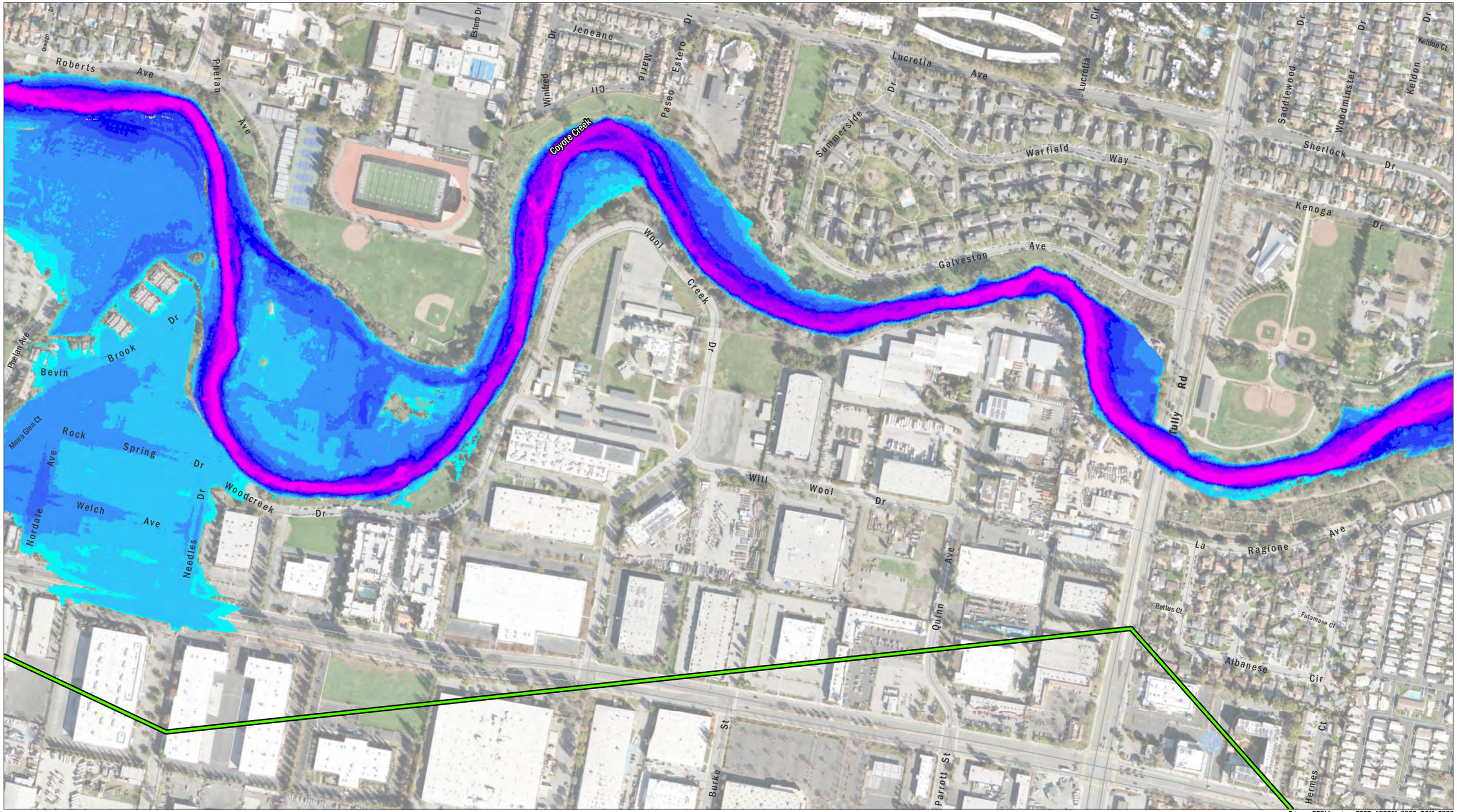


AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 4 Compared to Scenario 1

AECOM Oakland CA 5/6/2024 USER VogeS PATH \\na.aecomnet.com\fs\AMER\Oakland-USOAK01\DCS\Projects\GIS\Projects\60652041_CoyoteCreekFlood\02_Maps\02_Report_Maps\FloodMapping\4to1\Figure 2 - Existing Max Water Depths 1ft and Over_4to1.mxd



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

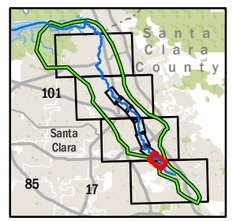
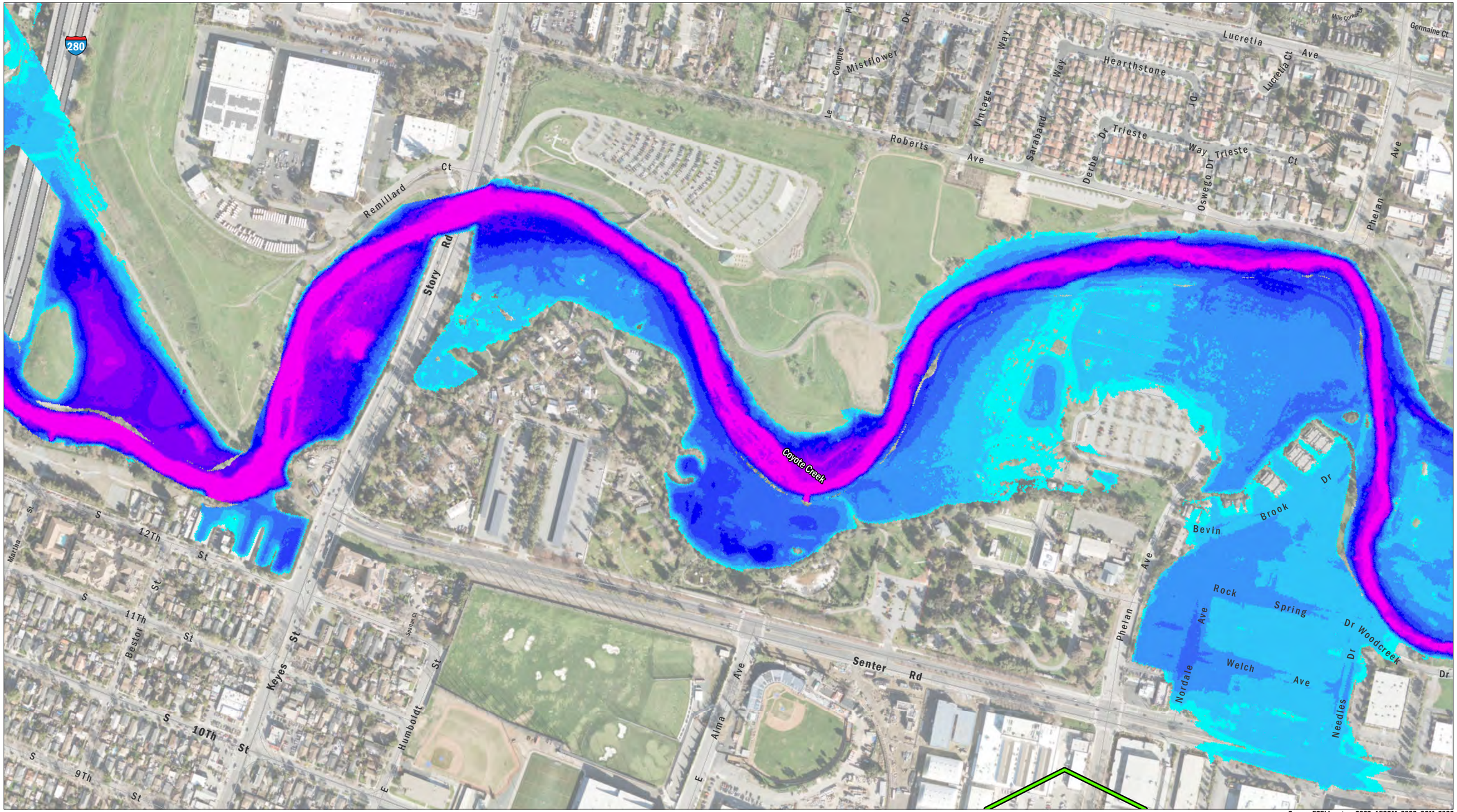


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

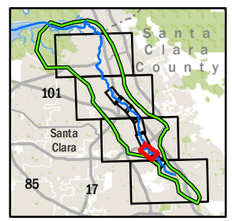
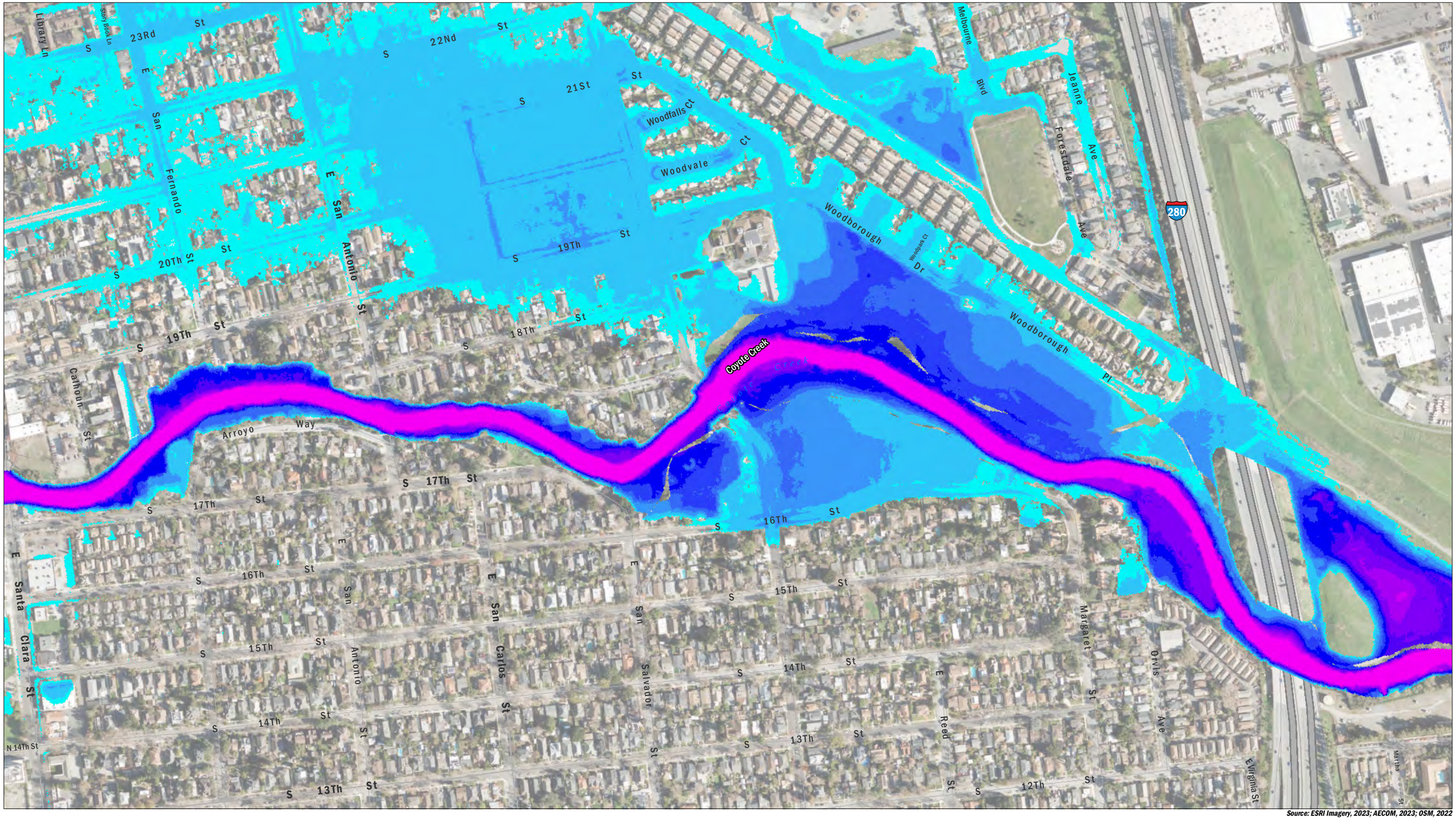


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

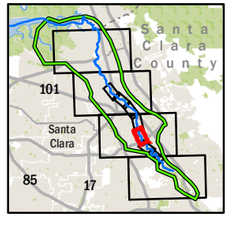
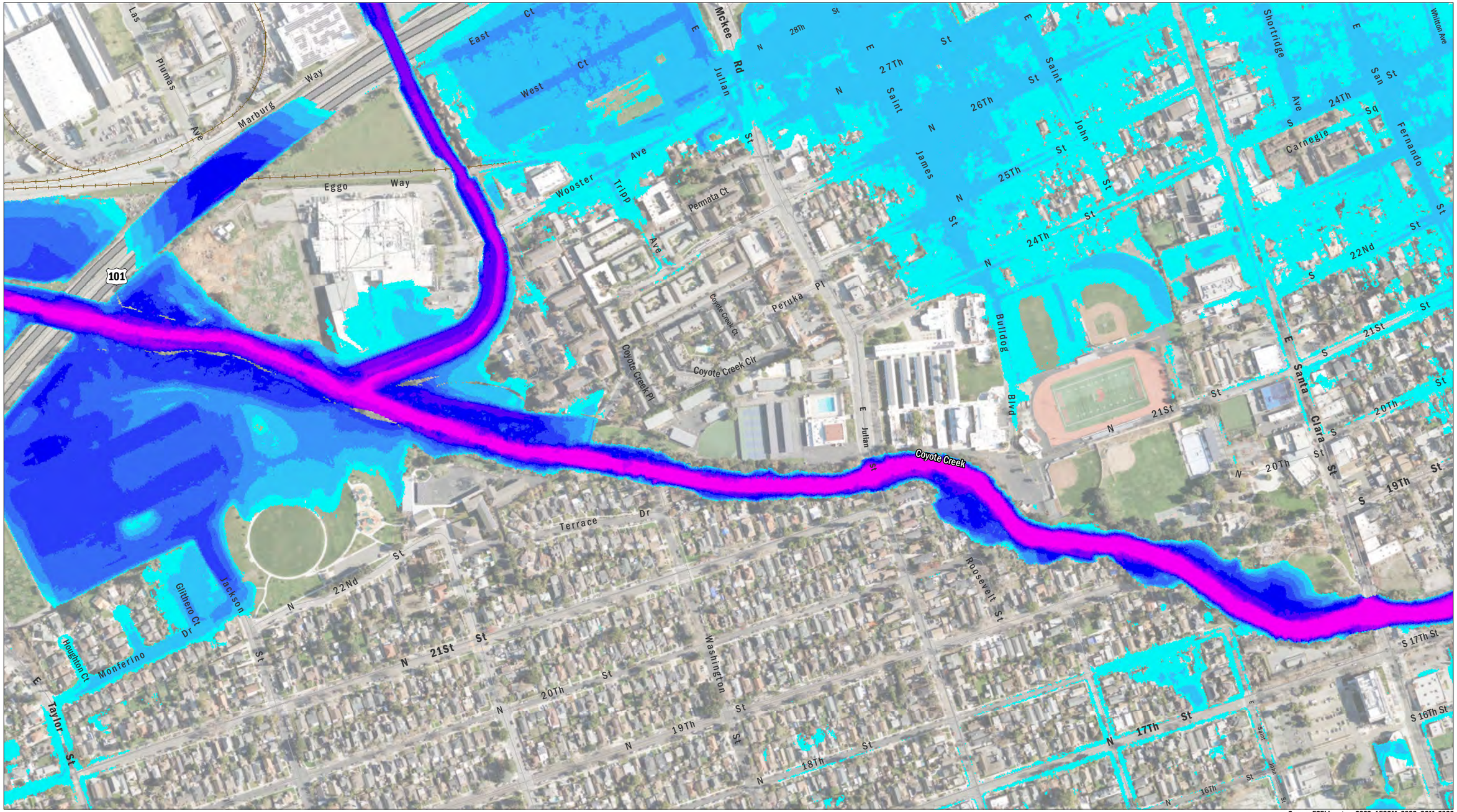


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

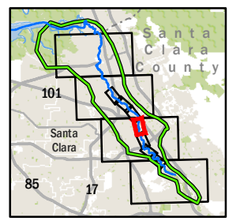
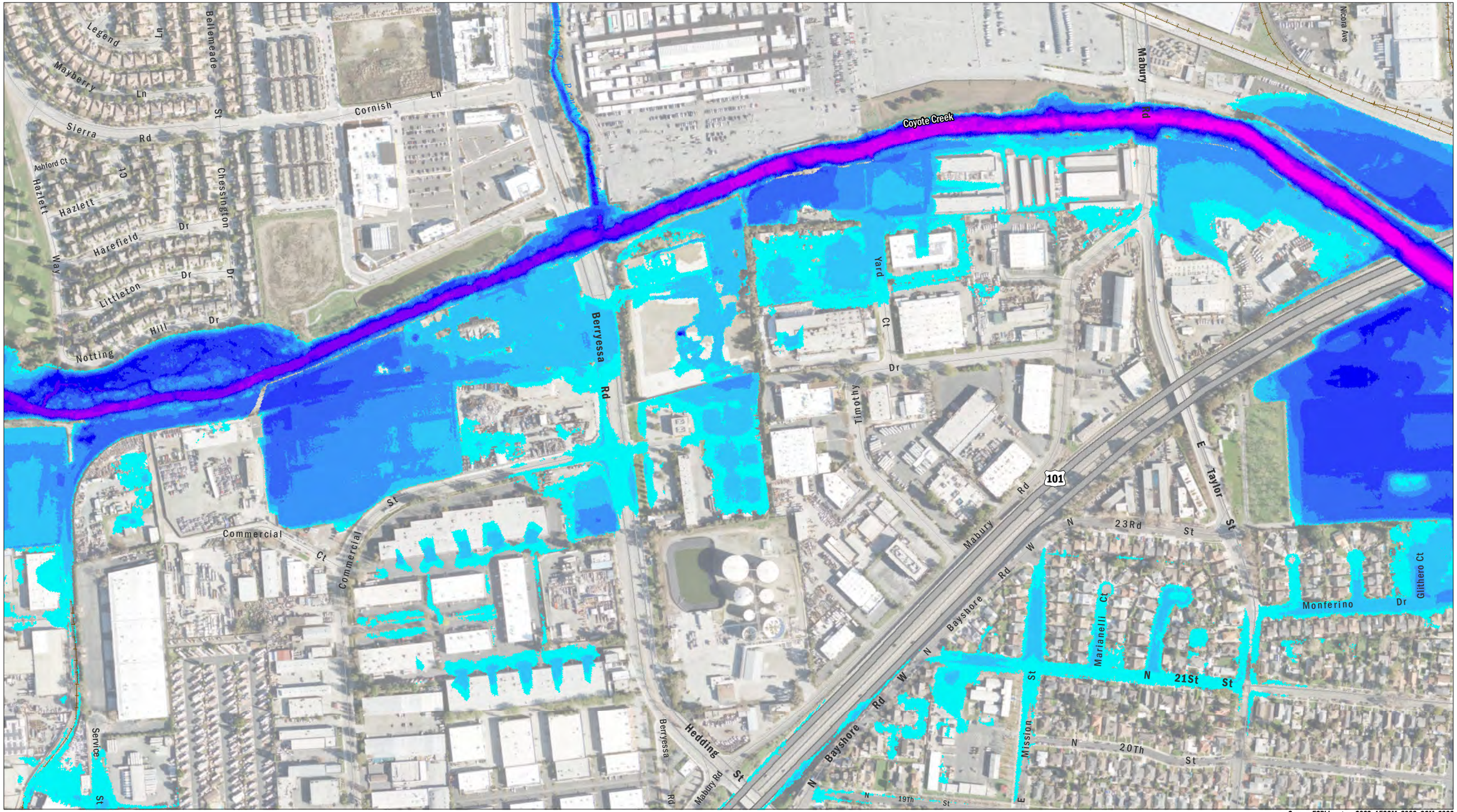


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

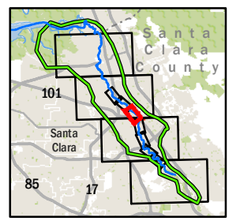
0 500
Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

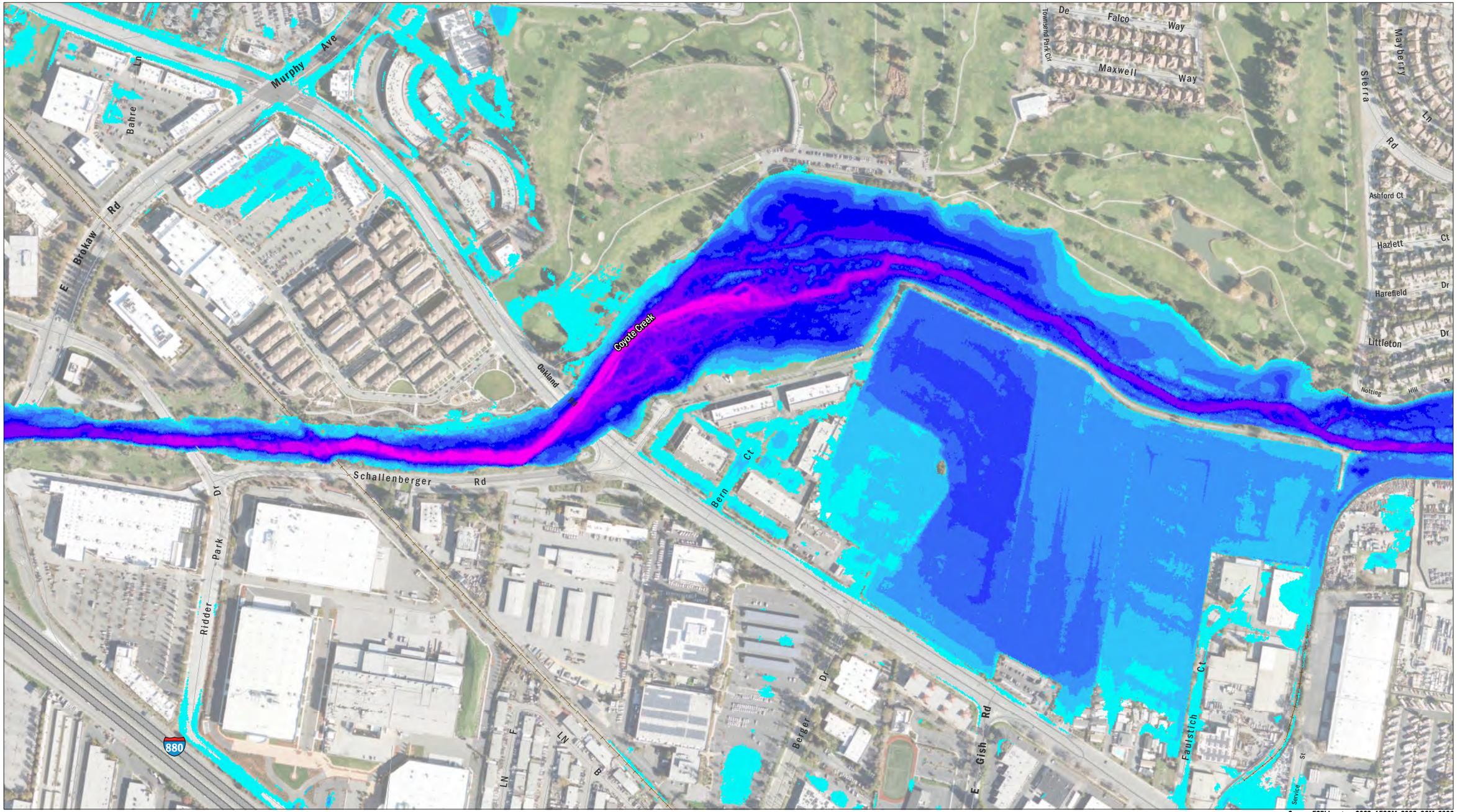
- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2
Existing Max. Water Depths 1ft and Over Scenario 1
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

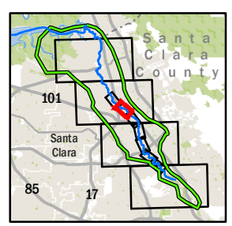
Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

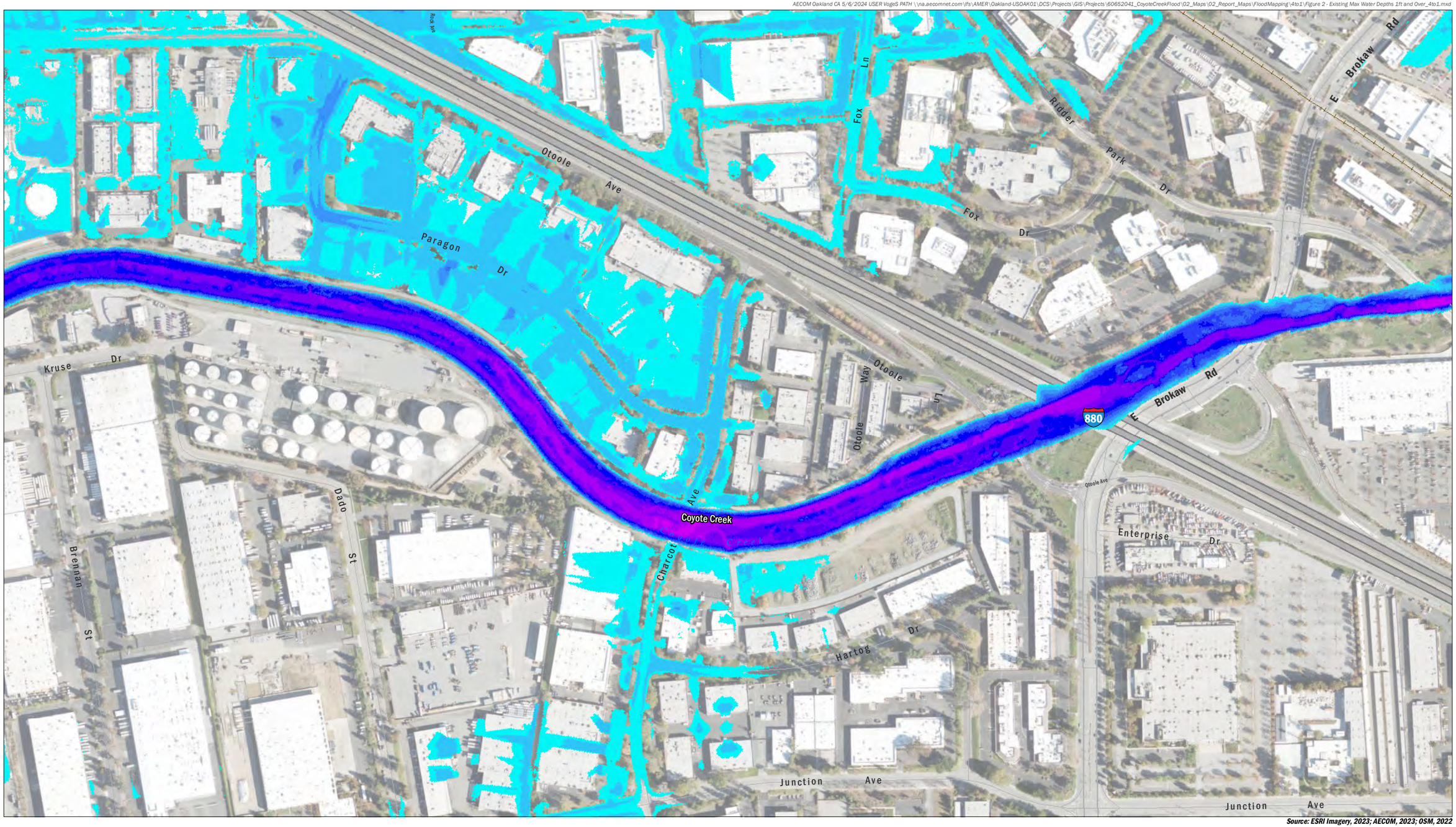


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

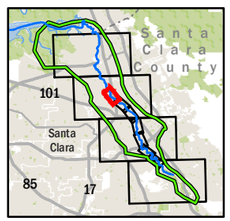
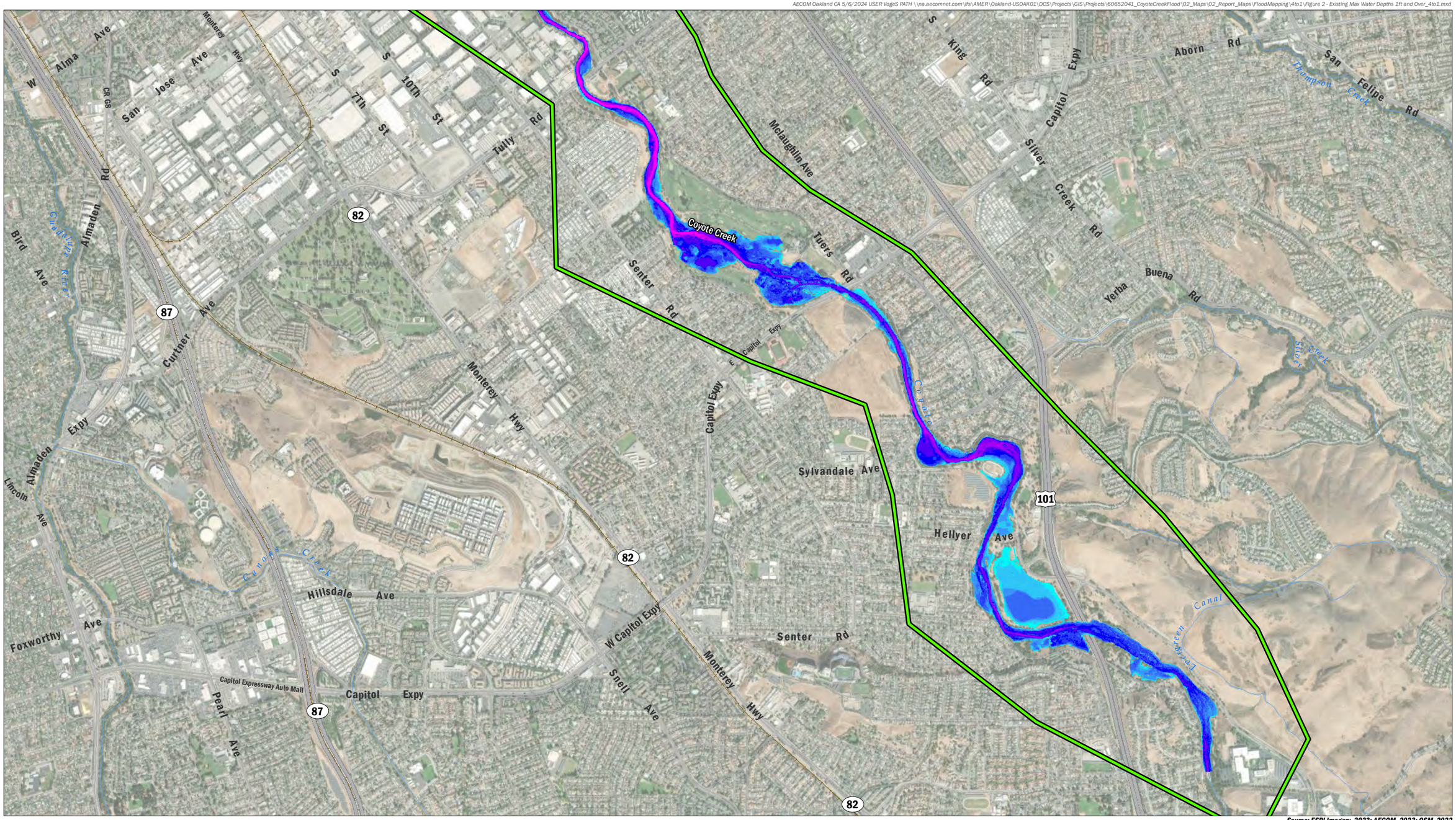


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



0 2,400 Feet

Created Date: 5/6/2024

Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

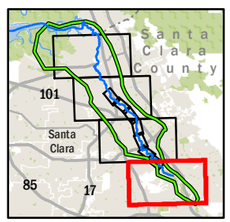
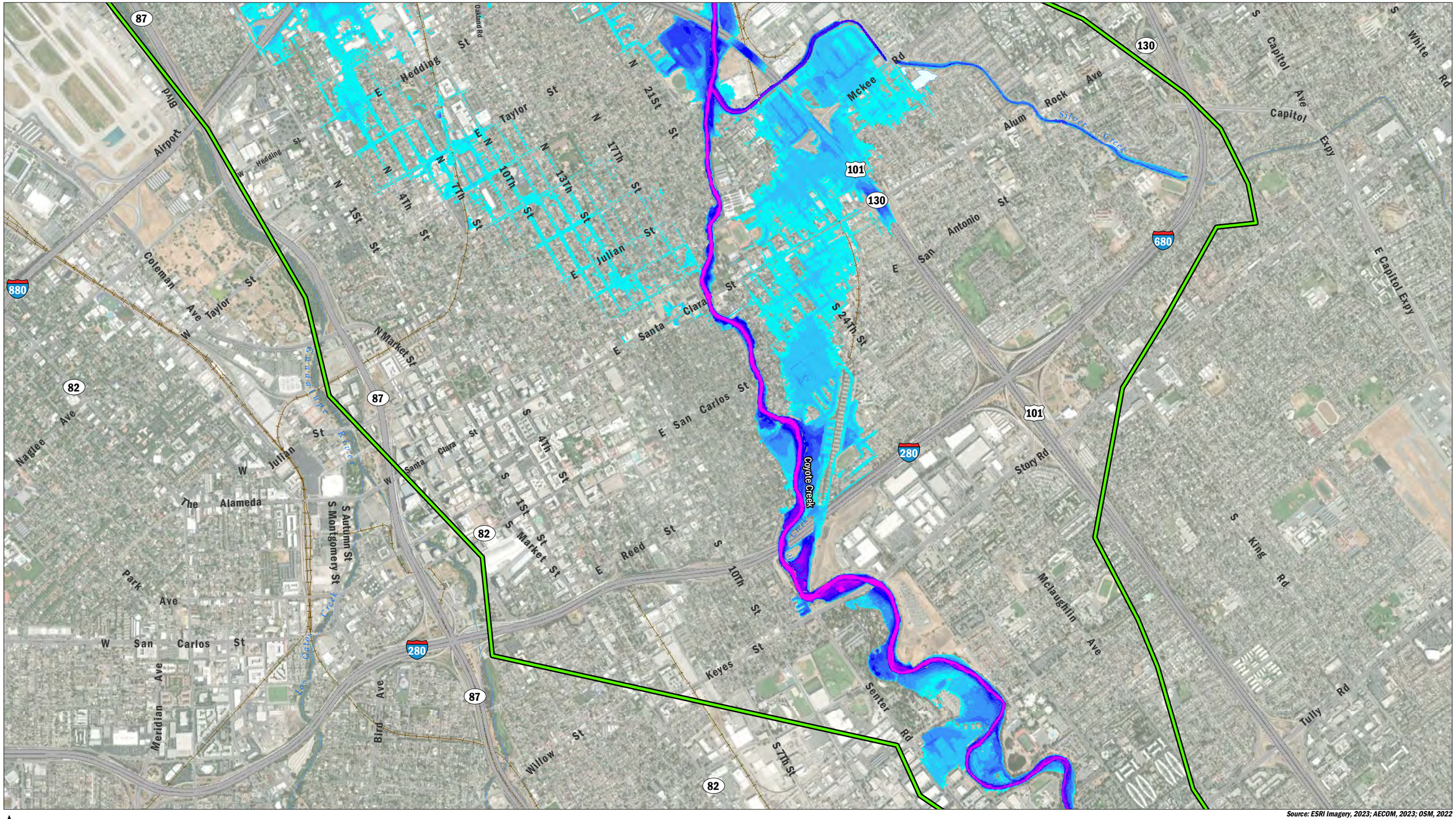


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

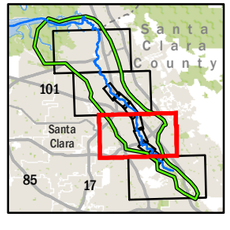
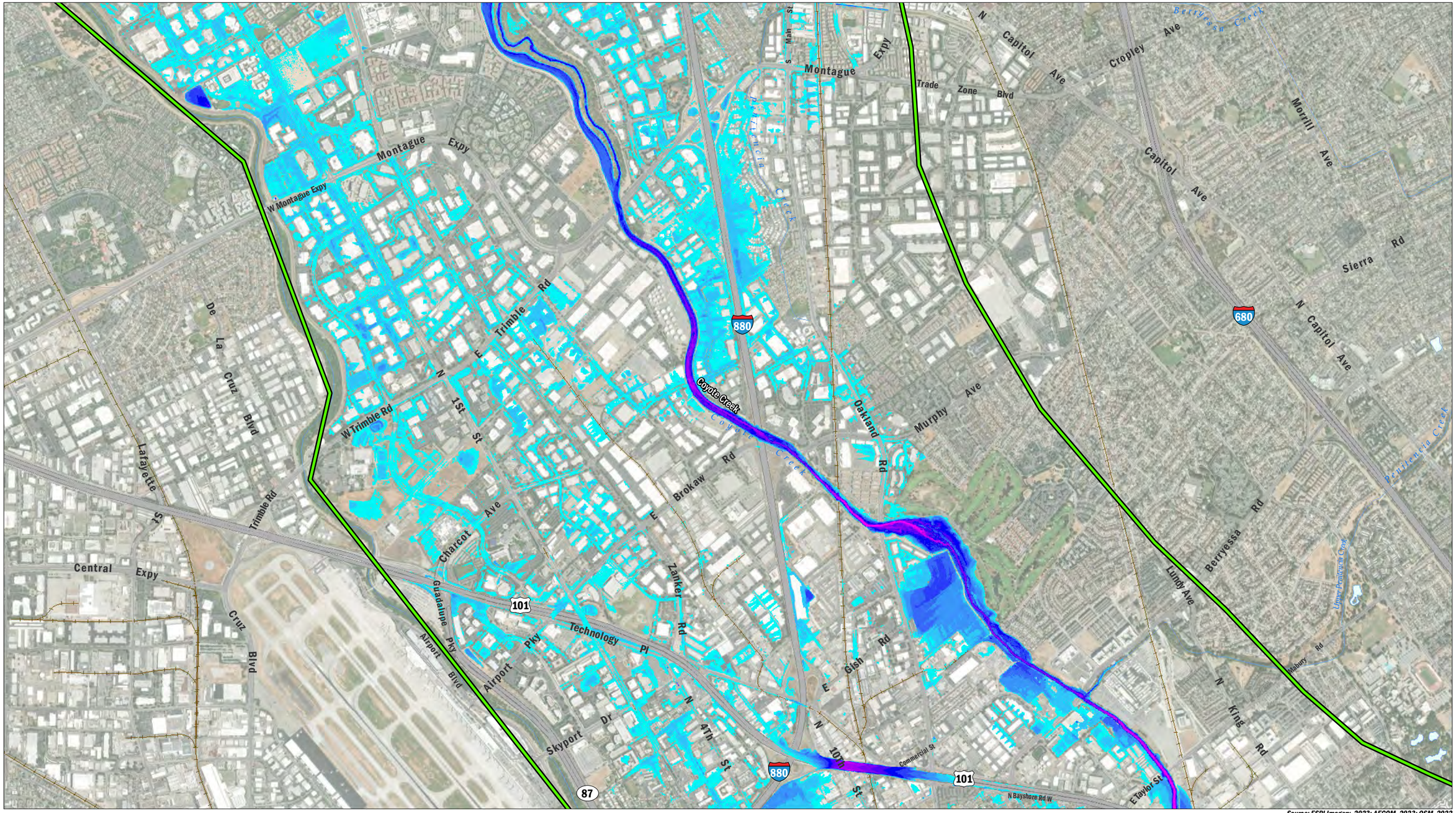


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

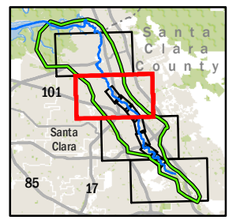
0 2,400
Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

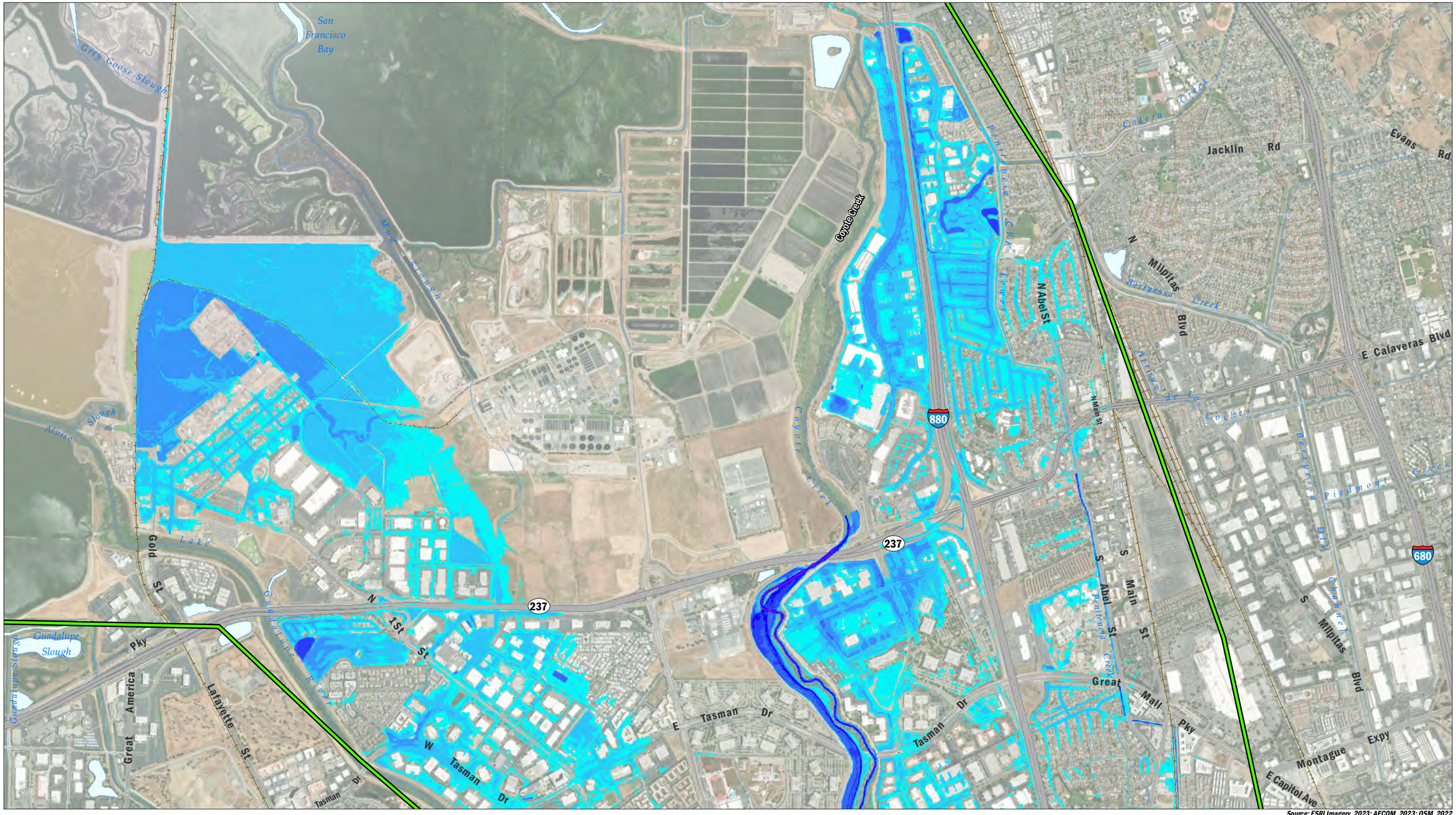
- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2
Existing Max. Water Depths 1ft and Over Scenario 1
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

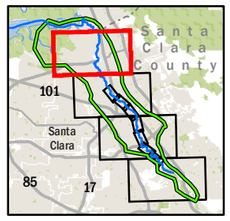
0 2,400
Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.58

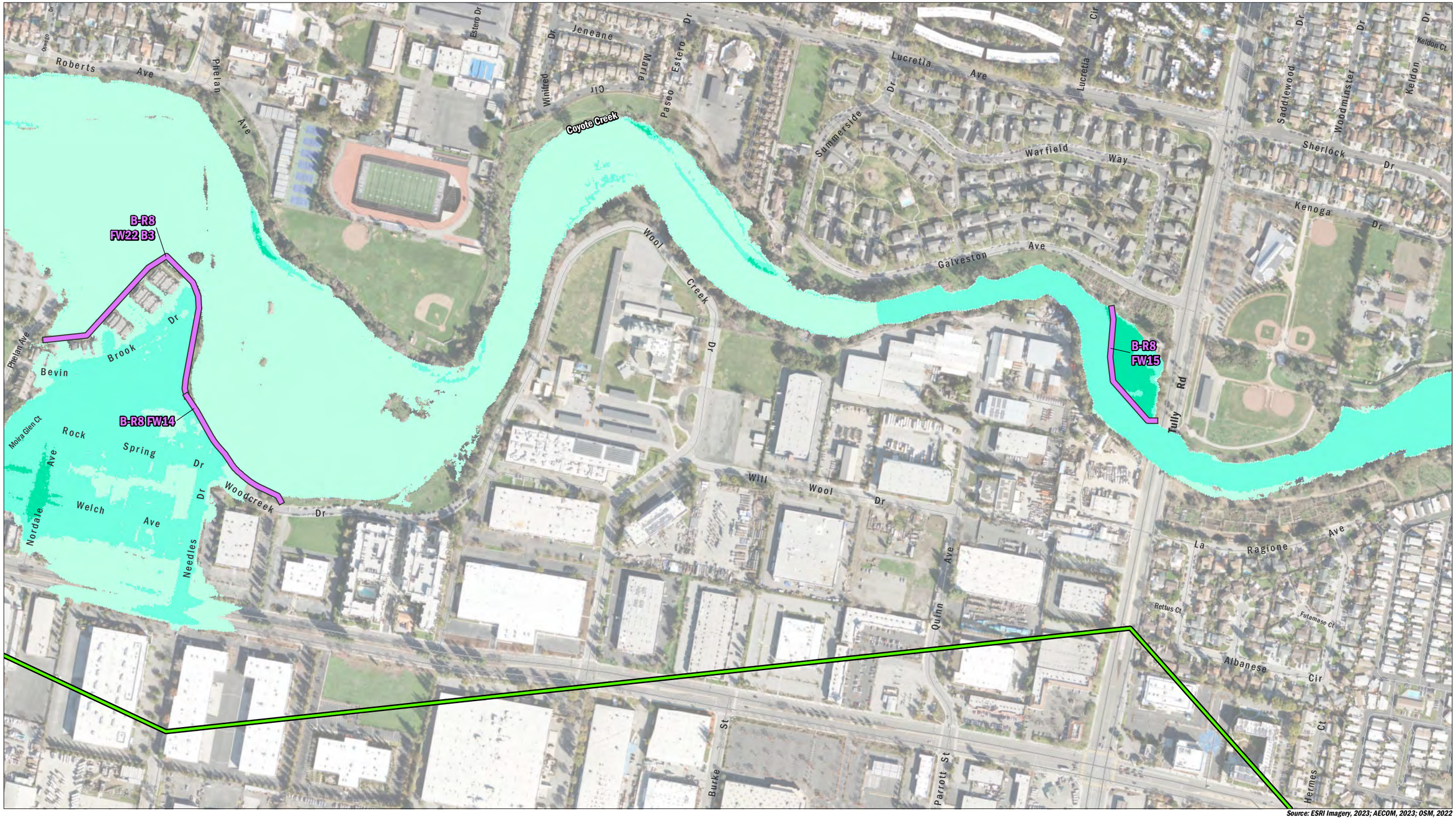


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



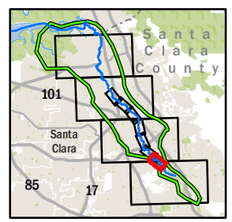
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.2 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 4.3

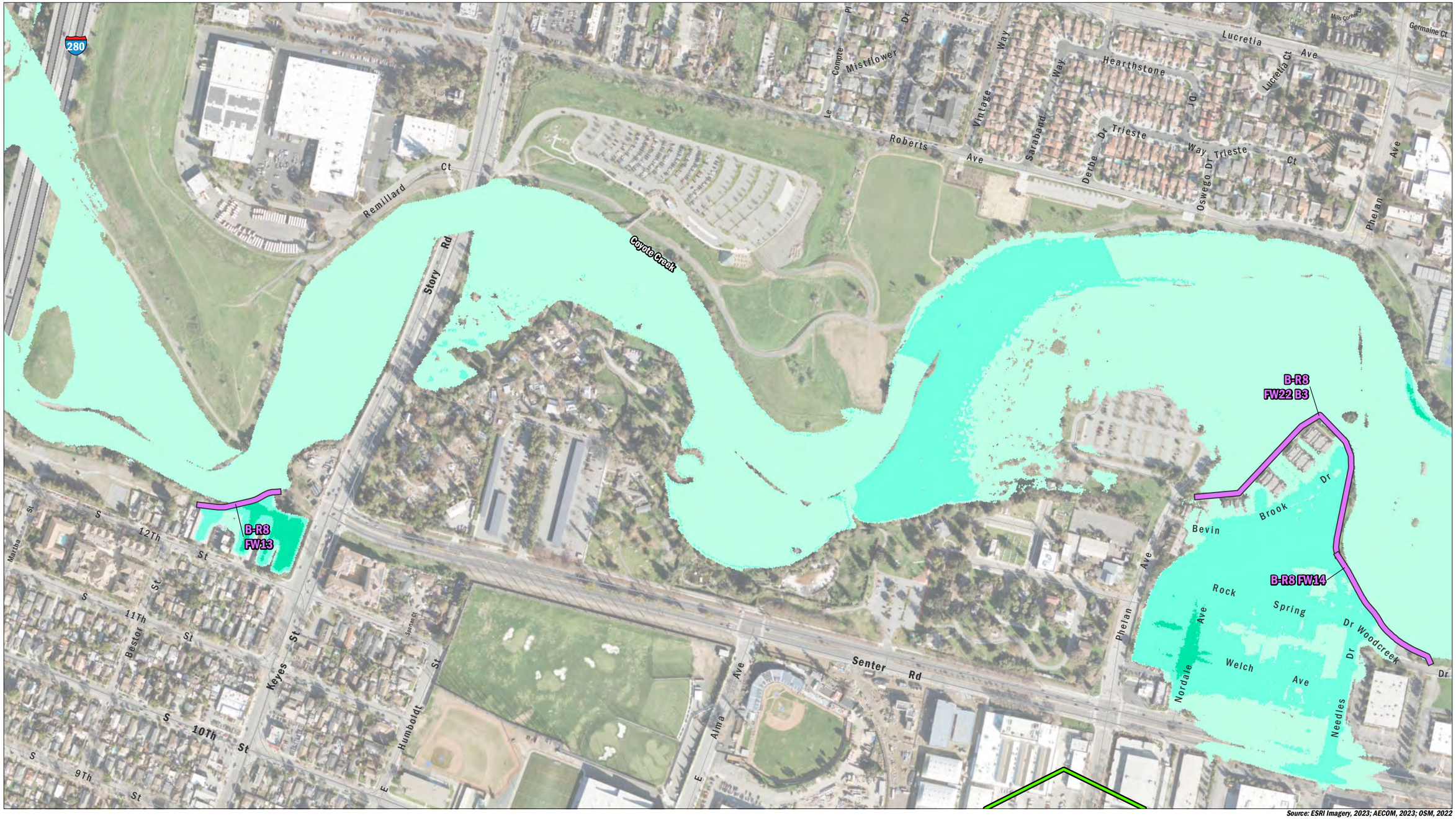


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.2 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 4.3

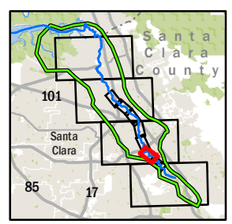
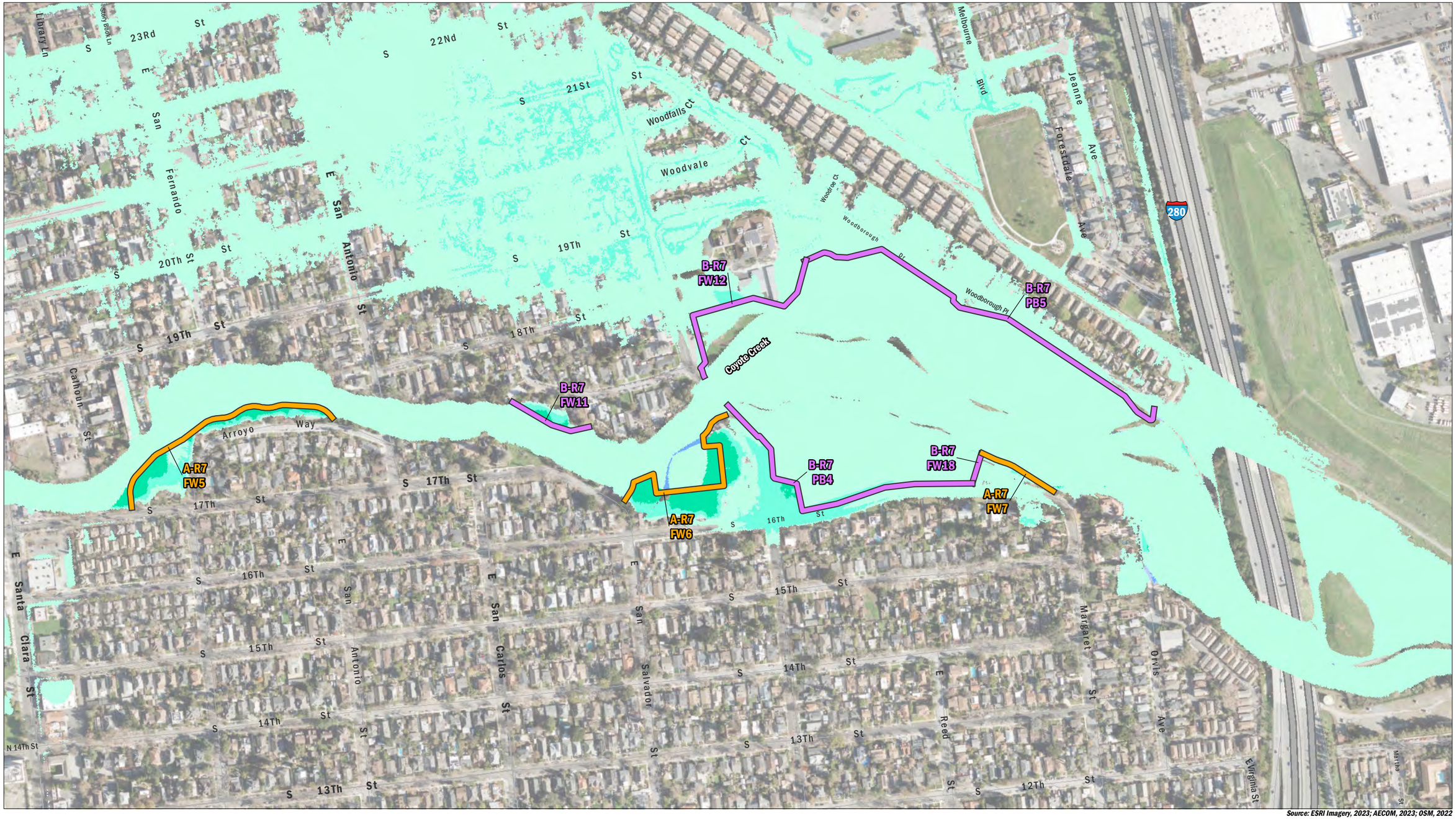


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1
Page 2 of 11



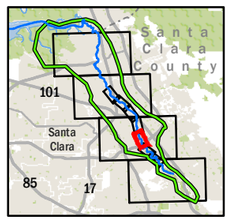
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.2 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 4.3



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.2 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 4.3

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

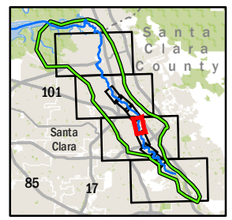
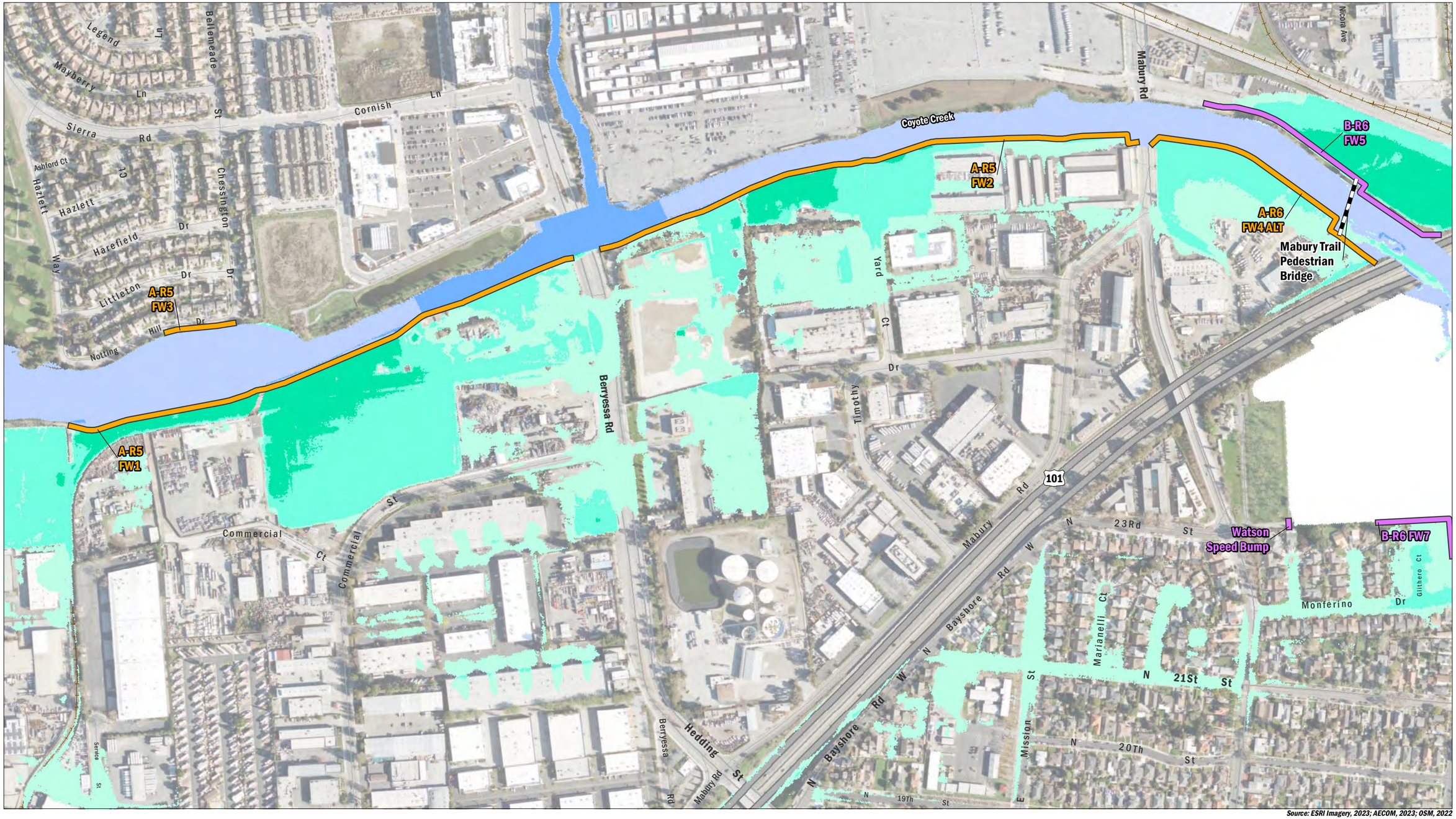


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

- -17.2 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 4.3

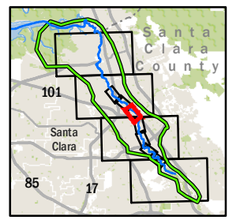
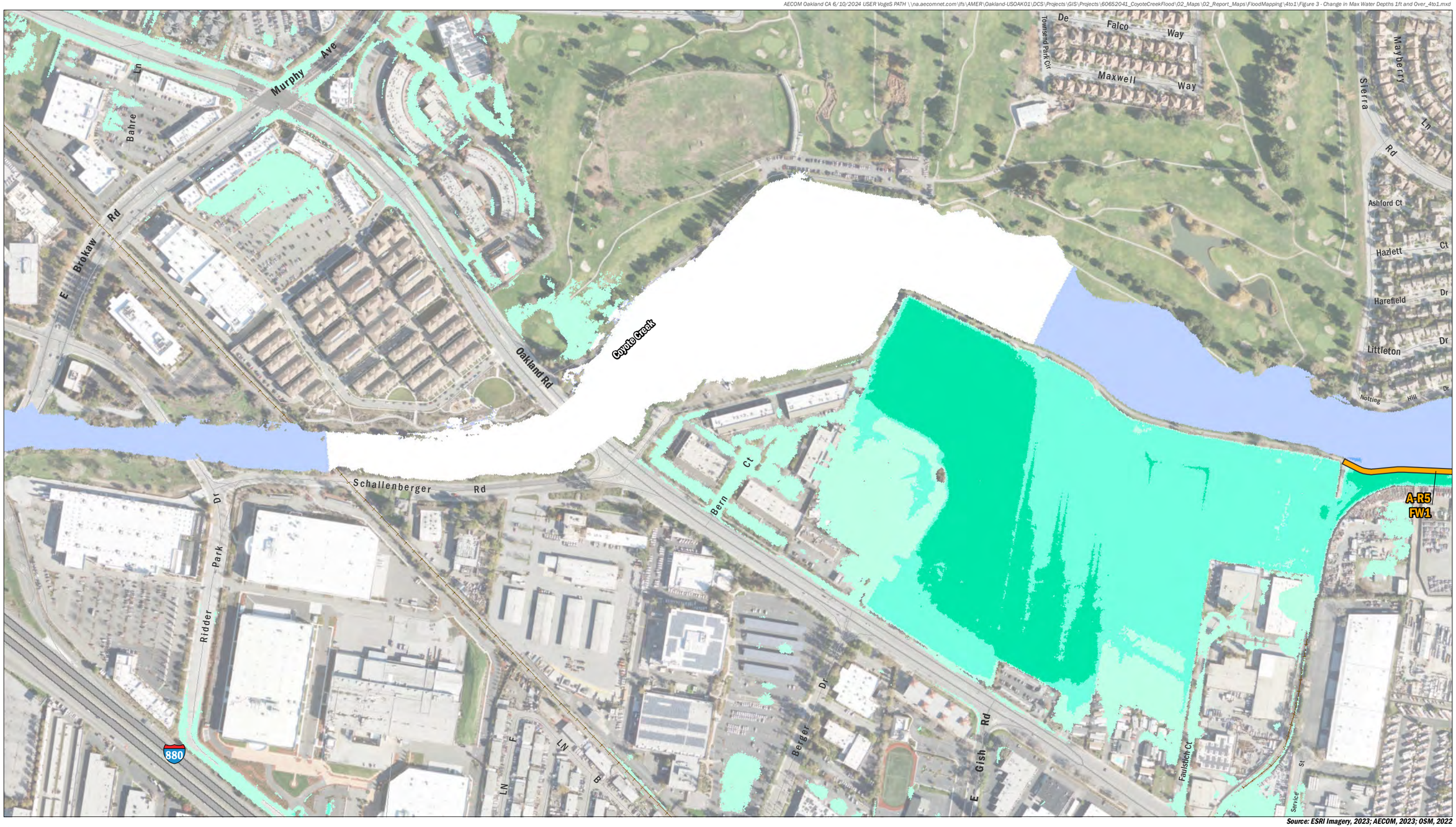


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

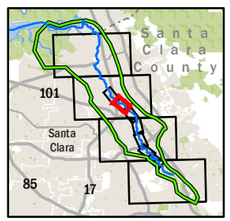
0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

-17.2 - -6	-3 - -0.1
-6 - -3	-0.1 - 0.1
	0.1 - 3
	3 - 4.3

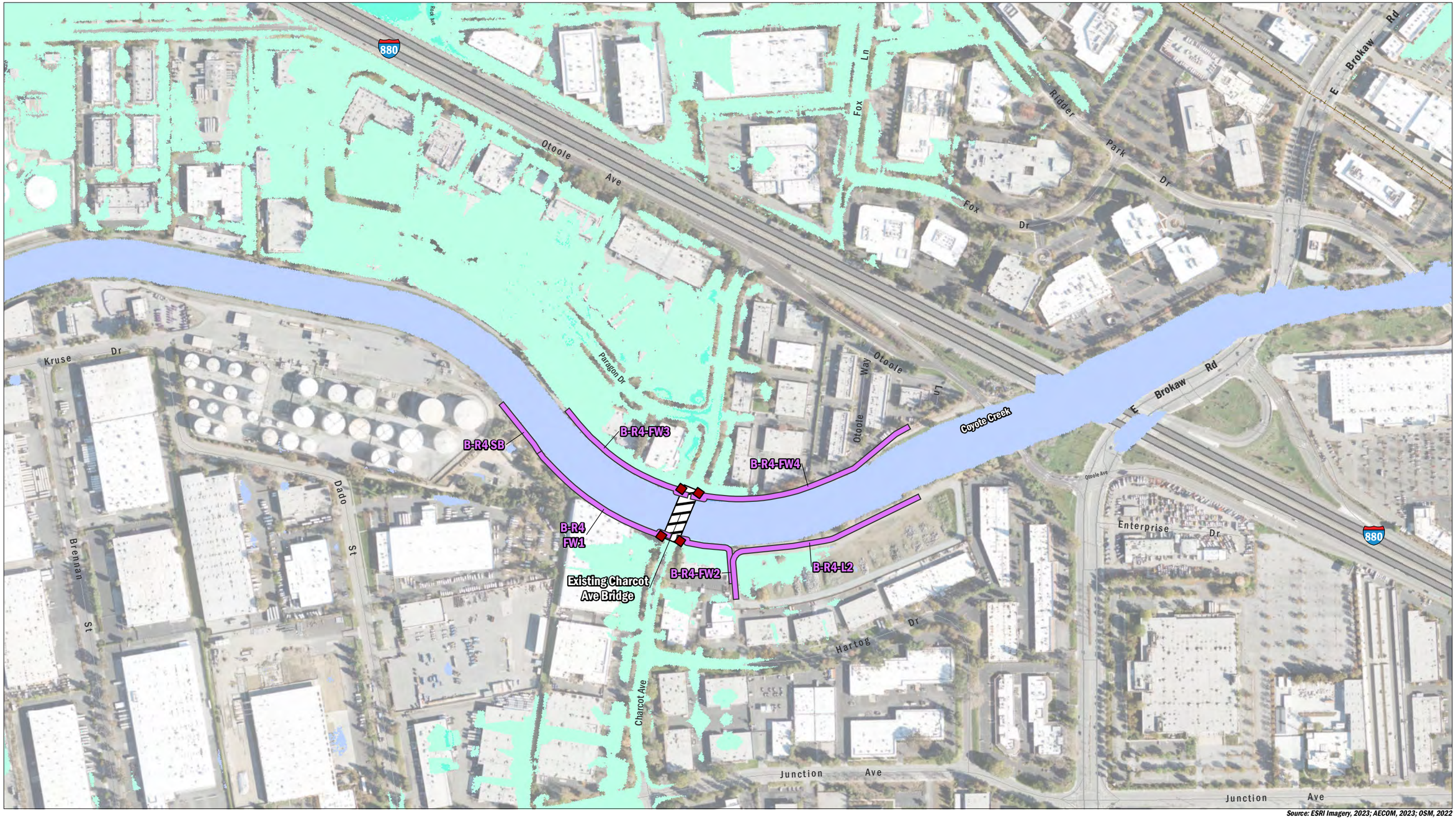


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

- -17.2 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 4.3

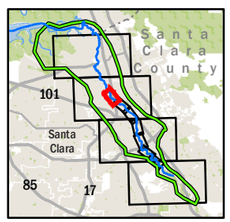
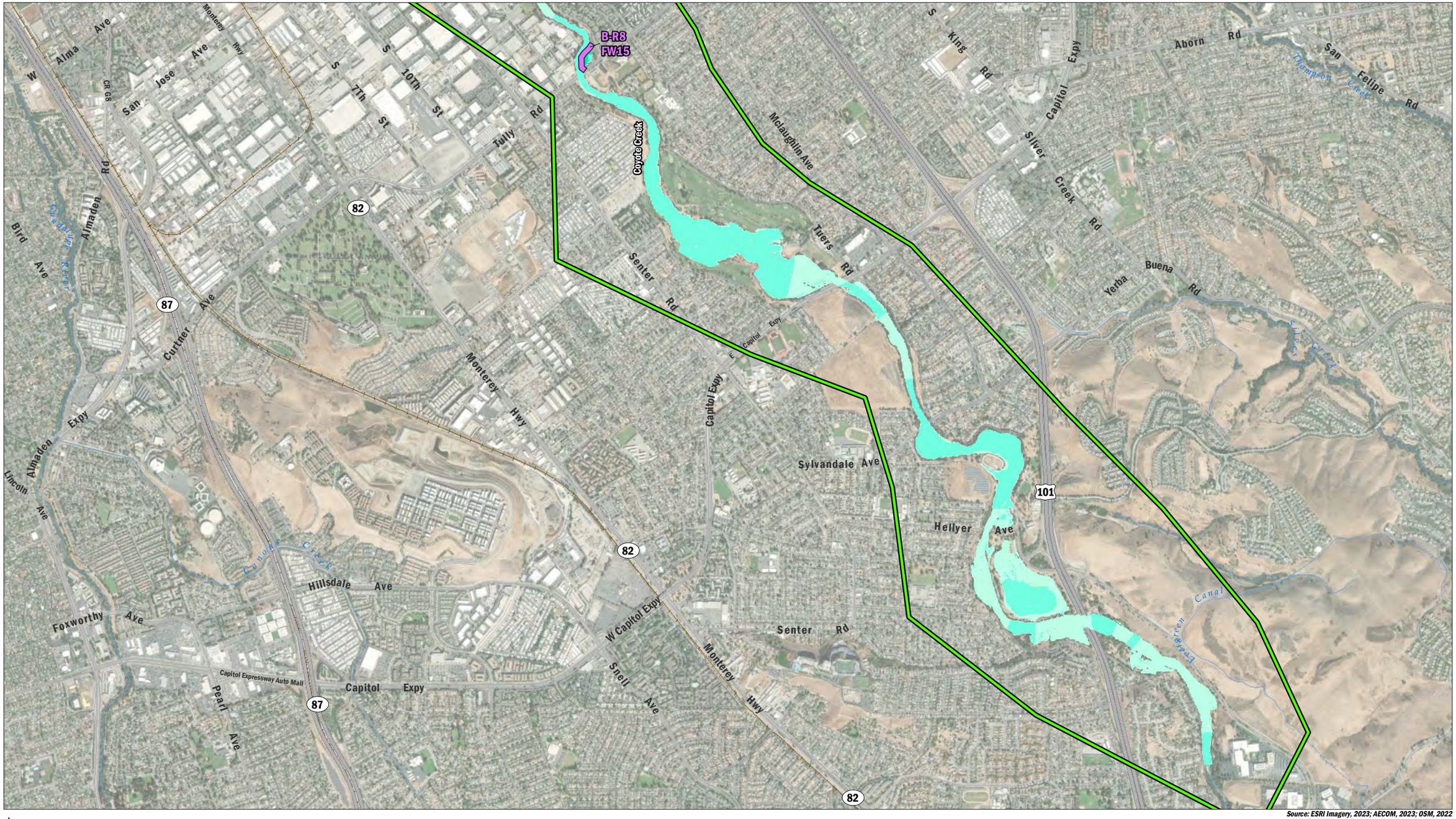


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.2 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 4.3

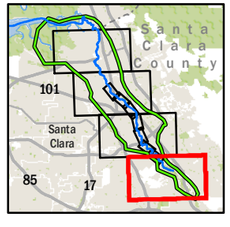
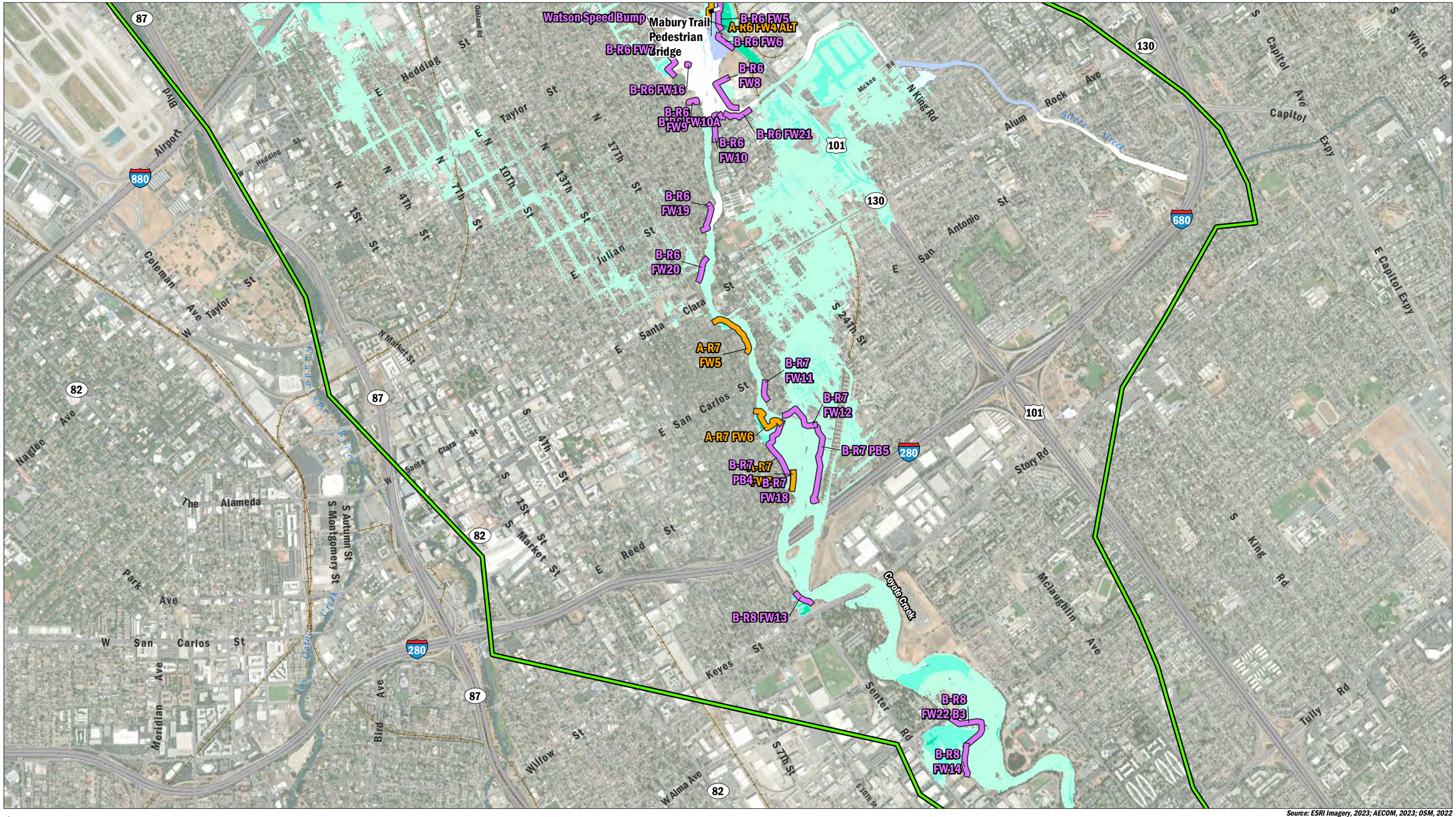


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

- -17.2 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 4.3

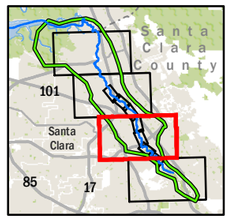
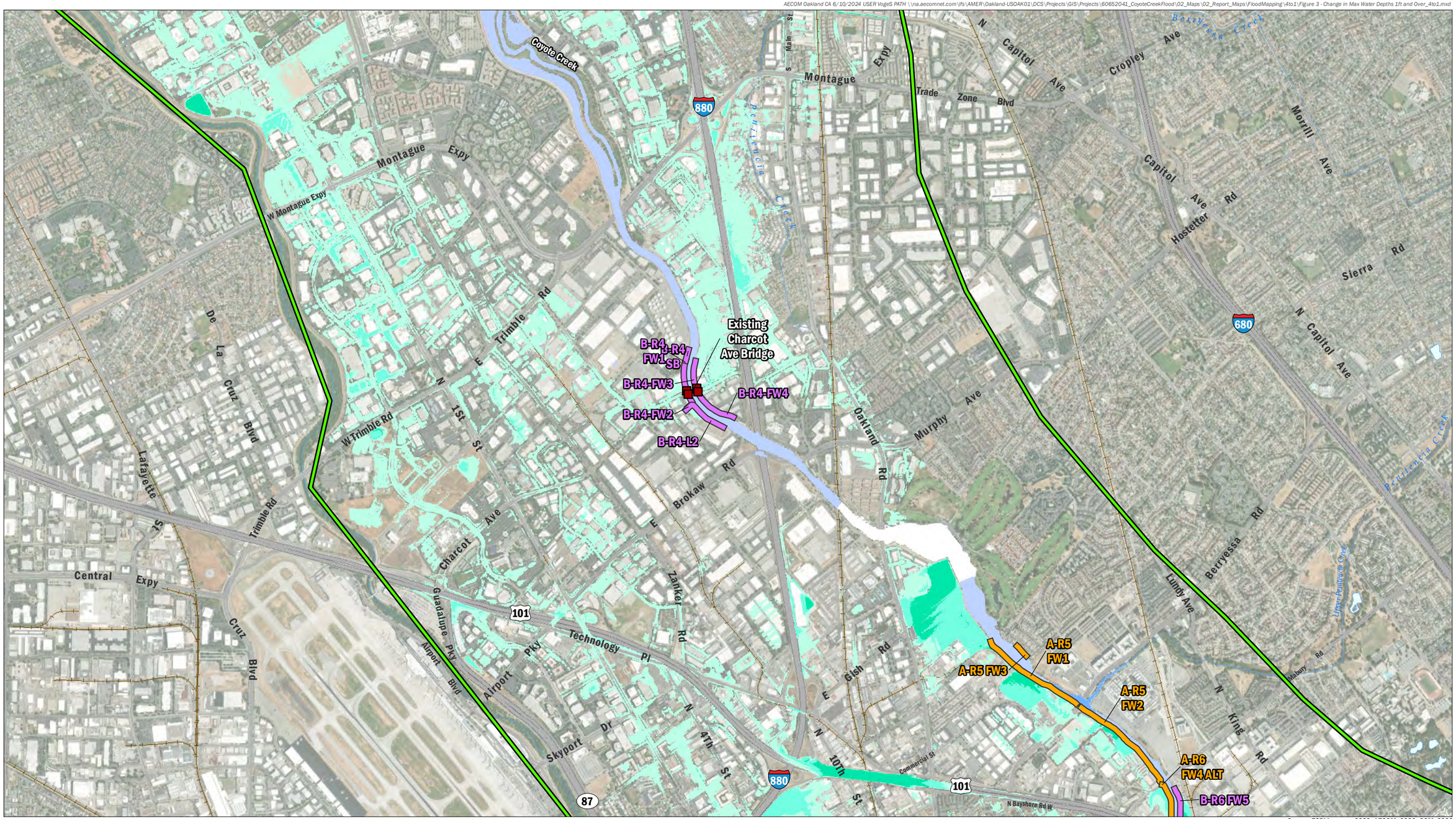


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
- -17.2 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 4.3

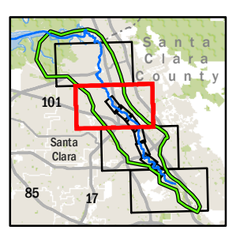
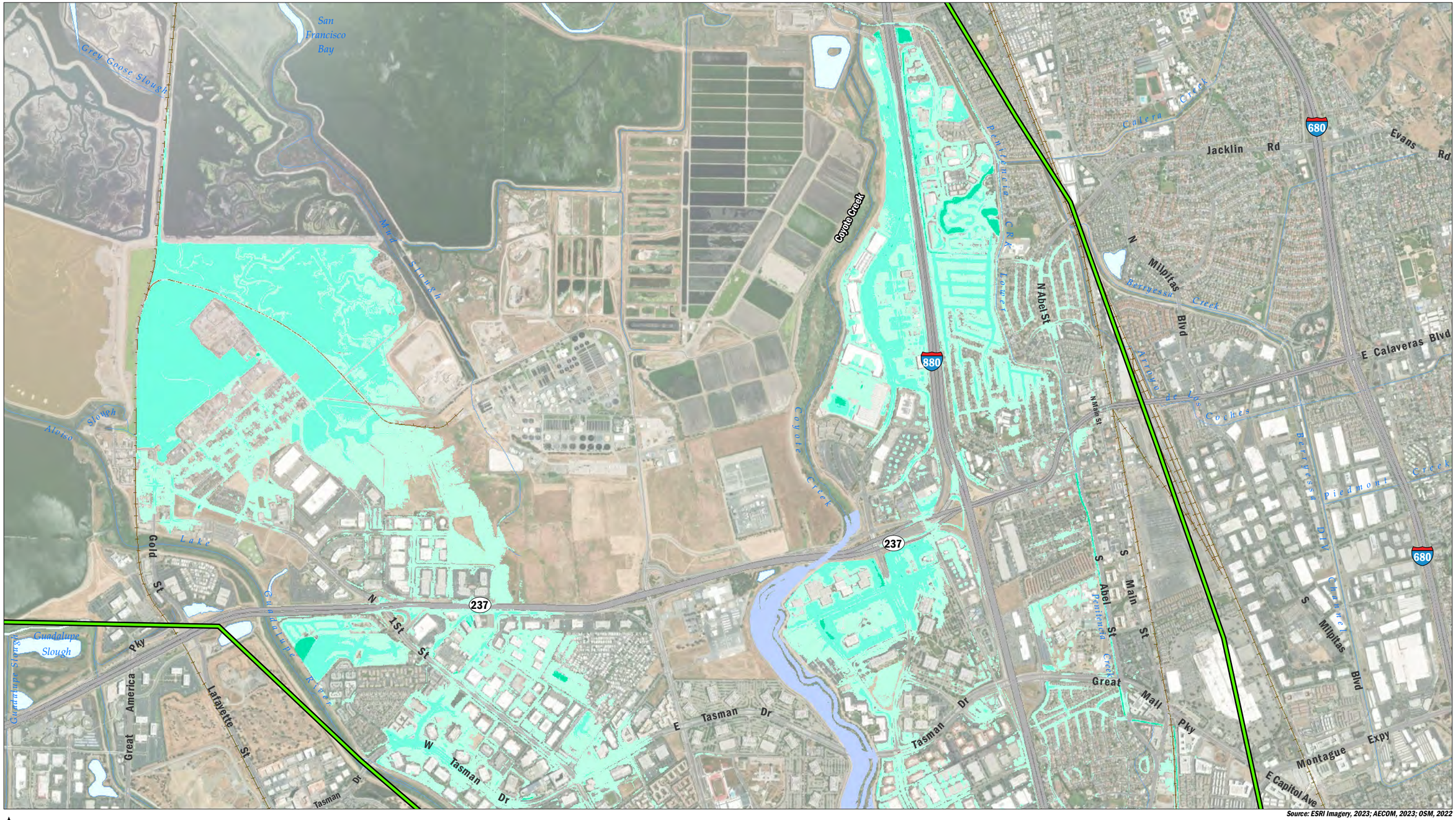


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

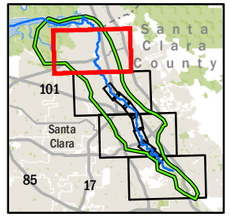
0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

- -17.2 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 4.3

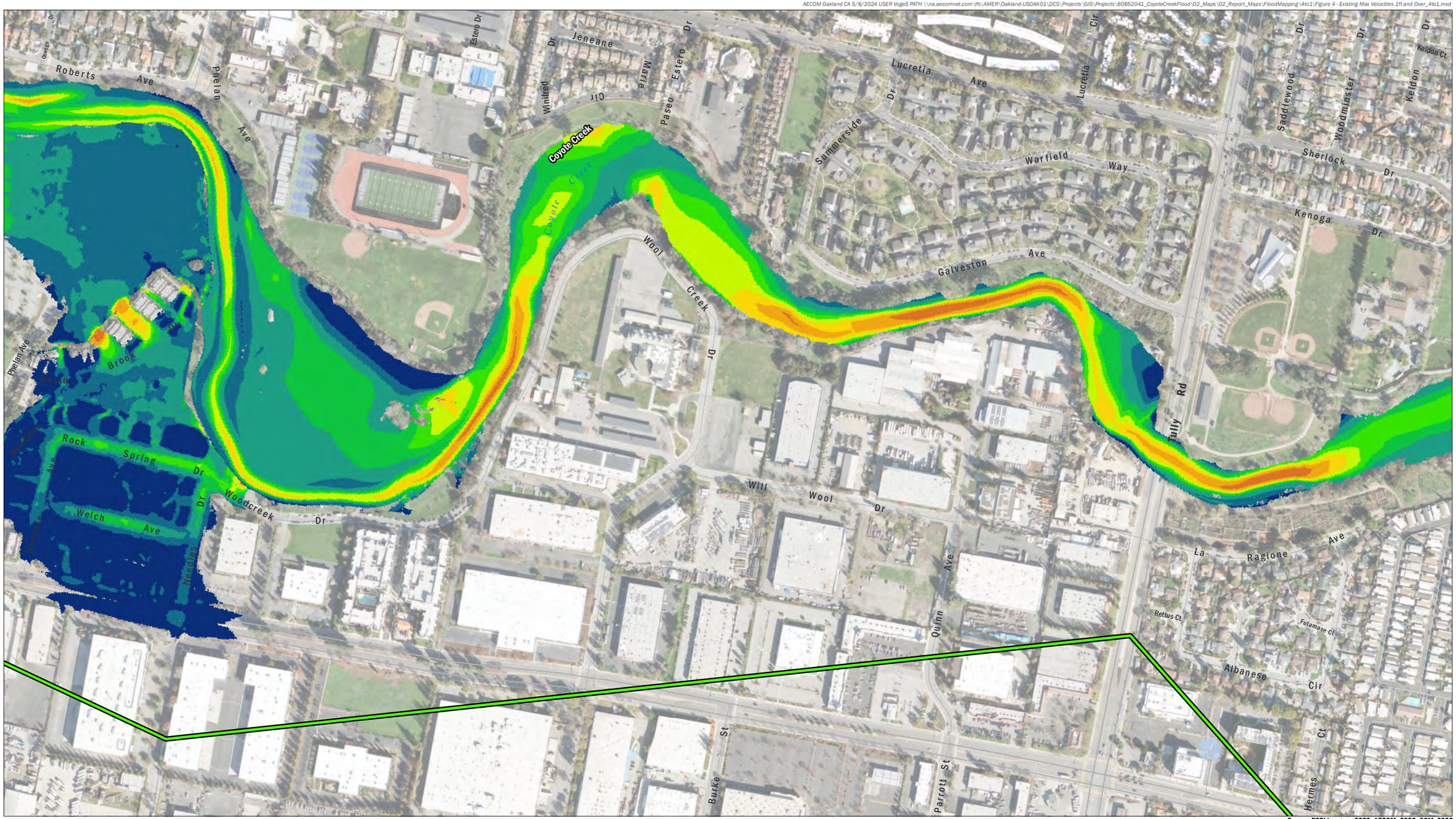


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 4 to Scenario 1
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.1

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

AECOM
Coyote Creek
EIR Modeling

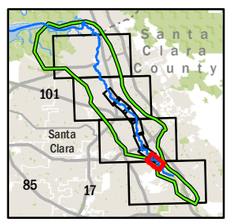
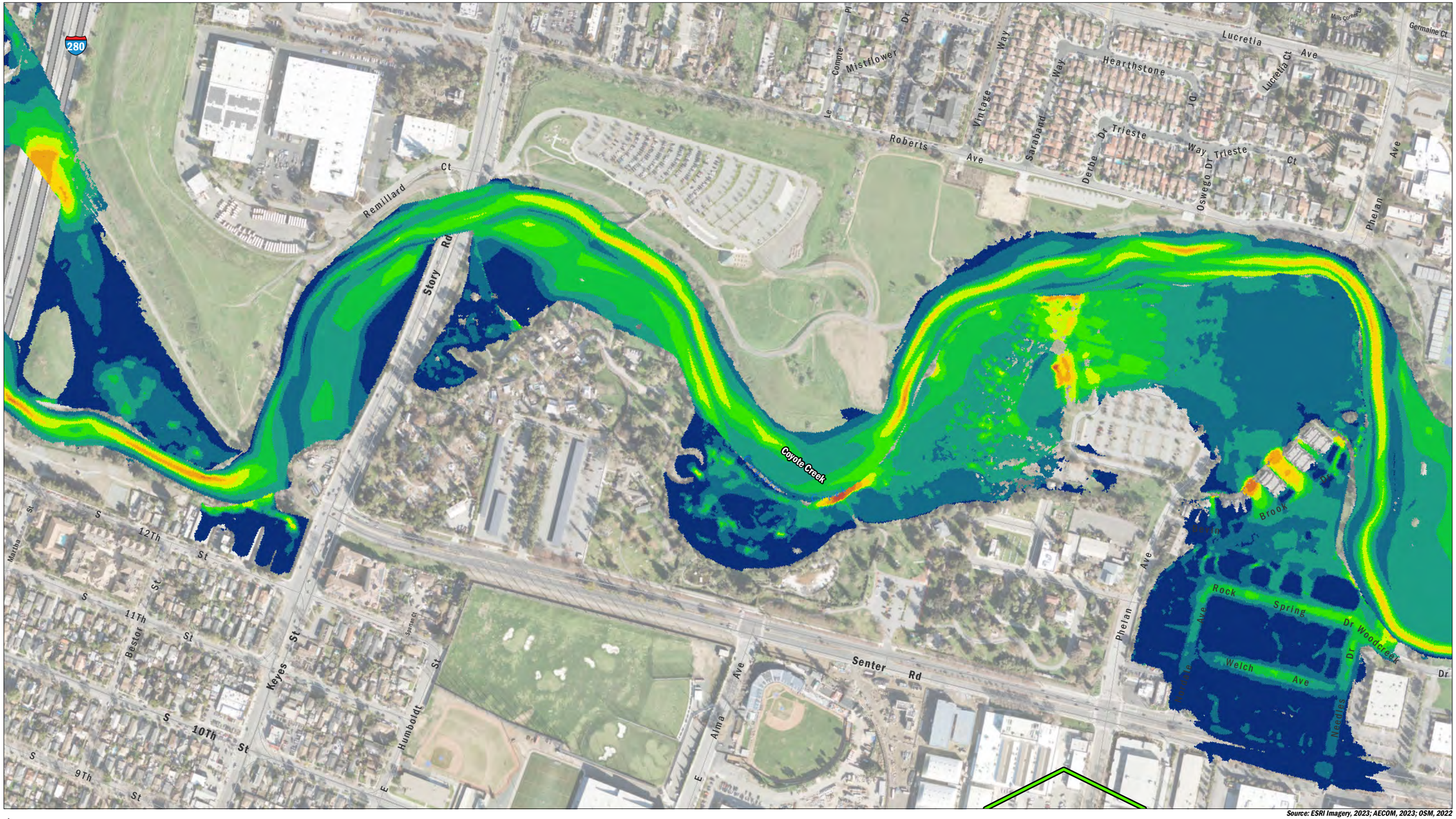


FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

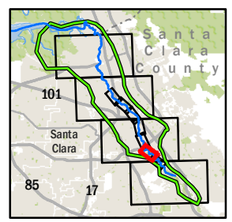
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.1



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

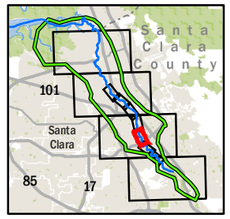
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.1



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.1

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

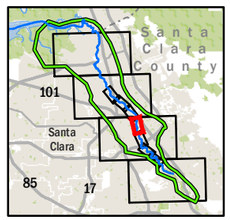
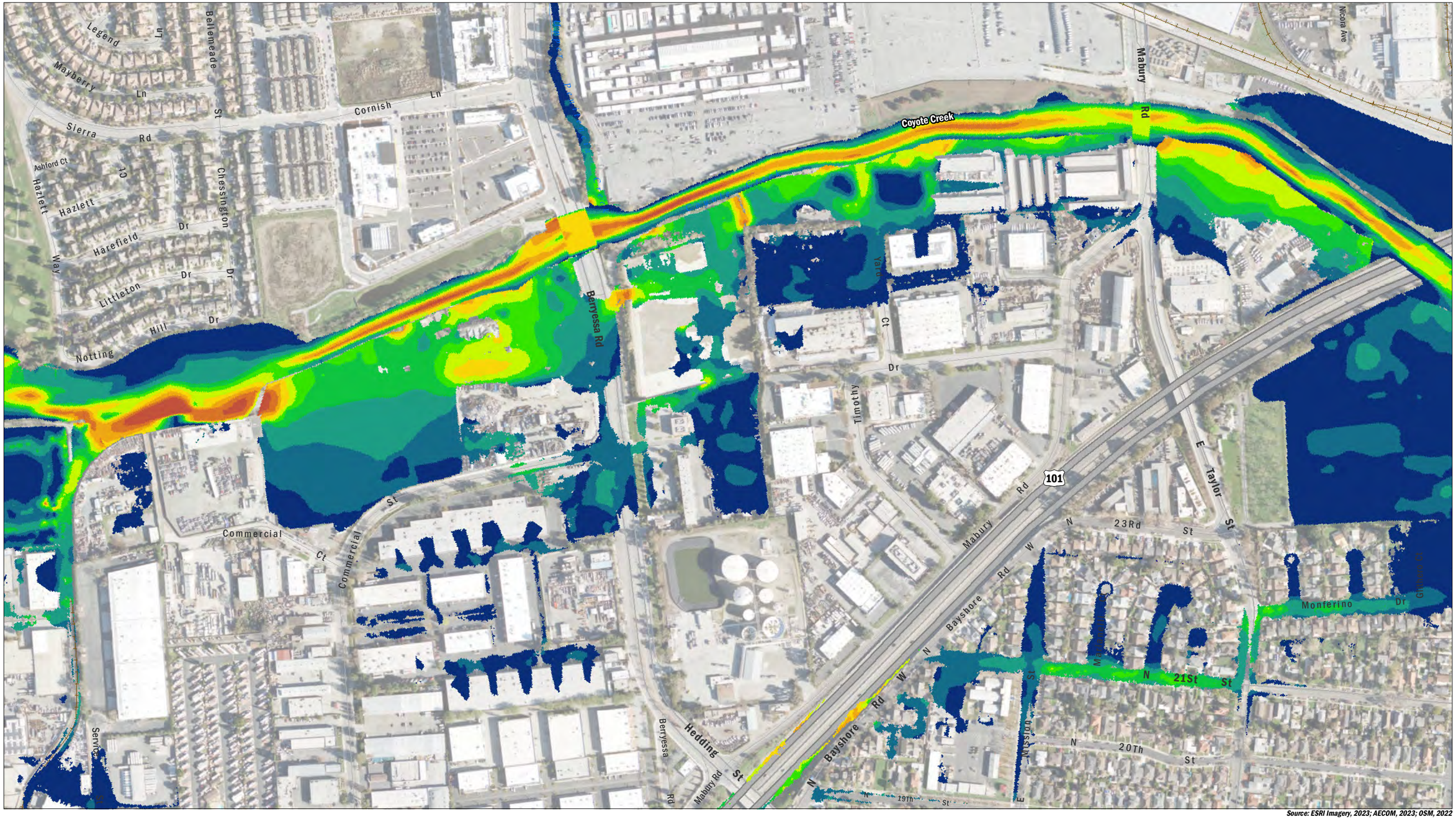


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.1

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

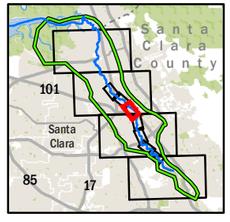
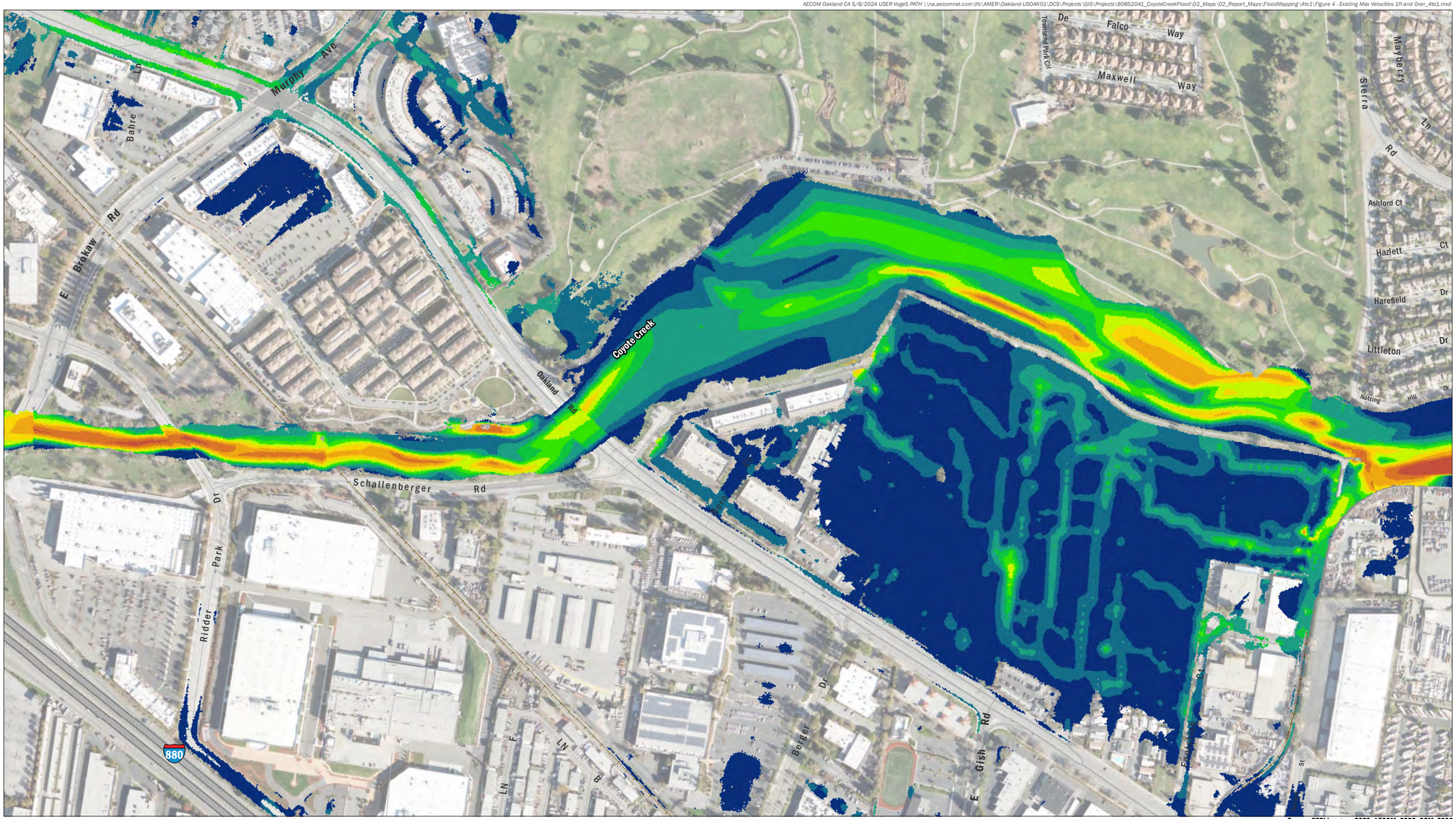


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.1

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

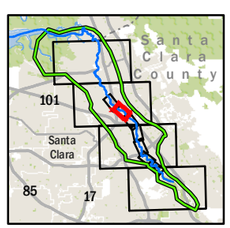


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

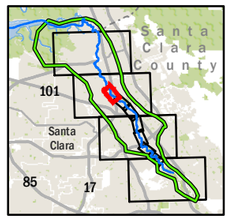
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

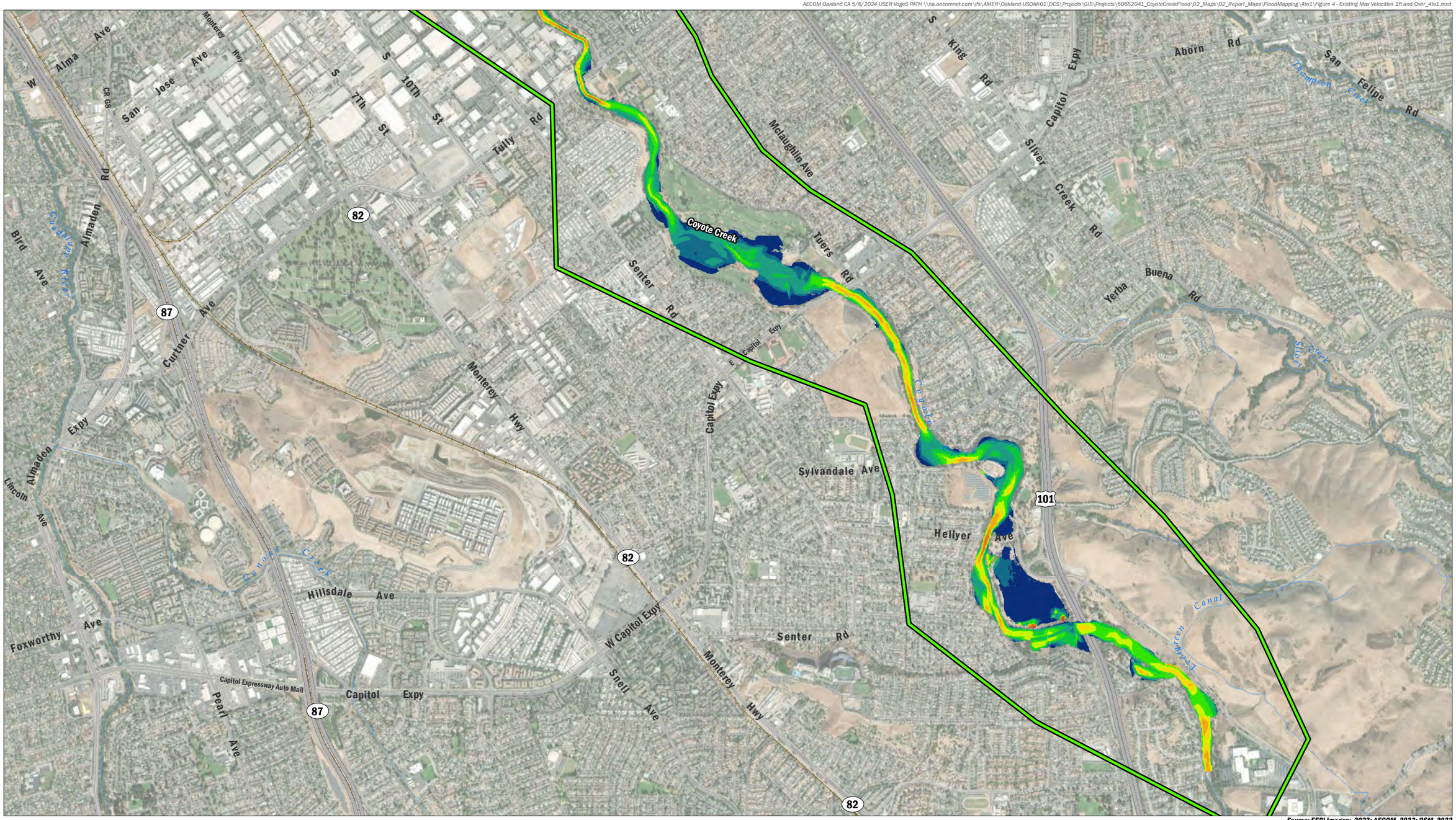
0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.1



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 7 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.1

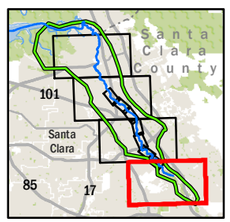
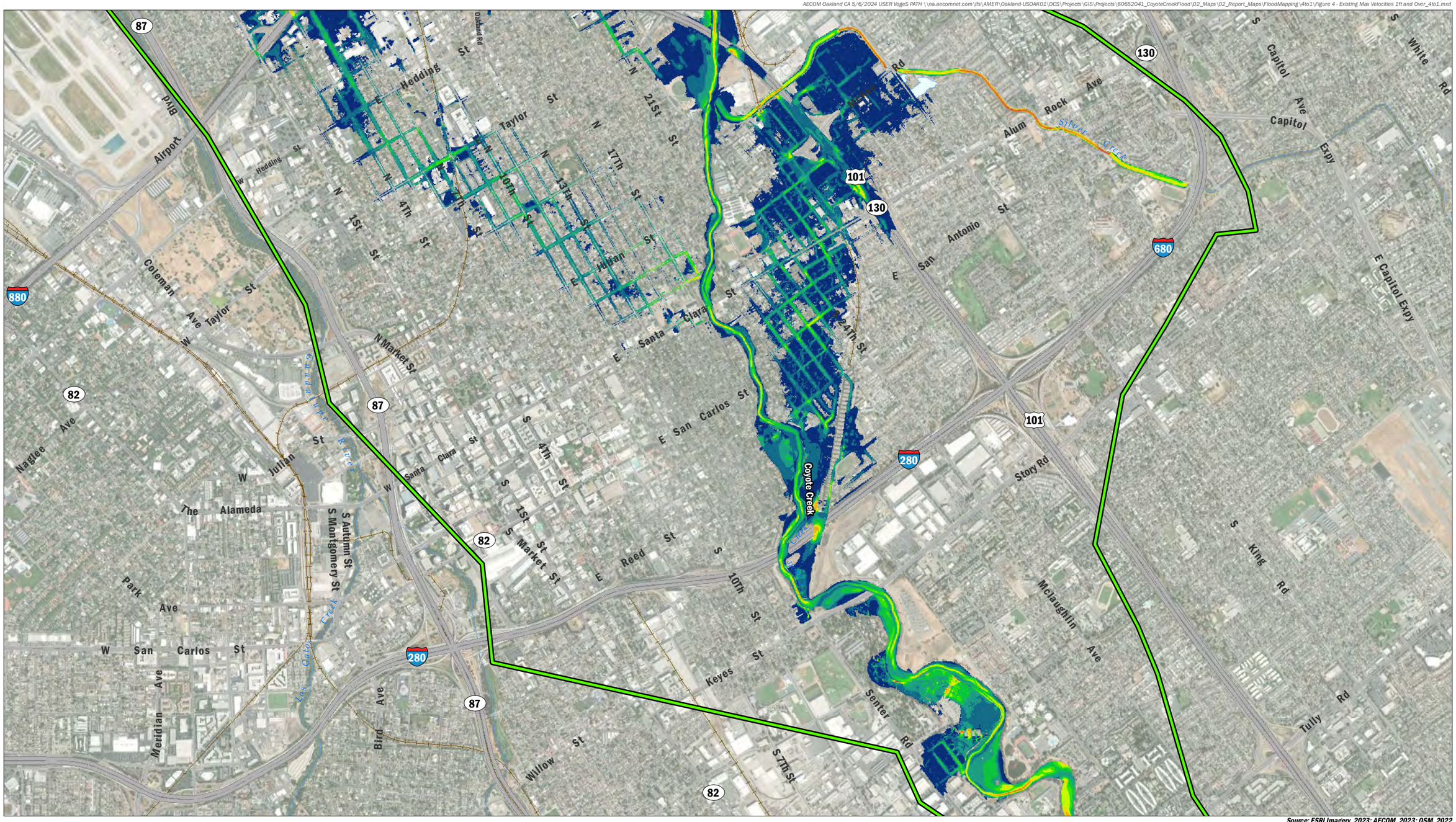


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.1

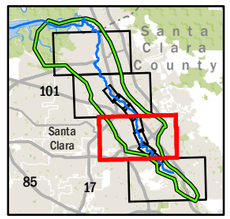
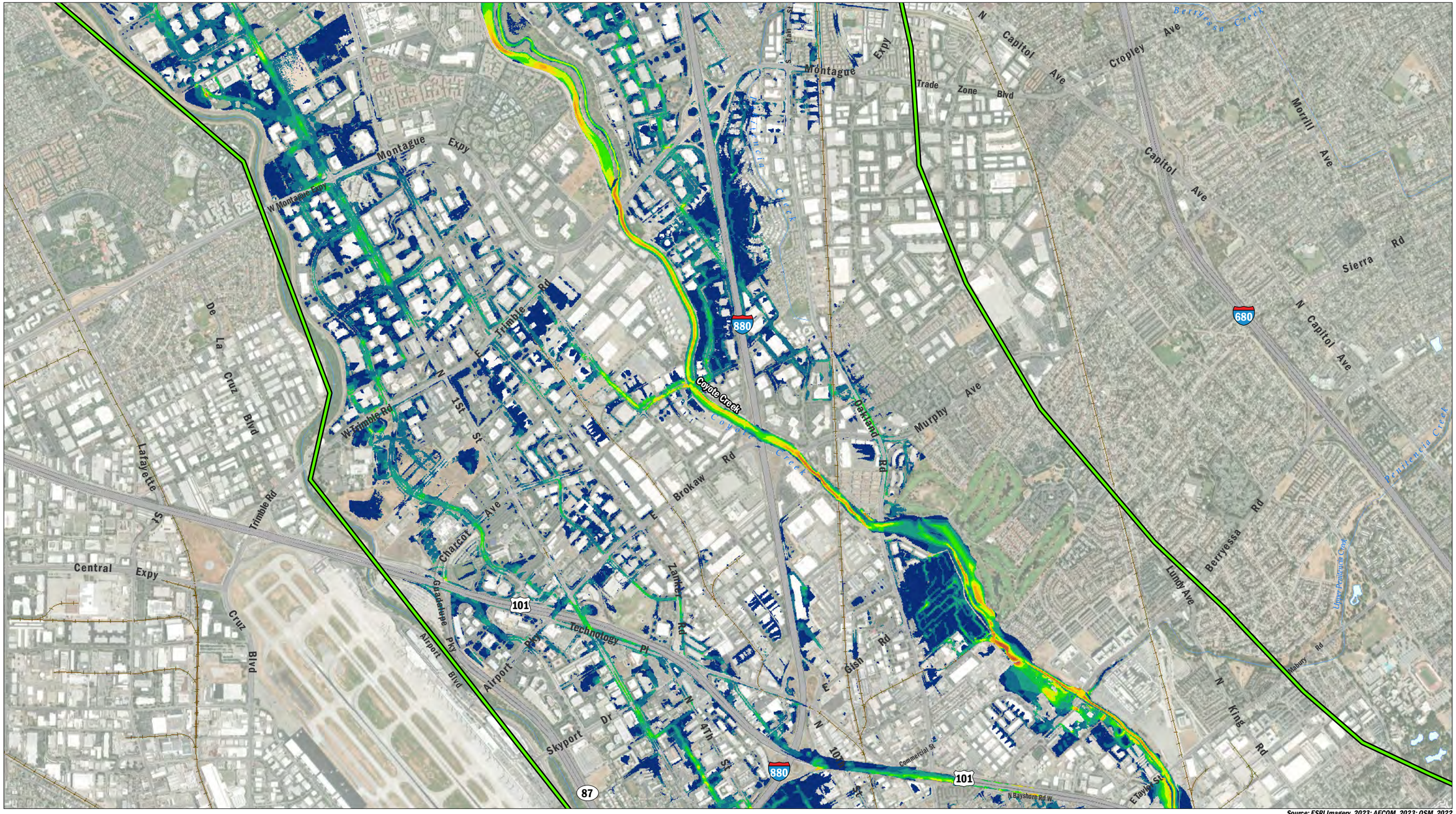


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

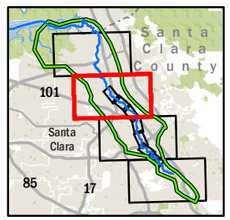
0 2,400
Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.1



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

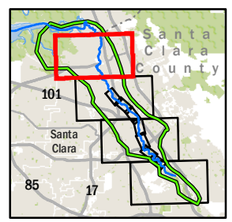
0 2,400
Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.1

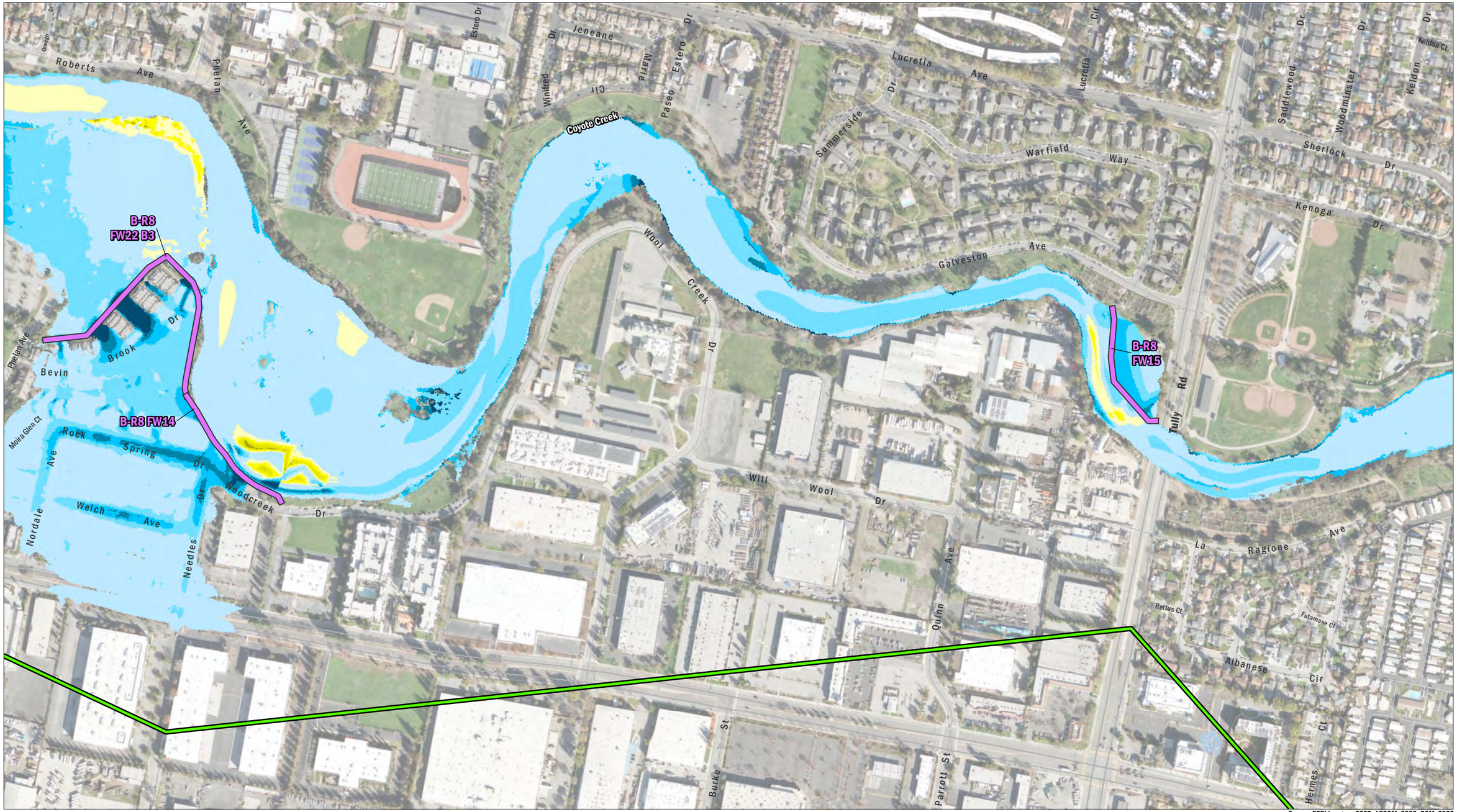


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

-9.9 - -4	-1 - 0
-4 - -3	0 - 1
-3 - -2	1 - 2
-2 - -1	2 - 3
	3 - 5.8

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

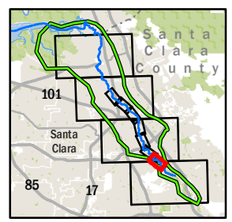
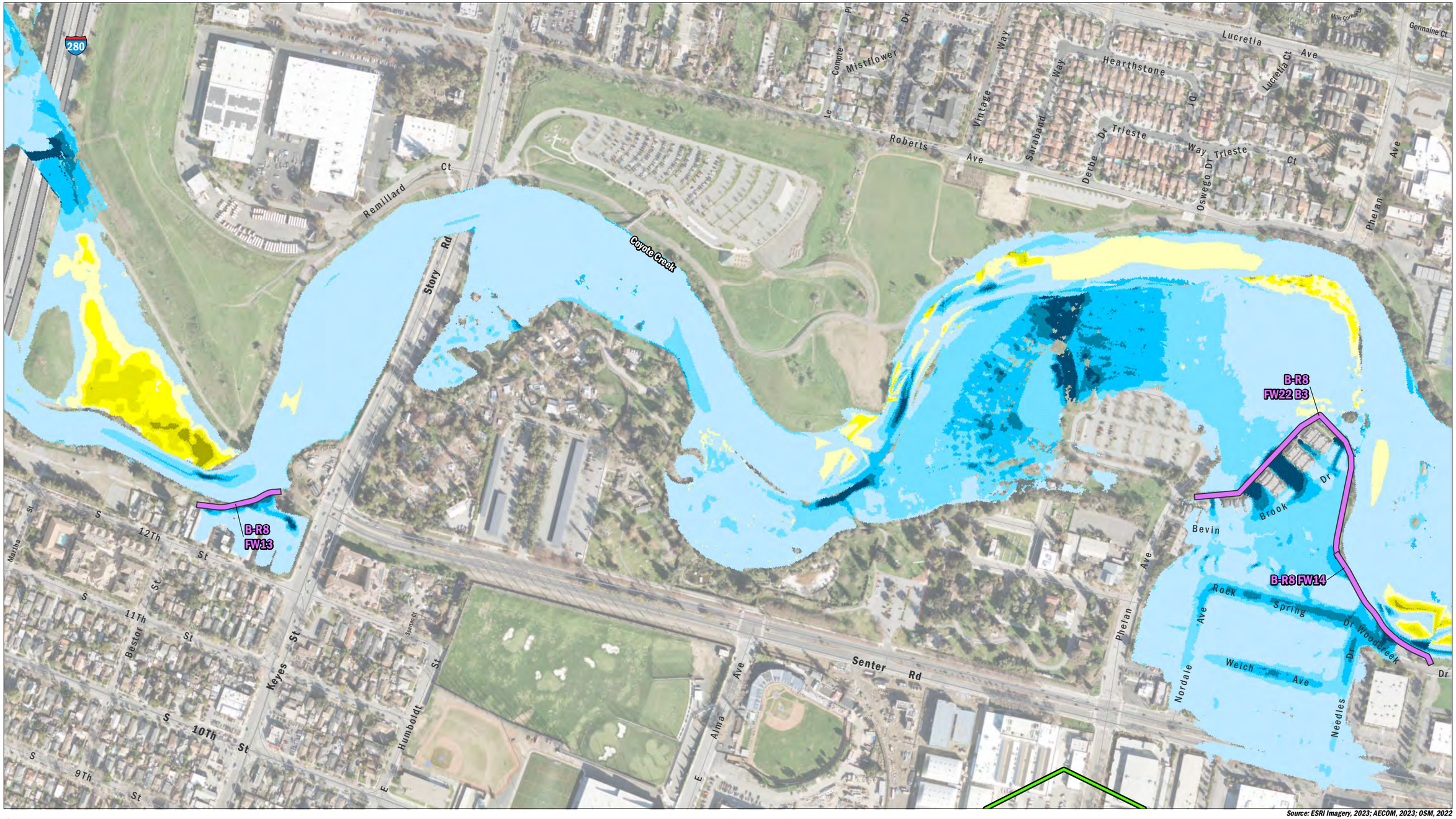


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)
-9.9 - -4
-4 - -3
-3 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 3
3 - 5.8

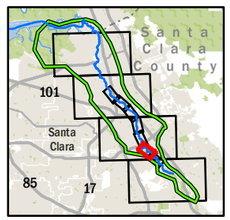
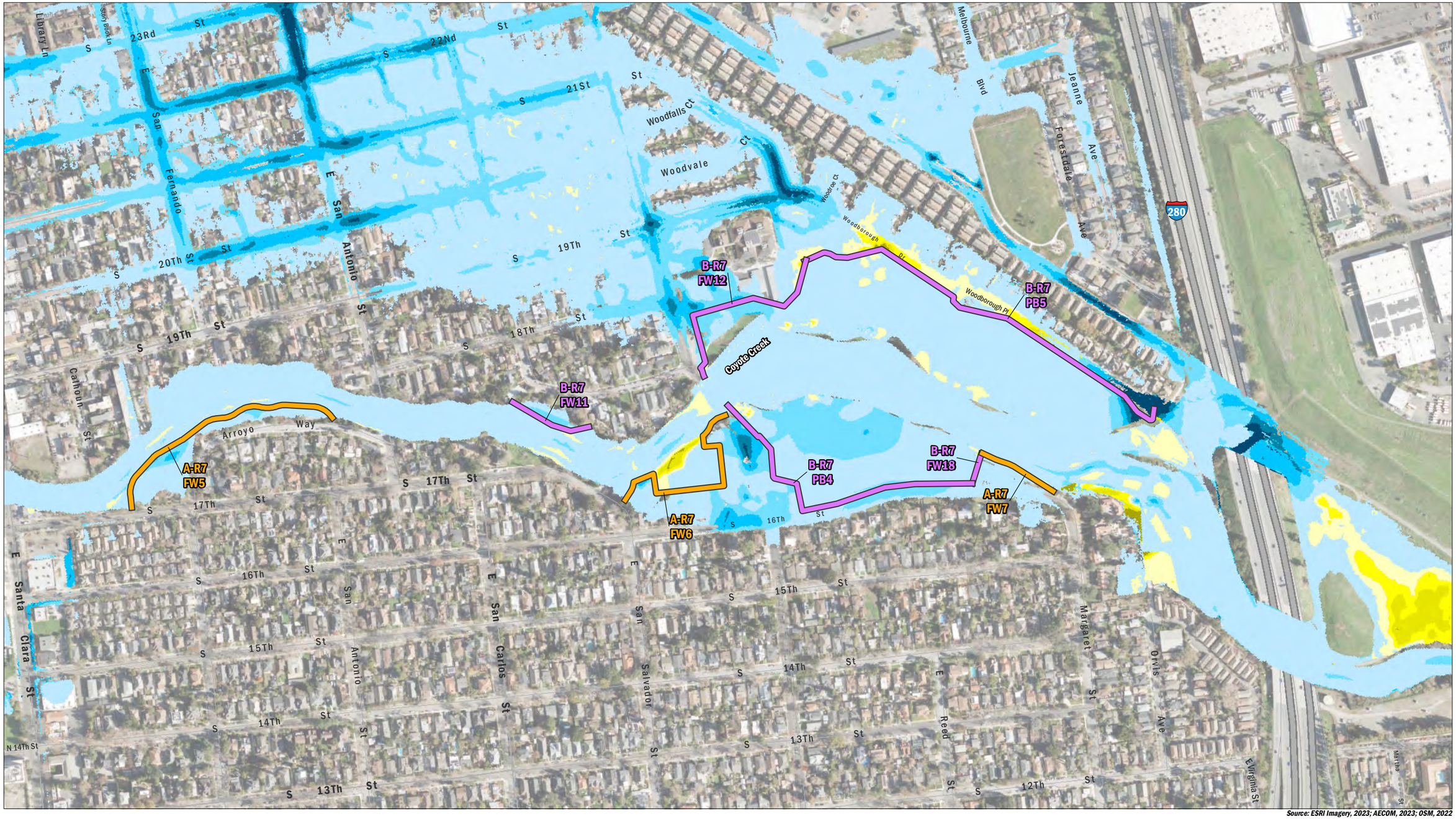


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

- -9.9 - -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 5.8

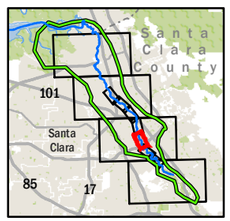
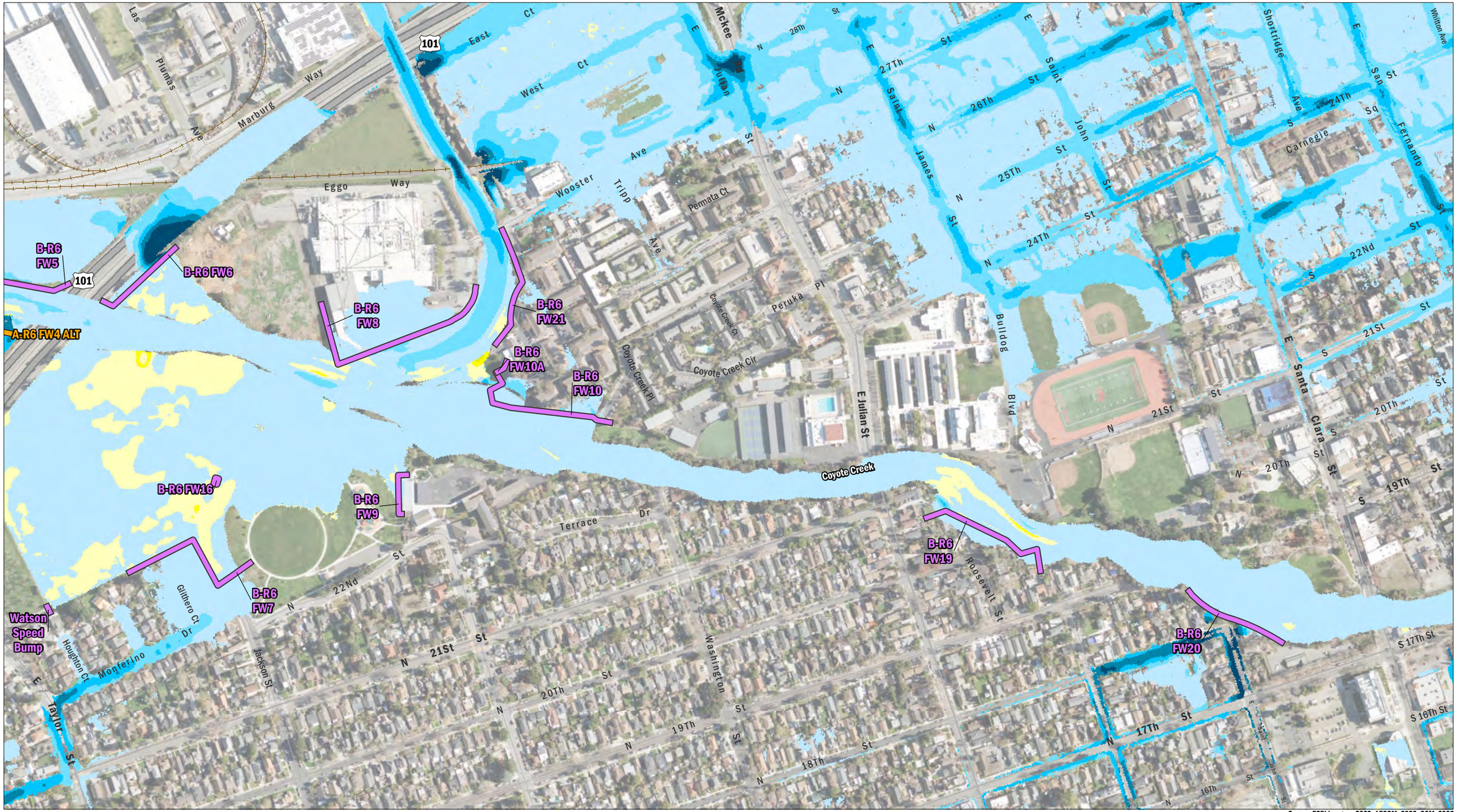


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

- -9.9 - -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 5.8

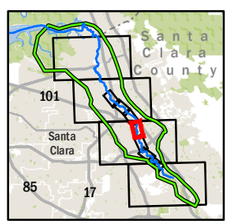
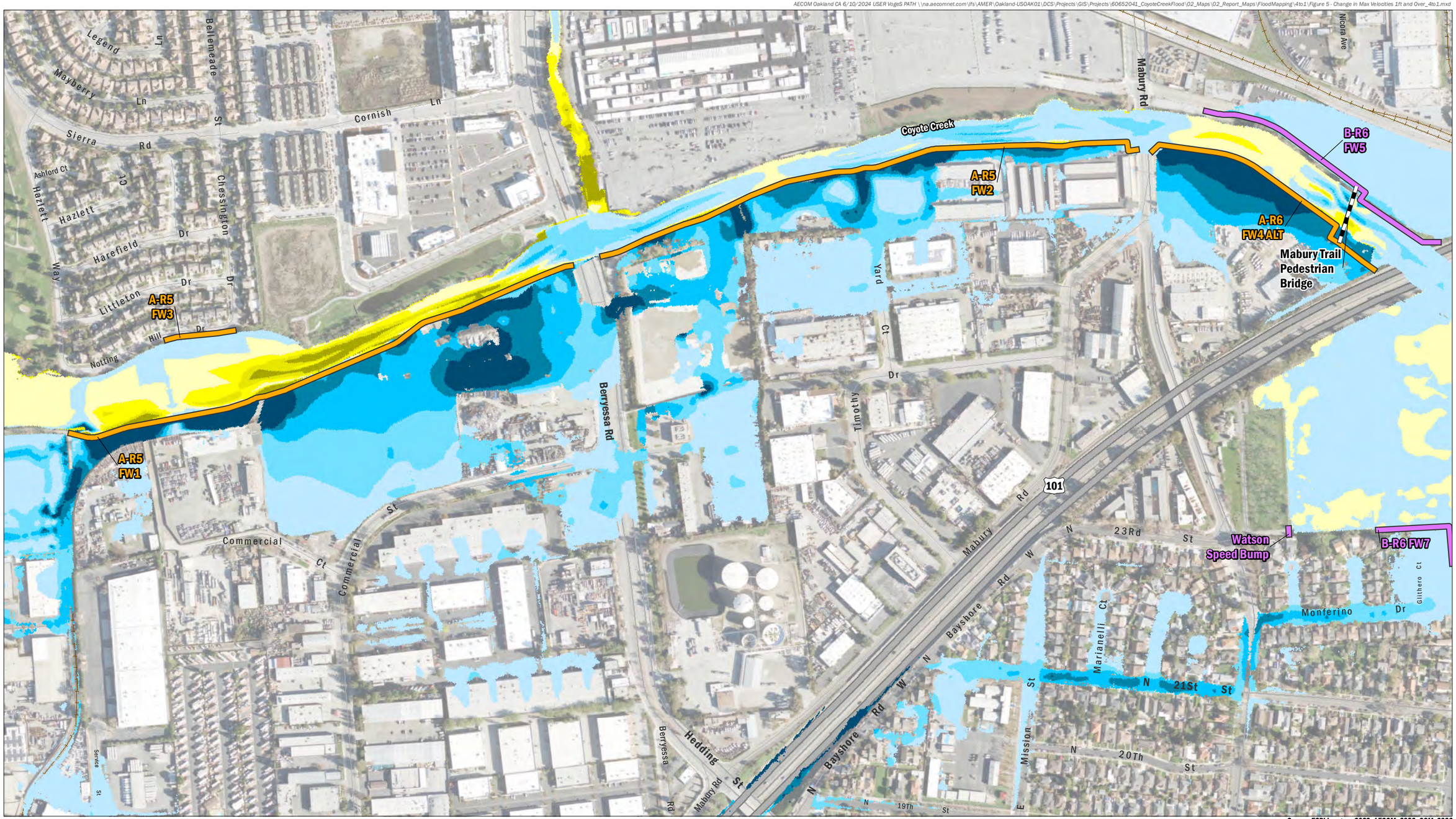


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

- -9.9 - -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 5.8

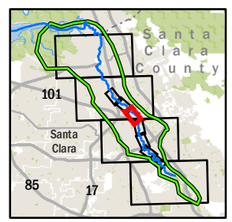
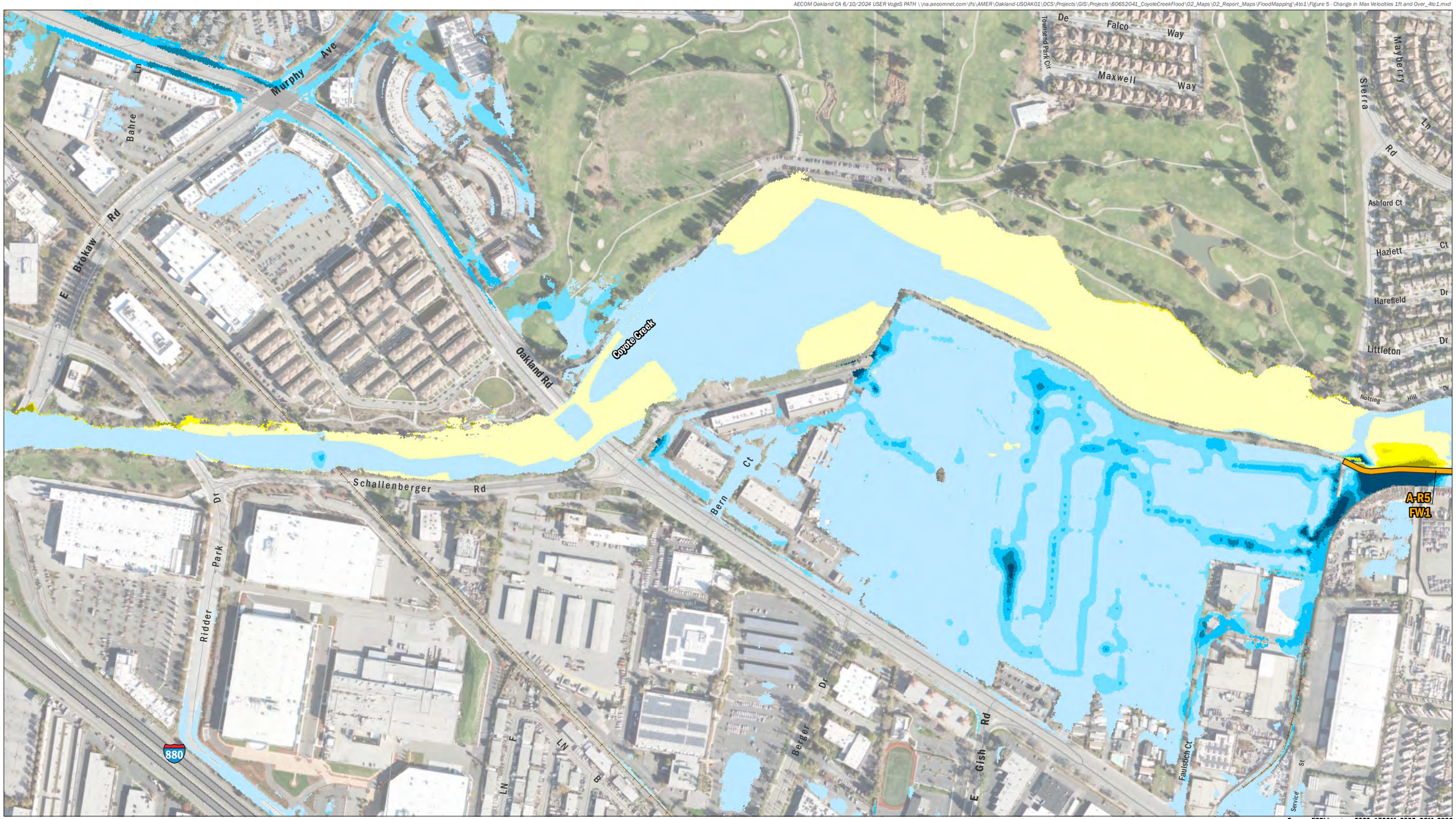


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

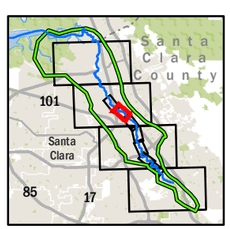
0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

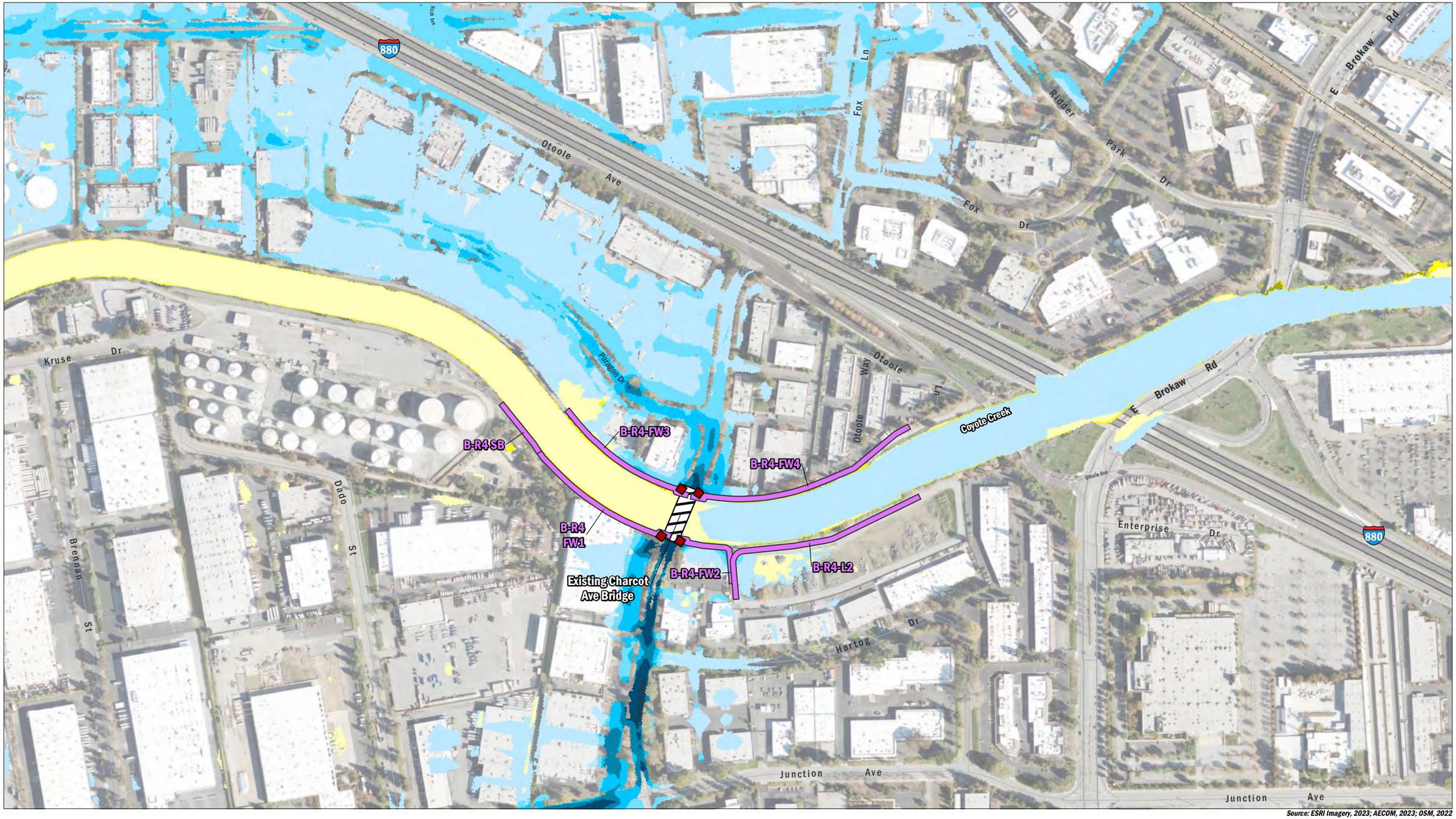
-9.9 - -4	-1 - 0
-4 - -3	0 - 1
-3 - -2	1 - 2
-2 - -1	2 - 3
	3 - 5.8



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5
Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

- -9.9 - -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 5.8

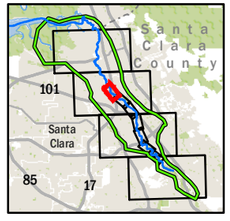
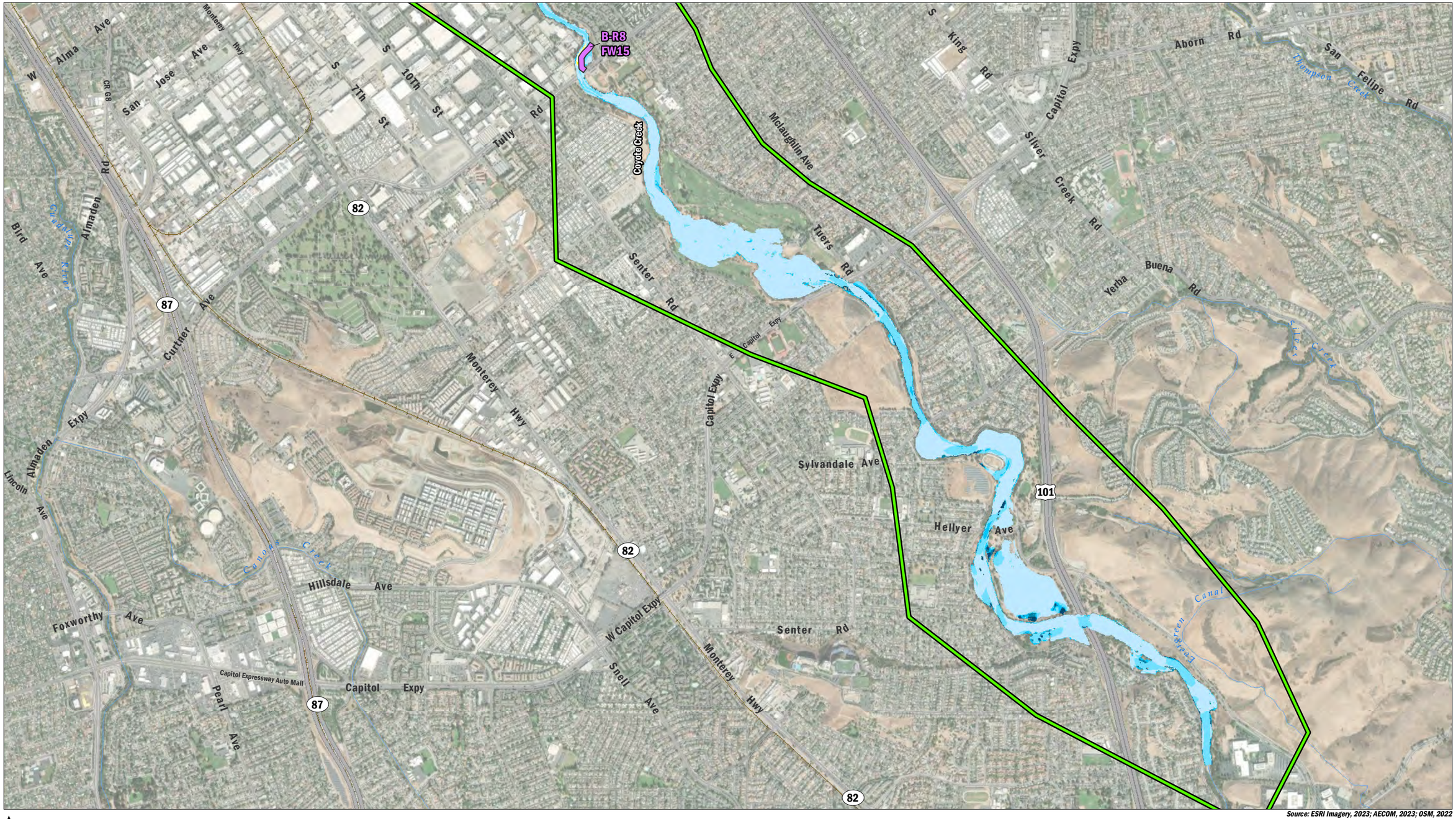


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

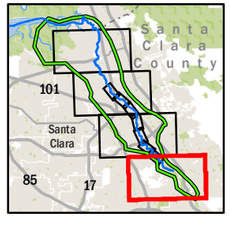
0 2,400
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

-9.9 - -4	-1 - 0
-4 - -3	0 - 1
-3 - -2	1 - 2
-2 - -1	2 - 3
	3 - 5.8

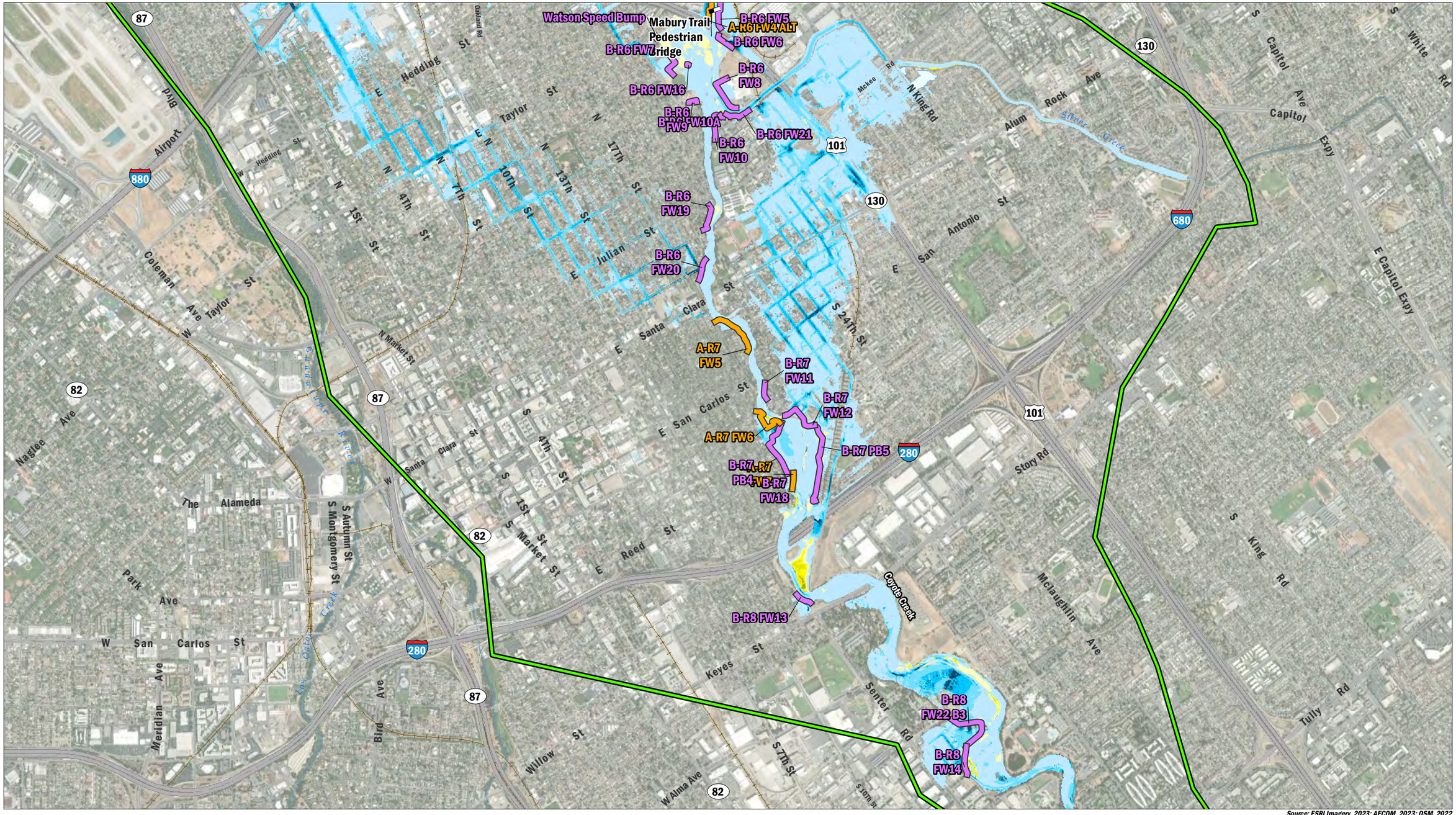


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

- -9.9 - -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 5.8

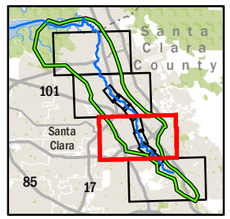
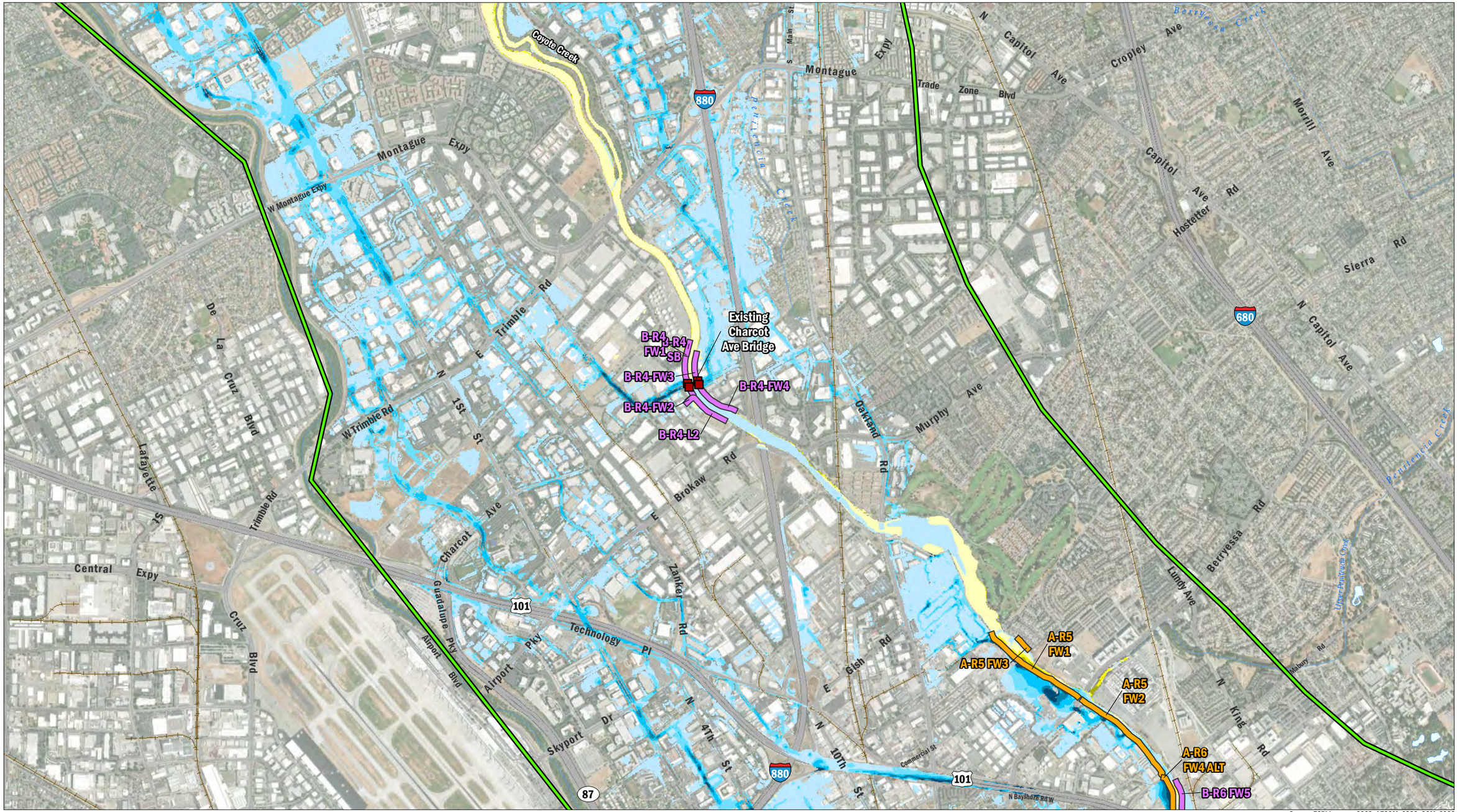


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

- -9.9 - -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 5.8

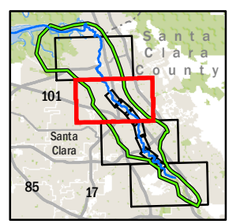
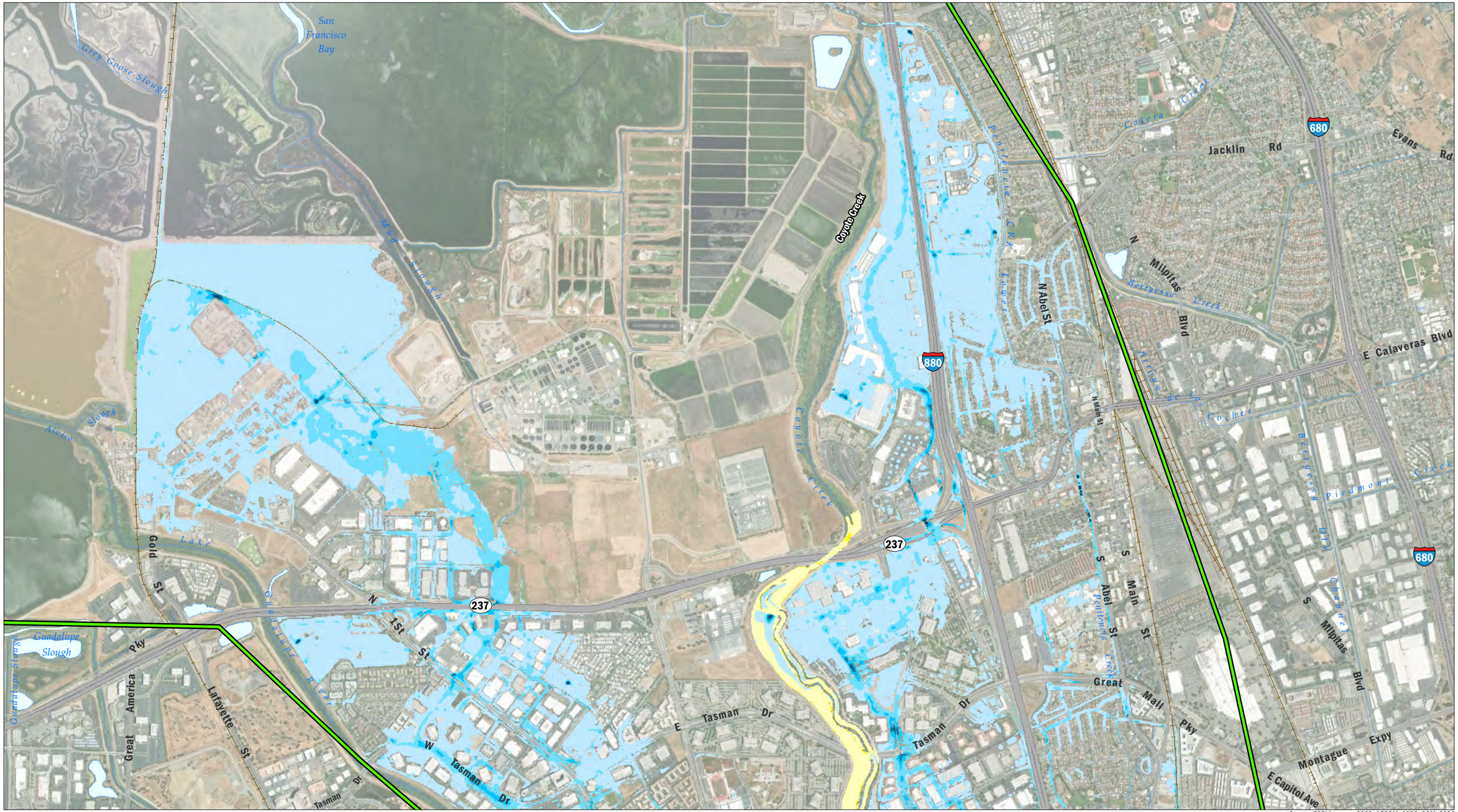


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

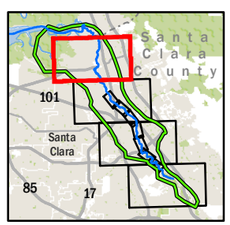
0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

Maximum Velocity Scenario 4 Minus Scenario 1
Velocity (ft/s)

- -9.9 - -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 5.8

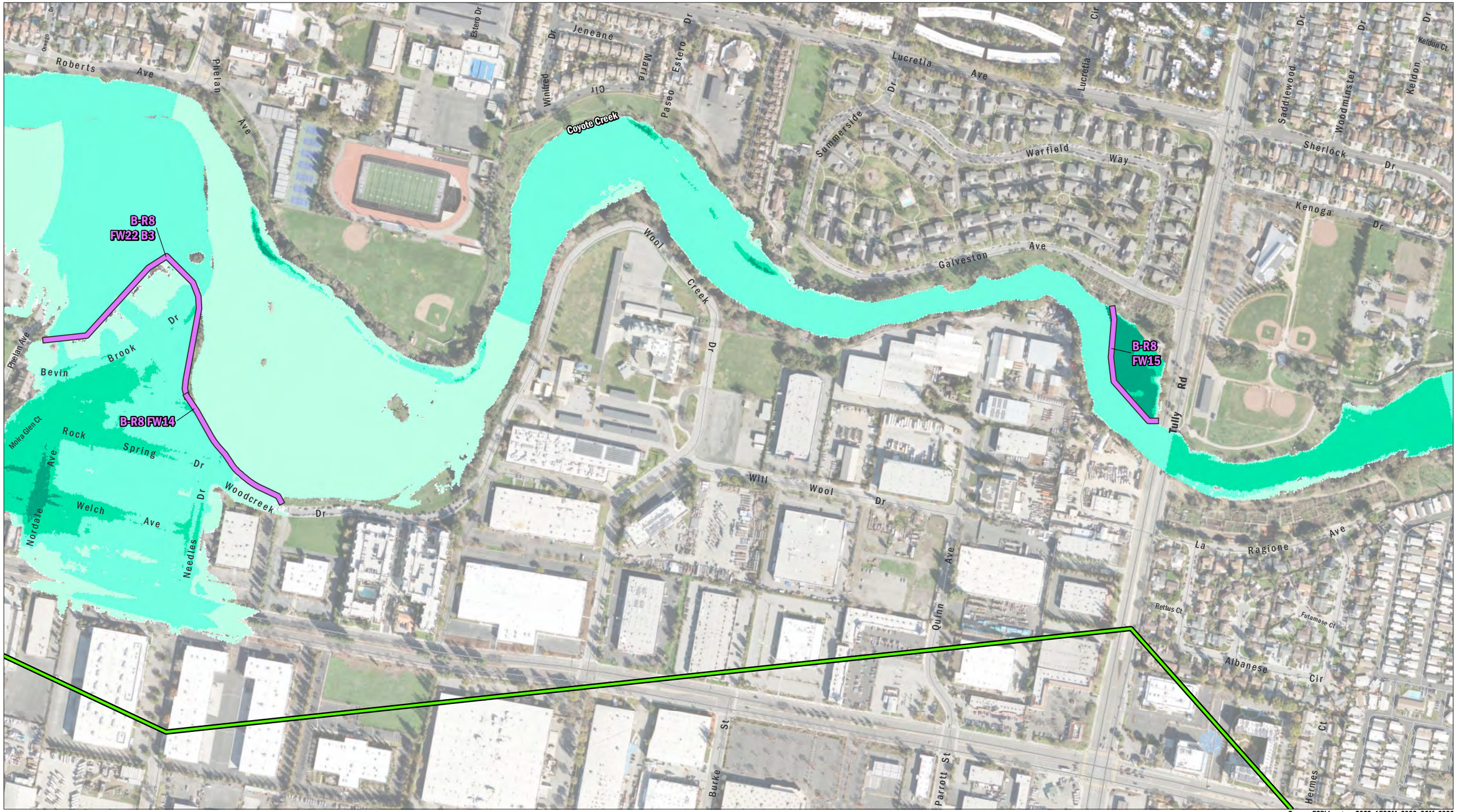


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.7 - -6
-6 - -4
-4 - -2
-2 - -0.1
-0.1 - 0.1
0.1 - 2
2 - 3.9

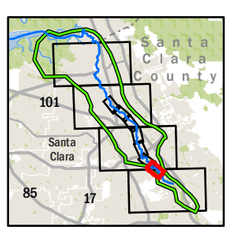
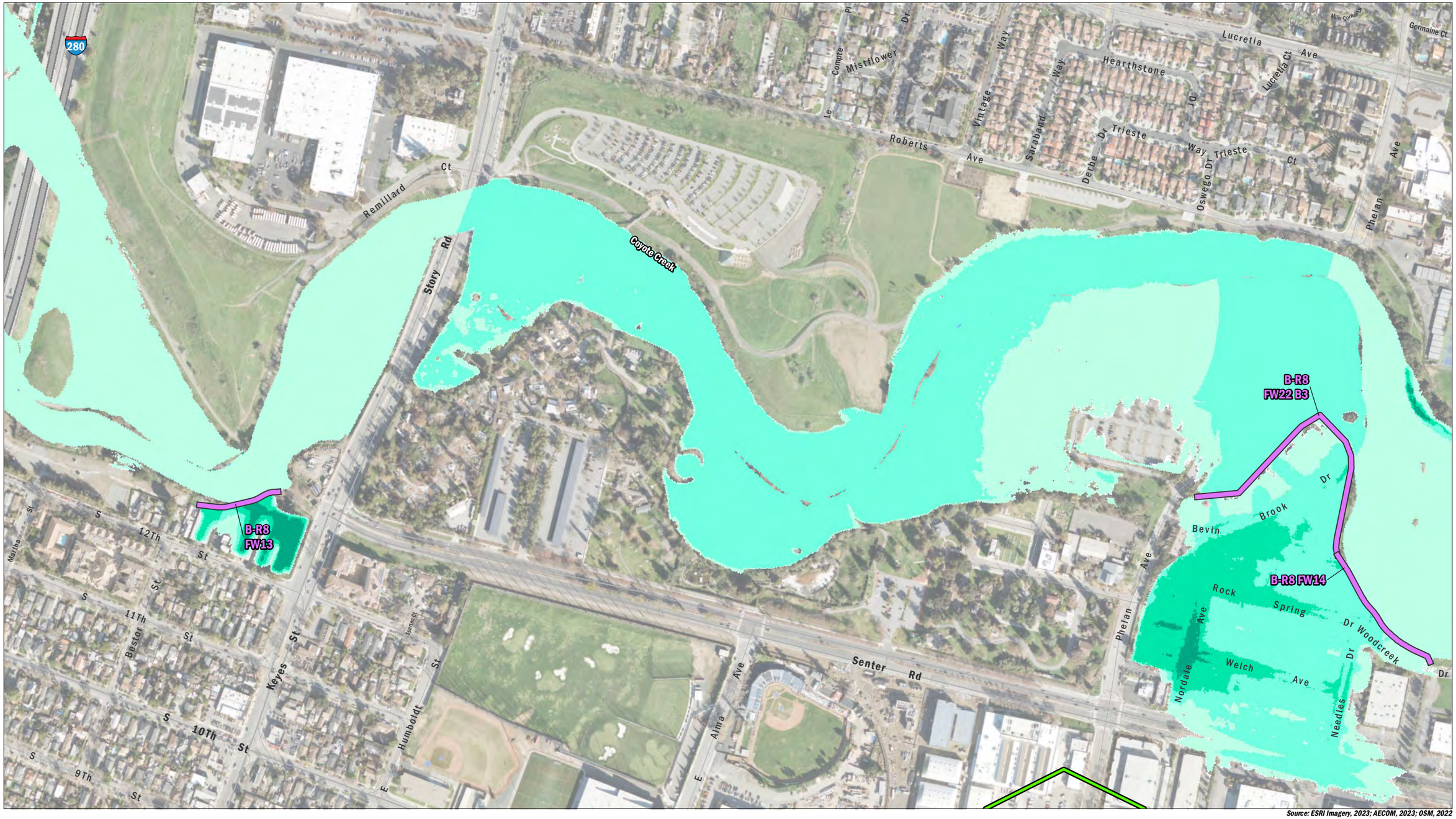


FIGURE 6
Change in All Max. Water Depths
Scenario 4 to Scenario 1
Page 1 of 11



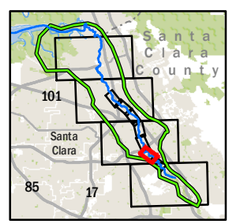
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

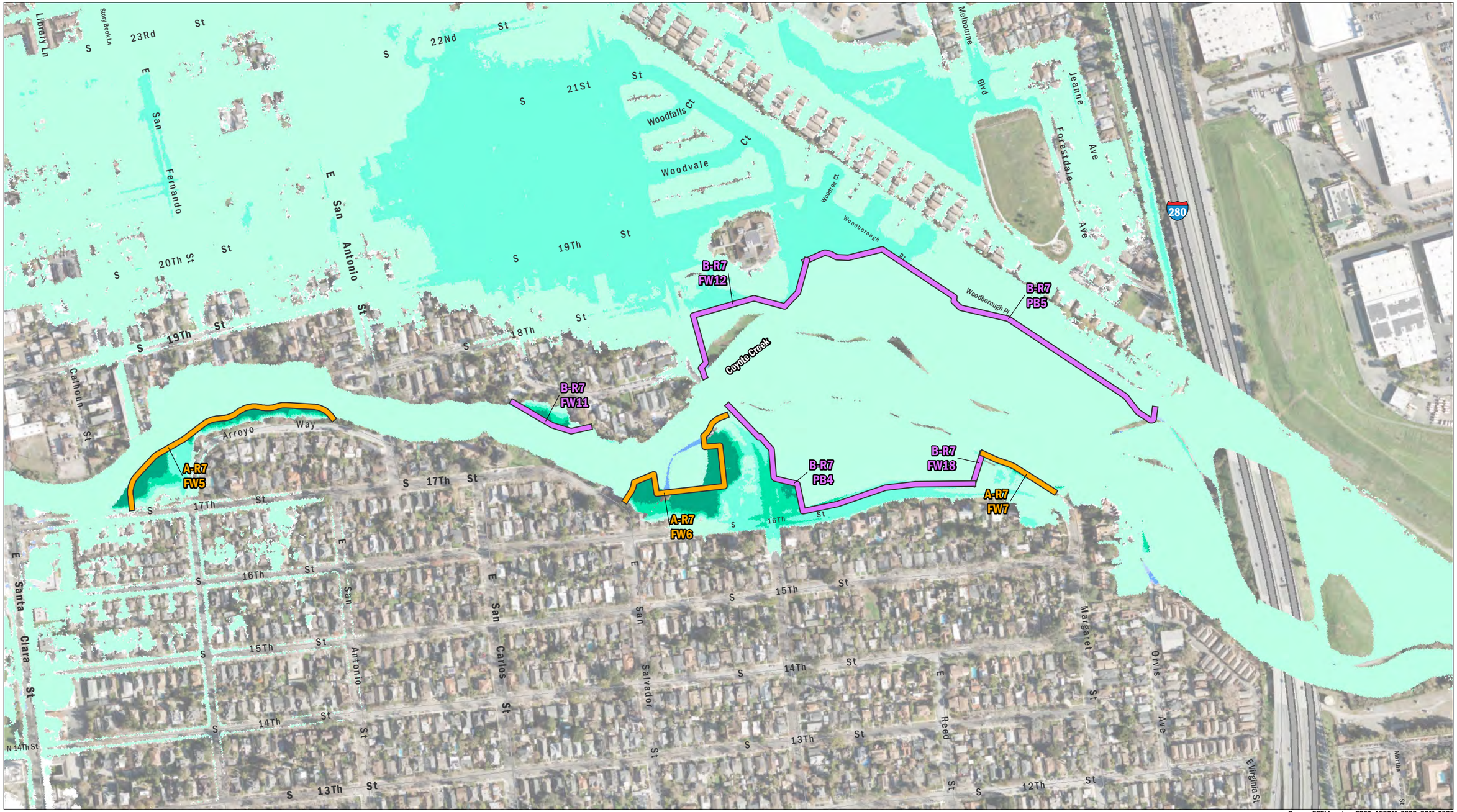
Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.7 - -6
-6 - -4
-4 - -2
-2 - -0.1
-0.1 - 0.1
0.1 - 2
2 - 3.9



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6
Change in All Max. Water Depths
Scenario 4 to Scenario 1



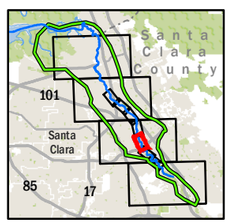
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.7 - -6
-6 - -4
-4 - -2
-2 - -0.1
-0.1 - 0.1
0.1 - 2
2 - 3.9



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6
Change in All Max. Water Depths
Scenario 4 to Scenario 1
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

- -17.7 - -6
- -6 - -4
- -4 - -2
- -2 - -0.1
- -0.1 - 0.1
- 0.1 - 2
- 2 - 3.9

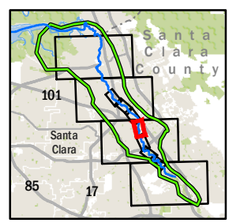
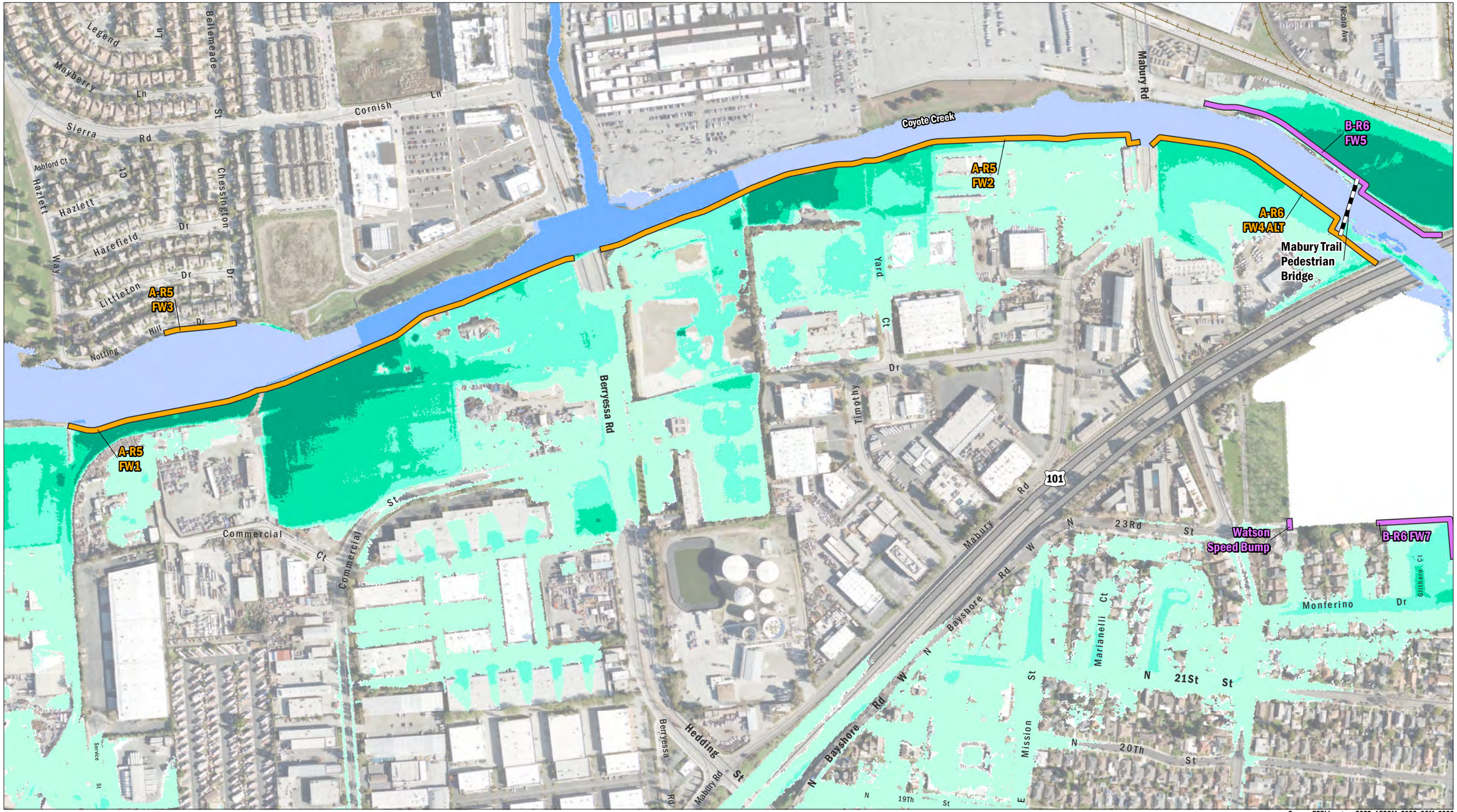


FIGURE 6

Change in All Max. Water Depths
Scenario 4 to Scenario 1
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

- -17.7 - -6
- -6 - -4
- -4 - -2
- -2 - -0.1
- -0.1 - 0.1
- 0.1 - 2
- 2 - 3.9

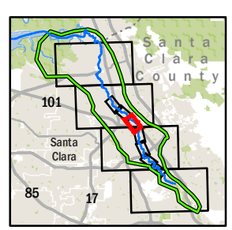
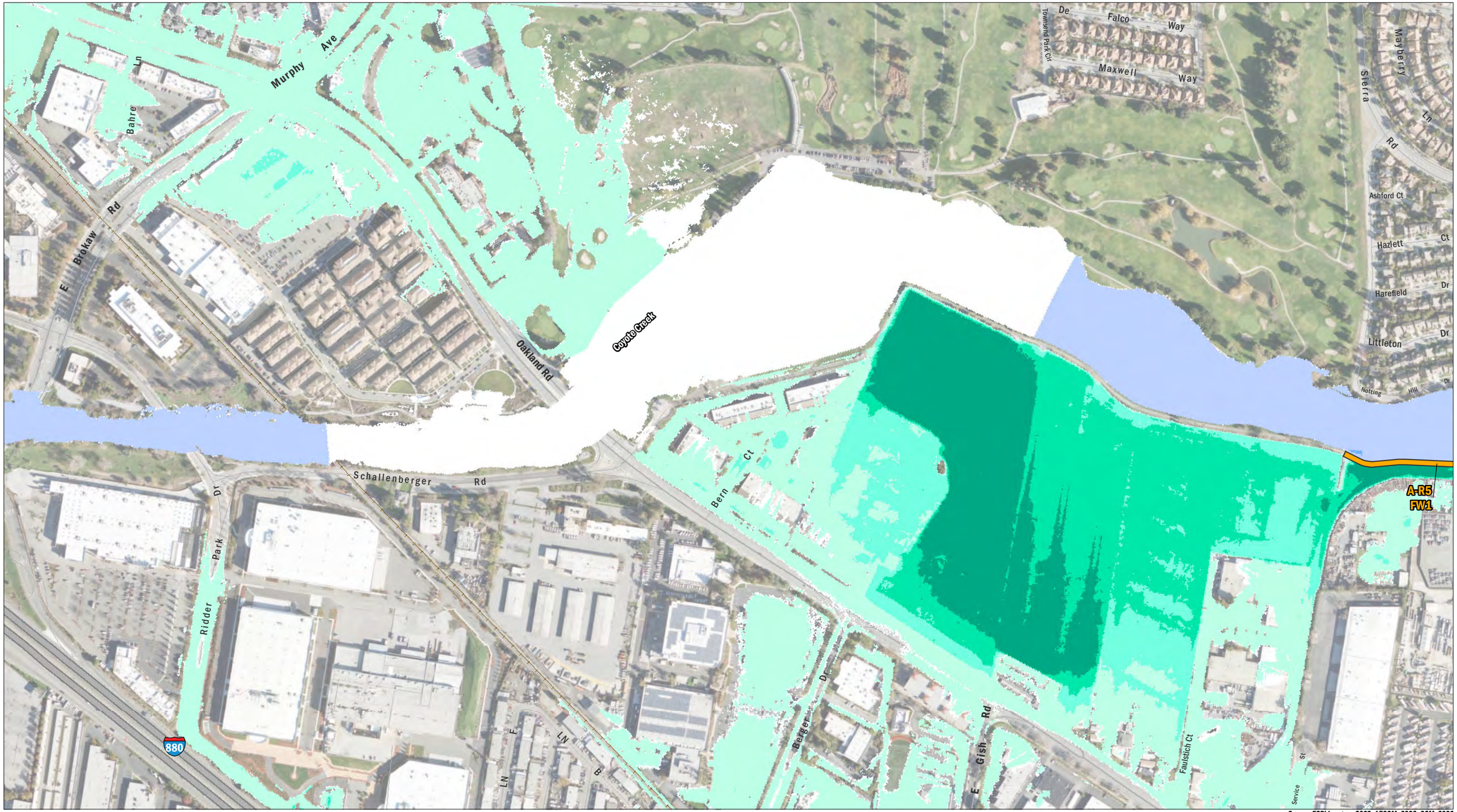


FIGURE 6

Change in All Max. Water Depths
Scenario 4 to Scenario 1
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.7 - -6
-6 - -4
-4 - -2
-2 - -0.1
-0.1 - 0.1
0.1 - 2
2 - 3.9

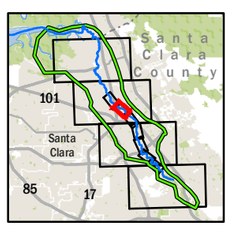
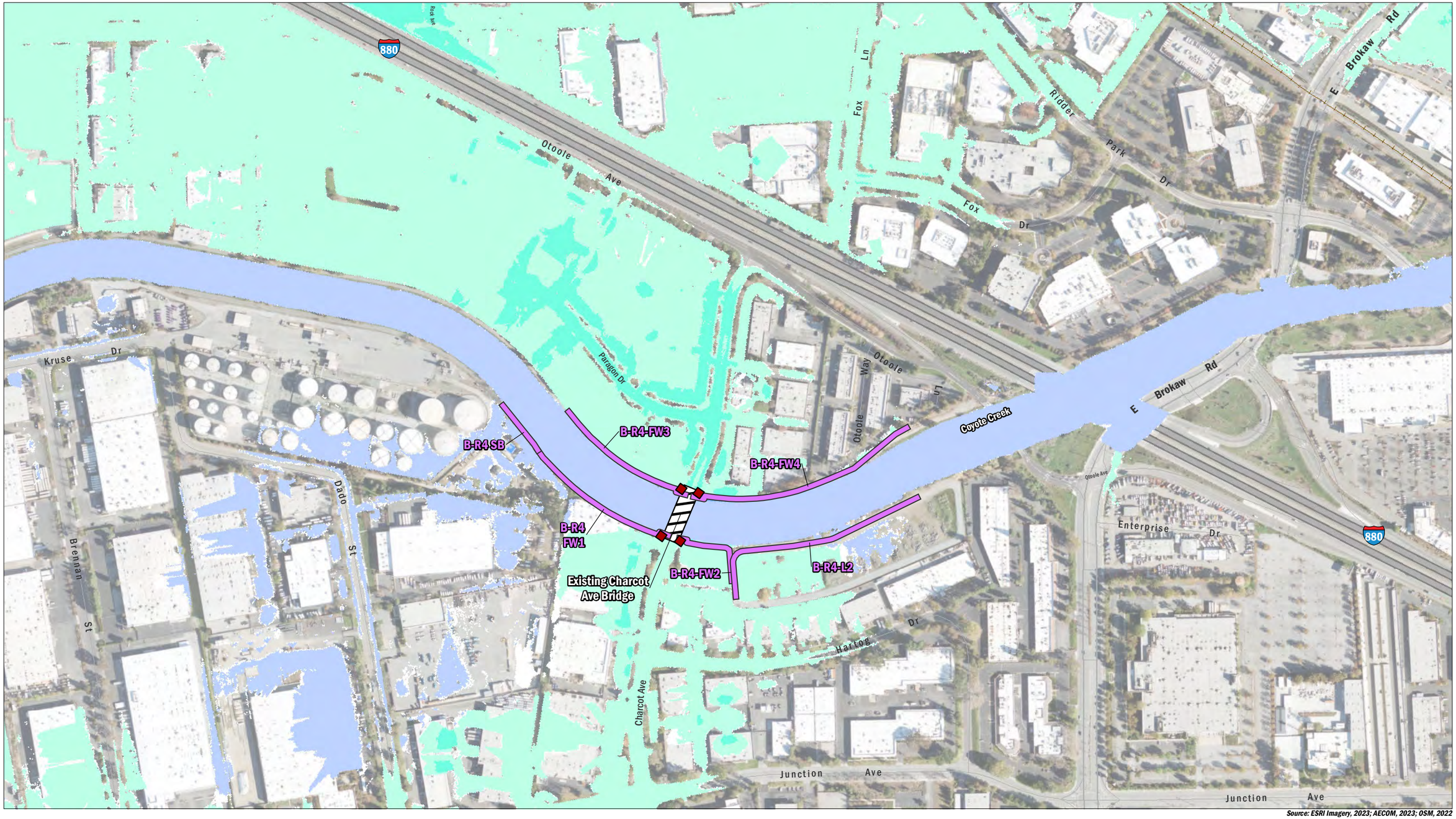


FIGURE 6
Change in All Max. Water Depths
Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1

Depth (ft)

- -17.7 - -6
- -6 - -4
- -4 - -2
- -2 - -0.1
- -0.1 - 0.1
- 0.1 - 2
- 2 - 3.9

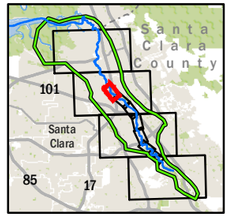
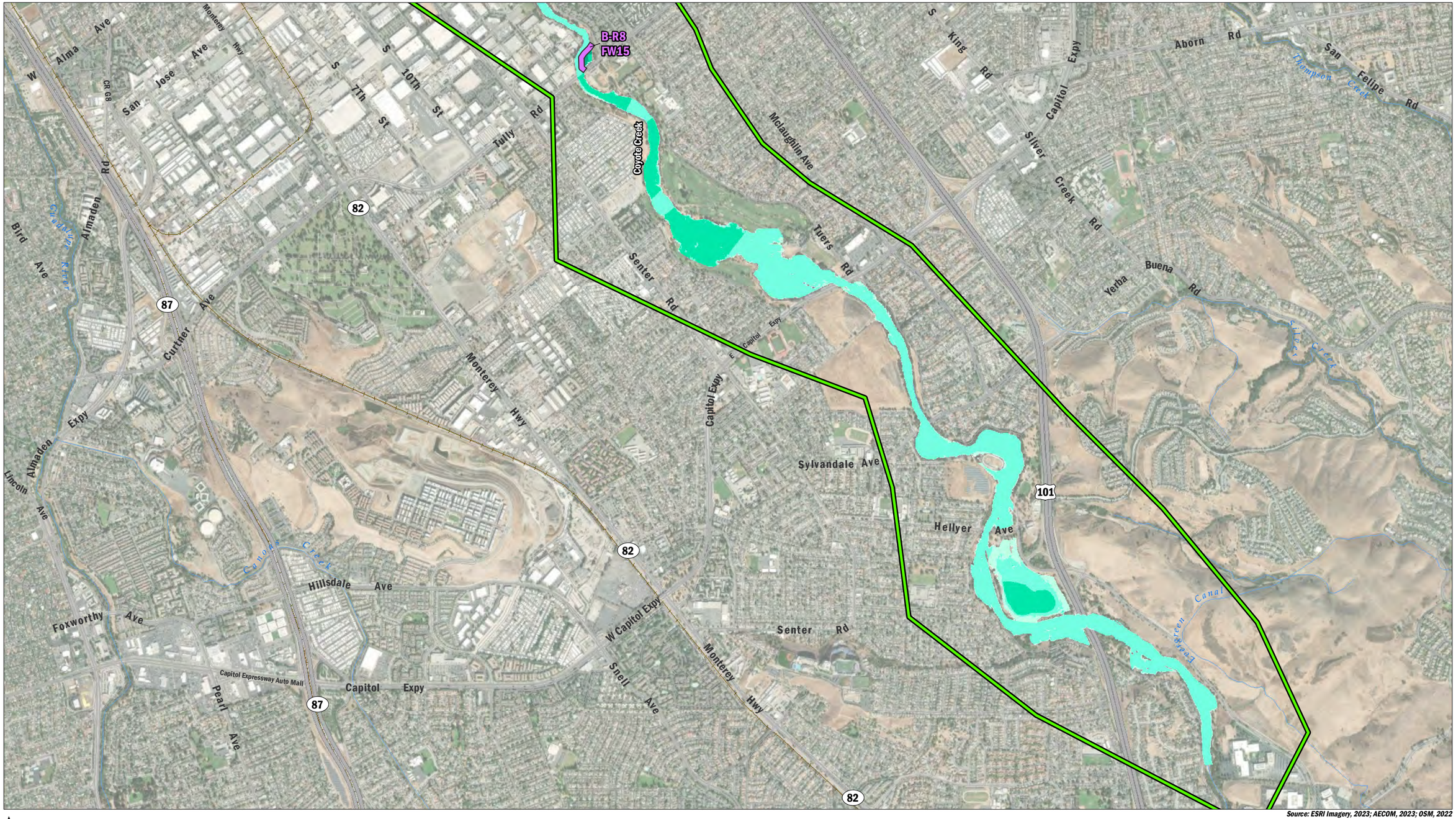


FIGURE 6

Change in All Max. Water Depths
Scenario 4 to Scenario 1
Page 7 of 11

AECOM Oakland CA 6/10/2024 USER VogeS PATH \\na.aecomnet.com\fs\AMER\Oakland-USOAK01\DCS\Projects\GIS\Projects\60652041_CoyoteCreekFlood\02_Maps\02_Report_Maps\FloodMapping\4to1\Figure 6 - Change in All Max Water Depths_4to1.mxd



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
-17.7 - -6
-6 - -4
-4 - -2
-2 - -0.1
-0.1 - 0.1
0.1 - 2
2 - 3.9

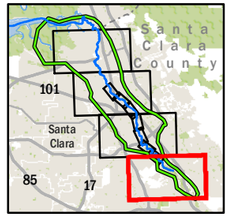
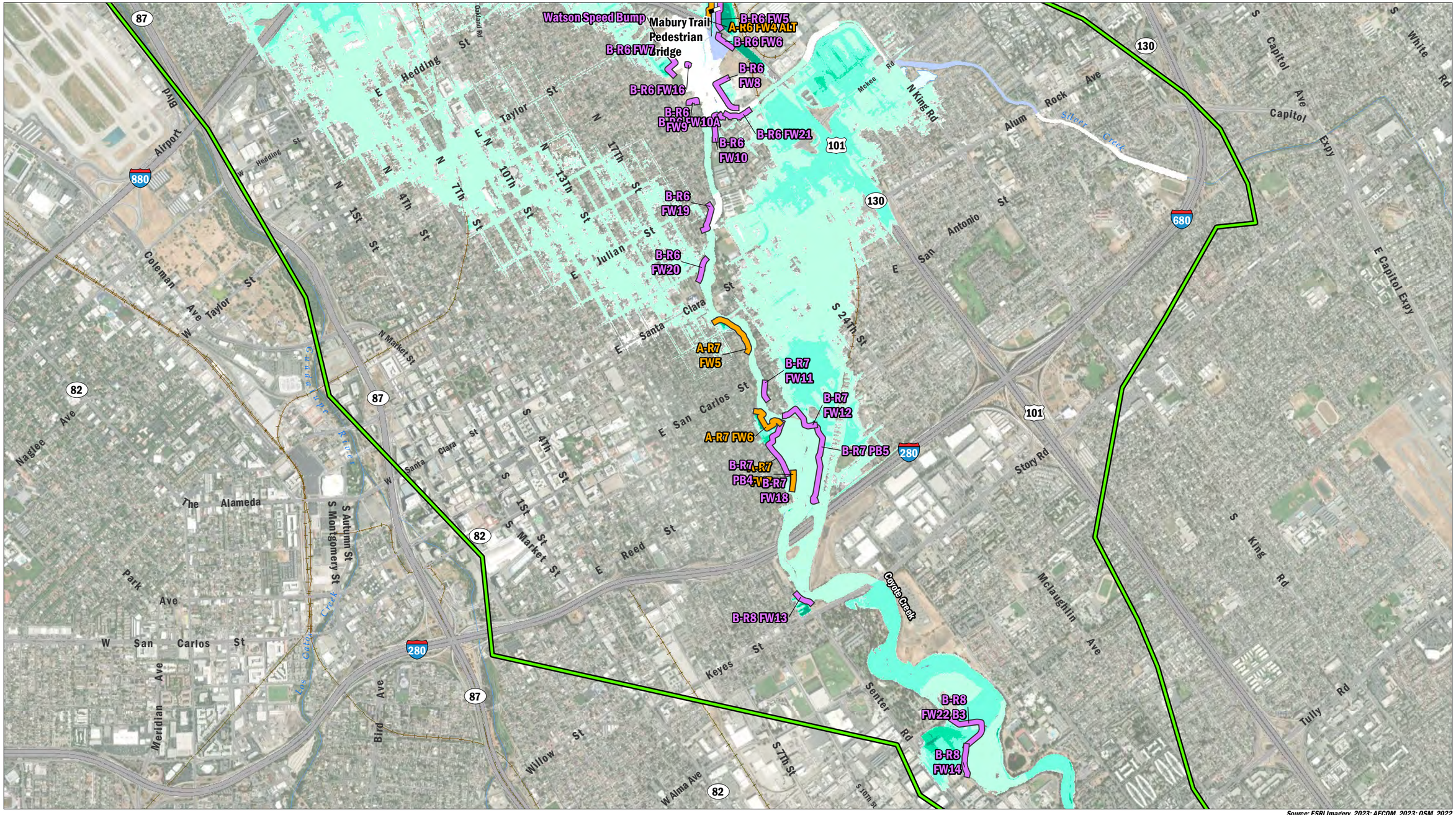


FIGURE 6

Change in All Max. Water Depths
Scenario 4 to Scenario 1
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

- -17.7 - -6
- -6 - -4
- -4 - -2
- -2 - -0.1
- -0.1 - 0.1
- 0.1 - 2
- 2 - 3.9

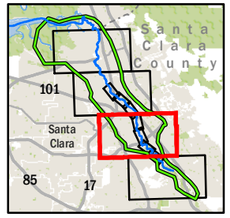
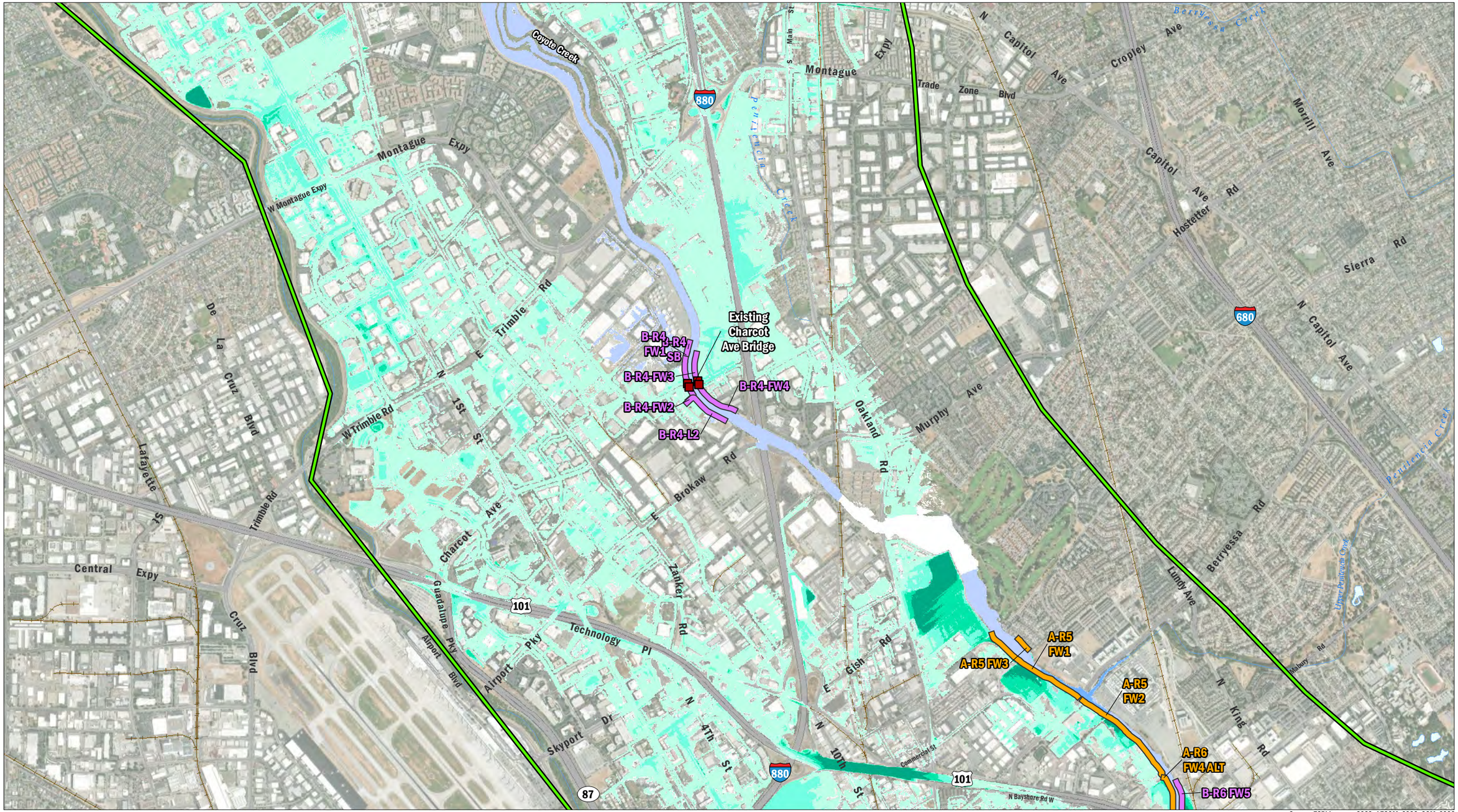


FIGURE 6
Change in All Max. Water Depths
Scenario 4 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)
- -17.7 - -6
- -6 - -4
- -4 - -2
- -2 - -0.1
- -0.1 - 0.1
- 0.1 - 2
- 2 - 3.9

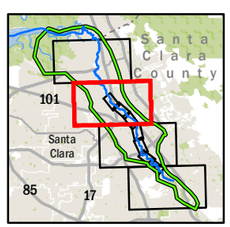
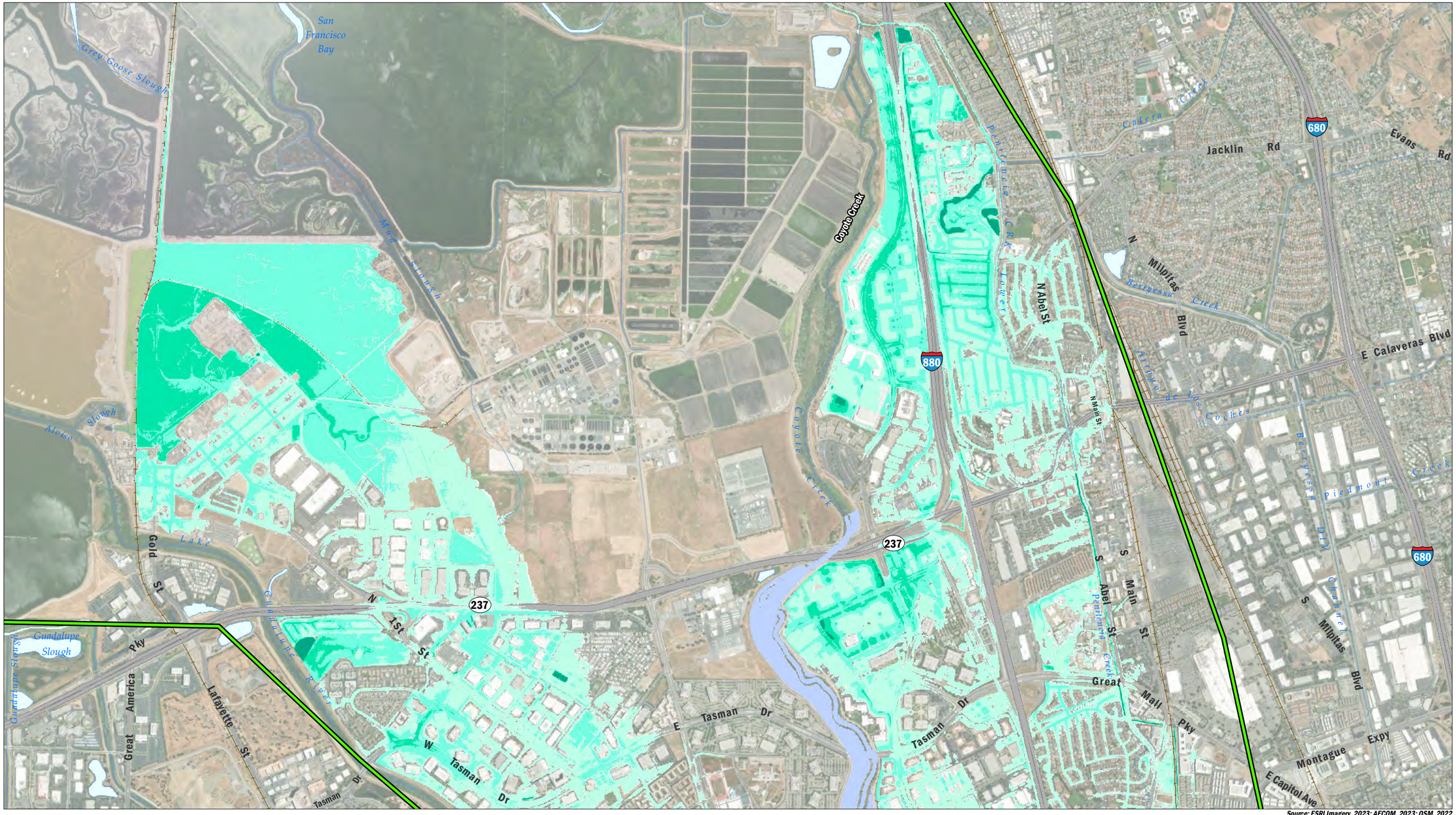


FIGURE 6

Change in All Max. Water Depths
Scenario 4 to Scenario 1
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 4 Minus Scenario 1
Depth (ft)

- -17.7 - -6
- -6 - -4
- -4 - -2
- -2 - -0.1
- -0.1 - 0.1
- 0.1 - 2
- 2 - 3.9

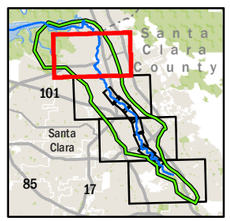
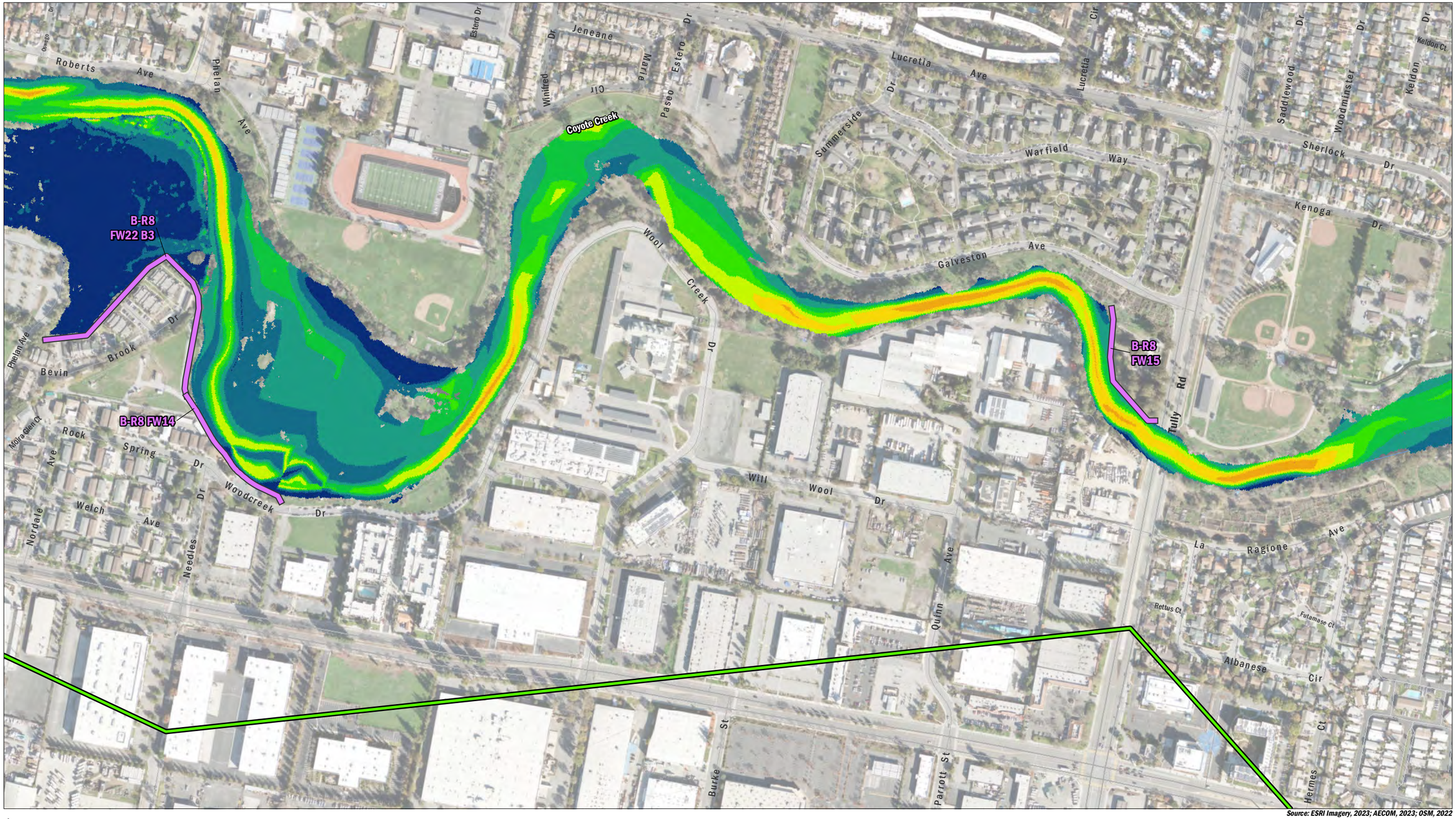


FIGURE 6

Change in All Max. Water Depths
Scenario 4 to Scenario 1
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

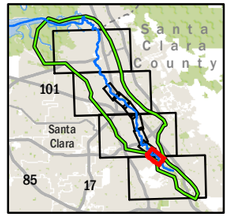
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.3



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

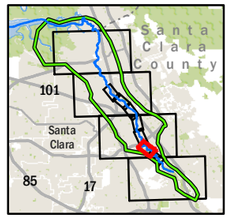
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

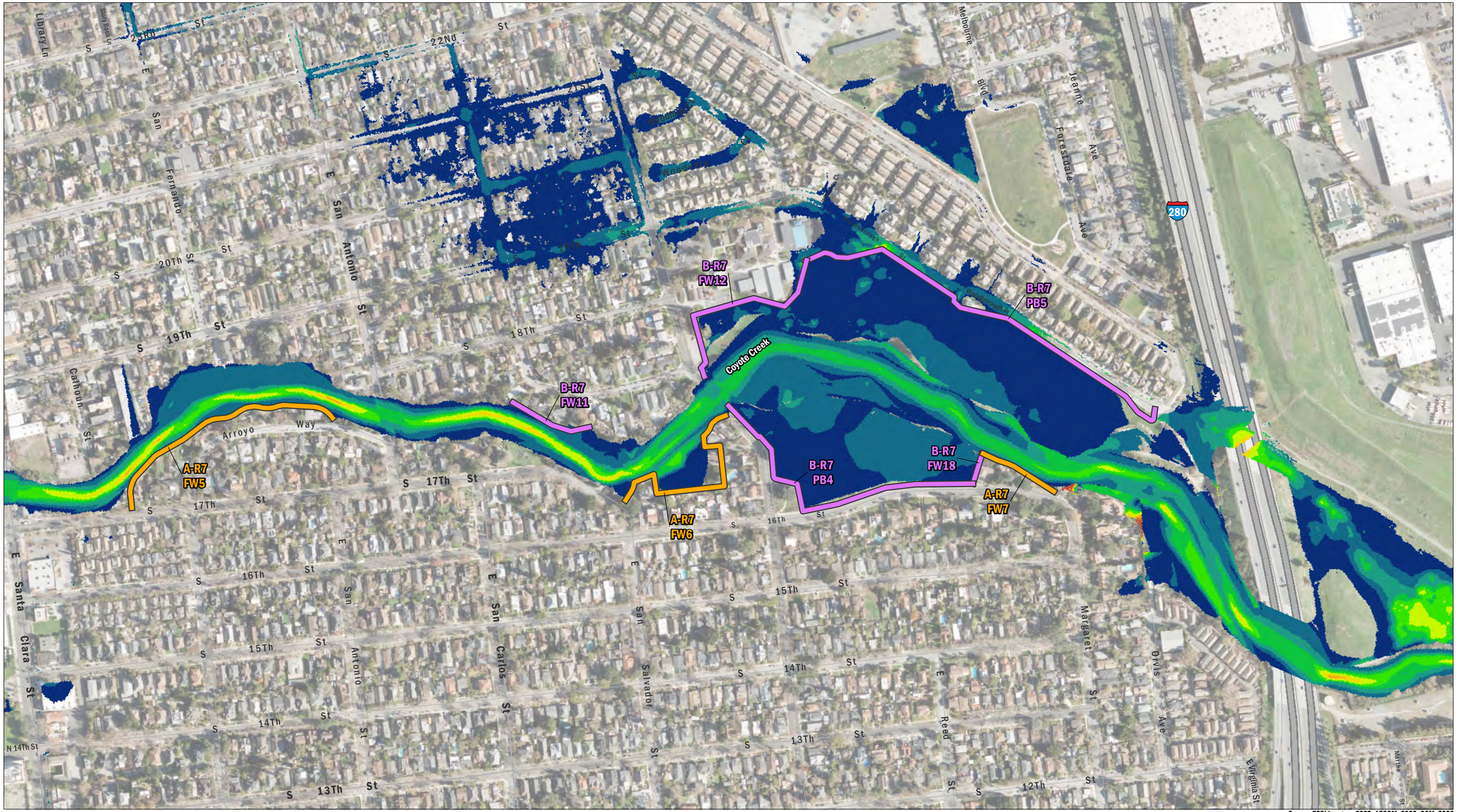
0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.3



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7
Proposed Max. Velocity in Depths 1ft and Over Scenario 4
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

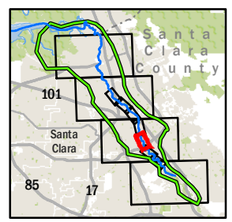
0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

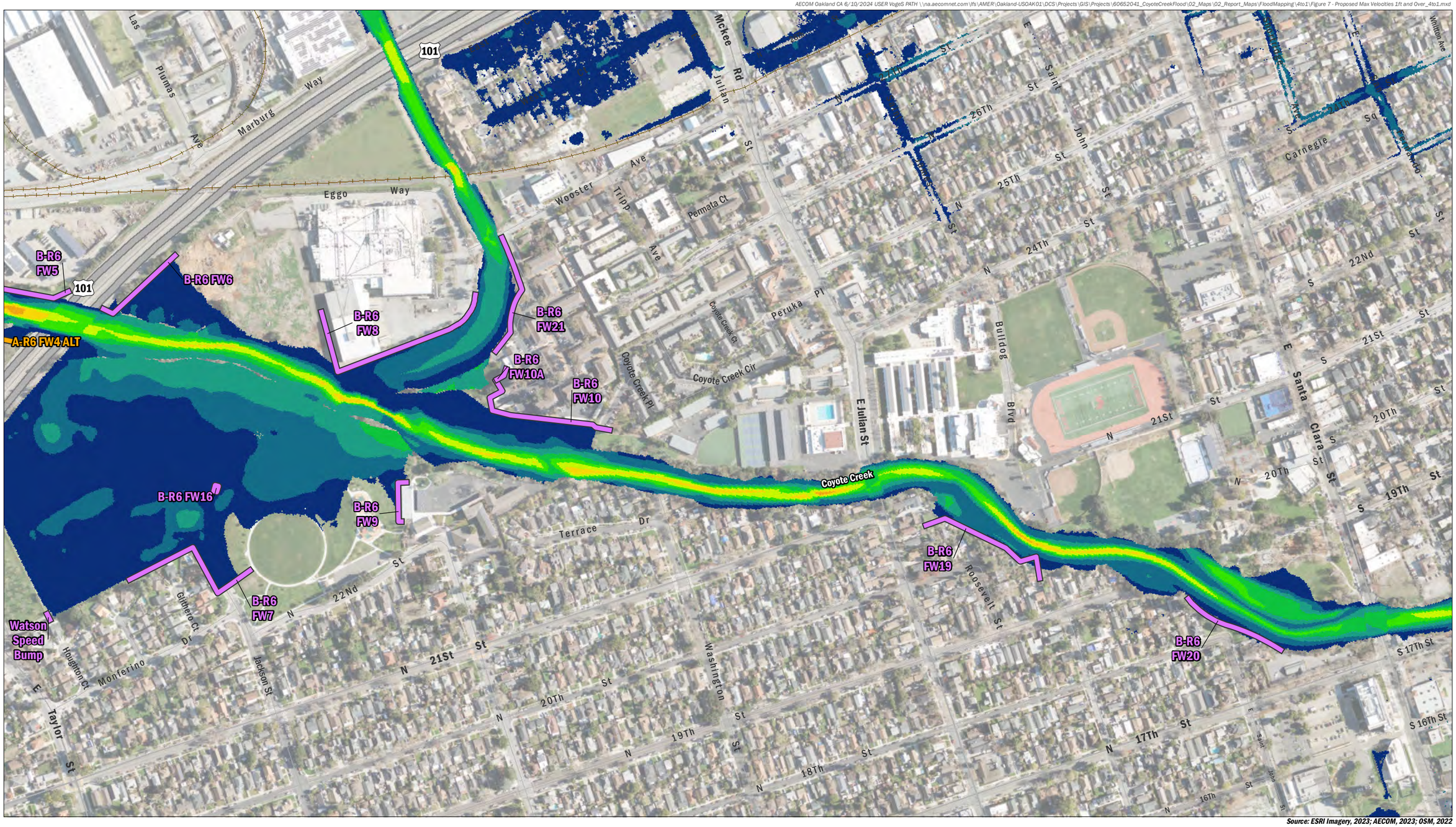
0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.3



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7
Proposed Max. Velocity in Depths 1ft and Over Scenario 4
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)
0 - 0.7
0.7 - 1.5
1.5 - 2.4
2.4 - 3.2
3.2 - 4
4 - 5
5 - 6.2
6.2 - 7.7
7.7 - 9.8
9.8 - 11.3

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

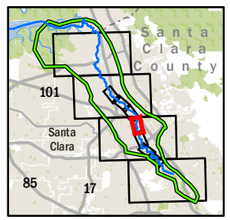


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.3

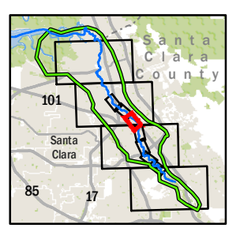
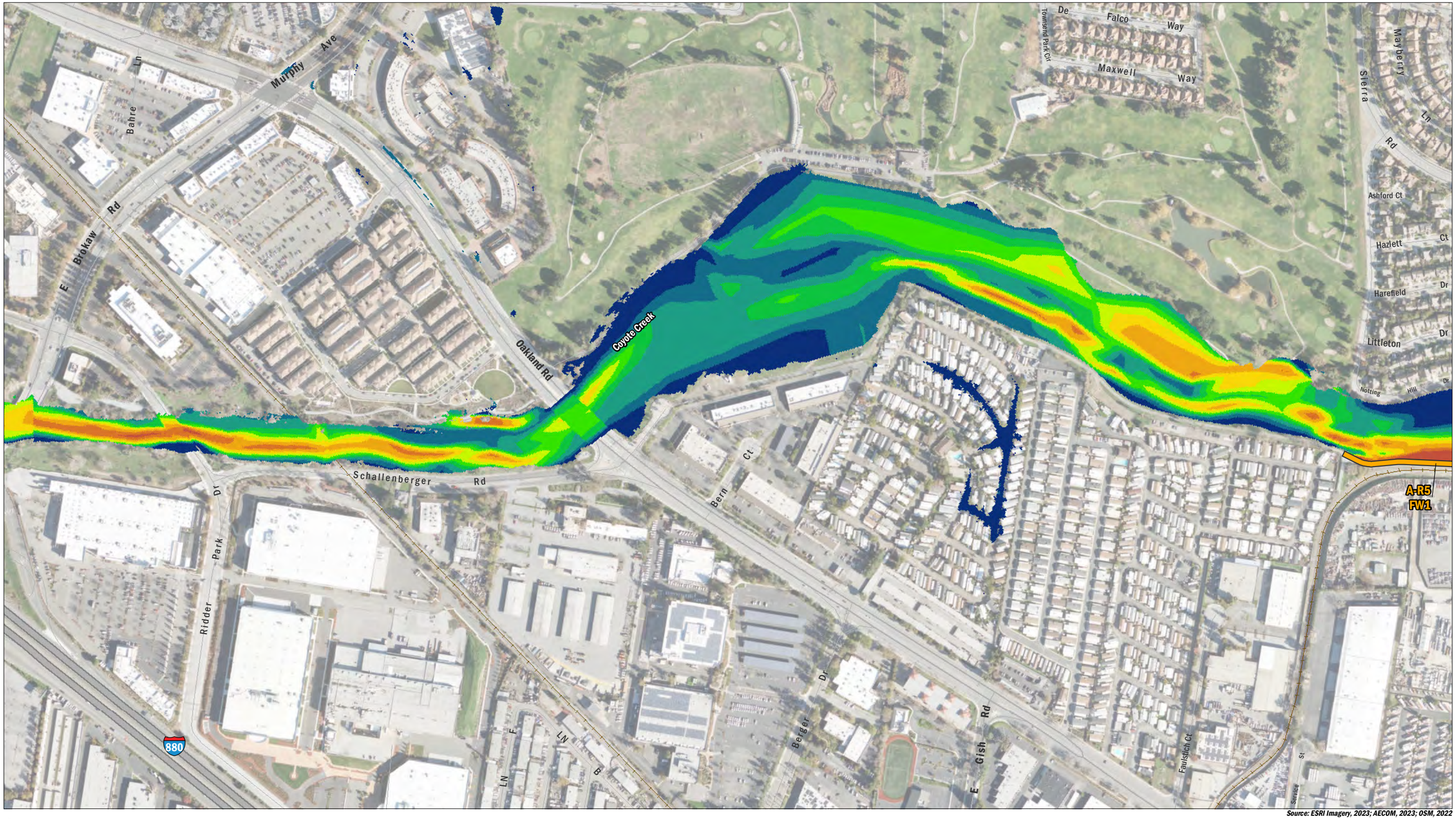


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.3

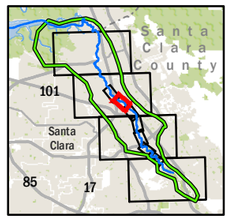
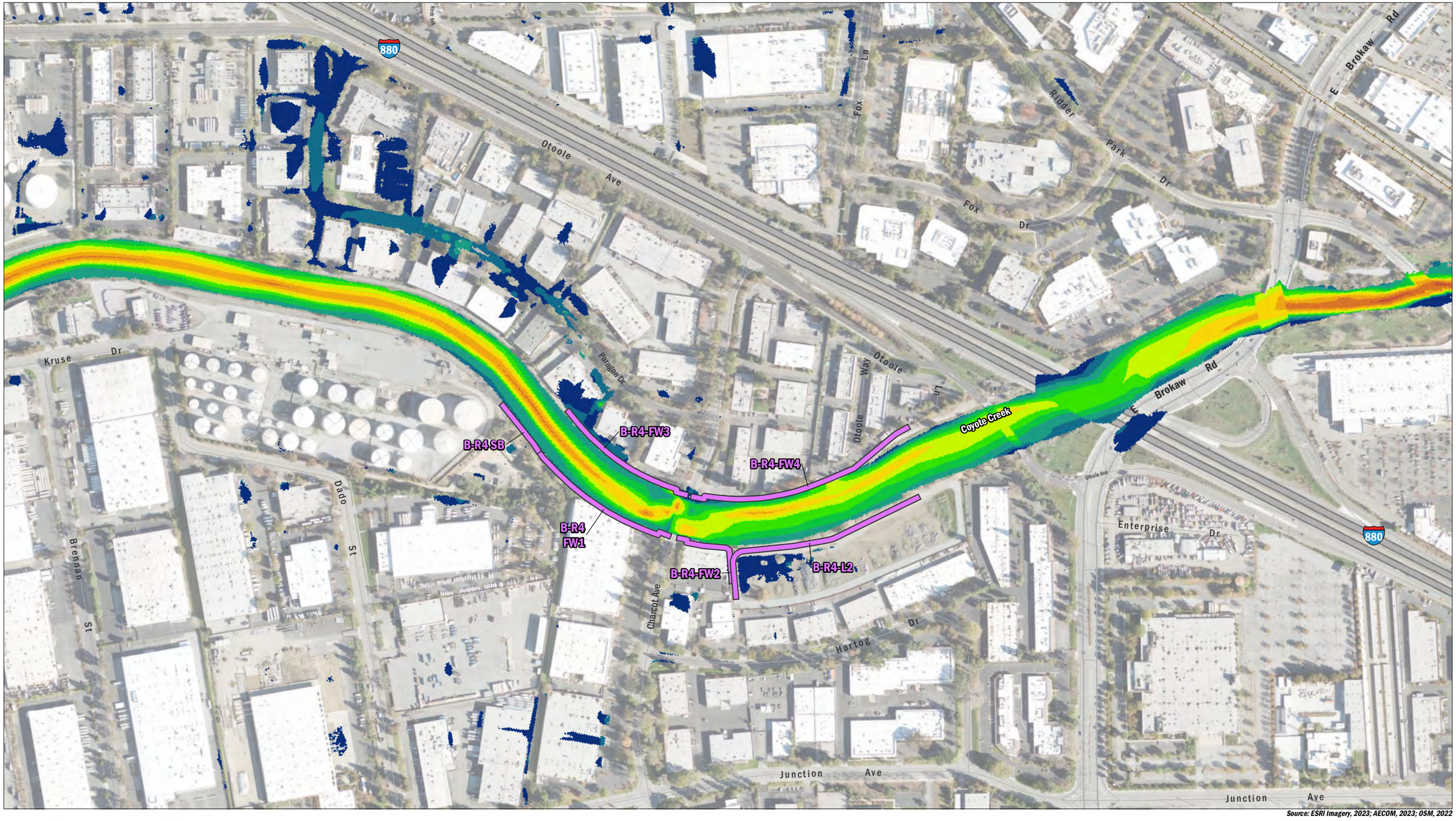


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP

Model Boundary

Maximum Velocity Scenario 4

Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.3

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

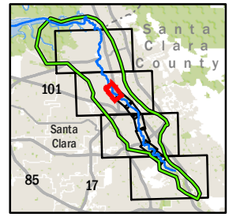
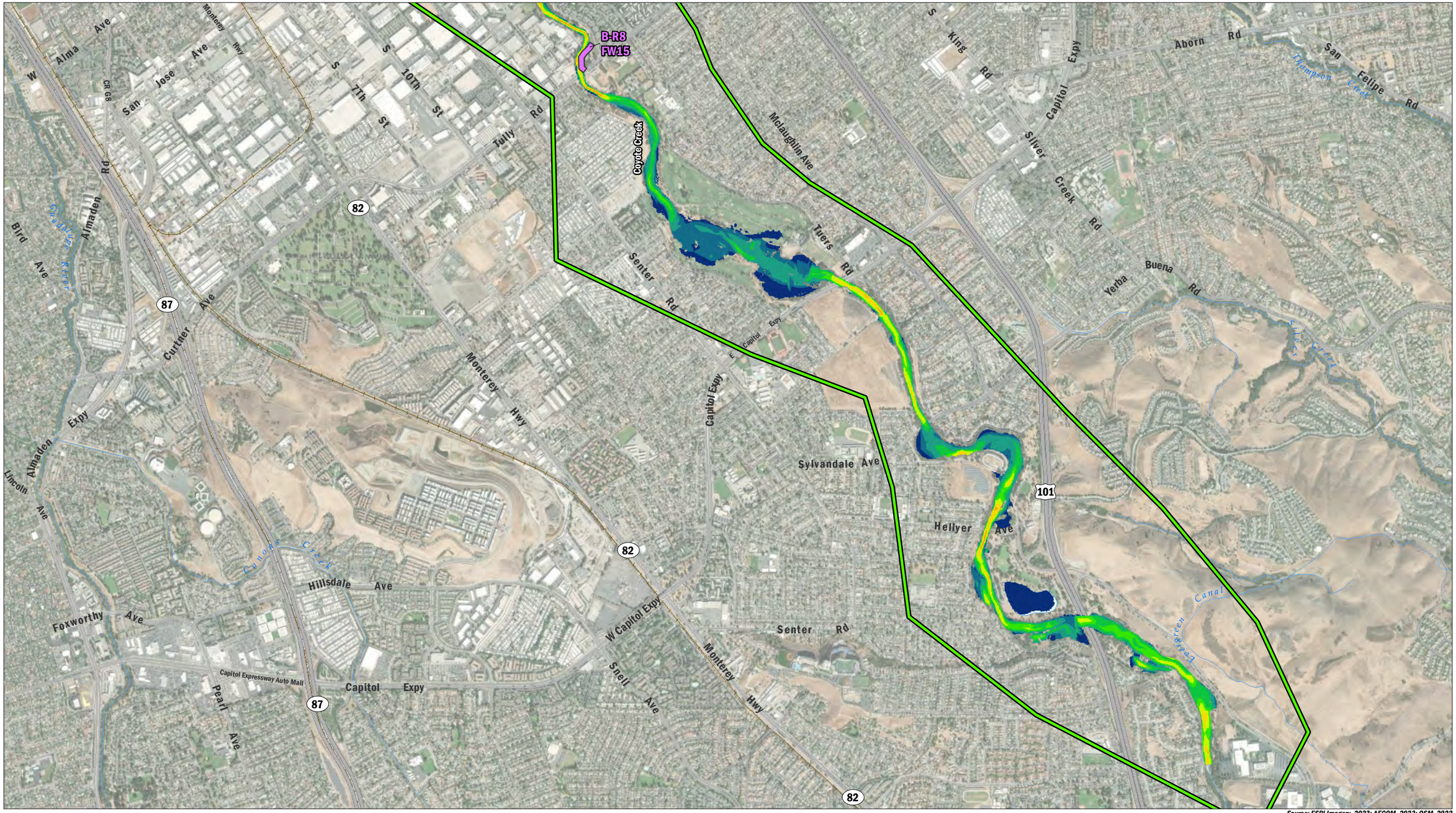


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.3

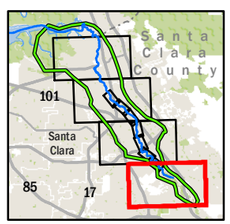
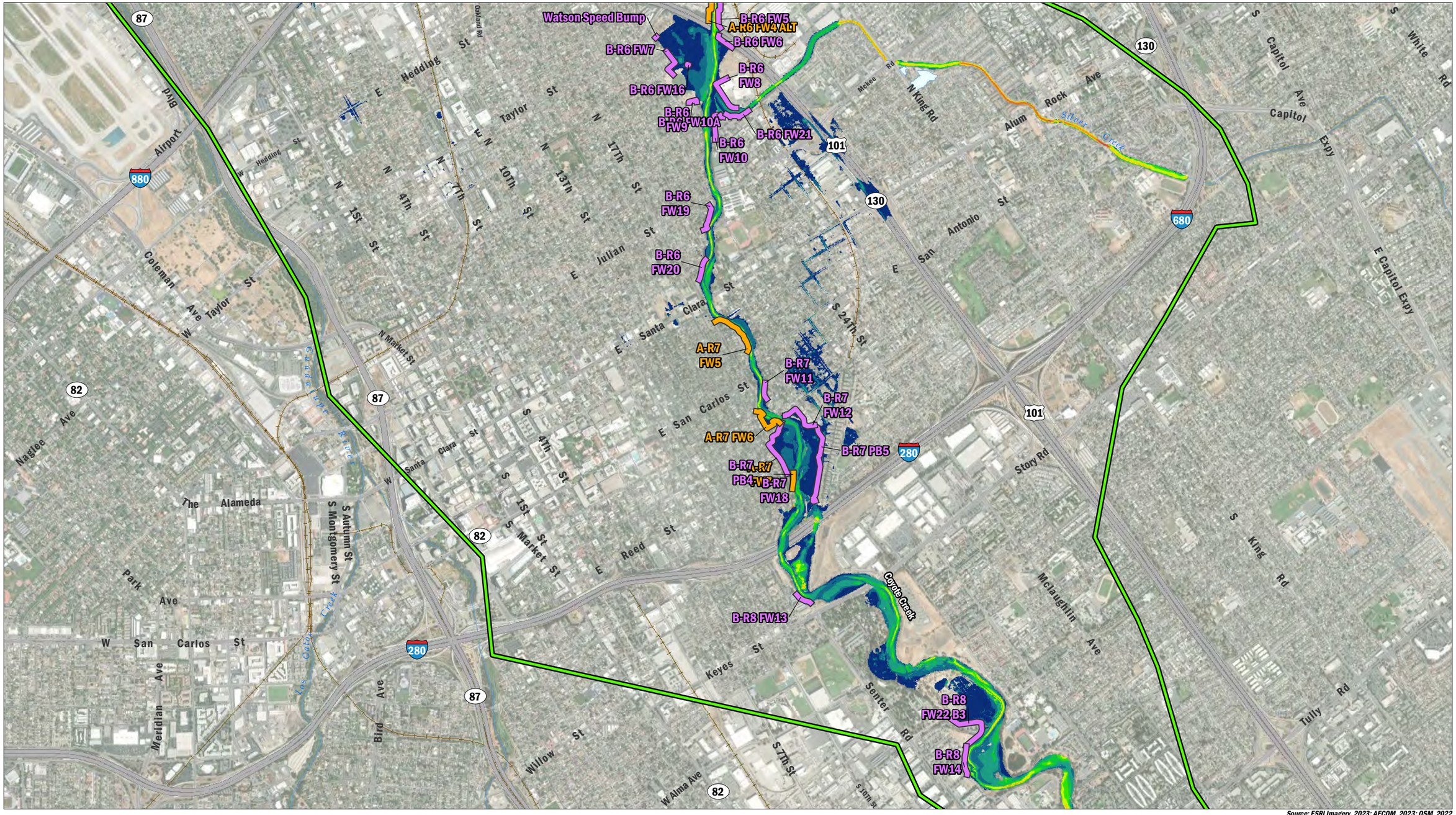


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.3

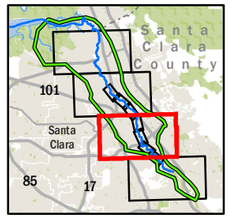
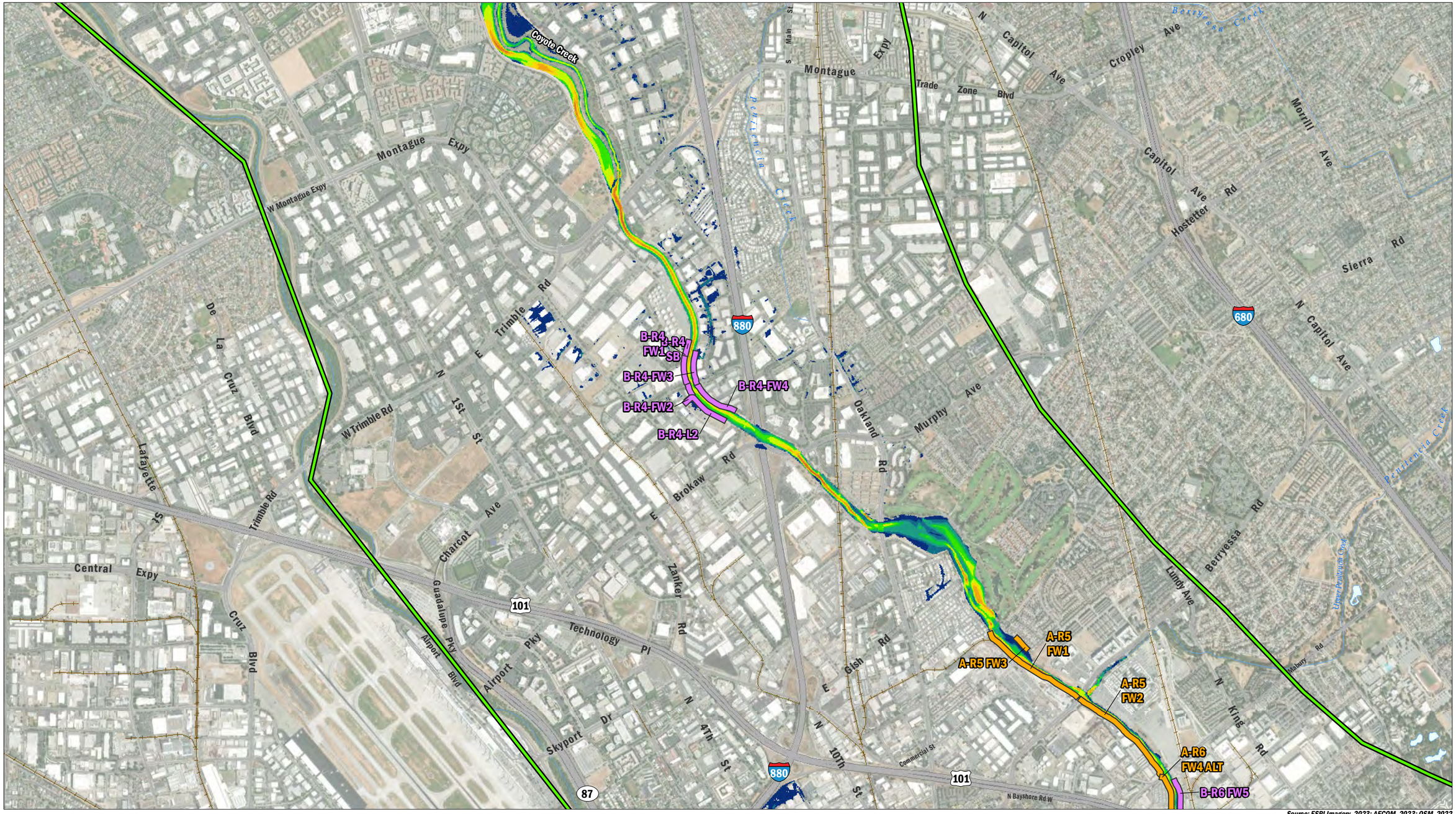


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

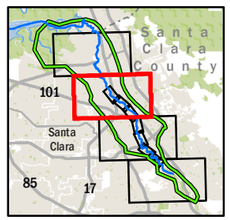
0 2,400 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.3



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

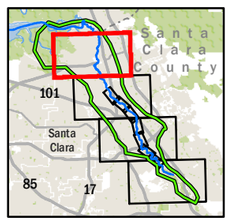
0 2,400 Feet

Created Date: 6/10/2024

Model Boundary

Maximum Velocity Scenario 4
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.3



AECOM
Coyote Creek
EIR Modeling

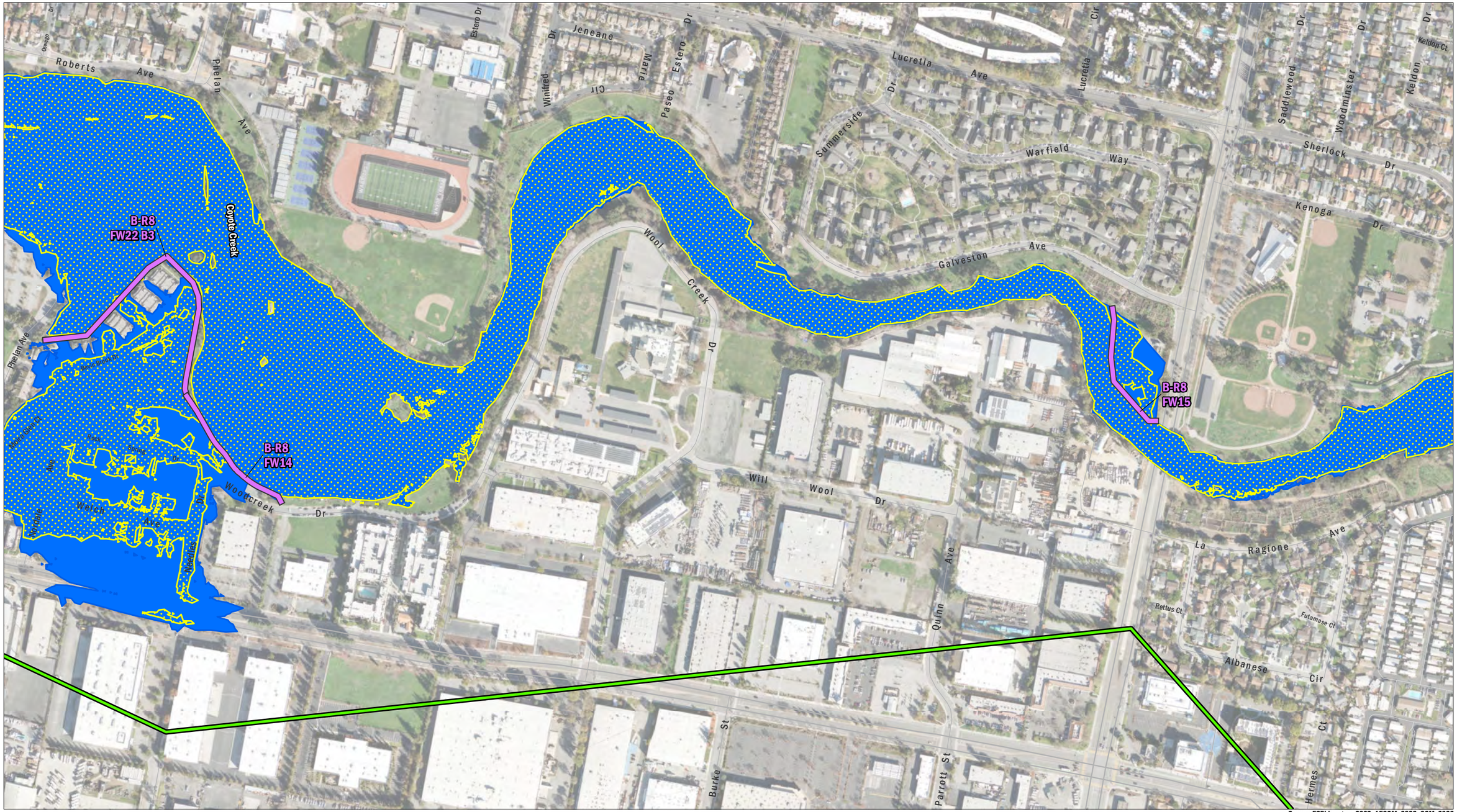
Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 4

Attachment 3

Scenario 5 Versus Scenario 1 Comparison Figures



0 500
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 5

AECOM
Coyote Creek
EIR Modeling

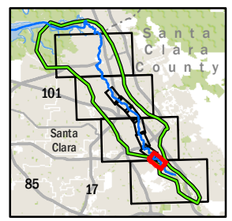
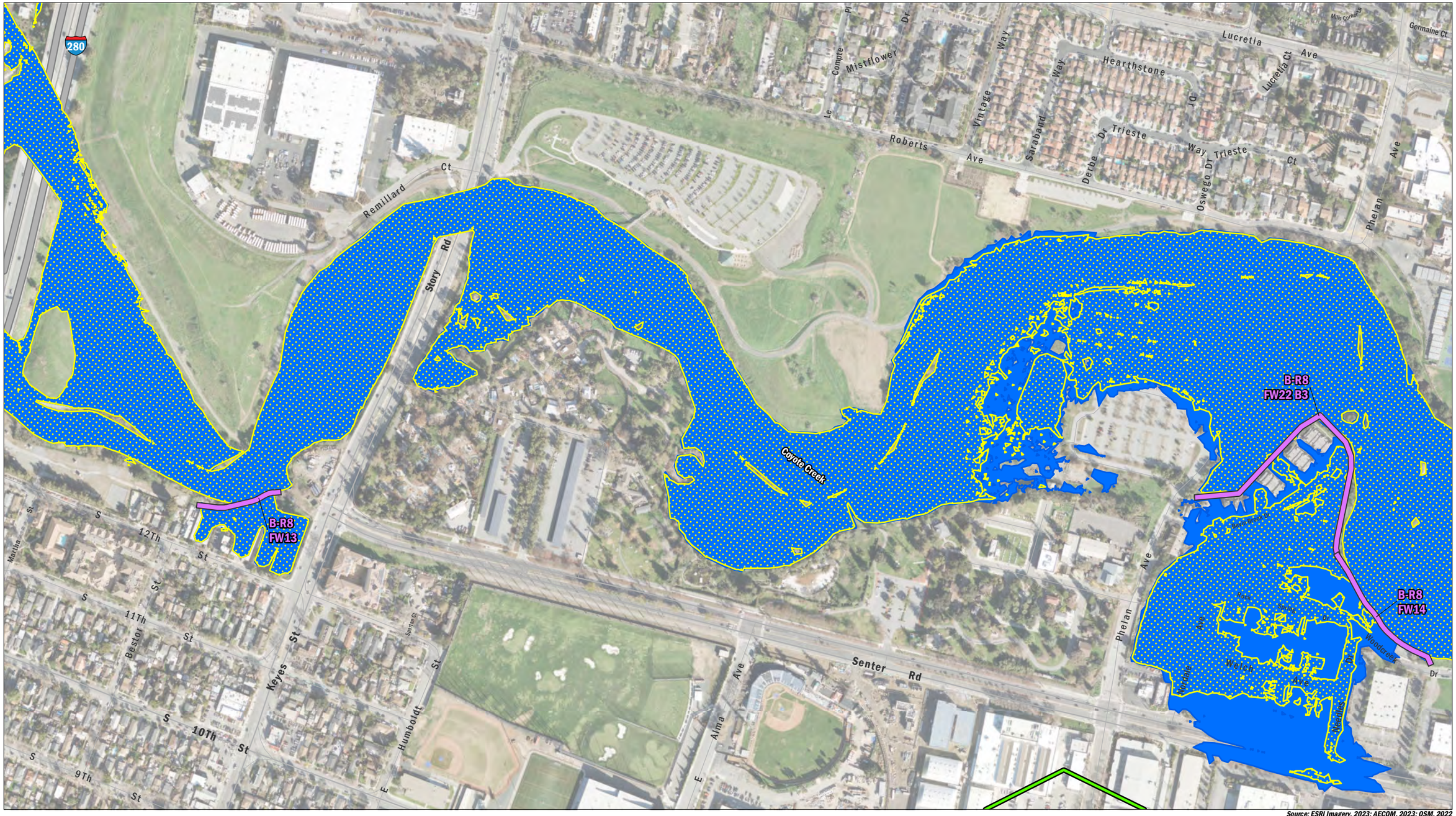


FIGURE 1
Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1
Page 1 of 11



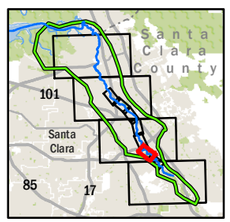
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

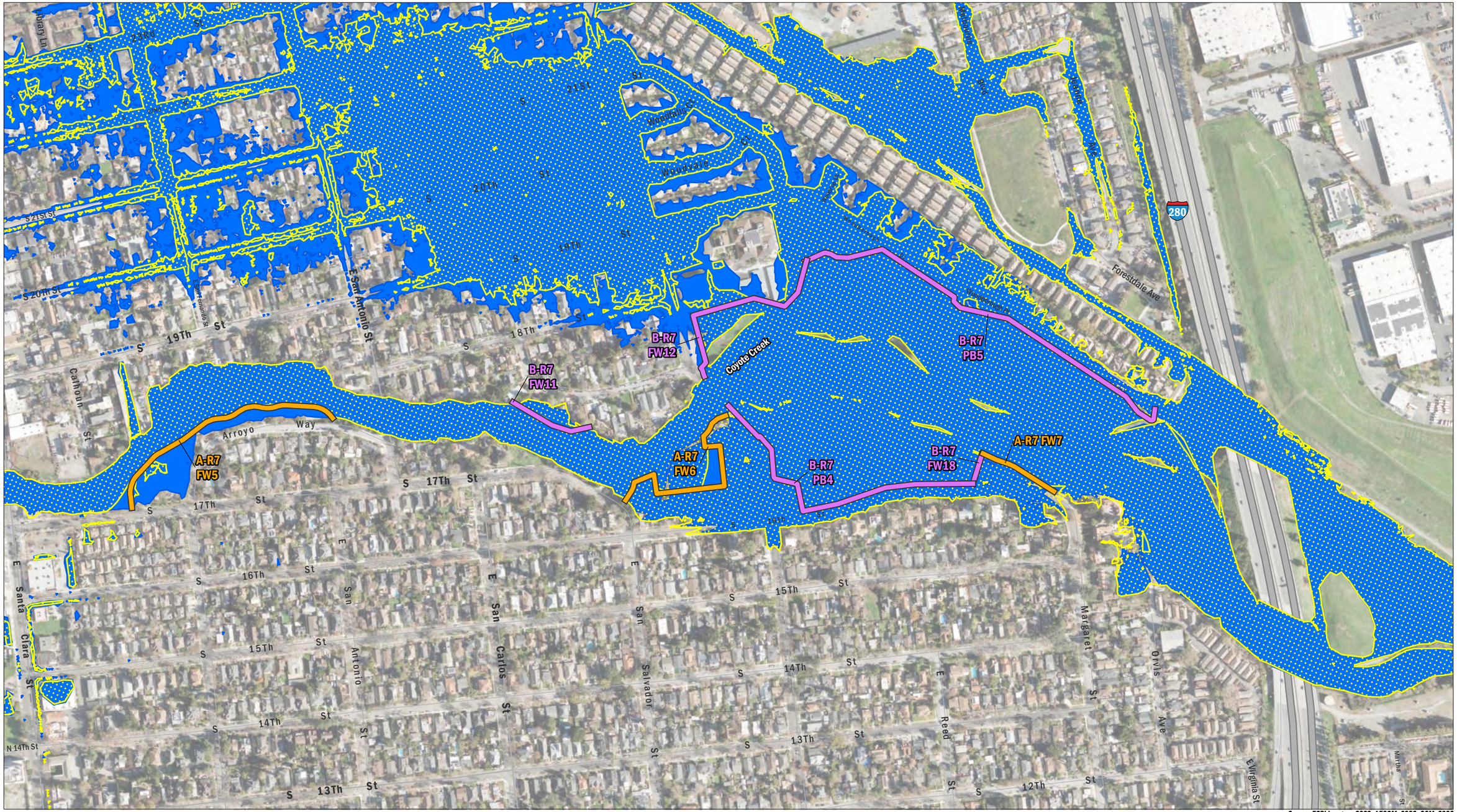
CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 5



AECOM
Coyote Creek
EIR Modeling

FIGURE 1
Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

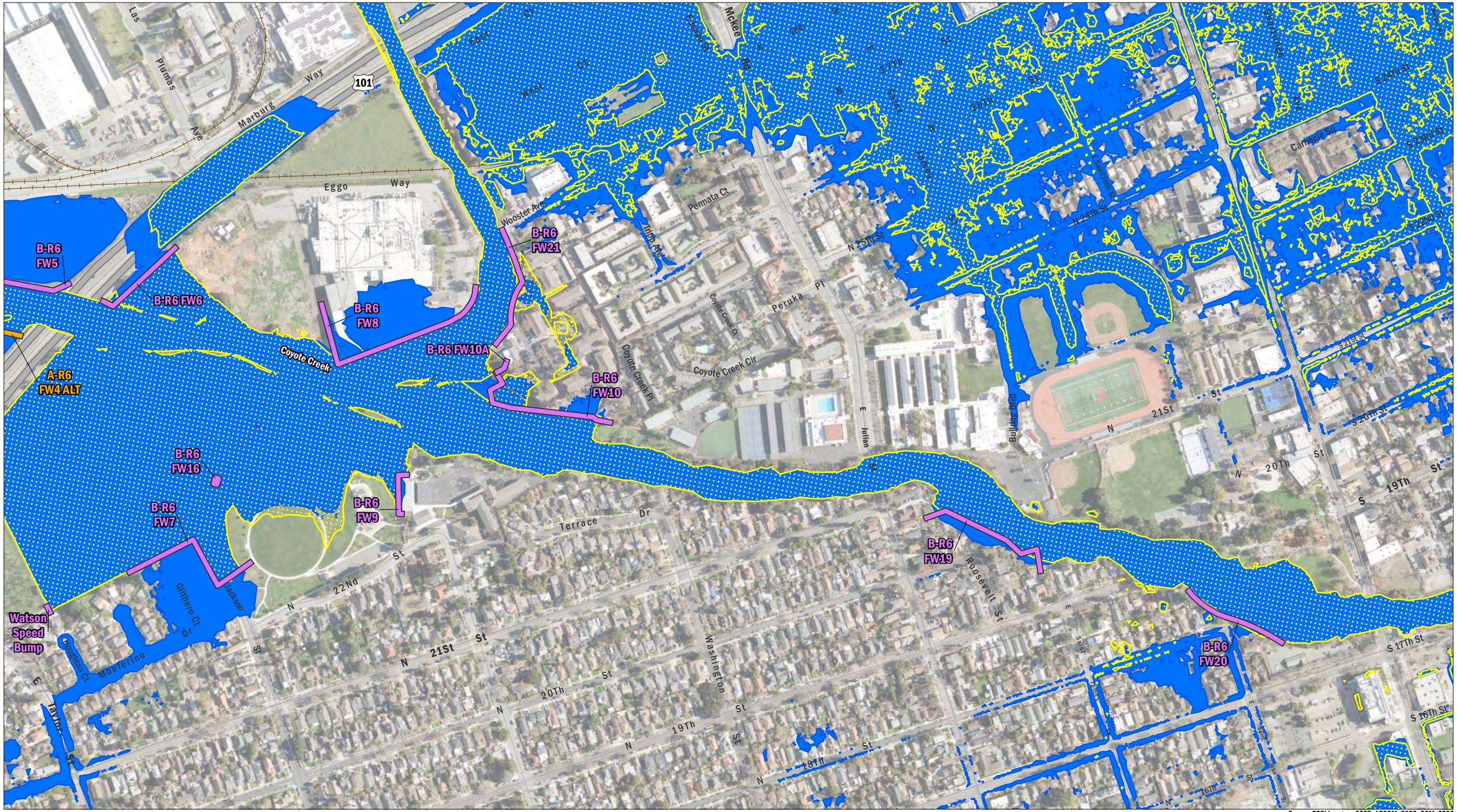
CCFMMP
CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 5

AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1
Page 3 of 11



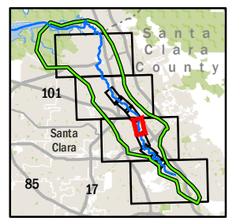
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

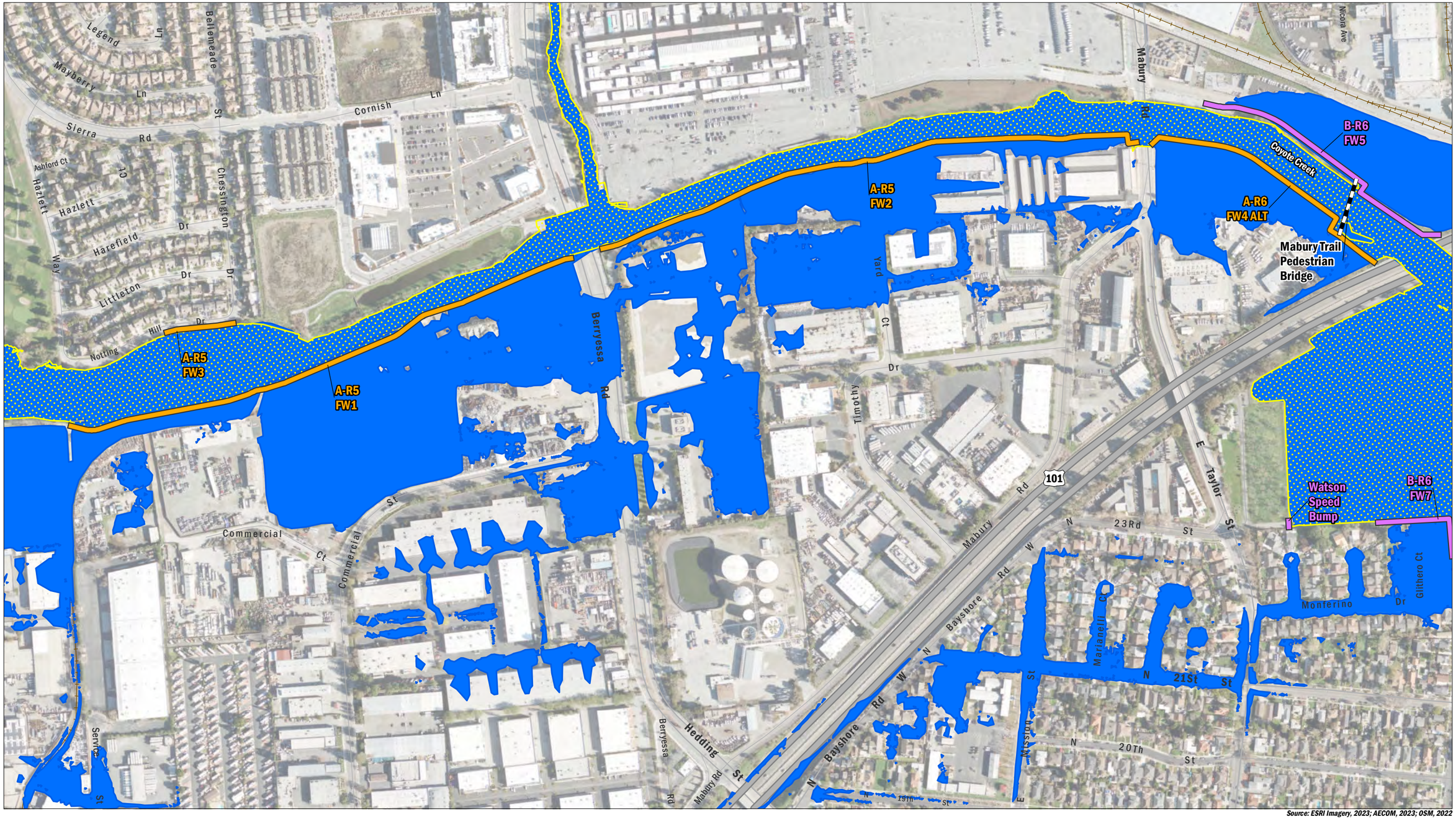
Modeled Flood Extents
Scenario 1
Scenario 5



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1
Page 4 of 11



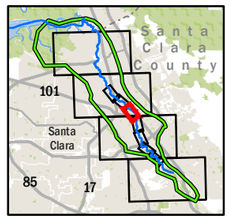
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

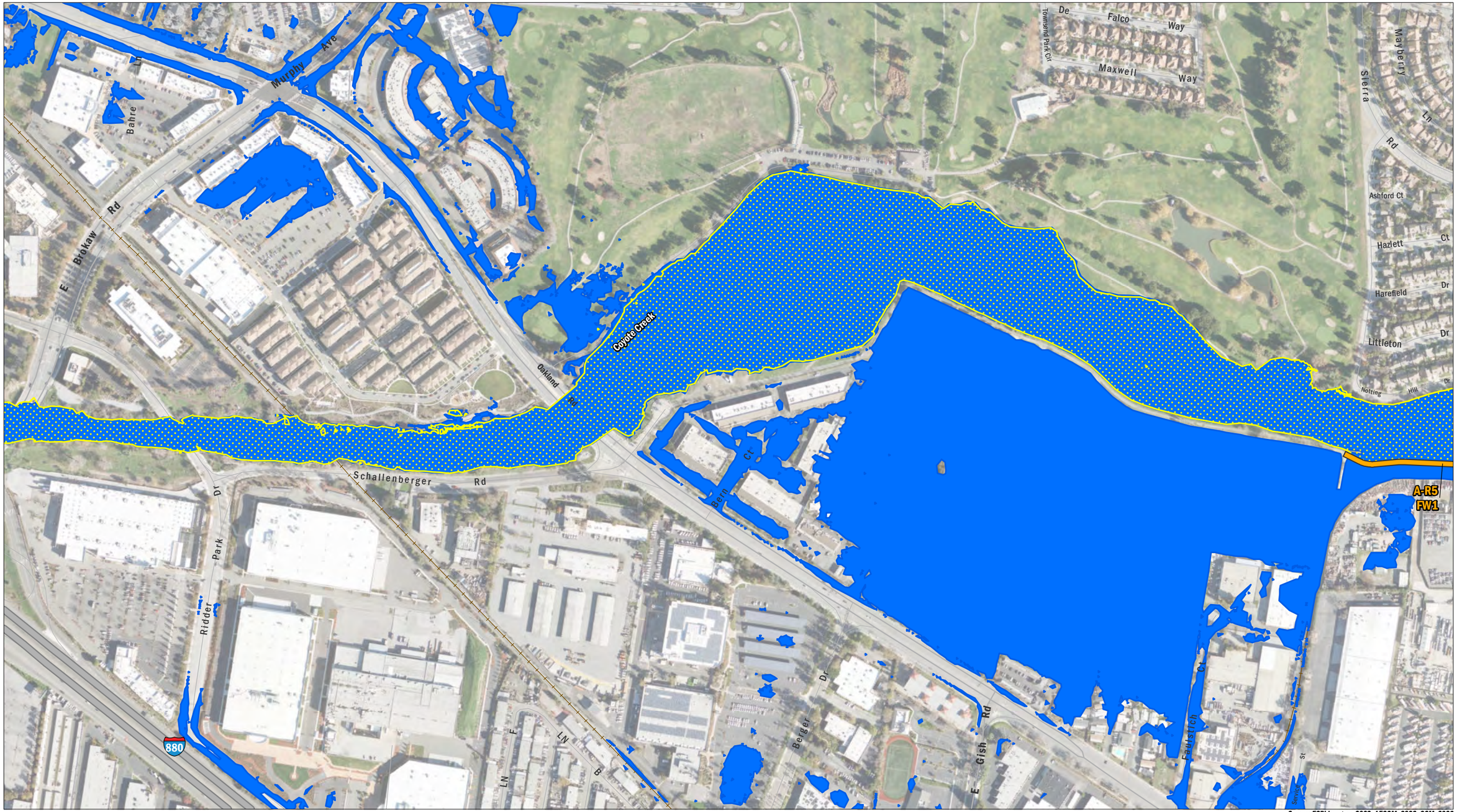
Modeled Flood Extents
- Scenario 1
- Scenario 5



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 5

AECOM
Coyote Creek
EIR Modeling

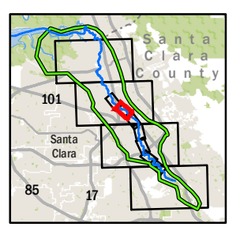
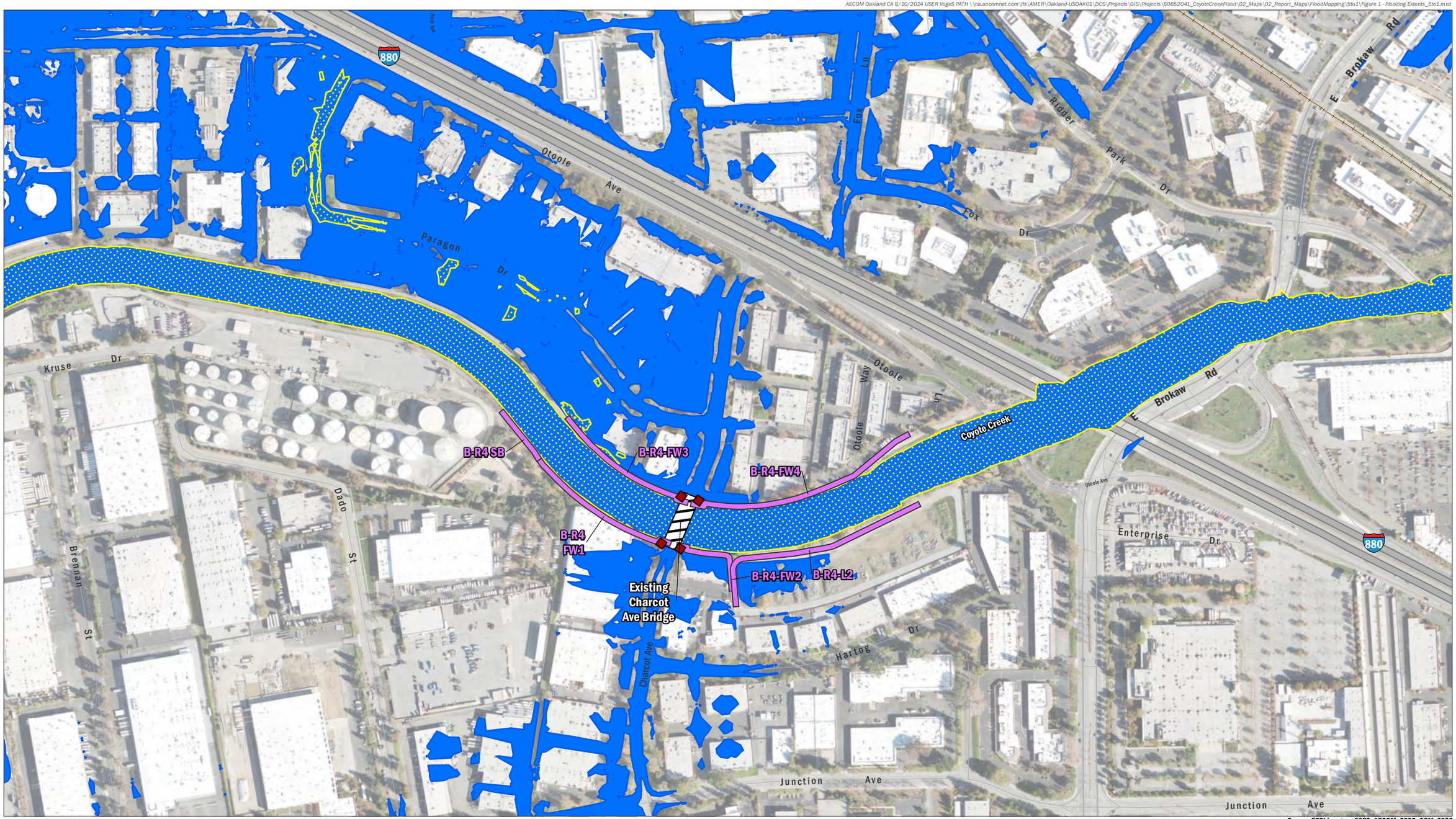


FIGURE 1
Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Modeled Flood Extents
- Scenario 1
- Scenario 5

AECOM
Coyote Creek
EIR Modeling

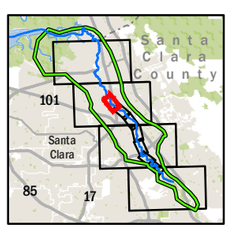


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1
Scenario 5

AECOM
Coyote Creek
EIR Modeling

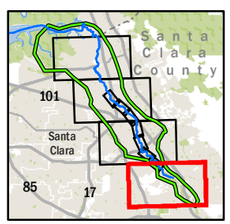
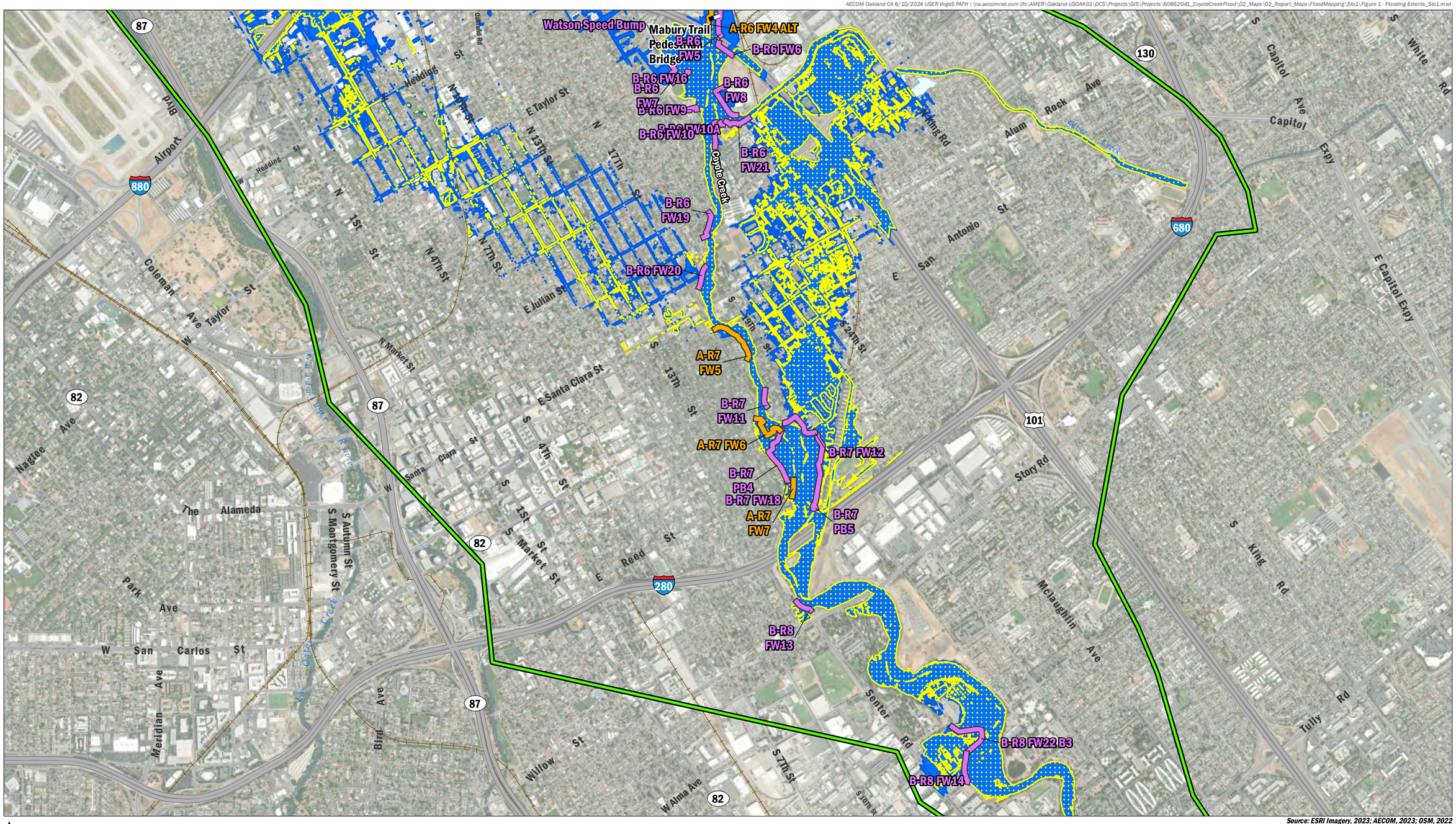


FIGURE 1
Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Modeled Flood Extents
- Scenario 1
- Scenario 5

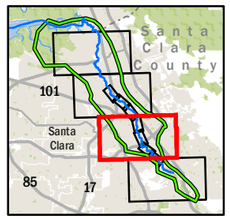
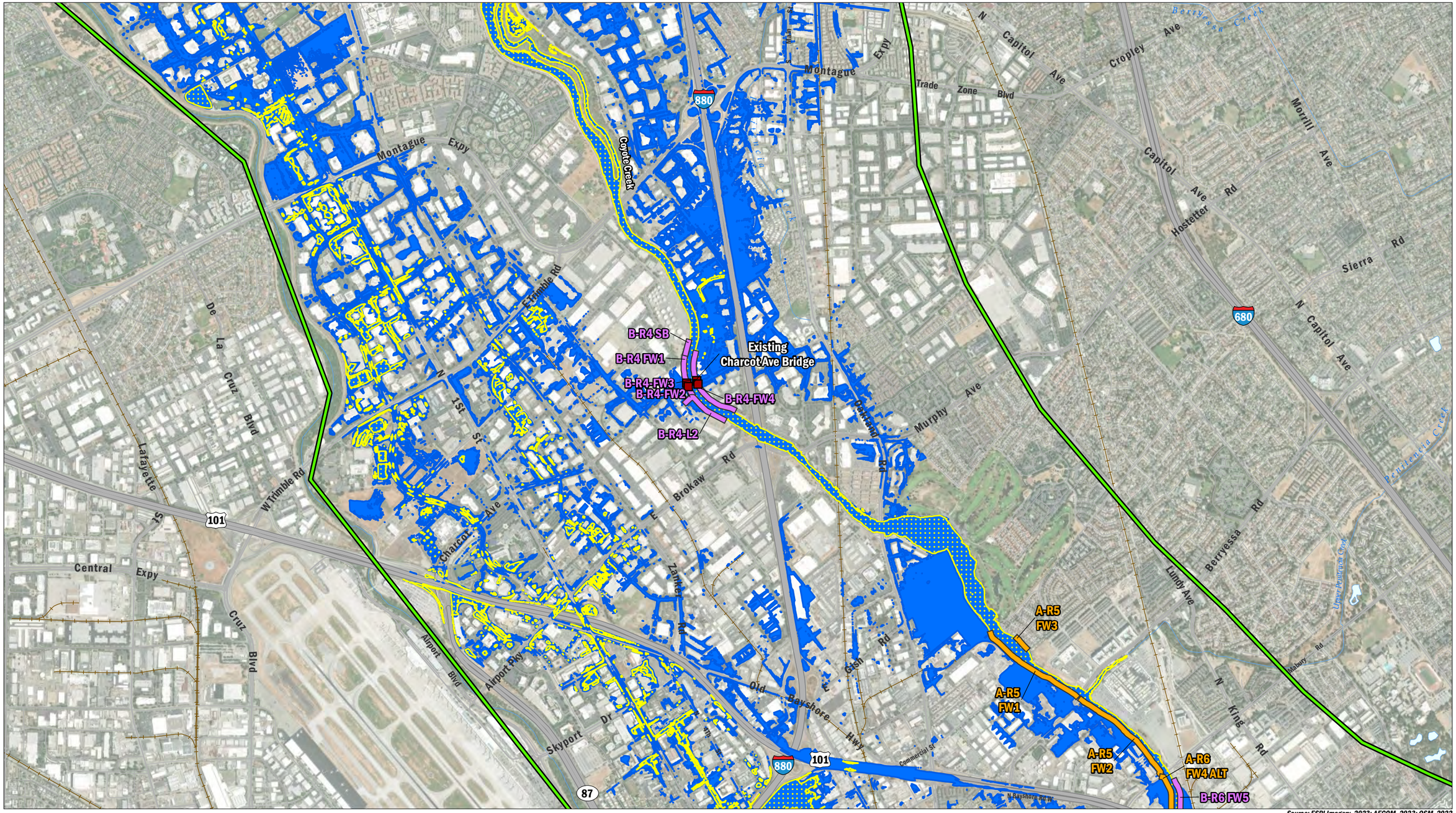


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1
Page 9 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

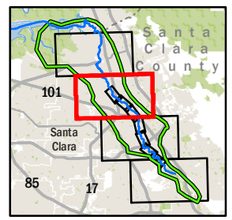
N

0 2,400
Feet

Created Date: 6/10/2024

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

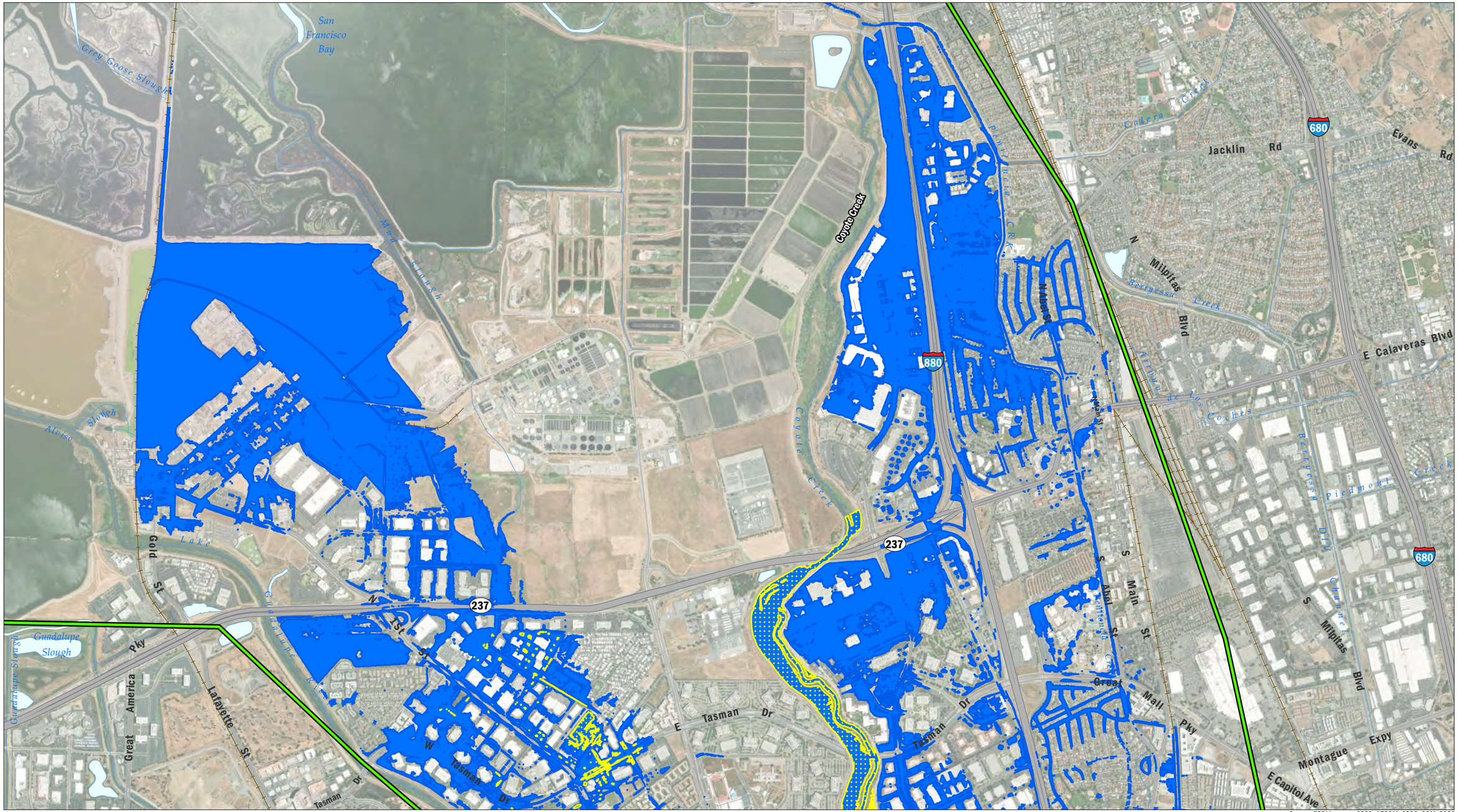
Modeled Flood Extents
- Scenario 1
- Scenario 5



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5 Compared to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

Modeled Flood Extents
- Scenario 1
- Scenario 5

AECOM
Coyote Creek
EIR Modeling

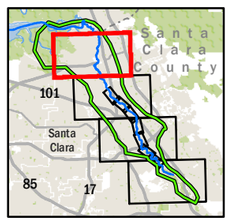
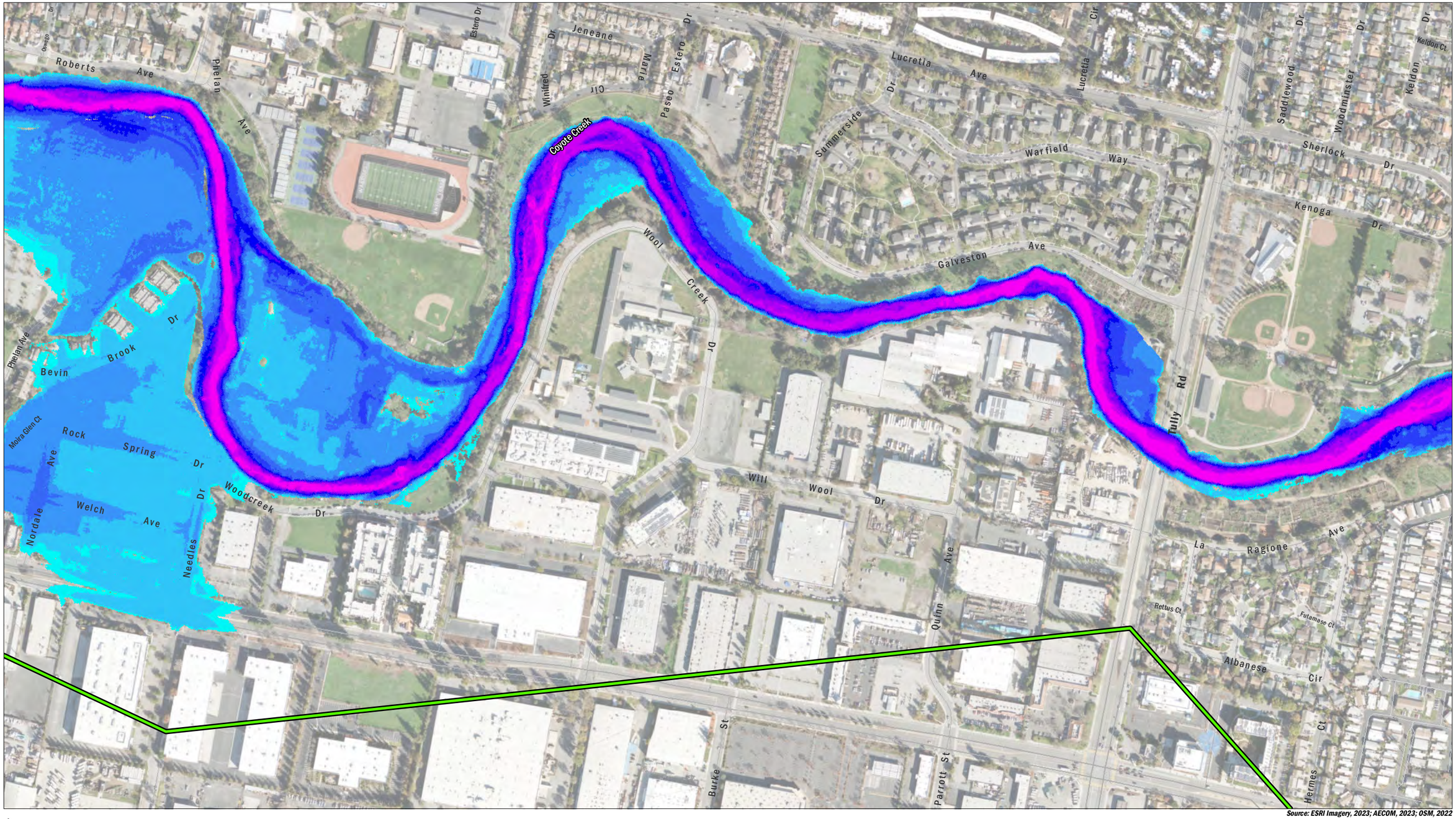


FIGURE 1

Flooding Extent Depths 1ft and Over Scenario 5 Compared to Scenario 1

AECOM Oakland CA 5/6/2024 USER VogeS PATH \\na.aecomnet.com\fs\AMER\Oakland-USOAK01\DCS\Projects\GIS\Projects\60652041_CoyoteCreekFlood\02_Maps\02_Report_Maps\FloodMapping\5to1\Figure 2 - Existing Max Water Depths 1ft and Over_5to1.mxd



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

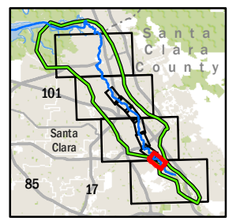
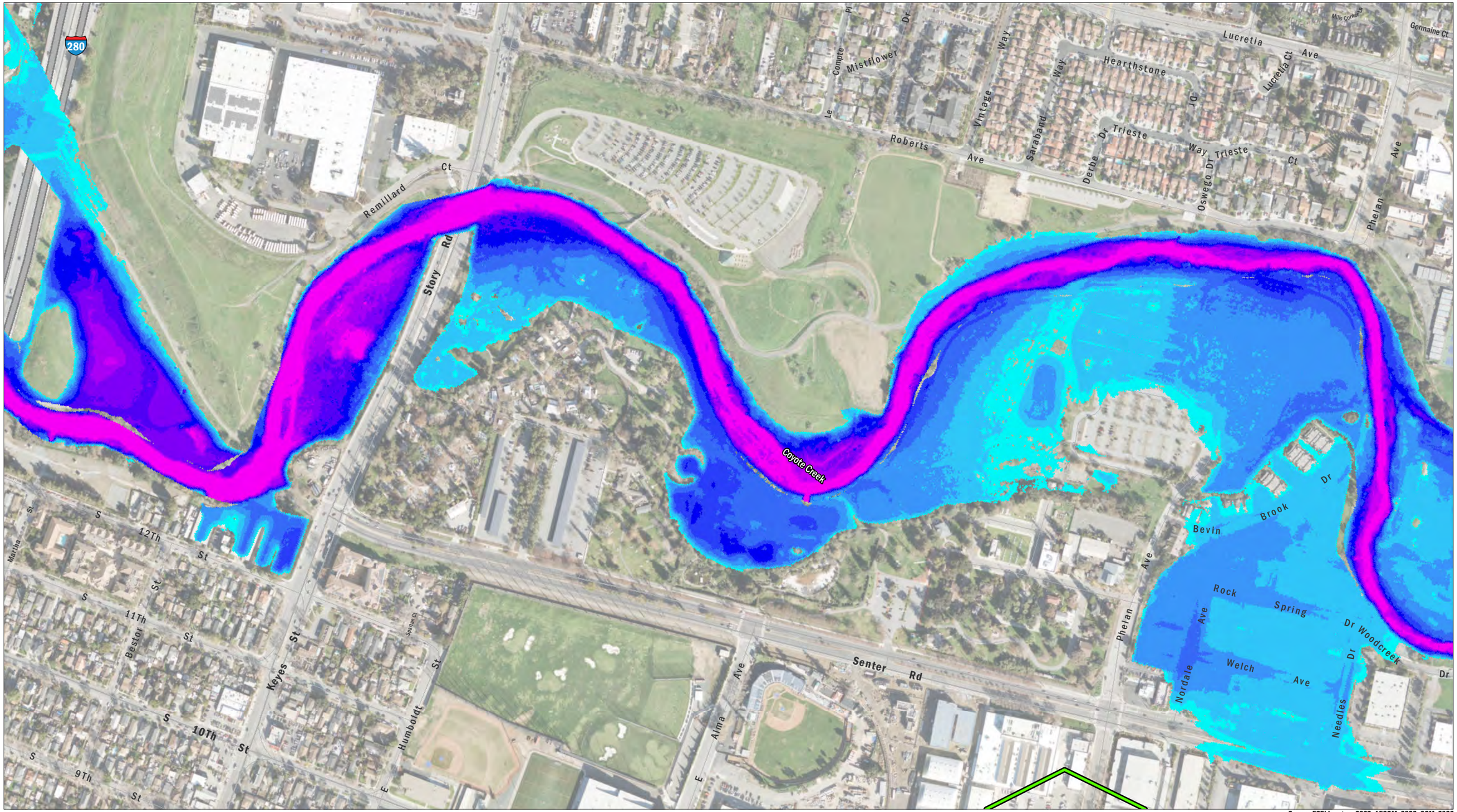


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

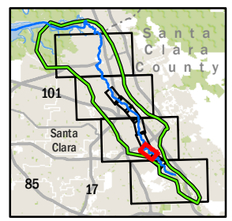
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

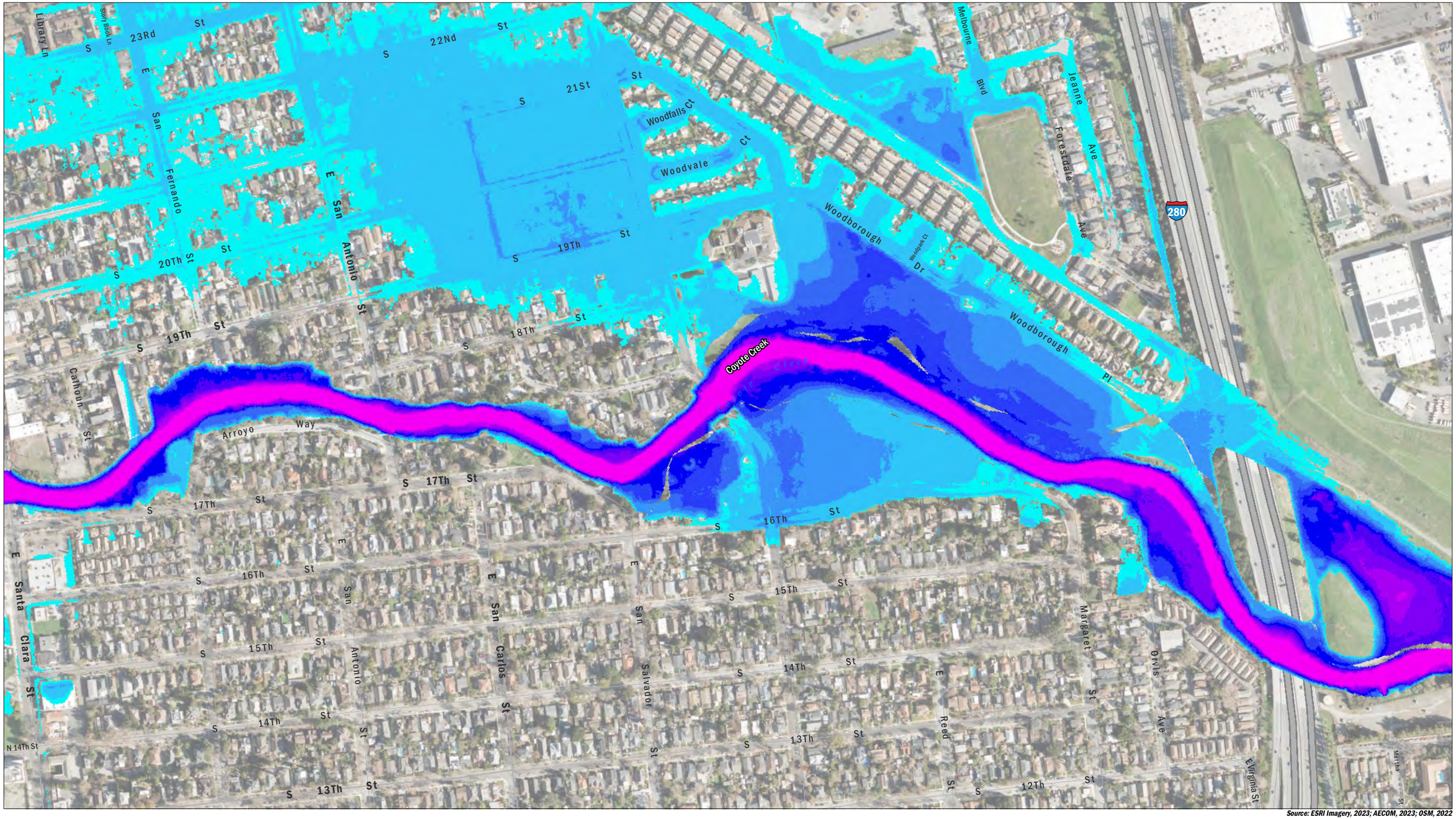


AECOM
Coyote Creek
EIR Modeling

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FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

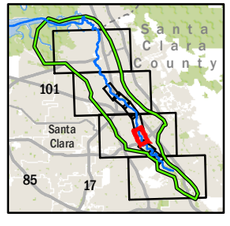
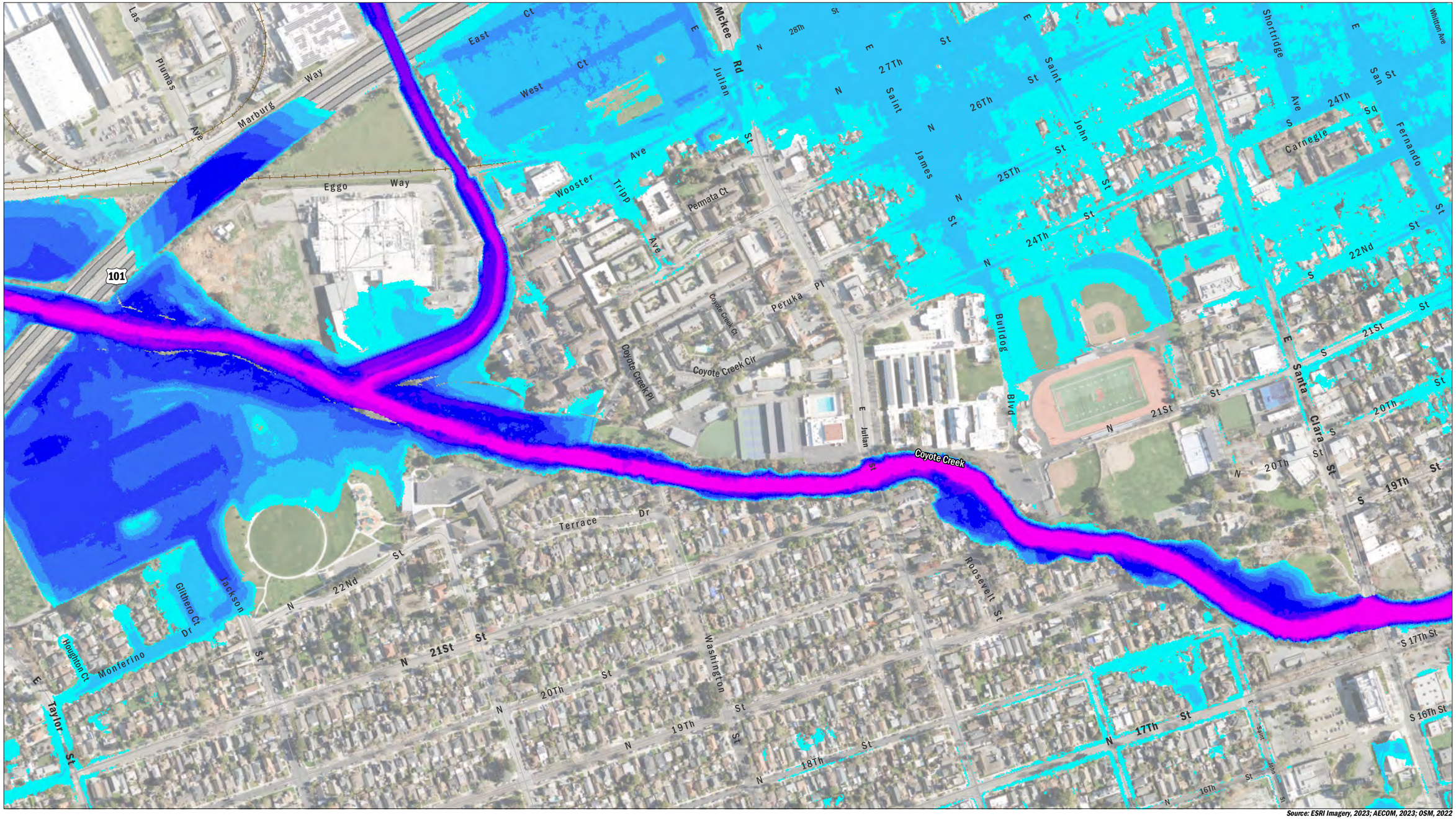


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1

AECOM Oakland CA 5/6/2024 USER VogeS PATH \\na.aecomnet.com\fs\AMER\Oakland-USOAK01\DCS\Projects\GIS\Projects\60652041_CoyoteCreekFlood\02_Maps\02_Report_Maps\FloodMapping\5to1\Figure 2 - Existing Max Water Depths 1ft and Over_5to1.mxd



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

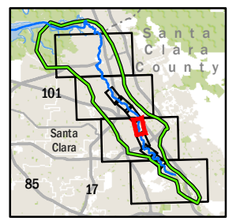
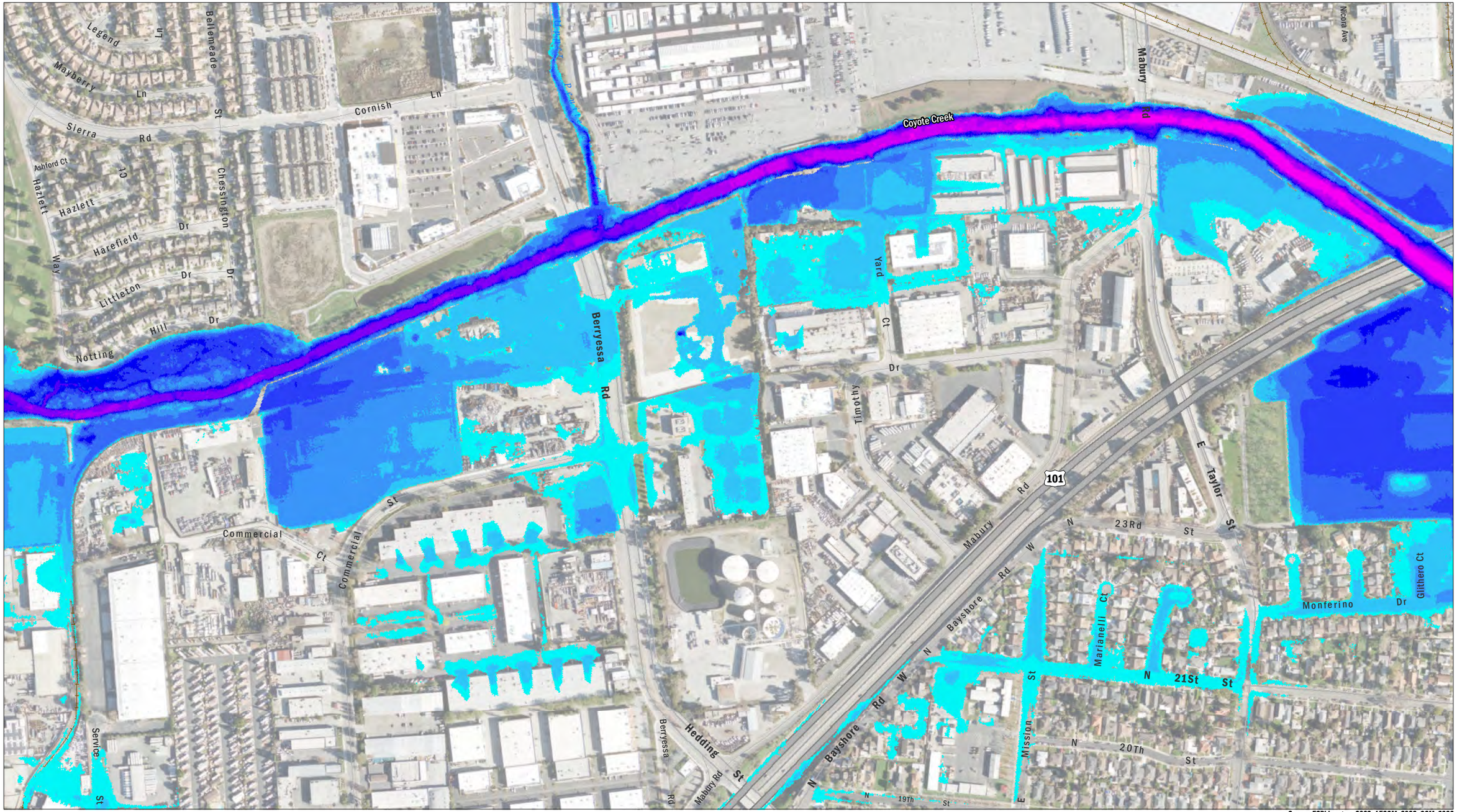


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

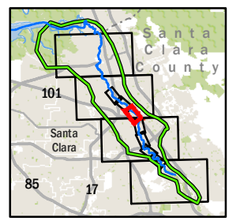
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

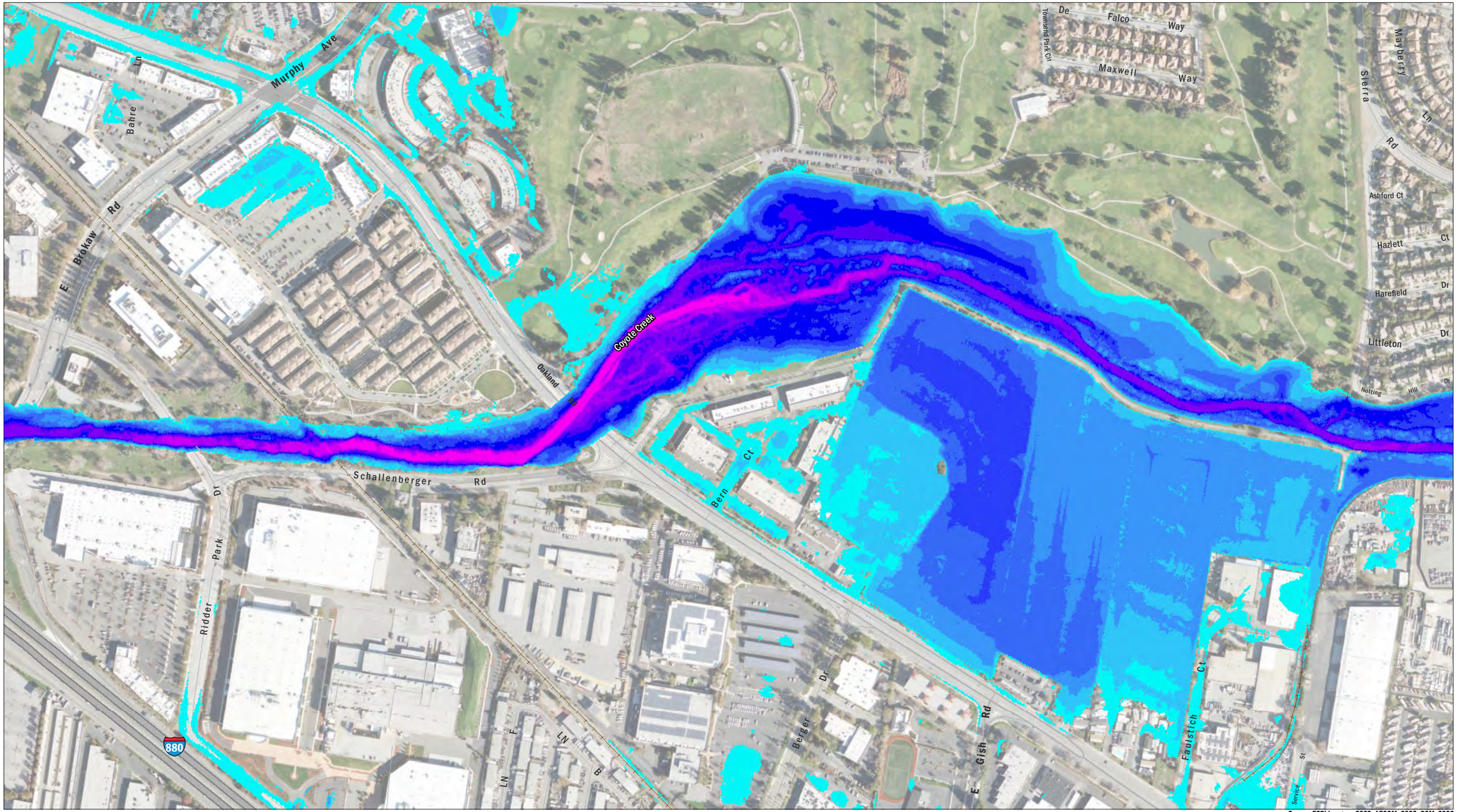
- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88



AECOM
Coyote Creek
EIR Modeling

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FIGURE 2
Existing Max. Water Depths 1ft and Over Scenario 1
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

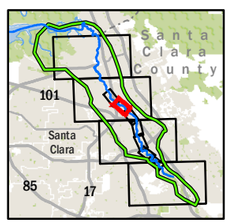
Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

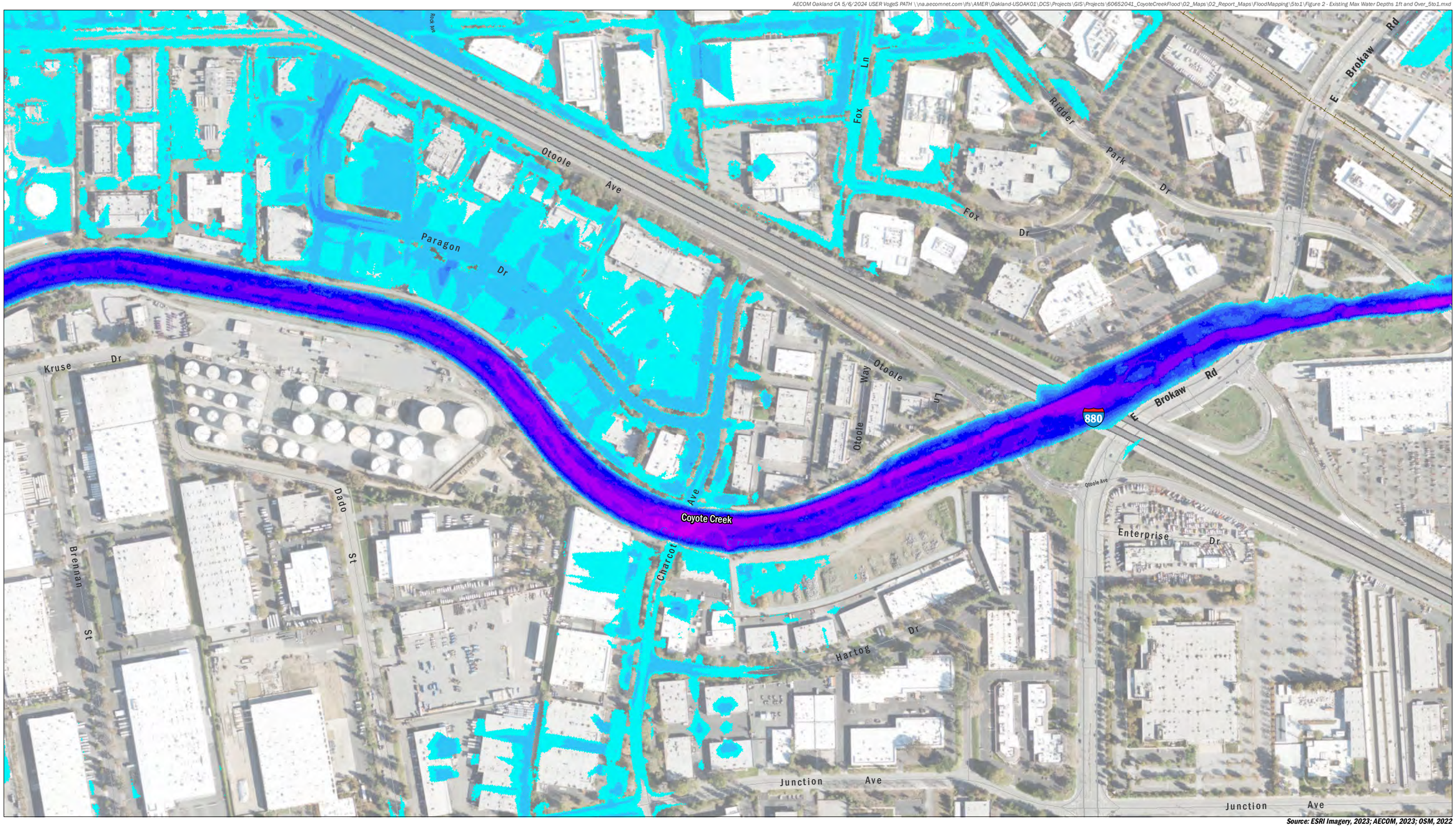


AECOM
Coyote Creek
EIR Modeling

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FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

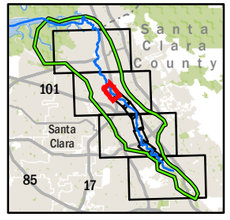
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

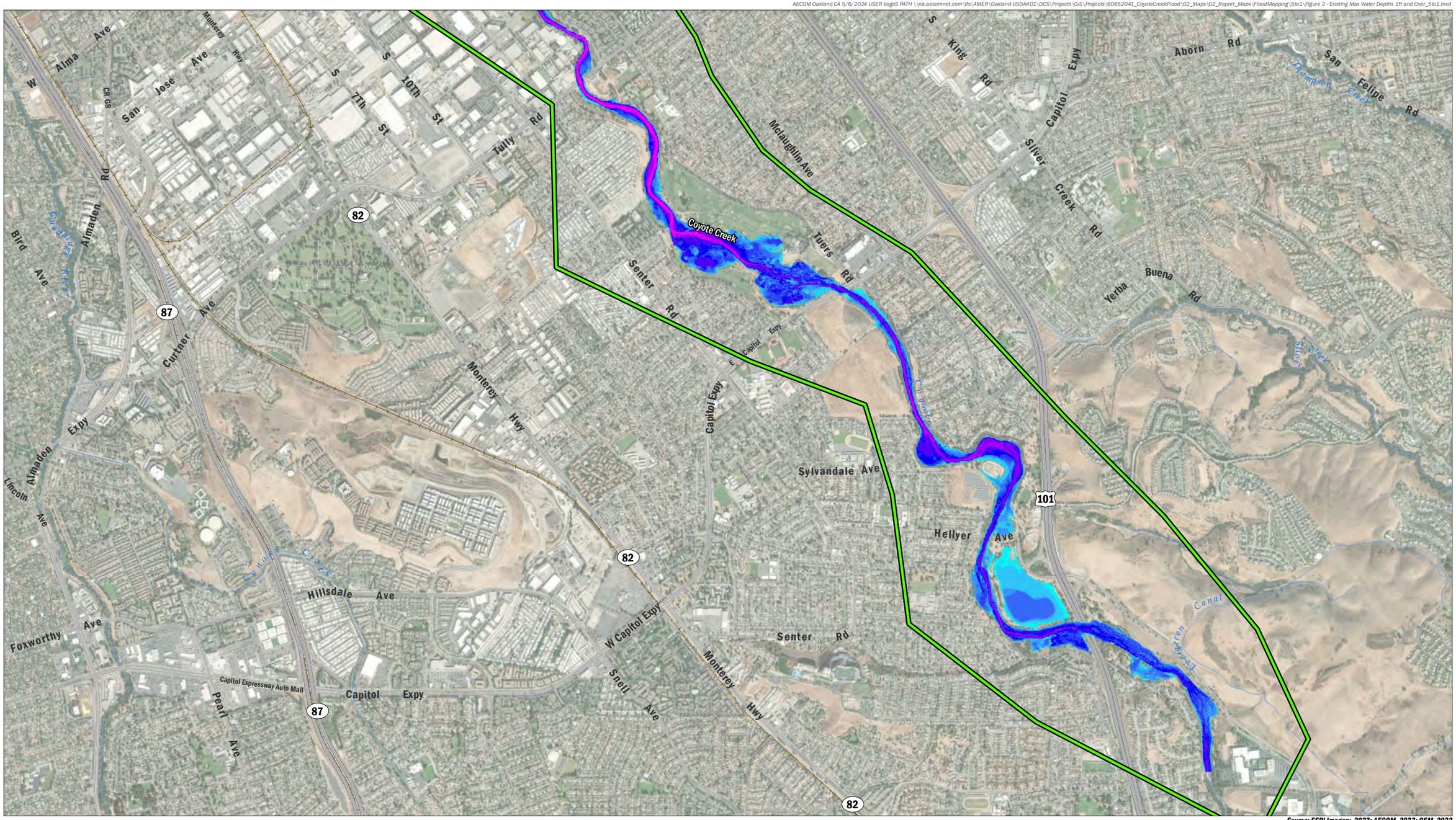


AECOM
Coyote Creek
EIR Modeling

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FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

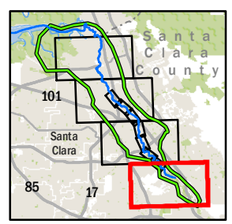
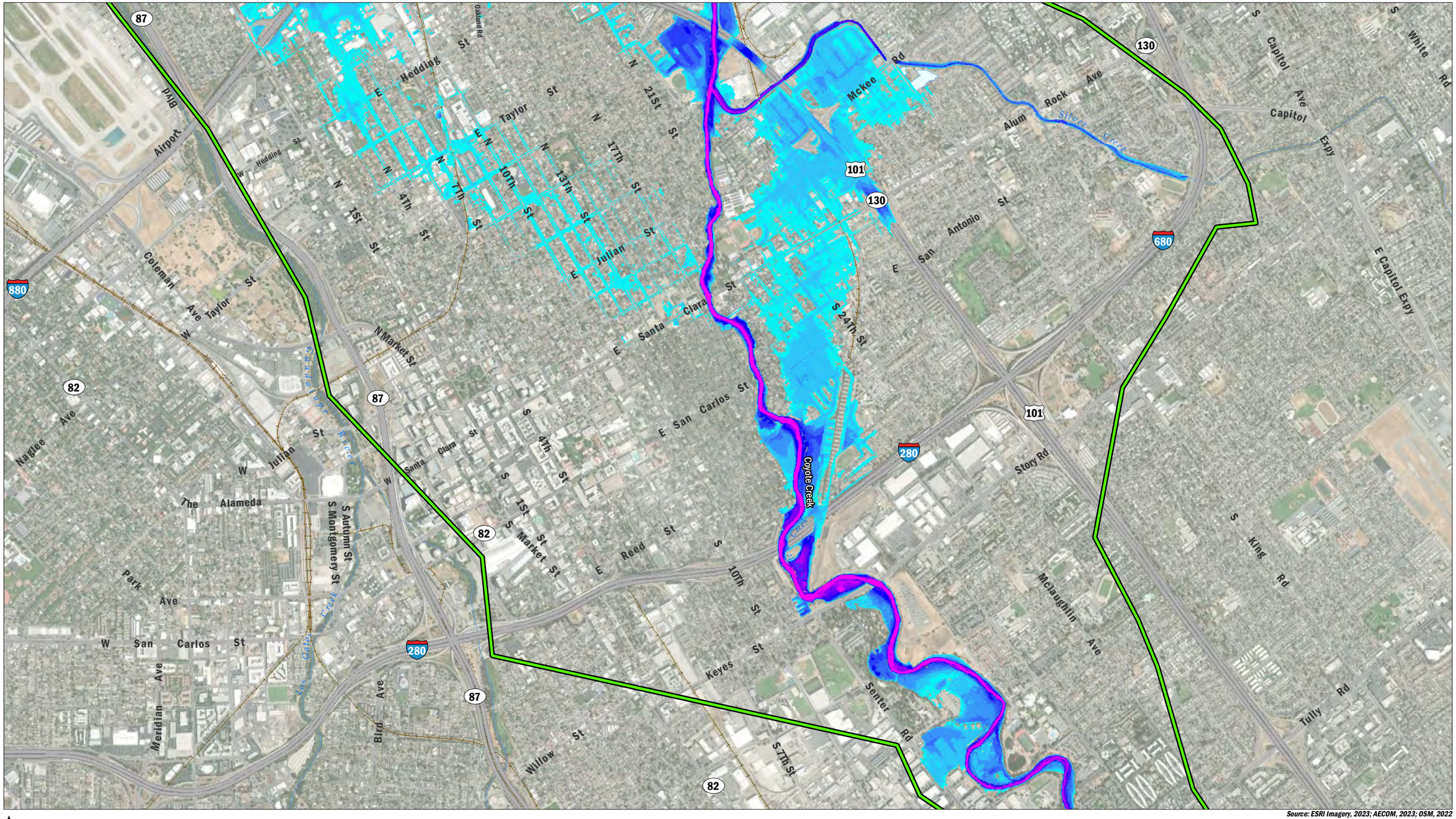


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

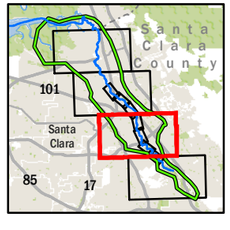
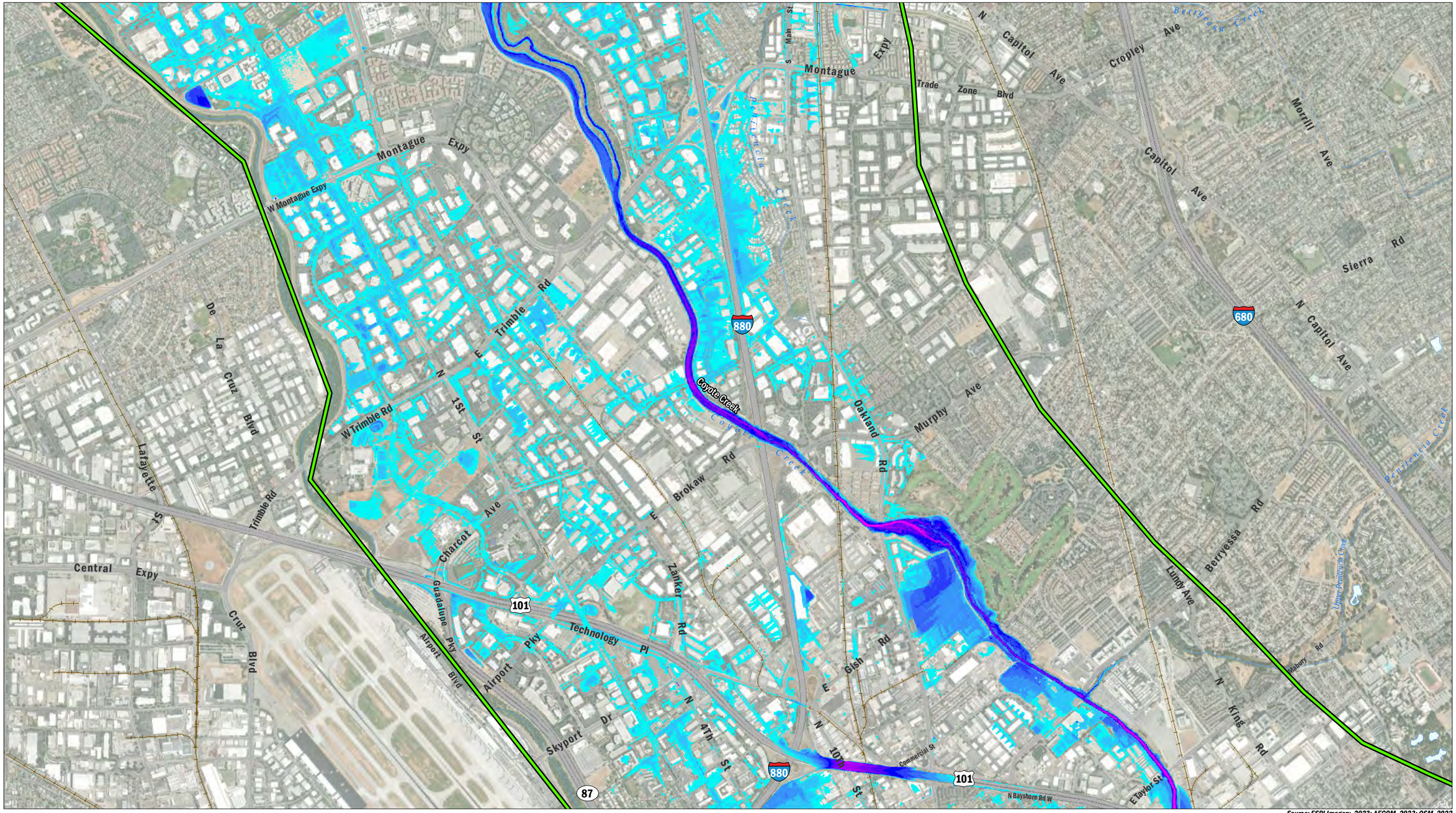


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

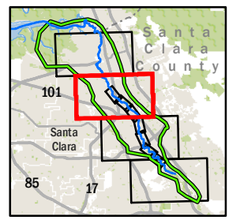
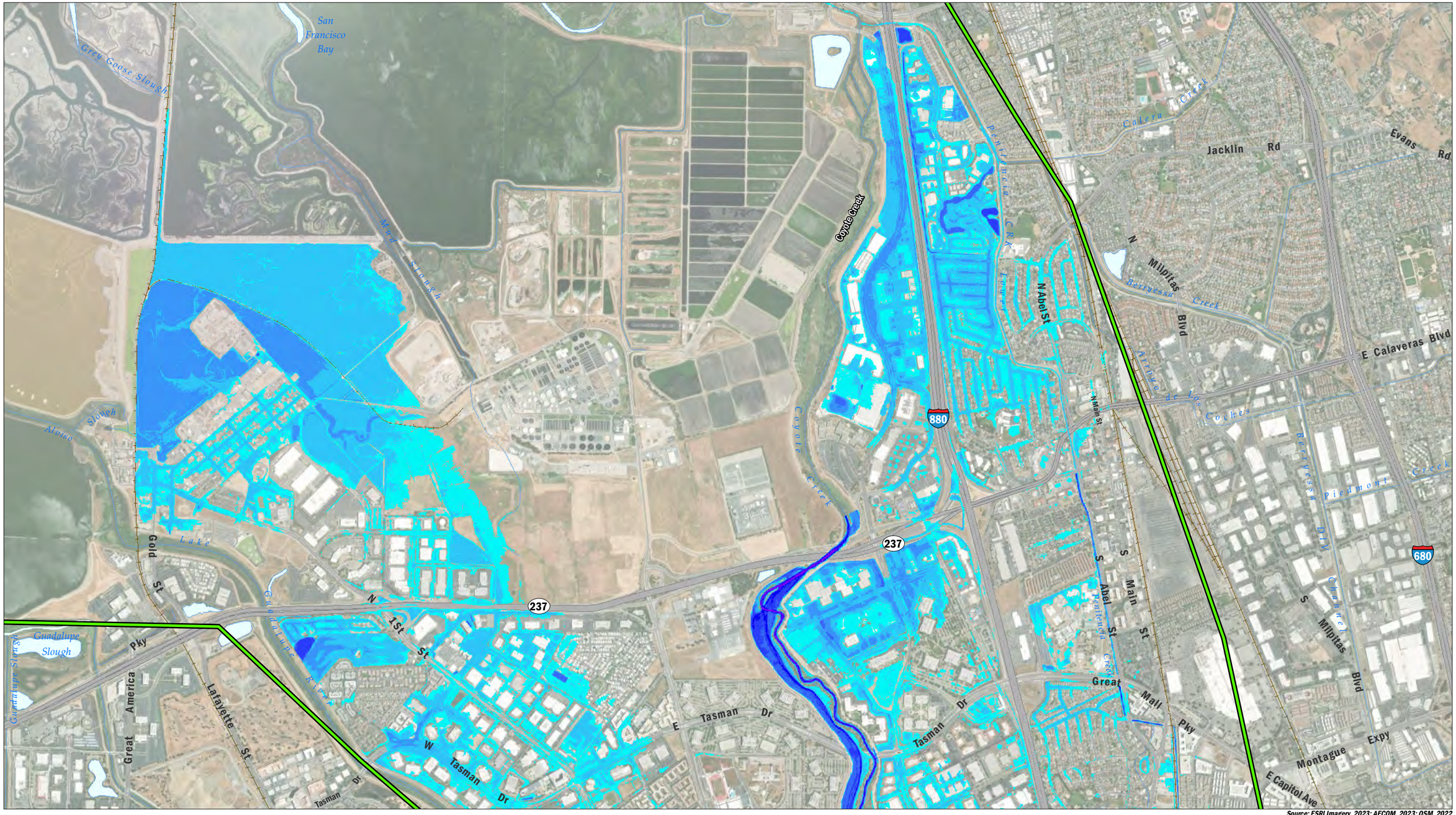


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 30.88

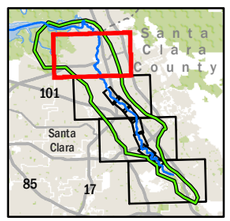
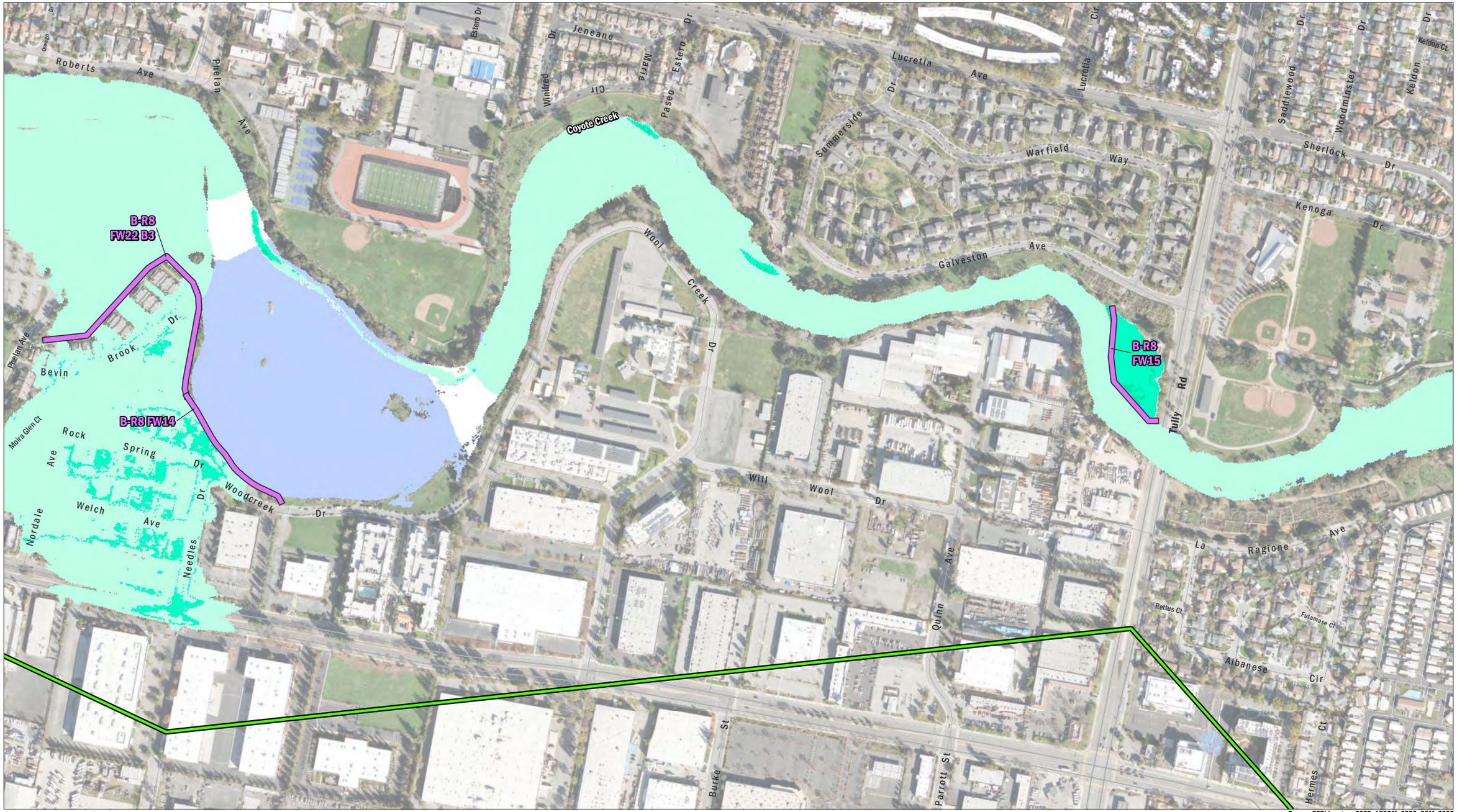


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1



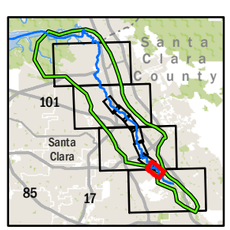
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-17.9 - -6
-6 - -3
-3 - -0.1
-1 - 0.1
0.1 - 3
3 - 3.8

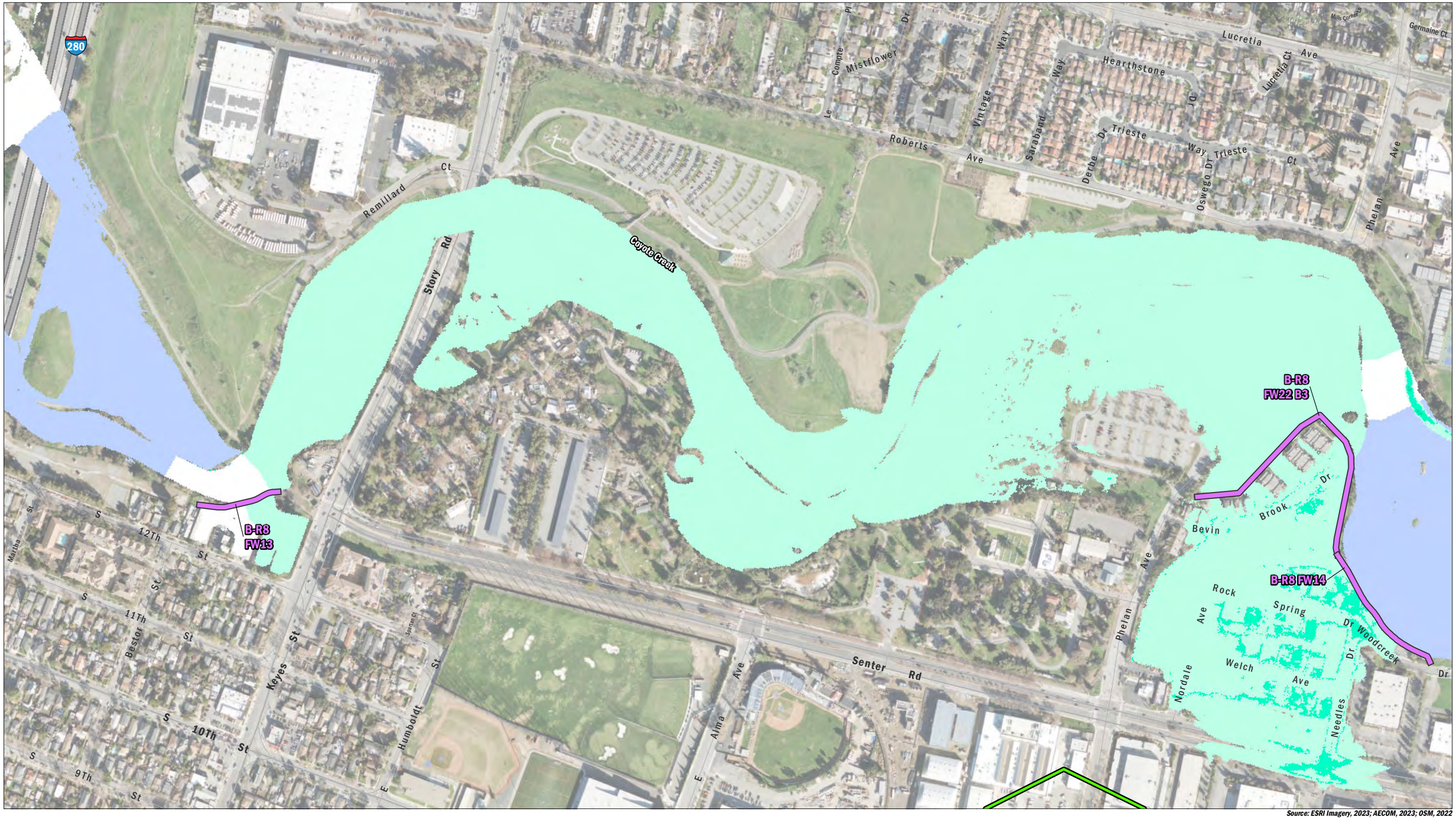


AECOM
Coyote Creek
EIR Modeling

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FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-17.9 - -6
-6 - -3
-3 - -0.1
-1 - 0.1
0.1 - 3
3 - 3.8

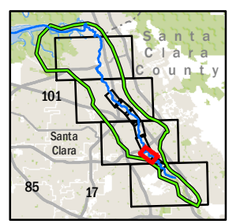
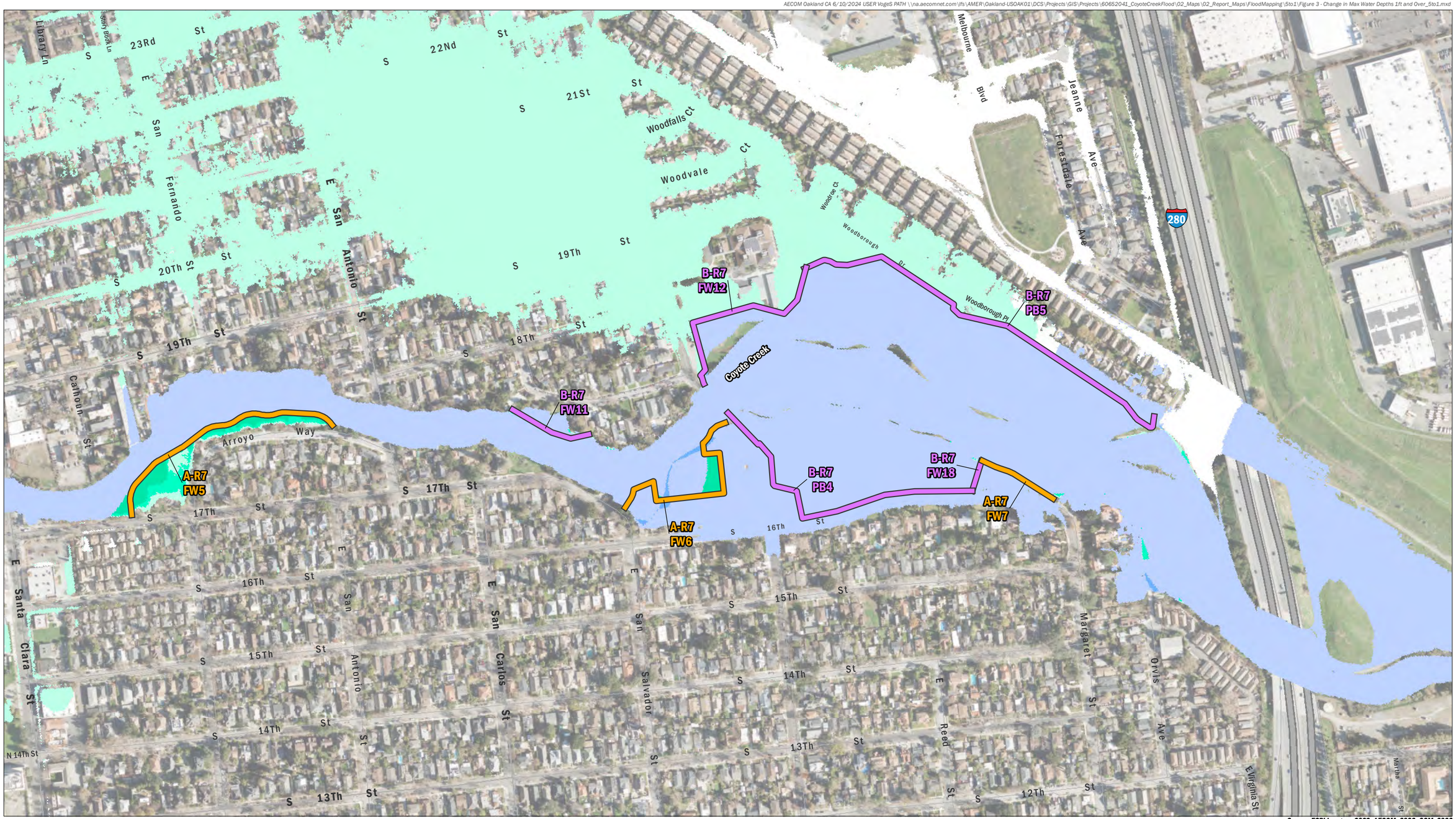


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1
Page 2 of 11



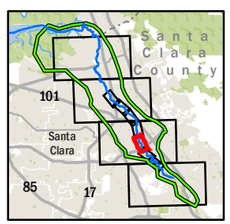
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-17.9 - -6
-6 - -3
-3 - -0.1
-1 - 0.1
0.1 - 3
3 - 3.8

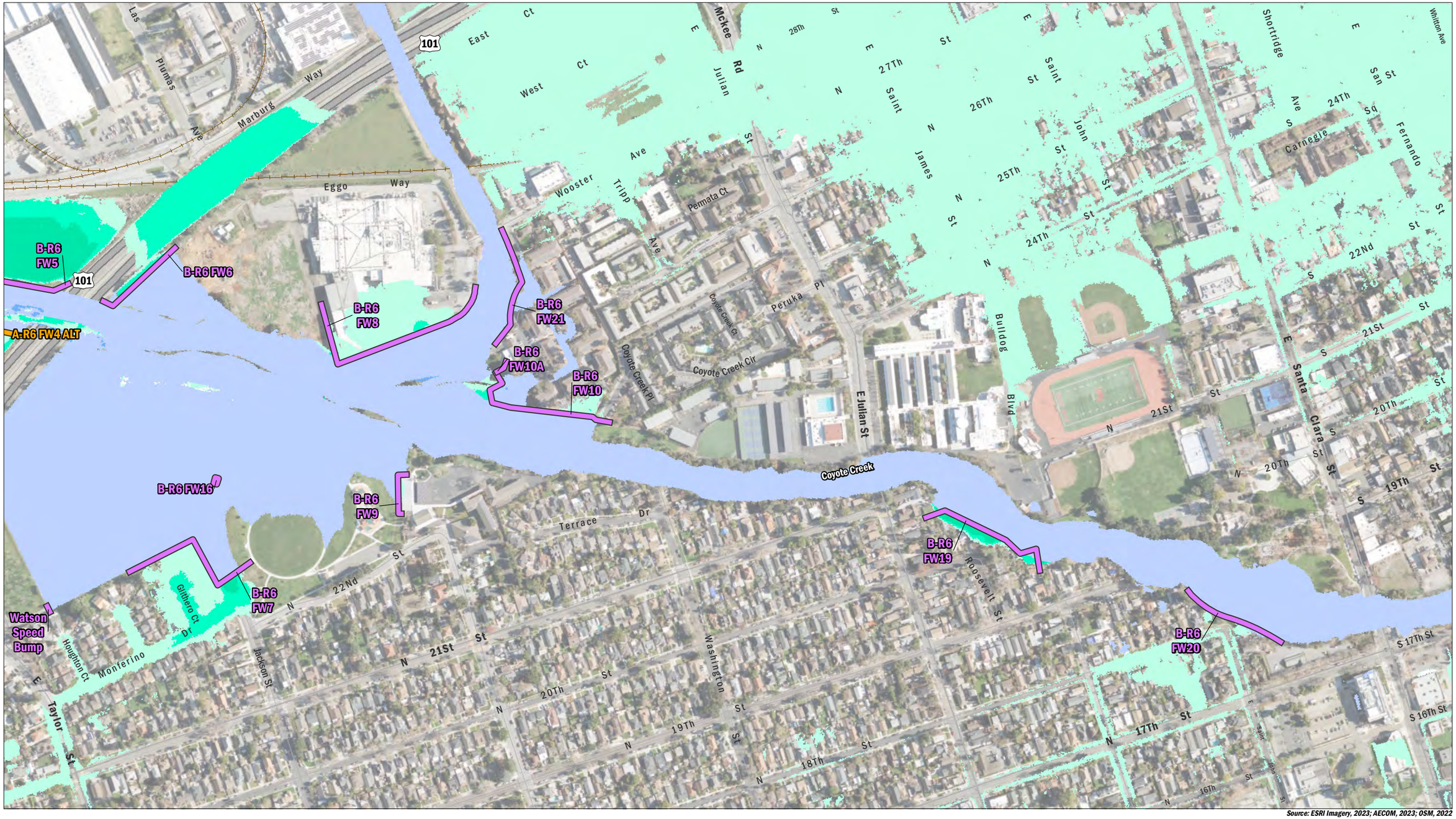


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -17.9 - -6
- -6 - -3
- -3 - -0.1
- -1 - 0.1
- 0.1 - 3
- 3 - 3.8

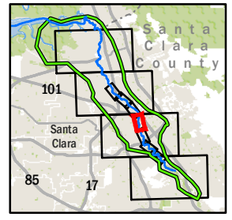
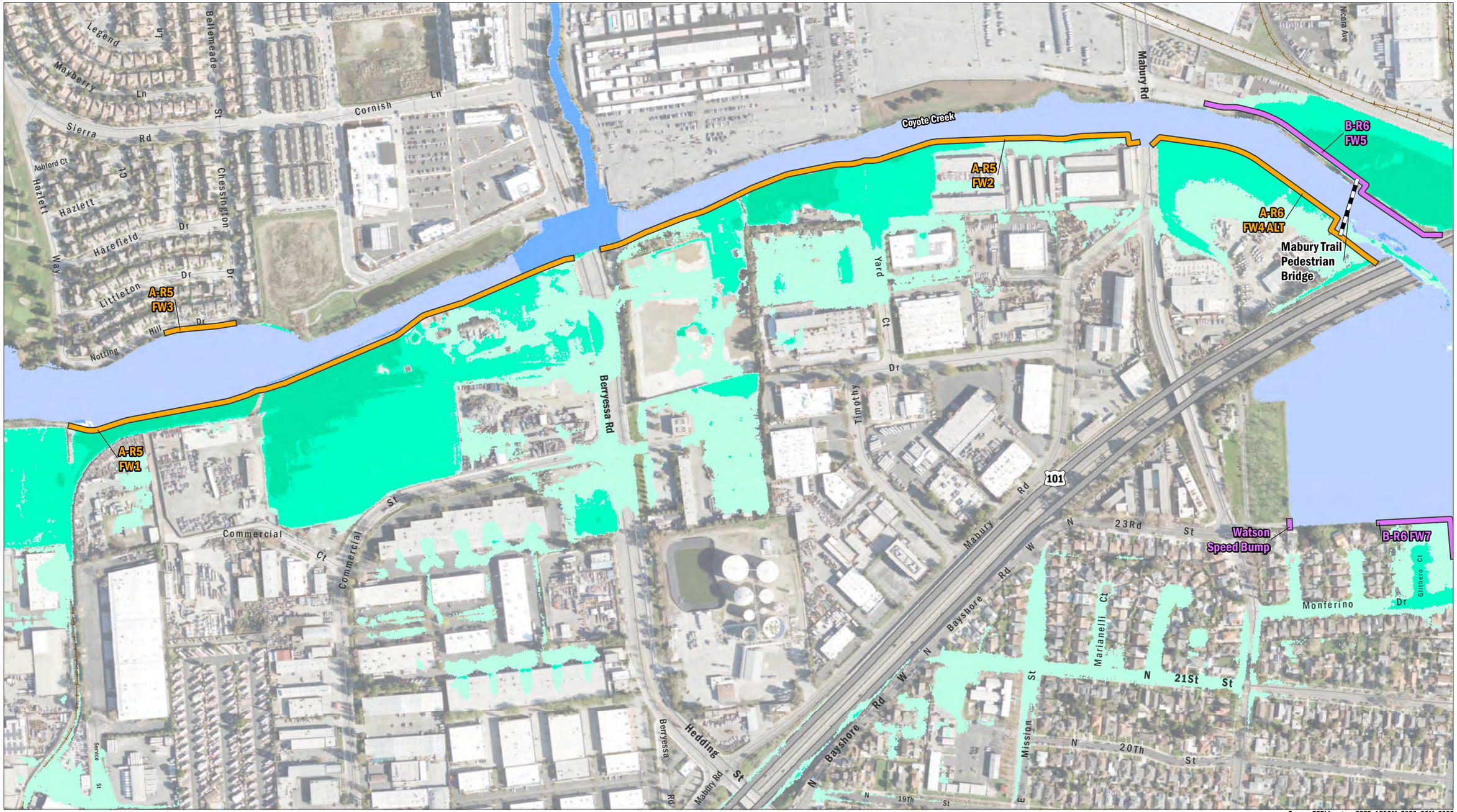


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1



0 500 Feet

Created Date: 6/10/2024

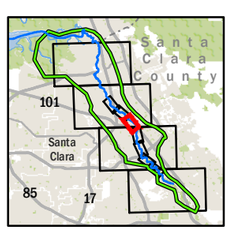
AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -17.9 - -6
- -6 - -3
- -3 - -0.1
- -1 - 0.1
- 0.1 - 3
- 3 - 3.8



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP

Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1

Depth (ft)

-17.9 - -6

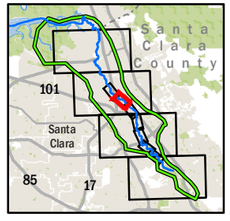
-6 - -3

-3 - -0.1

-1 - 0.1

0.1 - 3

3 - 3.8

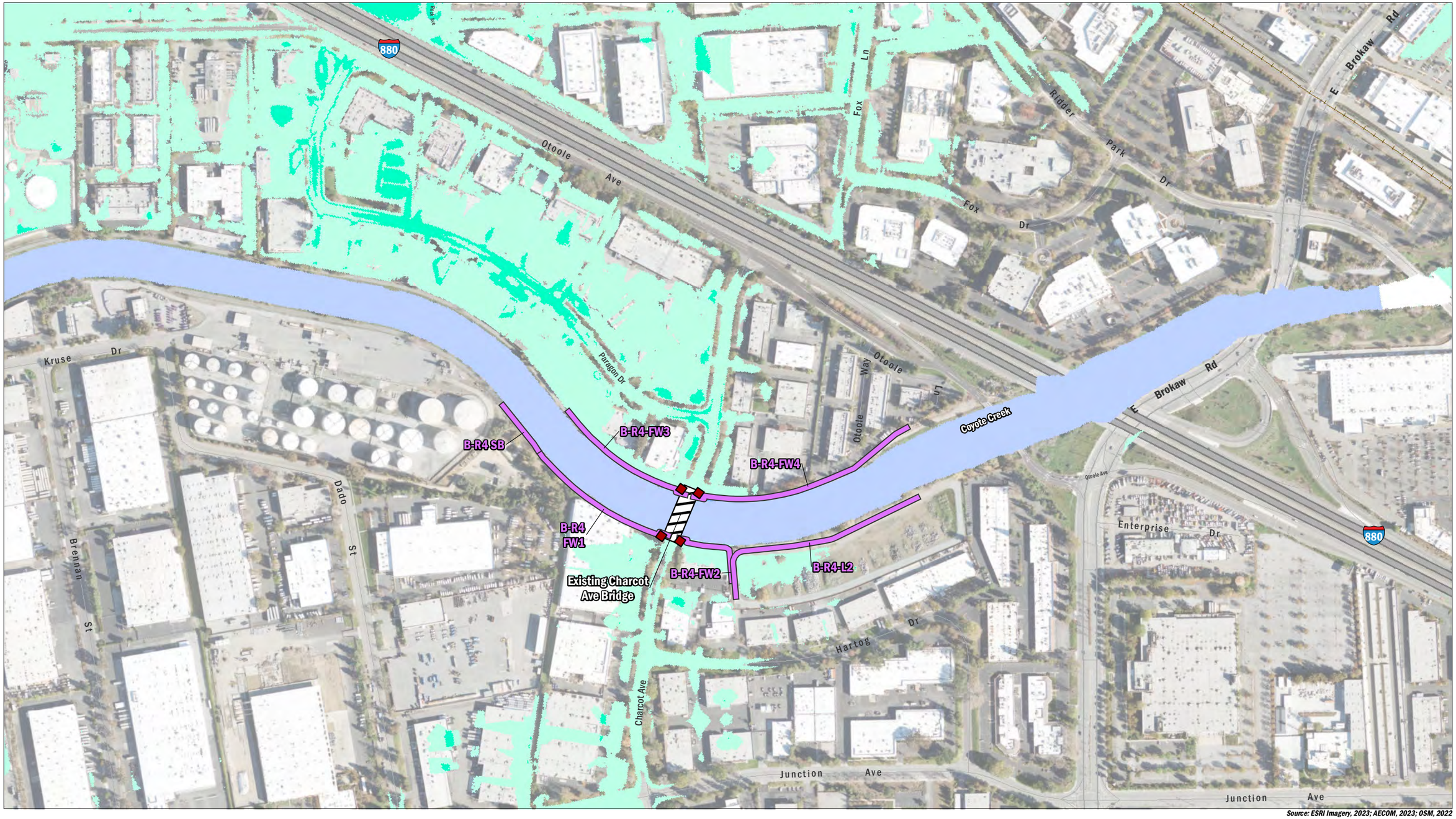


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -17.9 - -6
- -6 - -3
- -3 - -0.1
- -1 - 0.1
- 0.1 - 3
- 3 - 3.8

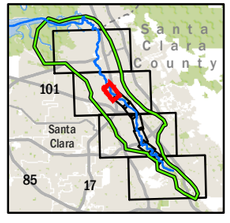
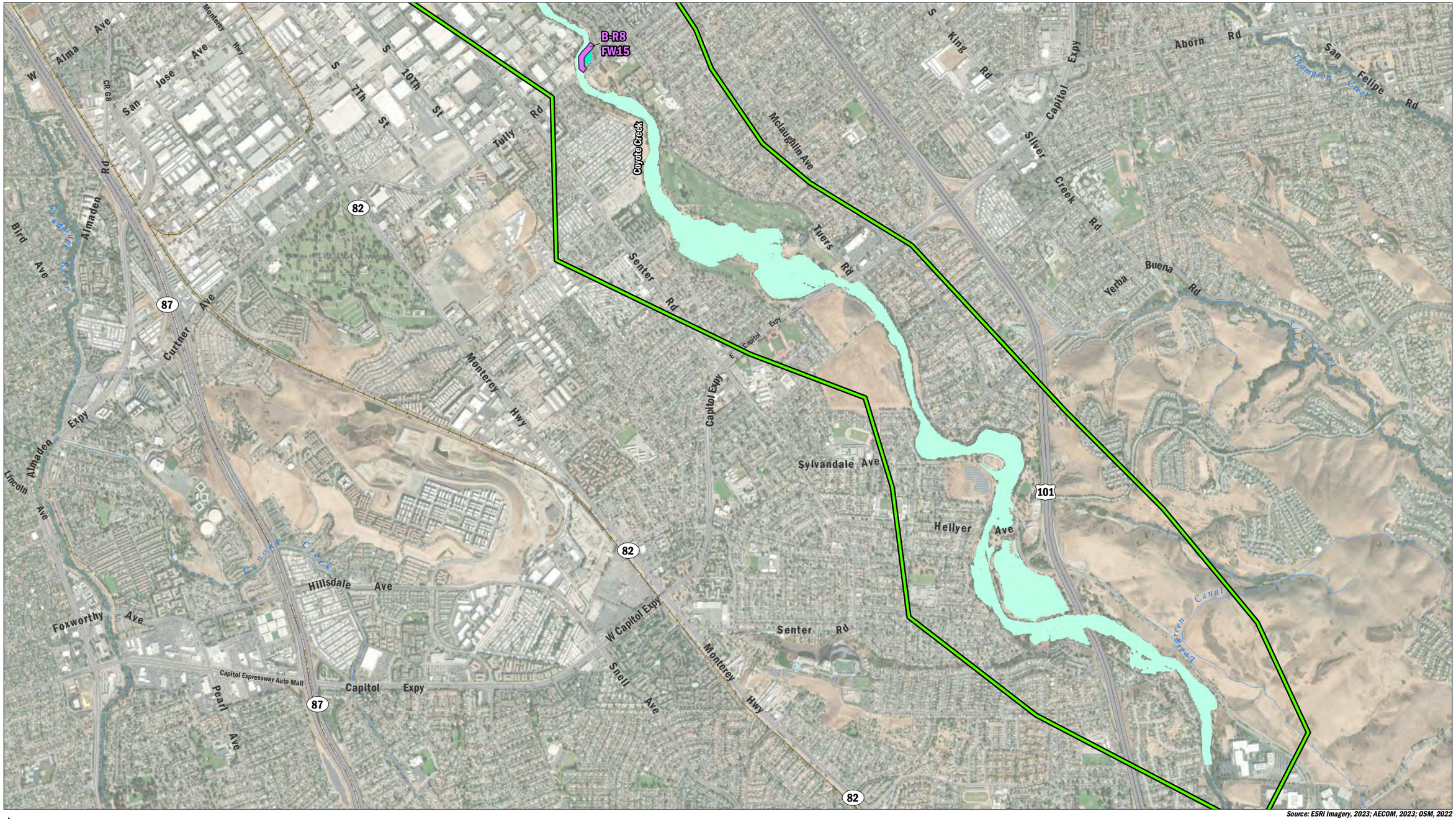


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-17.9 - -6
-6 - -3
-3 - -0.1
-1 - 0.1
0.1 - 3
3 - 3.8

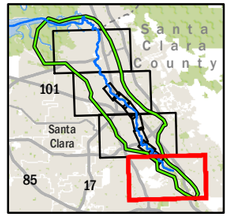
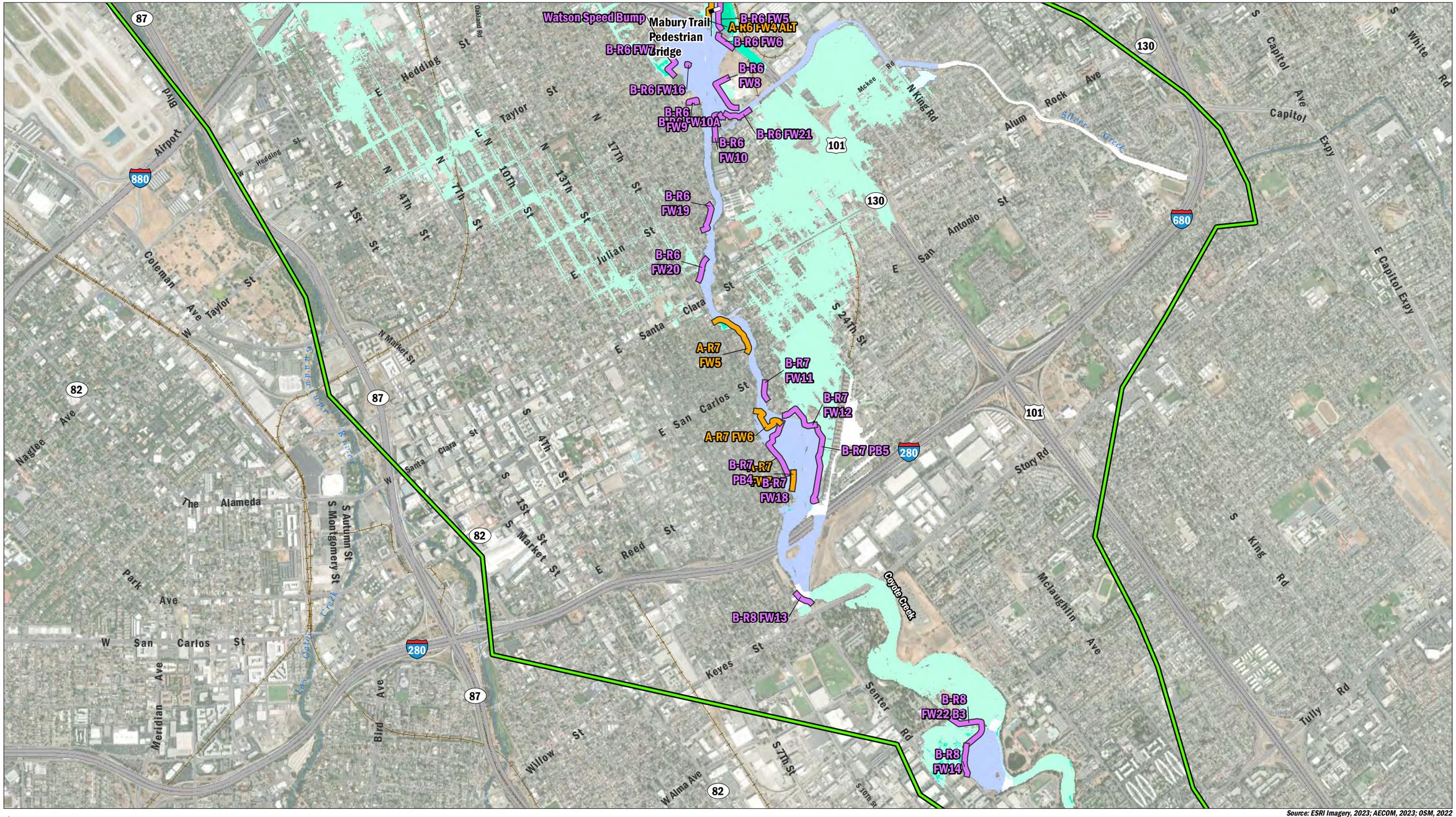


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -17.9 - -6
- -6 - -3
- -3 - -0.1
- -1 - 0.1
- 0.1 - 3
- 3 - 3.8

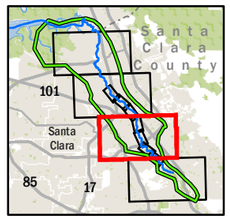
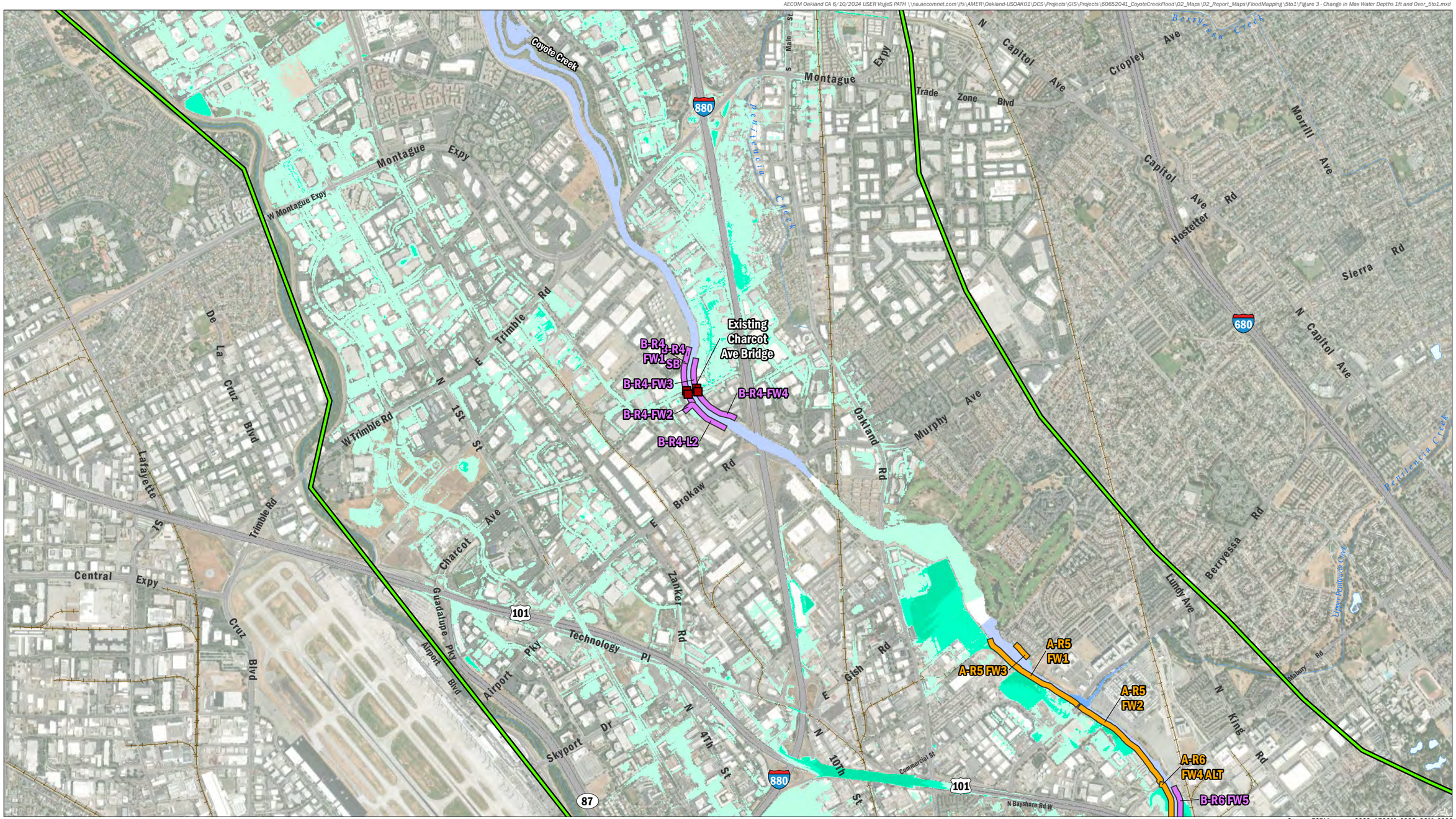


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -17.9 - -6
- -6 - -3
- -3 - -0.1
- -1 - 0.1
- 0.1 - 3
- 3 - 3.8

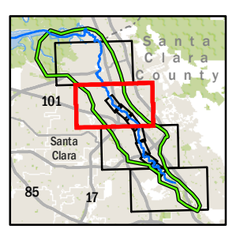
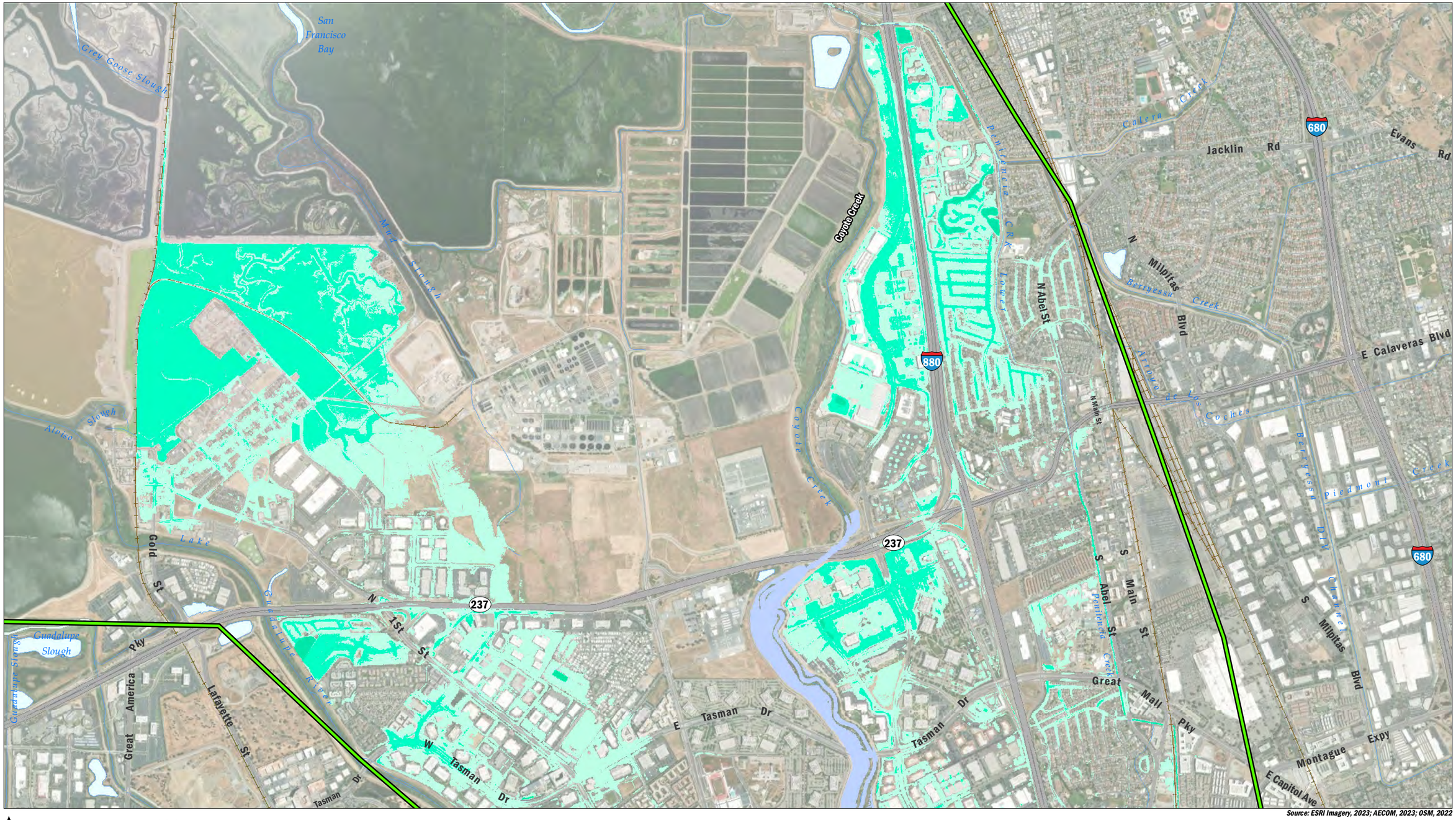


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -17.9 - -6
- -6 - -3
- -3 - -0.1
- -1 - 0.1
- 0.1 - 3
- 3 - 3.8

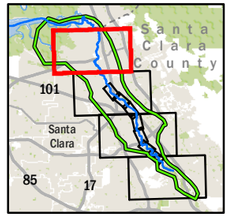
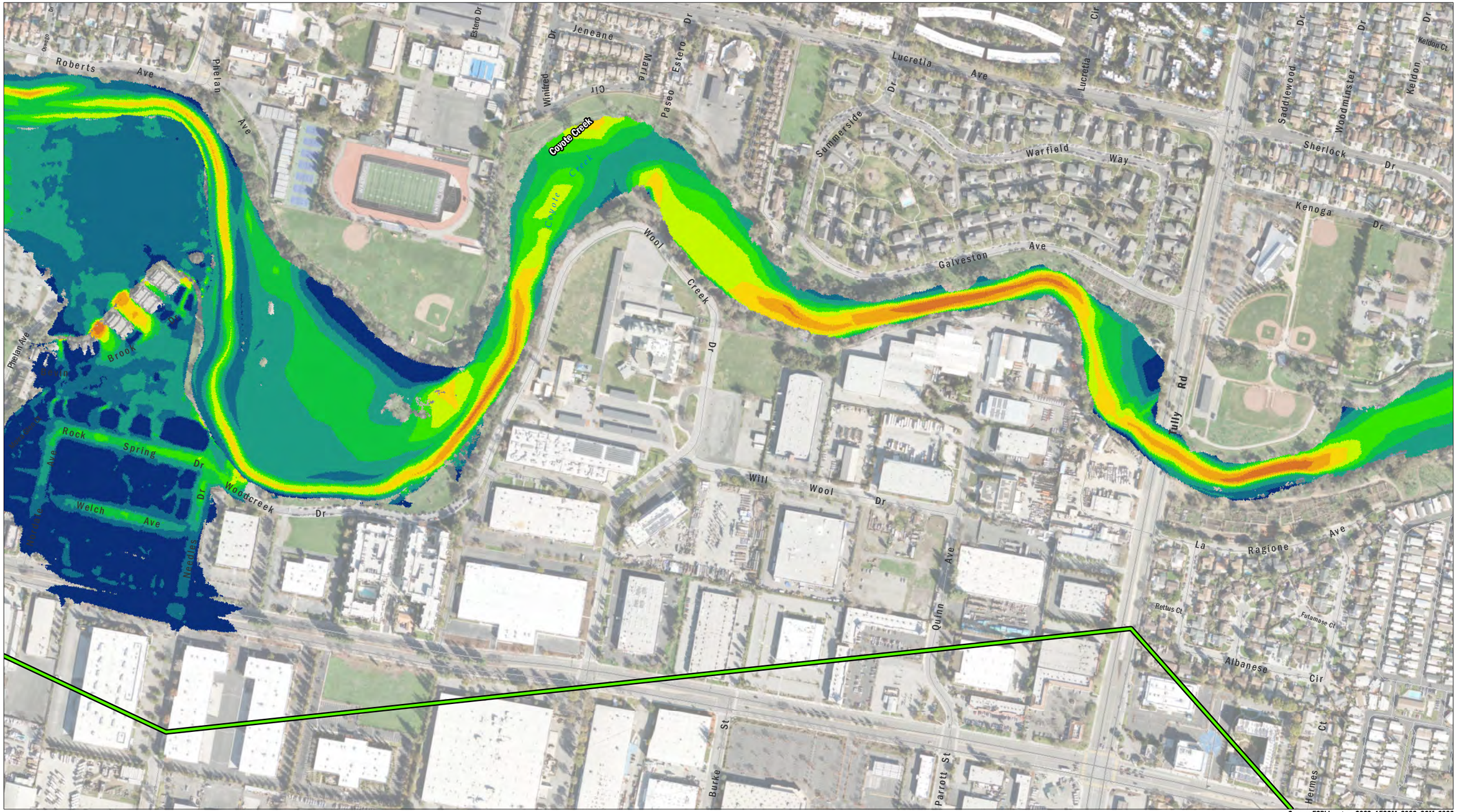


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5 to Scenario 1
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

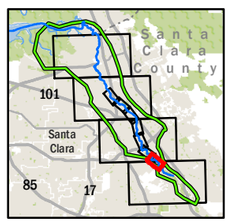
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

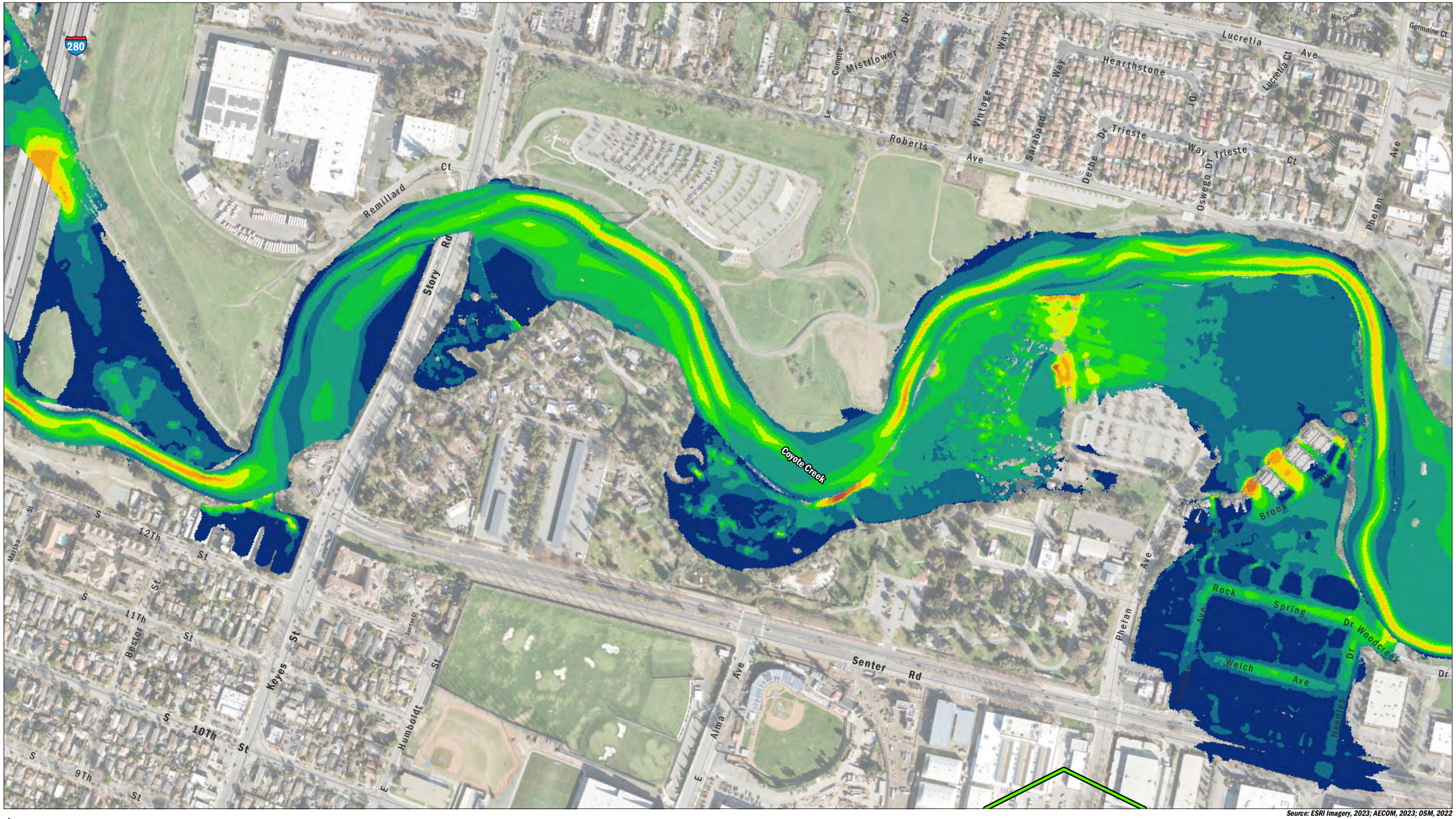
- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.6



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

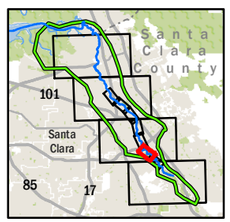
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.6



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

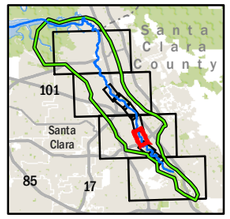
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.6



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

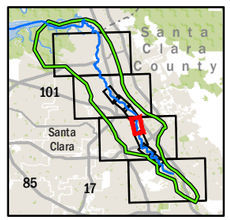
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

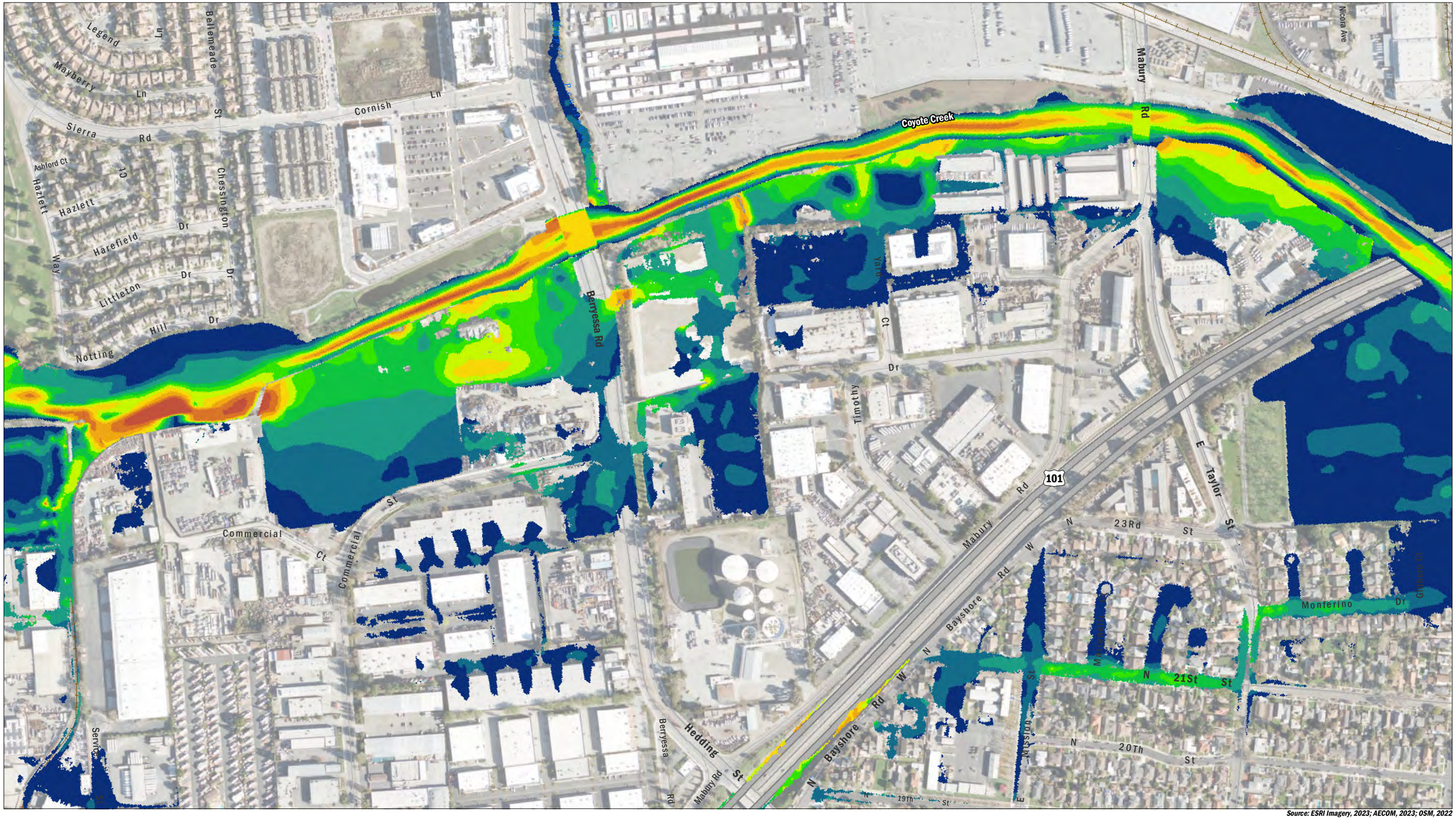
- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.6



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 4 of 11



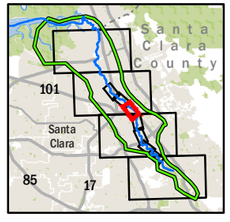
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

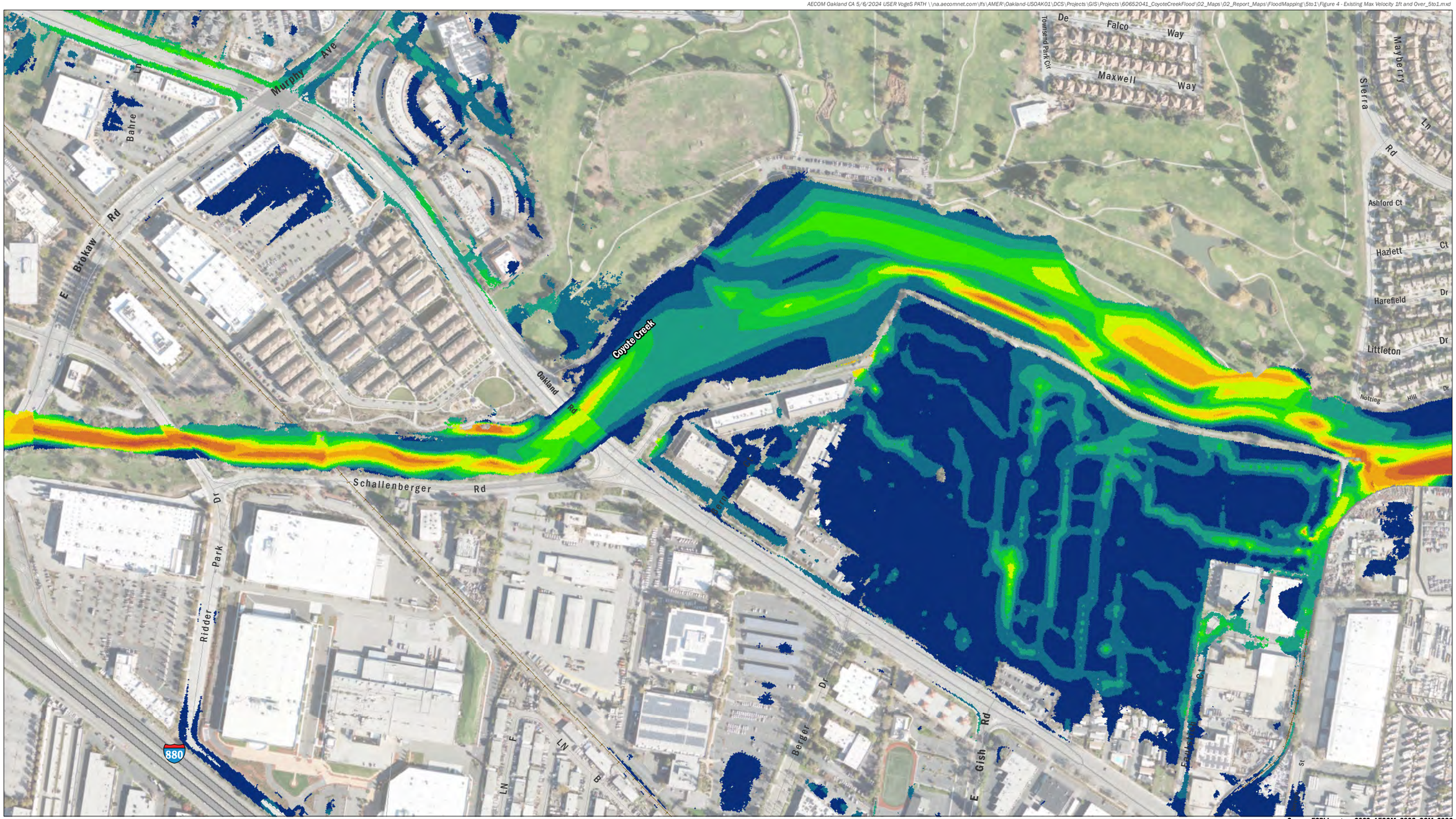
0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.6



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.6

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

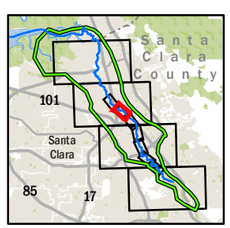


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

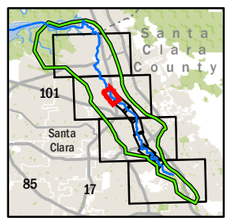
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

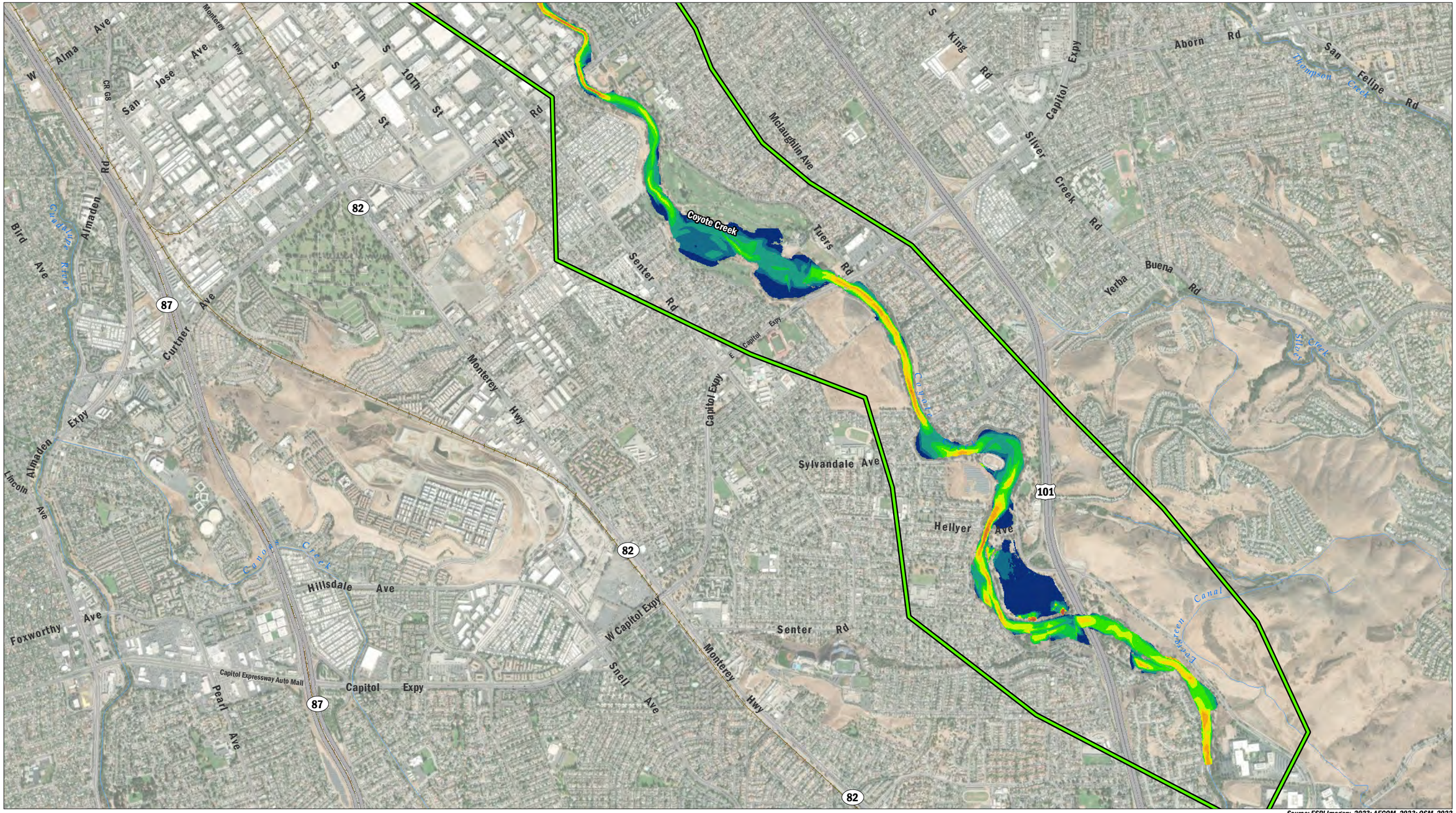
- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.6



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 7 of 11



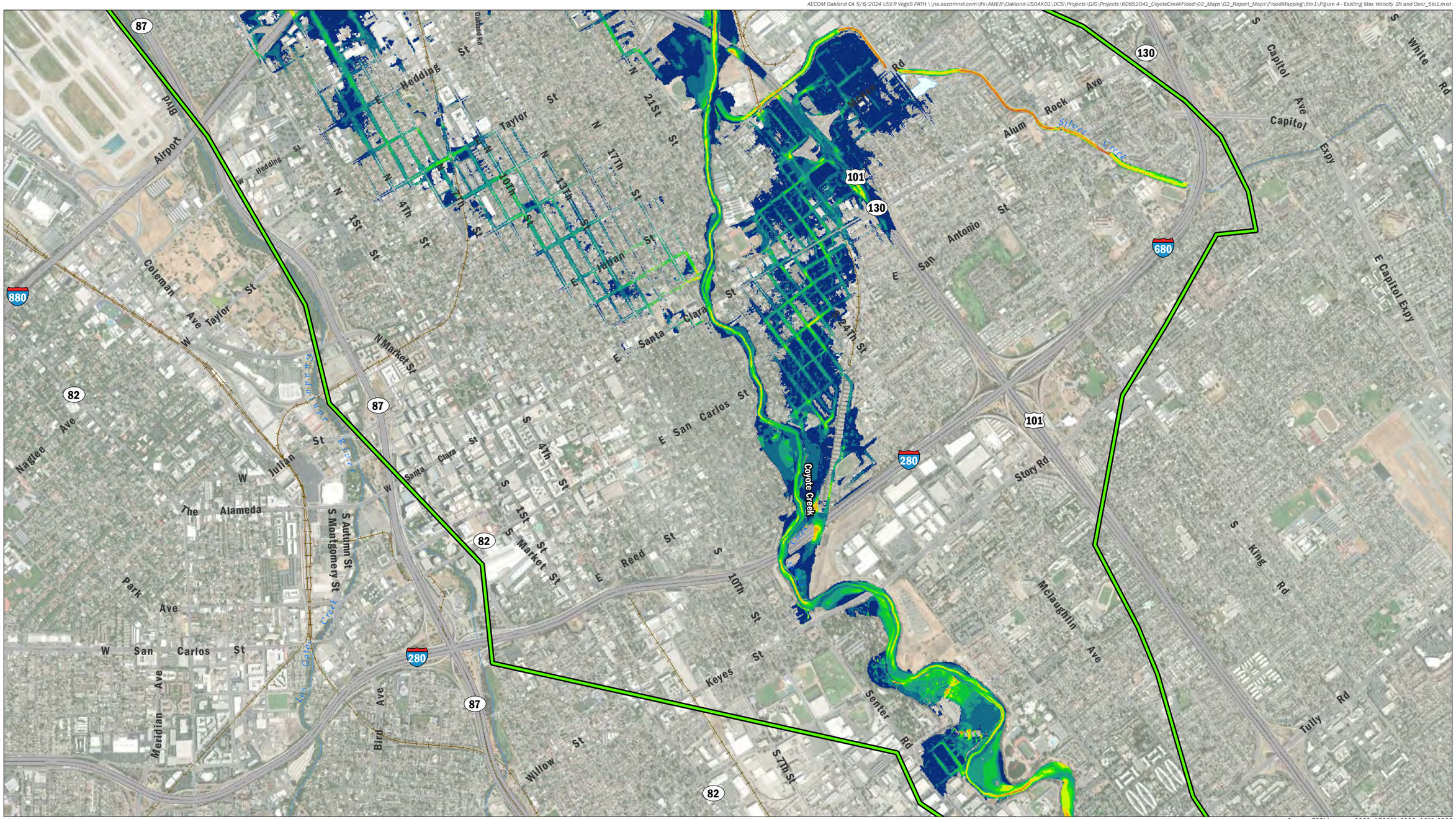
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.6

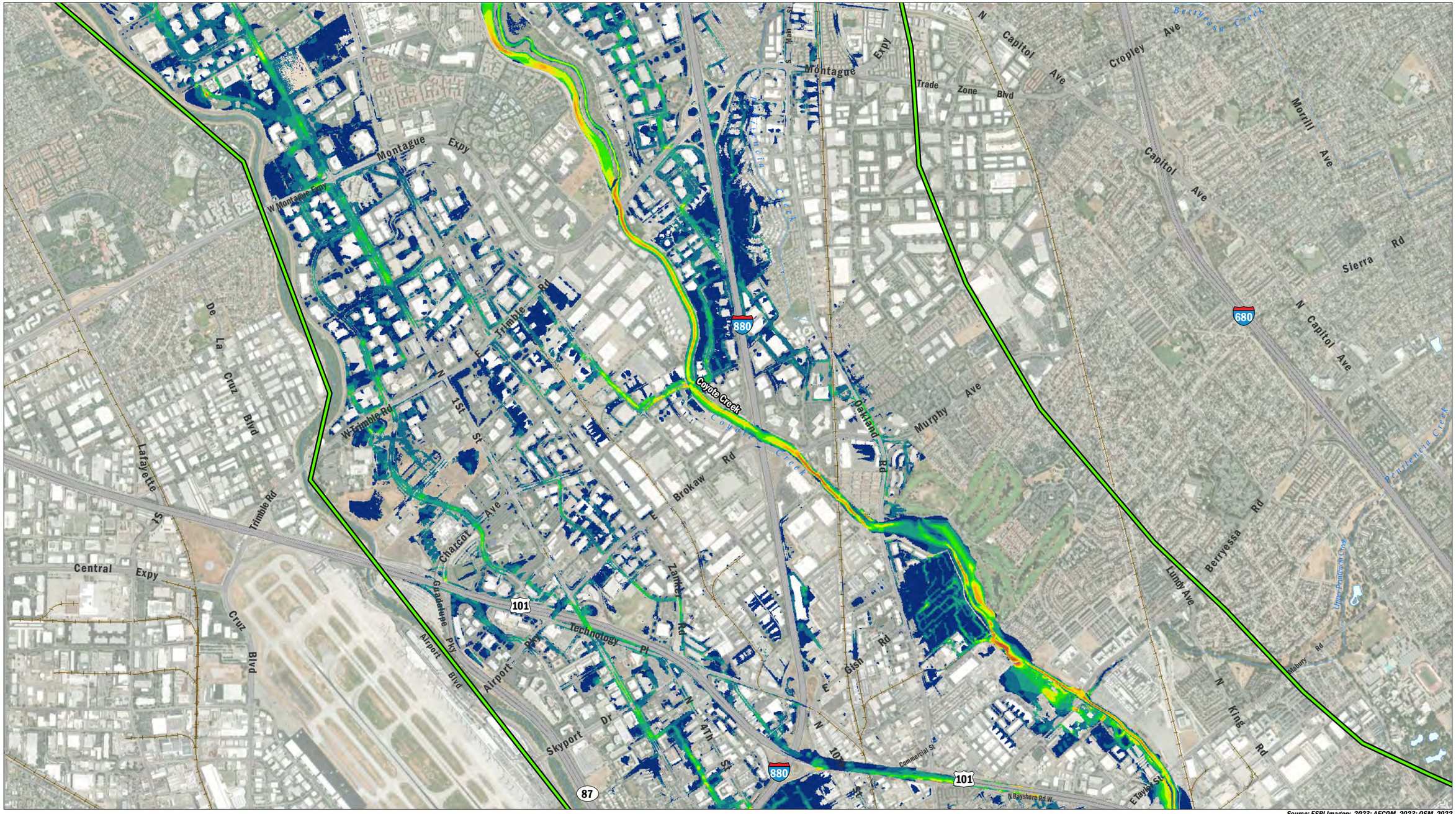
AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.



FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

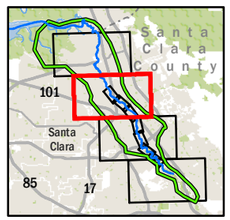
0 2,400 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.6



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.6

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

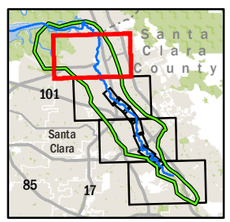
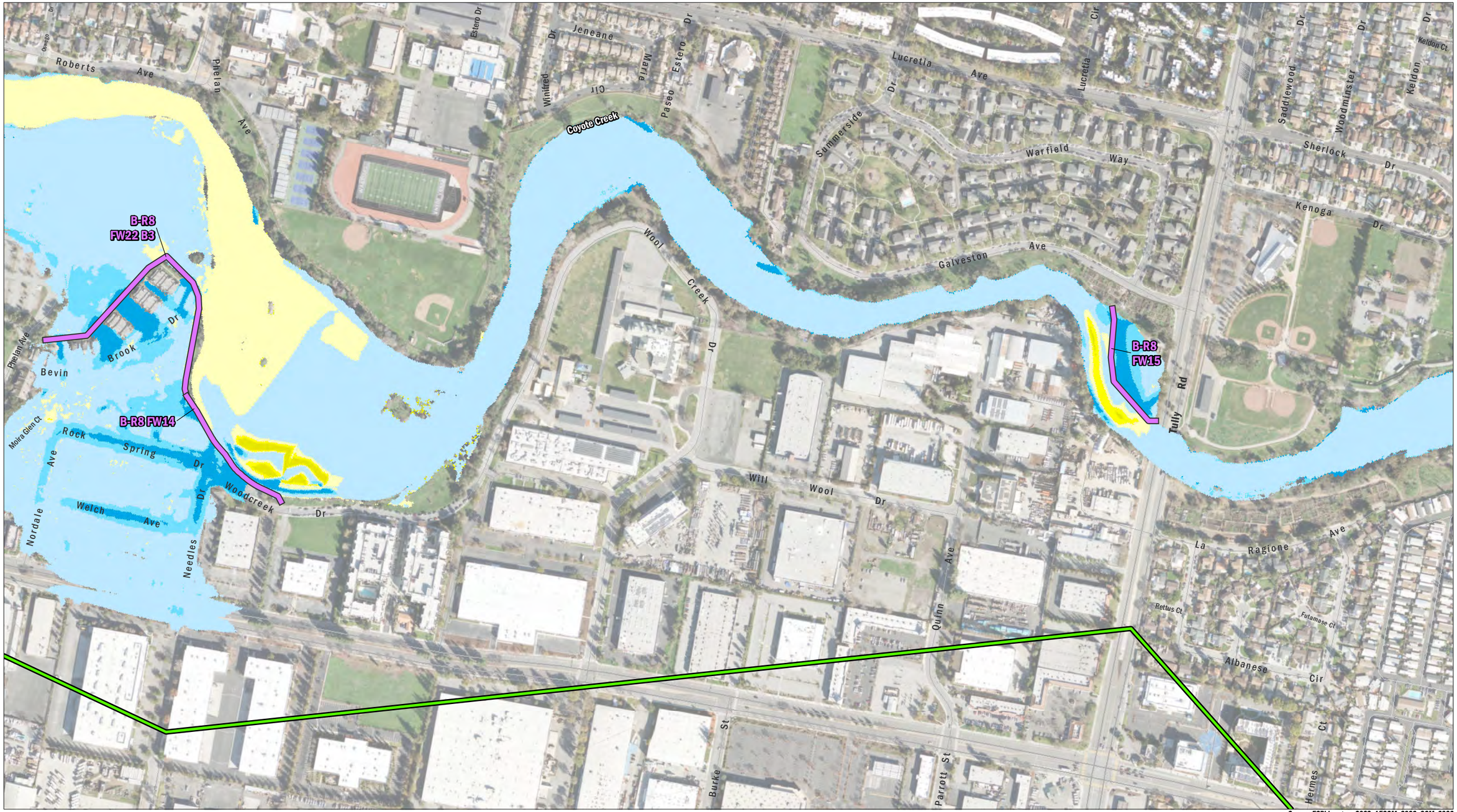


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)
-8.3- -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 5.1

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

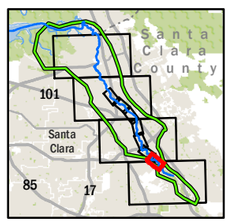
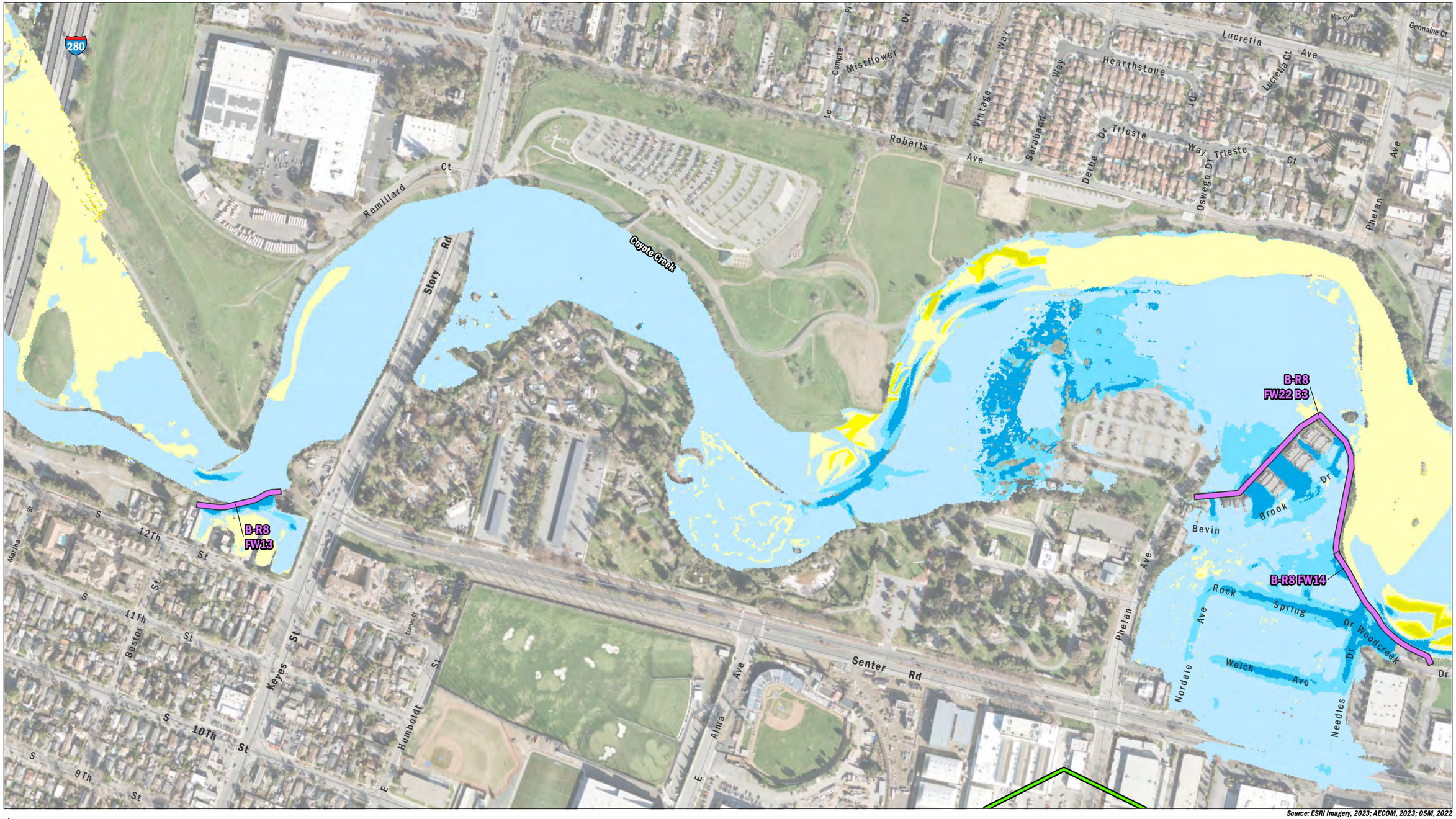


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1
Page 1 of 11



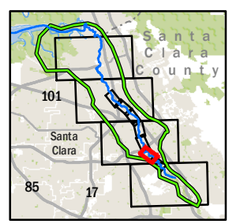
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)
-8.3- -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 5.1



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)
-8.3- -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 5.1

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

AECOM
Coyote Creek
EIR Modeling

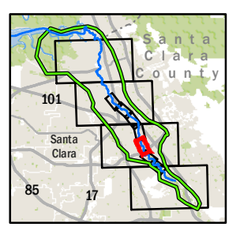
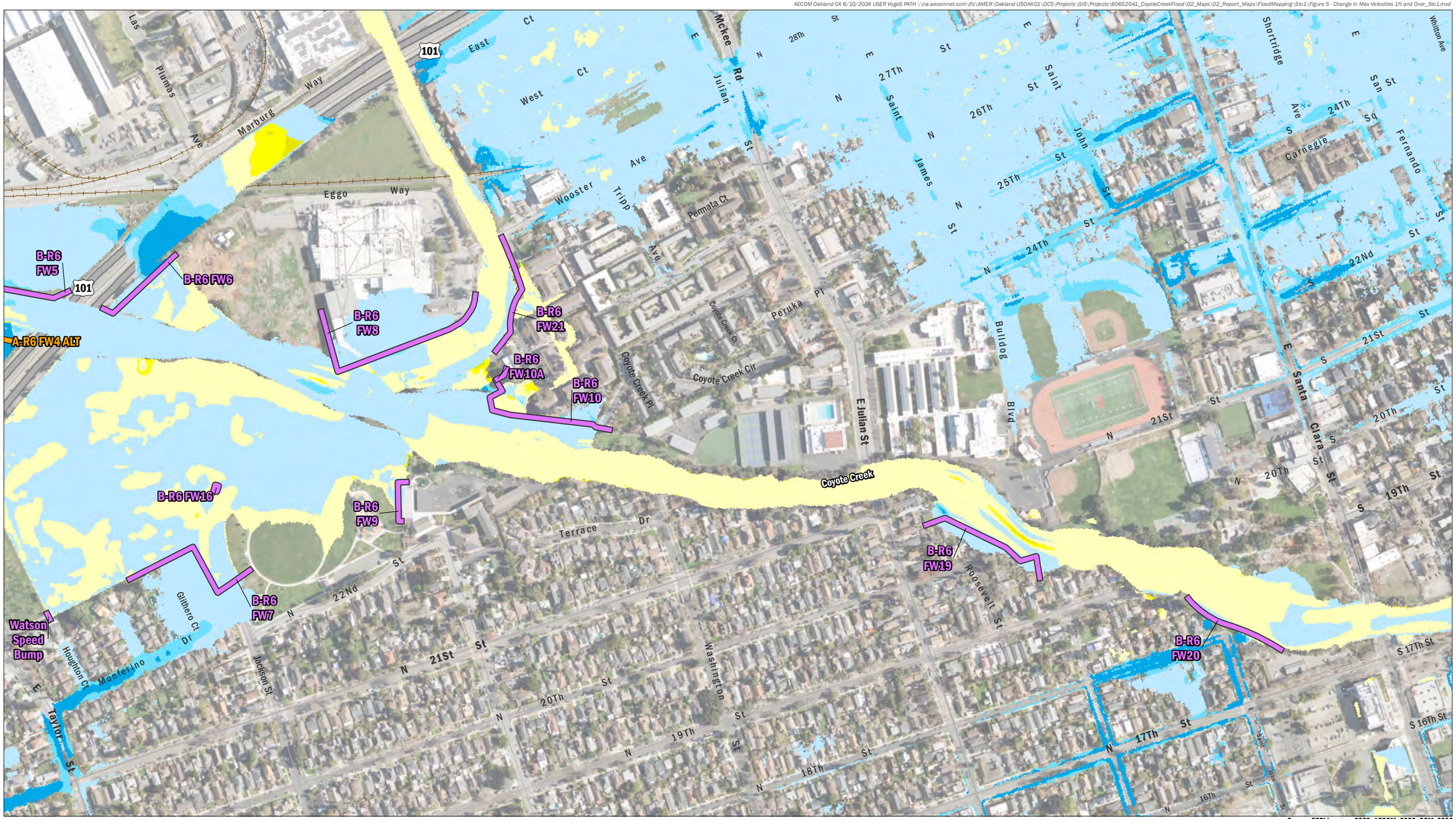


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)
- -8.3- -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 5.1

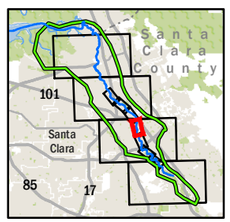
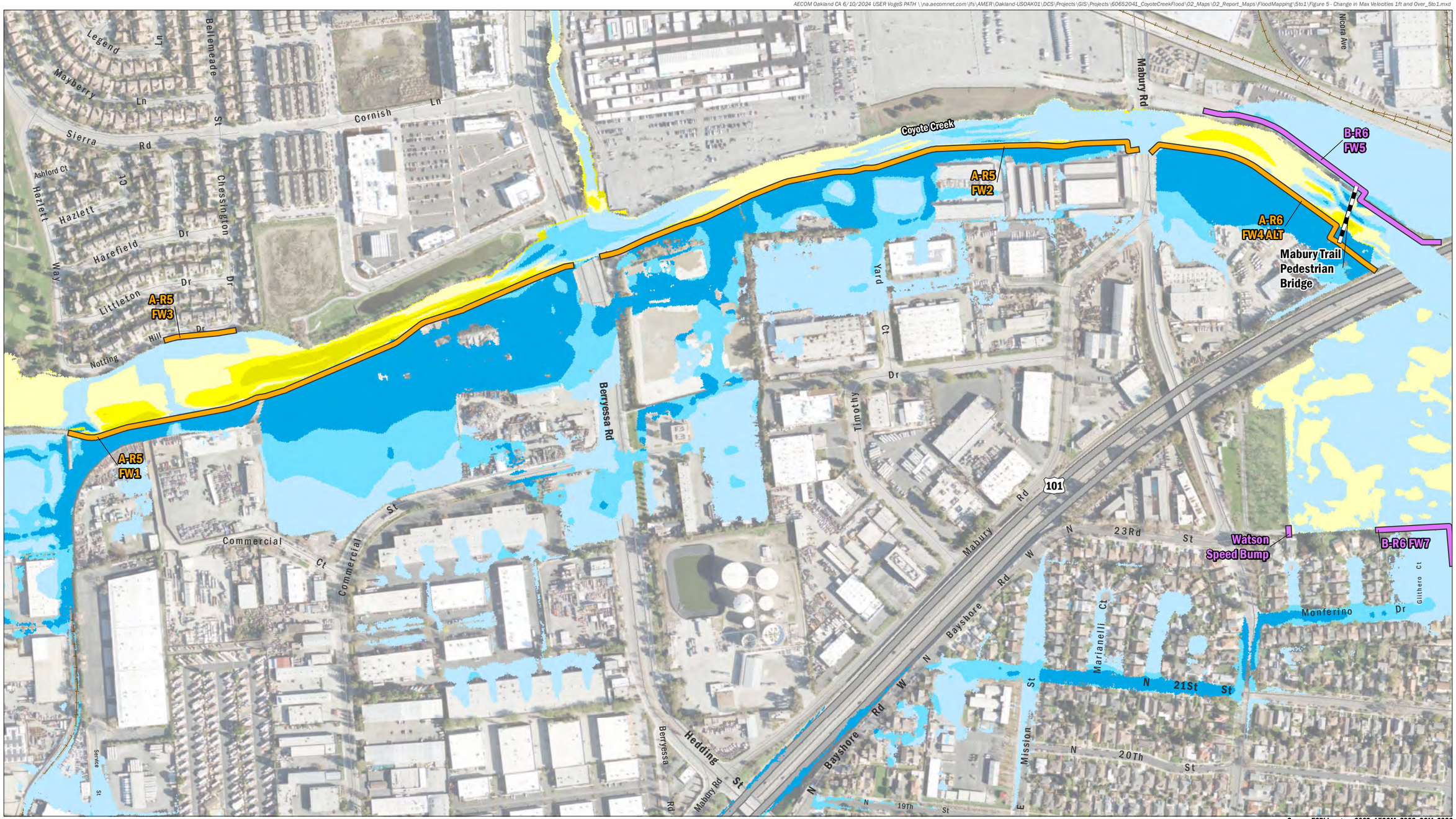


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)

- -8.3- -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 5.1

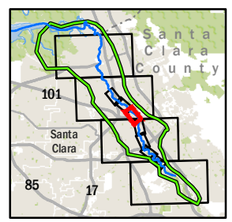
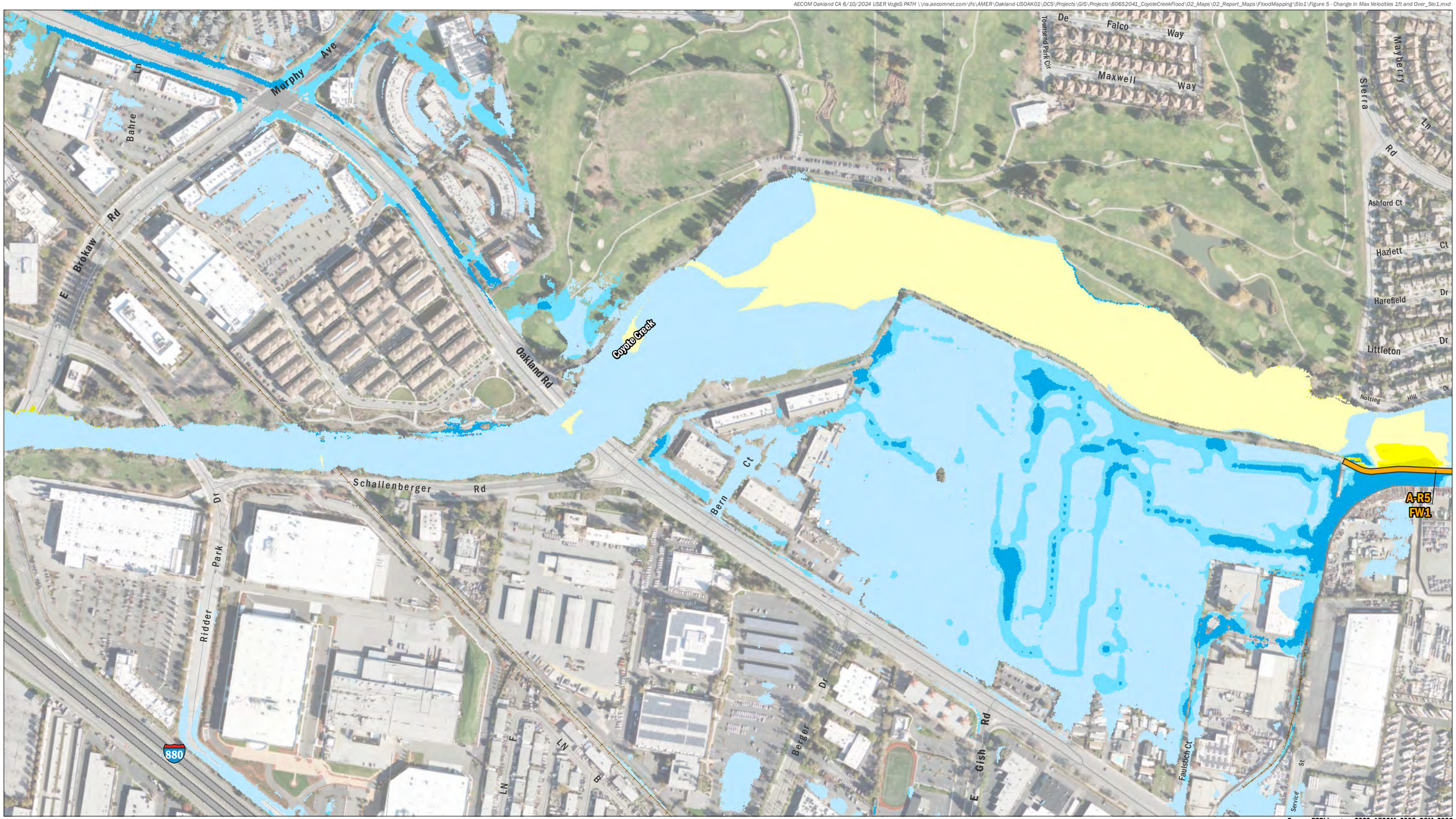


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1
Page 5 of 11



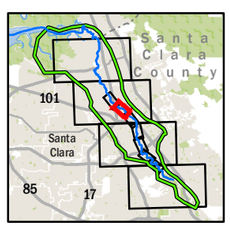
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

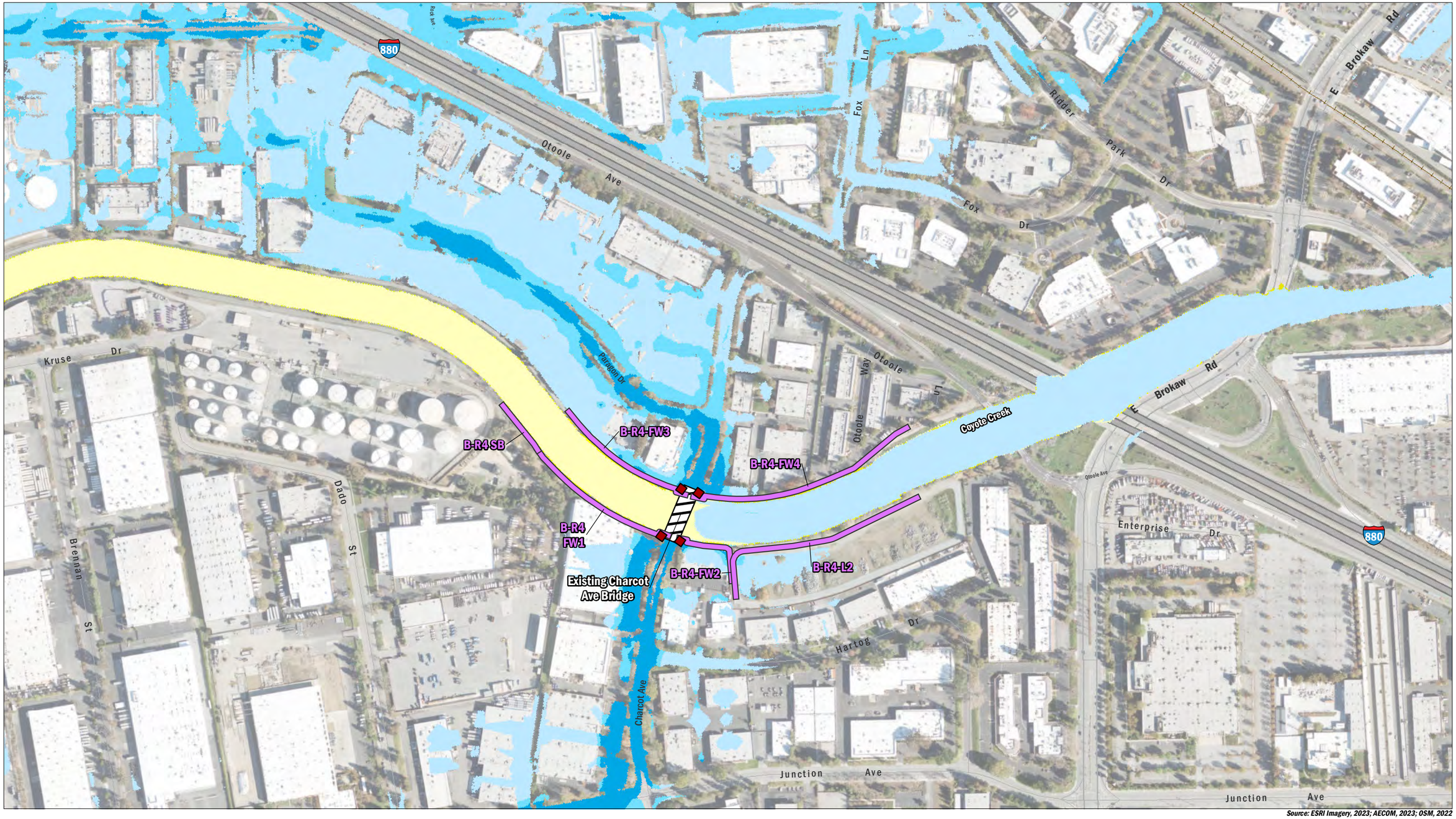
Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)
-8.3- -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 5.1



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5
Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)
- -8.3- -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 5.1

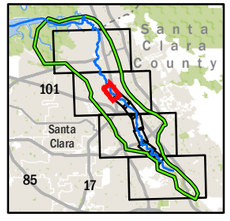
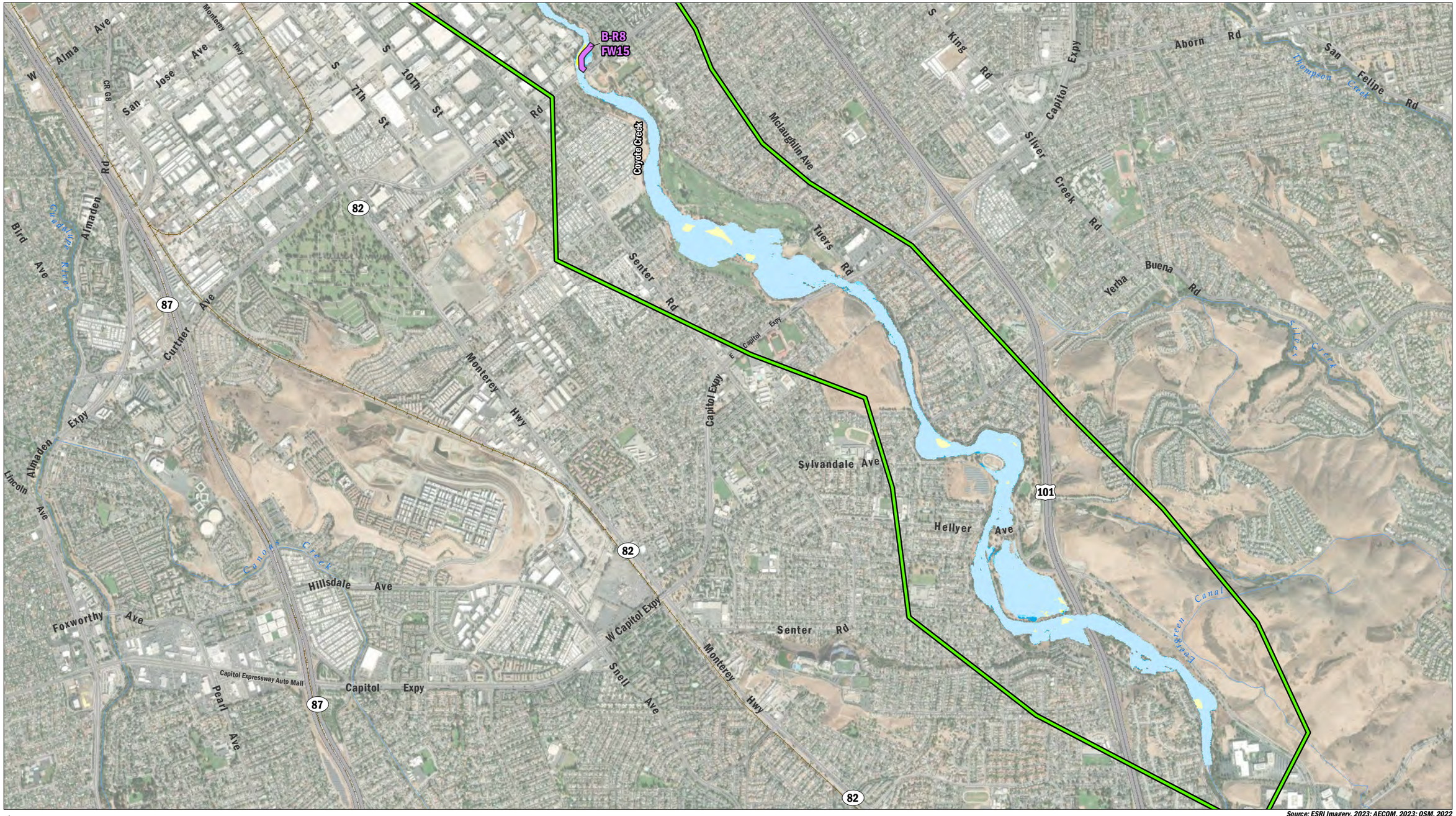


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1
Page 7 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)
-8.3- -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 5.1

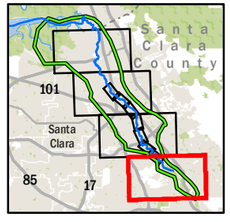
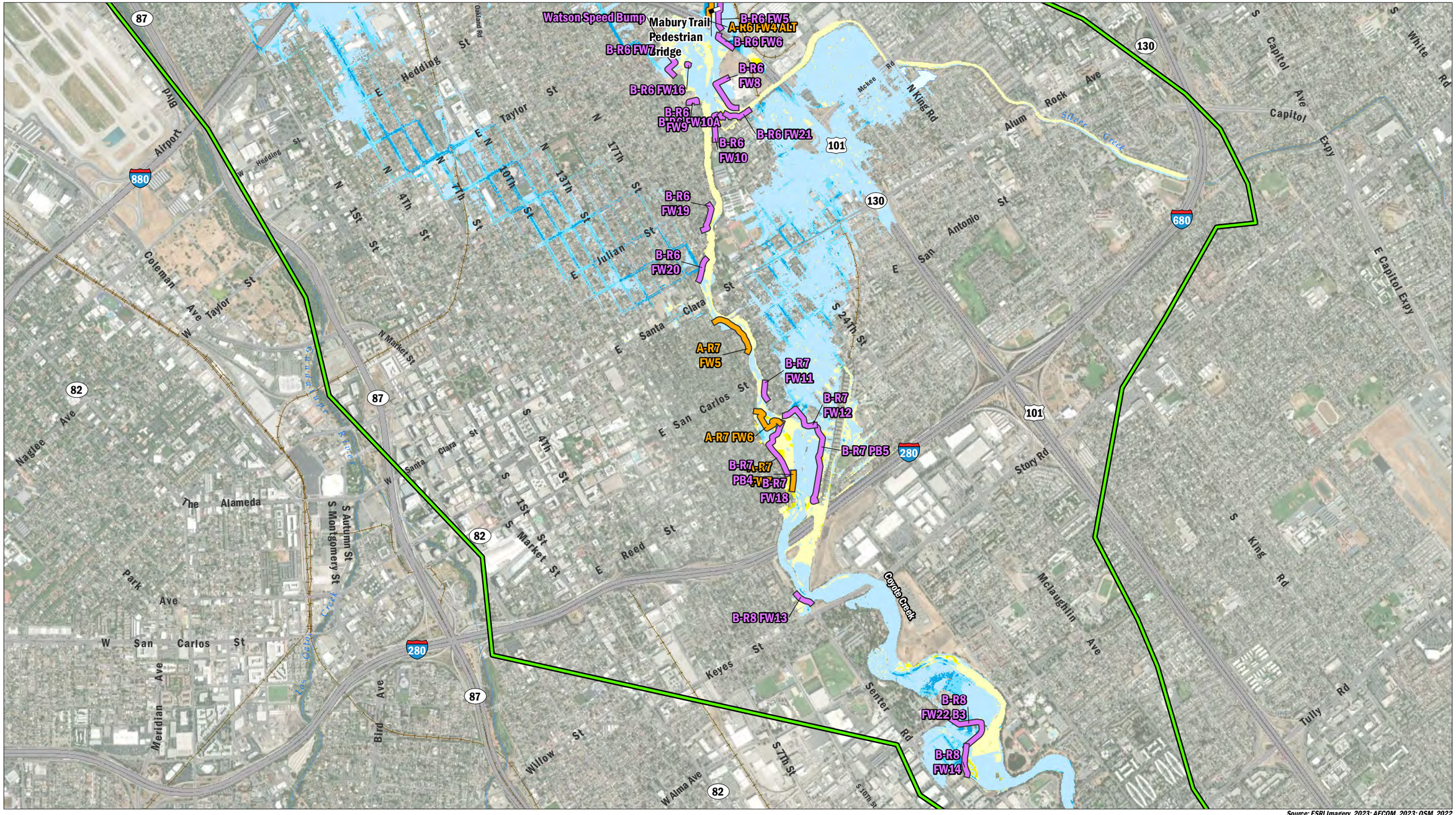


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)

- -8.3- -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 5.1

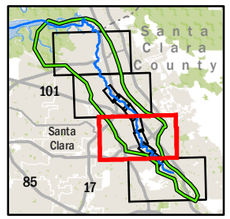
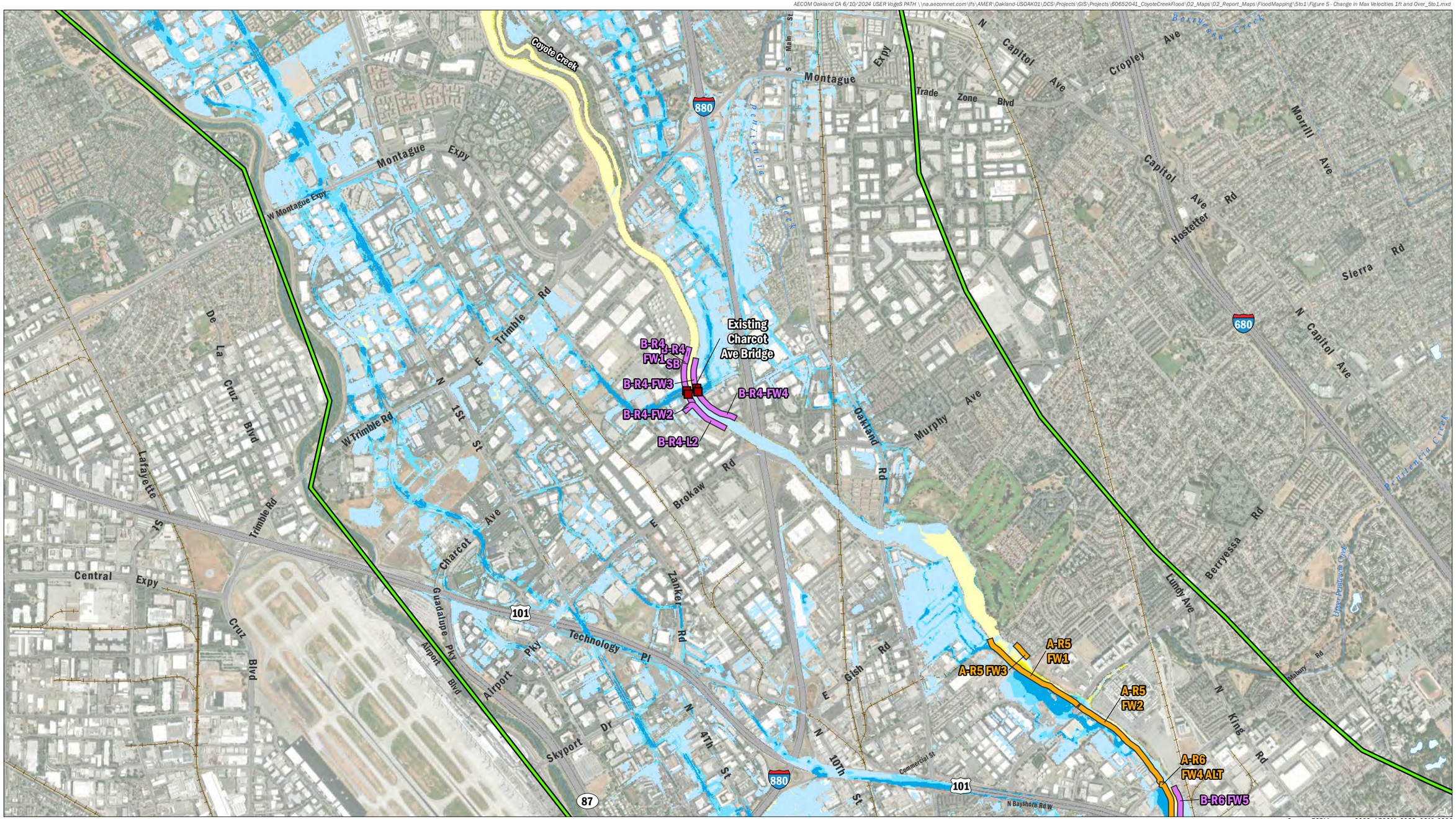


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)
- -8.3- -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 5.1

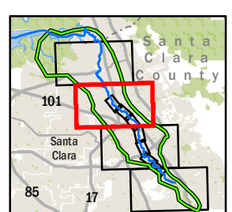
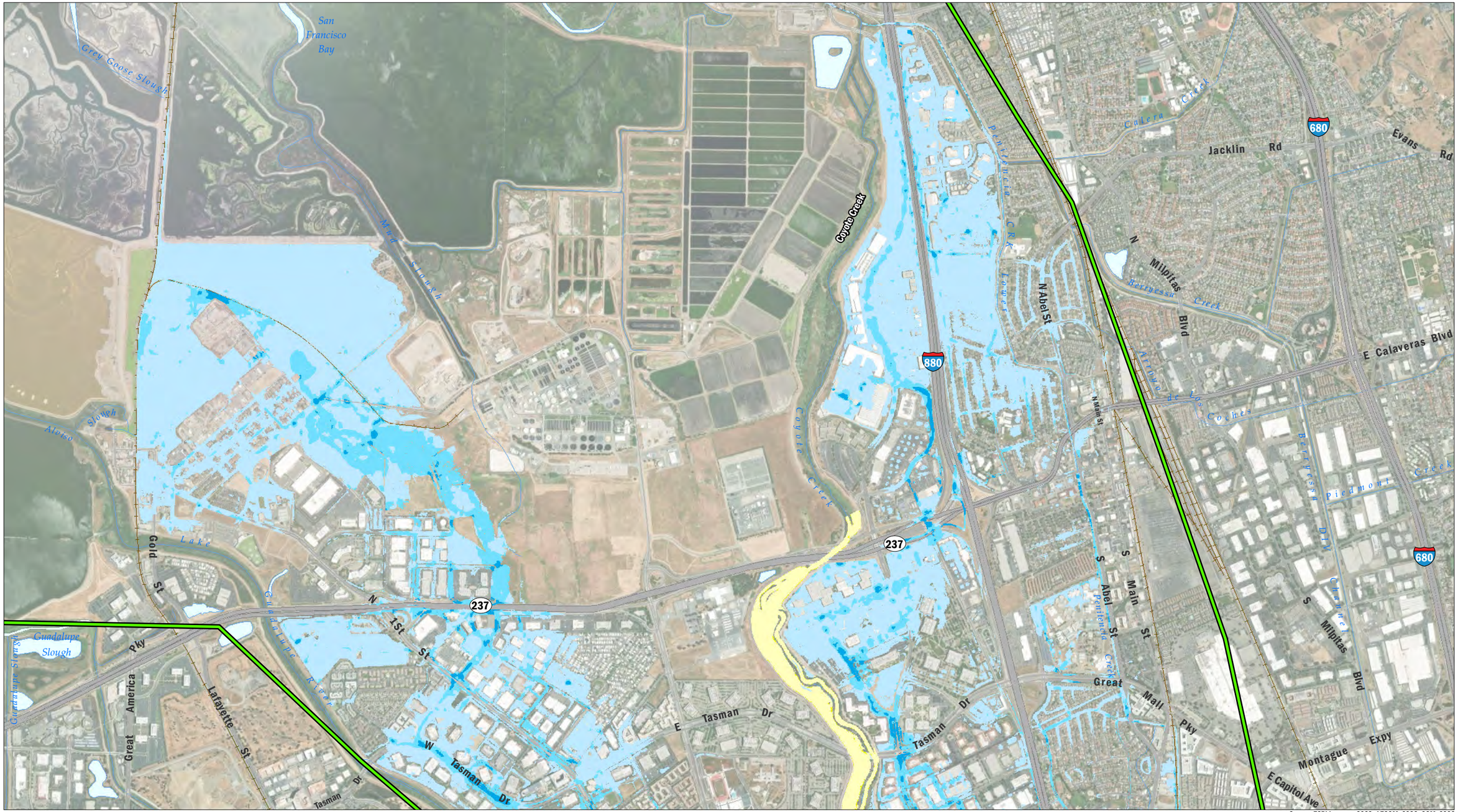


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

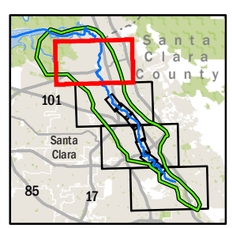
0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

Maximum Velocity Scenario 5 Minus Scenario 1
Velocity (ft/s)

- -8.3- -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 5.1

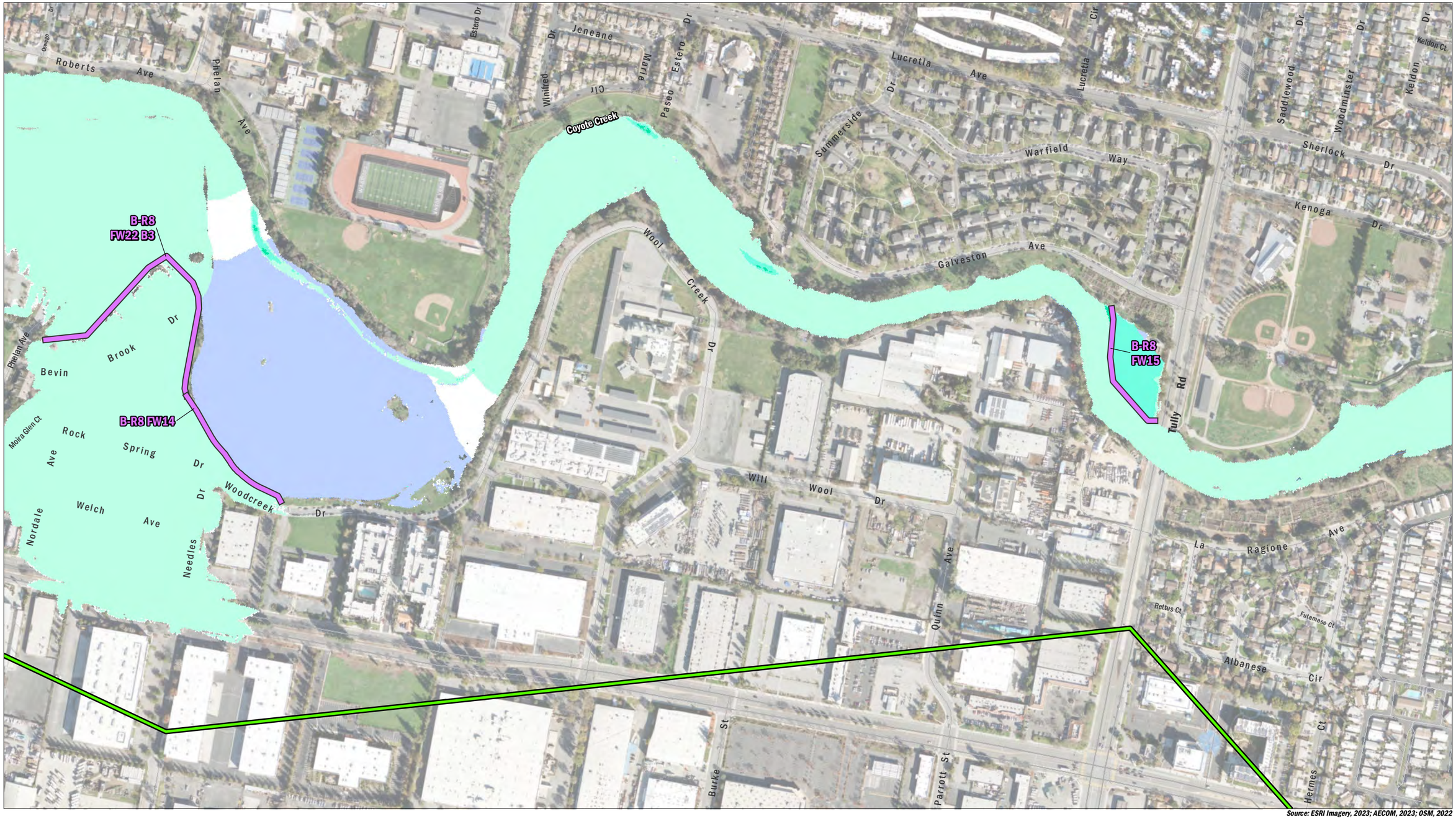


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-16.9 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 3.4

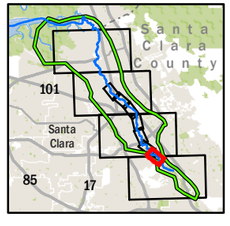
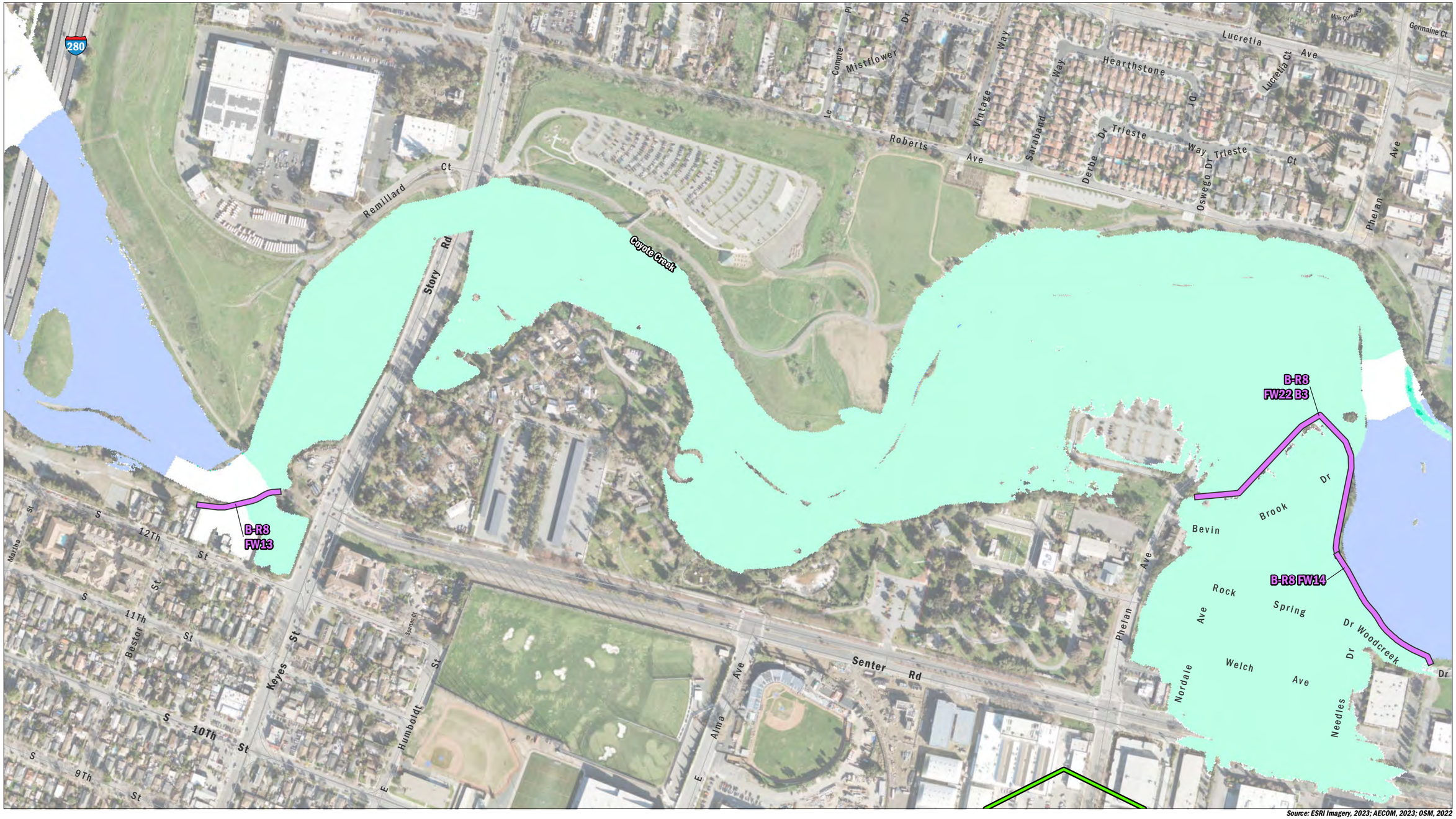


FIGURE 6

Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-16.9 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 3.4

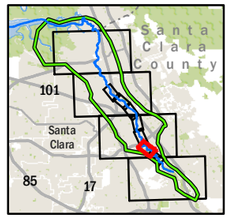
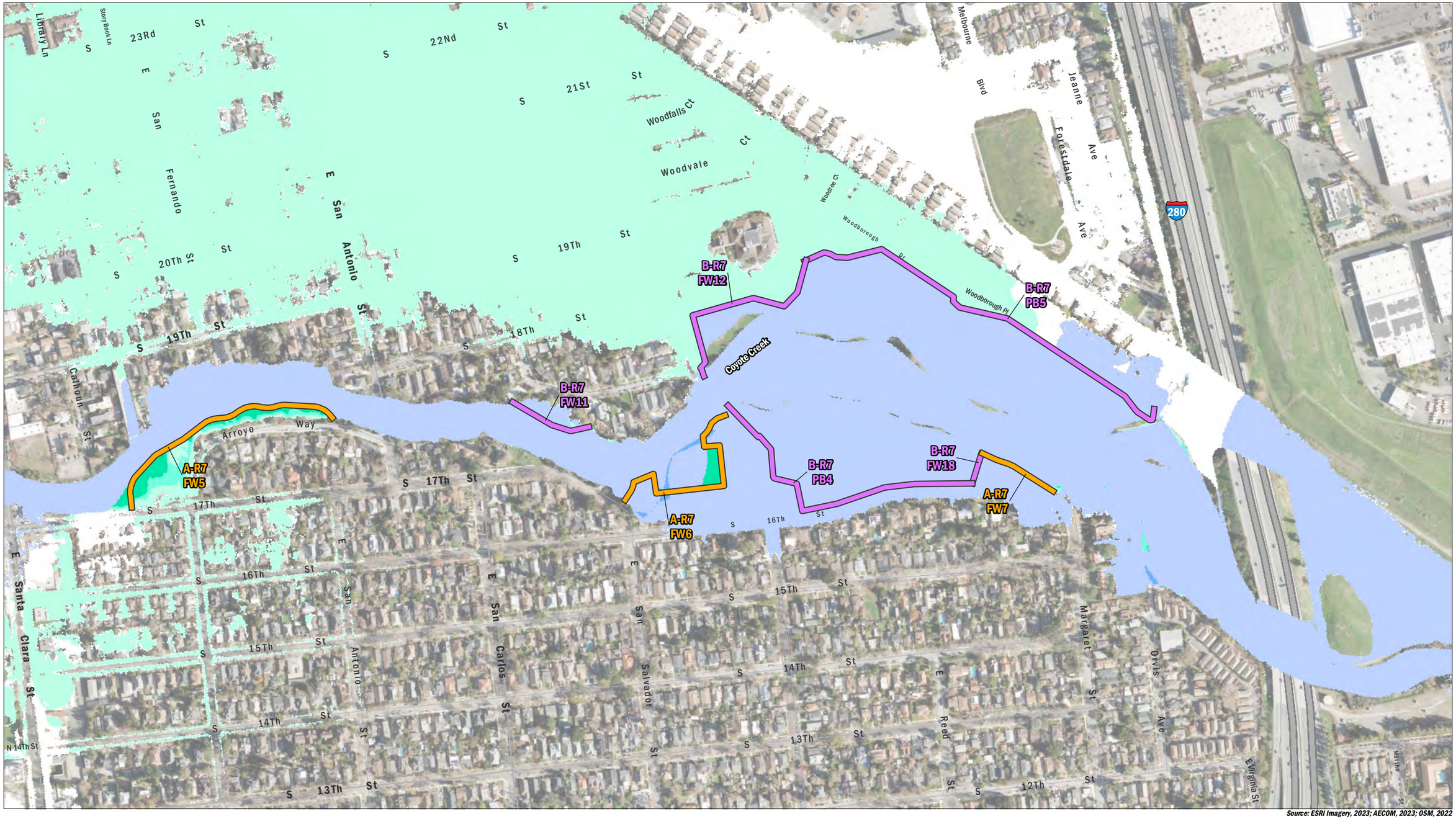


FIGURE 6
Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 2 of 11



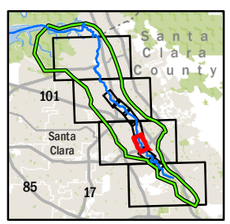
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

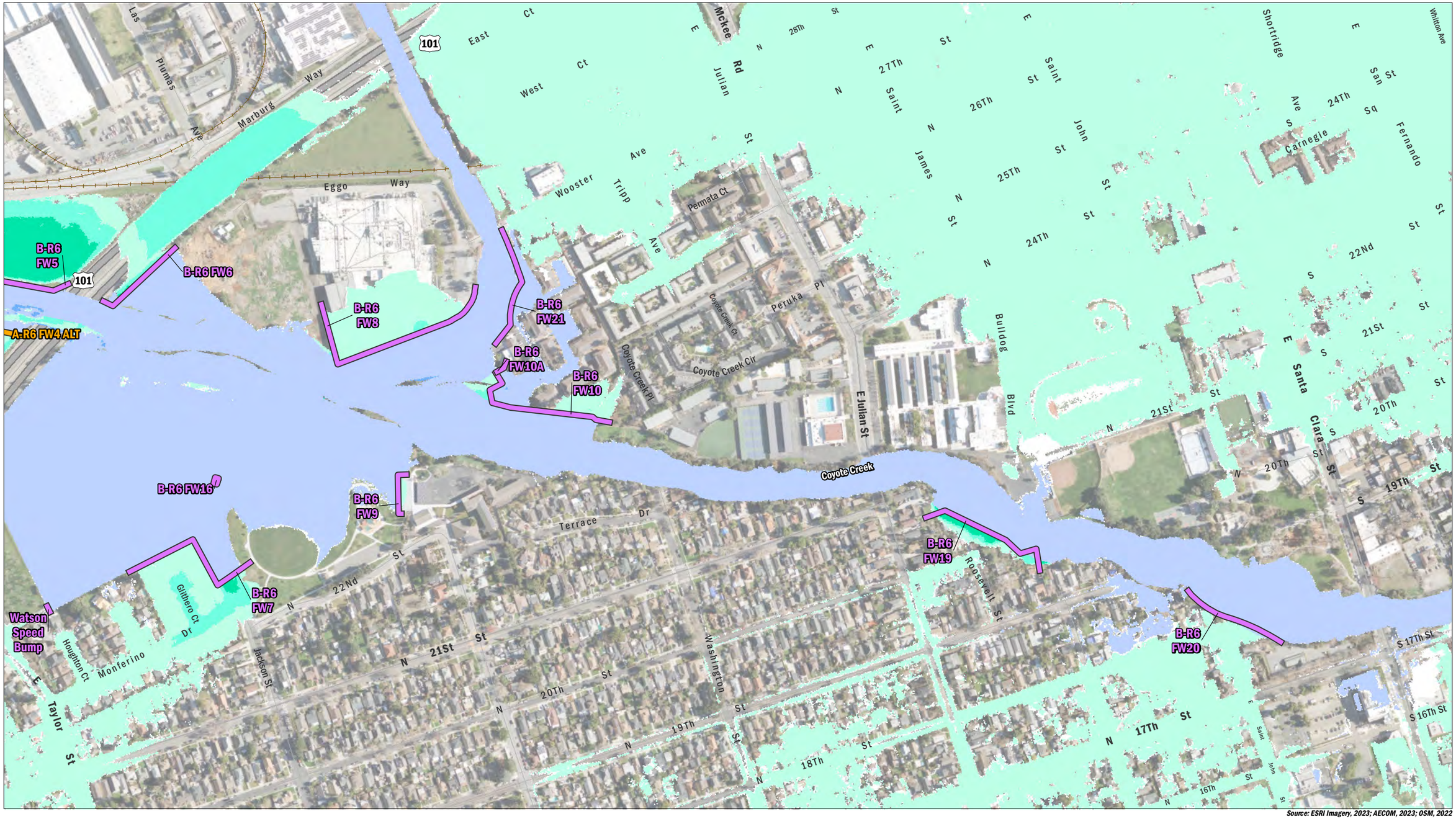
Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-16.9 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 3.4



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6
Change in All Max. Water Depths
Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-16.9 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 3.4

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

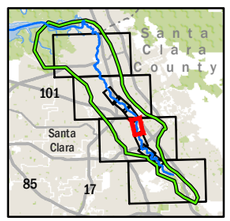
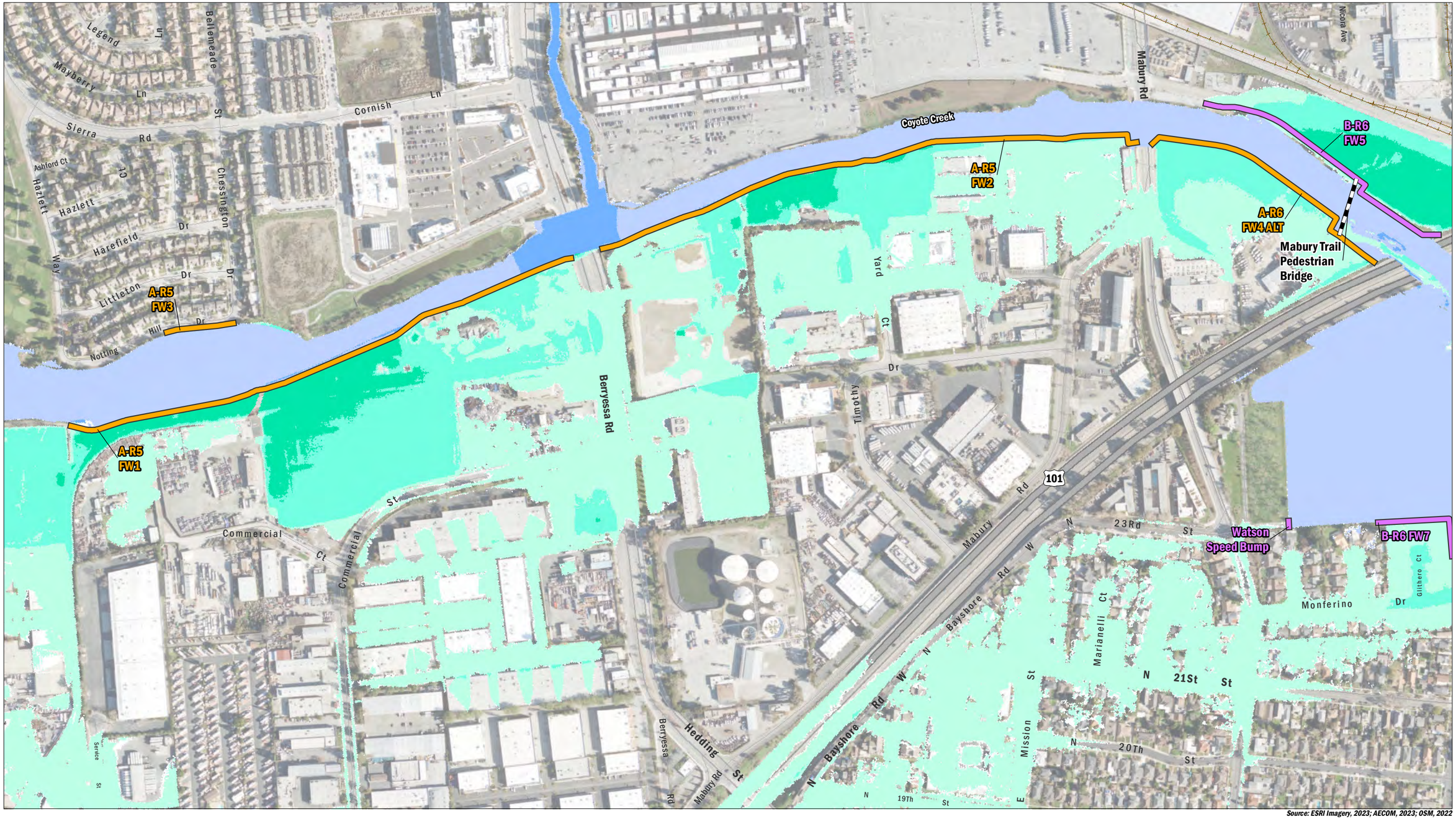


FIGURE 6

Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -16.9 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 3.4

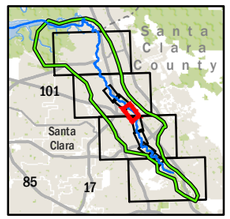
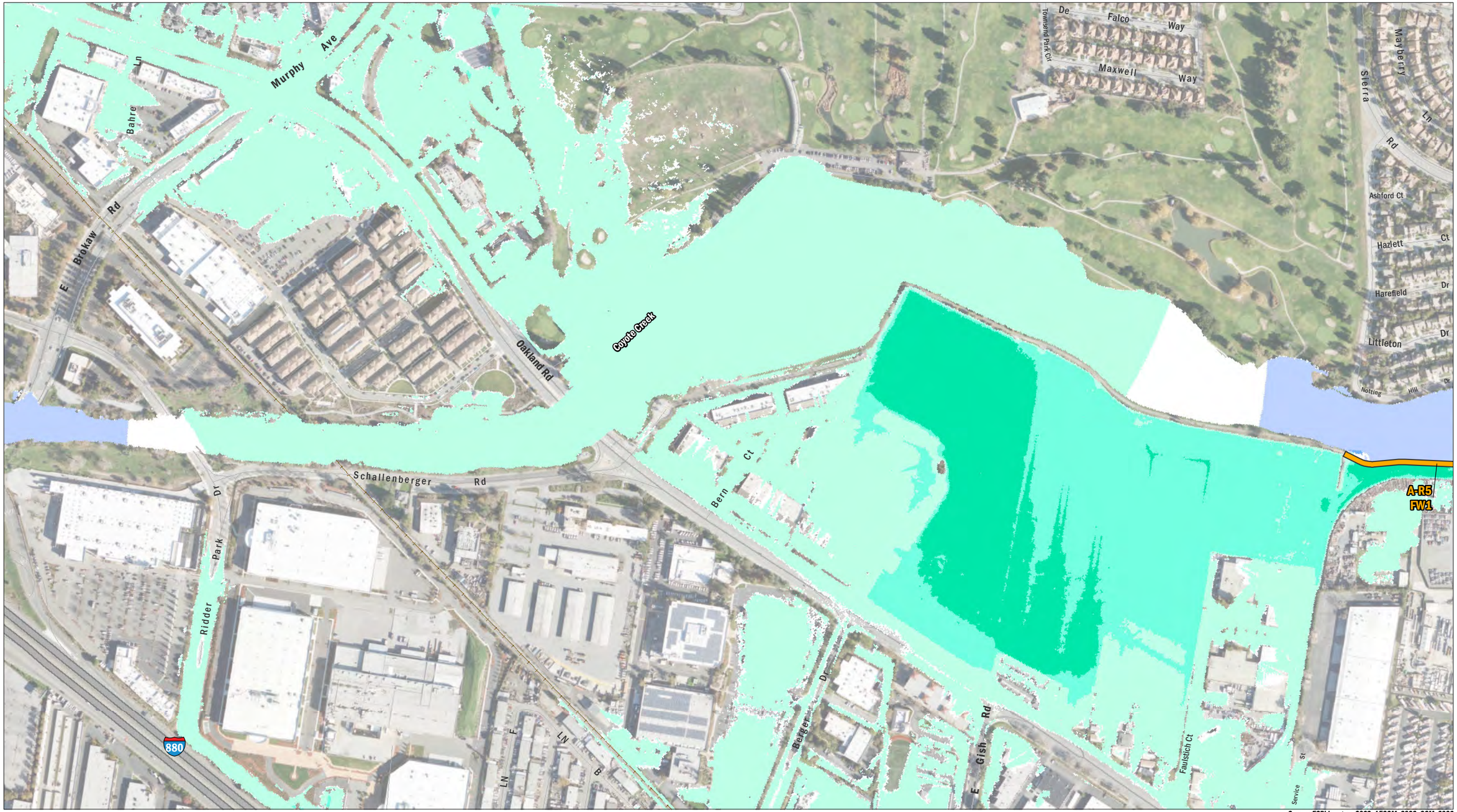


FIGURE 6

Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 5 of 11



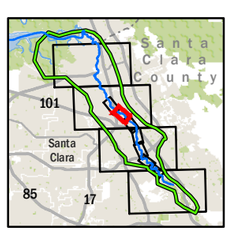
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

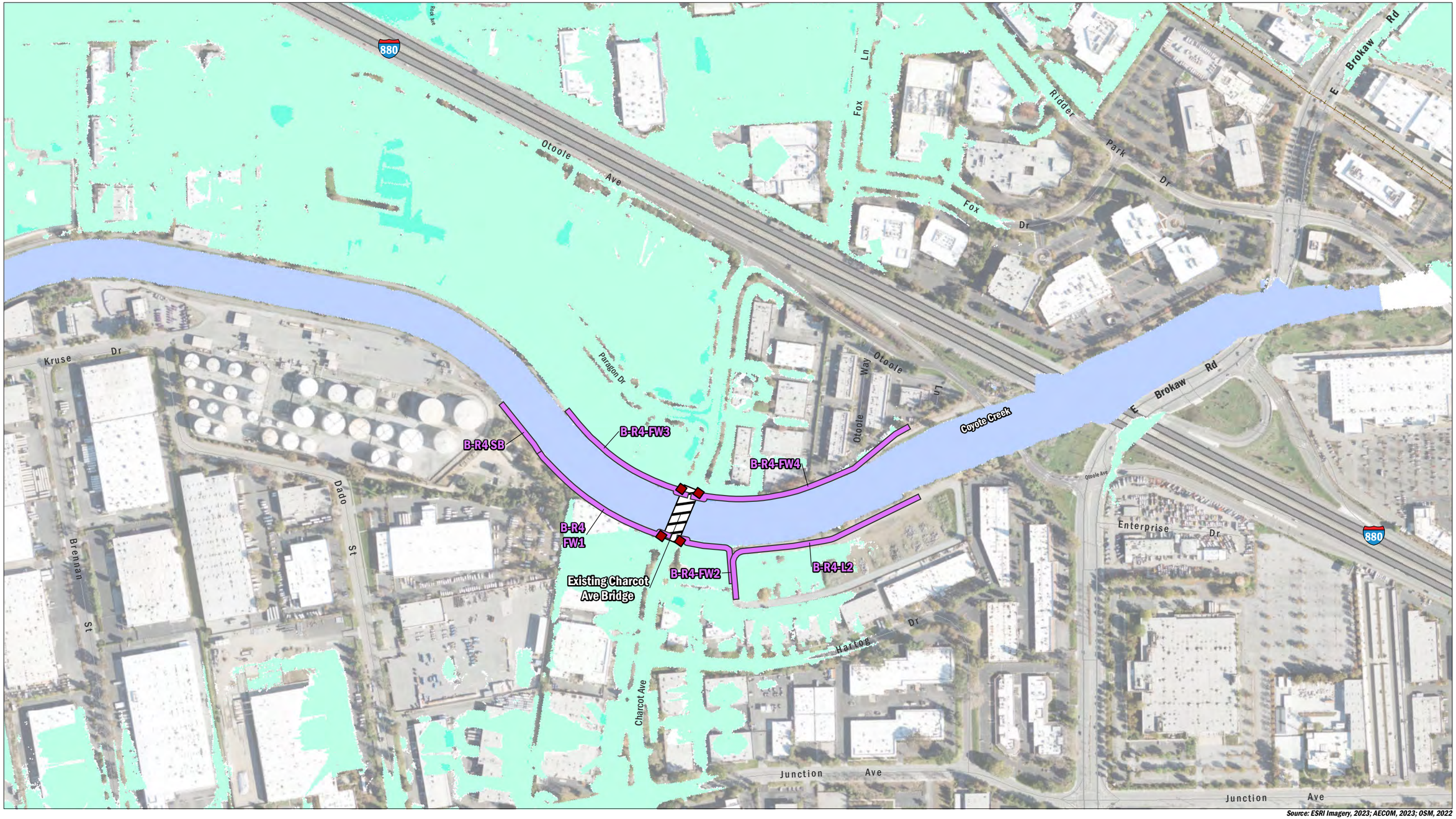
Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-16.9 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 3.4



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6
Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 6 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

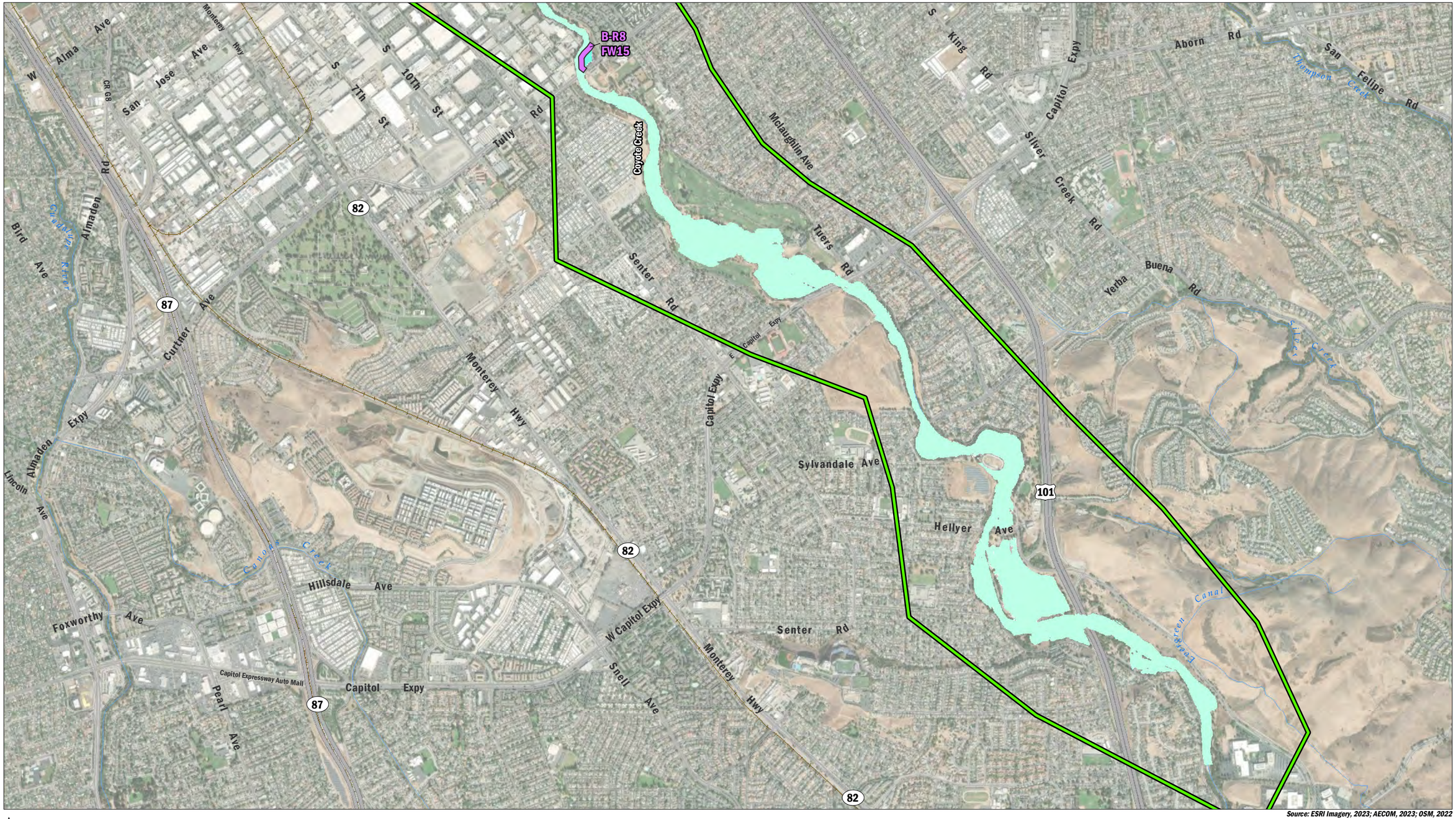
Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6

Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 7 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
-16.9 - -6
-6 - -3
-3 - -0.1
-0.1 - 0.1
0.1 - 3
3 - 3.4

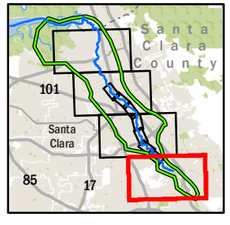
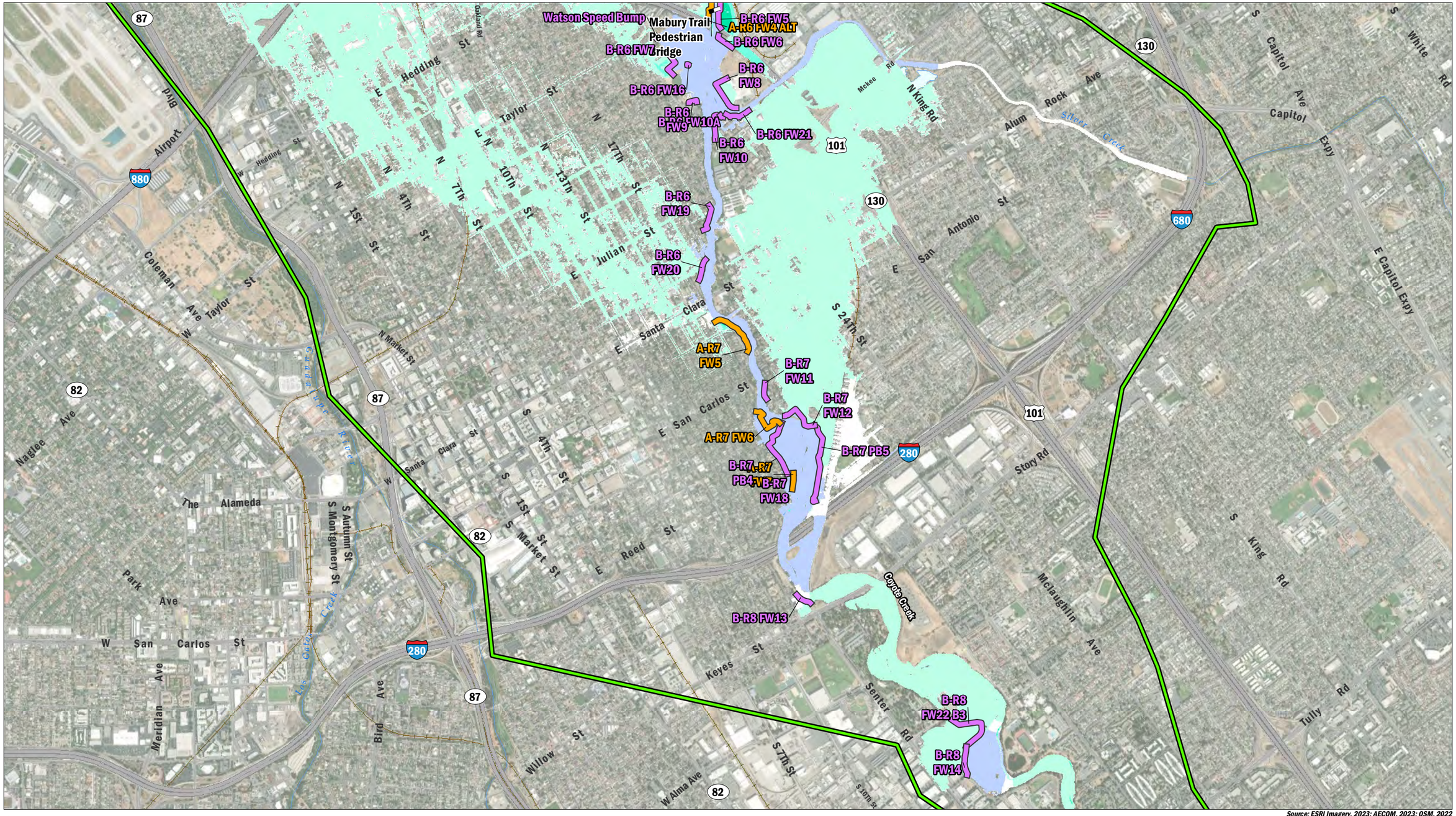


FIGURE 6

Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -16.9 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 3.4

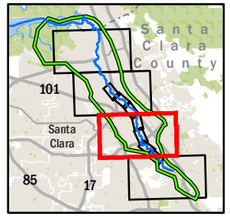
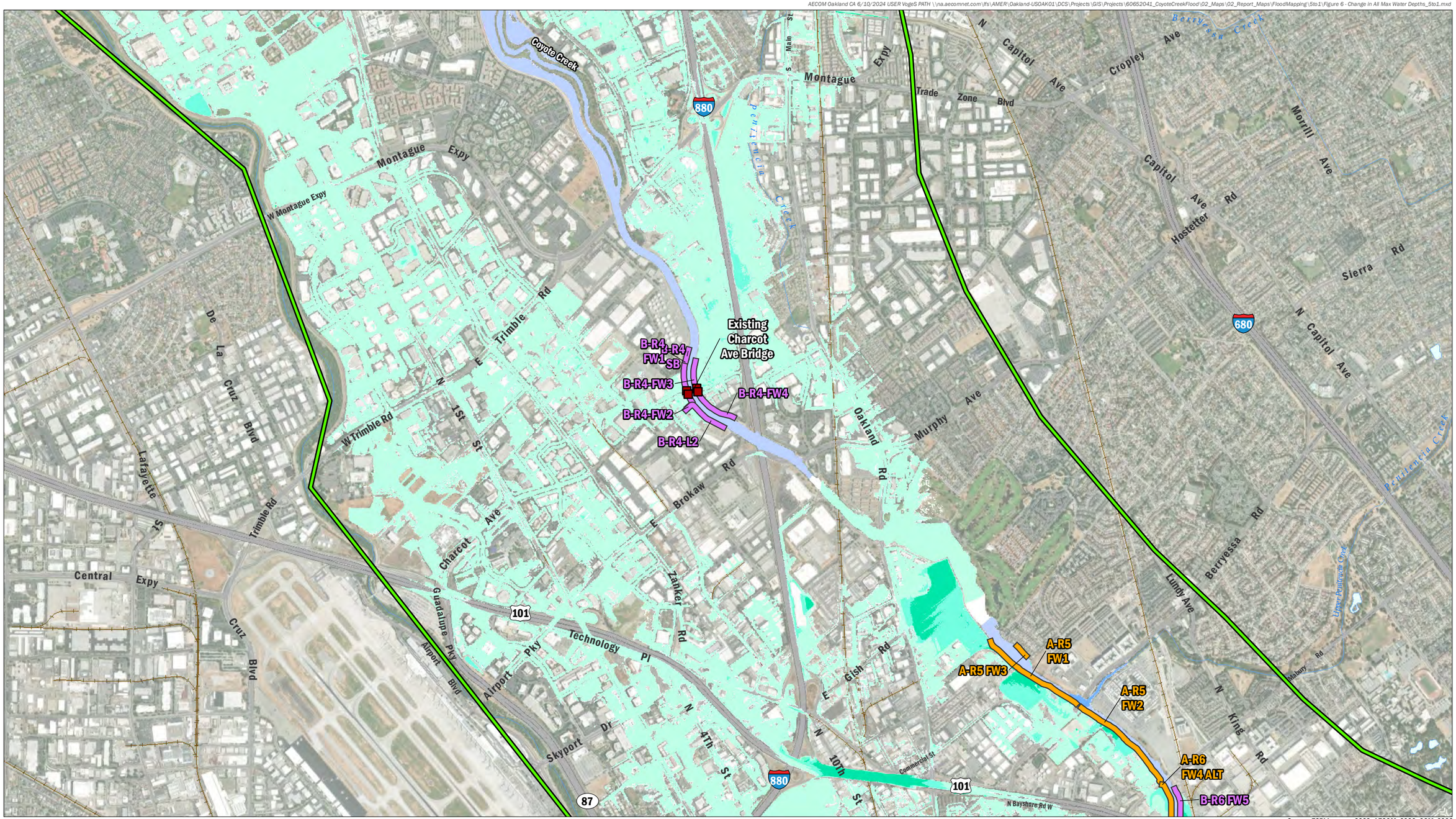


FIGURE 6

Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 9 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)
- -16.9 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 3.4

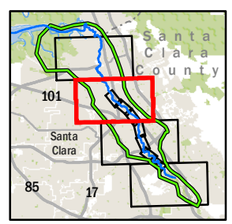
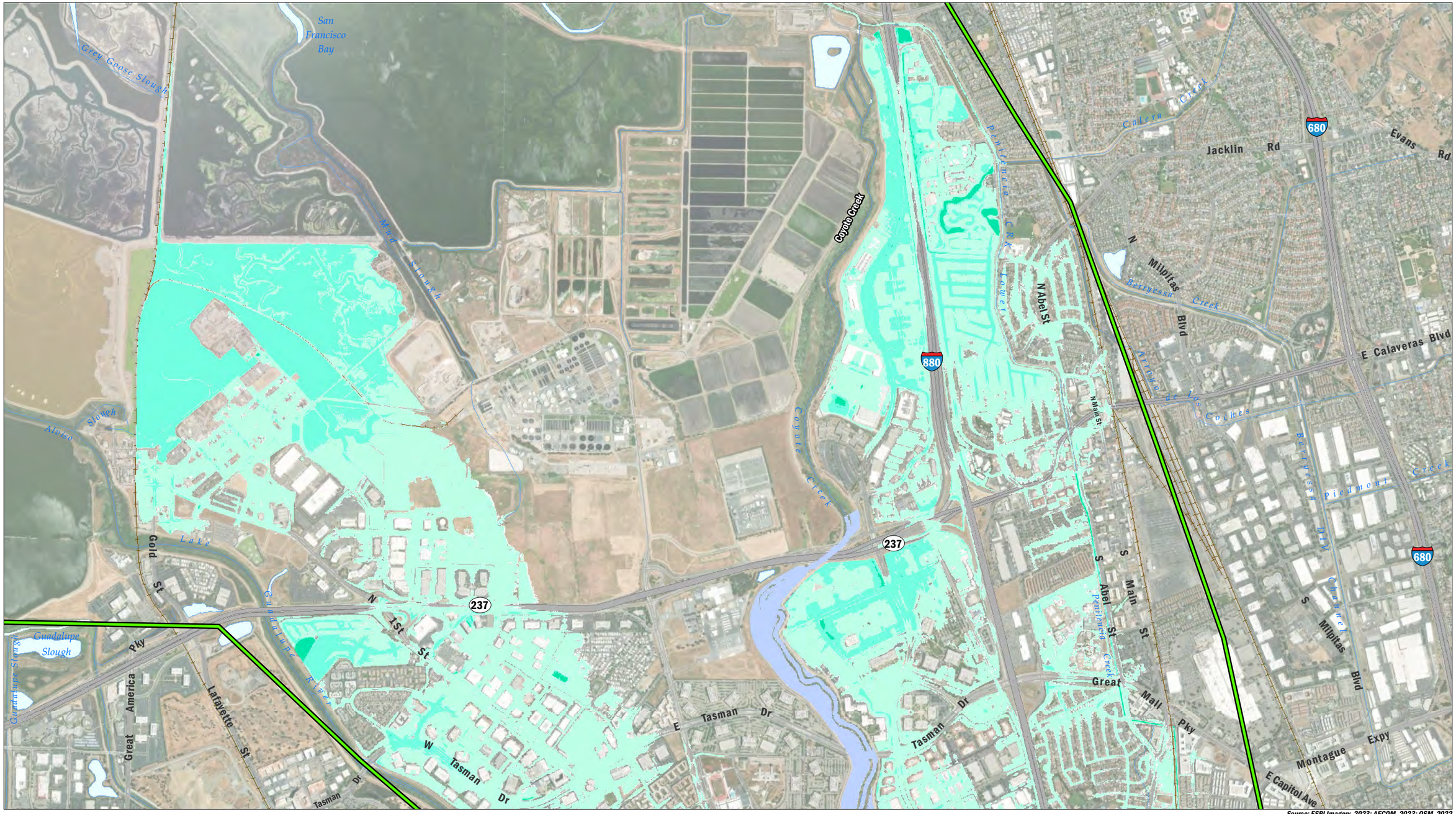


FIGURE 6
Change in All Max. Water Depths
Scenario 5 to Scenario 1



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

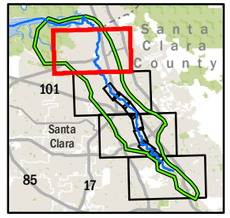
0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

Maximum Water Depth Scenario 5 Minus Scenario 1
Depth (ft)

- -16.9 - -6
- -6 - -3
- -3 - -0.1
- -0.1 - 0.1
- 0.1 - 3
- 3 - 3.4

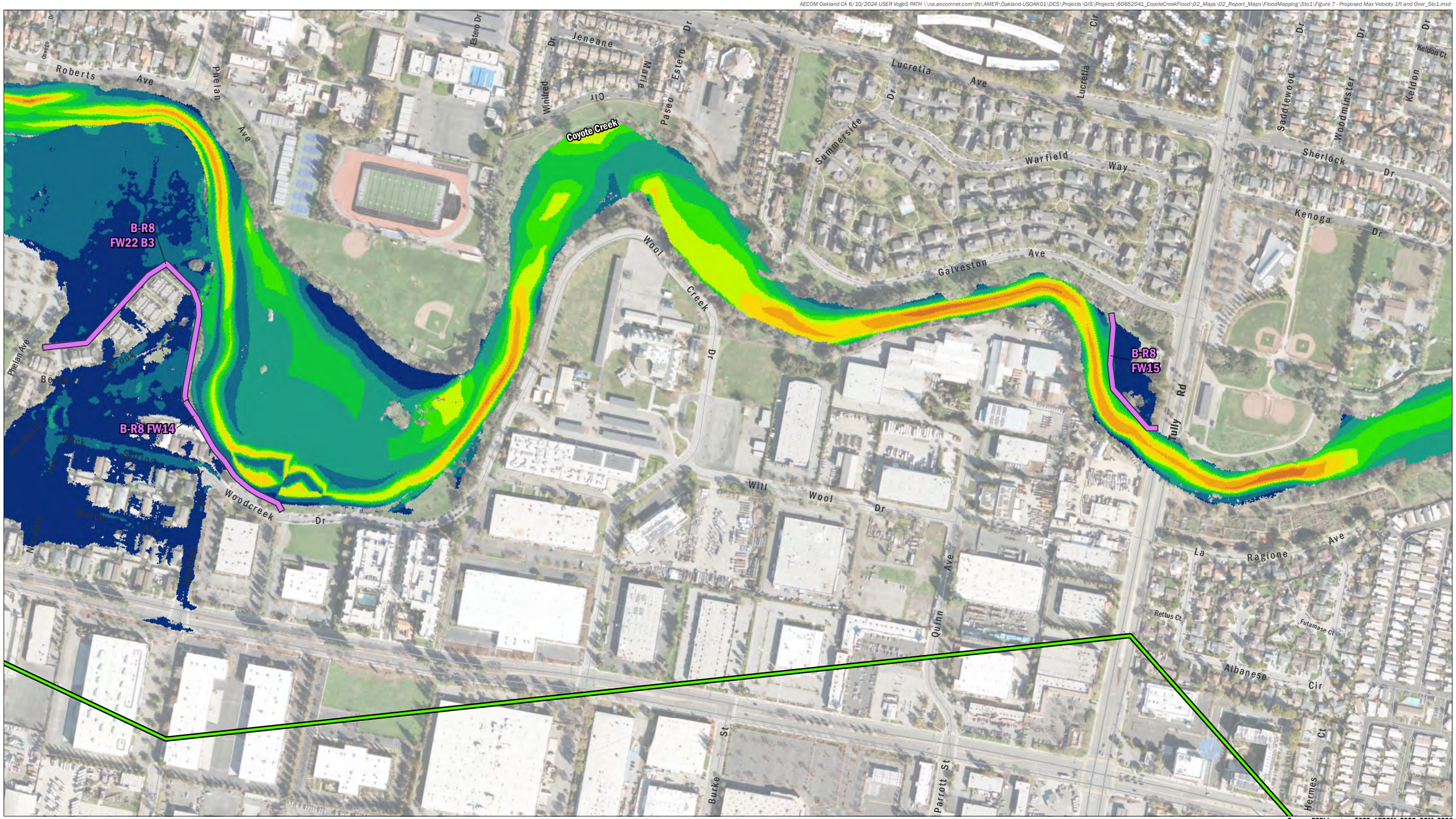


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6

Change in All Max. Water Depths
Scenario 5 to Scenario 1
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

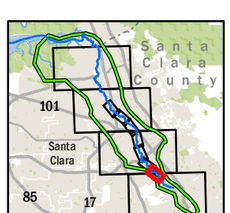
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.9



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.9

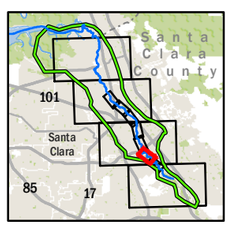


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

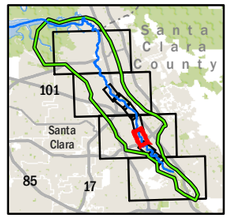
0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.9

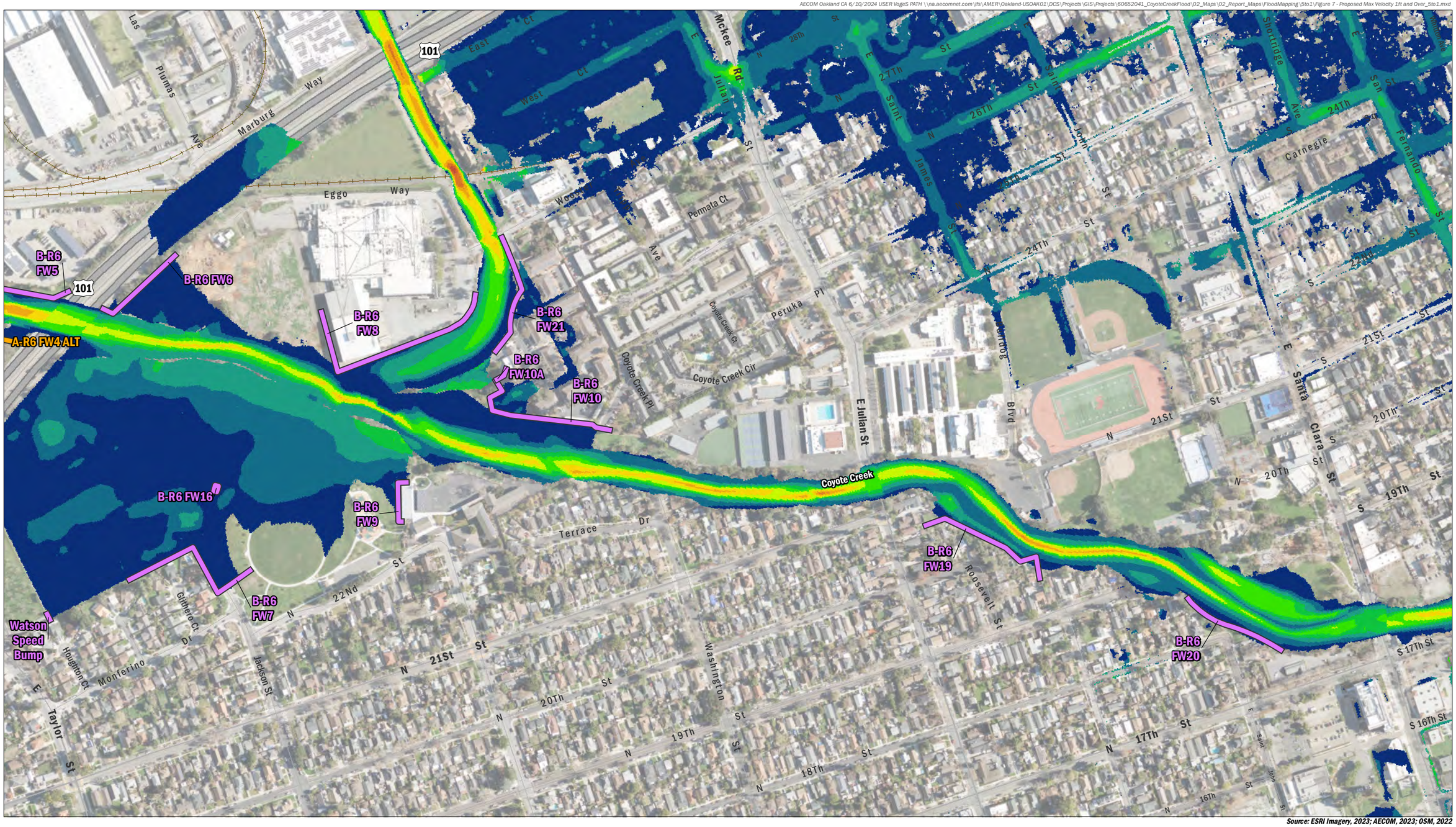


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.9

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

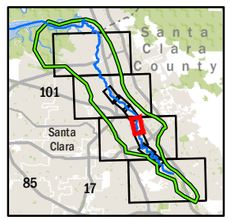


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.9

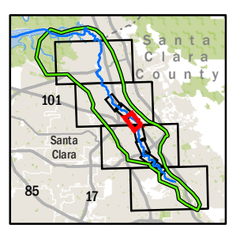
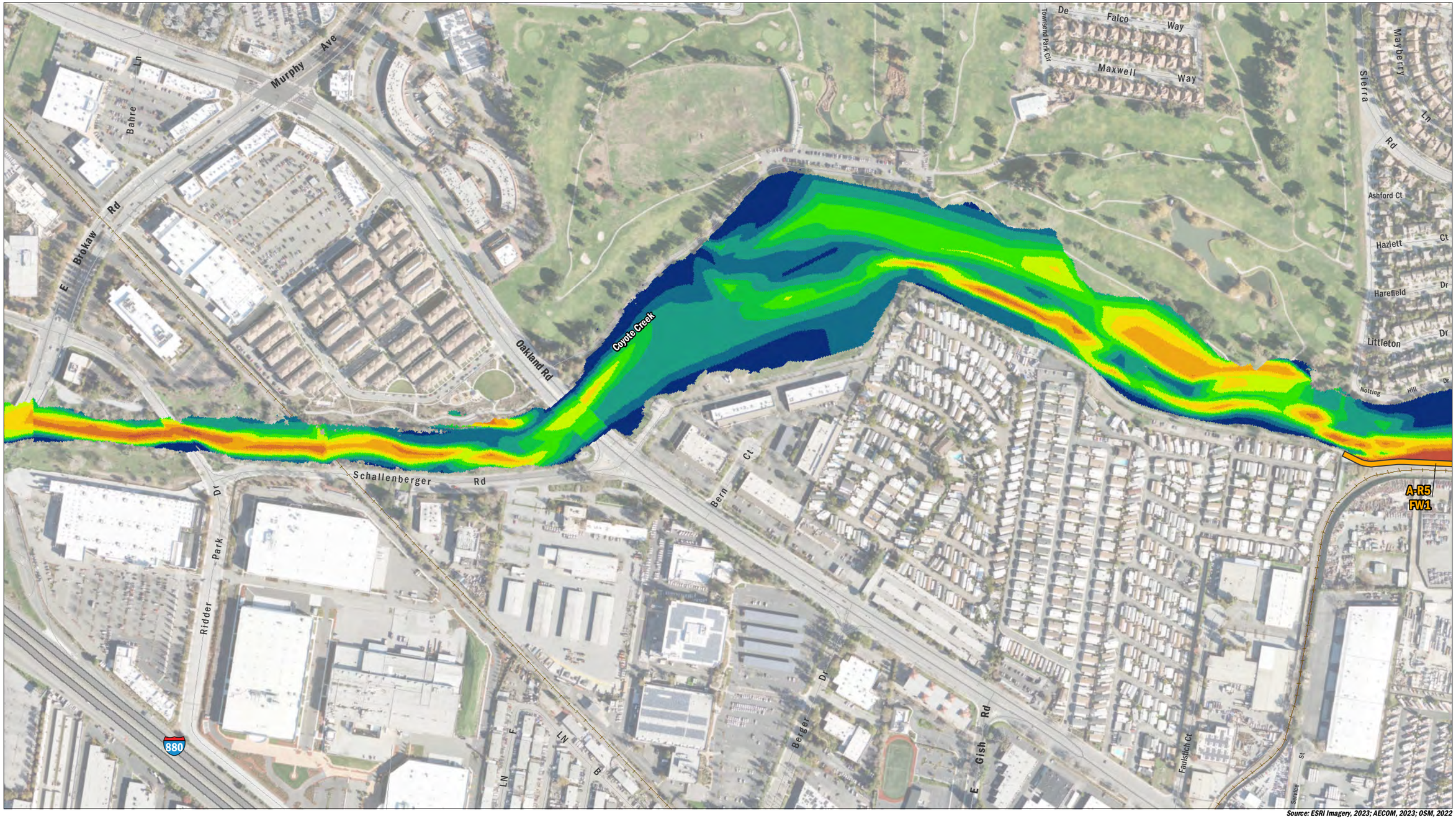


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

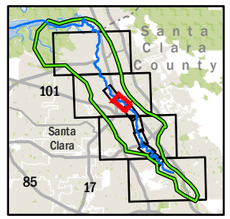
0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

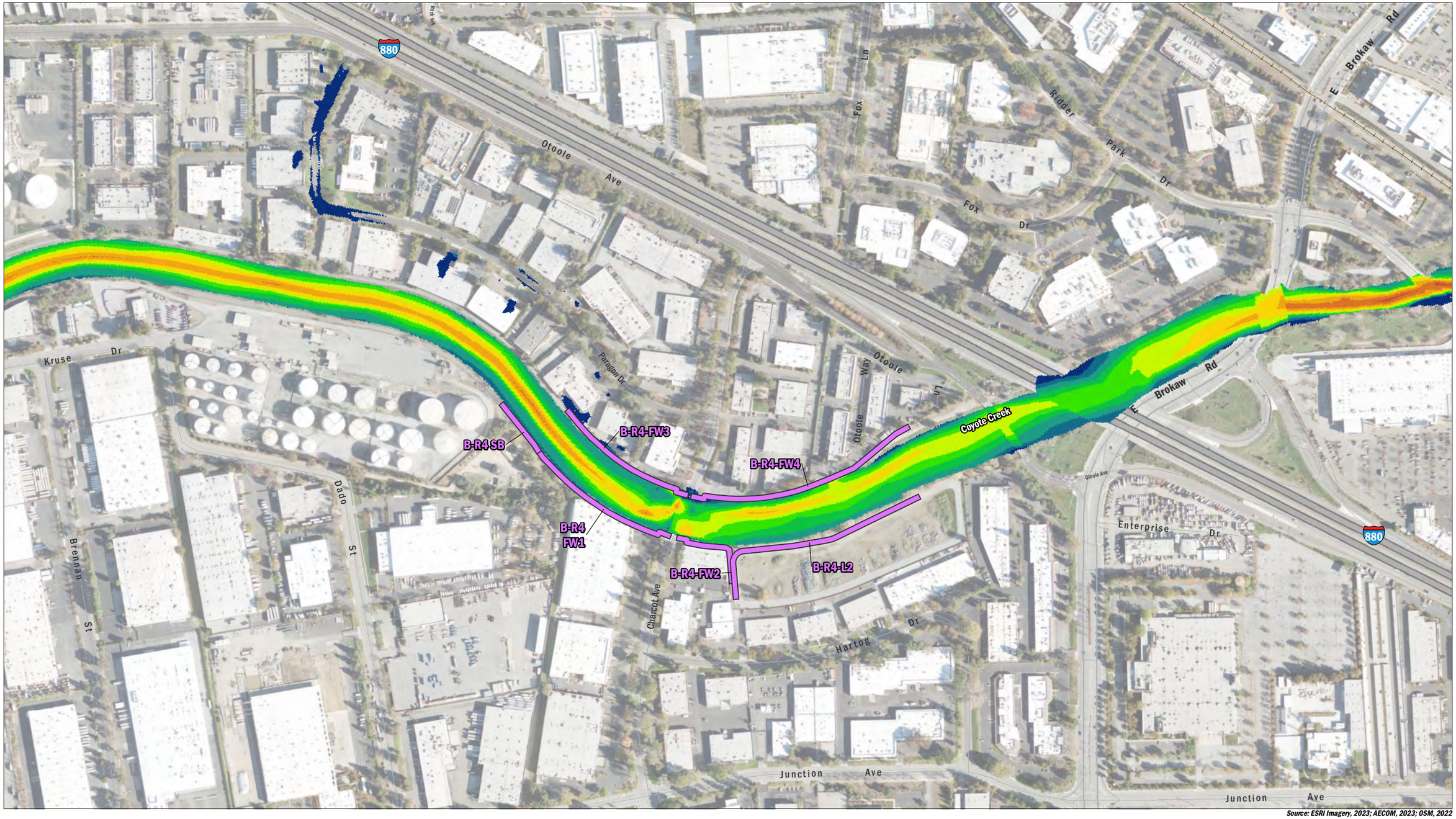
0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.9



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7
Proposed Max. Velocity in Depths 1ft and Over Scenario 5
Page 6 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP

Model Boundary

Maximum Velocity Scenario 5

Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.9

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

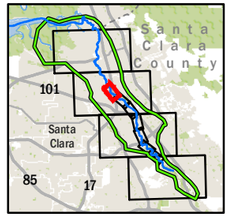
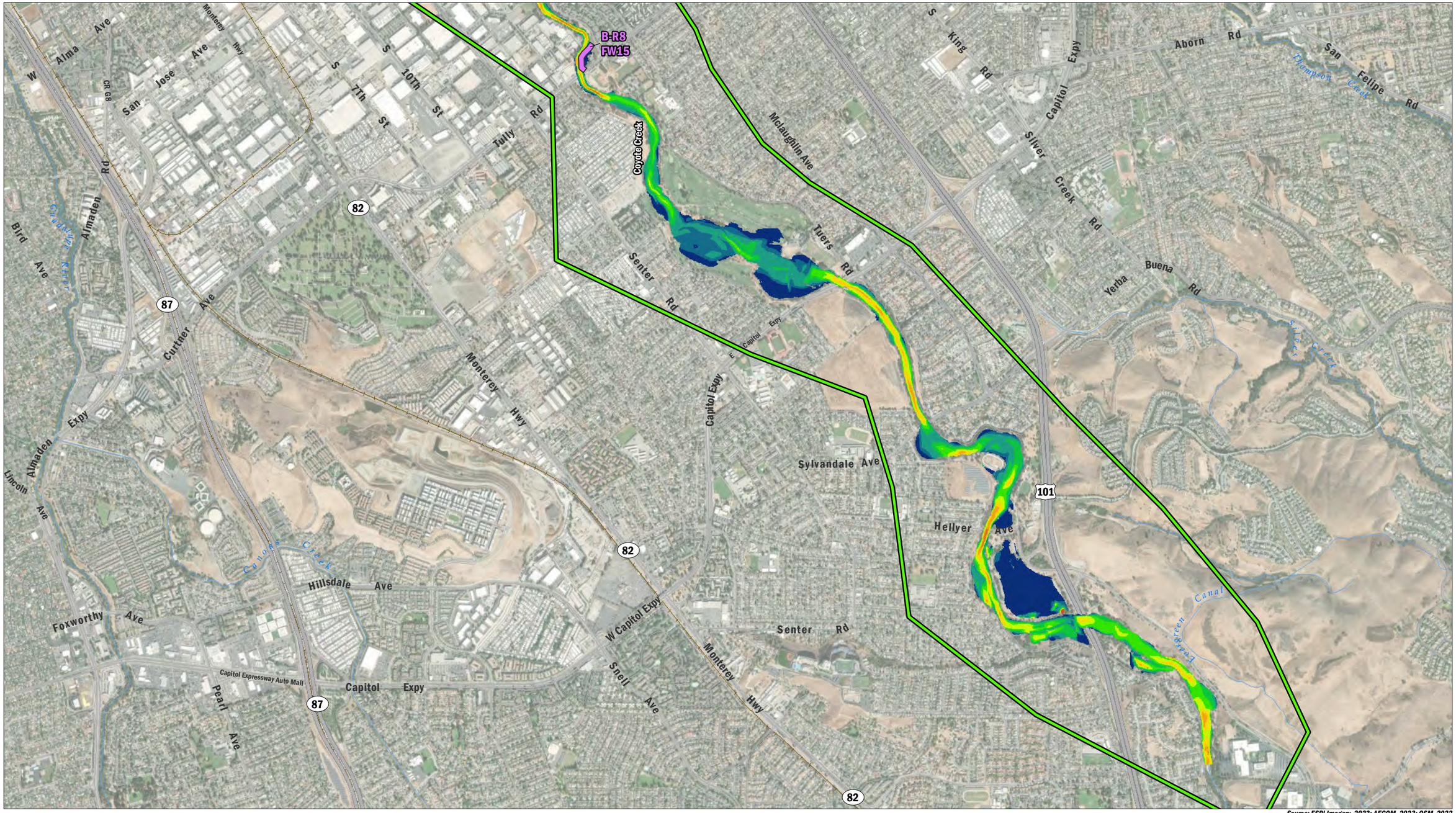


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.9

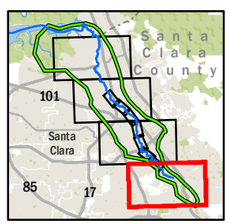
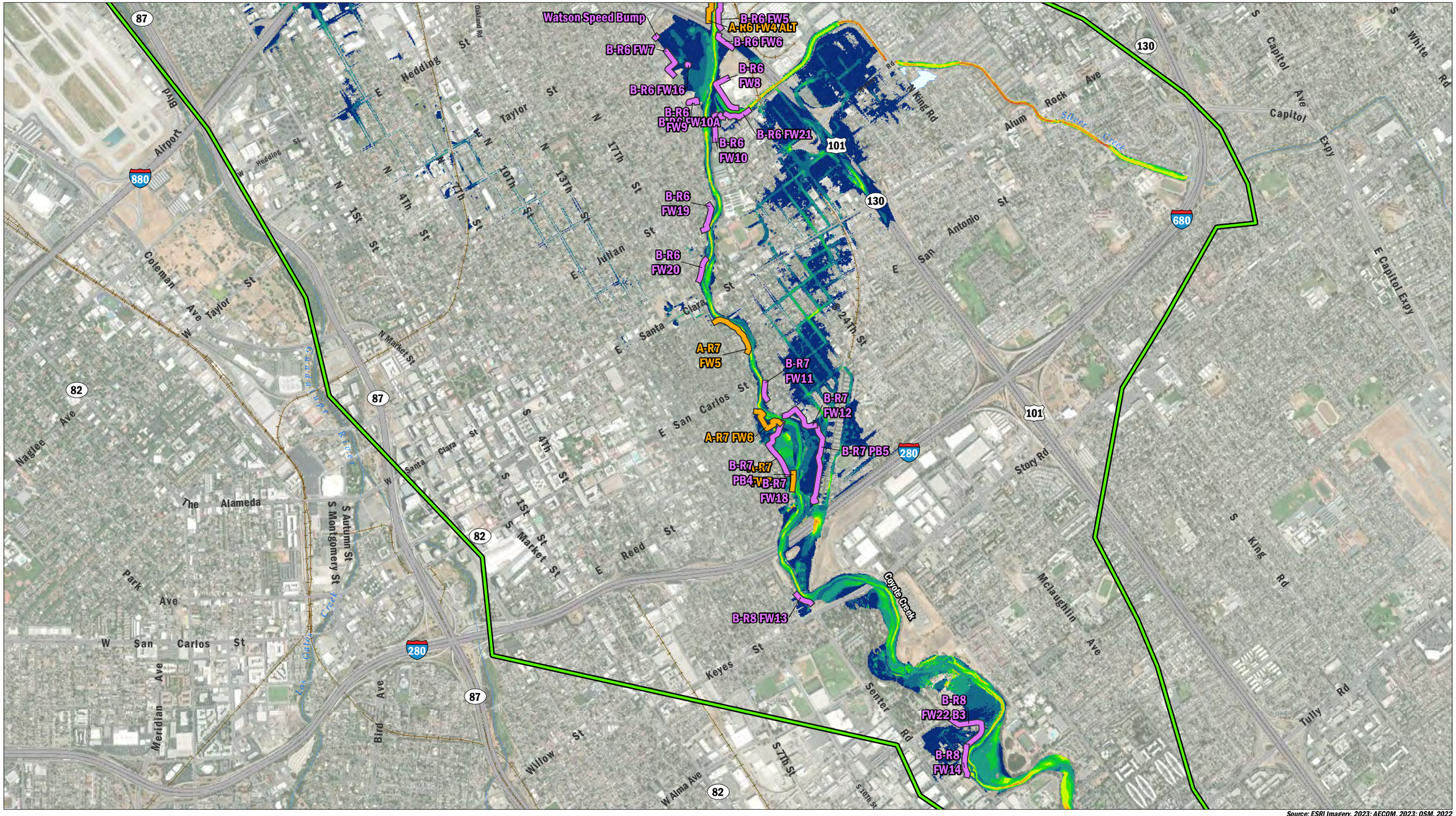


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.9

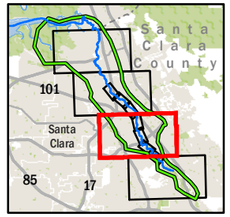
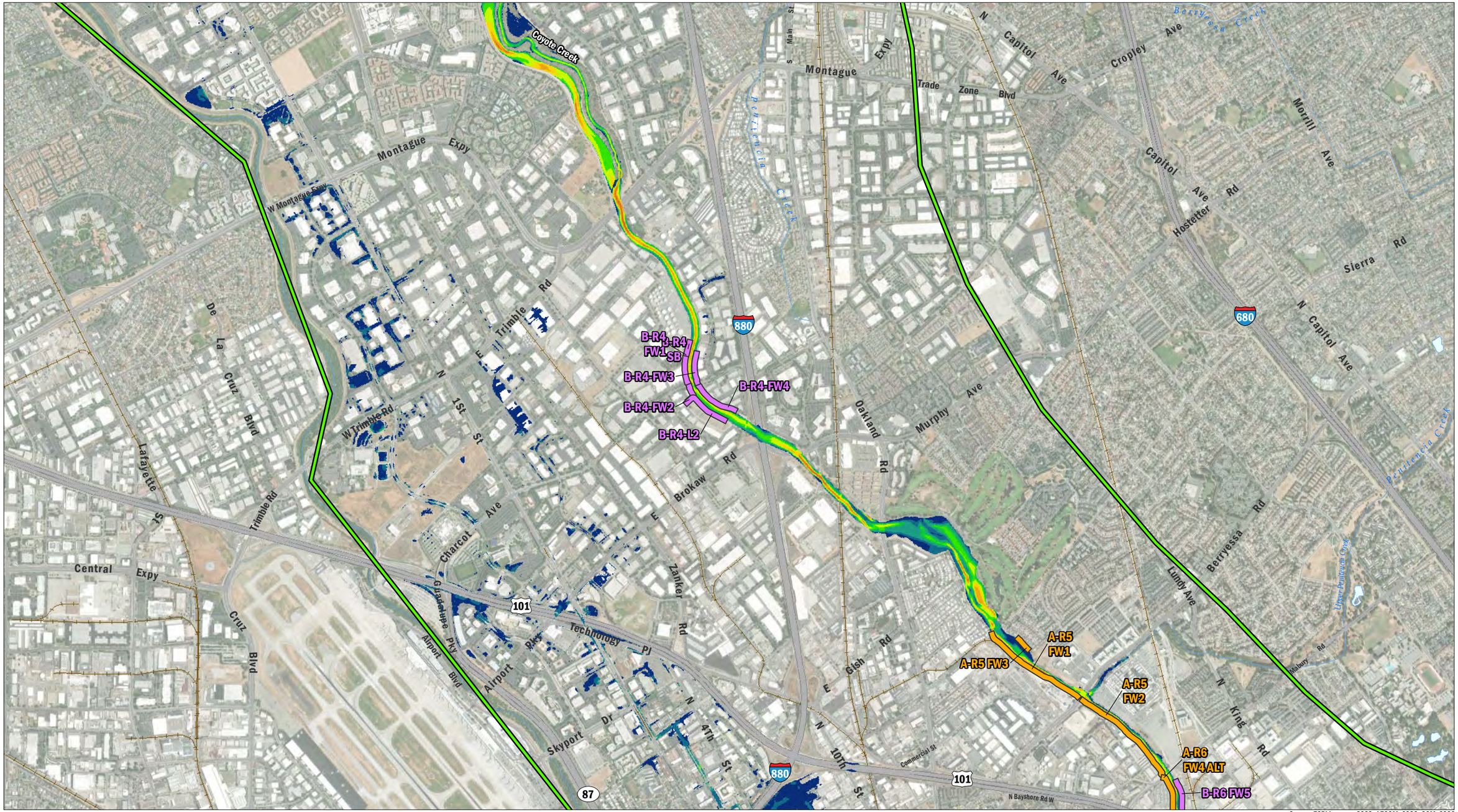


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.9

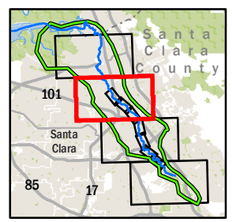


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

Model Boundary

Maximum Velocity Scenario 5
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.9

AECOM
Coyote Creek
EIR Modeling

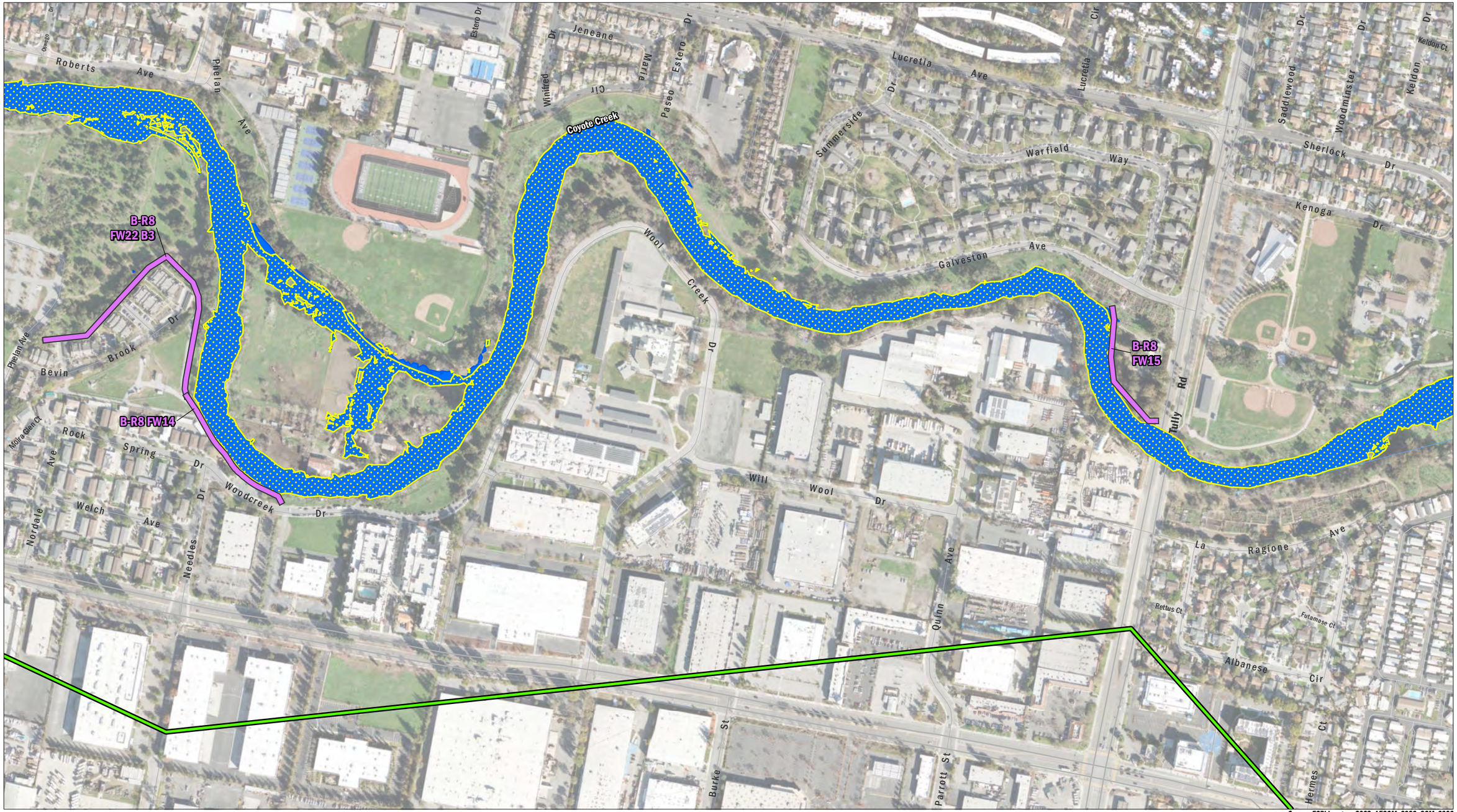
Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5
Page 11 of 11

Attachment 4

Scenario 5A Versus Scenario 1A Comparison Figures



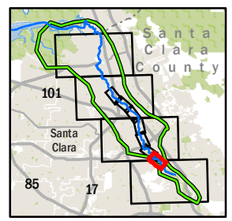
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1A
Scenario 5A



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5A Compared to Scenario 1A



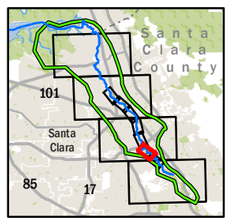
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1A
Scenario 5A



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over Scenario 5A Compared to Scenario 1A



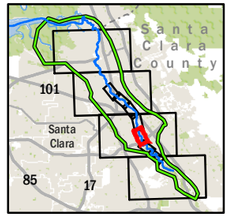
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

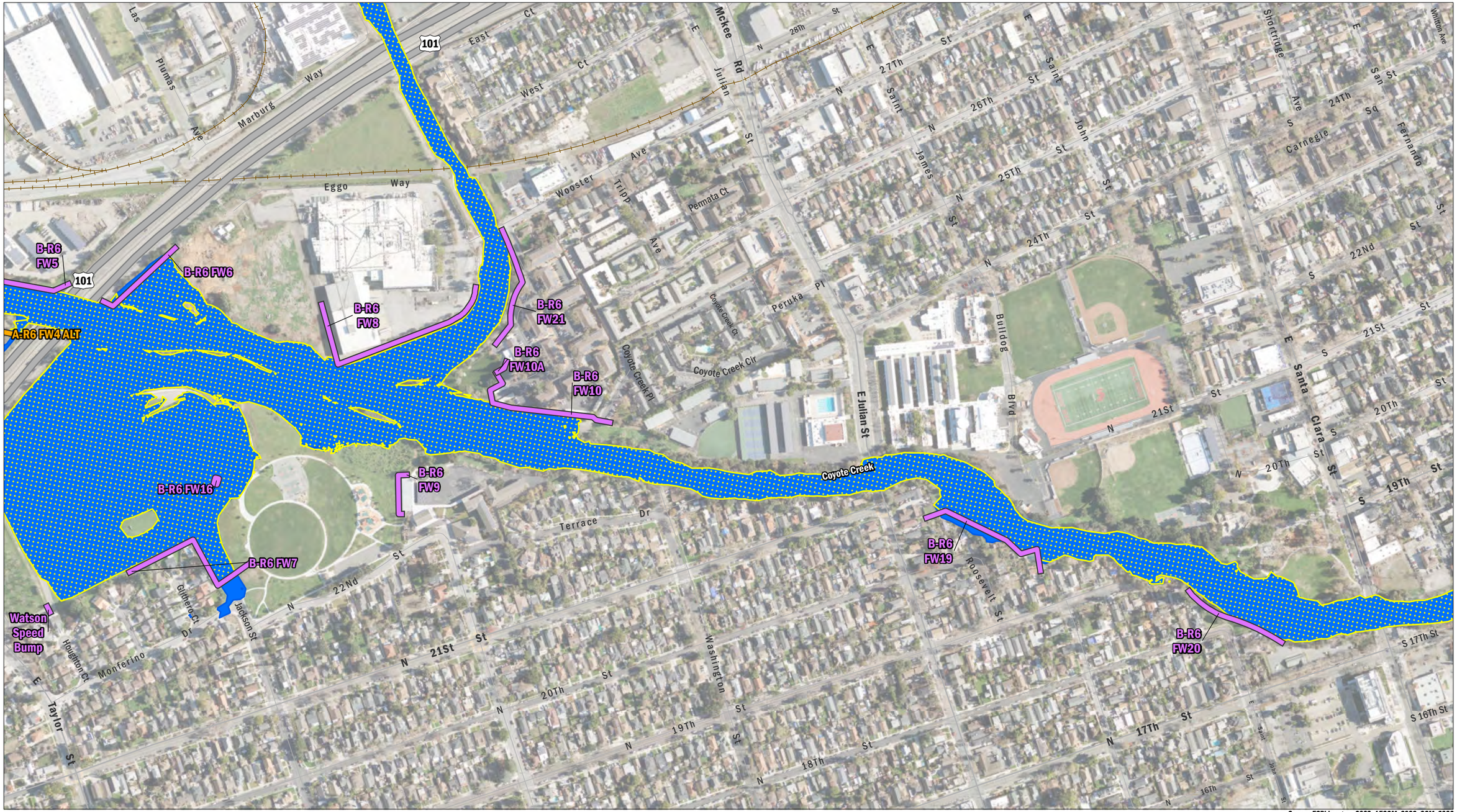
Modeled Flood Extents
Scenario 1A
Scenario 5A



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5A Compared to Scenario 1A
Page 3 of 11



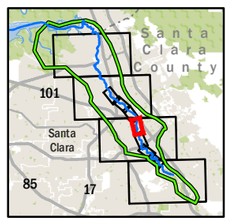
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

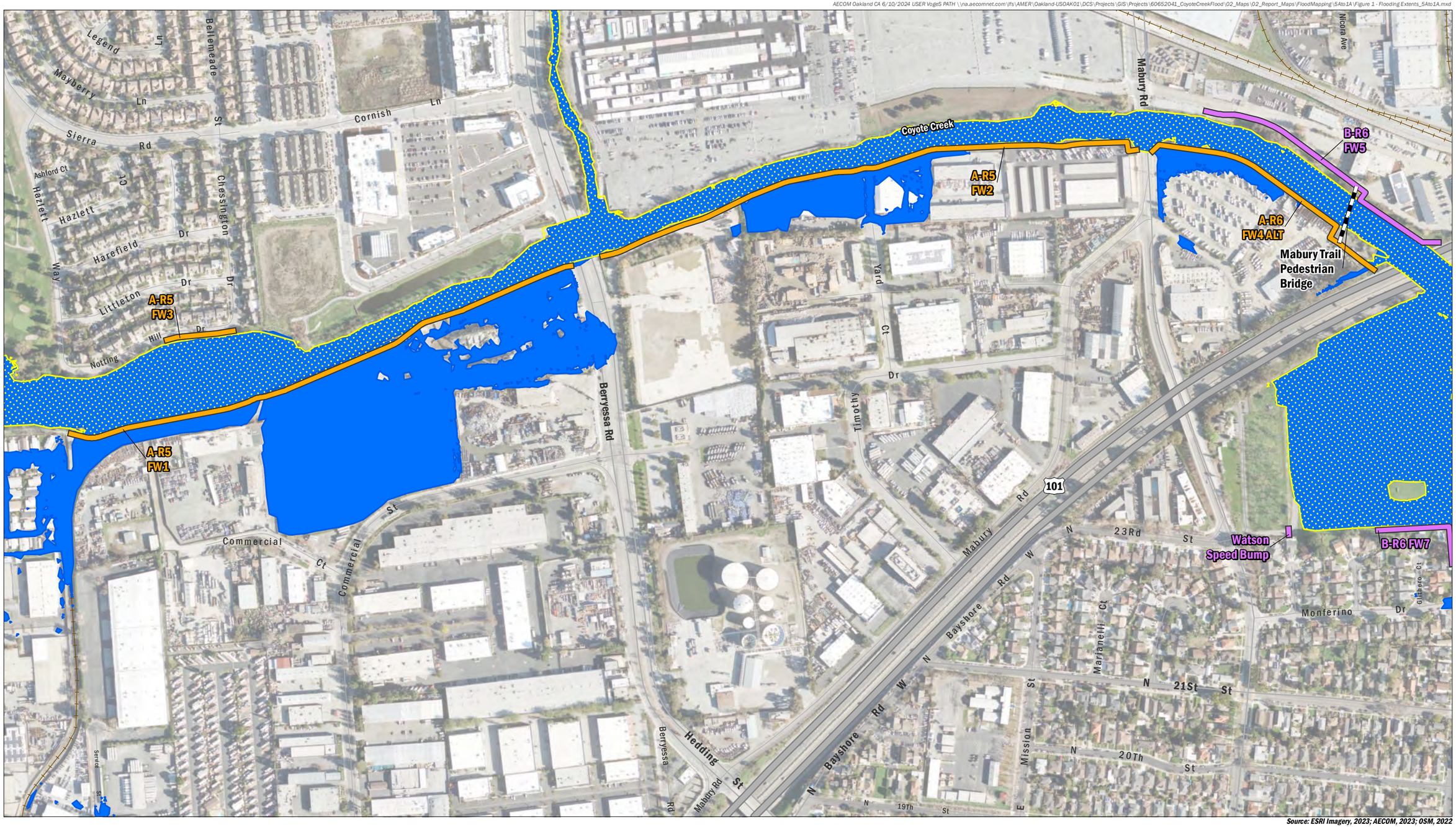
Modeled Flood Extents
Scenario 1A
Scenario 5A



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5A Compared to Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Modeled Flood Extents
- Scenario 1A
- Scenario 5A

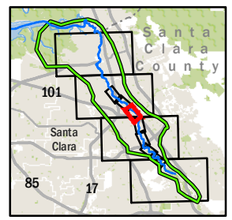
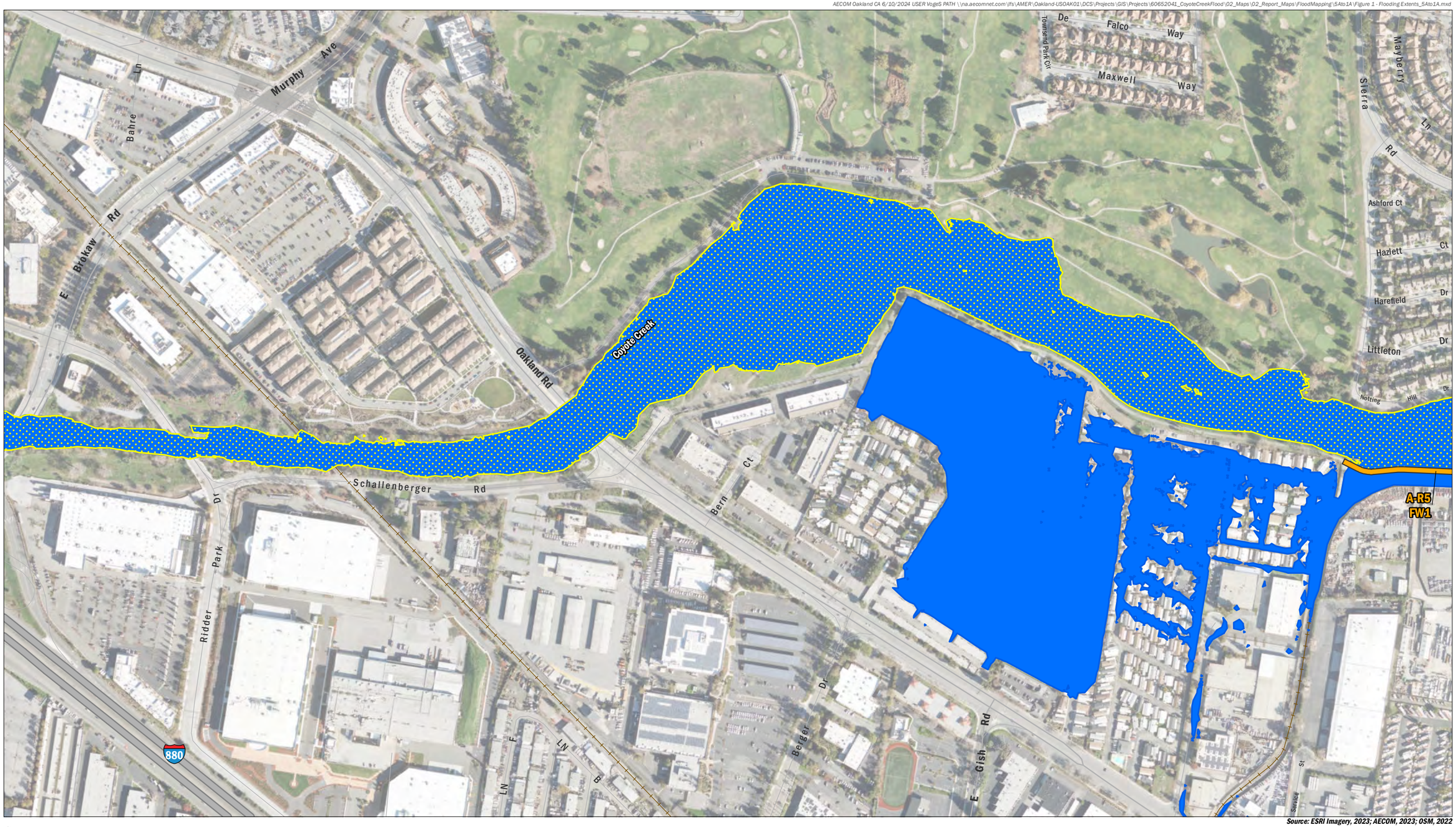


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5A Compared to Scenario 1A
Page 5 of 11



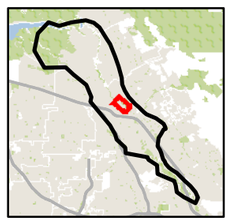
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

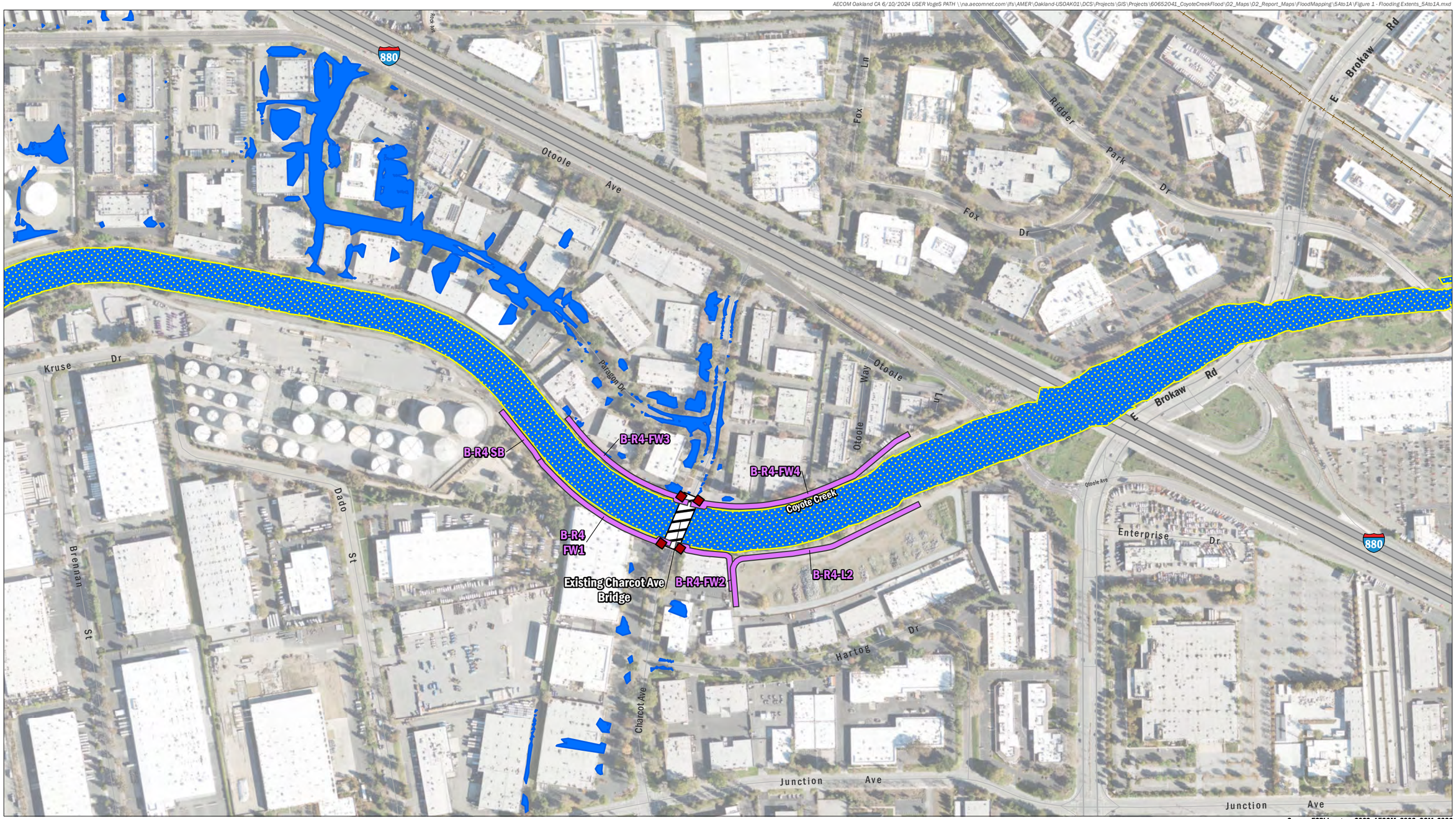
Modeled Flood Extents
Scenario 1A
Scenario 5A



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5A Compared to Scenario 1A
Page 6 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Modeled Flood Extents
- Scenario 1A
- Scenario 5A

AECOM
Coyote Creek
EIR Modeling

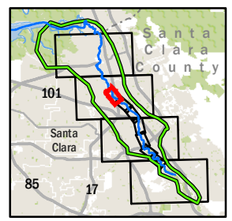
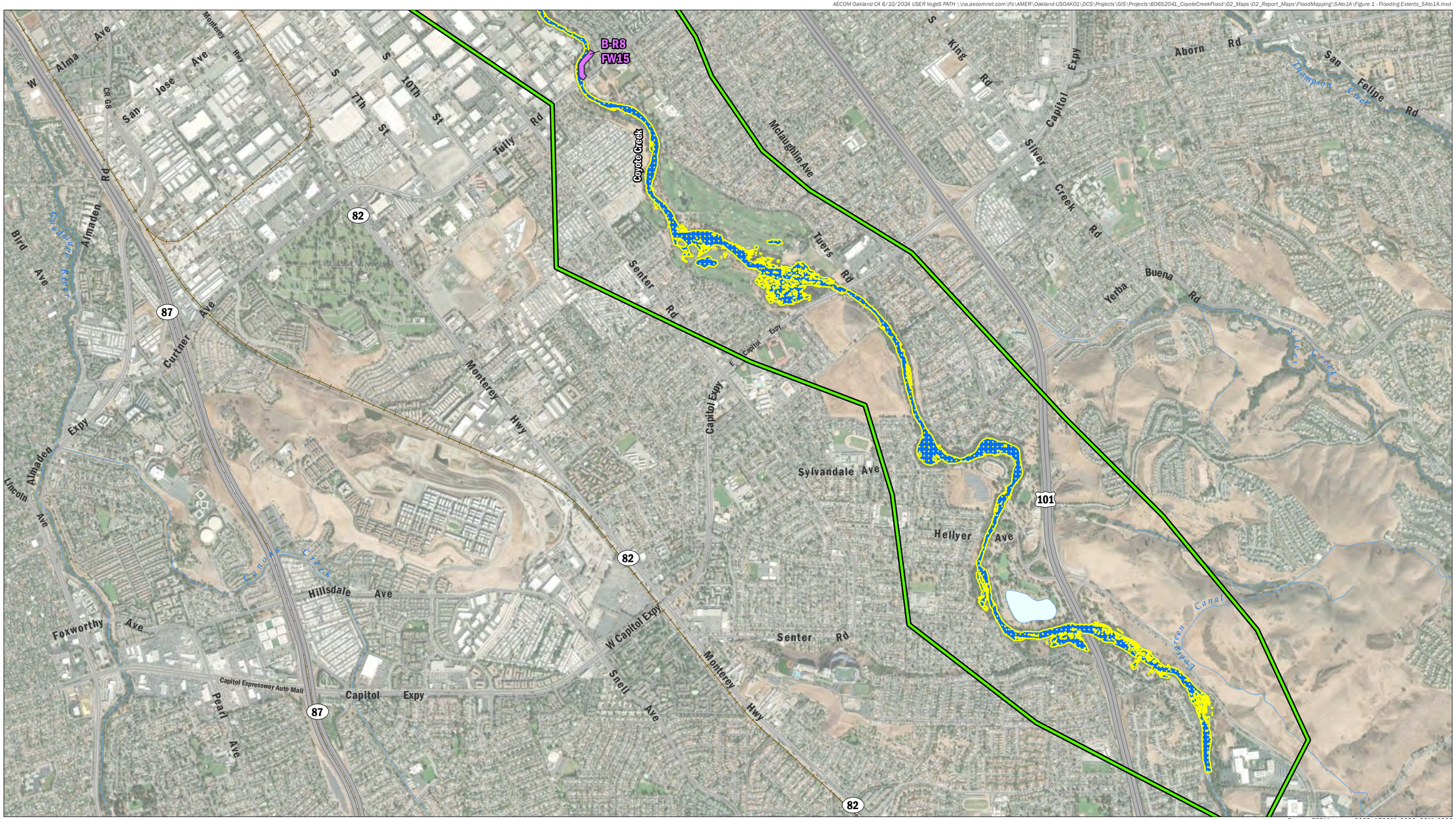


FIGURE 1

Flooding Extent Depths 1ft and Over Scenario 5A Compared to Scenario 1A
Page 7 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Modeled Flood Extents
Scenario 1A
Scenario 5A

AECOM
Coyote Creek
EIR Modeling

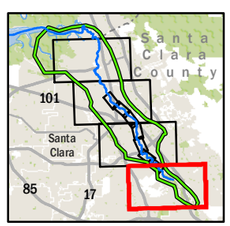
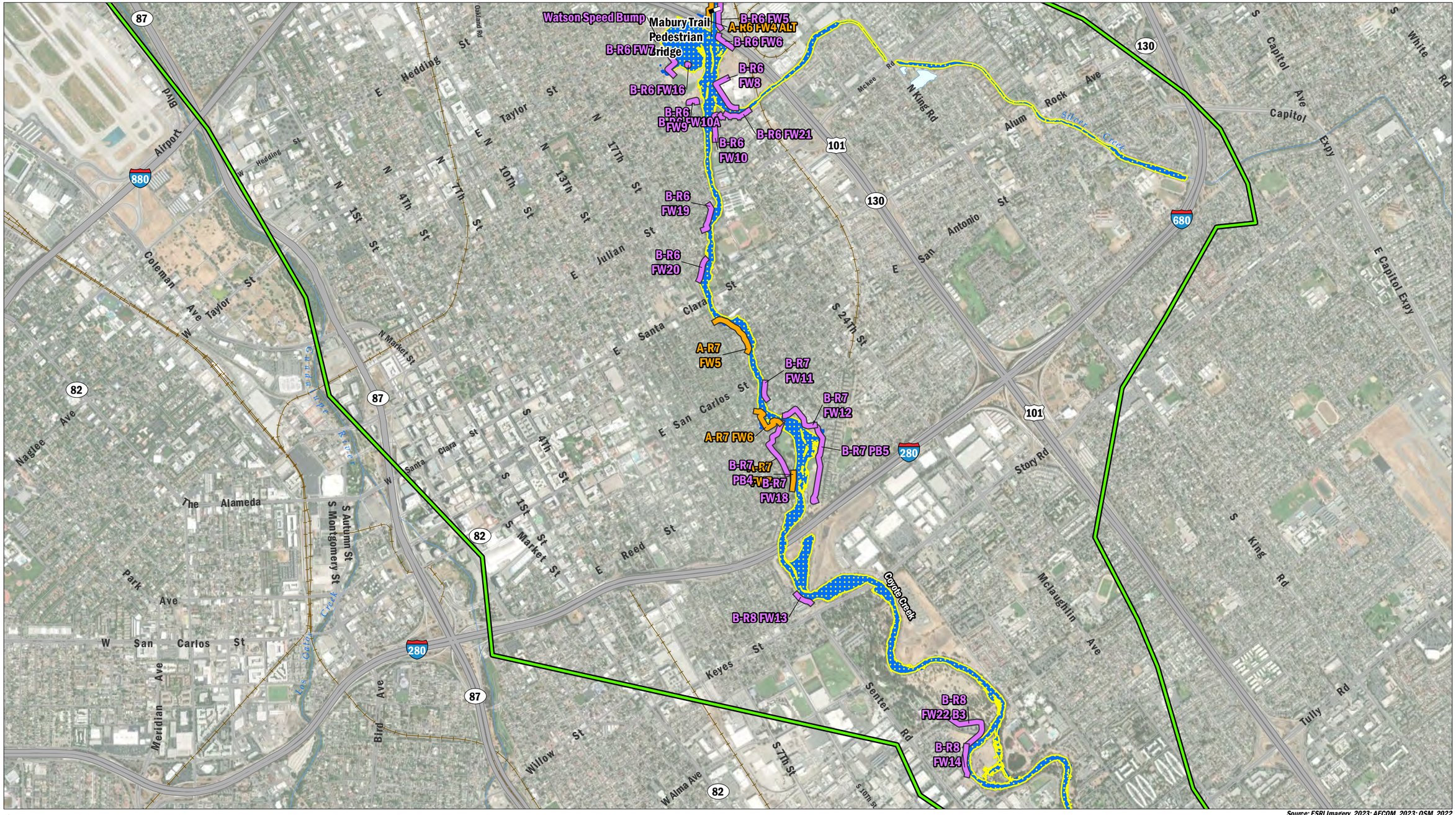


FIGURE 1

Flooding Extent Depths 1ft and Over
Scenario 5A Compared to Scenario 1A
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Modeled Flood Extents
- Scenario 1A
- Scenario 5A

AECOM
Coyote Creek
EIR Modeling

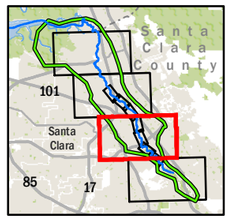
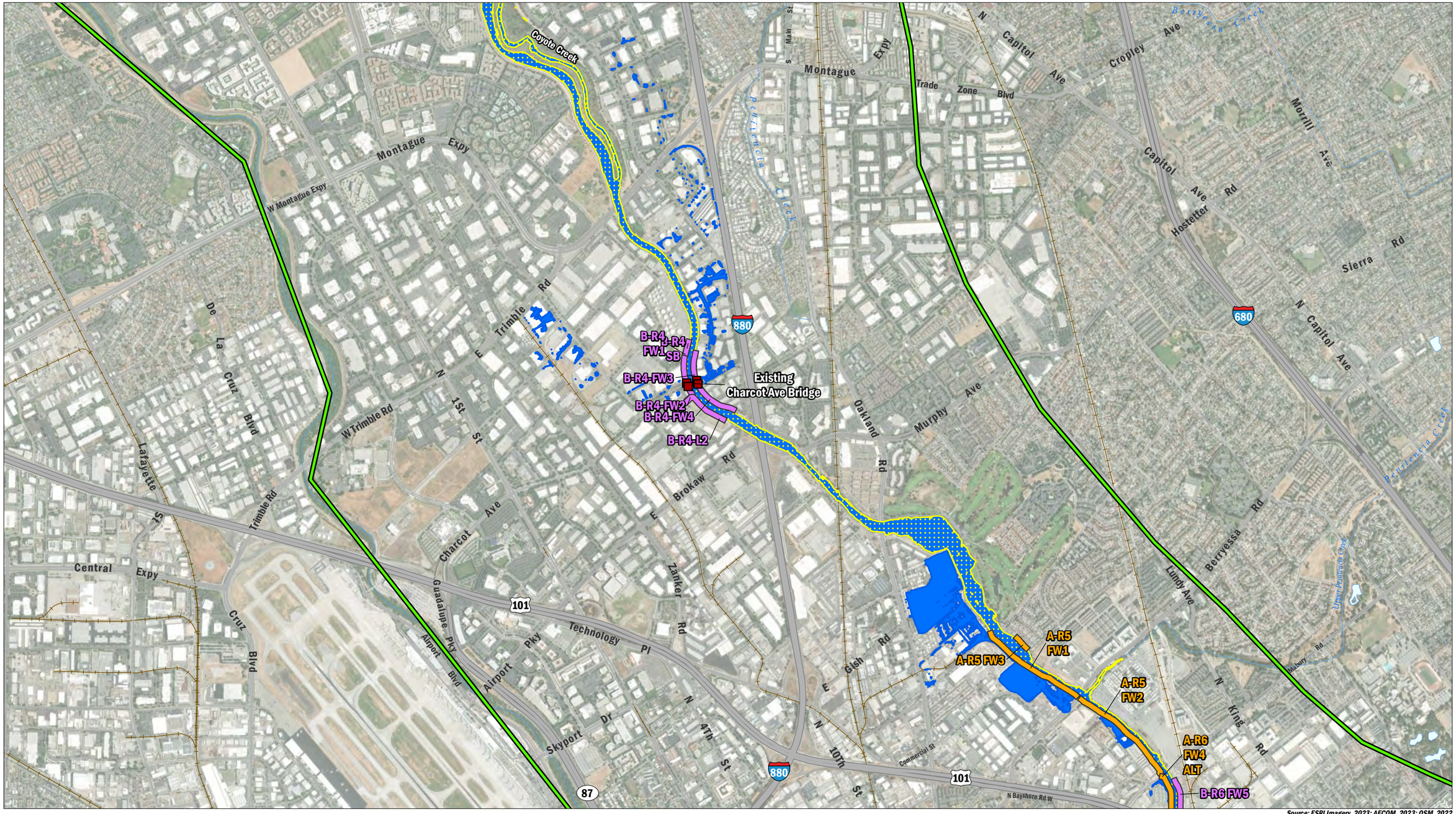


FIGURE 1

Flooding Extent Depths 1ft and Over Scenario 5A Compared to Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

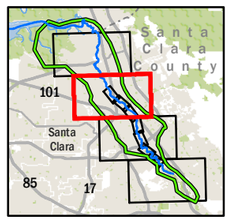
N

0 2,400
Feet

Created Date: 6/10/2024

Floodwall Tie-in to Charcot Ave Bridge
CCFMMP
CCFPP
Existing Charcot Ave Bridge
Model Boundary

Modeled Flood Extents
Scenario 1A
Scenario 5A



AECOM
Coyote Creek
EIR Modeling

FIGURE 1
Flooding Extent Depths 1ft and Over Scenario 5A Compared to Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

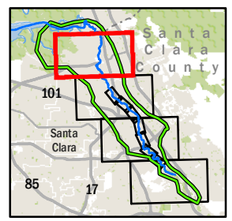
N

0 2,400
Feet

Created Date: 6/10/2024

Model Boundary

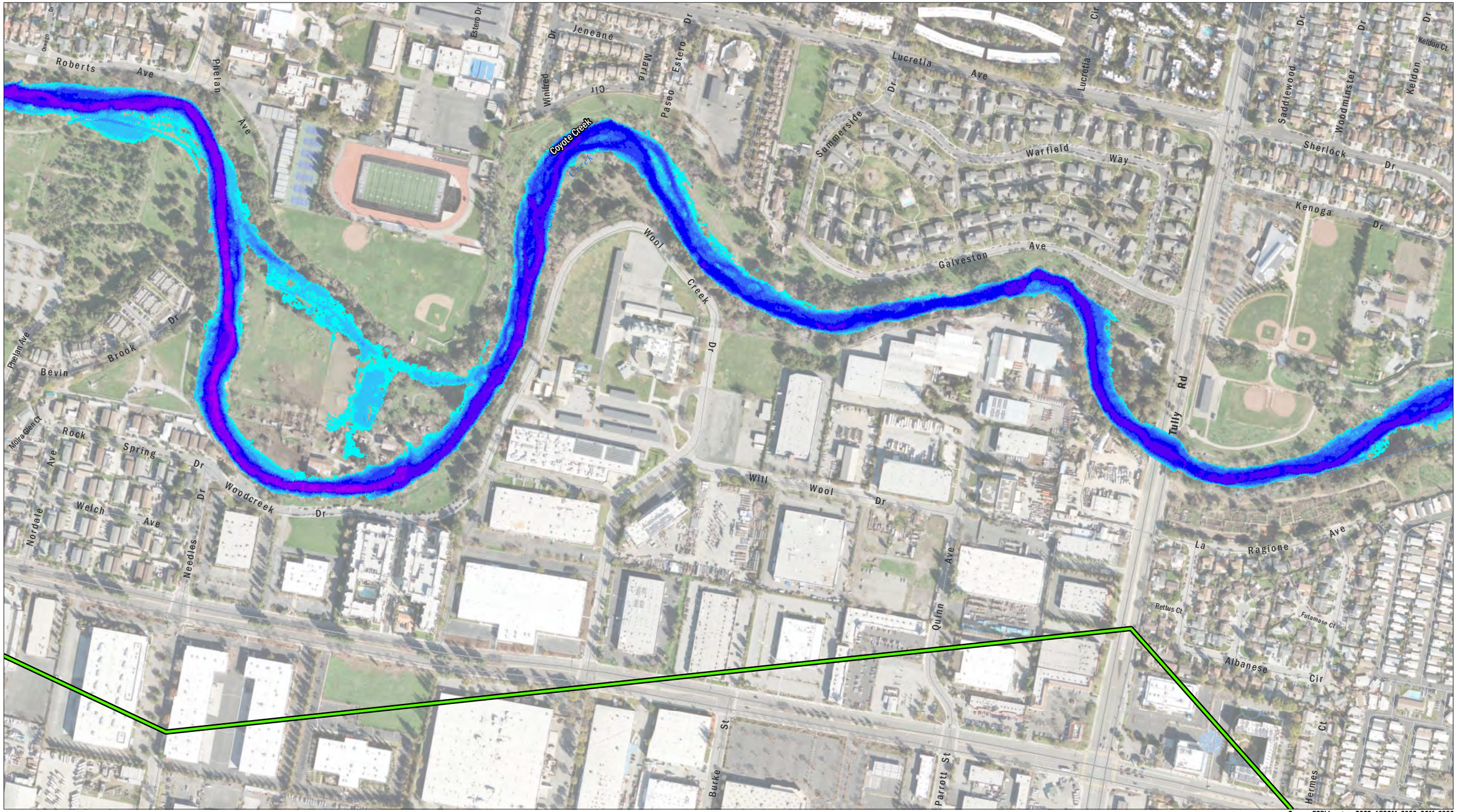
Modeled Flood Extents
- Scenario 1A
- Scenario 5A



AECOM
Coyote Creek
EIR Modeling

FIGURE 1

Flooding Extent Depths 1ft and Over Scenario 5A Compared to Scenario 1A
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

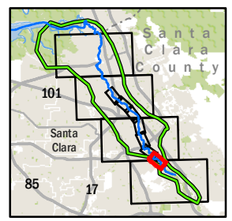


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1A

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

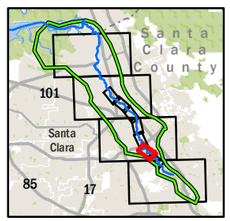
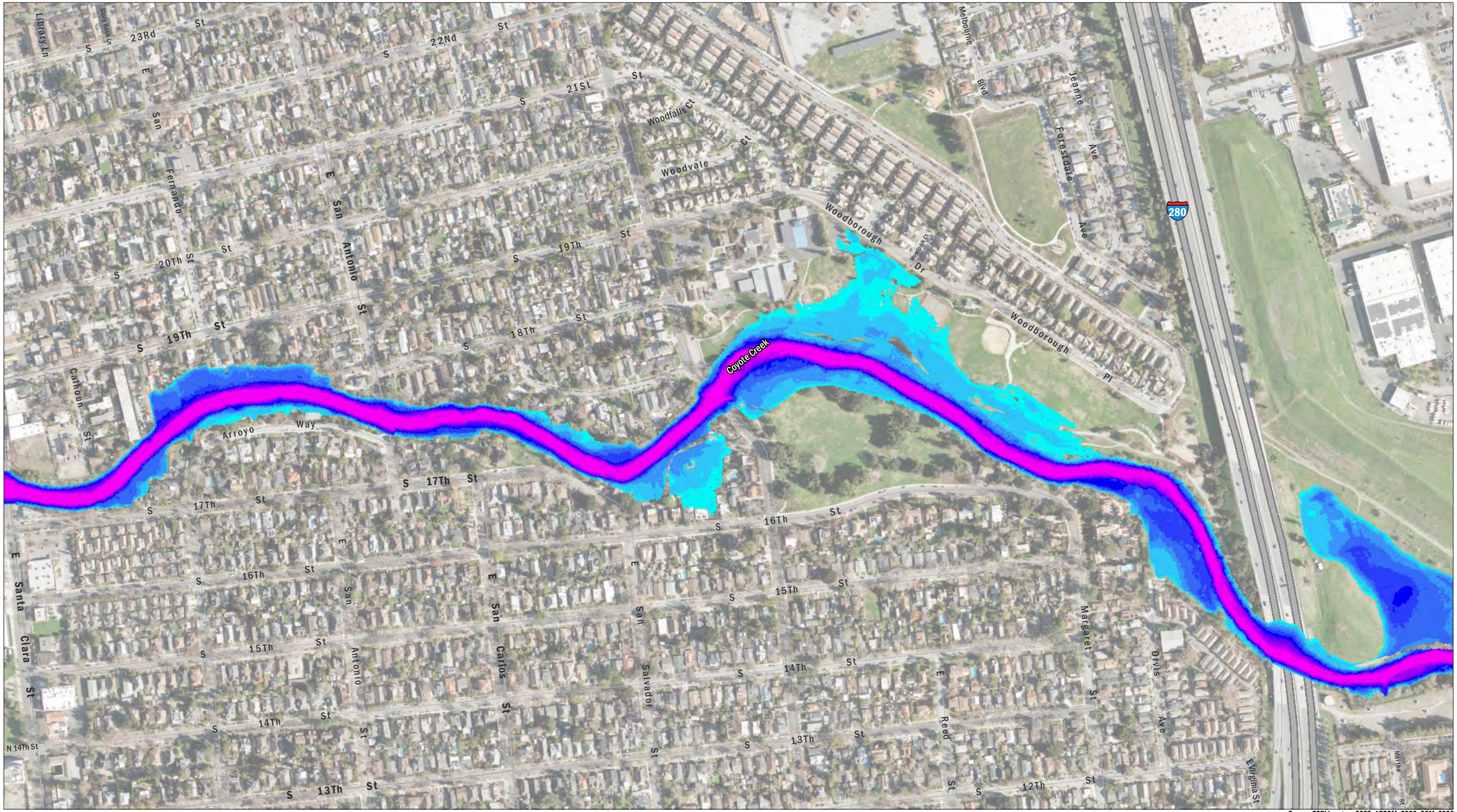


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

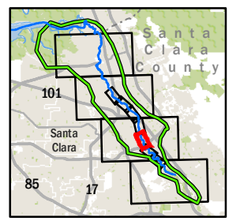
Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1A

Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

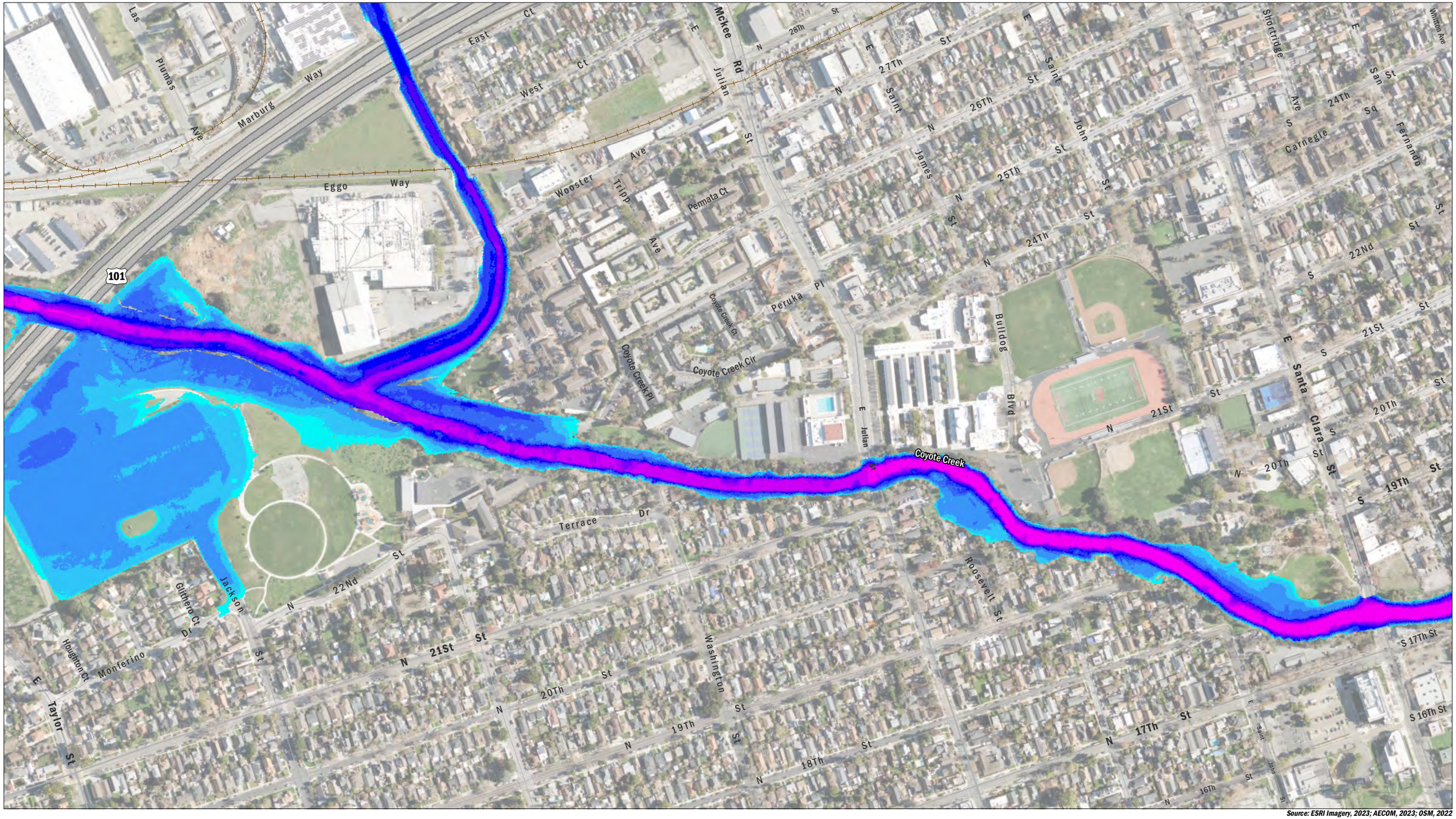


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

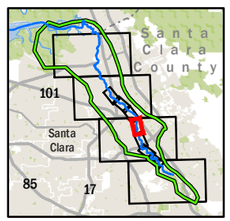


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

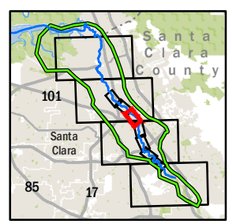
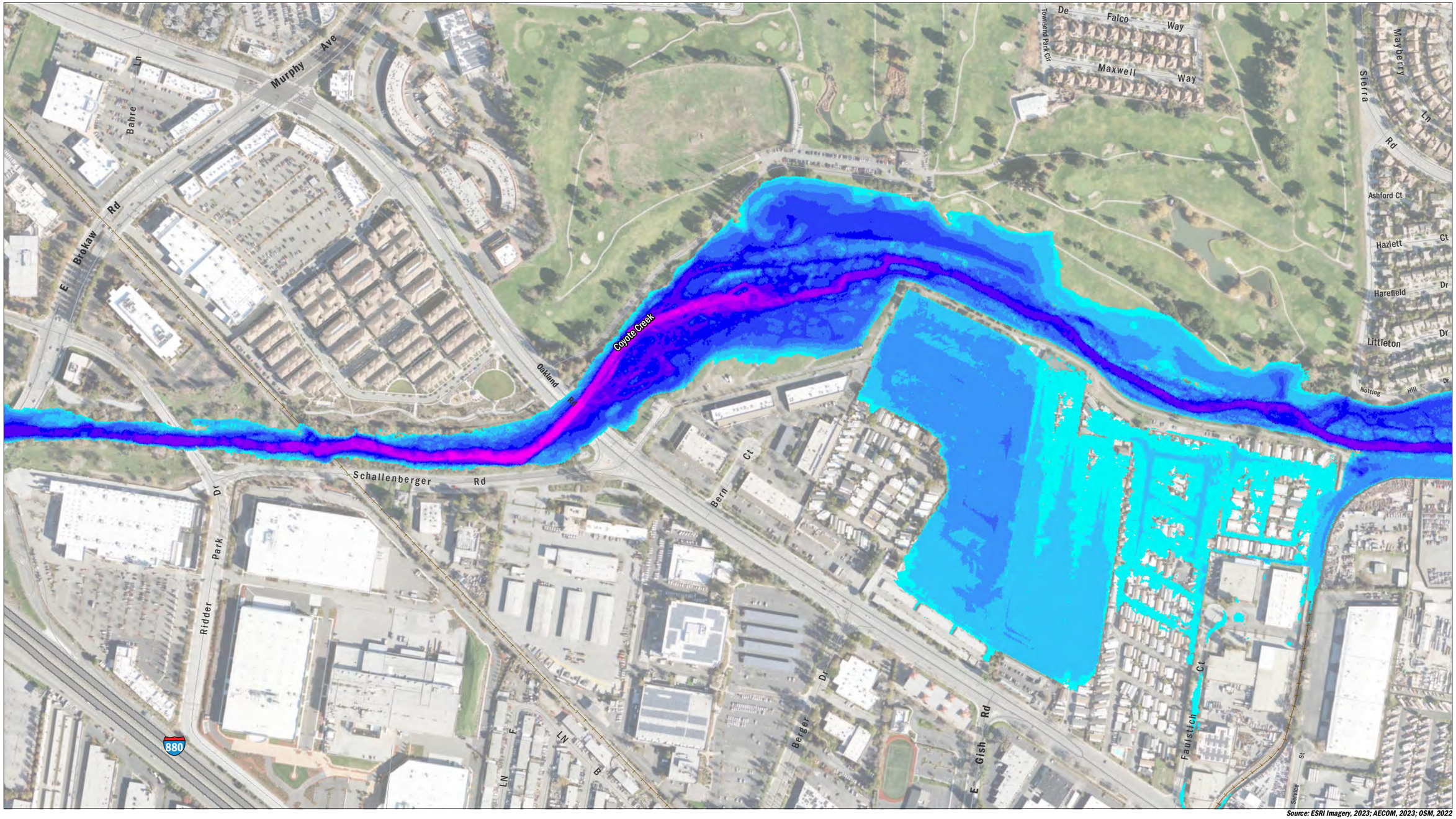


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

AECOM
Coyote Creek
EIR Modeling

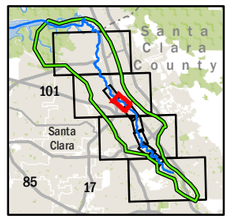
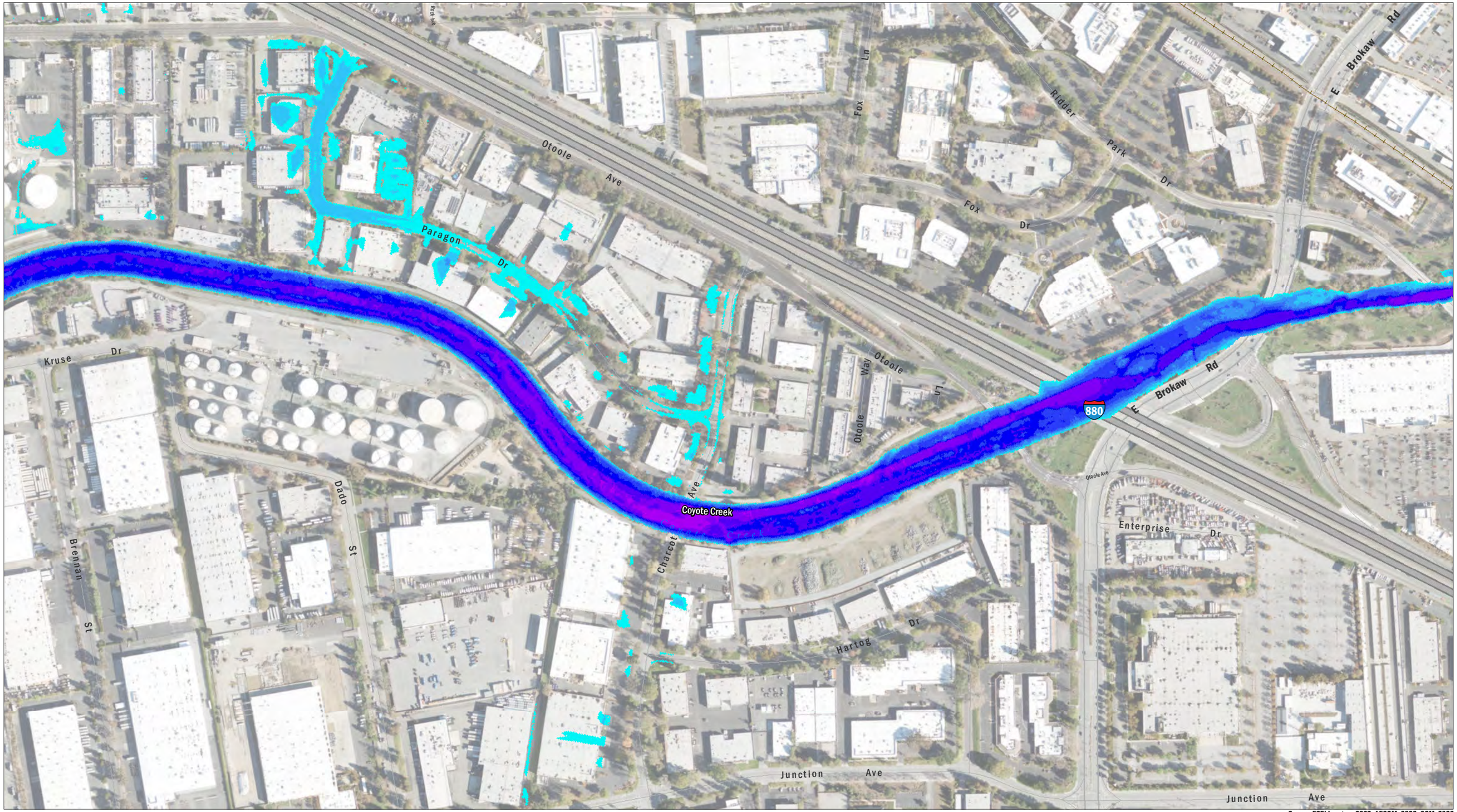


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

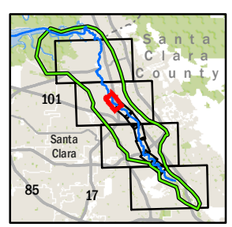
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 2
Existing Max. Water Depths 1ft and Over Scenario 1A
Page 7 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

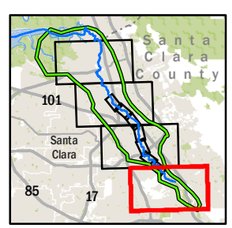
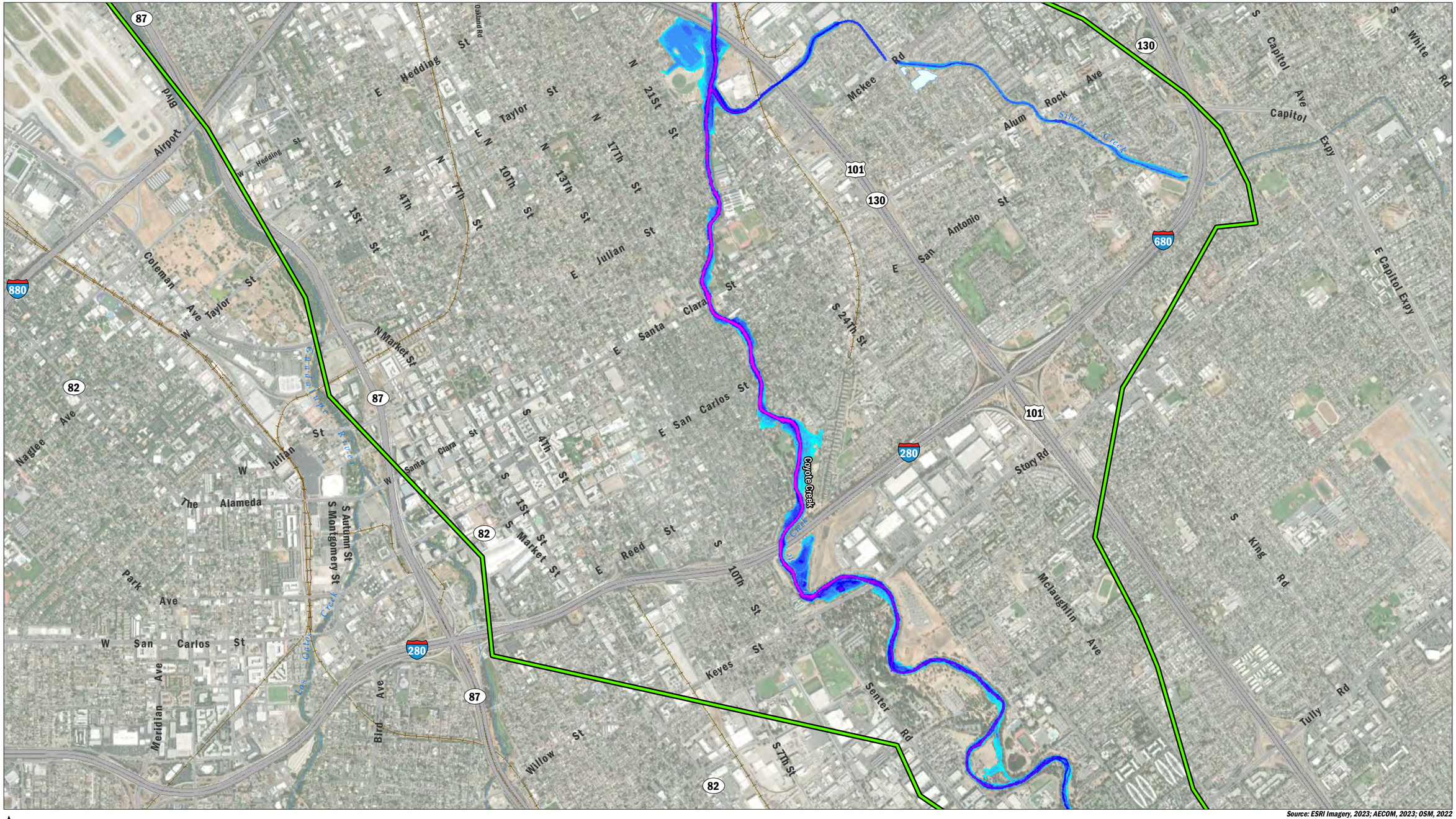


FIGURE 2
Existing Max. Water Depths 1ft and Over Scenario 1A
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

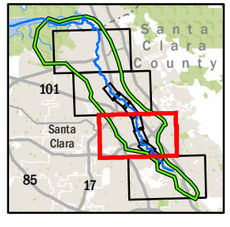
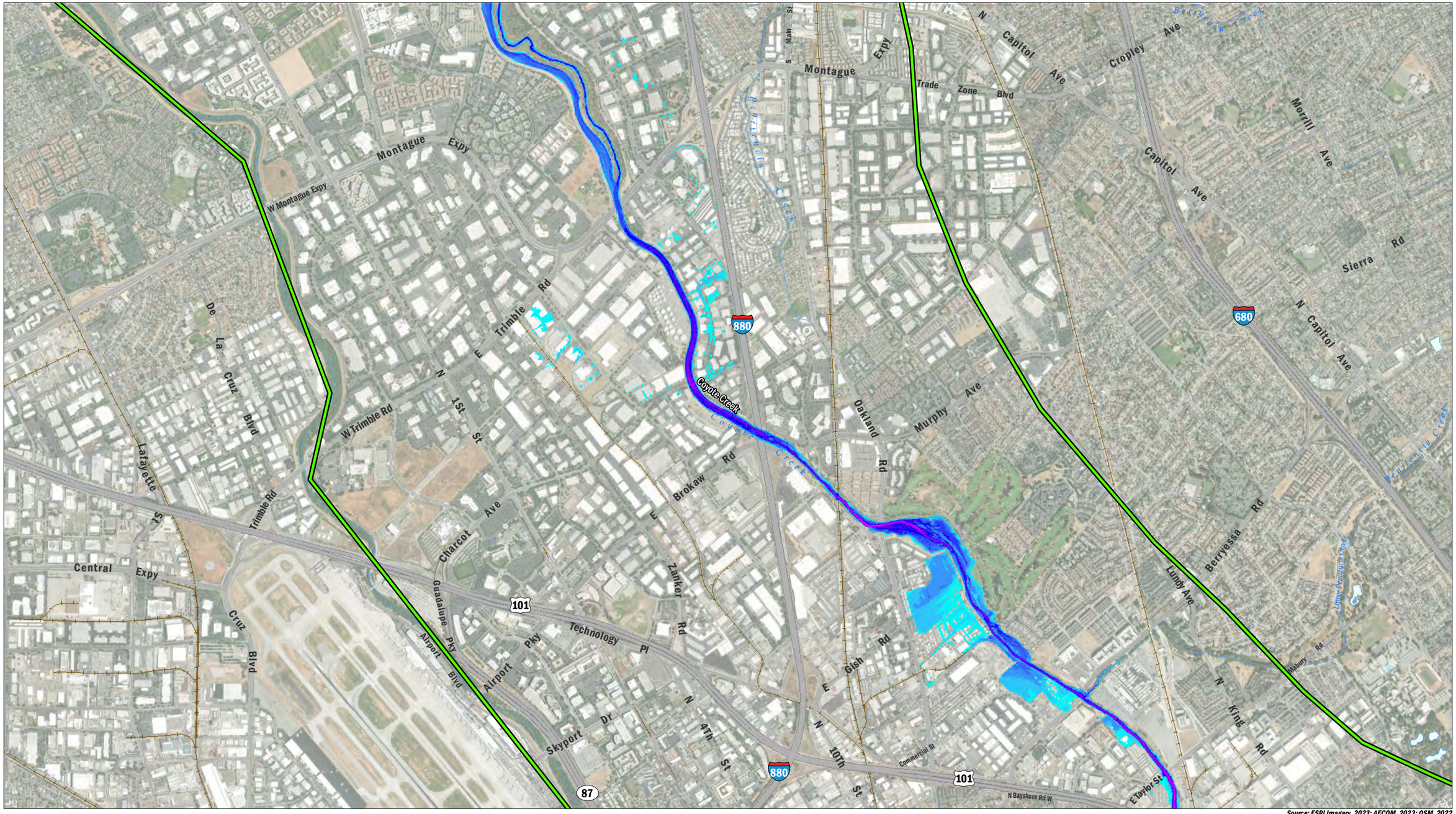


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

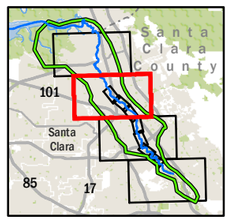


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 1A
Depth (ft)

- 1 - 1.99
- 2 - 3.99
- 4 - 5.99
- 6 - 7.99
- 8 - 9.99
- 10 - 11.99
- 12 - 13.99
- 14 - 15.99
- 16 - 17.99
- 18 - 19.99
- 20 - 23.77

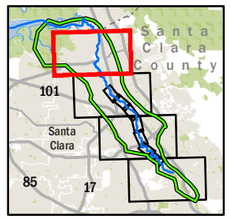
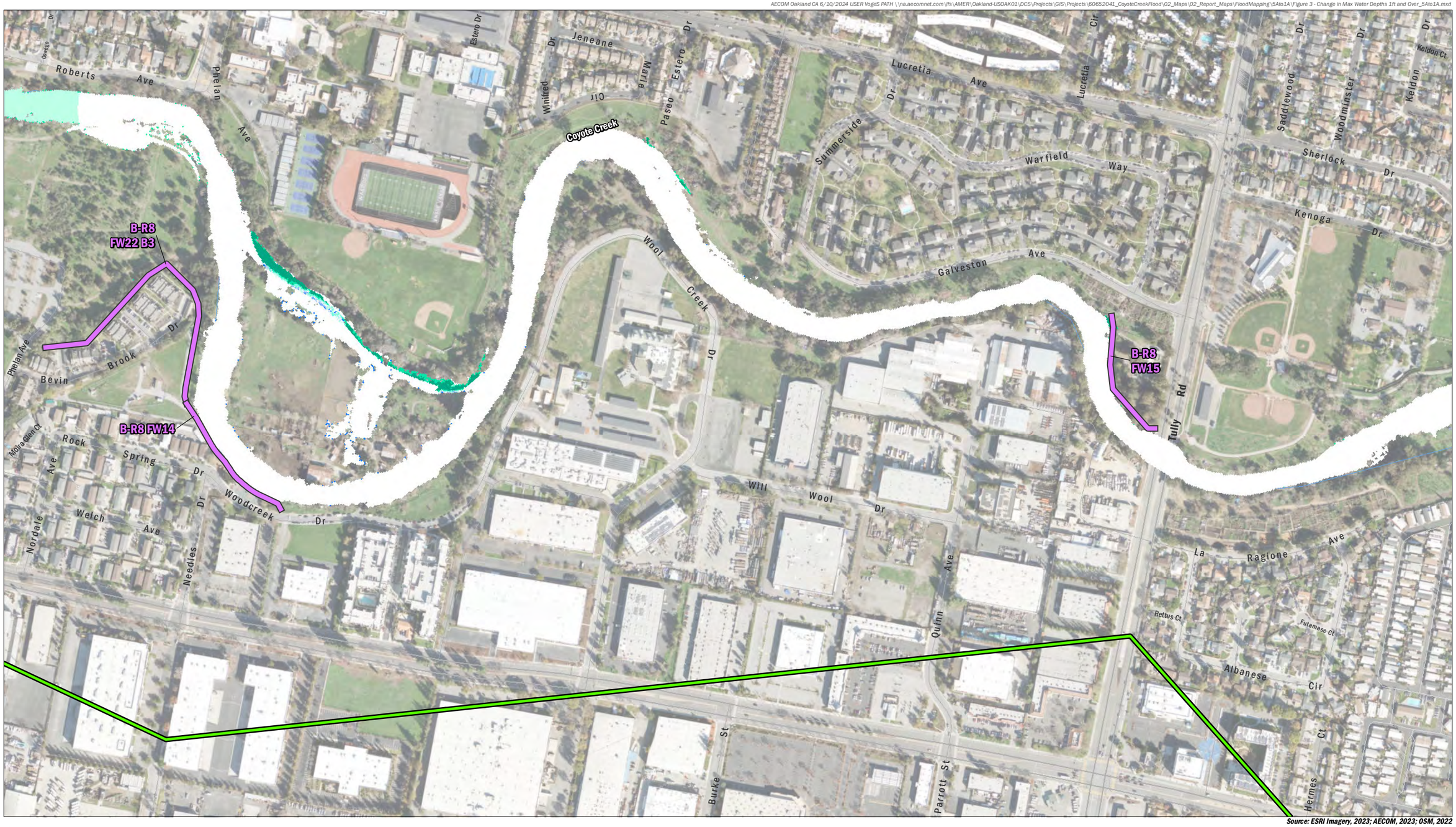


FIGURE 2

Existing Max. Water Depths 1ft and Over Scenario 1A
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

-7.1 - -1.5	-0.5 - -0.1
-1.5 - -1	-0.1 - 0.1
-1 - -0.5	0.1 - 0.5
	0.5 - 1
	1 - 2.2

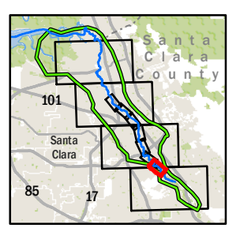


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

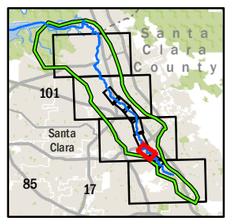
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

-7.1 - -1.5	-0.5 - -0.1
-1.5 - -1	-0.1 - 0.1
-1 - -0.5	0.1 - 0.5
	0.5 - 1
	1 - 2.2



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

-7.1 - -1.5
-1.5 - -1
-1 - -0.5
-0.5 - -0.1
-0.1 - 0.1
0.1 - 0.5
0.5 - 1
1 - 2.2

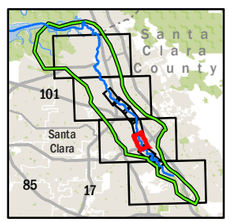


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)
-7.1 - -1.5
-1.5 - -1
-1 - -0.5
-0.5 - -0.1
-0.1 - 0.1
0.1 - 0.5
0.5 - 1
1 - 2.2

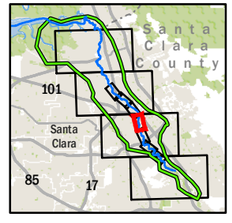
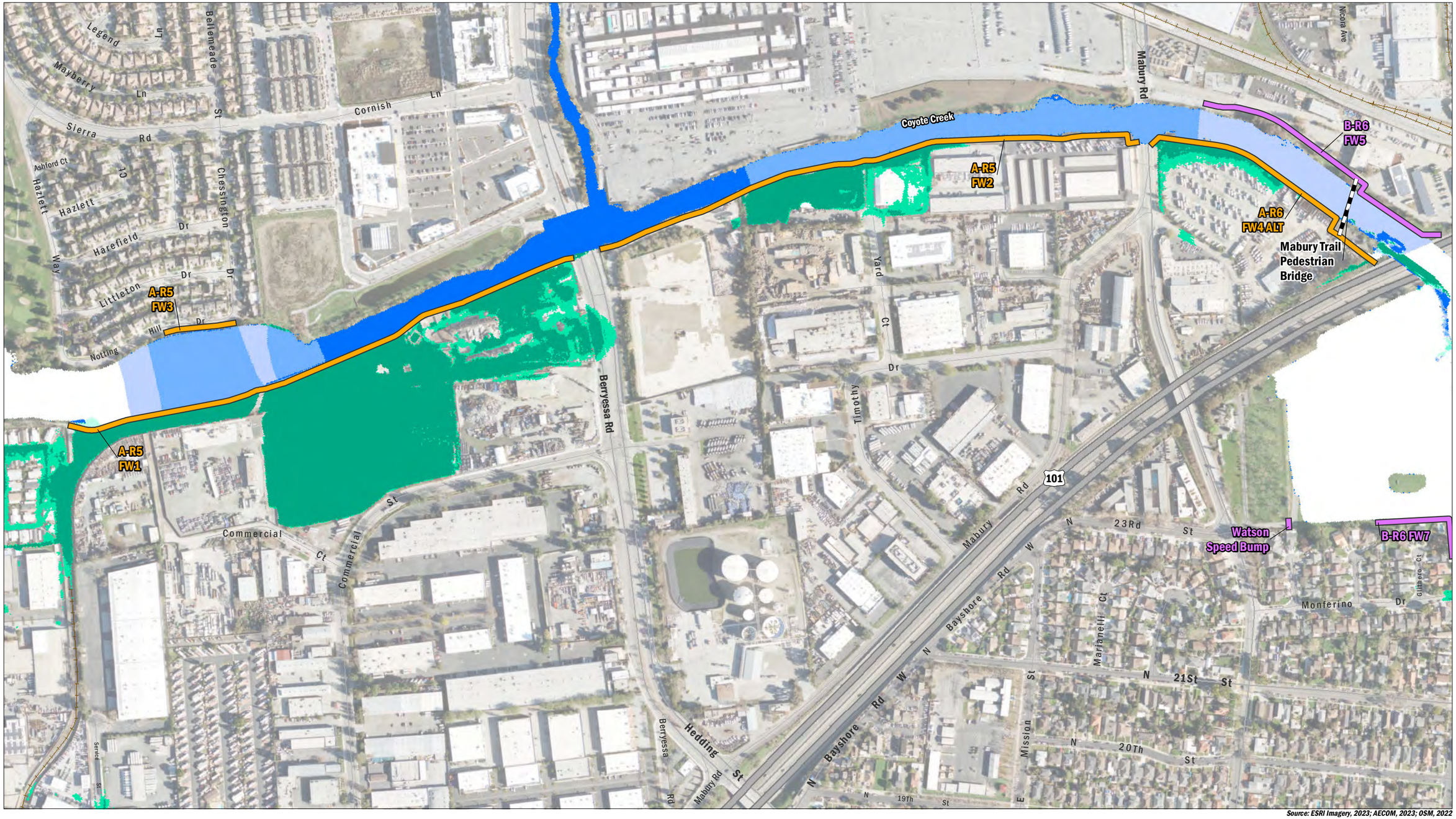


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

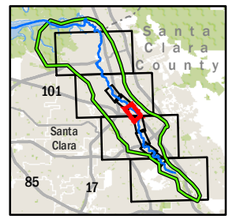


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

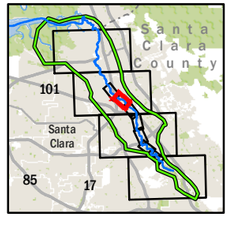
0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

-7.1 - -1.5	-0.5 - -0.1
-1.5 - -1	-0.1 - 0.1
-1 - -0.5	0.1 - 0.5
	0.5 - 1
	1 - 2.2

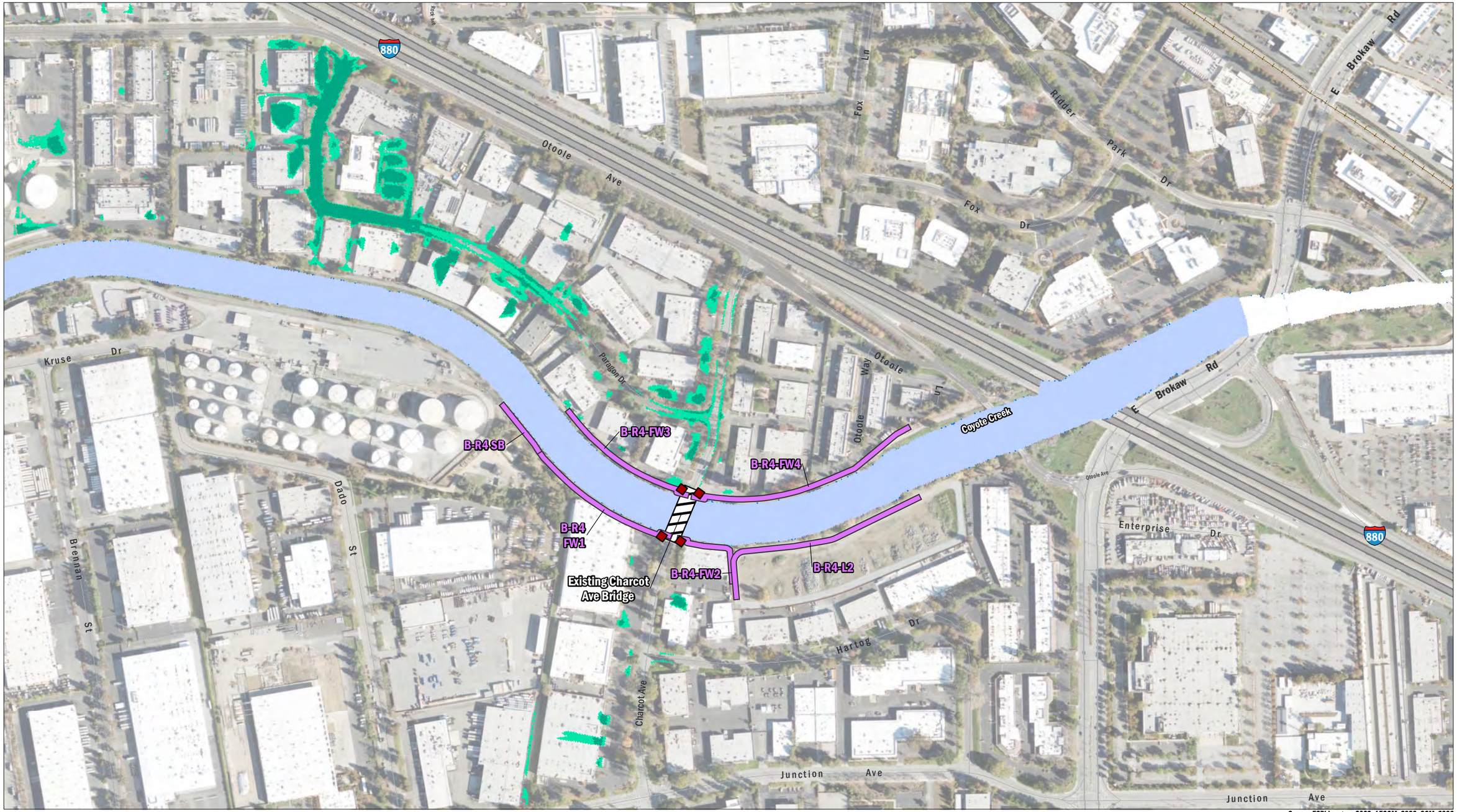


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

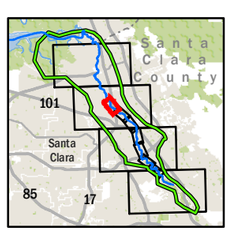


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

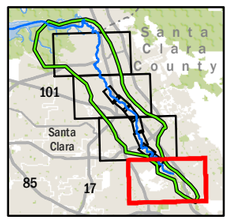
0 2,400
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

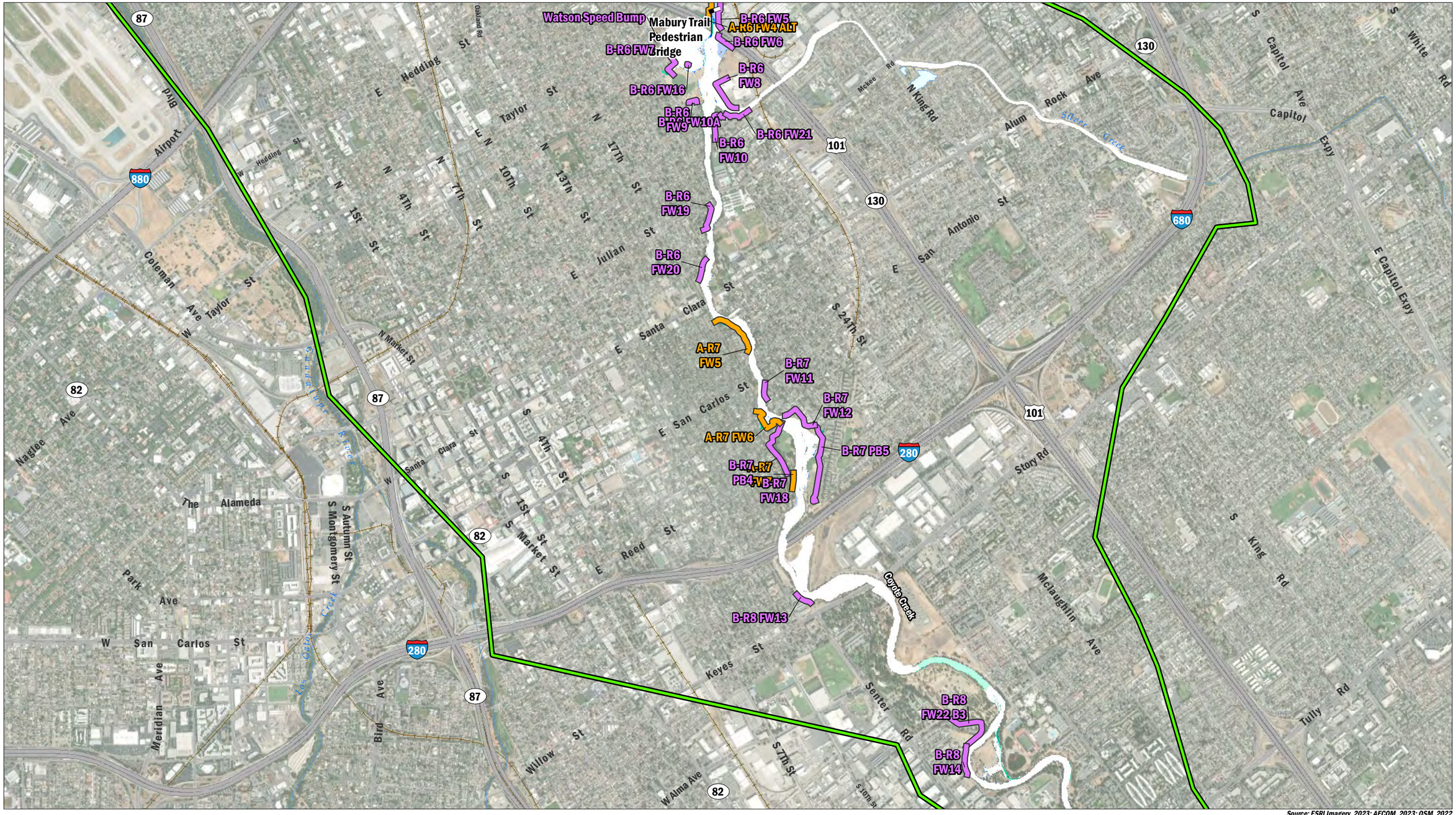
-7.1 - -1.5
-1.5 - -1
-1 - -0.5
-0.5 - -0.1
-0.1 - 0.1
0.1 - 0.5
0.5 - 1
1 - 2.2



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 3
Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

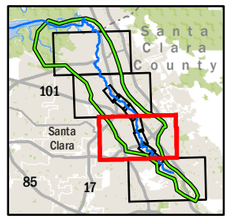
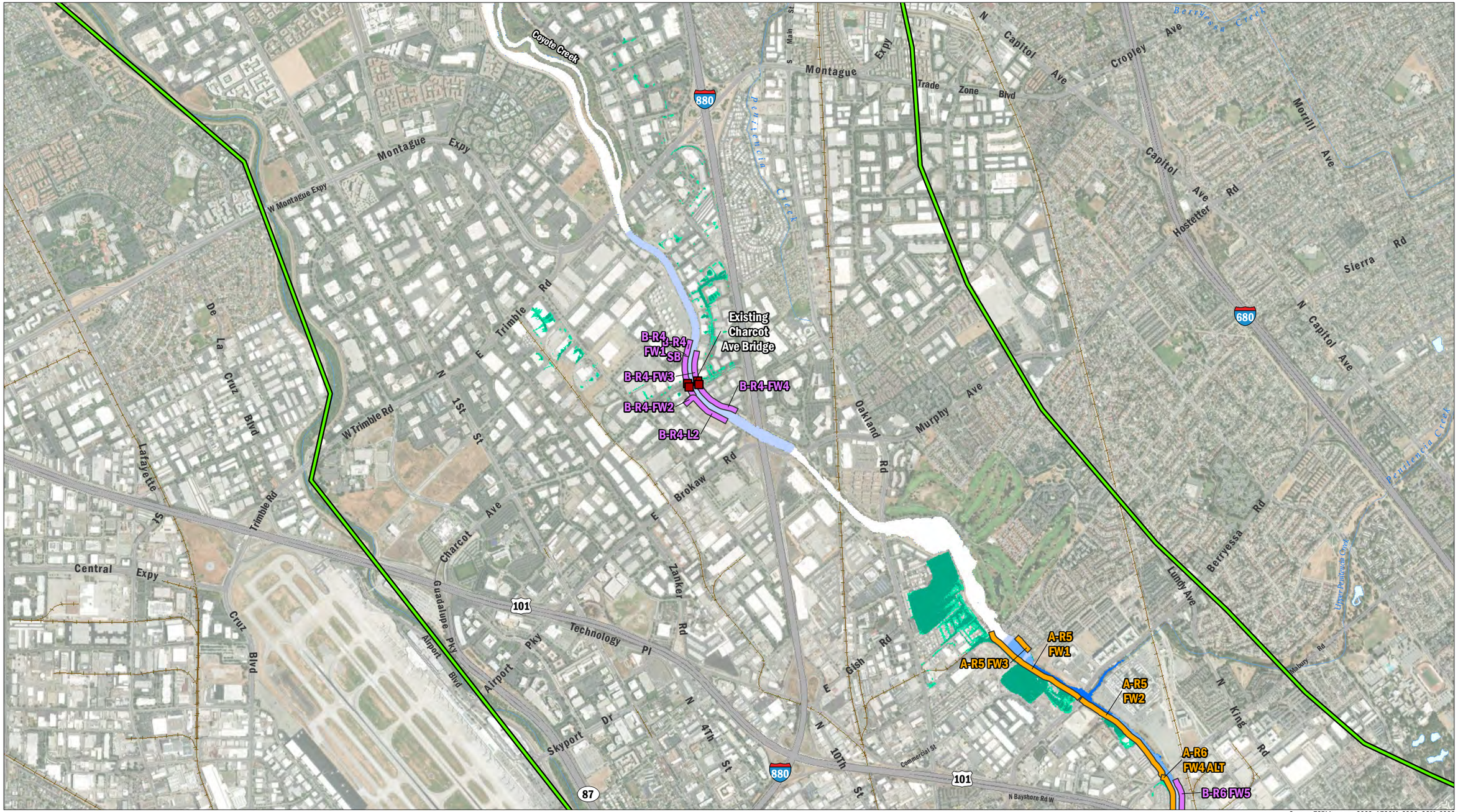


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

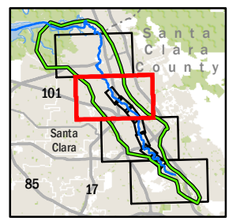


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

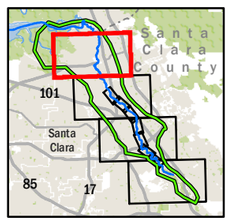
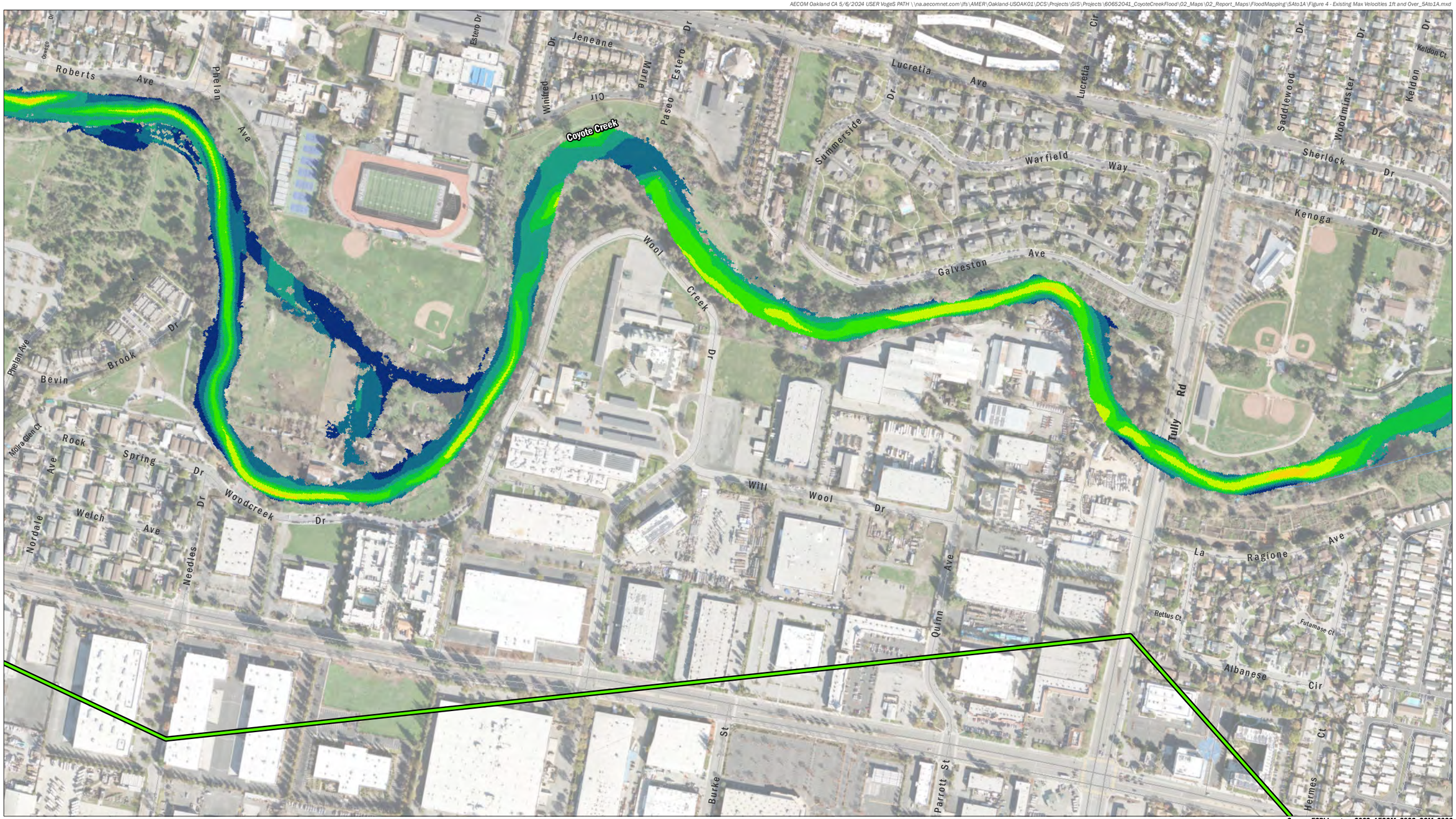


FIGURE 3

Change in Max. Water Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

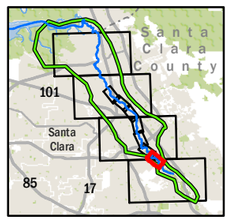
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

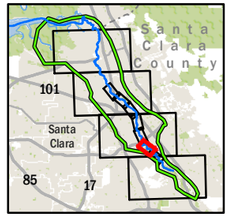
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

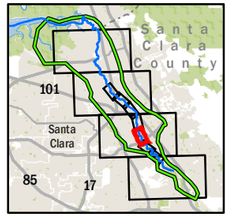
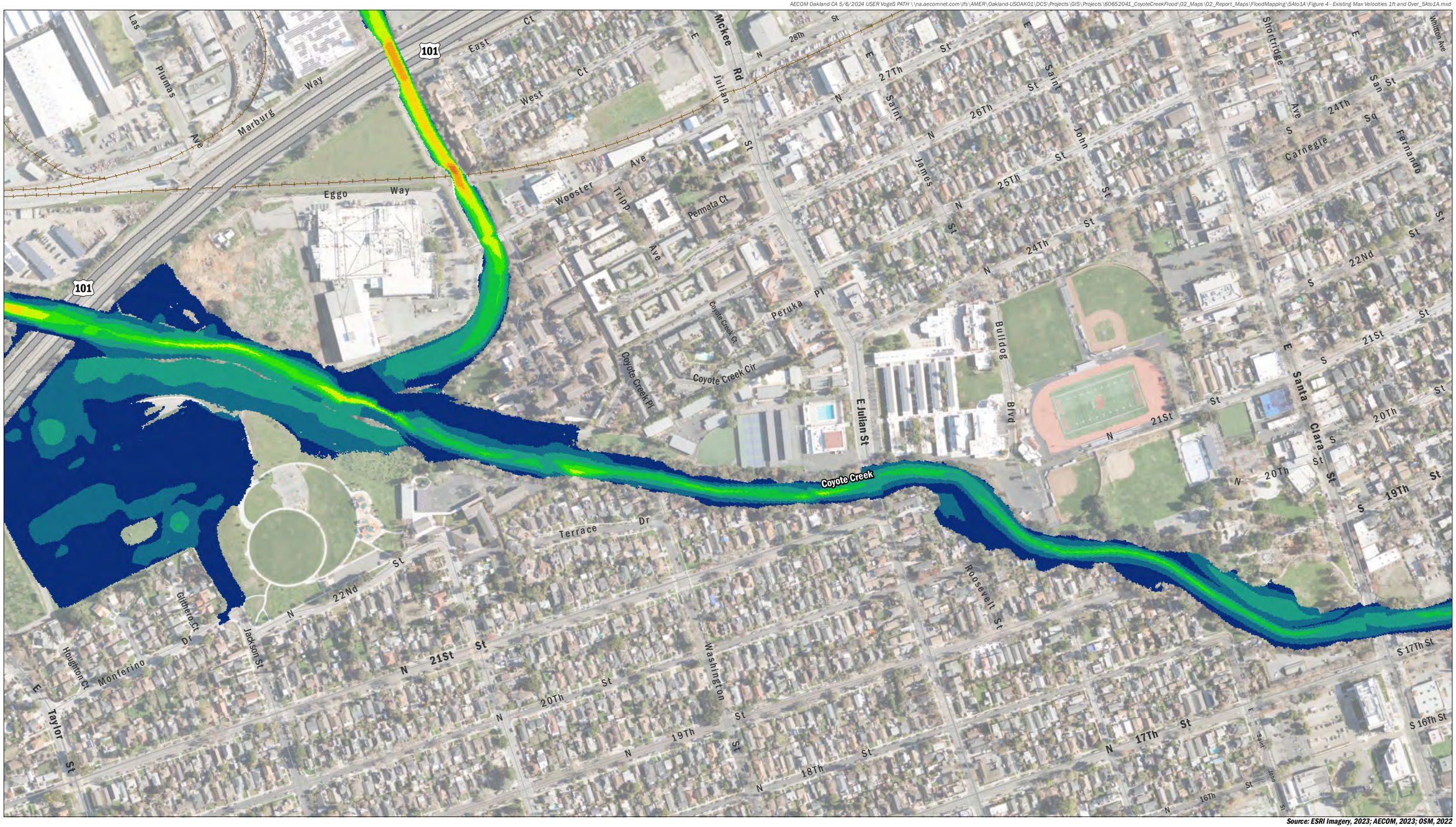


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

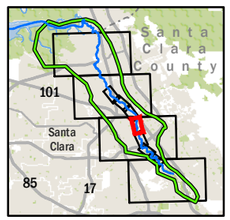
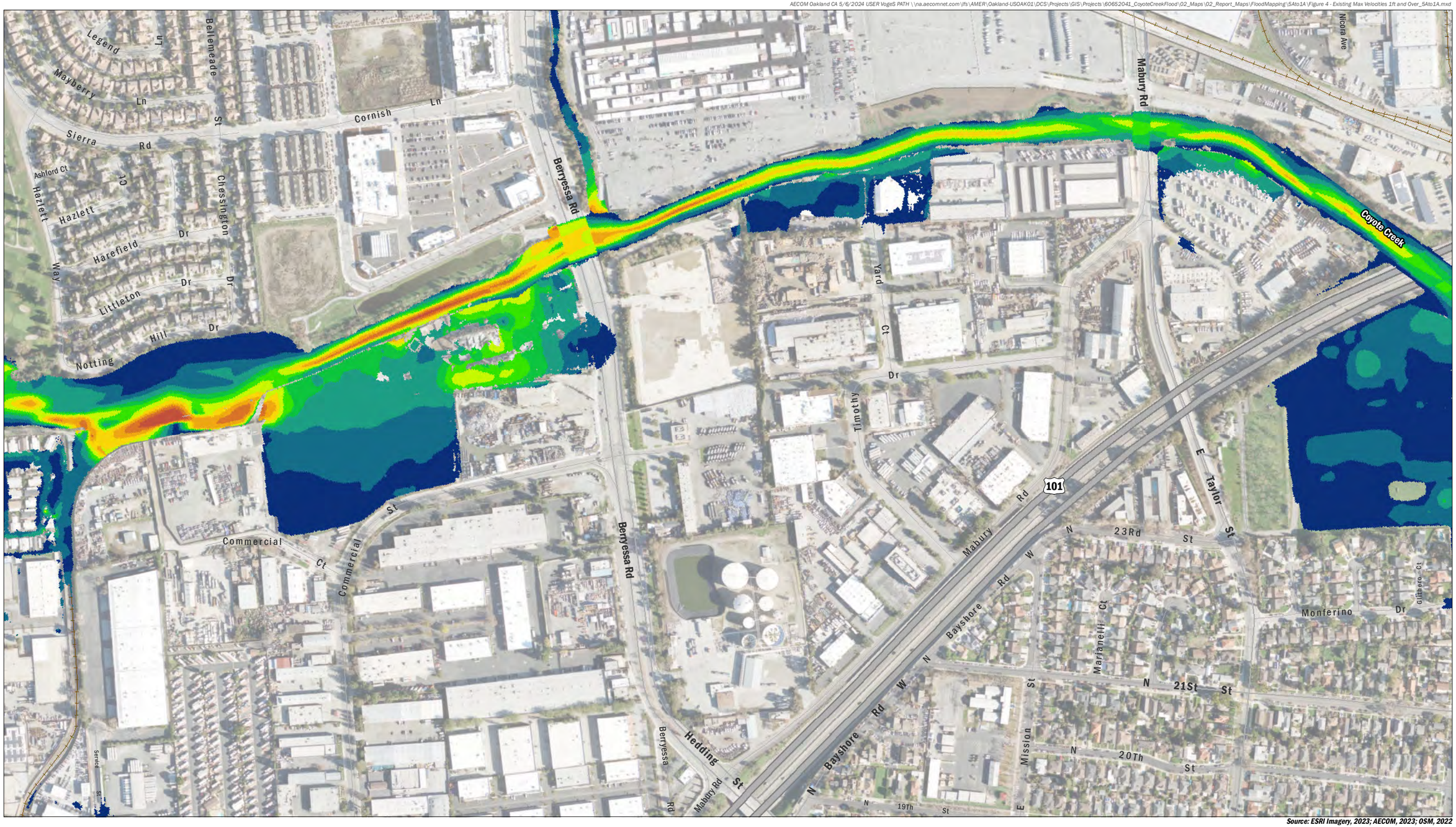


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

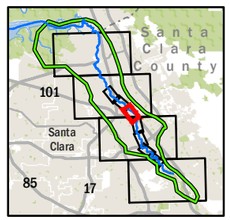
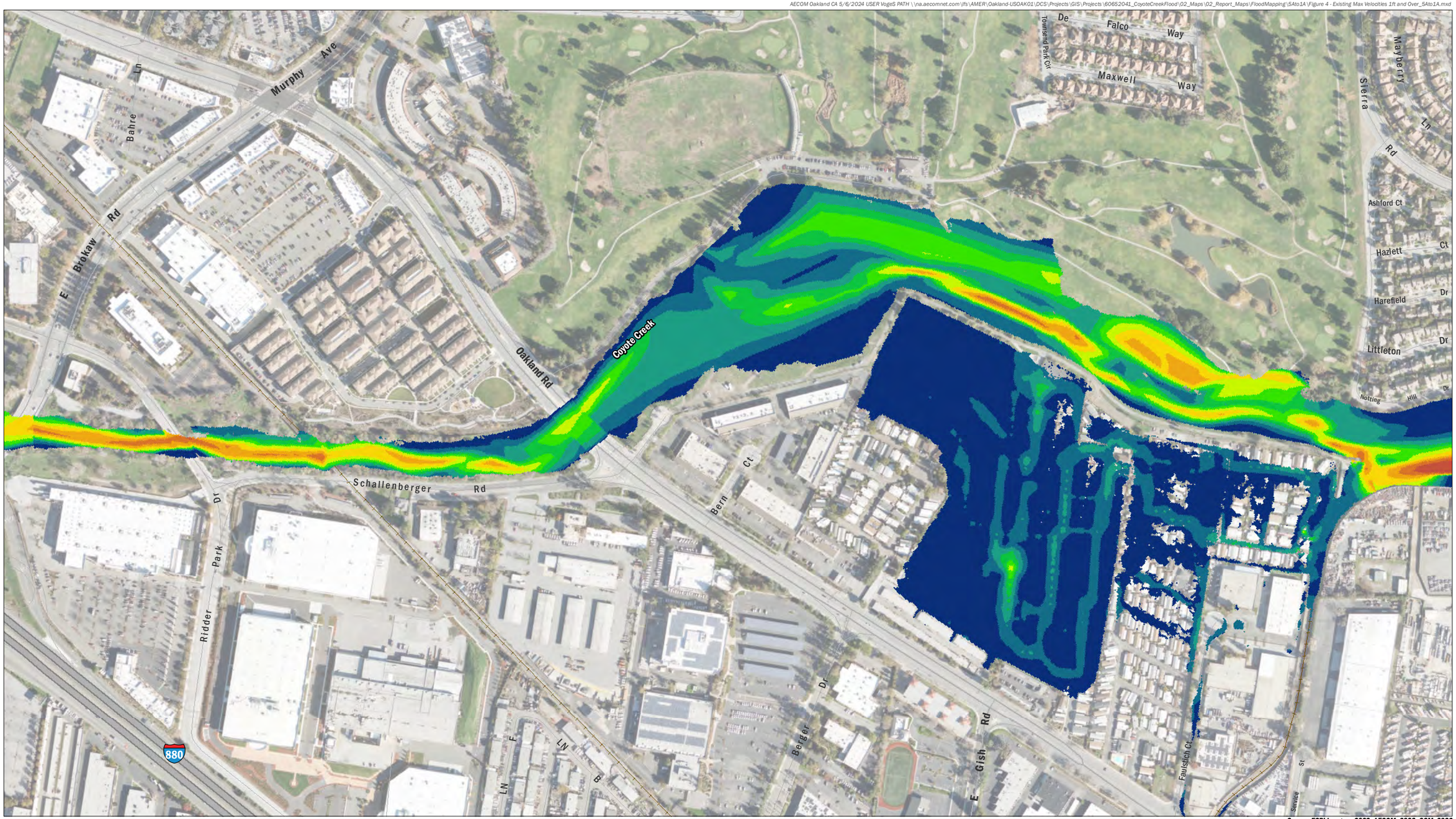


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

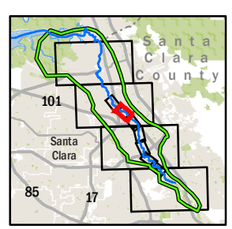
0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

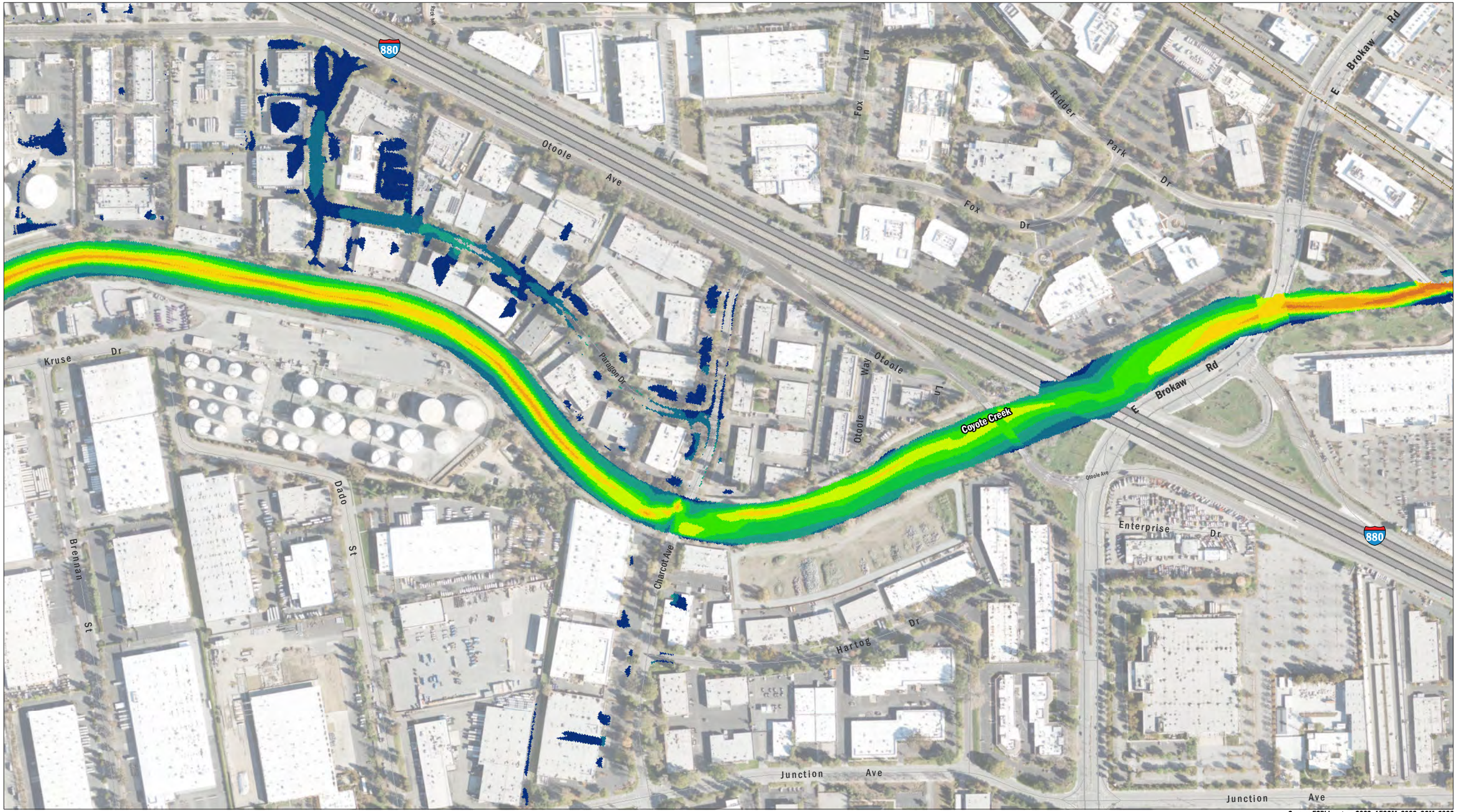
- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4
Existing Max. Velocity in Depths 1ft and Over Scenario 1A
Page 6 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

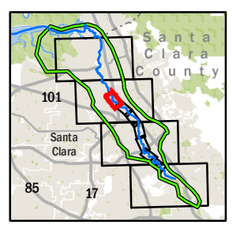


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A
Page 7 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 2,400 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

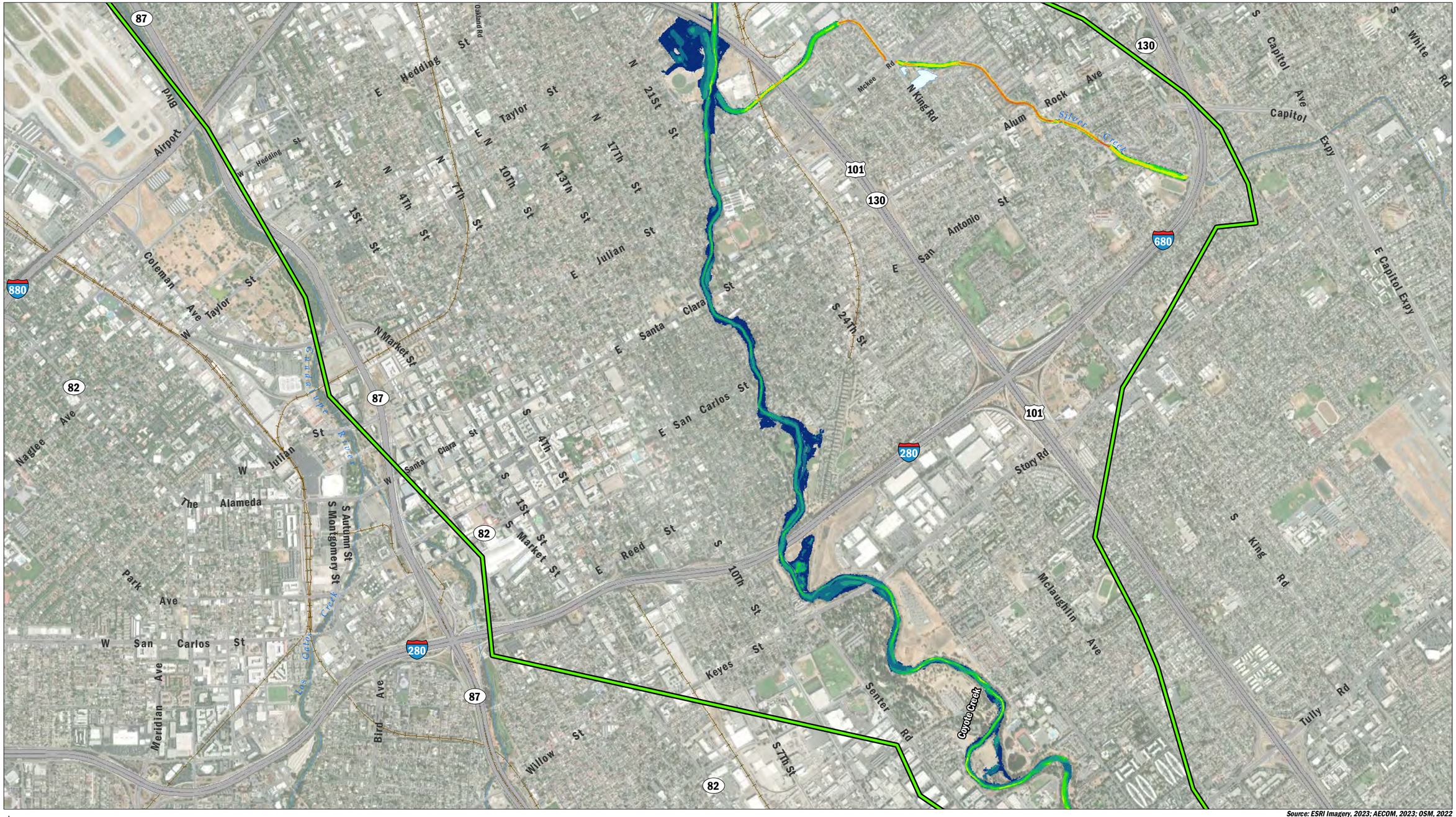
- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

AECOM
Coyote Creek
EIR Modeling

FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 5/6/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

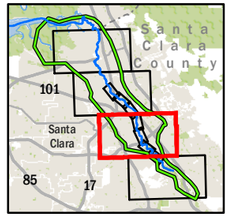
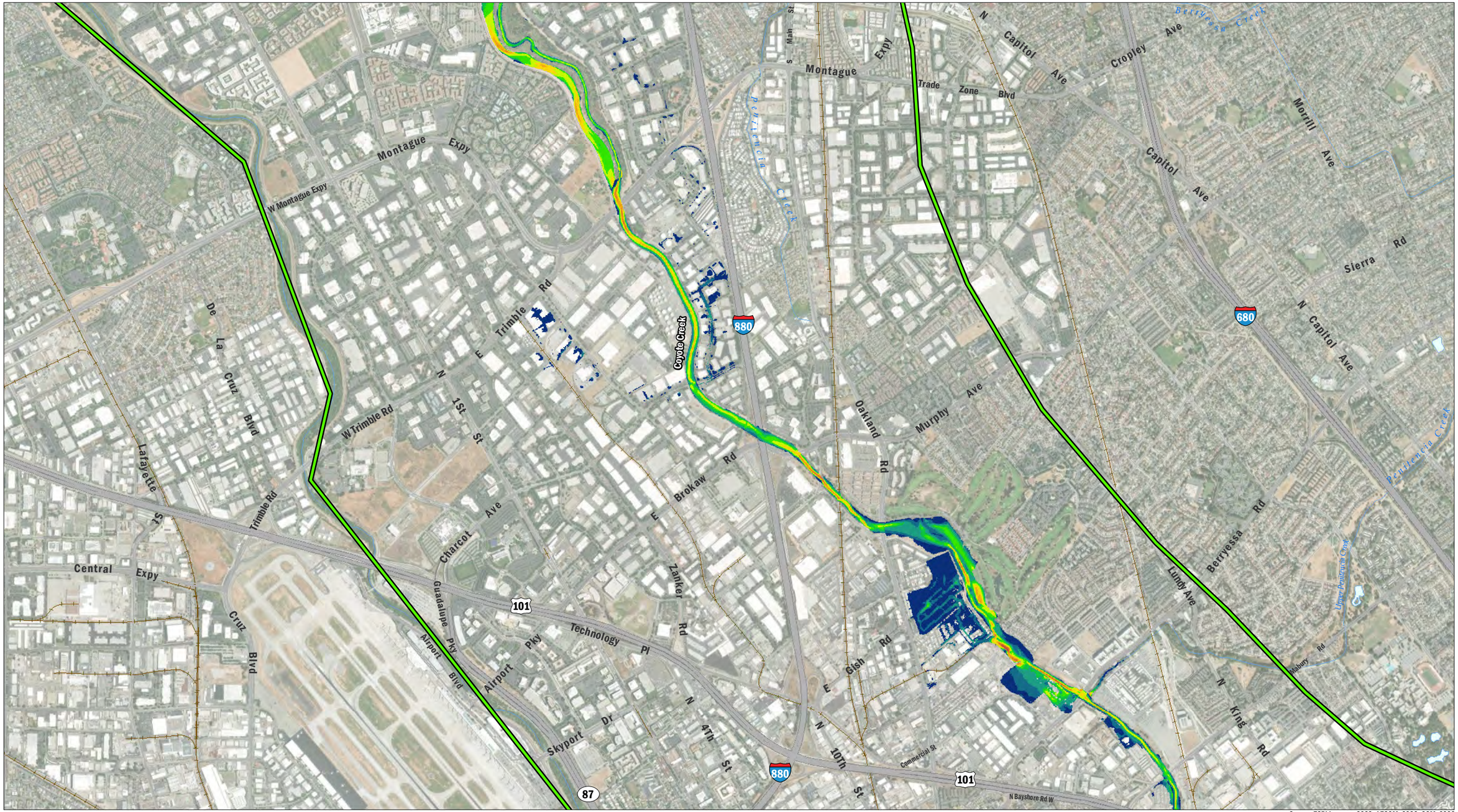


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

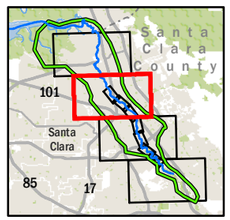
0 2,400
Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.5



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A
Page 10 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 5/6/2024

Model Boundary

Maximum Velocity Scenario 1A

Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

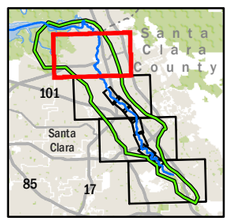
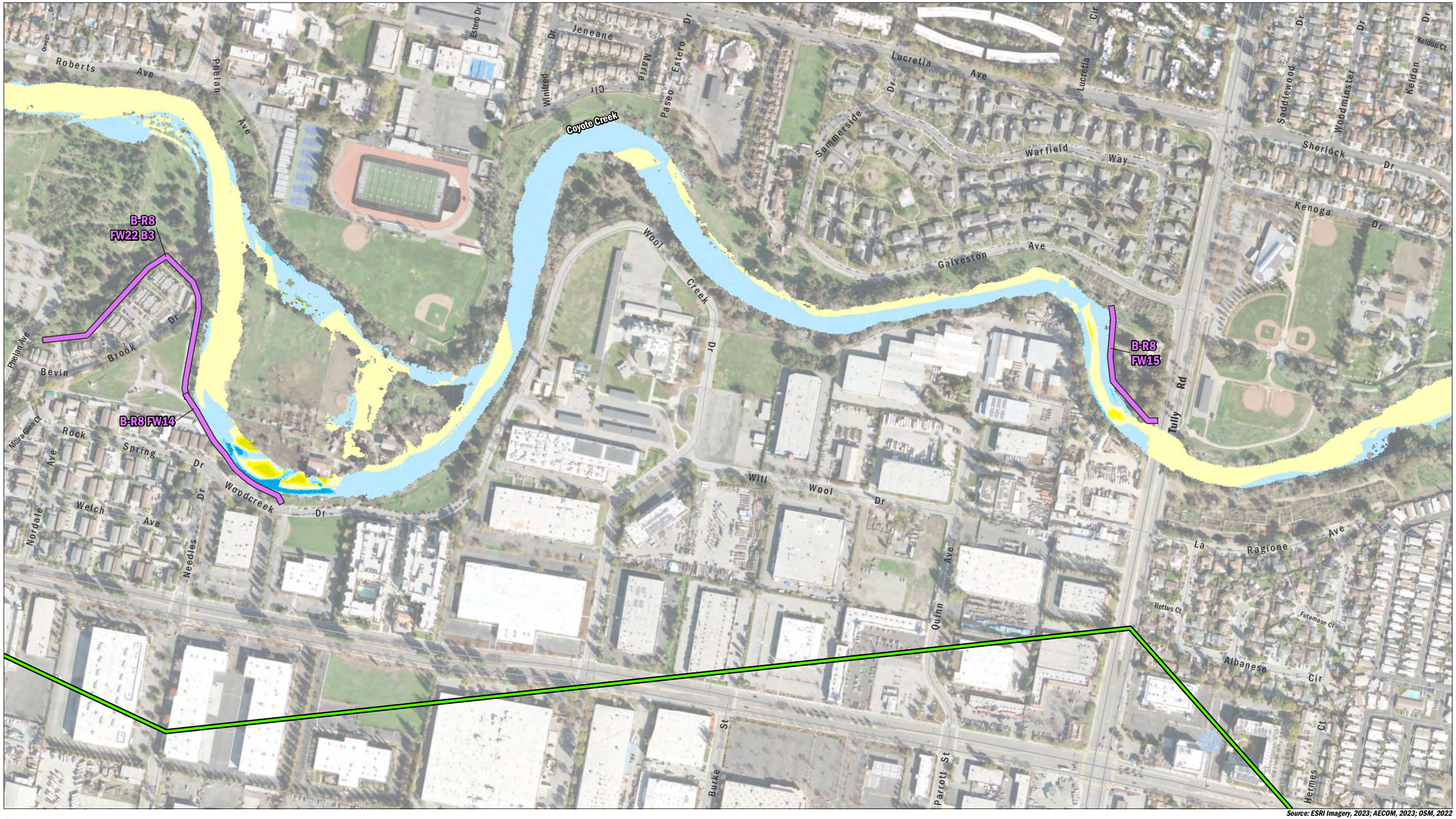


FIGURE 4

Existing Max. Velocity in Depths 1ft and Over Scenario 1A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)
-3.5 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 2.5

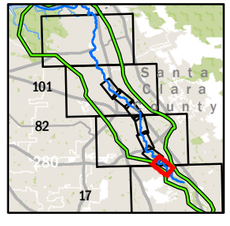
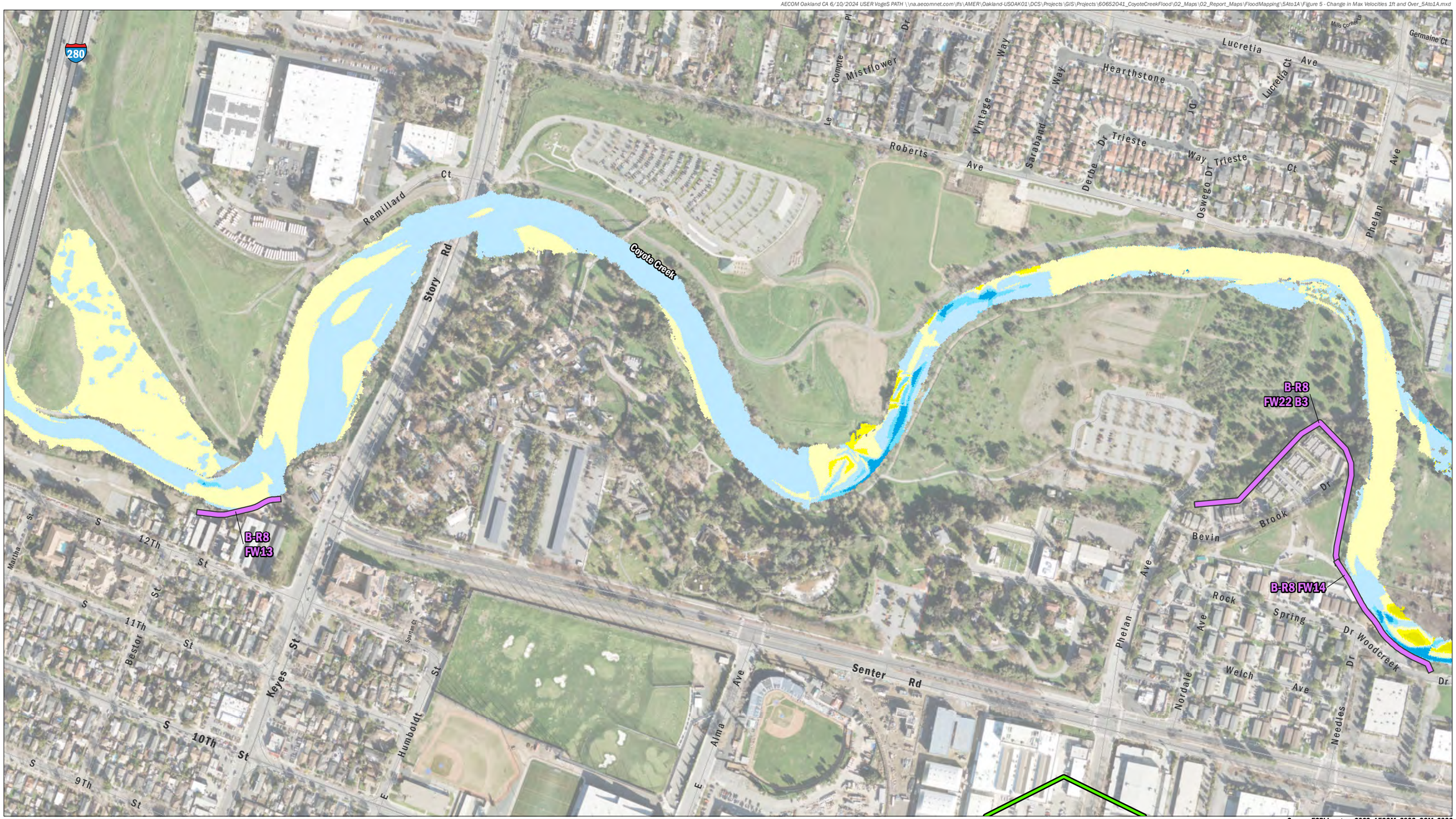


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a
Page 1 of 11



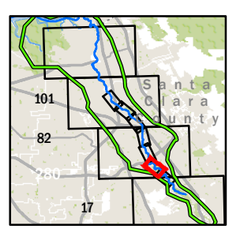
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)
-3.5 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 2.5



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)
-3.5 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 2.5

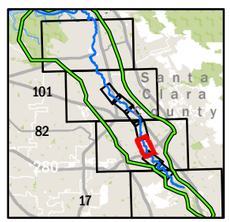
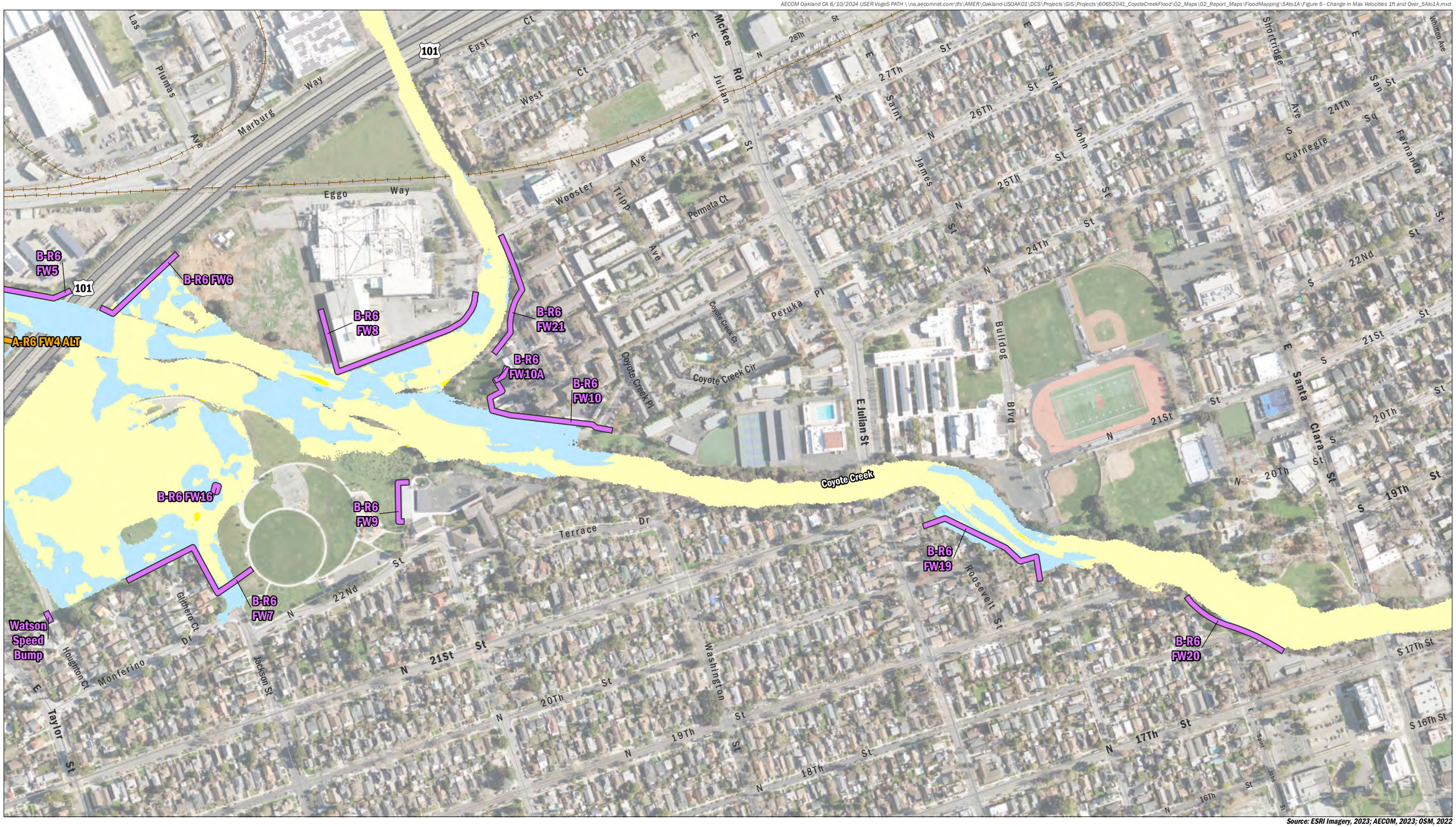


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)
-3.5 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 2.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

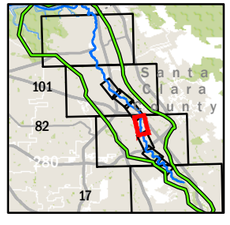
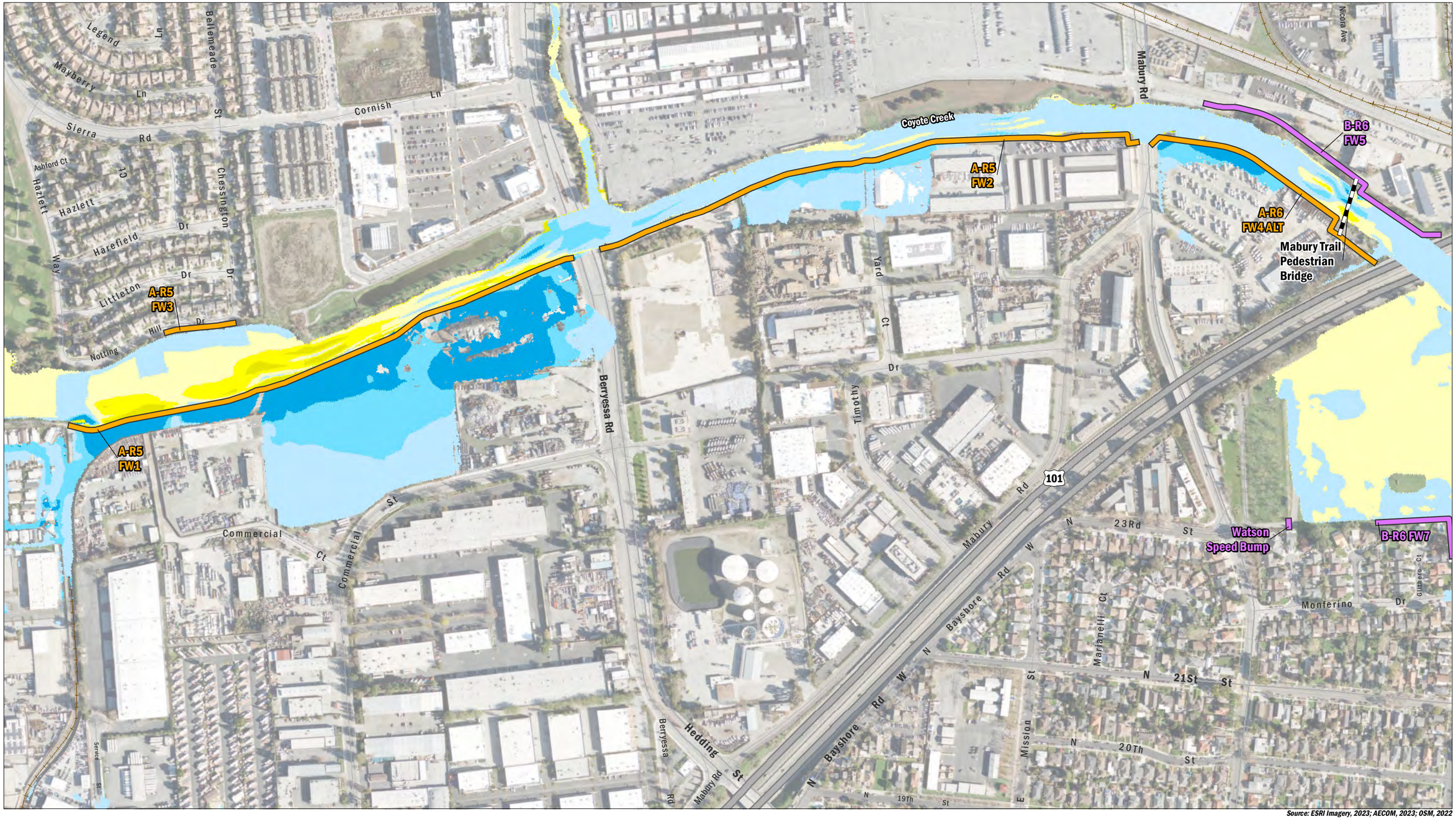


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)

- -3.5 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 2.5

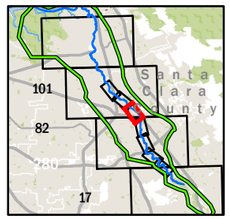


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a
Page 5 of 11



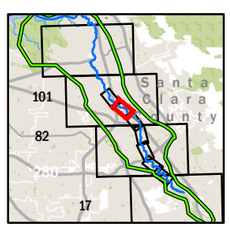
Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)
-3.5 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 2.5

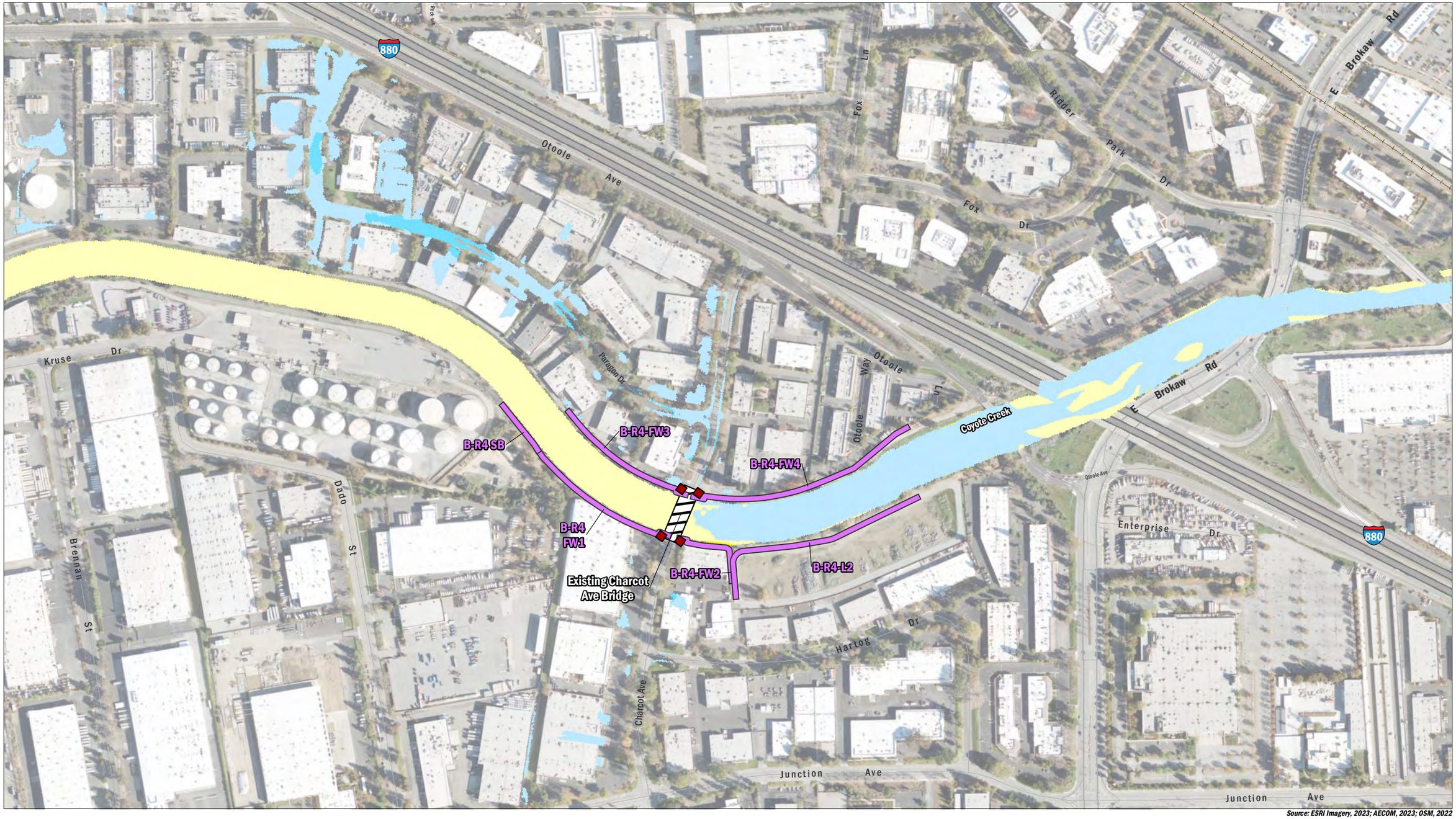


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)

- -3.5 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 2.5

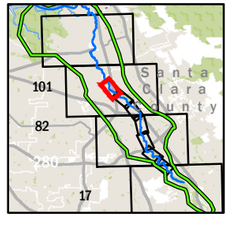


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)
-3.5 - -2
-2 - -1
-1 - 0
0 - 1
1 - 2
2 - 2.5

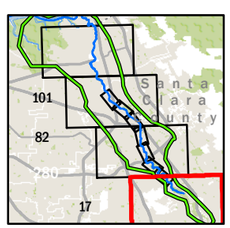
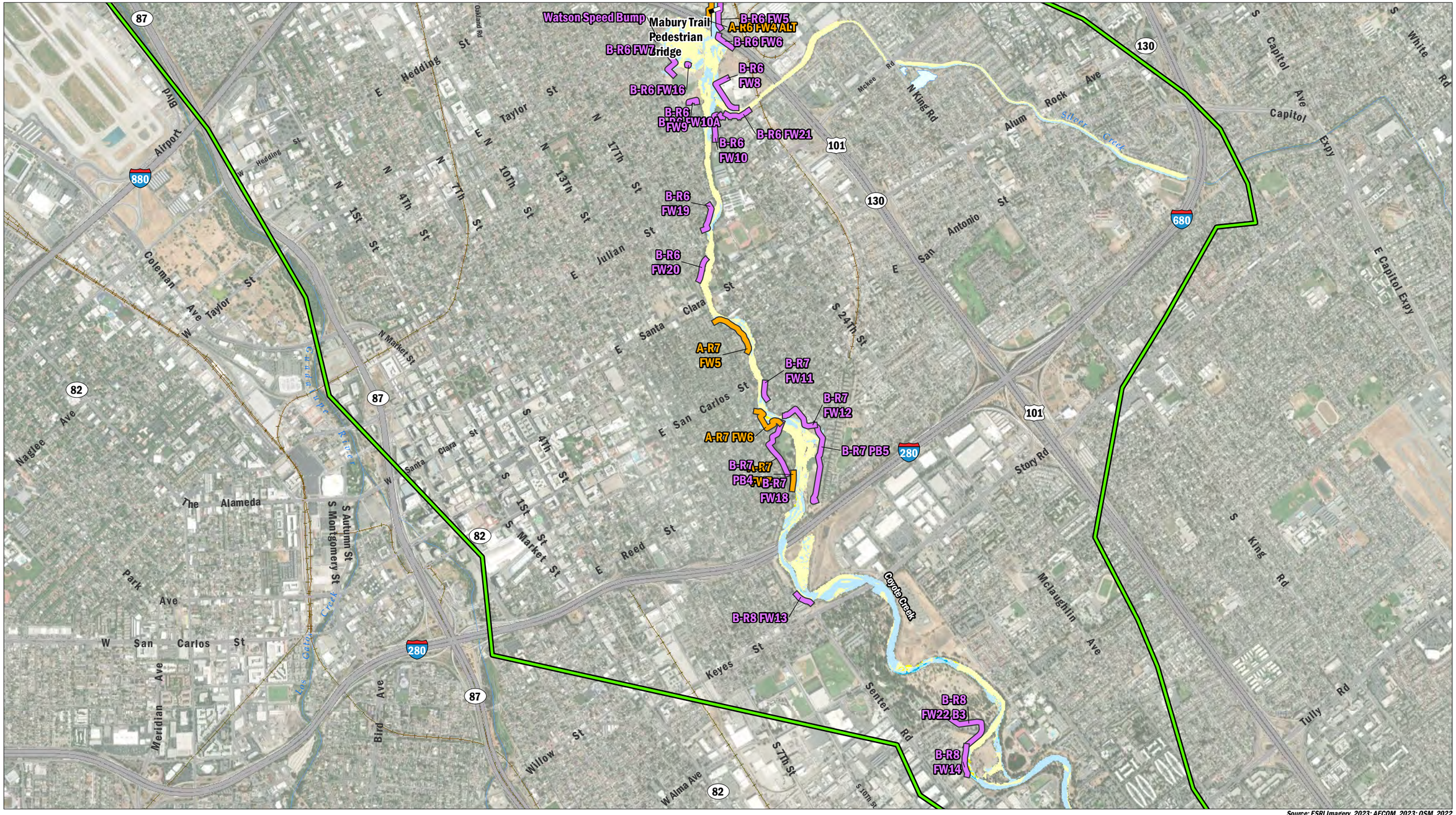


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)

- -3.5 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 2.5

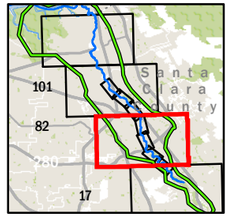
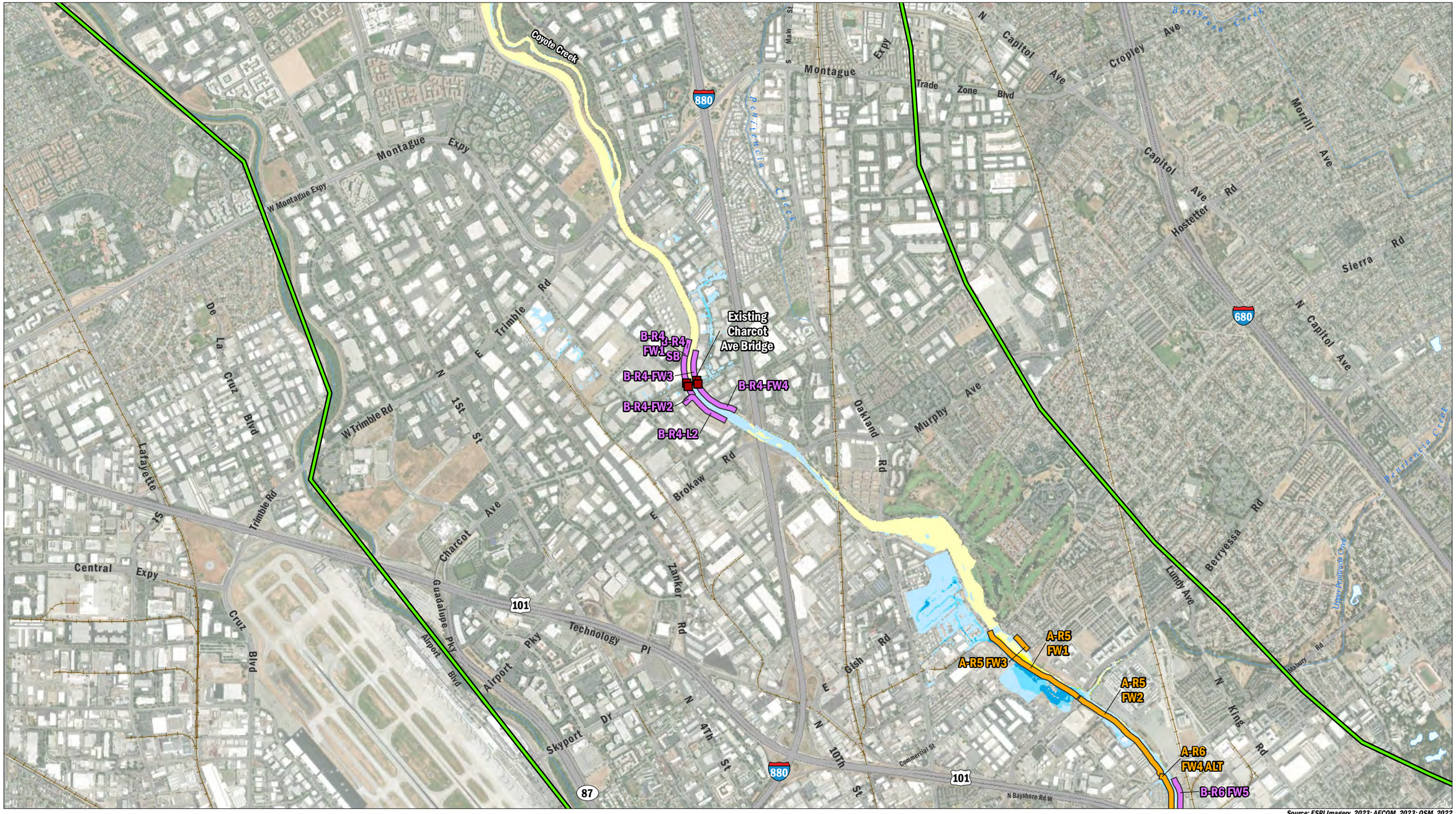


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A
Velocity (ft/s)
- -3.5 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 2.5

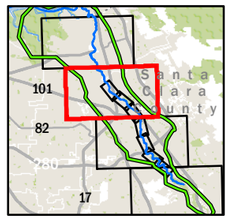


FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

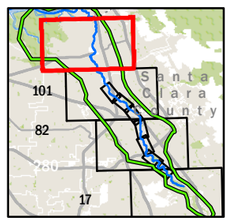
Created Date: 6/10/2024

Model Boundary

Maximum Velocity Scenario 5A Minus Scenario 1A

Velocity (ft/s)

- -3.5 - -2
- -2 - -1
- -1 - 0
- 0 - 1
- 1 - 2
- 2 - 2.5

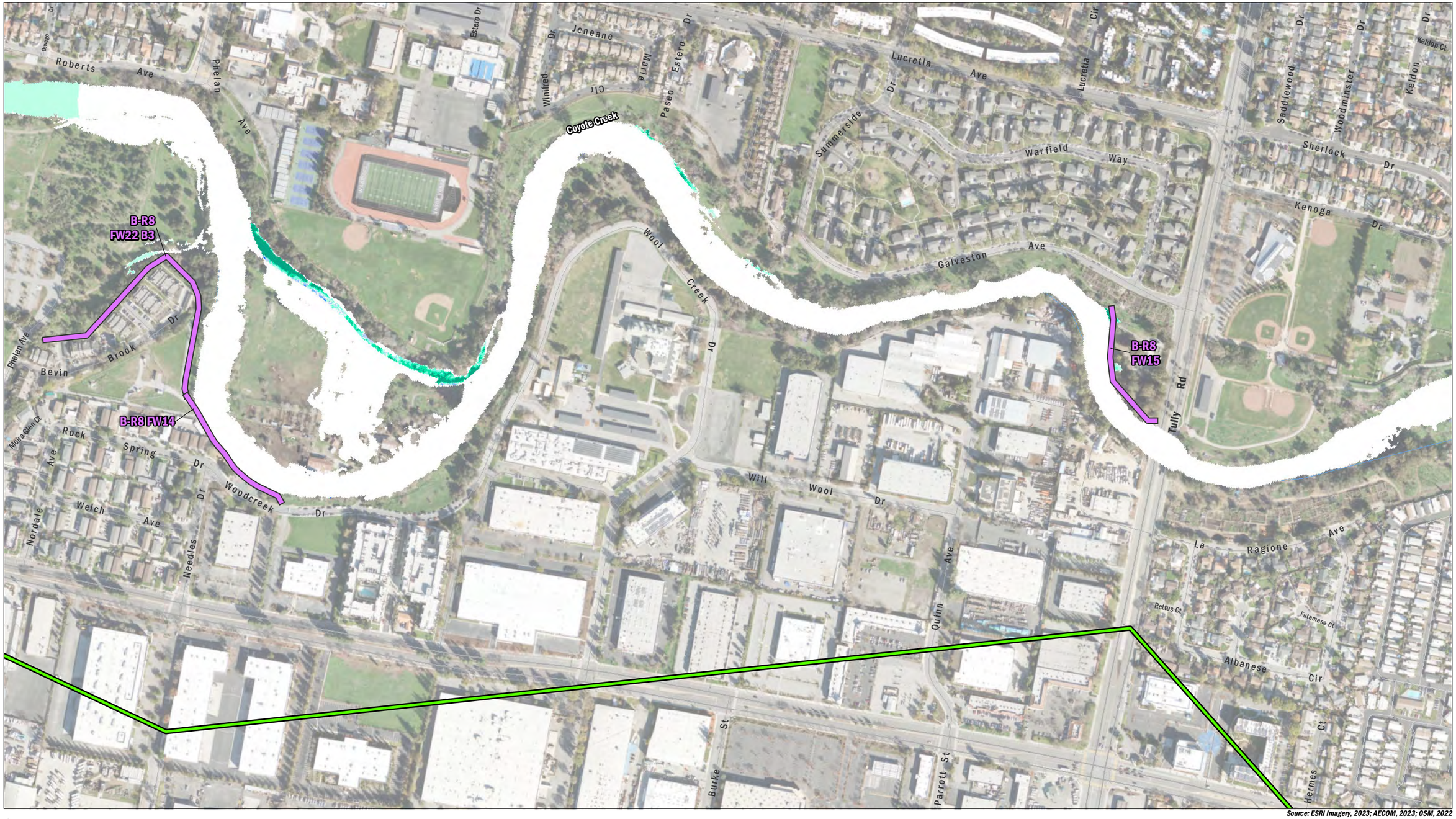


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 5

Change in Max. Velocities in Depths 1ft and Over Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

-7.1 - -1.5	-0.5 - -0.1
-1.5 - -1	-0.1 - 0.1
-1 - -0.5	0.1 - 0.5
	0.5 - 1
	1 - 2.2

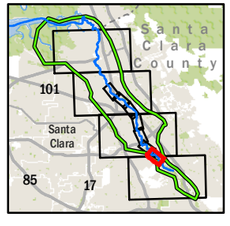


FIGURE 6

Change in All Max. Water Depths Scenario 5a to Scenario 1a
Page 1 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

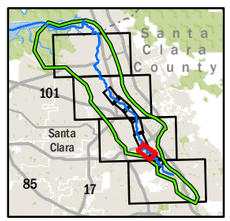
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

-7.1 - -1.5	-0.5 - -0.1
-1.5 - -1	-0.1 - 0.1
-1 - -0.5	0.1 - 0.5
	0.5 - 1
	1 - 2.2



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6

Change in All Max. Water Depths
Scenario 5a to Scenario 1a
Page 2 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)
-7.1 - -1.5
-1.5 - -1
-1 - -0.5
-0.5 - -0.1
-0.1 - 0.1
0.1 - 0.5
0.5 - 1
1 - 2.2

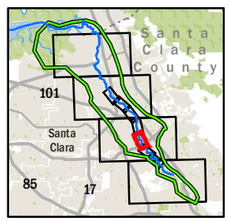
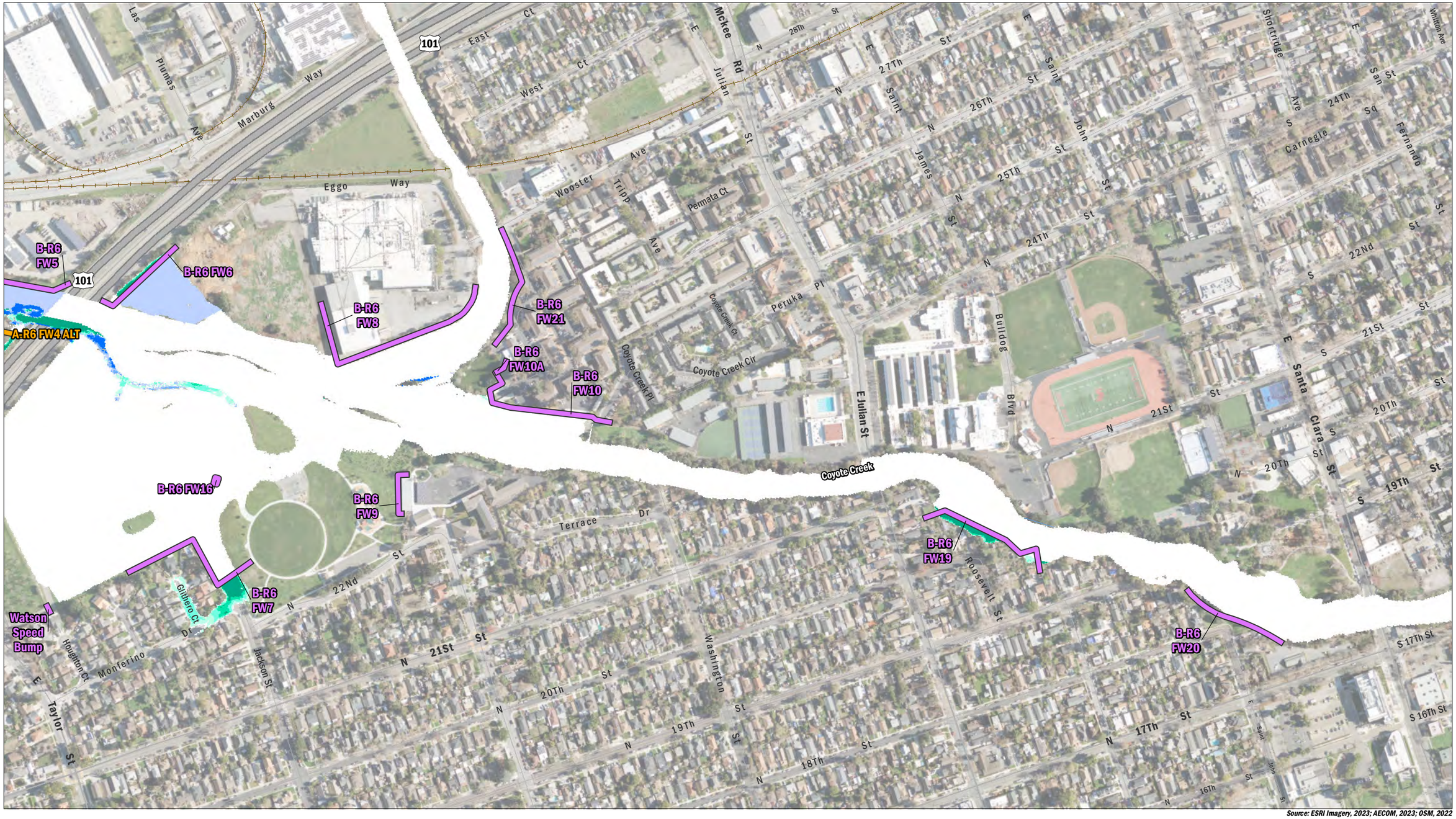


FIGURE 6
Change in All Max. Water Depths
Scenario 5a to Scenario 1a
Page 3 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFMMP
CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

-7.1 - -1.5
-1.5 - -1
-1 - -0.5
-0.5 - -0.1
-0.1 - 0.1
0.1 - 0.5
0.5 - 1
1 - 2.2

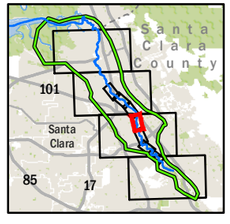
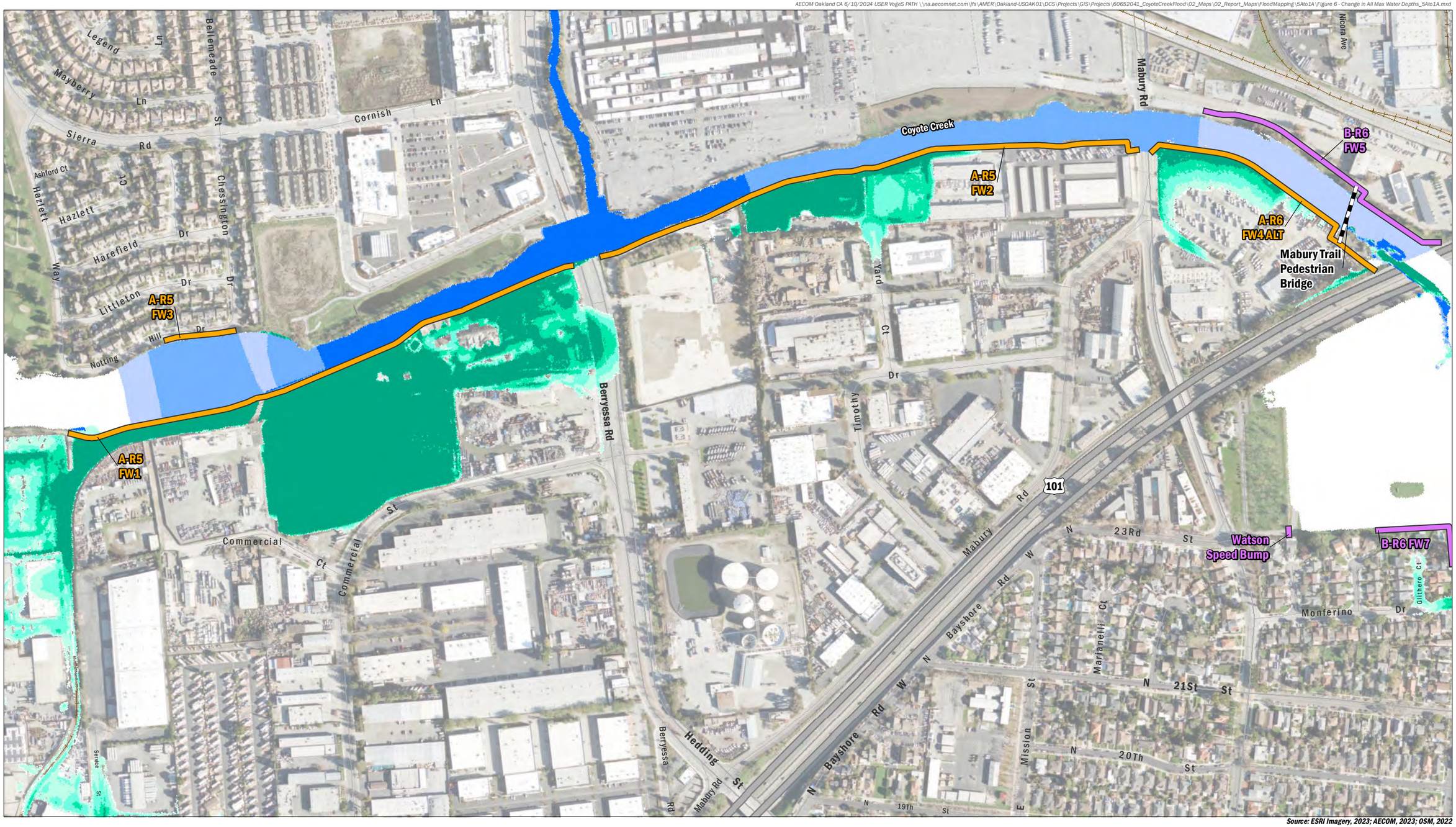


FIGURE 6

Change in All Max. Water Depths
Scenario 5a to Scenario 1a
Page 4 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

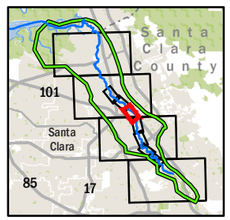


FIGURE 6

Change in All Max. Water Depths
Scenario 5a to Scenario 1a
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

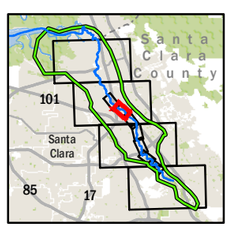
0 500
Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

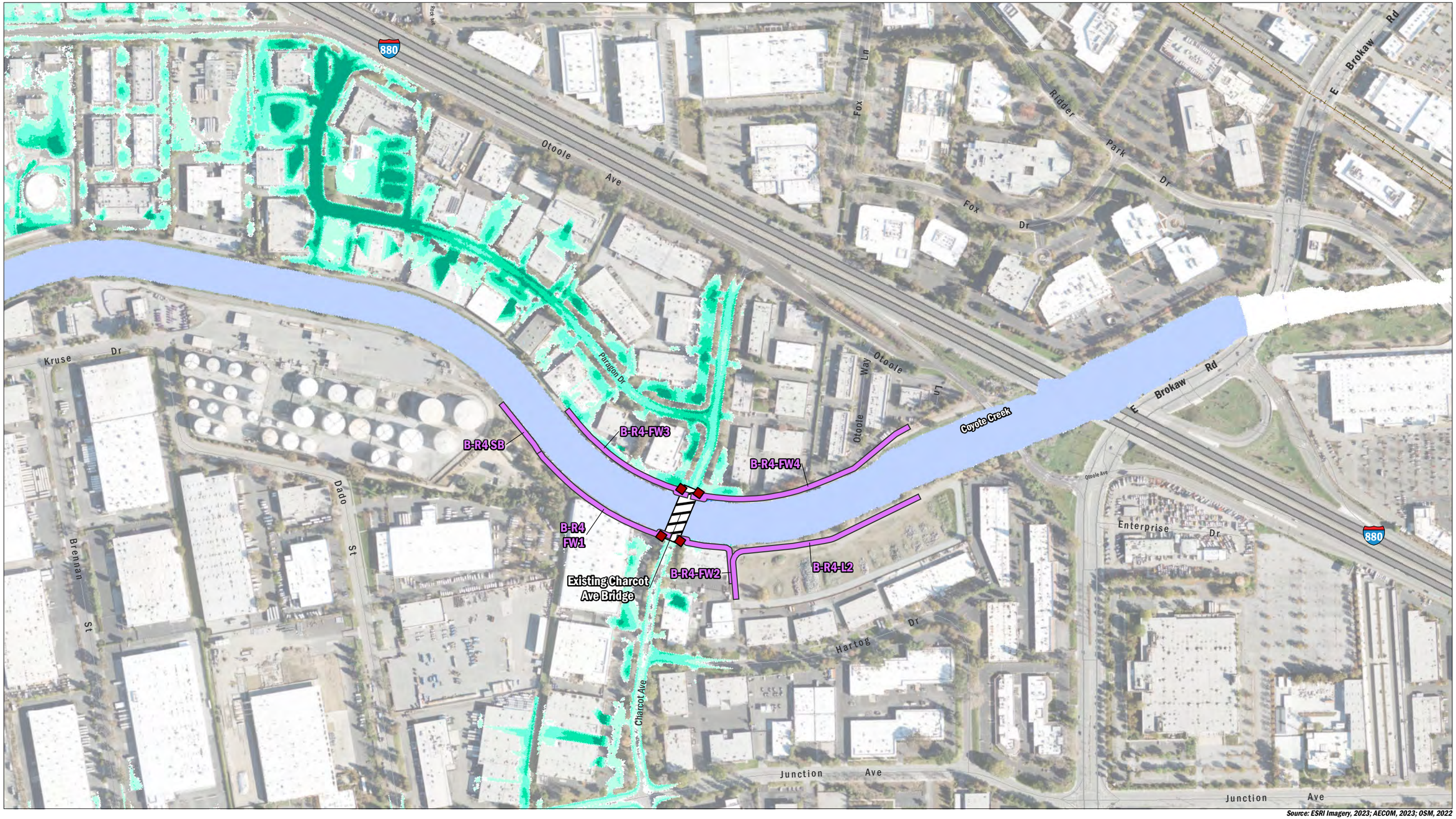
-7.1 - -1.5
-1.5 - -1
-1 - -0.5
-0.5 - -0.1
-0.1 - 0.1
0.1 - 0.5
0.5 - 1
1 - 2.2



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6
Change in All Max. Water Depths
Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

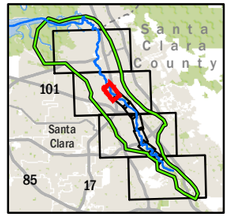


FIGURE 6

Change in All Max. Water Depths
Scenario 5a to Scenario 1a
Page 7 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

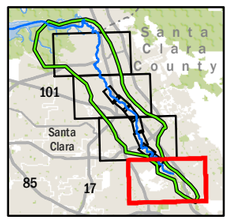
0 2,400
Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

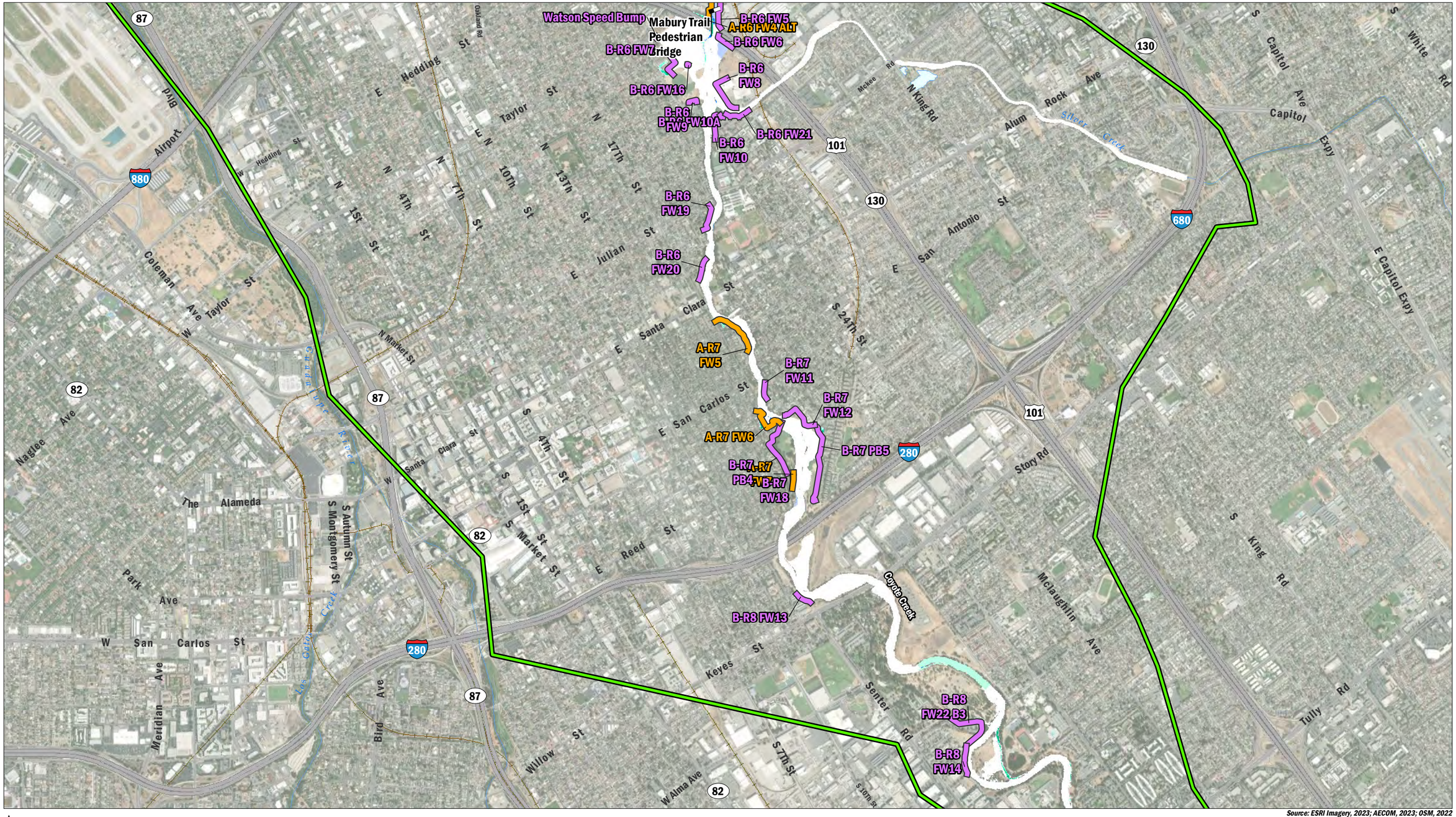
-7.1 - -1.5	-0.5 - -0.1
-1.5 - -1	-0.1 - 0.1
-1 - -0.5	0.1 - 0.5
	0.5 - 1
	1 - 2.2



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 6
Change in All Max. Water Depths
Scenario 5a to Scenario 1a
Page 8 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Mabury Trail Pedestrian Bridge
- CCFMMP
- CCFPP
- Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

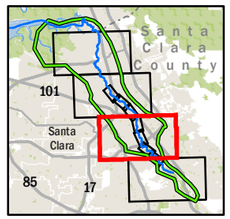
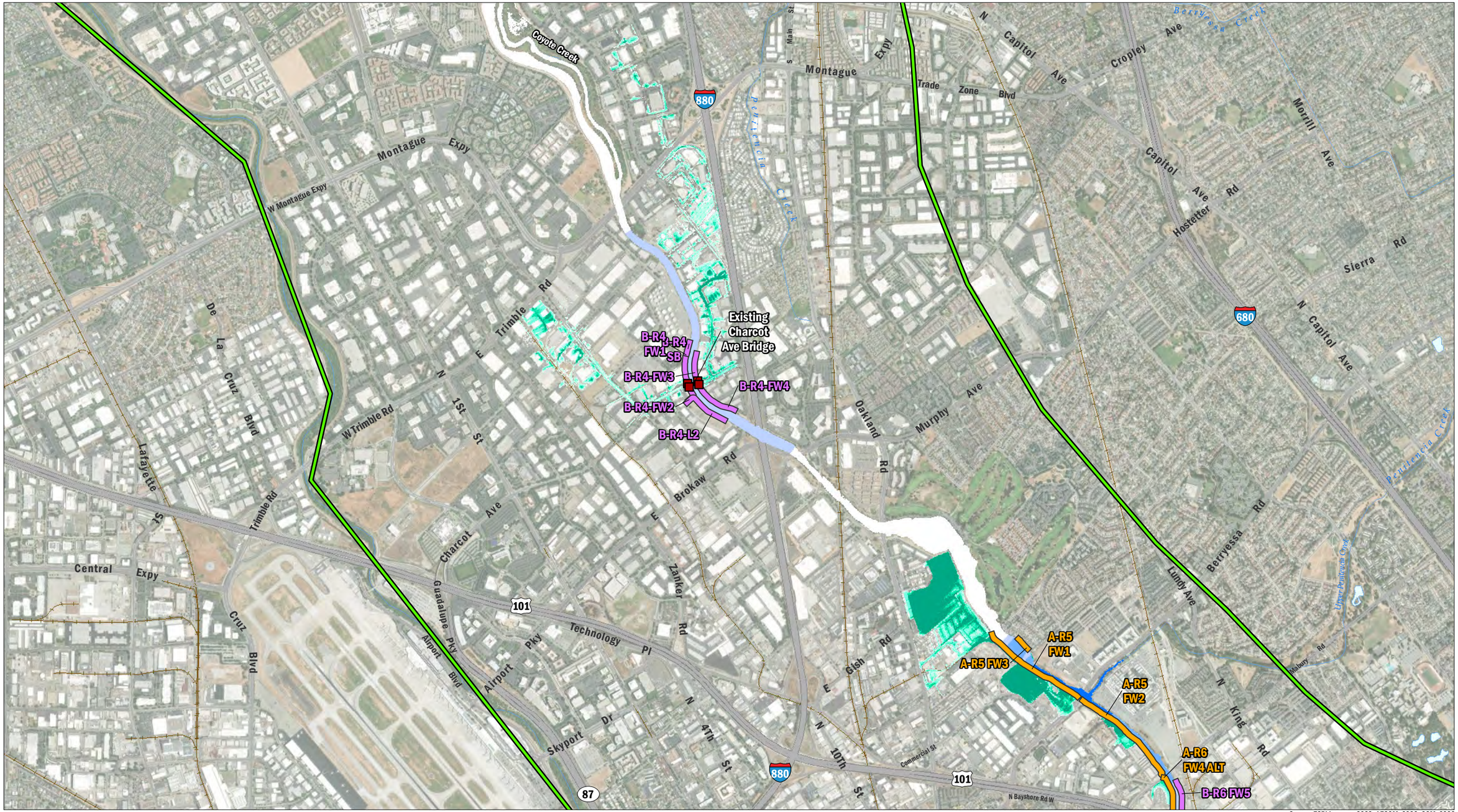


FIGURE 6

Change in All Max. Water Depths
Scenario 5a to Scenario 1a
Page 9 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- Floodwall Tie-in to Charcot Ave Bridge
- CCFMMP
- CCFPP
- Existing Charcot Ave Bridge
- Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

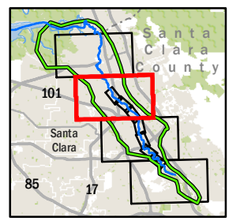


FIGURE 6

Change in All Max. Water Depths
Scenario 5a to Scenario 1a



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

Model Boundary

Maximum Water Depth Scenario 5A Minus Scenario 1A
Depth (ft)

- -7.1 - -1.5
- -1.5 - -1
- -1 - -0.5
- -0.5 - -0.1
- -0.1 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 2.2

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

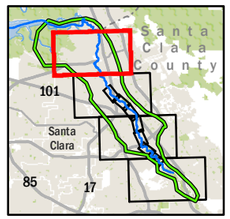
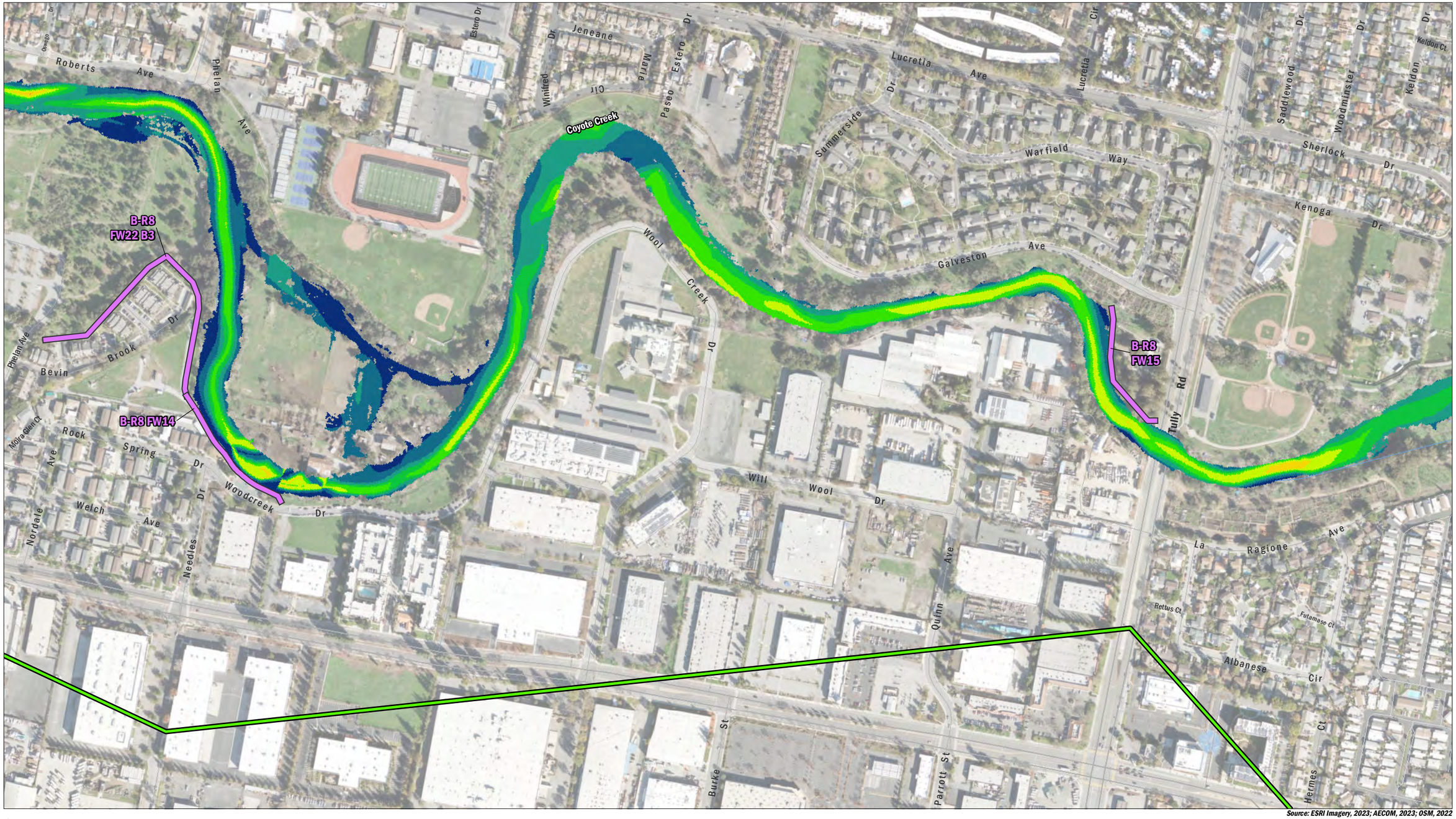


FIGURE 6

Change in All Max. Water Depths
Scenario 5a to Scenario 1a
Page 11 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

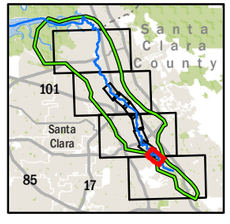
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.5



AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

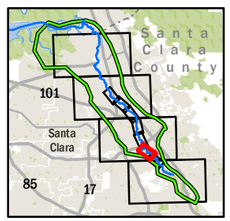
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.5

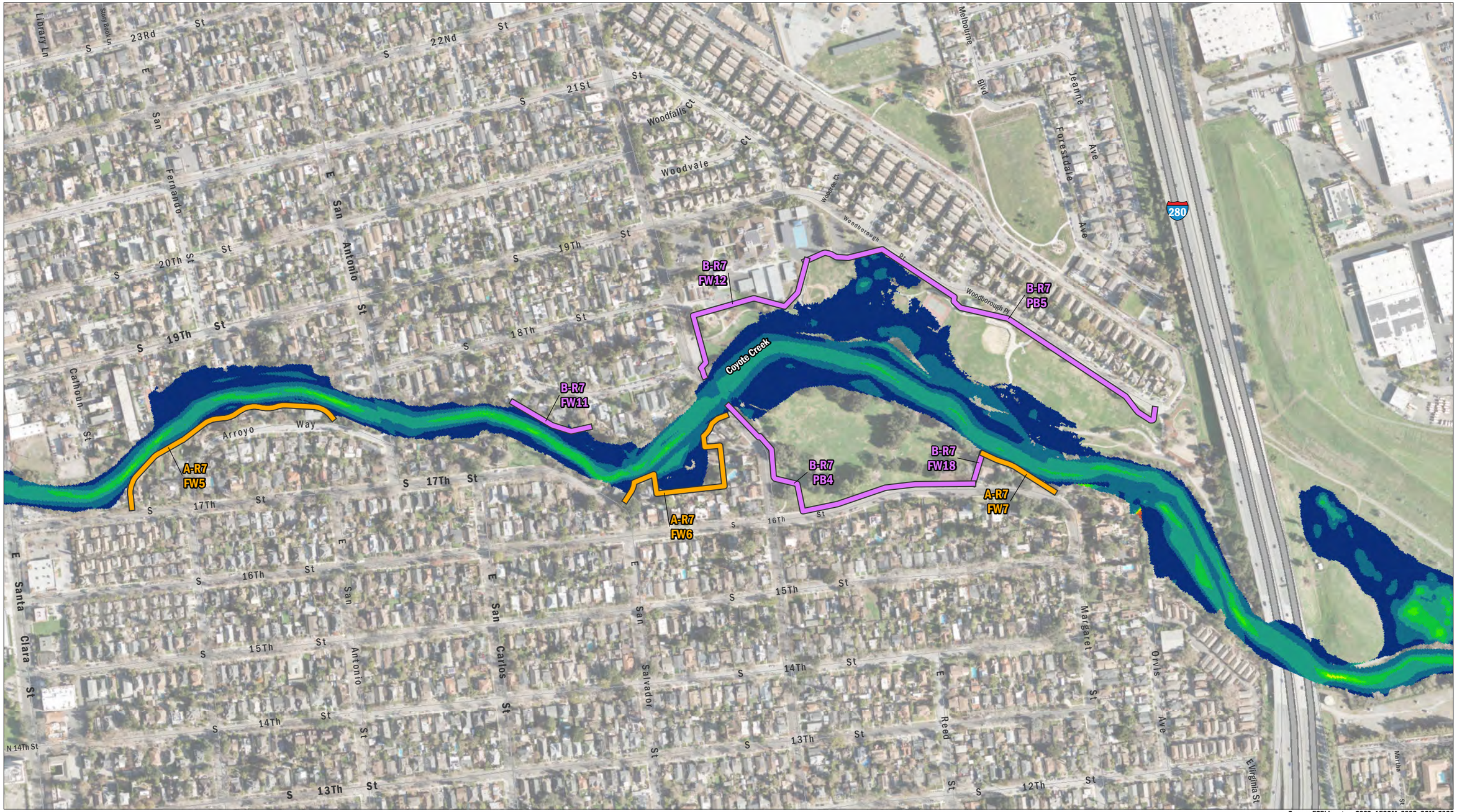


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

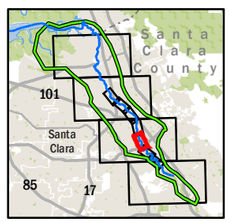
0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.5

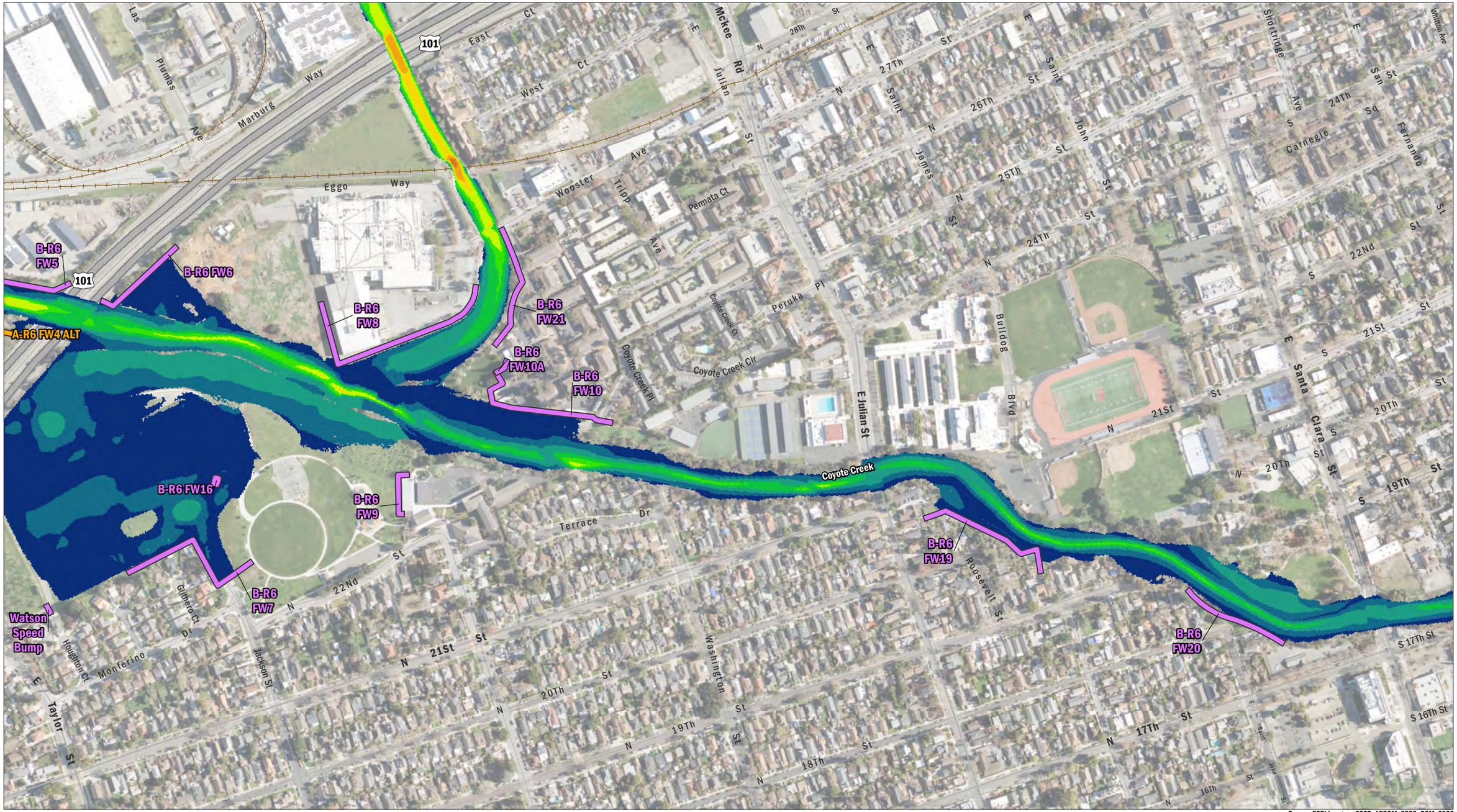


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

CCFMMP
CCFPP
Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)
0 - 0.7
0.7 - 1.5
1.5 - 2.4
2.4 - 3.2
3.2 - 4
4 - 5
5 - 6.2
6.2 - 7.7
7.7 - 9.8
9.8 - 11.5

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

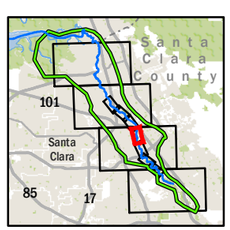


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

0 500 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

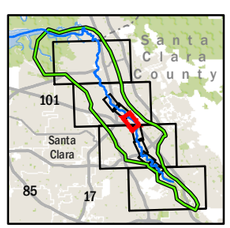
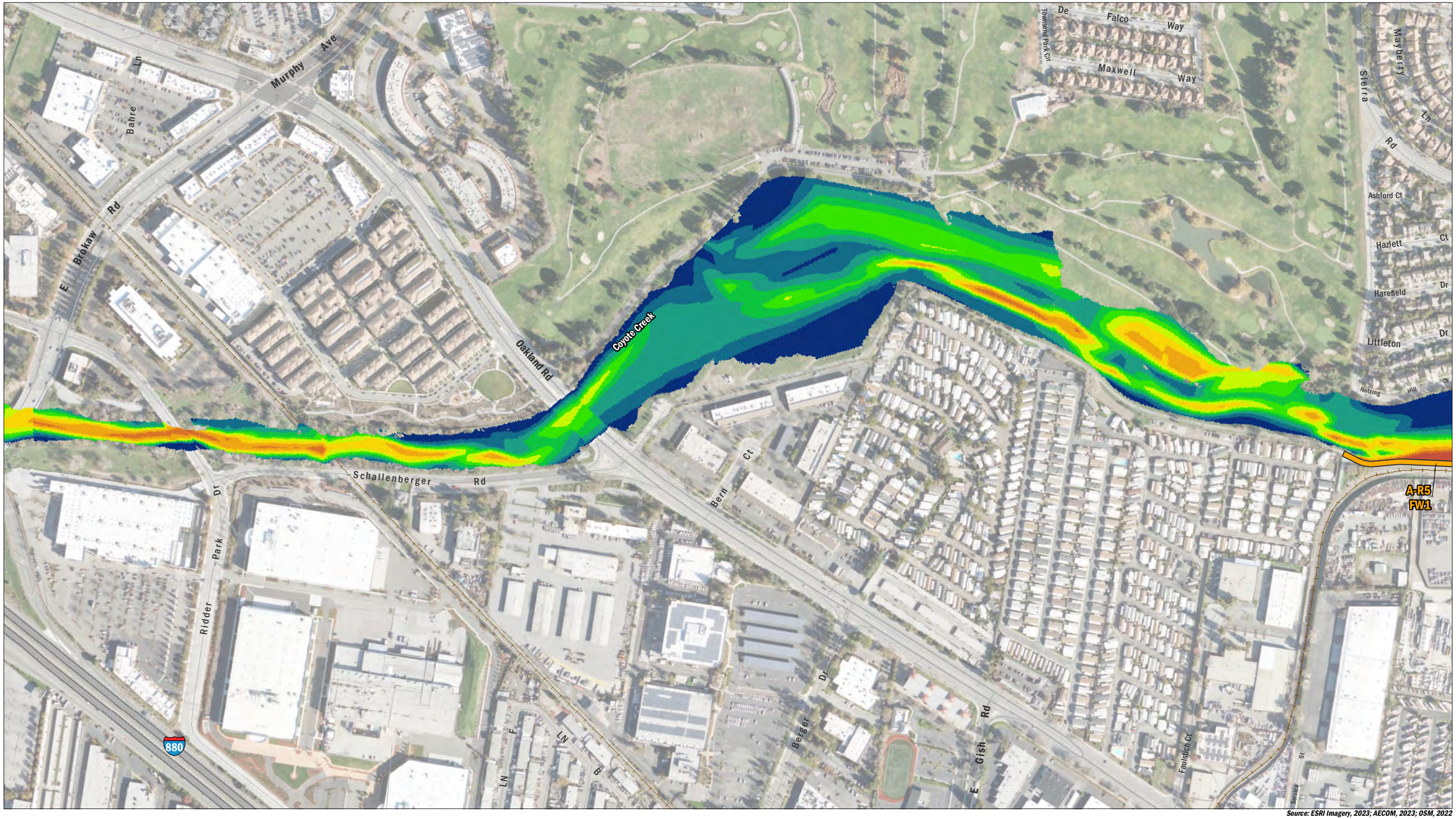


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A
Page 5 of 11



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

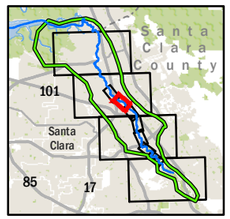
0 500 Feet

Created Date: 6/10/2024

CCFMMP
Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

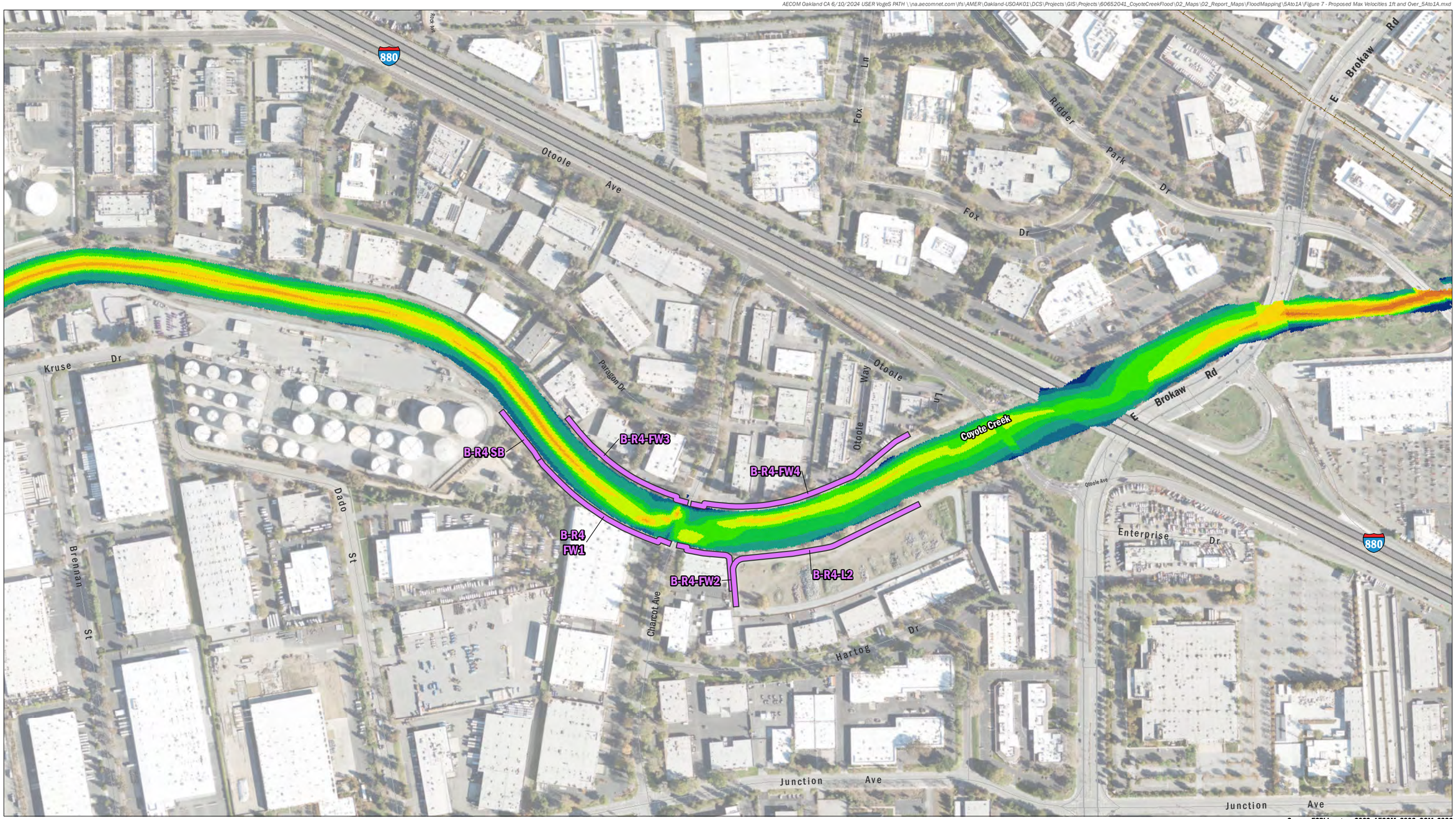


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

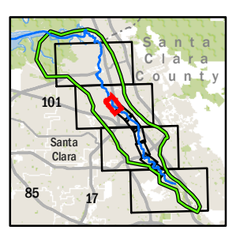
0 500 Feet

Created Date: 6/10/2024

CCFPP
Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

0 - 0.7	3.2 - 4
0.7 - 1.5	4 - 5
1.5 - 2.4	5 - 6.2
2.4 - 3.2	6.2 - 7.7
	7.7 - 9.8
	9.8 - 11.5

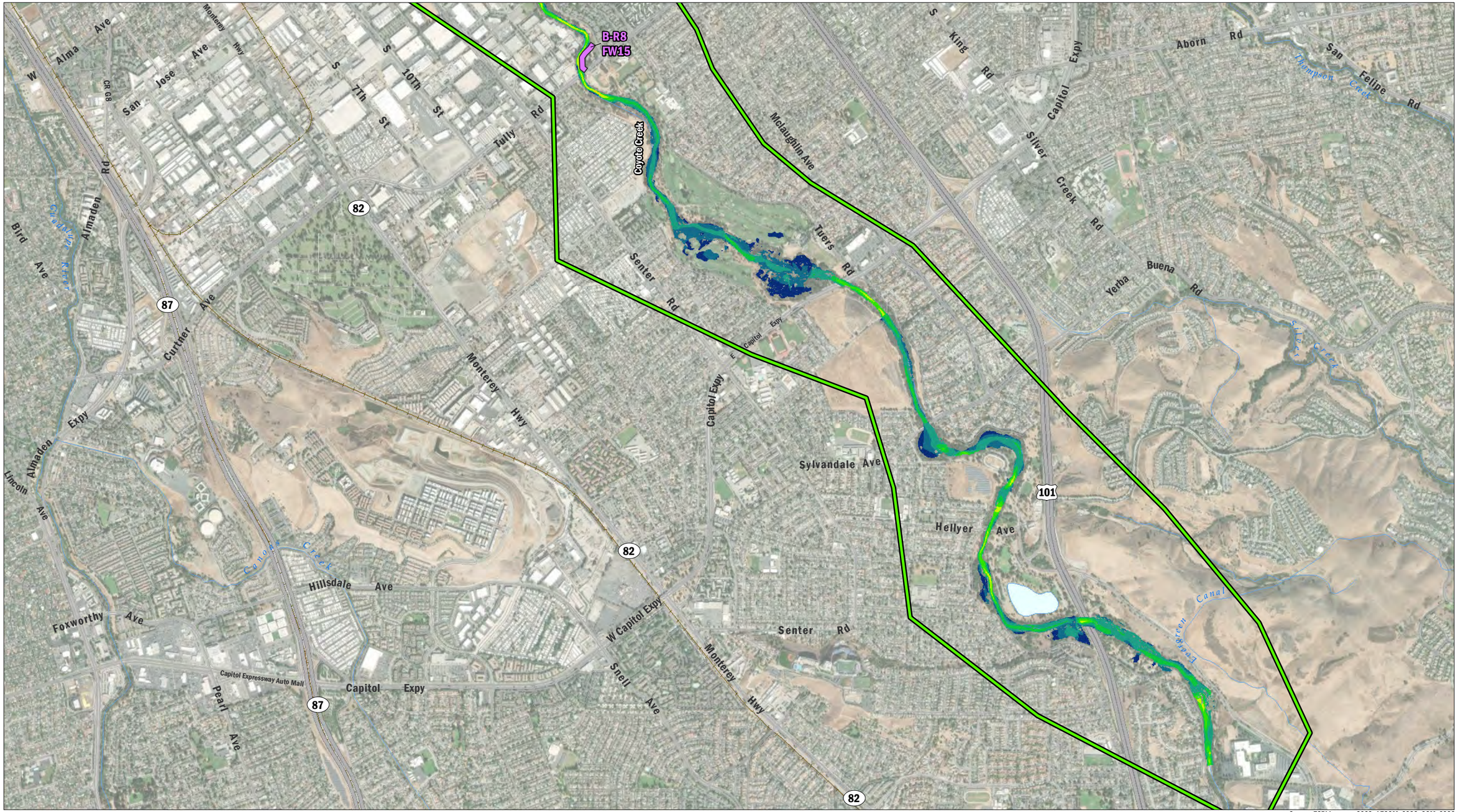


AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

CCFPP
Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

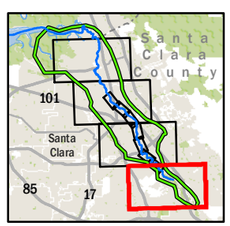
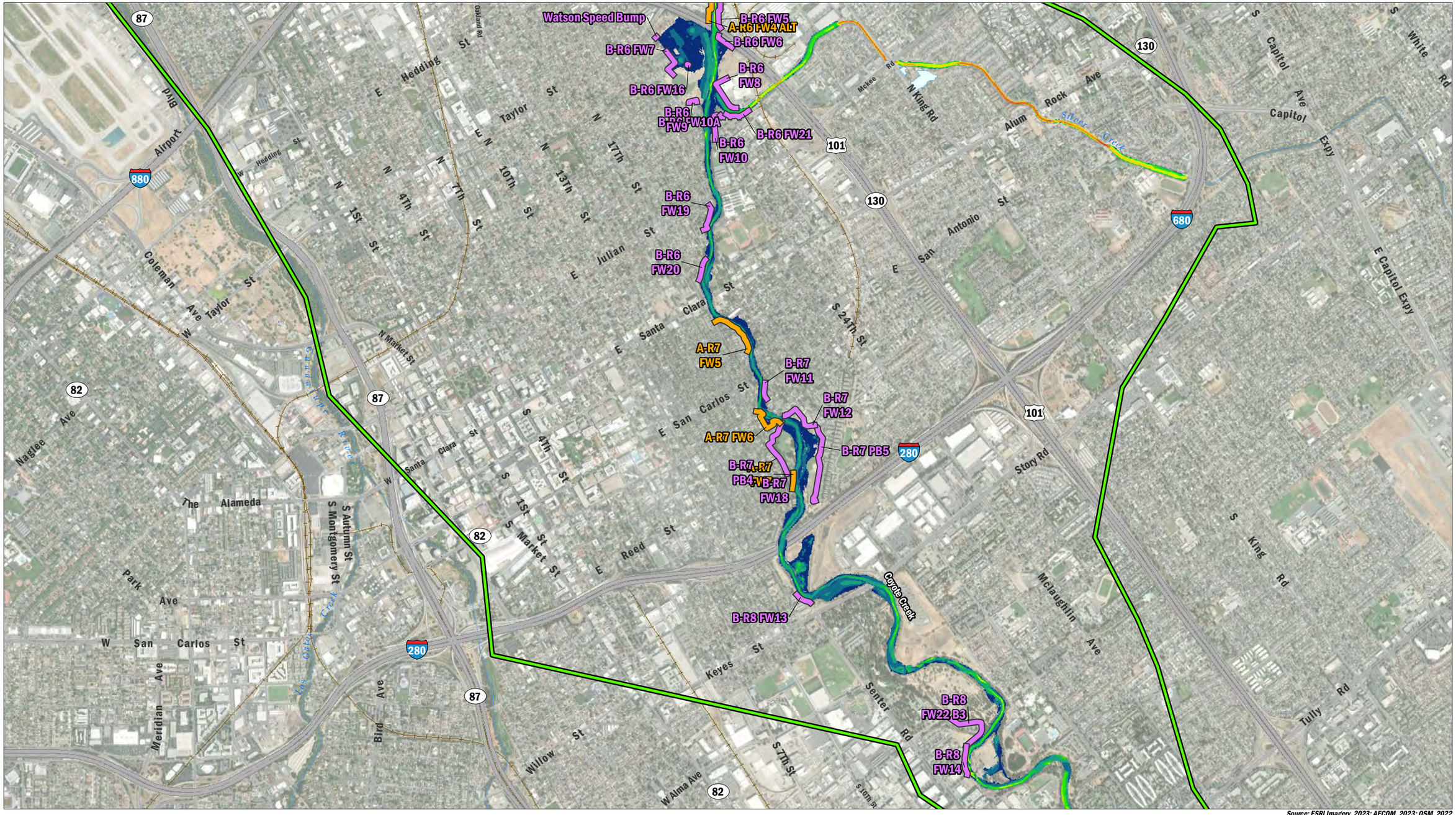


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400 Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

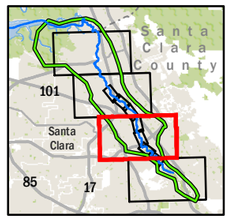


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

0 2,400
Feet

Created Date: 6/10/2024

AECOM
Coyote Creek
EIR Modeling

Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

- CCFMMP
- CCFPP
- Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5

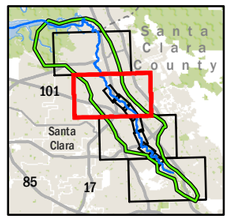


FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A



Source: ESRI Imagery, 2023; AECOM, 2023; OSM, 2022

N

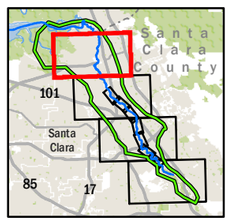
0 2,400 Feet

Created Date: 6/10/2024

Model Boundary

Maximum Velocity Scenario 5A
Velocity (ft/s)

- 0 - 0.7
- 0.7 - 1.5
- 1.5 - 2.4
- 2.4 - 3.2
- 3.2 - 4
- 4 - 5
- 5 - 6.2
- 6.2 - 7.7
- 7.7 - 9.8
- 9.8 - 11.5



AECOM
Coyote Creek
EIR Modeling

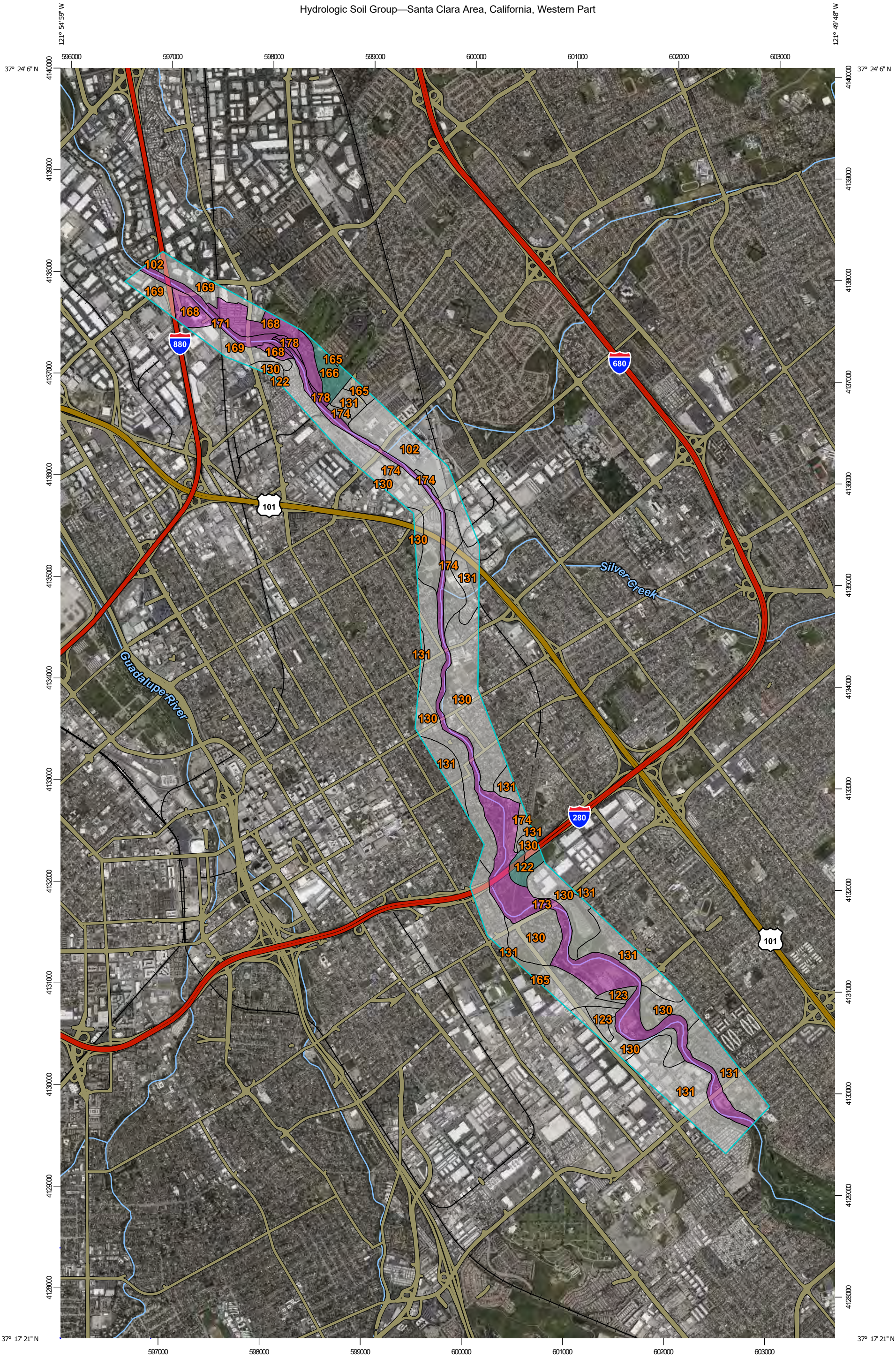
Note: For some ranges of values, there are not enough occurrences within the range to be evident at the figure scale. See the Technical Memorandum for further information.

FIGURE 7

Proposed Max. Velocity in Depths 1ft and Over Scenario 5A
Page 11 of 11

Attachment 5
NRCS HSG Web Soil Survey

Hydrologic Soil Group—Santa Clara Area, California, Western Part



Map Scale: 1:35,000 if printed on B portrait (11" x 17") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 12, Sep 11, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2023—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
102	Urban land, 0 to 2 percent slopes, alluvial fans		108.4	6.1%
122	Xerorthents, anthropogenic fill, 0 to 2 percent slopes	C	18.1	1.0%
123	Urban Land-Xerorthents, anthropogenic fill complex, 0 to 2 percent slopes		24.0	1.3%
130	Urban land-Still complex, 0 to 2 percent slopes		470.2	26.3%
131	Urban land-Elpaloalto complex, 0 to 2 percent slopes		422.3	23.7%
165	Urbanland-Campbell complex, 0 to 2 percent slopes, protected		10.5	0.6%
166	Campbell silt loam, 0 to 2 percent slopes, protected	C	27.1	1.5%
168	Elder fine sandy loam, protected, 0 to 2 percent slopes	A	88.7	5.0%
169	Urbanland-Elder complex, 0 to 2 percent slopes, protected		105.3	5.9%
171	Elder fine sandy loam, 0 to 2 percent slopes, rarely flooded	A	30.8	1.7%
173	Caninecreek-Elder complex, 0 to 2 percent slopes, rarely flooded	A	290.3	16.3%
174	Urban Land-Caninecreek-Elder complex, 0 to 2 percent slopes		182.4	10.2%
178	Caninecreek-Elder complex, 1 to 5 percent slopes, protected	A	6.5	0.4%
Totals for Area of Interest			**1,784.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher