Flow Equalization & Resource Recovery Facility Levee Improvements & Bayfront Recycled Water Facility Project

VOL. II - EIR APPENDICES
SCH#2020050414

DECEMBER 2020

WEST BAY
SANITARY DISTRICT

West Bay Sanitary District
500 Laurel Street | Menlo Park, CA 94025

APPENDIX A

NOP SCOPING COMMENTS

This page left intentionally blank

NATIVE AMERICAN HERITAGE COMMISSION

Received

JUN 05 20

West Bay Sanitary District

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

May 27, 2020

Phil Scott, District Manager
West Bay Sanitary District
500 Laurel Street
Menlo Park, CA 94025-3486

Re: 2020050414, Flow Equalization and Resource Recovery Facility Levee Improvements and Recycled Water Facility Project, San Mateo County

Dear Mr. Scott:

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 (http://ohp.parks.ca.gov/?page_id=1068) 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: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez

Nancy Gonzalez-Lopez
Staff Services Analyst

cc: State Clearinghouse

This page left intentionally blank

SAN MATEO
LAFCo
LOCAL AGENCY FORMATION COMMISSION
455 COUNTY CENTER, 2ND FLOOR • REDWOOD CITY, CA 94063-1663 • PHONE (650) 363-4224 • FAX (650) 363-4849

June 9, 2020

Received
JUN 12 2020
West Bay Sanitary District

West Bay Sanitary District
Attn: Phil Scott, District Manager
500 Laurel Street
Menlo Park, CA 94025

Subject: Notice of Preparation of an Environmental Impact Report for the Flow Equalization and Resource Recovery Facility Levee Improvements and Recycled Water Facility Project

Dear Mr. Scott,

Thank you for the opportunity to comment on the Notice of Preparation of an Environmental Impact Report (EIR) for the Flow Equalization and Resource Recovery Facility Levee Improvements and Recycled Water Facility Project (Project).

The Local Agency Formation Commission (LAFCo) is a state mandated local agency established in every county to oversee the boundaries of cities and special districts. San Mateo LAFCo has jurisdiction over the boundaries of the 20 cities, 22 independent special districts, and many of the 33 active county and city governed special districts serving San Mateo County.

The Notice of Prepetition (NOP) for the Project identifies a proposed development of levee improvements and the construction of a new recycled water facility. The NOP states that in addition to the facility, new pipeline will be constructed to connect serve customers with the recycled water.

In 2017, San Mateo LAFCo approved an application by West Bay Sanitary District to provide recycled water service within only the portions of its service area encompassing Sharon Heights Golf and Country Club and the Stanford Linear Accelerator Center (see Attachment A). The application was submitted pursuant go Government Code Section 56824. In approving the application, LAFCo amended the functions and services of the District to include recycled water as detailed below.

Function Services	
Solid Waste Collection and Disposal by Franchise Agreement; Recycling	Collect, transfer, and dispose of solid waste and provide solid waste handling service, including, but not limited to, source reduction, recycling, composting activities, pursuant to Division 30 (commencing with Section 40000), and consistent with Section 41821.2 of the Public Resources Code.
Sewage Collection	
Sewage Treatment (as member of Silicon Valley Clean Water - formerly South Bayside System Authority)	
On-site Wastewater Disposal	
Recycled Water	Construct and operate a satellite wastewater treatment plant, influent pump station and pipeline, solid discharge pipeline back to the sewer, and a recycled water pump station and delivery pipeline in Phases I and II, Sharon Heights Golf & Country Club and Stanford Lands

Currently, the District only has the authority to provide recycled water in the Sharon Heights Golf & Country Club and Stanford Lands of the District's service area. Any additional areas that are proposed to receive recycled water services shall require LAFCo authorization pursuant to Government Code 56824. An application shall be made to San Mateo LAFCo by resolution from the District if additional areas to receive recycled water.

LAFCo has the following comments regarding the NOP:

The Project proposes the construction of new influent and effluent piping to connect customers to the recycled water facility. The EIR should identify the service area for this recycled water and any new piping that will need to be installed for the customers to receive this service. The NOP currently only identifies the connection to a storage tank, which is stated to not be part of this project. Please clarify if the construction of the storage tank and the lines connecting it is proposed under a separate project, and if it is, describe how recycled water will be distributed to customers without the storage tank.

The EIR should identify environmental impacts of any customer connections to the recycled water transmission line.

Please clarify if the Project will have any impact on the existing recycled water service the District provides in Sharon Heights Golf & Country Club and Stanford Lands areas.

Please list San Mateo Local Agency Formation Commission as a permitting agency for the project if there are additional areas outside of Sharon Heights Golf & Country Club and Stanford Lands that will be receiving recycled water service outside of the Sharon Heights Golf & Country Club and Stanford Lands area. If such service is requested, an application to LAFCo, in accordance with Government Code Section 56824, shall be submitted. This shall include a resolution of application from the District, a plan for service, and applicable fees and application materials.

If approval from LAFCo is required, San Mateo LAFCo would be a Responsible Agency under California Environmental Act (CEQA) (CEQA Guidelines 21069). Before action could be taken by LAFCo, the West Bay Sanitary District must certify the EIR.

San Mateo LAFCo looks forward to reviewing all future environmental documents related to the Project.

Sincerely,

Rob Bartoli

Rob Bartoli
Management Analyst

Attachment A – 2016 WBSD Application for Sharon Heights Golf & Country Club and Stanford Lands Recycled Water Service

Attachment A

RECEIVED
DEC 0 2 2016
LAFCO

RESOLUTION NO. 2007 (2016)
IN THE DISTRICT BOARD OF THE WEST BAY SANITARY DISTRICT
COUNTY OF SAN MATEO, STATE OF CALIFORNIA

*****

RESOLUTION OF APPLICATION TO REQUEST THAT THE LOCAL AGENCY FORMATION COMMISSION AUTHORIZE LATENT POWERS WITHIN WEST BAY SANITARY DISTRICT'S SERVICE AREA FOR RECYCLED WATER DELIVERY PHASE I AND PHASE II

WHEREAS, West Bay Sanitary District's (the District) Service Area for Recycled Water Delivery Phase I and Phase II, is a District Service Area organized and existing under the laws of the State of California, Health and Safety Code Section 6400 *et seq.* ("H&S Code"); and

WHEREAS, the District's Recycled Water Service Area for Phase I encompasses the entire Sharon Heights Golf and Country Club and Phase II encompasses, Stanford Linear Accelerator Center, (see Exhibit A – map) located within San Mateo County and is authorized to provide various public services as delineated in its formation Resolution; and

WHEREAS, California Government Code Section 56824.12 authorizes the District Board of Directors to request approval of the local LAFCO to activate latent powers within an existing District Service Area pursuant to California Government Code Sections 56824.10 through 56824.14; and

WHEREAS, LAFCO's proceedings to activate latent powers within the District's Service Area may be initiated by a Resolution of Application approved by the West Bay Sanitary District's Board of Directors as the governing authority for the District; and

WHEREAS, West Bay Sanitary District's Board of Directors, in accordance with Government Code Section 56824.12(c)(1), held a duly noticed public hearing on this Resolution of Application to consider public comment on the proposed application (Exhibit B) for expansion of services to be provided within the boundaries of the District to include:

1. Operation and Maintenance (O&M), and Rehabilitation and Replacement (R&R) of Recycled Water treatment facility and pipelines on District operated properties and right of ways; and
2. Distribution of Recycled Water for Irrigation, Commercial, and Industrial use to Recycled Water Phase I and Phase II service area.

WHEREAS, the proposal to add operation and maintenance of Recycled Water treatment facility and pipelines on District owned or operated properties and Distribution of Recycled Water for Irrigation, Commercial and Industrial use is consistent with District's sphere of influence and is not inconsistent with any other district or city's sphere of influence;

NOW, THEREFORE, BE IT RESOLVED AND ORDERED by the West Bay Sanitary District's Board of Directors as follows:

SECTION 1. This proposal is made pursuant to Sections 56824.10 and 56824.12 of the California Government Code.

SECTION 2. This proposal is to activate latent powers within the West Bay Sanitary District consisting of:

1. Operation and Maintenance, and Rehabilitation and Replacement of Recycled Water treatment facility and pipelines on District operated properties and right of ways; and

2. Distribution of Recycled Water for Irrigation, Commercial and Industrial use to Recycled Water Phase I and Phase II service area.

The Plan for Services was prepared pursuant to Section 56653 attached hereto as Exhibit C.

SECTION 3. The boundaries of the District shall not be affected.

SECTION 4. The reason for this proposal is to provide recycled water by treating wastewater for reuse within the service area to meet customer demands for non-potable water. This activation of latent powers will provide for the operation and maintenance, and rehabilitation and replacement of Recycled Water treatment facility and pipelines on District operated properties and right of ways and for distribution of Recycled Water for irrigation, commercial, and industrial use in Recycled Water Phase I and Phase II service area. This application is to activate this latent power throughout Phase I and Phase II territory of West Bay Sanitary District; however, it is anticipated that application may be made in the future to include other phases of Recycled Water Treatment and Distribution within the District's jurisdiction and sphere of influence pursuant to the provisions of the H&S Code.

SECTION 5. The Board hereby requests that LAFCO undertake proceedings for this proposal in accordance with Government Code Section 56824.14.

SECTION 6. This proposal does not affect the boundaries of any city or district.

SECTION 7. The District Manager is directed to file a certified copy of this Resolution with the Executive Officer of LAFCO.

PASSED AND ADOPTED by the District Board of the West Bay Sanitary District at a special meeting thereof held on 30th day of November, 2016, by the following votes:

Ayes: MORITZ, DEHN, THIELE-SARDINA, OTTE
Noes: NONE
Absent: WALKER
Abstain: NONE

Edward P. Moritz
President of the District Board of the
West Bay Sanitary District of San
Mateo County, State of California

Attest:

Secretary of the District Board of the
West Bay Sanitary District of San Mateo
County, State of California

Exhibit "A"

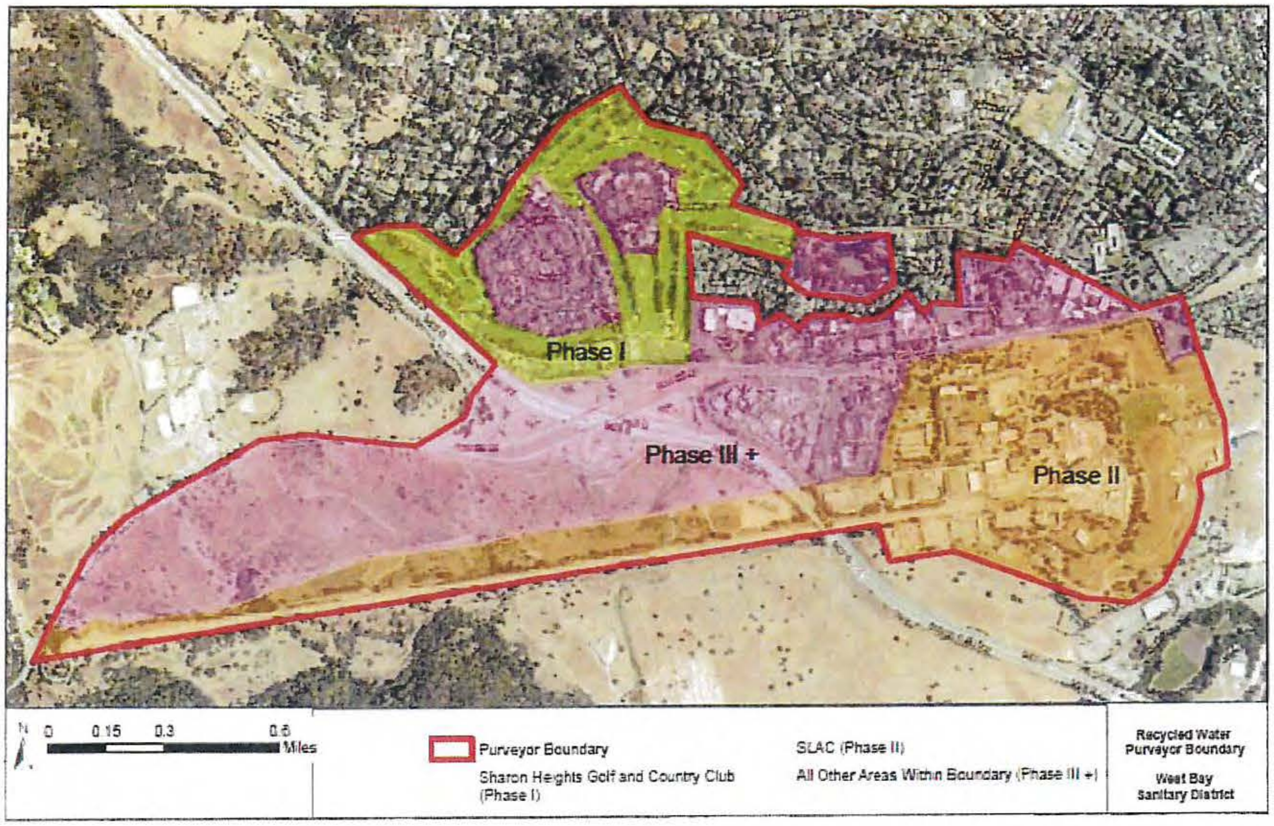

Phase I
Phase III +
Phase II
N
0 0.15 0.3 0.6 Miles
Purveyor Boundary
Sharon Heights Golf and Country Club (Phase I)
SLAC (Phase II)
All Other Areas Within Boundary (Phase III +)
Recycled Water Purveyor Boundary
West Bay Sanitary District

EXHIBIT B

APPLICATION FOR A CHANGE OF ORGANIZATION OR REORGANIZATION TO THE SAN MATEO LOCAL AGENCY FORMATION COMMISSION

A. GENERAL INFORMATION

1. Briefly describe the nature of the proposed change of organization or reorganization.

   Application to activate the recycled water pursuant to Government Code Section 56824.12 to the Sharon Heights Golf Course and Stanford Lands (Phase I and II) as shown on the attached map Exhibit A.

2. An application for a change of organization or reorganization may be submitted by individuals in the form of a petition or by an affected public agency in the form of a certified resolution. This application is submitted by (check one):

   ______ Landowners or registered voters, by petition
   __X__ An affected public agency, by resolution

   (If this application is submitted by petition of landowners or registered voters in the affected territory, complete the petition form.)

3. What are the reasons for the proposal?

   The reason for this proposal is to provide recycled water by treating wastewater for reuse within the service area to meet customer demands for non-potable water. This activation of latent powers will provide for the operation and maintenance, rehabilitation and replacement of Recycled Water treatment facility and pipelines on District operated properties and right of ways and for distribution of Recycled Water for irrigation, commercial, and industrial use in Recycled Water Phase I and Phase II service area as shown on the attached map. This application is to activate this latent power throughout Phase I and Phase II territory of West Bay Sanitary District; however, it is anticipated that application may be made in the future to include other territory in the District's Recycled Water Treatment and Distribution program within the District's jurisdiction and sphere of influence pursuant to the provisions of the Health and Safety Code.

4. Does this application have 100% consent of landowners in the affected area?

   __x__ Yes ______ No

5. Estimated acreage: Phase I ≈ 111 acres, Phase II ≈ 467 acres. Total ≈ 578 acres

B. SERVICES

1. List the name or names of all existing cities and special districts whose service area or service responsibility would be altered by the proposed change of organization or reorganization.

   West Bay Sanitary District

2. List all changes to the pattern of delivery of local services to the affected area. For each service affected by the proposed change(s) of organization, list the present source of service (state "none" if service is not now provided), the proposed source of service and the source of funding for construction of necessary facilities (if any) and operation. Example is given on the first two lines of the space provided for your response.

SERVICE	PRESENT SOURCE	PROPOSED SOURCE	FUNDING SOURCE	
			CONSTRUCTION	OPERATING
Recycled Water	None	West Bay Sanitary District	Clean Water State Revolving Fund Loans and grants guaranteed with a pledge of District General Fund Revenues and recovered through user agreements with irrigation, commercial and industrial users and other legal methods	User fees assessed to irrigation, commercial and industrial users. All Capital, operations and reserve costs will be recovered through the User Agreements and through Operations and Maintenance and fees such that the recycled water project will be revenue neutral to the District.

C. PROJECT PROPOSAL INFORMATION

1. Please describe the general location of the territory which is the subject of this proposal. Refer to major highways, roads and topographical features.

Sharon Park Golf Course and Stanford Linear Accelerator Center (SLAC)

2. Describe the present land use(s) in the subject territory.

Phase I, Sharon Heights Golf and Country Club is used as Open Space and Conversation District
Phase II, SLAC is used as a Federal Facility operated by the Dept. of Energy

3. How are adjacent lands used?

North: Residential

South: Open Space, Institutional, Residential

East: Residential, Commercial, Institutional

West: Open Space

4. Will the proposed change of organization result in additional development? If so, how is the subject territory to be developed?

No conditions of approval are requested.

5. What is the general plan designation of the subject territory?
Phase I. Sharon Heights Golf and Country Club has a General Plan land use of Parks and Recreation. The following excerpt is taken from the Menlo Park General Plan regarding the Parks and Recreation Land Use:
This designation provides for public and private golf courses, passive and active recreation uses, educational facilities, and similar and compatible uses. The letter "P" overlaid on this designation denotes a park. The maximum FAR shall be in the range of 2.5 percent to 30 percent. (See attachment 1 & 2).
Phase II. SLAC is used as a Federal Facility operated by the Dept. of Energy. SLAC resides in unincorporated SMCO not in the City of Menlo Park.

6. What is the existing zoning designation of the subject territory?

Phase I. Sharon Heights Golf and Country Club is designated as OSC, Open Space and Conversation Due to the zoning, the development potential is limited to public uses, public or private recreational uses, or agricultural uses. Source: Planning and Zoning Dept. (See attachment 1 & 2).

Phase II. SLAC is used as a Federal Facility operated by the Dept. of Energy. Resides in SMCO Zoning description is: R-E Residential Estates and S-11 Residential Density District #11

7. What prezoning, environmental review or development approvals have already been obtained for development in the subject territory?
None

8. What additional approvals will be required to proceed?

LAFCO

9. Does any portion of the subject territory contain any of the following --agricultural preserves, sewer or other service moratorium or wetlands subject to the State Lands Commission jurisdiction?

No

10. If no specific development projects are associated with this proposal, will the proposal increase the potential for development of the property? If so, how?

No specific development projects are planned.

* * * * * * * * * * * *

LAFCo will consider the person signing this application as the proponent of the proposed action(s). Notice and other communications regarding this application (including fee payment) will be directed to the proponent at:

NAME: West Bay Sanitary District

ADDRESS: 500 Laurel Street, Menlo Park, CA 94025 TELEPHONE: 650-321-0384

ATTN: Phil Scott, District Manager

Signature of Proponent

ATTACHMENT 1
CITY OF MENLO PARK
ZONING DISTRICT AND GENERAL PLAN LAND USE DESIGNATION CORRESPONDENCE TABLE

Zoning District		General Plan Land Use Designation
R-E	Residential Estate District	Very Low Density Residential
R-E-S	Residential Estate Suburban District	Very Low Density Residential
R-1-S	Single Family Suburban Residential District	Low Density Residential[1,2]
R-1-S (FG)	Single Family Suburban Residential District (Felton Gables)	Low Density Residential[2]
R-1-U	Single Family Urban Residential District	Low Density Residential
R-2	Low Density Apartment District	Medium Density Residential
R-3	Apartment District	Medium Density Residential
R-3-A	Garden Apartment Residential District	Medium Density Residential
R-3-C	Apartment-Office District	Professional and Administrative Offices[3]
R-4	High-Density Residential District	High Density Residential
R-4-S	High-Density Residential District, Special	High Density Residential
R-4-S (AHO)	High-Density Residential District, Special, Affordable Housing Overlay	High Density Residential
R-L-U	Retirement Living Units District	High Density Residential
C-1	Administrative and Professional District, Restrictive	Professional and Administrative Offices
C-1-A	Administrative and Professional District	Professional and Administrative Offices
C-1-C	Administrative, Professional and Research District, Restrictive	Professional and Administrative Offices
C-2	Neighborhood Shopping District	Retail/Commercial
C-2-A	Neighborhood Shopping District, Restrictive	Retail/Commercial
C-2-B	Neighborhood Commercial District, Restrictive	Retail/Commercial
C-2-S	Neighborhood Commercial District, Special	Retail/Commercial
C-4	General Commercial District	Retail/Commercial
M-2	General Industrial District	Limited Industry
M-3	Commercial Business Park	Commercial Business Park
SP-ECR/D	El Camino Real/Downtown Specific Plan	El Camino Real/Downtown Specific Plan
OSC	Open Space and Conservation District	Parks and Recreation
P-F	Public Facilities District	Public Facilities
FP	Flood Plain District	Non-Urban[4]
P	Parking District	Retail/Commercial
H	Historic Site District	Medium Density Residential[5]
AACP	Allied Arts Guild Preservation District	Other
X	Conditional Development	n/a[6]
U	Unclassified	n/a

[1] The General Plan refers to R-1-S as potentially part of either the Very Low Density Residential or Low Density Residential land use designations. However, when developments are built to R-1-S standards, only the Low Density Residential land use designation applies.
[2] The Stanford Golf Course area between Junipero Serra and Sand Hill Road is part of the Parks and Recreation land use designation.
[3] The R-3-C zoning district may have residential uses, but at densities covered by the Professional and Administrative Offices land use designation.
[4] Bayfront Park is part of the Parks and Recreation land use designation.
[5] The two parcels currently zoned H are 1040 Noel Drive and 1000 Crane Street.
[6] Conditional Development districts inherit the land use designation of their base zoning district.

ATTACHMENT 2

CITY OF MENLO PARK
ZONING MAP AND GENERAL PLAN LAND USE DIAGRAM
SHEET 1

Please see index sheet for detailed legend

Updated: April 2015
By: Planning Division, GIS Section

EXHIBIT C

Plan for Services

1. The services to be provided within the District are:

    - Operation and Maintenance, and Rehabilitation and Replacement (R&R) of Recycled Water treatment facility and pipelines on District operated properties and right of ways; and
    - Distribution of Recycled Water for Irrigation, Commercial, and Industrial use to Recycled Water Phase I and Phase II service area.

2. The level and range of services to be provided are operation and maintenance of District owned or operated recycled water facilities and appurtenances in a clean, productive and safe condition, and distribution of recycled water to certain irrigation, commercial, and industrial users in the service area.

3. Services may be extended within the Sharon Heights area in the Phase I service area of the golf course in the next 18 to 24 months. Extension into the Phase II service area for industrial, commercial and irrigation use may occur over the next few years.

4. Conditions including improvements or upgrades to existing facilities are not appropriate for this proposal.

5. Construction of the recycled water treatment facility will be funded with Clean Water State Revolving Fund loans and grants guaranteed by a pledge of District General Fund Revenues and recovered through User Agreements with irrigation, commercial, and industrial users and other legal methods of financing. O&M and R&R costs will be recovered through fees assessed to irrigation, commercial, and industrial users. All capital, operations, and reserve costs will be recovered through the User Agreement and through O&M and R&R fees such that the recycled water project will be revenue neutral to the District.

6. The total estimated cost to provide the new function of services within the entirety of the District's Sharon Heights area is not known at this time; however the estimated cost to construct the recycled water facility is estimated to be \$15.6M, and O&M costs are estimated at \$250,000 to \$300,000 annually. We assume the golf course will use between 152 acre feet per year (AFY) and 200 AFY. The cost of service is estimated to be in the range of \$3,600/acre foot and \$4,600/acre foot depending on how much recycled water the golf course actually uses and the final construction cost of the facility. These costs have been discussed with Sharon Heights Golf and Country Club in detail and they have entered into an MOU indicating they are willing to reimburse the District for the capital and O&M costs associated with the project. SLAC has been made aware of the costs as well and are interested in the project since the long term cost of potable water will eventually rise above the cost of recycled water and has environmental benefits, but have not yet entered into a User Agreement with the District.

   Facilities will be maintained throughout the project life and financing period of 30 years, with R&R services conducted to extend the useful life beyond 30 years, as needed, to continue to provide reliable water service as long as demands continue.

7. Alternatives to provide alternate water sources for irrigation have been explored and included the construction of a well but the immediate area is not suited for a well and a well proposal in Menlo Park was determined to be prohibitively expensive, intrusive and not accepted by the community.

An alternative to create a special assessment district to fund and provide the services would require the District to purchase land for the recycled water facility (increasing capital costs) and provide recycled water at a rate less than cost-of-service for at least several years resulting in a net increase to the District rate payers. Activation of latent powers to allow the District to perform the services is preferable because it avoids the need to create a new assessment district to fund and provide the necessary services via user agreements and private partnership.

This page left intentionally blank

San Francisco Bay Conservation and Development Commission
375 Beale Street, Suite 510, San Francisco, California 94105 tel 415 352 3600 fax 888 348 5190
State of California | Gavin Newsom – Governor | info@bcdc.ca.gov | www.bcdc.ca.gov

Transmitted via Electronic Mail

June 18, 2020

Phil Scott
District Manager
West Bay Sanitary District
500 Laurel Street
Menlo Park, CA 94025

SUBJECT: NOP Scoping Comments – Flow Equalization and Resource Recovery Facility Levee Improvements and Recycled Water Facility Project; State Clearinghouse Number 2020050414

Dear Mr. Scott:

Thank you for the opportunity to comment on West Bay Sanitary District's (District) Notice of Preparation (NOP) for the Flow Equalization and Resource Recovery Facility Levee Improvements and Recycled Water Facility Project (Project), State Clearinghouse Number 2020050414, distributed on May 18, 2020 and received in our office on May 27, 2020. The San Francisco Bay Conservation and Development Commission (BCDC or Commission) has not reviewed the NOP, but the following comments provided by staff are based on the *San Francisco Bay Plan* (Bay Plan) as amended through May 2020 and the McAteer-Petris Act. When evaluating projects, BCDC considers all applicable policies. The goal of this letter is to highlight some policies that are relevant to the Project, and to encourage you to meet with BCDC staff well before submitting your permit application to ensure that the proposed Project design is consistent with BCDC policies. In reviewing of your permit application, BCDC staff may raise additional relevant policies.

Commission Jurisdiction. BCDC is responsible for granting or denying permits for any proposed fill (e.g., earth or any other substance or material, including pilings or structures placed on pilings, and floating structures moored for extended periods of time); extraction of materials; or change in use of any water, land, or structure within the Commission's jurisdiction. Generally, BCDC's jurisdiction over San Francisco Bay extends from the Golden Gate to the confluence of the San Joaquin and Sacramento Rivers and includes tidal areas up to mean high tide, including all sloughs, and in marshlands up to five feet above mean sea level; a shoreline band consisting of territory located between the shoreline of the Bay and 100 feet landward and parallel to the shoreline; salt ponds; managed wetlands; and certain waterways that are tributaries to the Bay. The Commission can grant a permit for a project if it finds that the project is either (1) necessary to the health, safety, and welfare of the public in the entire Bay Area, or (2) is consistent with the provisions of the

McAteer-Petris Act and the Bay Plan. The Commission has jurisdiction over the Bay waters and shoreline areas on or around several parts of the project site and a permit from the Commission will be required. There are at least two existing BCDC permits associated with this site—M1994.044.00 and M2002.006.00. The District should be aware of the requirements of these permits and discuss the implications of these permits on the proposed Project with BCDC.

Priority Use Areas. Section 66602 of the McAteer-Petris Act states, in part, that certain water-oriented land uses along the bay shoreline are essential to the public welfare of the Bay Area, and that these uses include wildlife refuges and water-oriented recreation and public assembly, and, as such, the San Francisco Bay Plan should make provision for adequate and suitable locations for all these uses. In Section 66611, the Legislature declares “that the Commission shall adopt and file with the Governor and the Legislature a resolution fixing and establishing within the shoreline band the boundaries of the water-oriented priority land uses, as referred to in Section 66602,” and that “the Commission may change such boundaries in the manner provided by Section 66652 for San Francisco Bay Plan maps.”

From examination of the boundaries of the Project outlined in the NOP, it appears that one of the proposed sheet pile locations and the horizontal levee are directly adjacent to, and possibly partially within, the South San Francisco Bay Wildlife Priority Use Area. Parts of the Project are also directly adjacent to, and possibly partially within, the Menlo Park Waterfront Park, Beach Priority Use Area. Any proposals for placing fill, extracting materials, or changing the use of any land, water, or structure within those areas that are designated for Wildlife, Waterfront Park, or Beach Priority Use in the Bay Plan must be developed and managed in a manner consistent with applicable policies of the McAteer-Petris Act and the Bay Plan. The District should coordinate with BCDC to confirm whether any components of the Project fall within these Priority Use Areas, and if so, the EIR should describe the consistency of the Project with the relevant sections of the Bay Plan.

Commission Law and Bay Plan Policies Relevant to the Project

1. **Bay Fill.** Section 66605 of the McAteer-Petris Act (MPA) sets forth the criteria necessary to authorize placing fill in the Bay and certain waterways. It states, among other things, that further filling of the Bay should only be authorized if it is the minimum necessary to achieve the purpose of the fill and if harmful effects associated with its placement are minimized. According to the MPA, fill should be limited to water-oriented or minor fill for improving shoreline appearance or public access and should be authorized only when no alternative upland location is available for such purpose. The NOP anticipates that the Project will include installation of 3,400 feet of sheet pile wall, construction of an ecotone levee, raising the grades of perimeter access roads, and construction of a recycled water facility, including a potential bayside outfall for brine disposal. Some or all of these activities may involve Bay fill. In the draft EIR (DEIR), please describe how the proposed fill meets MPA fill requirements. Depending on the amount of net total fill proposed to construct the sheet pile wall, the Commission may require that fill be removed elsewhere on the waterfront to mitigate the amount of new fill proposed.

2. **Climate Change and Safety of Fills.** Climate Change Policy No. 2 states that, "When planning shoreline areas or designing larger shoreline projects, a risk assessment should be prepared…based on the estimated 100-year flood elevation that takes into account the best estimates of future sea level rise and current flood protection and planned flood protection…for the proposed project or shoreline area. A range of sea level rise projections for mid-century and end of century based on the best scientific data available should be used in the risk assessment." Policy No. 3 states that where such assessments show vulnerability to public safety, projects "should be designed to be resilient to a mid-century sea level rise projection" and an "adaptive management plan" should be prepared if it is likely the project will remain in place longer than mid-century.

   In addition, Policy No. 4 in the Bay Plan Safety of Fills section states that structures on fill or near the shoreline should have adequate flood protection including consideration of future relative sea level rise as determined by qualified engineers. The policy states that, "[a]dequate measure should be provided to prevent damage from sea level rise and storm activity that may occur on fill or near the shoreline over the expected life of a project…. New projects on fill or near the shoreline should either be set back from the edge of the shore so that the project will not be subject to dynamic wave energy, be built so the bottom floor level of structures will be above a 100-year flood elevation that takes future sea level rise into account for the expected life of the project, be specifically designed to tolerate periodic flooding, or employ other effective means of addressing the impacts of future sea level rise and storm activity." These policies should be read in combination with Public Access Policy No. 6, which states in part that public access areas "should be sited, designed, managed and maintained to avoid significant adverse impacts from sea level rise and shoreline flooding" and with policies on biological resource protection described below.

   The NOP mentions that the District is proposing to bring the site out of the FEMA 100-year flood zone and to plan for a 50-year sea level rise projection. In the DEIR, as required by Bay Plan Climate Change policies, the District should include the mean higher high water level, the 100-year flood elevation, the mid- and end-of-century sea level projections (preferably using projections based on the best-available science found in the State's SLR guidance, available here: http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf), anticipated site-specific storm surge effects, and a preliminary assessment of the Project's vulnerability to future flooding and sea level rise. The DEIR should include a discussion of how the Project has been designed to adapt to, tolerate, and/or manage sea level rise and shoreline flooding at the site to ensure the Project is resilient to mid-century sea level rise projections, and how it can adapt to end of the century projections if it is likely the Project will remain in place longer than mid-century. If necessary, the DEIR should indicate whether there are any proposed long-term adaptation strategies, whether adaptation strategies would have the potential to adversely affect public access areas and wildlife habitat, and methods for minimizing these effects.

3. **Shoreline Protection.** The Bay Plan establishes criteria by which new shoreline protection projects may be authorized and by which existing shoreline protection may be maintained or reconstructed. Shoreline Protection Policy No. 5 requires that "all shoreline protection projects should evaluate the use of natural and nature-based features such as marsh vegetation, levees with transitional ecotone habitat, mudflats, beaches, and oyster reefs, and should incorporate these features to the greatest extent practicable. Ecosystem benefits, including habitat and water quality improvement, should be considered in determining the amount of fill necessary for the project purpose. Suitability and sustainability of proposed shoreline protection and restoration strategies at the project site should be determined using the best available science on shoreline adaptation and restoration." Shoreline Protection Policy No. 7 states that "the Commission should encourage pilot and demonstration project to research and demonstrate the benefits of incorporating natural and nature-based techniques in San Francisco Bay." The Project's ecotone levee component adds natural and nature-based features and may be considered a pilot or demonstration project. Shoreline Protection Policy 2 states equitable and culturally-relevant community outreach and engagement should be conducted to meaningfully involve nearby communities for all shoreline protection project planning and design processes – other than maintenance and in-kind repairs to existing protection structures or small shoreline protection projects – in order to supplement technical analysis with local expertise and traditional knowledge and reduce unintended consequences. In particular, vulnerable, disadvantaged, and/or underrepresented communities should be involved. If such previous outreach and engagement did not occur, further outreach and engagement should be conducted prior to Commission action. Finally, Water Quality Policy No. 7 requires that, whenever practicable, native vegetation buffer areas should be used in place of hard shoreline and bank erosion control methods (e.g., rock riprap) where appropriate and practicable. New shoreline protection projects are also to avoid adverse impacts to natural resources and public access, and mitigation or alternative public access must be provided when avoidance is not possible.

   The DEIR should describe how the sheet pile wall and ecotone levee, as well as any other proposed shoreline protection features of the Project, would be consistent with BCDC's shoreline protection policies, including how natural and nature-based features are incorporated to the greatest extent practicable. The DEIR should also catalog existing shoreline protection structures at the Project site and identify where maintenance or reconstruction is required. Please also discuss the anticipated performance of the ecotone levee that is proposed for the Project site, and include an analysis of the potential to adversely impact natural resources or public access. The DEIR should also include a discussion of outreach and engagement that was conducted regarding this aspect of the Project.

4. **Water Quality**. The policies in the Water Quality section of the Bay Plan address water quality and require Bay water pollution to be prevented to the greatest extent feasible. New projects are required to be sited, designed, constructed and maintained to prevent or minimize the discharge of pollutants in the Bay by controlling pollutant sources at the project site, using appropriate construction materials, and applying best management practices. More specifically, Bay Plan policies on water quality state, in part, that "water quality in all parts of the Bay should be maintained at a level that will support and promote the beneficial uses of the Bay as identified in the San Francisco Bay Regional Water Quality Control Board's *Water Quality Control Plan, San Francisco Basin* and should be protected from all harmful or potentially harmful pollutants." The construction impacts and potential brine outfall described in the NOP could affect water quality around the site and beyond. The DEIR should include an analysis of potential water quality impacts associated with the Project. The District should also work with the Regional Water Quality Control Board and other relevant resource agencies to protect against impacts to the water quality of the slough and tidal marsh and to surrounding natural communities.

5. **Fill for Habitat.** Our Commission recently approved several new Bay Plan policies addressing Bay fill for habitat projects. While most of these policies are focused on projects for which the primary purpose is habitat restoration, enhancement, or creation, some of the policies may apply to the ecotone levee component of this Project. Fish, Other Aquatic Organisms, and Wildlife Policy No. 3 states "In reviewing or approving habitat restoration projects or programs the Commission should be guided by the best available science, including regional goals, and should, where appropriate, provide for a diversity of habitats for associated native aquatic and terrestrial plant and animal species." The NOP mentions that the proposed ecotone levee is a recommendation of the SF Bay Shoreline Adaptation Atlas. The DEIR should include and expand on this detail. Additionally, Fish, Other Aquatic Organisms, and Wildlife Policy No. 6 states, in part, that "Allowable fill for habitat projects in the Bay should (a) minimize near term adverse impacts to and loss of existing Bay habitat and native species; (b) provide substantial net benefits for Bay habitats and native species; and (c) be scaled appropriately for the project and necessary sea level rise adaptation measures in accordance with the best available science…" The DEIR should address how any fill proposed for the ecotone levee meets these criteria.

   Finally, Tidal Marshes and Tidal Flats Policy No. 8 states, in part, that "The level of design; amount, duration, and extent of monitoring; and complexity of the adaptive management plan required for a habitat project should be consistent with the purpose, size, impact, level of uncertainty, and/or expected lifespan of the project. Habitat projects should have a funding strategy for monitoring and adaptive management of the project, commensurate with the level of monitoring and adaptive management that is required for the project…" The DEIR should describe how these factors were taken into account in designing and planning for the long-term management of the ecotone levee.

6. **Biological Impacts**. Protection of biological resources, including wildlife and habitat, is addressed through several sections of the Bay Plan. Fish, Other Aquatic Organisms, and Wildlife Policy No. 1 states “To assure the benefits of fish, other aquatic organisms and wildlife for future generations, to the greatest extent feasible, the Bay's tidal marshes, tidal flats, and subtidal habitat should be conserved, restored and increased.” Furthermore, Tidal Marshes and Tidal Flats Policy No. 2 states that “Any proposed fill, diking, or dredging project should be thoroughly evaluated to determine the effect of the project on tidal marshes and tidal flats, and designed to minimize, and if feasible, avoid any harmful effects.” Additional policies in these Bay Plan sections, and policies in the Subtidal Areas section, provide further requirements on protection of the Bay’s natural resources.

   The NOP describes several activities that may impact tidal marshes and tidal flats, and the organisms that rely on these habitats. The Project proposes a potential bayside outfall for brine disposal, 3400 linear feet of sheet pile wall that will be driven or vibrated 30 feet deep and up to 15 feet high, and construction of a horizontal ecotone levee. The NOP states that “the outer levee and slopes and adjacent waters provide habitat for several special status species” and notes that the Project is expected to have temporary and permanent impacts that will require mitigation. The DEIR should address Bay Plan policies on Fish, Other Aquatic Organisms, and Wildlife; Tidal Marshes and Tidal Flats; and Subtidal Areas, and Bay Plan mitigation policies (described in more detail below) to describe how impacts to wildlife, tidal marsh, and tidal flats will be consistent with these policies. The NOP also states that the Project may involve noise and vibration during construction activities. The DEIR should describe the possible noise and vibration impacts to wildlife, particularly marine mammals.

7. **Mitigation**. Bay Plan policies on Mitigation require projects to “compensate for unavoidable adverse impacts to the natural resources of the Bay…” The policies provide specific criteria for how compensatory mitigation projects should be sited and designed, community involvement in providing compensatory mitigation, when compensatory mitigation should occur relative to the impacts, and how to determine whether banking or in-lieu fee programs are acceptable. The policies also state that “Mitigation programs should be coordinated with all affected local, state, and federal agencies having jurisdiction or mitigation expertise to ensure, to the maximum practicable extent, a single mitigation program that satisfies the policies of all the affected agencies.” The NOP mentions that the ecotone levee is proposed in part to compensate for the temporary and permanent impacts to habitats as a result of the Project. The DEIR should discuss how this proposed mitigation measure, and any other mitigation determined to be necessary to compensate for Project impacts, is consistent with Bay Plan Mitigation policies. Additionally, the District should coordinate with all regulatory agencies that have jurisdiction over the Project to develop a mitigation program that is agreeable to all of these agencies.

8. **Public Access / Appearance, Design, and Scenic Views**. Section 66602 of the McAteer-Petris Act states, in part, "that maximum feasible public access, consistent with a proposed project, should be provided." The Commission can only approve a project within its jurisdiction if it provides maximum feasible public access, consistent with the project. The Bay Plan policies on public access state, in part, that "in addition to the public access to the Bay provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline...Public access to some natural areas should be provided to permit study and enjoyment of these areas…Public access should be sited, designed, managed and maintained to avoid significant adverse impacts from sea level rise and shoreline flooding. Whenever public access to the Bay is provided as a condition of development, on fill or on the shoreline, the access should be permanently guaranteed…Diverse and interesting public access experiences should be provided which would encourage users to remain in the designated access areas to avoid or minimize potential adverse effects on wildlife and their habitat." Additionally, the Bay Plan policies on Appearance, Design, and Scenic Views state, in part, that: "Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas…"

   The NOP states that "Construction may cause temporary disruption of access to Bedwell Bayfront Park", but that no permanent impacts are anticipated. It also states that the Project "would add new visual elements to the site including a 5-foot high sheet pile wall…" The DEIR should discuss how the Project will maintain public access and views of the Bay, and how the Project will provide public access and views that are consistent with the Commission's Bay Plan policies.

9. **Environmental Justice**. Our Commission recently approved several new Bay Plan policies on Environmental Justice and Social Equity. Policy No. 2 of the new Bay Plan Environmental Justice and Social Equity chapter states "…the Commission should support, encourage, and request local governments to include environmental justice and social equity in their general plans, zoning ordinances, and in their discretionary approval processes." Policy No. 3 says "[e]quitable, culturally-relevant community outreach and engagement should be conducted by local governments and project applicants to meaningfully involve potentially impacted communities for major projects and appropriate minor projects in underrepresented and/or identified vulnerable and/or disadvantaged communities… Evidence of how community concerns were addressed should be provided." Policy No. 4 states "[i]f a project is proposed within an underrepresented and/or identified vulnerable and/or disadvantaged community, potential disproportionate impacts should be identified in collaboration with the potentially impacted communities." Revised Public Access Policy No. 5 states "[p]ublic access that substantially changes the use or character of the site should be sited, designed, and managed based on meaningful community involvement to create public access that is inclusive and welcoming to all and embraces local multicultural and indigenous history and presence…" The updated policies go further to state that public

access improvements should not only be consistent with the project, but also incorporate the culture(s) of the local community, and provide "…barrier free access for persons with disabilities, for people of all income levels, and for people of all cultures."

The DEIR should specify the culturally-relevant community outreach and engagement efforts that will be conducted for the Project, identify whether the Project is in a vulnerable community, and if so, should identify potential disproportionate impacts. The DEIR should also discuss how any public access provided as part of the Project will be sited, designed, and managed based on community involvement, and how it will ensure that the access is inclusive and welcoming to all.

Thank you for your consideration of these comments. Again, we encourage the District to discuss Project plans with BCDC during the pre-application phase of the process. If you have any questions regarding this letter, please do not hesitate to contact me at (415) 352-3626 or via email at megan.hall@bcdc.ca.gov.

Sincerely,

DocuSigned by:
Megan Hall
11DD675F1119439...

MEGAN HALL
Coastal Scientist

MH/ra

cc: State Clearinghouse (Sent Via Email: state.clearinghouse@opr.ca.gov)

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

JENNIFER LUCCHESI, *Executive Officer*
(916) 574-1800 *Fax* (916) 574-1810
California Relay Service TDD Phone 1-800-735-2929
from Voice Phone 1-800-735-2922

Contact Phone: **(916) 574-1890**

Established in 1938

June 22, 2020

File Ref: SCH # 2020050414

West Bay Sanitary District
Attn: Phil Scott, District Manager
500 Laurel Street
Menlo Park, CA 94025

VIA ELECTRONIC MAIL ONLY (Info@westbaysanitary.org)

Subject: Notice of Preparation (NOP) for an Environmental Impact Report (EIR) for the Flow Equalization and Resource Recovery Facility Levee Improvements and Recycled Water Facility Project, San Mateo and Santa Clara Counties

Dear Mr. Scott:

The California State Lands Commission (Commission) staff has reviewed the subject NOP for an Environmental Impact Report (EIR) for the Flow Equalization and Resource Recovery Facility Levee Improvements and Recycled Water Facility Project (Project), which is being prepared by the West Bay Sanitary District (District). The District, as the public agency proposing to carry out the Project, is the lead agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). The Commission is a trustee agency for projects that could directly or indirectly affect State sovereign land and their accompanying Public Trust resources or uses. Additionally, because the Project may involve work on State sovereign land, the Commission may act as a responsible agency. Commission staff requests that the District consult with us on preparation of the Draft EIR as required by CEQA section 21153, subdivision (a), and the State CEQA Guidelines section 15086, subdivisions (a)(1) and (a)(2).

Commission Jurisdiction and Public Trust Lands

The Commission has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The Commission also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6009, subd. (c); 6009.1; 6301; 6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the common law Public Trust Doctrine.

As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The state holds these lands for the benefit of all people of the state for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion or where the boundary has been fixed by agreement or a court. On navigable non-tidal waterways, including lakes, the state holds fee ownership of the bed of the waterway landward to the ordinary low-water mark and a Public Trust easement landward to the ordinary high-water mark, except where the boundary has been fixed by agreement or a court. Such boundaries may not be readily apparent from present day site inspections.

Based on the information provided and a review of in-house records, the proposed project may extend onto the bed of Westpoint Slough which at this location is within Commission-owned lands conveyed to the State by Leslie Salt Co. According to the project description, the proposed ecotone levee on the northern perimeter of the site would recontour the existing levee with a 10:1 to 20:1 slope to the water line. At this time, we do not have detailed project plans and sufficient information to determine if the proposed ecotone levee will extend onto the bed of Westpoint Slough. Once more detailed plans are prepared, please submit them to Commission staff for further review. Should the proposed levee extend beyond Assessor Parcel Number 055-400-010 and onto the bed of Westpoint Slough, a lease from the Commission will be required.

Project Description

The District proposes the proposed project to meet its objectives and needs as follows:

- Provide Federal Emergency Management Agency 100-year and anticipated sea level rise flood protection.
- Allow the District to provide recycled water to customers.

From the Project Description, Commission staff understands that the Project would include the following components that have potential to affect State sovereign land:

- Project Component 1. Installation of sheet pile walls around the northern and western perimeters of the facility.
- Project Component 2. Raising the grades of the perimeter access road within the property.
- Project Component 3. Construction of an ecotone levee.

Environmental Review

Commission staff requests that the District consider the following comments when preparing the EIR, to ensure that impacts to State sovereign land are adequately analyzed for the Commission's use of the EIR to support a future lease approval for the Project.

General Comments

1. Project Description: A thorough and complete Project Description should be included in the EIR in order to facilitate meaningful environmental review of potential impacts, mitigation measures, and alternatives. The Project Description should be as precise as possible in describing the details of all allowable activities (e.g., types of equipment or methods that may be used, maximum area of impact or volume of sediment removed or disturbed, seasonal work windows, locations for material disposal, etc.), as well as the details of the timing and length of activities. In particular, show on figures and engineering plans and provide written description of activities occurring waterward of the mean high tide line for Project area waterways. Thorough descriptions will facilitate Commission staff's determination of the extent of the Commission's leasing jurisdiction, make for a more robust analysis of the work that may be performed, and minimize the potential for subsequent environmental analysis to be required.

Biological Resources

2. For land under the Commission's jurisdiction, the EIR should disclose and analyze all potentially significant effects on sensitive species and habitats in and around the Project area, including special-status wildlife, fish, and plants, and if appropriate, identify feasible mitigation measures to reduce those impacts. The District should conduct queries of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database and U.S. Fish and Wildlife Service's (USFWS) Special Status Species Database to identify any special-status plant or wildlife species that may occur in the Project area. The EIR should also include a discussion of consultation with the CDFW, USFWS, and National Marine Fisheries Service (NMFS) as applicable, including any recommended mitigation measures and potentially required permits identified by these agencies.

3. Invasive Species: One of the major stressors in California waterways is introduced species. Therefore, the EIR should consider the Project's potential to establish or proliferate aquatic invasive species (AIS) such as the quagga mussel, or other nonindigenous, invasive species including aquatic and terrestrial plants. For example, construction boats and barges brought in from long stays at distant projects may transport new species to the Project area via hull biofouling, wherein marine and aquatic organisms attach to and accumulate on the hull and other submerged parts of a vessel. If the analysis in the EIR finds potentially significant AIS impacts, possible mitigation could include contracting vessels and barges from nearby or requiring contractors to perform a certain degree of hull-cleaning. The CDFW's Invasive Species Program could assist with this analysis as well as with the development of appropriate mitigation (information at https://www.wildlife.ca.gov/Conservation/Invasives).

4. Construction Noise: The EIR should also evaluate noise and vibration impacts on fish and birds from construction, restoration, and flood control activities in the water, on the levees, and for landside supporting structures. Mitigation measures could include species-specific work windows as defined by CDFW, USFWS, or NMFS. Again, staff recommends early consultation with these agencies to minimize the impacts of the Project on sensitive species.

Climate Change

5. Greenhouse Gas (GHG): A GHG emissions analysis consistent with the California Global Warming Solutions Act (Assembly Bill 32) and required by the State CEQA Guidelines should be included in the EIR. This analysis should identify a threshold for significance for GHG emissions, calculate the level of GHGs that will be emitted as a result of construction and ultimate build-out of the Project, determine the significance of the impacts of those emissions, and, if impacts are significant, identify mitigation measures that would reduce them to the extent feasible.

Cultural Resources

6. Submerged Resources: The EIR should evaluate potential impacts to submerged cultural resources in the Project area. The Commission maintains a shipwrecks database that can assist with this analysis. Commission staff requests that the District contact Staff Attorney Jamie Garrett (see contact information below) to obtain shipwrecks data from the database and Commission records for the Project site. The database includes known and potential vessels located on the State's tide and submerged lands; however, the locations of many shipwrecks remain unknown. Please note that any submerged archaeological site or submerged historic resource that has remained in state waters for more than 50 years is presumed to be significant. Because of this possibility, please add a mitigation measure requiring that in the event cultural resources are discovered during any construction activities, Project personnel shall halt all activities in the immediate area and notify a qualified archaeologist to determine the appropriate course of action.

7. Title to Resources: The EIR should also mention that the title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the state and under the jurisdiction of the California State Lands Commission (Pub. Resources Code, § 6313). Commission staff requests that the District consult with Staff Attorney Jamie Garrett, should any cultural resources on state lands be discovered during construction of the proposed Project. In addition, Commission staff requests that the following statement be included in the EIR's Mitigation and Monitoring Plan: "The final disposition of archaeological, historical, and paleontological resources recovered on state lands under the jurisdiction of the California State Lands Commission must be approved by the Commission."

Mitigation and Alternatives

8. Deferred Mitigation: In order to avoid the improper deferral of mitigation, mitigation measures must be specific, feasible, and fully enforceable to minimize significant adverse impacts from a project, and "shall not be deferred until some future time." (State CEQA Guidelines, §15126.4, subd. (a)). For example, references to the preparation of a permit from the State Water Resources Control Board to reduce an impact, without calling out the specific activities that will be included in the permit to reduce that particular impact to a less than significant level, is considered deferral. Commission staff requests that more specific information be provided in such mitigation measures (MMs) to demonstrate how the MM is going to mitigate potential significant impacts to less than significant.

Thank you for the opportunity to comment on the NOP for the Project. As a trustee and responsible agency, Commission staff requests that you consult with us on this Project and keep us advised of changes to the Project Description and all other important developments. Please send additional information on the Project to the Commission staff listed below as the EIR is being prepared.

Please refer questions concerning environmental review to Christine Day, Environmental Scientist, at (916) 562-0027 or christine.day@slc.ca.gov. For questions concerning archaeological or historic resources under Commission jurisdiction, please contact Staff Attorney Jamie Garrett, at (916) 574-0398 or jamie.garrett@slc.ca.gov. For questions concerning Commission leasing jurisdiction, please contact Dobri Tutov, Public Land Management Specialist, at (916) 574-0722 or dobri.tutov@slc.ca.gov.

Sincerely,

Eric Gillies

Eric Gillies, Acting Chief
Division of Environmental Planning
and Management

cc: Office of Planning and Research
C. Day, Commission
D. Tutov, Commission
J. Garrett, Commission

This page left intentionally blank

Certified mail list:

City of Menlo Park
Public Works Department
City Hall, 1st Floor,
701 Laurel St.,
Menlo Park, CA 94025
(Main Phone: 650-330-6780 Nikki Nagaya, Public Works Director, nhnagaya@menlopark.org)

City of Menlo Park
Community Development Department
City Hall, 1st Floor
701 Laurel St.,
Menlo Park, CA 94025
(Main: 650-330-6702, Deanna Chow, Interim Community Development Director, dmchow@menlopark.org)

City of Menlo Park
Community Services Department
701 Laurel Street
Menlo Park, CA 94025
(Main: 650-330-2200, Derek Schweigart, Community Services Director, dsschweigart@menlopark.org,)

City of Palo Alto
Planning and Development Services
250 Hamilton Ave, 5th Floor,
Palo Alto, CA 94301
(Jonathan Lait, Director Jonathan.Lait@CityofPaloAlto.org , (650) 329-2679))

City of Palo Alto
Public Works Department
250 Hamilton Ave, 5th Floor
Palo Alto, CA 94301
(pwd@cityofpaloalto.org, 650-329-2295, Brad Eggleston, Director)

City of Redwood City
Planning Department
1017 Middlefield Road
Redwood City, CA 94063
(Direct: (650) 780-7234 Fax: (650) 780-0128, planning@redwoodcity.org)

City of Redwood City
Public Works Department
1400 Broadway Street

Redwood City, CA 94063
(Main: 650-780-7464; Terence Kyaw, Public Works Director, tkyaw@redwoodcity.org, 650-780-7466)

San Mateo County
Office of Sustainability
455 County Center, 4th Floor
Redwood City, CA 94063
(sustainability@smcgov.org , 1-888-442-2666)

San Mateo County
Planning & Building Department
455 County Center
Redwood City, CA 94063
(general email: plngbldg@smcgov.org)

San Mateo County
Public Works Department
555 County Center, 5th Floor
Redwood City, CA 94063
(main line: 650-363-4100; general info: DPW_info@smcgov.org)

Silicon Valley Clean Water
1400 Radio Road
Redwood City, CA 94065-1220
(Phone: (650) 591-7121; info@svcw.org)

California Department of Fish and Wildlife (CDFW)
Randi Adair, Senior Environmental Scientist Supervisor,
Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
(randi.adair@wildlife.ca.gov ; 707-477-6819).

U.S. Army Corps of Engineers (USACE);
Bryan Matsumoto
450 Golden Gate Ave.
San Francisco, CA 94102
(Bryan.T.Matsumoto@usace.army.mil)

Regional Water Quality Control Board (RWQCB);
Tahsa Sturgis
1515 Clay St., Suite 1400
Oakland, CA 94612

(T: (510) 622-2316 Tahsa.Sturgis@waterboards.ca.gov)

Bay Conservation and Development Commission (BCDC)
Bay Area Metro Center
375 Beale St., Suite 510
San Francisco, CA 94105
(Phone: 415.352.3600, Fax: 888.348.5190 Email: info@bcdc.ca.gov)

State Lands Commission
100 Howe Avenue, Suite 100 South,
Sacramento, CA 95825
(916-574-1900 there is a Land Management – Bay Area/Delta division contact Nicholas Lavoie, 916.574.0452, Nicholas.Lavoie@slc.ca.gov)

Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105
(415-749-5000)

City of East Palo Alto
1960 Tate St.
East Palo Alto, CA 94303
Ph: 650-853-3189, planning@cityofepa.org

City of East Palo Alto
Public Works Department
2415 University Ave.
East Palo Alto, CA 94303
(Kamal Fallaha, Public Works Director, Phone: 650-853-3117, kfallaha@cityofepa.org)

San Mateo County Flood and Sea Level Rise Resiliency District
1700 El Camino Real, Suite 502, San Mateo, CA 94402;
Clerk of the Board, Christine Boland at cboland@oneshoreline.org 650-623-5934
Colin Martorana
Flood and Sea Level Rise Resiliency District | Associate Project Manager
1700 S. El Camino Real, Suite 502 | San Mateo, CA 94402
O: 650-623-5932
M: 650-730-0207
OneShoreline.org

California Coastal Conservancy
State Coastal Conservancy
1515 Clay St, 10th Floor
Oakland, CA 94612
Mary Small: mary.small@scc.ca.gov, and Moira McEnespy – moira.mcenespy@ scc.ca.gov, Other: grants@scc.ca.gov, https://scc.ca.gov/grants/

U. S. Environmental Protection Agency
Pacific Southwest San Francisco Office - Region 9
75 Hawthorne Street
San Francisco, CA, 94105
Luisa Valiela: valiela.luisa@epa.gov

California Department of Fish and Wildlife
Watershed Restoration Grants Branch
1416 Ninth Street, 12th Floor, Sacramento, CA 95814
(WatershedGrants@wildlife.ca.gov, Vicki Lake: vicki.lake@wildlife.ca.gov , Daniel Orr: daniel.orr@wildlife.ca.gov, Basil Ibewiro: basil.ibewiro@wildlife.ca.gov, https://wildlife.ca.gov/Conservation/Watersheds/Prop-68)

California Department of Water Resources
Coastal Watershed Flood Risk Reduction Program
P.O. Box 942836
Sacramento, CA 94236-0001
Patrick Luzuriaga: Patrick.Luzuriaga@water.ca.gov, Other: coastal@water.ca.gov

California Natural Resources Agency
Urban Flood Protection Grant Program
1416 Ninth Street, Suite 1311,
Sacramento, CA 95814
Teresa Mallory: teresa.mallory@resources.ca.gov
Other: bondsandgrants@resources.ca.gov

Ocean Protection Council
1416 Ninth Street, Suite 1311
Sacramento, CA 95814
(part of California Natural Resources Agency)
Holly Wyer: holly.wyer@resources.ca.gov
Jenn Eckerle: jenn.eckerle@resources.ca.gov
Marina Cazorla: marina.cazorla@resources.ca.gov

California Wildlife Conservation Board
Wildlife Conservation Board c/o CDFW
P.O. Box 944209
Sacramento, CA 94244-2090

U.S. Fish and Wildlife Service
1849 C Street, NW
Washington, DC 20240
John Klochak (Local Program Manager - SF Bay): John_Klochak@fws.gov

SF Bay Restoration Authority – Measure AA Funds
San Francisco Bay Restoration Authority
c/o State Coastal Conservancy
1515 Clay Street, 10th Floor, Oakland, CA 94612
grants@sfbayrestore.org

NEP Coastal Watersheds Grant Program
2300 Clarendon Blvd., Suite 603
Arlington, VA 22201
Suzanne Simon: ssimon@estuaries.org

Multi-Agency Statewide California Resilience Challenge
Bay Area Council Headquarters
353 Sacramento St., 10th Floor
San Francisco, California 94111
Adrian Covert: acovert@bayareacouncil.org (cc: Amari Cowan - acowan@bayareacouncil.org)

Regular Mail:

Save the Bay
300 Frank H. Ogawa Plaza, Suite 280
Oakland, CA 94612

3555 Haven Ave
Menlo Park, CA 94025

3559 Haven Ave
Menlo Park, CA 94025

3565 Haven Ave
Menlo Park, CA 94025

3561 Haven Ave
Menlo Park, CA 94025

3585 Haven Ave
Menlo Park, CA 94025

3600 Haven Ave
Menlo Park, CA 94025

3601 Haven Ave
Menlo Park, CA 94025

3603 Haven Ave
Menlo Park, CA 94025

3620 Haven Ave
Menlo Park, CA 94025

3624 Haven Ave
Menlo Park, CA 94025

3636 Haven Ave
Menlo Park, CA 94025

3638 Haven Ave
Menlo Park, CA 94025

3639 Haven Ave
Menlo Park, CA 94025

3642 Haven Ave
Menlo Park, CA 94025

3645 Haven Ave
Menlo Park, CA 94025

3695 Haven Ave
Menlo Park, CA 94025

3696 Haven Ave
Menlo Park, CA 94025

3698 Haven Ave
Menlo Park, CA 94025

3700 Haven Ave
Menlo Park, CA 94025

3708 Haven Ave
Menlo Park, CA 94025

3715 Haven Ave
Menlo Park, CA 94025

3717 Haven Ave
Menlo Park, CA 94025

3723 Haven Ave
Menlo Park, CA 94025

3735 Haven Ave
Menlo Park, CA 94025

3750 Haven Ave
Menlo Park, CA 94025

111 Independence Drive
Menlo Park, CA 94025

115 Independence Drive
Menlo Park, CA 94025

119 Independence Drive
Menlo Park, CA 94025

123 Independence Drive
Menlo Park, CA 94025

125 Independence Drive
Menlo Park, CA 94025

138 Jefferson Drive
Menlo Park, CA 94025

150 Jefferson Drive
Menlo Park, CA 94025

160 Jefferson Drive
Menlo Park, CA 94025

164 Jefferson Drive
Menlo Park, CA 94025

1205 Chrysler Drive

Menlo Park, CA 94025

1150 Chrysler Drive
Menlo Park, CA 94025

104 Constitution Drive
Menlo Park, CA 94025

110 Constitution Drive
Menlo Park, CA 94025

120 Constitution Drive
Menlo Park, CA 94025

130 Constitution Drive
Menlo Park, CA 94025

150 Constitution Drive
Menlo Park, CA 94025

160 Constitution Drive
Menlo Park, CA 94025

161 Constitution Drive
Menlo Park, CA 94025

163 Constitution Drive
Menlo Park, CA 94025

167 Constitution Drive
Menlo Park, CA 94025

169 Constitution Drive
Menlo Park, CA 94025

APPENDIX B

AIR QUALITY AND GREENHOUSE GASES EMISSIONS ESTIMATES

This page intentionally left blank

FERRF (Construction and Ops)

San Mateo County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	12.00	1000sqft	0.28	12,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	70
Climate Zone	5			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - MIG Modeler: Phil Gleason

Land Use - Construction and ops run; conseratively assumes entire footprint would be building space.

Construction Phase - Schedule updated per const schedule provided by F&L; see Table 2-2 of PD.

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - FERRF Ent & Marsh Road: Equipment updated per info provided by F&L; see Table 2-2 in EIR PD.

Off-road Equipment - ECL & SDI: Equipment updated per info provided by F&L; see Table 2-2 in EIR PD. Generator added for dewatering of tidal channel.

Off-road Equipment -

Off-road Equipment - RWF Construction: Equipment updated per info provided by F&L; see Table 2-2 in EIR PD. Paver added for re-paving of streets.

Off-road Equipment - SPI: Equipment updated per info provided by F&L; see Table 2-2 in EIR PD. Two (2) drill rigs cover intitial bore and the vibrational hammer used to install sheet pile

Trips and VMT - Worker trips updated per info provided by F&L; see Table 2-2 in EIR PD. Hauling and vendor trips updated to reflect soil and material/water delivery, respectively.

Grading - Reflects light grading may need to occur during levee improvement & fill placement; light grading for FERRF entrance improvements; leveling for RWF. Project would require ~32,250 CY of soil import for levee and other improvements.

Vehicle Trips - Conservately assumes four trips to and from the facility on a daily basis; typically would only be one for the Chief Plant Operator.

Energy Use -

Water And Wastewater -

Solid Waste -

Construction Off-road Equipment Mitigation - Watering twice per day in compliance with BAAQMD Fugitive Dust BMPs.

Fleet Mix - Assumes 80% of trips are LDT (50/50 split for LDT1 and LDT2) and 20% are HHDT for chem delivery / waste off-haul

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	0.00
tblConstructionPhase	NumDays	2.00	21.00
tblConstructionPhase	NumDays	5.00	0.00
tblConstructionPhase	NumDays	2.00	43.00
tblConstructionPhase	NumDays	2.00	131.00
tblConstructionPhase	NumDays	2.00	390.00

tblFleetMix	HHD	6.6180e-003	0.20
tblFleetMix	LDA	0.47	0.00
tblFleetMix	LDT1	0.05	0.40
tblFleetMix	LDT2	0.27	0.40
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	7.1130e-003	0.00
tblFleetMix	MCY	9.2350e-003	0.00
tblFleetMix	MDV	0.14	0.00
tblFleetMix	MH	8.0800e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	4.2590e-003	0.00
tblFleetMix	SBUS	5.0500e-004	0.00
tblFleetMix	UBUS	3.0670e-003	0.00
tblGrading	AcresOfGrading	0.00	10.00
tblGrading	AcresOfGrading	0.00	1.00
tblGrading	AcresOfGrading	0.00	2.00
tblGrading	MaterialImported	0.00	32,250.00
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Sheet Pile Install
tblOffRoadEquipment	PhaseName		RWF Construction
tblOffRoadEquipment	PhaseName		RWF Construction
tblOffRoadEquipment	PhaseName		Sheet Pile Install
tblOffRoadEquipment	PhaseName		Levee/Ecotone Levee & Stormdrain Imp
tblOffRoadEquipment	PhaseName		RWF Construction
tblOffRoadEquipment	PhaseName		Levee/Ecotone Levee & Stormdrain Imp
tblOffRoadEquipment	PhaseName		RWF Construction
tblOffRoadEquipment	PhaseName		Levee/Ecotone Levee & Stormdrain Imp
tblOffRoadEquipment	PhaseName		RWF Construction
tblOffRoadEquipment	PhaseName		Levee/Ecotone Levee & Stormdrain Imp
tblOffRoadEquipment	UsageHours	1.00	8.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	4,031.00	4,032.00

tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripNumber	20.00	8.00
tblTripsAndVMT	WorkerTripNumber	10.00	8.00
tblTripsAndVMT	WorkerTripNumber	28.00	60.00
tblVehicleTrips	ST_TR	1.32	0.33
tblVehicleTrips	SU_TR	0.68	0.33
tblVehicleTrips	WD_TR	6.97	0.33

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.3212	3.6182	2.8718	6.9900e-003	1.0512	0.1437	1.1949	0.5564	0.1337	0.6901	0.0000	642.3763	642.3763	0.1456	0.0000	646.0159
2023	0.4466	4.2803	3.9647	8.8700e-003	1.6367	0.1910	1.8277	0.8796	0.1771	1.0566	0.0000	782.7417	782.7417	0.2123	0.0000	788.0482
2024	0.1091	1.0276	0.9901	2.2100e-003	0.4100	0.0452	0.4551	0.2200	0.0418	0.2618	0.0000	195.2458	195.2458	0.0531	0.0000	196.5720
Maximum	**0.4466**	**4.2803**	**3.9647**	**8.8700e-003**	**1.6367**	**0.1910**	**1.8277**	**0.8796**	**0.1771**	**1.0566**	**0.0000**	**782.7417**	**782.7417**	**0.2123**	**0.0000**	**788.0482**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.3212	3.6182	2.8718	6.9900e-003	0.5082	0.1437	0.6519	0.2600	0.1337	0.3937	0.0000	642.3758	642.3758	0.1456	0.0000	646.0154
2023	0.4466	4.2803	3.9647	8.8700e-003	0.7749	0.1910	0.9659	0.4061	0.1770	0.5832	0.0000	782.7409	782.7409	0.2123	0.0000	788.0473
2024	0.1091	1.0276	0.9901	2.2100e-003	0.1941	0.0452	0.2392	0.1016	0.0418	0.1434	0.0000	195.2456	195.2456	0.0531	0.0000	196.5718
Maximum	**0.4466**	**4.2803**	**3.9647**	**8.8700e-003**	**0.7749**	**0.1910**	**0.9659**	**0.4061**	**0.1770**	**0.5832**	**0.0000**	**782.7409**	**782.7409**	**0.2123**	**0.0000**	**788.0473**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**52.32**	**0.00**	**46.60**	**53.64**	**0.00**	**44.22**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2022**	**3-31-2022**	1.4851	1.4851
2	**4-1-2022**	**6-30-2022**	0.5320	0.5320
3	**7-1-2022**	**9-30-2022**	0.5378	0.5378
4	**10-1-2022**	**12-31-2022**	1.3861	1.3861
5	**1-1-2023**	**3-31-2023**	1.1695	1.1695
6	**4-1-2023**	**6-30-2023**	1.1811	1.1811
7	**7-1-2023**	**9-30-2023**	1.1941	1.1941
8	**10-1-2023**	**12-31-2023**	1.1955	1.1955
9	**1-1-2024**	**3-31-2024**	1.1375	1.1375
		Highest	1.4851	1.4851

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0531	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.1000e-004	2.1000e-004	0.0000	0.0000	2.3000e-004
Energy	1.6000e-003	0.0146	0.0122	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	42.2405	42.2405	1.5000e-003	5.4000e-004	42.4381
Mobile	9.4000e-004	0.0169	0.0185	8.0000e-005	4.3300e-003	5.0000e-005	4.3800e-003	1.1600e-003	4.0000e-005	1.2000e-003	0.0000	7.6526	7.6526	7.1000e-004	0.0000	7.6702
Waste						0.0000	0.0000		0.0000	0.0000	3.0205	0.0000	3.0205	0.1785	0.0000	7.4832
Water						0.0000	0.0000		0.0000	0.0000	0.8804	4.3682	5.2486	0.0906	2.1800e-003	8.1625
Total	**0.0557**	**0.0314**	**0.0309**	**1.7000e-004**	**4.3300e-003**	**1.1600e-003**	**5.4900e-003**	**1.1600e-003**	**1.1500e-003**	**2.3100e-003**	**3.9009**	**54.2615**	**58.1624**	**0.2713**	**2.7200e-003**	**65.7543**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0531	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.1000e-004	2.1000e-004	0.0000	0.0000	2.3000e-004
Energy	1.6000e-003	0.0146	0.0122	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	42.2405	42.2405	1.5000e-003	5.4000e-004	42.4381
Mobile	9.4000e-004	0.0169	0.0185	8.0000e-005	4.3300e-003	5.0000e-005	4.3800e-003	1.1600e-003	4.0000e-005	1.2000e-003	0.0000	7.6526	7.6526	7.1000e-004	0.0000	7.6702
Waste						0.0000	0.0000		0.0000	0.0000	3.0205	0.0000	3.0205	0.1785	0.0000	7.4832
Water						0.0000	0.0000		0.0000	0.0000	0.8804	4.3682	5.2486	0.0906	2.1800e-003	8.1625
Total	**0.0557**	**0.0314**	**0.0309**	**1.7000e-004**	**4.3300e-003**	**1.1600e-003**	**5.4900e-003**	**1.1600e-003**	**1.1500e-003**	**2.3100e-003**	**3.9009**	**54.2615**	**58.1624**	**0.2713**	**2.7200e-003**	**65.7543**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2022	12/31/2021	5	0	
2	Sheet Pile Install	Grading	1/1/2022	1/31/2022	5	21	
3	Architectural Coating	Architectural Coating	1/27/2022	1/26/2022	5	0	
4	Levee/Ecotone Levee & Stormdrain Imp	Grading	2/1/2022	3/31/2022	5	43	
5	FERRF Entrance / Marsh Road Grade and Util Inst	Grading	4/1/2022	9/30/2022	5	131	
6	RWF Construction	Grading	10/1/2022	3/31/2024	5	390	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 18,000; Non-Residential Outdoor: 6,000; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Sheet Pile Install	Bore/Drill Rigs	2	8.00	221	0.50
Sheet Pile Install	Concrete/Industrial Saws	0	8.00	81	0.73
Sheet Pile Install	Excavators	1	8.00	158	0.38
Sheet Pile Install	Rubber Tired Dozers	1	8.00	247	0.40
Sheet Pile Install	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48
Levee/Ecotone Levee & Stormdrain Imp	Concrete/Industrial Saws	1	8.00	81	0.73

Levee/Ecotone Levee & Stormdrain Imp	Excavators	1	8.00	158	0.38
Levee/Ecotone Levee & Stormdrain Imp	Generator Sets	2	12.00	84	0.74
Levee/Ecotone Levee & Stormdrain Imp	Rollers	1	8.00	80	0.38
Levee/Ecotone Levee & Stormdrain Imp	Rubber Tired Dozers	1	8.00	247	0.40
Levee/Ecotone Levee & Stormdrain Imp	Tractors/Loaders/Backhoes	2	8.00	97	0.37
FERRF Entrance / Marsh Road Grade and Util Inst	Concrete/Industrial Saws	0	8.00	81	0.73
FERRF Entrance / Marsh Road Grade and Util Inst	Cranes	0	4.00	231	0.29
FERRF Entrance / Marsh Road Grade and Util Inst	Excavators	1	8.00	158	0.38
FERRF Entrance / Marsh Road Grade and Util Inst	Rollers	1	8.00	80	0.38
FERRF Entrance / Marsh Road Grade and Util Inst	Rubber Tired Dozers	1	8.00	247	0.40
FERRF Entrance / Marsh Road Grade and Util Inst	Tractors/Loaders/Backhoes	1	8.00	97	0.37
RWF Construction	Bore/Drill Rigs	1	8.00	221	0.50
RWF Construction	Concrete/Industrial Saws	1	8.00	81	0.73
RWF Construction	Cranes	1	8.00	231	0.29
RWF Construction	Excavators	2	8.00	158	0.38
RWF Construction	Paving Equipment	1	8.00	132	0.36
RWF Construction	Rollers	1	8.00	80	0.38
RWF Construction	Rubber Tired Dozers	2	8.00	247	0.40
RWF Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Levee/Ecotone Levee & Stormdrain Imp	Bore/Drill Rigs	1	8.00	221	0.50

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Sheet Pile Install	4	10.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Levee/Ecotone Levee & Stormdrain Imp	8	8.00	10.00	4,032.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
FERRF Entrance / Marsh Road Grade an	4	8.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
RWF Construction	11	60.00	10.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.3 Sheet Pile Install - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0632	0.0000	0.0632	0.0348	0.0000	0.0348	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0174	0.1762	0.1382	3.7000e-004		7.7600e-003	7.7600e-003		7.1400e-003	7.1400e-003	0.0000	32.9143	32.9143	0.0107	0.0000	33.1804
Total	**0.0174**	**0.1762**	**0.1382**	**3.7000e-004**	**0.0632**	**7.7600e-003**	**0.0710**	**0.0348**	**7.1400e-003**	**0.0419**	**0.0000**	**32.9143**	**32.9143**	**0.0107**	**0.0000**	**33.1804**

3.3 Sheet Pile Install - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0103	4.6900e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.7126	2.7126	2.4000e-004	0.0000	2.7185
Worker	2.5000e-004	1.6000e-004	1.7600e-003	1.0000e-005	8.3000e-004	0.0000	8.3000e-004	2.2000e-004	0.0000	2.2000e-004	0.0000	0.6395	0.6395	1.0000e-005	0.0000	0.6398
Total	**5.7000e-004**	**0.0105**	**6.4500e-003**	**4.0000e-005**	**1.5100e-003**	**2.0000e-005**	**1.5400e-003**	**4.2000e-004**	**2.0000e-005**	**4.4000e-004**	**0.0000**	**3.3521**	**3.3521**	**2.5000e-004**	**0.0000**	**3.3583**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0285	0.0000	0.0285	0.0156	0.0000	0.0156	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0174	0.1762	0.1382	3.7000e-004		7.7600e-003	7.7600e-003		7.1400e-003	7.1400e-003	0.0000	32.9143	32.9143	0.0107	0.0000	33.1804
Total	**0.0174**	**0.1762**	**0.1382**	**3.7000e-004**	**0.0285**	**7.7600e-003**	**0.0362**	**0.0156**	**7.1400e-003**	**0.0228**	**0.0000**	**32.9143**	**32.9143**	**0.0107**	**0.0000**	**33.1804**

3.3 Sheet Pile Install - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	0.0103	4.6900e-003	3.0000e-005	6.8000e-004	2.0000e-005	7.1000e-004	2.0000e-004	2.0000e-005	2.2000e-004	0.0000	2.7126	2.7126	2.4000e-004	0.0000	2.7185
Worker	2.5000e-004	1.6000e-004	1.7600e-003	1.0000e-005	8.3000e-004	0.0000	8.3000e-004	2.2000e-004	0.0000	2.2000e-004	0.0000	0.6395	0.6395	1.0000e-005	0.0000	0.6398
Total	**5.7000e-004**	**0.0105**	**6.4500e-003**	**4.0000e-005**	**1.5100e-003**	**2.0000e-005**	**1.5400e-003**	**4.2000e-004**	**2.0000e-005**	**4.4000e-004**	**0.0000**	**3.3521**	**3.3521**	**2.5000e-004**	**0.0000**	**3.3583**

3.4 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Levee/Ecotone Levee & Stormdrain Imp - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1366	0.0000	0.1366	0.0720	0.0000	0.0720	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0668	0.6345	0.6432	1.2500e-003		0.0311	0.0311		0.0296	0.0296	0.0000	108.5137	108.5137	0.0219	0.0000	109.0619
Total	**0.0668**	**0.6345**	**0.6432**	**1.2500e-003**	**0.1366**	**0.0311**	**0.1677**	**0.0720**	**0.0296**	**0.1017**	**0.0000**	**108.5137**	**108.5137**	**0.0219**	**0.0000**	**109.0619**

3.5 Levee/Ecotone Levee & Stormdrain Imp - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0162	0.5516	0.2901	1.5700e-003	0.0337	1.6000e-003	0.0353	9.2700e-003	1.5300e-003	0.0108	0.0000	162.7329	162.7329	0.0214	0.0000	163.2678
Vendor	6.5000e-004	0.0211	9.6000e-003	6.0000e-005	1.4000e-003	5.0000e-005	1.4500e-003	4.1000e-004	4.0000e-005	4.5000e-004	0.0000	5.5543	5.5543	4.8000e-004	0.0000	5.5663
Worker	4.1000e-004	2.6000e-004	2.8800e-003	1.0000e-005	1.3500e-003	1.0000e-005	1.3600e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.0476	1.0476	2.0000e-005	0.0000	1.0481
Total	**0.0173**	**0.5729**	**0.3026**	**1.6400e-003**	**0.0365**	**1.6600e-003**	**0.0381**	**0.0100**	**1.5800e-003**	**0.0116**	**0.0000**	**169.3347**	**169.3347**	**0.0219**	**0.0000**	**169.8822**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0615	0.0000	0.0615	0.0324	0.0000	0.0324	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0668	0.6345	0.6432	1.2500e-003		0.0311	0.0311		0.0296	0.0296	0.0000	108.5136	108.5136	0.0219	0.0000	109.0618
Total	**0.0668**	**0.6345**	**0.6432**	**1.2500e-003**	**0.0615**	**0.0311**	**0.0926**	**0.0324**	**0.0296**	**0.0621**	**0.0000**	**108.5136**	**108.5136**	**0.0219**	**0.0000**	**109.0618**

3.5 Levee/Ecotone Levee & Stormdrain Imp - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0162	0.5516	0.2901	1.5700e-003	0.0337	1.6000e-003	0.0353	9.2700e-003	1.5300e-003	0.0108	0.0000	162.7329	162.7329	0.0214	0.0000	163.2678
Vendor	6.5000e-004	0.0211	9.6000e-003	6.0000e-005	1.4000e-003	5.0000e-005	1.4500e-003	4.1000e-004	4.0000e-005	4.5000e-004	0.0000	5.5543	5.5543	4.8000e-004	0.0000	5.5663
Worker	4.1000e-004	2.6000e-004	2.8800e-003	1.0000e-005	1.3500e-003	1.0000e-005	1.3600e-003	3.6000e-004	1.0000e-005	3.7000e-004	0.0000	1.0476	1.0476	2.0000e-005	0.0000	1.0481
Total	**0.0173**	**0.5729**	**0.3026**	**1.6400e-003**	**0.0365**	**1.6600e-003**	**0.0381**	**0.0100**	**1.5800e-003**	**0.0116**	**0.0000**	**169.3347**	**169.3347**	**0.0219**	**0.0000**	**169.8822**

3.6 FERRF Entrance / Marsh Road Grade and Util Inst - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3950	0.0000	0.3950	0.2169	0.0000	0.2169	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0898	0.9152	0.7163	1.2700e-003		0.0454	0.0454		0.0418	0.0418	0.0000	111.8530	111.8530	0.0362	0.0000	112.7573
Total	**0.0898**	**0.9152**	**0.7163**	**1.2700e-003**	**0.3950**	**0.0454**	**0.4404**	**0.2169**	**0.0418**	**0.2586**	**0.0000**	**111.8530**	**111.8530**	**0.0362**	**0.0000**	**112.7573**

3.6 FERRF Entrance / Marsh Road Grade and Util Inst - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9700e-003	0.0642	0.0292	1.7000e-004	4.2700e-003	1.4000e-004	4.4100e-003	1.2400e-003	1.3000e-004	1.3700e-003	0.0000	16.9211	16.9211	1.4700e-003	0.0000	16.9579
Worker	1.2600e-003	7.8000e-004	8.7600e-003	4.0000e-005	4.1300e-003	2.0000e-005	4.1500e-003	1.1000e-003	2.0000e-005	1.1200e-003	0.0000	3.1916	3.1916	5.0000e-005	0.0000	3.1930
Total	**3.2300e-003**	**0.0649**	**0.0380**	**2.1000e-004**	**8.4000e-003**	**1.6000e-004**	**8.5600e-003**	**2.3400e-003**	**1.5000e-004**	**2.4900e-003**	**0.0000**	**20.1127**	**20.1127**	**1.5200e-003**	**0.0000**	**20.1509**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1777	0.0000	0.1777	0.0976	0.0000	0.0976	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0898	0.9152	0.7163	1.2700e-003		0.0454	0.0454		0.0418	0.0418	0.0000	111.8528	111.8528	0.0362	0.0000	112.7572
Total	**0.0898**	**0.9152**	**0.7163**	**1.2700e-003**	**0.1777**	**0.0454**	**0.2231**	**0.0976**	**0.0418**	**0.1393**	**0.0000**	**111.8528**	**111.8528**	**0.0362**	**0.0000**	**112.7572**

3.6 FERRF Entrance / Marsh Road Grade and Util Inst - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9700e-003	0.0642	0.0292	1.7000e-004	4.2700e-003	1.4000e-004	4.4100e-003	1.2400e-003	1.3000e-004	1.3700e-003	0.0000	16.9211	16.9211	1.4700e-003	0.0000	16.9579
Worker	1.2600e-003	7.8000e-004	8.7600e-003	4.0000e-005	4.1300e-003	2.0000e-005	4.1500e-003	1.1000e-003	2.0000e-005	1.1200e-003	0.0000	3.1916	3.1916	5.0000e-005	0.0000	3.1930
Total	**3.2300e-003**	**0.0649**	**0.0380**	**2.1000e-004**	**8.4000e-003**	**1.6000e-004**	**8.5600e-003**	**2.3400e-003**	**1.5000e-004**	**2.4900e-003**	**0.0000**	**20.1127**	**20.1127**	**1.5200e-003**	**0.0000**	**20.1509**

3.7 RWF Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3925	0.0000	0.3925	0.2153	0.0000	0.2153	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1205	1.2093	0.9800	2.0100e-003		0.0575	0.0575		0.0532	0.0532	0.0000	176.0226	176.0226	0.0522	0.0000	177.3284
Total	**0.1205**	**1.2093**	**0.9800**	**2.0100e-003**	**0.3925**	**0.0575**	**0.4500**	**0.2153**	**0.0532**	**0.2685**	**0.0000**	**176.0226**	**176.0226**	**0.0522**	**0.0000**	**177.3284**

3.7 RWF Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.8000e-004	0.0318	0.0145	8.0000e-005	2.1200e-003	7.0000e-005	2.1900e-003	6.1000e-004	7.0000e-005	6.8000e-004	0.0000	8.3960	8.3960	7.3000e-004	0.0000	8.4142
Worker	4.7000e-003	2.9200e-003	0.0326	1.3000e-004	0.0154	9.0000e-005	0.0154	4.0900e-003	8.0000e-005	4.1700e-003	0.0000	11.8772	11.8772	2.0000e-004	0.0000	11.8822
Total	**5.6800e-003**	**0.0348**	**0.0471**	**2.1000e-004**	**0.0175**	**1.6000e-004**	**0.0176**	**4.7000e-003**	**1.5000e-004**	**4.8500e-003**	**0.0000**	**20.2732**	**20.2732**	**9.3000e-004**	**0.0000**	**20.2965**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1766	0.0000	0.1766	0.0969	0.0000	0.0969	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1205	1.2093	0.9800	2.0100e-003		0.0575	0.0575		0.0532	0.0532	0.0000	176.0224	176.0224	0.0522	0.0000	177.3282
Total	**0.1205**	**1.2093**	**0.9800**	**2.0100e-003**	**0.1766**	**0.0575**	**0.2341**	**0.0969**	**0.0532**	**0.1501**	**0.0000**	**176.0224**	**176.0224**	**0.0522**	**0.0000**	**177.3282**

3.7 RWF Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.8000e-004	0.0318	0.0145	8.0000e-005	2.1200e-003	7.0000e-005	2.1900e-003	6.1000e-004	7.0000e-005	6.8000e-004	0.0000	8.3960	8.3960	7.3000e-004	0.0000	8.4142
Worker	4.7000e-003	2.9200e-003	0.0326	1.3000e-004	0.0154	9.0000e-005	0.0154	4.0900e-003	8.0000e-005	4.1700e-003	0.0000	11.8772	11.8772	2.0000e-004	0.0000	11.8822
Total	**5.6800e-003**	**0.0348**	**0.0471**	**2.1000e-004**	**0.0175**	**1.6000e-004**	**0.0176**	**4.7000e-003**	**1.5000e-004**	**4.8500e-003**	**0.0000**	**20.2732**	**20.2732**	**9.3000e-004**	**0.0000**	**20.2965**

3.7 RWF Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5668	0.0000	1.5668	0.8608	0.0000	0.8608	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4256	4.1698	3.7862	8.0400e-003		0.1905	0.1905		0.1766	0.1766	0.0000	704.3997	704.3997	0.2087	0.0000	709.6160
Total	**0.4256**	**4.1698**	**3.7862**	**8.0400e-003**	**1.5668**	**0.1905**	**1.7573**	**0.8608**	**0.1766**	**1.0374**	**0.0000**	**704.3997**	**704.3997**	**0.2087**	**0.0000**	**709.6160**

3.7 RWF Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0900e-003	0.0999	0.0571	3.2000e-004	8.4800e-003	1.4000e-004	8.6200e-003	2.4500e-003	1.3000e-004	2.5900e-003	0.0000	32.6266	32.6266	2.8700e-003	0.0000	32.6984
Worker	0.0178	0.0106	0.1214	5.0000e-004	0.0614	3.6000e-004	0.0618	0.0163	3.3000e-004	0.0167	0.0000	45.7155	45.7155	7.3000e-004	0.0000	45.7338
Total	**0.0209**	**0.1105**	**0.1786**	**8.2000e-004**	**0.0699**	**5.0000e-004**	**0.0704**	**0.0188**	**4.6000e-004**	**0.0193**	**0.0000**	**78.3421**	**78.3421**	**3.6000e-003**	**0.0000**	**78.4321**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.7051	0.0000	0.7051	0.3874	0.0000	0.3874	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4256	4.1698	3.7862	8.0400e-003		0.1905	0.1905		0.1766	0.1766	0.0000	704.3988	704.3988	0.2087	0.0000	709.6152
Total	**0.4256**	**4.1698**	**3.7862**	**8.0400e-003**	**0.7051**	**0.1905**	**0.8955**	**0.3874**	**0.1766**	**0.5639**	**0.0000**	**704.3988**	**704.3988**	**0.2087**	**0.0000**	**709.6152**

3.7 RWF Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0900e-003	0.0999	0.0571	3.2000e-004	8.4800e-003	1.4000e-004	8.6200e-003	2.4500e-003	1.3000e-004	2.5900e-003	0.0000	32.6266	32.6266	2.8700e-003	0.0000	32.6984
Worker	0.0178	0.0106	0.1214	5.0000e-004	0.0614	3.6000e-004	0.0618	0.0163	3.3000e-004	0.0167	0.0000	45.7155	45.7155	7.3000e-004	0.0000	45.7338
Total	**0.0209**	**0.1105**	**0.1786**	**8.2000e-004**	**0.0699**	**5.0000e-004**	**0.0704**	**0.0188**	**4.6000e-004**	**0.0193**	**0.0000**	**78.3421**	**78.3421**	**3.6000e-003**	**0.0000**	**78.4321**

3.7 RWF Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3925	0.0000	0.3925	0.2153	0.0000	0.2153	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1041	1.0009	0.9473	2.0100e-003		0.0450	0.0450		0.0417	0.0417	0.0000	176.1779	176.1779	0.0522	0.0000	177.4818
Total	**0.1041**	**1.0009**	**0.9473**	**2.0100e-003**	**0.3925**	**0.0450**	**0.4375**	**0.2153**	**0.0417**	**0.2570**	**0.0000**	**176.1779**	**176.1779**	**0.0522**	**0.0000**	**177.4818**

3.7 RWF Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.5000e-004	0.0243	0.0145	8.0000e-005	2.1200e-003	3.0000e-005	2.1500e-003	6.1000e-004	3.0000e-005	6.5000e-004	0.0000	8.0835	8.0835	7.2000e-004	0.0000	8.1016
Worker	4.2600e-003	2.4100e-003	0.0284	1.2000e-004	0.0154	9.0000e-005	0.0154	4.0900e-003	8.0000e-005	4.1700e-003	0.0000	10.9844	10.9844	1.7000e-004	0.0000	10.9886
Total	**5.0100e-003**	**0.0267**	**0.0429**	**2.0000e-004**	**0.0175**	**1.2000e-004**	**0.0176**	**4.7000e-003**	**1.1000e-004**	**4.8200e-003**	**0.0000**	**19.0680**	**19.0680**	**8.9000e-004**	**0.0000**	**19.0902**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1766	0.0000	0.1766	0.0969	0.0000	0.0969	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1041	1.0009	0.9473	2.0100e-003		0.0450	0.0450		0.0417	0.0417	0.0000	176.1777	176.1777	0.0522	0.0000	177.4816
Total	**0.1041**	**1.0009**	**0.9473**	**2.0100e-003**	**0.1766**	**0.0450**	**0.2216**	**0.0969**	**0.0417**	**0.1386**	**0.0000**	**176.1777**	**176.1777**	**0.0522**	**0.0000**	**177.4816**

3.7 RWF Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.5000e-004	0.0243	0.0145	8.0000e-005	2.1200e-003	3.0000e-005	2.1500e-003	6.1000e-004	3.0000e-005	6.5000e-004	0.0000	8.0835	8.0835	7.2000e-004	0.0000	8.1016
Worker	4.2600e-003	2.4100e-003	0.0284	1.2000e-004	0.0154	9.0000e-005	0.0154	4.0900e-003	8.0000e-005	4.1700e-003	0.0000	10.9844	10.9844	1.7000e-004	0.0000	10.9886
Total	**5.0100e-003**	**0.0267**	**0.0429**	**2.0000e-004**	**0.0175**	**1.2000e-004**	**0.0176**	**4.7000e-003**	**1.1000e-004**	**4.8200e-003**	**0.0000**	**19.0680**	**19.0680**	**8.9000e-004**	**0.0000**	**19.0902**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	9.4000e-004	0.0169	0.0185	8.0000e-005	4.3300e-003	5.0000e-005	4.3800e-003	1.1600e-003	4.0000e-005	1.2000e-003	0.0000	7.6526	7.6526	7.1000e-004	0.0000	7.6702
Unmitigated	9.4000e-004	0.0169	0.0185	8.0000e-005	4.3300e-003	5.0000e-005	4.3800e-003	1.1600e-003	4.0000e-005	1.2000e-003	0.0000	7.6526	7.6526	7.1000e-004	0.0000	7.6702

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	3.96	3.96	3.96	11,561	11,561
Total	3.96	3.96	3.96	11,561	11,561

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.000000	0.400000	0.400000	0.000000	0.000000	0.000000	0.000000	0.200000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	26.3915	26.3915	1.1900e-003	2.5000e-004	26.4949
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	26.3915	26.3915	1.1900e-003	2.5000e-004	26.4949
NaturalGas Mitigated	1.6000e-003	0.0146	0.0122	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8491	15.8491	3.0000e-004	2.9000e-004	15.9432
NaturalGas Unmitigated	1.6000e-003	0.0146	0.0122	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8491	15.8491	3.0000e-004	2.9000e-004	15.9432

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	297000	1.6000e-003	0.0146	0.0122	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8491	15.8491	3.0000e-004	2.9000e-004	15.9432
Total		**1.6000e-003**	**0.0146**	**0.0122**	**9.0000e-005**		**1.1100e-003**	**1.1100e-003**		**1.1100e-003**	**1.1100e-003**	**0.0000**	**15.8491**	**15.8491**	**3.0000e-004**	**2.9000e-004**	**15.9432**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	297000	1.6000e-003	0.0146	0.0122	9.0000e-005		1.1100e-003	1.1100e-003		1.1100e-003	1.1100e-003	0.0000	15.8491	15.8491	3.0000e-004	2.9000e-004	15.9432
Total		**1.6000e-003**	**0.0146**	**0.0122**	**9.0000e-005**		**1.1100e-003**	**1.1100e-003**		**1.1100e-003**	**1.1100e-003**	**0.0000**	**15.8491**	**15.8491**	**3.0000e-004**	**2.9000e-004**	**15.9432**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	90720	26.3915	1.1900e-003	2.5000e-004	26.4949
Total		**26.3915**	**1.1900e-003**	**2.5000e-004**	**26.4949**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	90720	26.3915	1.1900e-003	2.5000e-004	26.4949
Total		**26.3915**	**1.1900e-003**	**2.5000e-004**	**26.4949**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0531	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.1000e-004	2.1000e-004	0.0000	0.0000	2.3000e-004
Unmitigated	0.0531	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.1000e-004	2.1000e-004	0.0000	0.0000	2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	6.2600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0469					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.1000e-004	2.1000e-004	0.0000	0.0000	2.3000e-004
Total	**0.0531**	**0.0000**	**1.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.1000e-004**	**2.1000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	6.2600e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0469					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.1000e-004	2.1000e-004	0.0000	0.0000	2.3000e-004
Total	**0.0531**	**0.0000**	**1.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.1000e-004**	**2.1000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	5.2486	0.0906	2.1800e-003	8.1625
Unmitigated	5.2486	0.0906	2.1800e-003	8.1625

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	2.775 / 0	5.2486	0.0906	2.1800e-003	8.1625
Total		**5.2486**	**0.0906**	**2.1800e-003**	**8.1625**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	2.775 / 0	5.2486	0.0906	2.1800e-003	8.1625
Total		**5.2486**	**0.0906**	**2.1800e-003**	**8.1625**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	3.0205	0.1785	0.0000	7.4832
Unmitigated	3.0205	0.1785	0.0000	7.4832

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	14.88	3.0205	0.1785	0.0000	7.4832
Total		**3.0205**	**0.1785**	**0.0000**	**7.4832**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	14.88	3.0205	0.1785	0.0000	7.4832
Total		**3.0205**	**0.1785**	**0.0000**	**7.4832**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

FERRF EIR

Appendix B: GHG Emissions Compilation Summary

Prepared by MIG, Inc., October 2020

Table 1: Construction Emissions

Year	CO2	CH4	N2O	CO2E
2022	642	0	-	646
2023	783	0	-	788
2024	195	0	-	197
Total	1,620	0	-	1,631
Amortized (30 yr)	*54.0*	*0.0*	-	*54.4*

Table 2: Operational & Total Project Emissions

Source	CO2	CH4	N2O	CO2E
Area	0.00	-	-	0.00
Energy	42.2	0.0	0.0	42.4
Mobile	7.7	0.0	-	7.7
Waste	3.0	0.2	-	7.5
Water	5.2	0.1	0.0	8.2
Fans and Pumps	621.9	0.0	0.0	624.4
Effluent Evaporation	-	-	0.3	84.1
Sub-Total (Operational)	680.1	0.3	0.3	774.2
Amortized Construction	*54.0*	*0.0*	-	*54.4*
Total	734.1	0.3	0.3	828.6

FERRF EIR

Appendix B: GHG Emissions Compilation Summary

Prepared by MIG, Inc., October 2020

Table 1: Common Conversions

kW/hp	kW/MW	lbs/MT	Liter/Gallon
0.745699872	1000	2204.62	3.78541

Pump and Fan Consumption Calcs

Table 2: Pump and Fan Electicity Consumption Calculations

Pump / Fan Location	Horsepower (hp)	# of Pumps	Annual Runtime (hrs)	HP-hr (Annual)
Influent Pump Station	20	1	8760	175,200
Fine Screen & Screening Conveyer / Washer / Compactor	3	1		26,280
EQ Return Pumps	4.7	1		41,172
Anoxic Basin Mixers	4.69	2		82,169
Anoxic Basin Feed Forward Pumps	10.1	2		176,952
Membrane Basin Permeate Pumps	10	2		175,200
Non-Potable Water Pumps	7.5	2		131,400
Aerobic Basin Blowers	30	2		525,600
Membrane Basin Blowers	7.5	2		131,400
Carbon Adsorbers	25	2		438,000
Blower Room Supply Fan	10	1		87,600
Distribution Pumps	100	1		876,000
			Total (HP-hr)	2,866,973
			Total (kW-hr)	2,137,901
			Total (MW-hr)	2,138

Source: EIR Project Description and Sharon Heights RWF OM Manual Final 052820

Table 3: Pump and Fan GHG Emissions Calculations

Source	CO2	CH4	NO2	CO2e
CalEEMod Emission Factor (lb/kWh)	641.35	0.03	0.01	643.86
CalEEMod Emission Factor (MT/kWh)	0.29	0.00	0.00	0.29
Project Emissions from Pumps/Fans	621.94	0.03	0.01	624.38

Wastewater Processing Calcs

Table 4: Wastewater Throughput Calculations

Peak Flow Capacity (MGD)	Peak Flow Capacity (MGY)	Peak Flow Capacity (GY)	Peak Flow Capacity (million liters per year)	Peak Flow Capacity (liters per year)
1	365	-	1,382	1,381,674,650

N2O Emissions (MT) = Wastewater x 10^-6 x N Load x 44/28 x EF effluent x 10^-3

Term	Desc	Value	Unit	Reference
Wastewater	Vol of Wastewater	Input	liters	User
10^-6	Conversion Factor	--	kg / mg	--
N Load	Mass of N Discharg	26	mg/ liter of WW	USEPA 2008
44/28	Ratio of molecular weights for N2O and N2			USEPA 2008
EF effluent	N2O effluent em fa	0.005	kg N2O / kg N	LGOP default
10^-3	Conversion Factor	--	MT / kg	--

Table 5: Wastewater Treatment Emissions Calculations

	CO2	CH4	N2O	CO2e
Process Emissions (MT)	0	0	0.28	84.11

APPENDIX C

BIOLOGICAL RESOURCES REPORT

This page left intentionally blank

West Bay Sanitary District
Flow Equalization and Resource Recovery Facility Levee Improvements and Bayfront Recycled Water Facility Project

Biological Resources Report

Prepared for:
West Bay Sanitary District
500 Laurel Street Menlo Park, CA 94205

Prepared by:
MIG
2055 Junction Avenue, Suite 205
San José, CA 95134

December 2020

Table of Contents

List of Abbreviated Terms

AMM	Avoidance and Minimization Measures
BMP	Best Management Practice
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFP	California Fully Protected Species
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CSSC	California Species of Special Concern
CWA	Clean Water Act
EFH	Essential Fish Habitat
FERRF	Flow Equalization and Resource Recovery Facility
FESA	Federal Endangered Species Act
GPS	Global Positioning System
HCP	Habitat Conservation Plan
IPaC	Information for Planning and Consultation
LSAA	Lake and Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
NMFS	National Marine Fisheries Service
NCCP	Natural Community Conservation Plan
NPDES	National Pollution Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
RWF	Recycled Water Facility
RWQCB	Regional Water Quality Control Board
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WBSD	West Bay Sanitary District

1 Introduction

This report provides an evaluation of biological resources that may be impacted by the proposed West Bay Sanitary District (WBSD) Flow Equalization and Resource Recovery Facility (FERRF) Levee Improvements and Bayfront Recycled Water Facility (RWF) Project (project) in Menlo Park, San Mateo County, California. It identifies sensitive biological resources with potential to occur at the project site, potential impacts to those resources resulting from the project, and recommended measures to avoid significant impacts defined by the California Environmental Quality Act (CEQA).

The report will be used during project planning, environmental review, and in support of applications for resource agency permits. The report includes the following sections:

- Section 2 Project Location and Description: provides an overview of the project
- Section 3 Regulatory Setting: provides a list of the federal, state, and local regulations that pertain to the project
- Section 4 Methods: includes the approach used for the evaluation, including field work and literature review
- Section 5 Environmental Setting: provides a description of the environmental conditions at the project site, including vegetation communities and associated wildlife habitats present, and a discussion of special-status plant and animal species and sensitive communities that are known to occur or that could potentially occur in the project area
- Section 7 Biological Impact Assessment and Avoidance Measures: provides an evaluation of the potential impacts to biological resources that may occur as a result of the project; and responses to the CEQA Guidelines Appendix G questions related to biological resources; and provides recommendations to avoid or minimize impacts to biological resources, as needed, to ensure that the project remains in compliance with all applicable federal, state, and local regulatory requirements and avoids significant impacts under CEQA

2 Project Location and Description

The proposed project is located at the West Bay Sanitary District's 20-acre Menlo Park Flow Equalization and Resource Recovery Facility (FERRF) site, at 1700 Marsh Road (APN 055-400-101), adjacent to Bedwell Bayfront Park in Menlo Park, San Mateo County, California in the *Palo Alto*, California U.S. Geological Survey (USGS) 7.5-minute quadrangle (Appendix A, Figures 1 and 2). The FERRF contains three open basins (also referred to as ponds in this report) that provide a combined 23.5 million gallons of wastewater storage for District flows when the conveyance system to the plant is at capacity, most likely during wet weather events, or when the conveyance system to the plant is undergoing maintenance or repairs.

The FERRF site also contains the decommissioned Menlo Park Wastewater Treatment Plant (WWTP, in service 1952-1980). WBSD currently also uses the FERRF site as extra office space and an auxiliary corporation yard for equipment and material storage, training exercises, pump repair workshop, Capital Improvement Project staging area, and salt marsh plant propagation area.

The existing levees surrounding the site were built in the late 1950's and are not currently certified by the Federal Emergency Management Agency to protect the site from the 100-year flood event. Therefore, the levees require improvement and/or repairs to ensure that both the facility and San Francisco Bay remain protected from raw wastewater cross contamination, including during flood events and the projected 50-year sea level rise elevations.

To receive FEMA certification, WBSD proposes to protect the site from flooding and sea level rise by installing sheet pile walls around the northern and western perimeters of the facility, raising the grades of the perimeter access road within the property, and building an ecotone levee[1] on the north side to promote shoreline resiliency. These are described in more detail below.

In addition to flood improvements, the project includes the proposed Bayfront Recycled Water Facility adjacent to the existing decommissioned water treatment plant. The Bayfront RWF would occupy approximately 12,000 square feet of the study area and be sized to produce up to 1.0 million gallons of recycled water per day. It includes equipment and storage tanks, as described in more detail later in this report. Remnant structures of the decommissioned wastewater treatment plant would remain unaffected by the proposed project facilities except that the project will cap the existing drainage system of the decommissioned wastewater treatment plant at the discharge point to Westpoint Slough and reroute it to discharge into one of the existing storage ponds. No new impervious surfaces created by the project would discharge stormwater off-site.

An existing swale along the eastern boundary of the site will be improved. Improvements include installing an outfall with two short sections of pipe fitted with one-way check valves to

---

[1] Ecotone levees are a structural, natural, and nature-based adaptation measure comprising gentle slopes or ramps that provide a gradual transition zone between tidal marshes and flood risk management levees. They stretch from the levee crest to the marsh surface and can provide wetland-upland transition zone habitat when properly vegetated with native grasses, rushes, and sedges. They can attenuate waves, provide high-tide refuge for marsh wildlife, and allow room for marshes to migrate upslope with sea level rise.

allow stormwater to drain into the Bay without allowing seawater to backup into the swale. The improvements to the swale are described in some detail later.

The Bayfront RWF system would require new influent and effluent piping and a pump station to connect the facility with customers (end users) for the recycled water. An influent pump station will be constructed the site of the District's existing pump station at the west side of Marsh Road at the entrance to Bedwell Bayfront Park (Appendix A, Figure 3). It consists of a 12-foot diameter wet well with a few associated above ground control cabinets placed on concrete footings. The wet well is a cylindrical mostly underground structure with an influent pipe at the bottom, discharge pipe at the top, and two submersible pumps (approximately 10-20 horsepower each) to move influent from SVCW to the Bayfront RWF. Only one pump is needed; however, two are provided for redundancy in the event a pump breaks down. Construction of the wet well is expected to require excavation of an approximately 15-foot deep hole.

The new influent pump station and piping would transport the recycled water to customers (end users) in the Menlo Park Bayshore area. Proposed influent and distribution pipeline alignments would be in existing street rights-of-way except for various utility crossings including a high-pressure gas line and railroad properties.

The Bayfront RWF includes two alternatives for disposal of reverse osmosis (RO) concentrate (effluent) including discharging into the existing basins on site and a bayside outfall in the northwest corner of the site. This is described in more detail below.

The FERRF site is largely unpaved. The only impervious areas at the site are the remnant WTTP facilities and a portion of the entrance driveway into the site. Northern coastal salt marsh and tidal slough are located along the western and northern shorelines, and developed and annual grassland border the eastern and southern boundaries of the FERRF property.

The District's objectives for the proposed project are to:

- Provide FEMA certified levee improvements to the FERRF to protect the facility and San Francisco Bay water quality in a 100-year flood event and guard against projected 50-year sea level rise estimates.
- Maintain the FERRF site's existing function and preserve maximum flow equalization storage at the site.
- Incorporate an ecotone levee (living shoreline) on a portion of the site to promote shoreline resiliency and avoid the loss of wetlands and upland habitat caused by climate change.
- Provide a 1.0 MGD capacity Bayfront RWF to provide recycled water to address demand and provide an additional revenue stream to the District.

- Improve the existing ditch that serves as storm drainage along the eastern portion of the parcel to allow storm water to drain to the slough while not allowing bay water to infiltrate the property.
- Decommission the existing outfall/drainage system for the retired treatment plant at the discharge point and reconfigure onsite stormwater drainage to drain to the on-site ponds.

2.1 Sheet Pile Installation

Sheet pile walls are interlocking steel metal plates (3/8-inch thick, 12-inches wide, 35 feet tall/long) that will be driven or vibrated into the existing earthen levees. The proposed thickness of the piles is based on predicted erosion rates and the minimum service life of the material. Approximately 3,400 linear feet of sheet piles would be placed at the top of the bank along the western and northern portions of the FERRF site, with a short, approximately 200-foot section extending onto Menlo Park land at the site entrance. A double wall (two walls in parallel) is planned on the north side of the site to improve seismic stability of the existing northern levee.

The sheet piles would be driven or vibrated into the ground approximately 30 feet deep, while leaving the top of the pile at a height of 15 feet (North American Vertical Datum of 1988, or NAVD 88) in elevation. This height was selected to account for the FEMA flood height as well as the projected 50-year sea level rise height. The 50-year sea level rise projection used to establish the proposed sheet pile height is the San Mateo County Sea Level Rise and Overtopping Analysis for San Mateo County's Bayshore, developed using the BCDC's Adapting to Rising Tides Methodology (May 2016).

Early conversations with the sheet pile contractor indicated that a potential method could be use of a single directional drill rig with a vibrational hammer. A key step in this process is to predrill through existing fill with an auger to make installation easier and reduce vibration. Spoils would not need to be extracted since the goal is just to break up the compacted levee soil for easier installation of the sheet piles.

The western perimeter levee varies in elevation from 10- to 12-foot elevation; therefore, approximately three to five (3-5) feet of sheet pile would remain visible above ground. The double pile wall along the north of the site would not be visible above ground because the ecotone levee on the north side of the wall and the northern perimeter levee/roadway to the south of the wall would both be brought up to the same 15-foot elevation with fill.

The outboard face of the exposed areas of sheet pile wall will include modular unit wall enhancements that attach to the wall structure to provide physical habitat for sessile (immobile) organisms, such as mussels and algae, and refuge and forage for fish species. The modular units are made from a bio-enhanced concrete mix with surface complexity and physical design that provides suitable environmental conditions for marine flora and fauna. The wall enhancements can increase the habitat value of the vertical wall by providing habitat that would not otherwise be provided. The modular units target the recruitment of native fish and invertebrates once sea level rise inundates the exposed sheet pile.

2.2 Recycled Water Facility and Treated RO Effluent

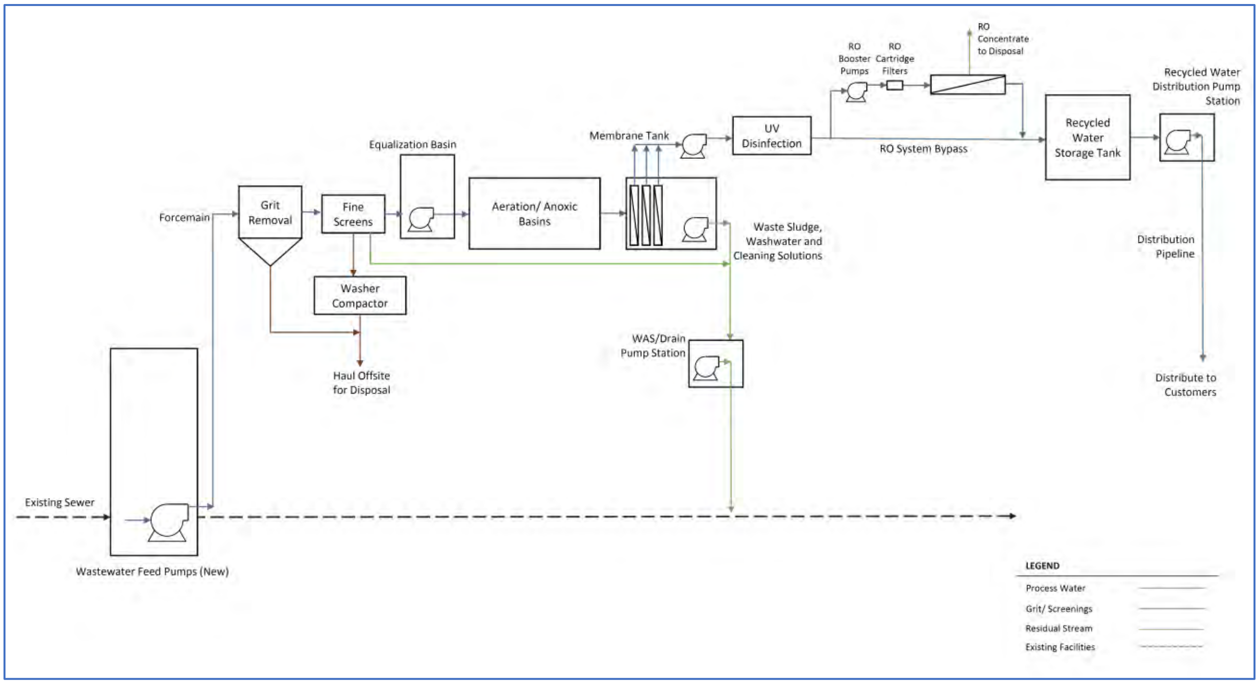
As described in the project EIR, in 2014 the WBSD completed a Recycled Water Market Survey, including a preliminary market and recycled water supply assessment and evaluation of three conceptual alternatives to provide recycled water to customers and assess overall feasibility of adding recycled water to the available water supply portfolio. As a result of the market survey, the District proceeded with design and construction of a satellite treatment plant at Sharon Heights Golf Course & Country Club in Menlo Park to provide recycled water for irrigation at the golf course, Stanford Linear Accelerator Center (SLAC), and other customers in the area. The facility began operations in March 2020.

The District also prepared a Bayfront Recycled Water Facilities Plan (Woodard & Curran 2019) to evaluate implementation of a recycled water facility project in the Bayfront area. The proposed Bayfront RWF is a result of these initial planning efforts. Title 22 of the California Code of Regulations (Title 22) specifies the allowable uses of recycled water based on the target level of treatment. The proposed Bayfront RWF would produce disinfected tertiary recycled water, commonly referred to as “purple pipe” water. Potential uses in WBSD’s service area are categorized as irrigation, commercial cooling tower and other industrial uses, fire-fighting, public fill stations, or for flushing toilets. The service areas for recycled water for the Sharon Heights and proposed Bayfront RWF do not overlap.

The proposed Bayfront RWF would operate year-round and occupy an approximately 12,000 square foot area just west of the decommissioned WWTP and would be sized to produce up to 1.0 MGD of recycled water (approximately 550 acre-feet per year).

The major components of the Bayfront RWF include an influent flow diversion structure, submersible influent pumps, influent force main, grit removal and screen fines that would be off hauled, dual fine screen, equalization basin, equalization return pumps, anoxic basin with mixers and feed forward pumps, aerobic basin with mixer and feed forward pumps and diffusers, membrane basins with membrane cassettes, permeate pumps, reverse osmosis (RO) system, chemical system for membrane cleaning, recycled water tank and distribution pumps, distribution pipeline, odor control system, electrical and supervisory control and data acquisition (SCADA) system, standby generator, sampling system and laboratory testing areas. The Bayfront RWF process flow schematic is shown below.

WATER RECYCLING FACILITY PROCESS FLOW SCHEMATIC



Source: Woodard & Curran 2020. [2020.04.06 Process Schematic_MBR+RO_Rev.pdf]

The Bayfront RWF processes listed above and shown in the process flow schematic would be housed in structures at the FERRF site including:

- A concrete masonry unit (CMU) headworks building approximately 25 feet wide by 50 feet wide and 18 feet high);
- Below grade concrete basins consisting of equalization, anoxic, aerobic, and membrane basins approximately 50 feet wide by 90 feet long and 15 feet deep);
- CMU reverse osmosis (RO) facility approximately 25 feet wide by 20 feet long and 18 feet high;
- CMU operations and laboratory building approximately 25 feet wide by 20 feet long and 13 feet high;
- Below grade recycled water holding tank approximately 15 feet wide by 15 feet long and 10 feet deep;
- Pad for odor control system approximately 30 feet wide by 20 feet long;
- Electrical service transformer pad located separate from the treatment facility approximately 6 feet wide by 6 feet long;
- Reverse osmosis (RO) concentrate discharge storage tank (one (1) tank, 25,000-gallon size or 2 (two) 12,500-gallon tanks) and RO concentrate discharge pipeline (to Pond 3 or outfall to slough);

- Two (2) steel, 0.5 MG recycled water storage tanks (55 feet diameter, 30 feet high); and
- Distribution pump station building approximately 25 feet long by 13 feet wide and 10-foot-high building to house two pumps (between 30 to 100 hp each) and their controls.

As noted above, building materials are primarily CMU block construction. None of the above listed features would utilize large windows or highly reflective materials. The Bayfront RWF would be constructed on imported fill to achieve a finished floor elevation of 12 feet, which is 12 inches above the FEMA flood elevation.

The water recycling process results in three waste streams: grit (solids), RO concentrate, and a mix of waste sludge, wash water and cleaning solutions. The grit is collected and disposed of at a sanitary landfill. The waste sludge, wash water and cleaning solutions are disposed of in the sanitary sewer. The RO concentrate will be disposed of in a basin on site, or through an outfall into the adjacent slough. The RO concentrate is the focus of this discussion because it may impact biological resources.

The RO concentrate is remainder fluids from the RO process that are not suitable for irrigation use due to the amount of total dissolved solids (TDA). In general, water recycling involves processing treated domestic wastewater with a membrane bioreactor (MBR) and reverse osmosis (RO) to further purify secondarily treated wastewater to tertiary treated (recycled water) standards. All of the typical constituents found in treated wastewater will be present in the remainder fluids. The flow from the proposed 1 MGD plant is expected to average 0.025 MGD or 25,000 gallons/day, but could be a maximum of 50,000 gallons/day. For comparison, the nearby Palo Alto Wastewater Treatment and Silicon Valley Clean Water Facilities discharge up to 39 MGD and 29 MGD of effluent, respectively (San Francisco Regional Water Quality Control Board Order No. R2-2017-0041 and National Pollutant Discharge Elimination System No. CA0038849).

Concentrations of the constituents will depend on wastewater levels and the efficiency of the wastewater treatment process. Further analysis will be needed for certain metals such as arsenic, copper, lead, nickel, mercury, selenium, and zinc, which are likely to be present at detectable levels. Other constituents potentially present at detectable levels may include antimony, chromium, acrolein, chlorobenzene, chloromethane, toluene, bis(2-ethylhexyl) phthalate, and ammonia. If improperly treated, the wastewater effluent can also include:

- Fine solids
- Excessive organic material
- Excessive nutrients (mainly nitrogen and phosphorus)
- Human pathogens
- Toxic organic chemicals
- Metals

It is proposed that the RO concentrate will be discharged into a pond onsite (e.g., Pond 3) and left to evaporate by 50 percent at which time it can be off-hauled to a landfill. When the pond is filled and there is no capacity for the RO concentrate, the RO concentrate would be discharged to the slough continuously at an average temperature of 25 degrees Celsius (77 degrees Fahrenheit). The proposed outfall is located at the northwestern corner of the site where tidal action and water depth can provide the greatest dilution. Based on influent wastewater from SVCW, the RO concentrate that would be generated as part of the second waste stream is expected to exhibit the pollutant concentrations listed in the table below.

REVERSE OSMOSIS CONCENTRATE CONCENTRATIONS

Pollutant	# of Samples	SVCW Effluent Concentration (assumed RO influent)		Projected RO Concentrate Concentration	
		95th Percentile (ug/L)	Average (ug/L)	Estimated 95th Percentile (ug/L)	Estimated Average Concentration (ug/L)
Arsenic, Total	60	1.4	1.00	7.0	5.0
Copper, Total	60	11	7.41	55	37
Lead, Total	60	0.28	0.19	1.4	0.93
Nickel, Total	60	5.3	3.97	27	20
Mercury, Total	60	0.0082	0.0050	0.041	0.025
Selenium, Total	60	0.79	0.48	4.0	2.4
Zinc, Total	60	19	14.40	95.3	72
Cyanide, Total (as CN)	60	4.3	2.84	22	14
Source: Woodard & Curran (W&C) 2020. SVCW effluent data for the period June 2015 – May 2020 was used for all pollutants analyzed. All available data was used, without removing any potential outliers. W&C assumed the water quality of the SVCW effluent would be similar to the influent RO water quality for WBSD. W&C assumed 80% RO flow recovery and RO rejection of 100% for all pollutants.					

2.3 Ecotone Levee

An ecotone is a transition zone between natural communities. A community is composed of plant and animal species occupying a given area. Because the transition zone includes elements from adjacent communities, its structure and composition results in a unique ecosystem called an ecotone. The ecotone is the transition zone that supports plant and animal species from all adjacent communities, as well as those species adapted to the environment in the ecotone itself. An ecotone is often populated by a rich diversity of life. In general, the greater the contrast between adjoining communities, the greater diversity of species present (Cadenasso et al. 2003; Lindenmayer and Fischer 2006).

Between 70% and 93% of historic wetlands within San Francisco Bay Estuary have been lost due to agriculture, salt production, and urbanization. Conservation of existing wetlands is critical to preserving habitats for special-status species, fish, migratory birds, and protecting the seashore from erosion and flooding. Furthermore, there is increasing awareness of the important link between tidal wetlands, ecotones, and upland habitats. Ecotones and upland habitats play an important role in food web dynamics in tidal wetlands, provide important buffers to reduce human effects from adjacent urban and residential areas that commonly border wetlands around the Bay, and they provide refuge for wetland animals during extreme high tides. Over the long term, ecotones and upland habitats could also provide substantial benefits because they could serve as critical areas for upland migration of wetlands, when considering predicted increases in rates of sea-level rise (Callaway et al. 2011).

Within the San Francisco Bay estuary, tidal wetlands with intact, undeveloped upland habitats contain the largest remaining populations of special-status species, including Salt marsh harvest mouse (*Reithrodontomys raviventris*) and California Ridgway's rail (*Rallus longirostris obsoletus*) (Sustaita et al. 2011; Whitcraft et al. 2011; Overton and Wood 2015), underlying the importance of natural ecotones in the persistence of these species. In addition, the San Francisco Bay estuary is one of the most important staging and wintering areas for migratory waterfowl and shorebirds in the Pacific Flyway (Harvey et al. 1992).

Currently, there is a very narrow transition zone between the top of the levee and the salt marsh on the north side of the project (Figure 3). While the salt marsh is a natural community, the man-made levee is dominated by sparse, non-native vegetation and subject to regular human disturbance, which diminishes the habitat value of the levee (see Section 5.2). The project will create a wider upland transition zone, planted with native vegetation, between the existing salt marsh habitat and levee on the north side of the project site. The proposed approximately 3.1-acre ecotone levee will provide higher quality native upland refugia habitat as well as a natural wildlife corridor. With a projected sea level rise of up to 1.9 feet by 2050 under a high emissions scenario, the majority of the existing salt marsh habitat on the north side of the Biological Study Area (BSA) will be permanently inundated (completely under water), resulting in a permanent loss of wetlands in just 30 years. Construction of an ecotone levee would mitigate for the permanent loss of wetlands from projected sea level rise.

The use of ecotone levees has also been proposed as one of several natural measures to protect coastlines from the coastal flood hazard associated with climate change (Point Blue Conservation Science, et al. 2019). Global sea levels are rising as a result of climate change.

With sea levels projected to rise up to 6.9 feet by 2100 under a high emissions scenario for greenhouse gases, vital infrastructure along the coast is at risk from tidal inundation as well as an increase in the frequency and magnitude of storm surges (Chen et al. 2017; Rahmstorf 2017; OPC 2018).

The proposed ecotone levee is a sea level rise adaptation specifically identified in the San Francisco Estuary Institute Adaptation Atlas. It provides resiliency against sea level rise by maintaining upland habitat for special status species that would otherwise eventually be wholly under water. (Appendix A, Figure 3).

The District participated in two Interagency Meetings (August 2018 and July 2019), and two site visits (one with RWQCB staff and one with USFWS staff) to solicit early comments on the project. At the first Interagency Meeting in 2018 the agencies recommended that the project incorporate an ecotone levee into project design.

At the second Interagency Meeting on July 11, 2019, the District introduced the ecotone levee, and identified that the existing facilities would be used for a recycled water facility. The meeting was attended by staff from the USACE, National Marines Fisheries Service (NMNFS), the USFWS, RWQCB, and SLC.

The San Francisco Bay Shoreline Adaptation Atlas defines an ecotone levee as a gentle slope or ramp (with a length to height ratio of 20:1 or gentler) bayward of a flood risk management levee and landward of a tidal marsh (SFEI and SPUR 2019). Ecotone levees can attenuate waves, provide high-tide refuge for marsh wildlife, and allow room for marshes to migrate upslope with sea level rise. In addition, levees wider than 80 feet, planted with dense vegetation between 1.6 and 3.3 feet tall, can provide measurable benefits to tidal marsh dependent birds, both in the short- and long-term (Wasson et al. 2013; SFEI and SPUR 2019).

The use of ecotone levees to mitigate for sea level rise is also consistent with the goals and objectives of the 2016 Comprehensive Conservation and Management Plan (CCMP) for the San Francisco Estuary (Estuary Blueprint) (San Francisco Estuary Partnership 2016). The CCMP was the result of a collaborative effort among 70 Bay and Delta agencies and organizations. One of the goals of the CCMP is to "*Bolster the resilience of Estuary ecosystems, shorelines, and communities to climate change"* and one of the action items of the CCMP is to:

> *"Protect areas between estuarine and terrestrial ecosystems (transition zones), and their ecosystem services, to help the Estuary adapt to rising sea levels. Integrate transition zones into baylands restoration and enhancement projects to provide both migration space and high water refugia."*

Within the San Francisco Bay estuary, ecotone levees may provide higher quality native upland refugia habitat for special-status species and migratory birds; and can increase the resilience of tidal habitat to climate change by allowing for sea level rise. An ecotone levee may also protect existing infrastructure adjacent to the Bay from future flooding caused by sea level rise.

The San Francisco Estuary Institute (SFEI) and San Francisco Bay Area Planning and Urban Research Association (SPUR) published the San Francisco Bay Shoreline Adaptation Atlas, which identifies effective shoreline adaptation strategies that are appropriate for specific settings and take advantage of natural processes (SFEI and SPUR 2019). The report divides the San Francisco Bay shoreline into 30 operational landscape units (OLUs) which are connected geographic areas that share common physical characteristics that would benefit from being managed as individual units. The report identifies the shoreline along the northern levee of the FERRF site as potentially suitable for an ecotone levee that can address coastal risks including storm surge, erosion, and short-term and long-term sea level rise.

The proposed ecotone levee would be located along the northern perimeter of the FERRF site, extend to a height of 15 feet (NAVD 88), and utilize slopes ranging from 20:1 (horizontal to vertical) to 10:1, to maintain some of the existing channel characteristics of Westpoint Slough in the area (see Figure 3 in Appendix A).

The ecotone levee would be built by first installing coffer dams at low tide to isolate the area from tidal action. The coffer dams are expected to be sheet piles that would be vibrated into bay mud using a vibratory hammer (or similar machinery) staged on the top of the existing levee. Dewatering is not expected to be necessary (Freyer & Laureta, pers. comm. December 2020).

Once the construction area is isolated from tidal action the existing marsh vegetation would be mechanically stripped from the area after pre-construction surveys for special-status species are completed. The vegetation would be preserved onsite, watered, and protected so it can be used to revegetate the ecotone levee.

Locally sourced, imported fill would be used to raise the existing northern levee and ecotone levee to an elevation of 15 feet NAV88. The fill used would be specifically sourced from locations supplying appropriate material to support the proposed ecotone levee plantings and shoreline location. Placement of imported fill would be done from the landside, above the mean high tide water line (approximately 6.8 feet elevation; existing levee is between 10 to 12 feet) with the use of loaders, backhoes, and excavators. Dewatering for activities that require work below the mean high tide water line are not expected. If necessary, they would require a site-specific dewatering plan prepared and reviewed as part of project regulatory permit applications. A dewatering plan is also included, if necessary, as a mitigation measure in this report.

Construction activities would take place land side and no activities are planned by boat or barge.

Once grading is complete, the area would be inspected for stability and prepared for planting. Plants from salvaged marsh sod, seeds, and container plants would be installed as determined by a site planting plan approved by the resource agencies. Temporary irrigation woud be provided during the plant establishment period.

Once all revegetation is installed and inspected by a restoration ecologist the coffer dam would be removed to re-open the area to tidal action. Pending results of a wave run up analysis, the design reviewed and ultimately approved by state and federal resource agencies may include living shoreline elements at the toe of slope of the ecotone levee (e.g., oysters, eel grass). In addition, notches or knick points at the edge adjacent to West Point Slough may be included in the design to encourage dendritic channels to develop.

2.3.1 On-Site Storm Water Improvements

The FERRF has an existing 30-inch pipe, located approximately 20 feet east of the old WWTP, that extends from the WWTP north to an outfall to Westpoint Slough. Since the plant is no longer operational, wastewater is no longer discharged. The proposed project includes capping of this line and rerouting any drainage collected in this line to the existing flow equalization basins.

2.3.2 Storm Ditch Improvements and Grading

There is an existing ditch in Bedwell Bayfront Park, along the south and eastern portion of the FERRF site, that conveys stormwater from Bedwell Bayfront Park and discharges it to Westpoint Slough. The proposed levee improvements on the FERRF site require that the adjacent existing ditch be improved with one-way check valves to allow water to drain off the site, but not allow bay waters to infiltrate back into the drainage ditch. Approximately 460 CY of imported fill would be used to raise the grades in and around the area, including a section of the Bay Trail to 15 feet NAVD 88. The outfall would be sized and designed to ensure slope protection and adequate capacity to prevent flooding, erosion, and siltation.

2.3.3 Entrance Roadway Grading

The entrance to the FERRF site from Marsh Road within Bedwell Bayfront Park would be graded with imported fill to bring the entrance roadway and immediate surrounding areas, including a short segment of the Bay Trail, up to 15 feet NAVD 88. Approximately 2,700 cubic yards of fill is anticipated. A short (less than 5 feet) retaining wall is planned just inside the entrance at the southwest corner of the pond closest to the entrance (Pond 1). Existing paved portions of Marsh Road and the FERRF entrance roadway affected by project activities would be repaved (returned to original condition) and unpaved areas would remain unpaved.

2.3.4 Project Construction Sequence and Schedule

The District intends to build the levee improvements first, followed by the Bayfront RWF. Construction would most likely start with the installation of the sheet piles along the western portion of the property. Once those sheet piles are in place, the construction would move on to the northern levee and ecotone levee construction phase. This includes salvaging existing site vegetation on the outboard side of the northern levee, raising the existing levee to an elevation of 15 NAV88, and construction of the ecotone levee as well as the storm ditch outfall improvements. The installation of utilities and the raising of the grade on Marsh road would follow. The final phase would consist of the construction of the recycled water treatment plant, the RO concentrate disposal pipeline, the new onsite drainage system, and off-site influent pump station, influent and discharge pipelines.

The proposed project would increase the impervious area at the site by a total of approximately 14,113 square feet (approximately 13,620 square feet for the FERRF and approximately 493 square feet for the influent wastewater pump station).

Construction of the levee improvements is anticipated to begin in early 2022, pending receipt of all required permits. The target date for construction of the Bayfront RWF is in early 2023; however, the proposed project's construction schedule may change depending on the timing and availability of future funding.

The anticipated construction phases, duration, typical equipment used, and number of anticipated workers during construction of the project are summarized below. Construction staging for project activities other than the influent pump station would occur at the project site. Construction staging for the influent pump station would occur at the influent pump station site.

SUMMARY OF PROJECT CONSTRUCTION PHASES, DURATION, AND EQUIPMENT

Construction Activity	Months	Typical Equipment[A]	Workers[B]
1. Sheet Pile Installation	1	Excavator (1), Loader (1), Dozer (1), Water Truck (1), Auger Rig (1), Vibrational Hammer / Pile Driver (1)	10
2. Levee/Ecotone Levee and storm drain improvements	1 to 2	Excavator (1), Loader (1), Dozer (1), Water Truck (1), Roller (1), Backhoe (1), Vibrational Hammer / Pile Driver (1)	8
3. FERRF entrance/Marsh Road grade and utilities installation	3 to 6	Excavator (1), Loader (1), Dozer (1), Water Truck (1), Roller (1)	8
4. Recycled Water Treatment Plant	18	Excavator (2), Loader (2), Dozer (2), Water Truck (1), Roller (1), Mobile Crane (1), Impact or Vibrational Hammer / Pile Driver (1)	60[C]

(A) The typical equipment list does not reflect all equipment that would be used during the construction phase.
(B) Worker numbers are approximate.
(C) Reflects the number of workers present during the peak construction period of this activity.

2.3.5 Estimated Fill Quantities

The District estimates the project would require the import of approximately 32,250 cubic yards (CY) of fill for the levee improvements and raising grades in and around the site. These numbers are expected to be refined once the ecotone levee design is approved by the resource agencies. These estimates are based on an ecotone levee size of about 3.46 acres, including upland and marsh.

FILL QUANTITIES

Location	Cut/Fill/Off-Haul Amount (CY)
Levee Fill	10,350 CY
Ecotone Fill	17,900 CY
Bayfront RWF Fill	840 CY
Entrance Driveway Fill	2,700 CY
Storm Ditch/Bedwell Bayfront Park Fill	460 CY
Total Fill	**32,250 CY**

3 Regulatory Setting

Biological resources in California are protected under federal, state, and local laws. The laws that may pertain to the biological resources found on the project site are described in this section.

3.1 Federal

3.1.1 Federal Endangered Species Act

The Federal Endangered Species Act (FESA) of 1973, as amended, provides the regulatory framework for the protection of plant and animal species (and their associated critical habitats), which are formally listed, proposed for listing, or candidates for listing as endangered or threatened under FESA. FESA has the following four major components: (1) provisions for listing species, (2) requirements for consultation with the United States (U.S.) Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), (3) prohibitions against "taking" (i.e., harassing, harming, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting to engage in any such conduct) of listed species, and (4) provisions for permits that allow incidental "take". FESA also discusses recovery plans and the designation of critical habitat for listed species.

Both the USFWS and NOAA Fisheries share the responsibility for administration of FESA. Section 7 requires federal agencies, in consultation with, and with the assistance of the USFWS or NOAA Fisheries, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. Non-federal agencies and private entities can seek authorization for take of federally listed species under Section 10 of FESA, which requires the preparation of a Habitat Conservation Plan.

3.1.2 U.S. Migratory Bird Treaty Act

The U.S. Migratory Bird Treaty Act (MBTA; 16 USC §§ 703 et seq., Title 50 Code of Federal Regulations [CFR] Part 10) states it is "unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill; attempt to take, capture or kill; possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, 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 any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or in part, of any such bird or any part, nest or egg thereof…" In short, under MBTA it is illegal to disturb a nest that is in active use, since this could result in killing a bird, destroying a nest, or destroying an egg. The USFWS enforces MBTA. The MBTA does not protect some birds that are non-native or human-introduced or that belong to families that are not covered by any of the conventions implemented by MBTA. In 2017, the USFWS issued a memorandum stating that the MBTA does not prohibit incidental take; this was followed in 2020 with an Environmental Impact Statement and a proposed rule to formalize this change to the MBTA. Incidental take refers to impacts to migratory birds incidental to an otherwise lawful activity, as opposed to purposefully destroying migratory birds. The MBTA is limited to purposeful actions, such as directly and knowingly removing a nest to construct a project, hunting, and poaching.

3.1.3 Marine Mammal Protection Act

The Marine Mammal Protection Act prohibits the take of marine mammals, with certain exceptions, in waters under the jurisdiction of the U.S. or by citizens of the U.S. on the high seas, as well as the importation of marine mammals and marine mammal products into the U.S. Take is defined as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.” Harassment is defined as “any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild; or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.”

3.1.4 Clean Water Act

The Clean Water Act (CWA) is the primary federal law regulating water quality. The implementation of the CWA is the responsibility of the U.S. Environmental Protection Agency (EPA). However, the EPA depends on other agencies, such as the individual states and the U.S. Army Corps of Engineers (USACE), to assist in implementing the CWA. The objective of the CWA is to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” Section 404 and 401 of the CWA apply to activities that would impact waters of the U.S. The USACE enforces Section 404 of the CWA and the California State Water Resources Control Board enforces Section 401.

Section 404

As part of its mandate under Section 404 of the CWA, the EPA regulates the discharge of dredged or fill material into “waters of the U.S.”. “Waters of the U.S.” include territorial seas, tidal waters, and non-tidal waters in addition to wetlands and drainages that support wetland vegetation, exhibit ponding or scouring, show obvious signs of channeling, or have discernible banks and high-water marks. Wetlands are 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" (33 CFR 328.3(b)). The discharge of dredged or fill material into waters of the U.S. is prohibited under the CWA except when it is in compliance with Section 404 of the CWA. Enforcement authority for Section 404 was given to the USACE, which it accomplishes under its regulatory branch. The EPA has veto authority over the USACE's administration of the Section 404 program and may override a USACE decision with respect to permitting.

In tidal waters, USACE jurisdiction extends to the landward extent of vegetation associated with salt or brackish water or the high tide line (HTL) (see 33 CFR, Part 328.4). The HTL is defined in 33 CFR, Part 328.3 as "the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The HTL may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gauges, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other tides that occur with periodic frequency, but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm."

Substantial impacts to waters of the U.S. may require an Individual Permit. Projects that only minimally affect waters of the U.S. may meet the conditions of one of the existing Nationwide Permits, provided that such permits' other respective conditions are satisfied. A Water Quality Certification or waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions (see below).

Section 401

Any applicant for a federal permit to impact waters of the U.S. under Section 404 of the CWA, including Nationwide Permits where pre-construction notification is required, must also provide to the USACE a certification or waiver from the State of California. The "401 Certification" is provided by the State Water Resources Control Board through the local Regional Water Quality Control Board (RWQCB).

The RWQCB issues and enforces permits for discharge of treated water, landfills, storm-water runoff, filling of any surface waters or wetlands, dredging, agricultural activities and wastewater recycling. The RWQCB recommends the "401 Certification" application be made at the same time that any applications are provided to other agencies, such as the USACE, USFWS, or NOAA Fisheries. The application is not final until completion of environmental review under the CEQA. The application to the RWQCB is similar to the pre-construction notification that is required by the USACE. It must include a description of the habitat that is being impacted, a description of how the impact is proposed to be minimized and proposed mitigation measures with goals, schedules, and performance standards. Mitigation must include a replacement of functions and values, and replacement of wetland at a minimum ratio of 2:1, or twice as many acres of wetlands provided as are removed. The RWQCB looks for mitigation that is on site and in-kind, with functions and values as good as or better than the water-based habitat that is being removed.

Section 402

Section 402 of the Clean Water Act requires that all construction sites on an acre or greater of land (see Section 3.4.4 below), as well as municipal, industrial and commercial facilities discharging wastewater or stormwater directly from a point source (a confined and discrete conveyance, such as a pipe, ditch, channel, tunnel, conduit, discrete fissure, or container) into a surface water of the United States (a lake, river, and/or ocean) must obtain permission under the National Pollutant Discharge Elimination System (NPDES) permit. The EPA issues NPDES permits to ensure the receiving waters of the U.S. will achieve specified Water Quality Standards (WQS). The EPA has fully authorized certain states to issue NPDES permits, including the State of California. However, the EPA retains the authority to consider effects on federally listed species and critical habitat, through Section 7 of the FESA, in its approval and oversight of state-run NPDES programs.

All point discharges in the California require a NPDES permit from the RWQCB. In California, NPDES permits are also referred to as waste discharge requirements (WDRs). California Water Code Section 13260 states that persons discharging or proposing to discharge waste that could affect the quality of the waters of the State, other than into a community sewer system, shall file an Application/Report of Waste Discharge (ROWD).

The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the RWQCB's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes implementation programs to achieve water quality objectives. All point discharges into the Bay will be evaluated against the objectives set forth in the Basin Plan, covering over 126 priority pollutants.

3.1.5 Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 prohibits the creation of any obstruction to the navigable capacity of waters of the U.S., including discharge of fill and the building of any wharfs, piers, jetties, and other structures without Congressional approval or authorization by the Chief of Engineers and Secretary of the Army (33 U.S. Code 403). Navigable waters of the U.S., which are defined in 33 CFR, Part 329.4, include all waters subject to the ebb and flow of the tide, and/or those which are presently or have historically been used to transport commerce. The shoreward jurisdictional limit of tidal waters is further defined in 33 CFR, Part 329.12 as “the line on the shore reached by the plane of the mean (average) high water (MHW).” Where precise definition of the actual location of the MHW line becomes necessary, it must be established by survey with reference to the available tidal datum. The USACE does not regulate wetlands under Section 10, only the open waters component of tidal habitat (under the Rivers and Harbors Appropriation Act of 1899), and there is overlap between Section 10 jurisdiction, which extends landward to the MHW and Section 404 jurisdiction, which extends landward to the HTL.

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

3.1.6 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act governs all fishery management activities that occur in federal waters within the United States' 200-nautical-mile limit. The Act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans (FMPs) to achieve the optimum yield from U.S. fisheries in their regions. These councils, with assistance from the NMFS, establish Essential Fish Habitat (EFH) in FMPs for all managed species. Additionally, along the West Coast, NOAA Fisheries relies on Fishery Management Councils to identify habitats that fall within Habitat Areas of Particular Concern (HAPC). These areas provide important ecological functions and/or are especially vulnerable to degradation. HAPCs are discreet subsets of Essential Fish Habitat that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPC are not afforded any additional regulatory protection under the Magnuson-Stevens Act; however, federal projects with potential adverse impacts on HAPC are more carefully scrutinized during the consultation process. Federal agencies that fund, permit, or implement activities that may adversely affect EFH are required to consult with the NMFS regarding potential adverse effects of their actions on EFH and respond in writing to recommendations by the NMFS.

3.2 State

3.2.1 California Environmental Quality Act

The CEQA (Public Resources Code Sections 21000 et. seq.) requires public agencies to review activities which may affect the quality of the environment so that consideration is given to preventing damage to the environment. When a lead agency issues a permit for development that could affect the environment, it must disclose the potential environmental effects of the project. This is done with an "Initial Study and Negative Declaration" (or Mitigated Negative

Declaration) or with an “Environmental Impact Report”. Certain classes of projects are exempt from detailed analysis under CEQA.

CEQA Guidelines Section 15380 defines endangered, threatened, and rare species for purposes of CEQA and clarifies that CEQA review extends to other species that are not formally listed under the state or federal Endangered Species Acts but that meet specified criteria. The state maintains a list of sensitive, or “special-status”, biological resources, including those listed by the state or federal government or the California Native Plant Society (CNPS) as endangered, threatened, rare or of special concern due to declining populations. During CEQA analysis for a proposed project, the California Natural Diversity Data Base (CNDDB) is usually consulted. CNDDB relies on information provided by the California Department of Fish and Wildlife (CDFW), USFWS, and CNPS, among others. Under CEQA, the lists kept by these and any other widely recognized organizations are considered when determining the impact of a project. CDFW is a trustee agency under CEQA and, as a trustee agency, will review any CEQA document prepared for a project.

3.2.2 California Endangered Species Act

The California Endangered Species Act (CESA; Fish and Game Code 2050 et seq.) generally parallels the FESA. It establishes the policy of the State to conserve, protect, restore, and enhance threatened or endangered species and their habitats. Section 2080 of the California Fish and Game Code prohibits the take, possession, purchase, sale, and import or export of endangered, threatened, or candidate species, unless otherwise authorized by permit or by the regulations. “Take” is defined in Section 86 of the California Fish and Game Code as to “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” This definition differs from the definition of “take” under FESA. CESA is administered by CDFW. CESA allows for take incidental to otherwise lawful projects but mandates that State lead agencies consult with the CDFW to ensure that a project would not jeopardize the continued existence of threatened or endangered species.

3.2.3 California Fish and Game Code Sections 1600-1607

Sections 1600-1607 of the California Fish and Game Code require that a Notification of Lake or Streambed Alteration Agreement (LSAA) application be submitted to CDFW for “any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake.” CDFW reviews the proposed actions in the application and, if necessary, prepares a LSAA that includes measures to protect affected fish and wildlife resources, including mitigation for impacts to bats and bat habitat. These code sections apply to freshwater rivers, streams and lakes, and do not apply to tidal waters. While CDFW may comment on the project as a Trustee Agency under CEQA, a Lake or Streambed Alteration Agreement would not apply to this project.

3.2.4 Native Plant Protection Act

The Native Plant Protection Act (NPPA) was created in 1977 with the intent to preserve, protect, and enhance rare and endangered plants in California (California Fish and Game Code sections 1900 to 1913). The NPPA is administered by CDFW, which has the authority to designate native plants as endangered or rare and to protect them from "take." CDFW maintains a list of plant species that have been officially classified as endangered, threatened or rare. These special-status plants have special protection under California law and projects that directly impact them may not qualify for a categorical exemption under CEQA guidelines.

3.2.5 Fully Protected Species and Species of Special Concern

The classification of California fully protected (CFP) species was the CDFW's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, amphibians and reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The Fish and Game Code sections (§5515 for fish, §5050 for amphibian and reptiles, §3511 for birds, §4700 for mammals) deal with CFP species and state that these species "…may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species" (CDFW Fish and Game Commission 1998). "Take" of these species may be authorized for necessary scientific research. This language makes the CFP designation the strongest and most restrictive regarding the "take" of these species. In 2003, the code sections dealing with CFP species were amended to allow the CDFW to authorize take resulting from recovery activities for state-listed species.

California species of special concern (CSSC) are broadly defined as animals not listed under the FESA or CESA, but which are nonetheless of concern to the CDFW because they are declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under FESA and CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although these species generally have no special legal status, they are given special consideration under CEQA during project review.

3.2.6 California Migratory Bird Protection Act

Fish & Game Code section 3513 states that Federal authorization of take or possession is no longer lawful under the state Fish & Game Code if the Federal rules or regulations are inconsistent with state law. The California Migratory Bird Protection Act (MBPA) was passed in September 2019 to provide a level of protection to migratory birds in California consistent with the U.S. MBTA prior to the 2017 rule change limiting protection of migratory birds under the U.S. MBTA to purposeful actions (i.e., directly and knowingly removing a nest to construct a project, hunting, and poaching). Thus, under the MBPA protections for migratory birds in California are consistent with rules and regulations adopted by the United States Secretary of the Interior under the U.S. MBTA before January 1, 2017. The MBPA reverts to existing provisions of the U.S. MBTA on January 20, 2025.

3.2.7 Nesting Birds

Nesting birds, including raptors, are protected under California Fish and Game Code Section 3503, which reads, "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." In addition, under California Fish and Game Code Section 3503.5, "it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto". Passerines and non-passerine land birds are further protected under California Fish and Game Code 3513. As such, CDFW typically recommends surveys for nesting birds that could potentially be directly (e.g., actual removal of trees/vegetation) or indirectly (e.g., noise disturbance) impacted by project-related activities. Disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by CDFW.

3.2.8 Non-Game Mammals

Sections 4150-4155 of the California Fish and Game Code protects non-game mammals, including bats. Section 4150 states "A mammal occurring naturally in California that is not a game mammal, fully protected mammal, or fur-bearing mammal is a nongame mammal. A non-game mammal may not be taken or possessed except as provided in this code or in accordance with regulations adopted by the commission". The non-game mammals that may be taken or possessed are primarily those that cause crop or property damage. Bats are classified as a non-game mammal and are protected under California Fish and Game Code.

3.2.9 Sensitive Vegetation Communities

Sensitive vegetation communities are natural communities and habitats that are either unique in constituent components, of relatively limited distribution in the region, or of particularly high wildlife value. These communities may or may not necessarily contain special-status species. Sensitive natural communities are usually identified in local or regional plans, policies or regulations, or by the CDFW (i.e., CNDDB) or the USFWS. The CNDDB identifies a number of natural communities as rare, which are given the highest inventory priority (Holland 1986; CDFW 2016). Impacts to sensitive natural communities and habitats must be considered and evaluated under the CEQA (CCR: Title 14, Div. 6, Chap. 3, Appendix G).

3.2.10 Porter-Cologne Water Quality Control Act

The intent of the Porter-Cologne Water Quality Control Act (Porter-Cologne) is to protect water quality and the beneficial uses of water, and it applies to both surface and ground water. Under this law, the State Water Resources Control Board develops statewide water quality plans, and the RWQCBs develop basin plans, which identify beneficial uses, water quality objectives, and implementation plans. The RWQCBs have the primary responsibility to implement the provisions of both statewide and basin plans. Waters regulated under Porter-Cologne, referred to as “waters of the State,” include isolated waters that are not regulated by the USACE. Projects that require a USACE permit, or fall under other federal jurisdiction, and have the potential to impact waters of the State are required to comply with the terms of the Water Quality Certification Program. If a proposed project does not require a federal license or permit, any person discharging, or proposing to discharge, waste (e.g. dirt) to waters of the State must file a Report of Waste Discharge and receive either waste discharge requirements (WDRs) or a waiver to WDRs before beginning the discharge.

3.2.11 California State Lands Commission

The California State Lands Commission has jurisdiction and management over sovereign state-owned lands, lands sold directly to settlers from the federal government, lands granted to the state for sale or use, and lands granted by a prior sovereign (i.e., rancho and pueblo lands). Sovereign lands include approximately four million acres of land underlying the State’s navigable and tidal waterways, including the beds of California’s navigable rivers, lakes and streams, as well as the state’s tide and submerged lands along the State’s approximately1,100 miles of coastline and offshore islands.

The Commission holds its sovereign lands for the benefit of all the people of the State, subject to the Public Trust for water related commerce, navigation, fisheries, recreation, open space and other recognized Public Trust uses. Authorization from the Commission is required if there are plans to build upon or otherwise occupy any lands described above, such activity may be within the Commission’s jurisdiction. The Commission also monitors sovereign land granted in trust by the California Legislature to approximately 70 local jurisdictions that generally consist of prime waterfront lands and coastal waters. The Commission protects and enhances these lands and natural resources by issuing leases for use or development, providing public access, resolving boundaries between public and private lands, and implementing regulatory programs to protect state waters from oil spills and invasive species introductions.

The Commission's jurisdiction for tidal lands extends from the mean high tide line to three nautical miles offshore. Except for those locations where the boundary has been permanently fixed by either a court or an agreement with the Commission, the boundary of tidal lands is classified as an ambulatory boundary because it is based on the location of the water. The ambulatory boundary is determined from the mean high tide, which can be determined by either the published MHW elevation from the closest NOAA tide station to the project or a linear interpolation between two adjacent tide stations, depending on tidal regime characteristics. The current tidal datum and epoch should be used (presently NAVD88 and 1983-2001, respectively). Local, published control benchmarks should be used in determining elevations at the survey site. Control benchmarks are the monuments on the ground that have been precisely located and referenced to the local tide stations and vertical datum used to calculate the mean high tide elevation and the elevation datum must match that of the tidal datum.

3.2.12 The McAteer-Petris Act and the Bay Conservation and Development Commission

In response to uncoordinated and indiscriminate filling of the Bay, the California legislature passed the McAteer-Petris Act in 1965, establishing the San Francisco Bay Conservation and Development Commission (BCDC) as the management and regulatory agency for the San Francisco Bay and Delta. A permit must be obtained from the BCDC for shoreline projects; dredge and fill activities in the Bay or certain tributaries, salt ponds, or managed wetlands; and Suisun Marsh projects. The limits of BCDC jurisdiction are defined in the Bay Plan (BCDC 2012) and include a 100-foot-wide band along the shoreline of the Bay. The "shoreline" is defined as all areas that are subject to tidal action from the south end of the Bay to the Golden Gate (Point Bonita-Point Lobos), and to the Sacramento River line (a line between Stake Point and Simmons Point, extended northeasterly to the mouth of Marshall Cut). In addition, the BCDC will take jurisdiction over the marshlands lying between mean high tide and up to 5 feet above mean sea level (MSL), where marsh vegetation is present; tidelands (land lying between mean high tide and mean low tide); and submerged lands (land lying below mean low tide). In relation to salt ponds, the BCDC will claim "salt ponds consisting of all areas which have been diked off from the Bay and have been used during the three years immediately preceding 1969 for the solar evaporation of Bay water in the course of salt production" (BCDC 2020).

The BCDC may claim jurisdiction over the tidal marsh in the study area. Additionally, a 100-foot area extending laterally landward of the Bay Shoreline, located at 5 feet above MSL would be jurisdictional as Shoreline Band. A total of 11.75 acres of the study area is potentially subject to BCDC jurisdiction (Appendix A, Figure 8). Any impacts to tidal marsh and the Shoreline Band lands will require a permit from the BCDC.

3.2.13 State and Local Requirements to Control Construction-Phase and Post-Construction Water Quality Impacts

Construction Phase. The CWA has nationally regulated the discharge of pollutants to the waters of the U.S. from any point source since 1972. In 1987, amendments to the CWA added Section 402(p), which established a framework for regulating nonpoint source storm water discharges under the National Pollutant Discharge Elimination System (NPDES). The NPDES is a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the U.S. In California, this permit program is administered by the RWQCBs. The NPDES General Construction Permit requirements apply to clearing, grading, and disturbances to the ground such as excavation. Construction activities on one or more acres are subject to a series of permitting requirements contained in the NPDES General Construction Permit. This permit requires the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes Best Management Practices (BMPs) to be implemented during project construction. The project sponsor is also required to submit a Notice of Intent (NOI) with the State Water Resources Control Board Division of Water Quality. The NOI includes general information on the types of construction activities that would occur on the site.

Post-Construction Phase. In many Bay Area counties, including San Mateo County, projects must also comply with the *California Regional Water Quality Control Board, San Francisco Bay Region, Municipal Regional Stormwater NPDES Permit* (MRP) (Water Board Order No. R2-2009-0074). This MRP requires that all projects implement BMPs and incorporate Low Impact Development practices into the design that prevents stormwater runoff pollution, promotes infiltration, and holds/slows down the volume of water coming from a site. In order to meet these permit and policy requirements, projects must incorporate the use of green roofs, impervious surfaces, tree planters, grassy swales, bioretention and/or detention basins, among other factors.

3.3 Local

3.3.1 City of Menlo Park ConnectMenlo General Plan

The following goals, policies, and programs from the City of Menlo Park's General Plan Open Space/, Noise, and Safety Elements are relevant to the environmental factors potentially affected by the proposed project because adjacent land uses include open space and tidal habitat. However, the flow equalization facility is not classified into a zoning district and therefore is not specifically designated in the City's General Plan Land Use Element.

- *Goal LU-4*: Promote the development and retention of business uses that provide goods or services needed by the community that generate benefits to the City and avoid or minimize potential environmental and traffic impacts.

- o *Policy LU-4.5: Business Uses and Environmental Impacts*. Allow modifications to business operations and structures that promote revenue-generating uses for which potential environmental impacts can be mitigated.

- *Goal LU-6*: Preserve open-space lands for recreation; protect natural resources and air and water quality; and protect and enhance scenic qualities.
  - o *Policy LU-6.5: Open Space Retention*. Maximize the retention of open space on larger tracts (e.g., portions of the St. Patrick's Seminary site) through means such as rezoning consistent with existing uses, clustered development, acquisition of a permanent open space easement, and/or transfer of development rights.
  - o *Policy LU 6.6: Public Bay Access*. Protect and support public access to the Bay for the scenic enjoyment of open water, sloughs, and marshes, including restoration efforts, and completion of the Bay Trail.
  - o *Policy LU-6.7: Habitat Preservation*. Collaborate with neighboring jurisdictions to preserve and enhance the Bay, shoreline, San Francisquito Creek, and other wildlife habitat and ecologically fragile areas to the maximum extent possible.
  - o *Policy LU-6.8*: *Landscaping in Development.* Encourage extensive and appropriate landscaping in public and private development to maintain the City's tree canopy and to promote sustainability and healthy living, particularly through increased trees and water-efficient landscaping in large parking areas and in the public right-of-way.
  - o *Policy LU-6.1: Baylands Preservation*. Allow development near the Bay only in already developed areas.
  - o *Program LU-6.D*: *Design for Birds*. Require new buildings to employ facade, window, and lighting design features that make them visible to birds as physical barriers and eliminate conditions that create confusing reflections to birds.
  - o *Program LU-6.E: Don Edwards National Wildlife Refuge*. Consider the most appropriate zoning designation for the Don Edwards San Francisco National Wildlife Refuge to achieve the preservation and protection of wildlife habitat and ecological values associated with the marshlands and former salt ponds bordering the San Francisco Bay.
- *Goal OSC1*: Maintain, Protect, and Enhance Open Space and Natural Resources.
  - o *Policy OSC1.1: Natural Resources Integration with Other Uses.* Protect Menlo Park's natural environment and integrate creeks, utility corridors, and other significant natural and scenic features into development plans.
  - o *Policy OSC1.2: Habitat for Open Space and Conservation Purposes.* Preserve, protect, maintain, and enhance water, water-related areas, plant and wildlife habitat for open space and conservation purposes.

- o *Policy OSC1.3: Sensitive Habitats*. Require new development on or near sensitive habitats to provide baseline assessments prepared by qualified biologists and specify requirements relative to the baseline assessments.
- o *Policy OSC1.4: Habitat Enhancement*. Require new development to minimize the disturbance of natural habitats and vegetation and require revegetation of disturbed natural habitat areas with native or non-invasive naturalized species.
- o *Policy OSC1.5: Invasive, Non-Native Plant Species*. Avoid the use of invasive, non-native species, as identified on the lists of invasive plants maintained at the California Invasive Plant Inventory and United States Department of Agriculture invasive and noxious weeds database, or other authoritative sources, in landscaping on public property.
- o *Policy OSC1.15: Heritage Trees*. Protect Heritage Trees, including during construction activities through enforcement of the Heritage Tree Ordinance (Chapter 13.24 of the Municipal Code – see below).

3.3.2 Bedwell Bayfront Park Master Plan

The Bedwell Bayfront Park Master Plan establishes goals to guide the future development and feature recommendations for additional access and expanded recreational uses (City of Menlo Park 2018). The Master Plan supports Goal LU-6 and OSC1 from the City of Menlo Park General Plan and Goal 4 of the Master Plan is to protect existing sensitive habitats and landfills systems.

3.3.3 City of Menlo Park Municipal Code

The City of Menlo Park Municipal Code contains all ordinances for Menlo Park. Title 16, Zoning, includes regulations relevant to biological resources in the study area as discussed below.

Bird-Friendly Design. Chapter 16.43.140 (6) requires all new construction, regardless of size, to implement the following bird-friendly design measures:

- No more than 10% of facade surface area shall have non-bird-friendly glazing.
- Placement of buildings shall avoid the potential funneling of flight paths towards a building facade.
- Bird-friendly glazing includes, but is not limited to opaque glass, covering of clear glass surface with patterns, paned glass with fenestration patterns, and external screens over non-reflective glass.
- Glass skyways or walkways, freestanding glass walls, and transparent building corners shall not be allowed.
- Transparent glass shall not be allowed at the rooflines of buildings, including in conjunction with green roofs.

- Use of rodenticides shall not be allowed.
- A project may receive a waiver from one (1) or more of the items listed in subsections (6)(A) to (F) of this section, subject to the submittal of a site-specific evaluation from a qualified biologist and review and approval by the planning commission. (Ord. 1024 § 3 (part), 2016).

Landscape Design Plan. Chapter 12.44.090(1)(G) states that the use of invasive and/or noxious plant species is strongly discouraged. Invasive species are defined as those plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. A noxious weed refers to any weed designated by the weed control regulations in the Weed Control Act and identified on a regional district noxious weed control list.

Heritage Trees. Chapter 13.24, Heritage Trees, establishes regulations for the preservation of heritage trees, defined as:

- Trees of historical significance, special character or community benefit, specifically designated by resolution of the City Council,
- An oak tree (*Quercus* sp.), which is native to California and has a trunk with a circumference of 31.4 inches (diameter of 10 inches) or more, measured at 54 inches above natural grade, and
- All trees other than oaks, which have a trunk with a circumference of 47.1 inches (diameter of 15 inches) or more, measured 54 inches above natural grade, with the exception of trees that are less than 12 feet in height, which will be exempt from this section.

To protect heritage trees, Section 13.24.025 requires that a tree protection plan prepared by a certified arborist be submitted for any work performed within a tree protection zone, which is an area ten times the diameter of the tree. Furthermore, all tree protection plans should be reviewed and approved by the Director of Community Development or his or her designee prior to issuance of any permit for grading or construction.

The removal of heritage trees or pruning of more than one-fourth of the branches or roots within a 12-month period requires a permit from the City's Director of Public Works or his or her designee and payment of a fee. The Director of Public Works may issue a permit when the removal or major pruning of a heritage tree is reasonable based on a number of criteria, including condition of the tree, need for removal to accommodate proposed improvements, the ecological and long-term value of the tree, and feasible alternatives that would allow for tree preservation.

4 Methods

This section describes the methods used to complete the general biological resources assessment. Methods include a database and literature review, field survey, an assessment of plant communities and wildlife habitats and corridors, an assessment of sensitive habitats and aquatic features, and a habitat evaluation for special-status species.

4.1 Background Review

Available background information pertaining to the biological resources on and near the project was reviewed prior to conducting field surveys. Information was compiled and subsequently compared against site conditions during field surveys. The following sources were consulted:

- CNDDB record search for 9-quadrangles including: Palo Alto, Mountain View, Newark, Redwood Point, San Mateo, Woodside, La Honda, Mindego Hill, and Cupertino (CNDDB 2020),
- CNPS Rare Plant Program *Inventory of Rare and Endangered Plants of California* record 9-quadrangle search, including: Palo Alto, Mountain View, Newark, Redwood Point, San Mateo, Woodside, La Honda, Mindego Hill, and Cupertino (CNPS 2020) Quadrangle-level results are not maintained for California Rare Plant Rank (CRPR) 3 and 4 species, so we also conducted a search of the CNPS Inventory records for these species occurring in San Mateo County (CNPS 2020),
- CDFW CNDDB for natural communities of special concern that occur within the project region (CNDDB 2020),
- NMFS Fisheries Essential Fish Habitat Mapper was reviewed to determine the locations of designated, mapped EFH and Habitat Areas of Particular Concern (HAPC) (http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html),
- USFWS Information for Planning and Consultation (IPaC) tool, using default parameters set within the search tool (USFWS 2020),
- USFWS National Wetland Inventory (NWI 2020),
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS 2020), and
- Other relevant scientific literature, technical databases, resource agency reports, and Federal Register notices and other information published by USFWS and NMFS; in order to assess the current distribution of special-status plants and animals in the project vicinity.

An Environmental Constraints Analysis Report was prepared for the project by MIG in January 2018. The 2018 report and its findings were used as reference material for this General Biological Resources Report. However, this report represents current conditions within the BSA, as of May 2020. The purpose of the environmental constraints analysis was to inform the District of potential environmental constraints as it deliberated the pros and cons of the project alternatives. The environmental constraints analysis describes:

- The sensitive resources that could be affected by the construction of the project alternatives;
- the potential regulatory requirements triggered by each alternative;
- the avoidance, minimization, and mitigation measures each alternative may require; and
- what additional technical studies were needed.

The environmental constraints analysis considered the potential impacts of each of four alternatives in terms of the CEQA checklist that is provided in the CEQA Guidelines, including all CEQA disciplines. With regard to biological resources it identified potential project impacts to several special-status species and permits that would be required.

4.2 Field Surveys

Field surveys were conducted to (1) assess existing biotic habitats and plant and animal communities in the parcel, (2) assess the BSA for its potential to support special-status species and their habitats, and (3) conduct a U.S. Army Corps of Engineers delineation of wetlands and waters (see Section 6.3). Reconnaissance-level field surveys of the 31.18-acre biological survey area (BSA) were conducted by MIG senior biologist David Gallagher, M.S. on September 30, 2019 and May 4, 2020 (Figure 2). The purpose of these surveys was to provide a project-specific impact assessment for the development of the site as described above. A site survey to complete the wetland delineation was completed in February 2020. Prior to this, MIG biologists visited the site in March 2017, October 2017, February 2018 and March 2018.

4.2.1 Sensitive Habitats and Aquatic Features

All plant communities observed in the BSA were evaluated to determine if they are considered sensitive. Sensitive natural communities are communities that are especially diverse; regionally uncommon; or of special concern to local, state, and federal agencies. Elimination or substantial degradation of these communities would constitute a significant impact under CEQA.

The BSA was also inspected for the presence of wetlands, drainages, streams, coastal waterways, and other aquatic features, including those that support stream-dependent (i.e., riparian) plant species that could be subject to jurisdiction by the USACE, RWQCB, and/or CDFW. Wetlands are defined for regulatory purposes in the 33 CFR 328.3 and 40 CFR 230.3 as “areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” To be considered subject to federal jurisdiction, a wetland must be located within the study area and normally exhibit positive indicators for hydrophytic vegetation, hydric soil, and wetland hydrology.

4.2.2 Wetland Delineation

MIG surveyed the West Bay Sanitary District Flow Equalization and Resource Recovery Facility (FERRF) Flood Protection Project study area located in the City of Menlo Park in San Mateo County, California for wetlands and other waters potentially subject to regulation under Section 404 of the Clean Water Act as administered by the United States Army Corps of Engineers (USACE). The survey also delineated the extent of waters of the state that may be subject to regulation by the Regional Water Quality Control Board (RWQCB) under Section 401 of the Clean Water Act and under the Porter Cologne Water Quality Control Act. Lastly, the extent of waters that are likely subject to regulation under the McAteer-Petris Act of 1965, which is administered by the San Francisco Bay Conservation and Development Commission (BCDC), are included in this delineation.

Before the delineation survey was conducted, topographic maps and aerial photos of the study area were obtained and reviewed from several sources, such as the USGS, NRCS, NWI, Google Earth software (Google Inc. 2019), and UC Santa Barbara Library's collection of aerial photography (UCSB 2019).

On September 30, 2019, MIG senior biologist David Gallagher performed a technical delineation of wetlands and other waters in the study area, in accordance with the Corps of Engineers 1987 Wetlands Delineation Manual (Corps Manual; Environmental Laboratory 1987). Additionally, the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West (Version 2.0) (Regional Supplement) (USACE 2008a) and A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2008b) were followed to document site conditions relative to hydrophytic vegetation, hydric soils, and wetland hydrology. Mr. Gallagher performed preliminary mapping of the extent and distribution of wetlands and other waters of the U.S. that may be subject to regulation under Section 404 of the Clean Water Act (CWA), waters of the state that may be subject to regulation under the Porter Cologne Water Quality Control Act, which is administered by the RWQCB, and waters that may be subject to regulation under the McAteer-Petris Act of 1965, which is administered by BCDC. Mr. Gallagher also surveyed for aquatic and riparian habitat that may be subject to regulation under Sections 1600-1607 of the California Fish and Game Code, which is administered by California Department of Fish and Wildlife (CDFW).

The jurisdictional delineation was approved by the USACE in November 2020. A copy of the delineation is attached in Appendix E.

4.2.3 Special-Status Species Habitat Evaluation

During the 2020 field survey, Mr. Gallagher evaluated the suitability of the habitat to support special-status species documented within the BSA and within the vicinity of the study area. For the purposes of this assessment, special-status species include those plant and animals listed, proposed for listing or candidates for listing as threatened or endangered by the USFWS or NOAA Fisheries under the FESA, those listed or proposed for listing as rare, threatened or endangered by the CDFW under the CESA, animals designated as CFP or CSSC by the CDFW, birds protected by the USFWS under the MTBA and/or by the CDFW under Fish and Game Code Sections 3503 and 3513, and plants listed as Rank 1A, 1B, 2, 3 and 4 of the CNPS Inventory.

The potential occurrence of special-status plant and animal species in the BSA was initially evaluated by developing a list of special-status species that are known to or have the potential to occur in the vicinity of the study area based on a 9-quad search of current database records (e.g., CNDDB and CNPS Electronic Inventory records) and review of the USFWS list of federal endangered and threatened species (i.e., IPaC). The potential for occurrence of those species included on the 9-quad list was then evaluated based on the habitat requirements of each species relative to the habitat conditions documented in the study area. If there are no documented occurrences within five miles of the BSA, if there is clearly no suitable habitat present, and if the study area is clearly outside of the expected range of the species, these species were eliminated from consideration and are not discussed further. All remaining species were then evaluated for the potential to occur on or in the immediate vicinity of the study area according to the following criteria:

> *Not Expected:* CNDDB or other documents do not record the occurrence of the species within or reasonably near the study area and within the last 10 years, and/or no components of suitable habitat are present within or adjacent to the study area.
>
> *Low Potential:* The CNDDB or other documents may or may not record the occurrence of the species within a 5-mile radius of the study area. However, few components of suitable habitat are present within or adjacent to the study area.
>
> *Moderate Potential*. Species does not meet all terms of High or Low category. For example: CNDDB or other reputable documents may record the occurrence of the species near but beyond a 5-mile radius of the study area, or some of the components representing suitable habitat are present within or adjacent to the study area, but the habitat is substantially degraded or fragmented.
>
> *High Potential:* The CNDDB or other reputable documents record the occurrence of the species off-site, but within a 5-mile radius of the study area and within the last 10 years.

All or most of the components representing suitable habitat are present within the study area.

Present or Assumed Present. Species was observed on the study area, or recent species records (within five years) from literature are known within the study area.

5 Existing Land Uses, Natural Communities, and Habitats

5.1 General Study Area Description

The BSA includes the operational flow equalization facility, three operational wastewater detention ponds used for wet weather flow storage, remnants of a decommissioned wastewater treatment plant, existing street rights-of-way for the proposed recycled water pipeline alignments, and the location for the new influent pump station located at Marsh Road. The BSA also extends into the surrounding baylands and Bedwell Bayfront Park (Appendix A, Figure 2). The BSA is bordered by the Don Edwards National Wildlife Refuge to the north, Bedwell Bayfront Park to the east, and Flood Slough and salt evaporation ponds to the west. The study area elevation ranges from approximately 0 to 40 feet North American Vertical Datum of 1988 (NAVD88) (Google Inc. 2020). Bedwell Bayfront Park is the former site of a landfill closed in 1984. The 160-acre park is owned by the City of Menlo Park and includes an extensive bike/pedestrian trail system. The Don Edwards National Wildlife Refuge spans 30,000 acres of open bay, salt pond, salt marsh, mudflat, upland and vernal pool habitats located throughout south San Francisco Bay, provides critical habitat for several special-status species, and is a major stopover for migrating birds along the Pacific Flyway.

The climate at the study area is coastal Mediterranean, with most rain falling in the winter and spring. Mild cool temperatures are common in the winter. Hot to mild temperatures are common in the summer. Climate conditions in the study area include a 30-year average of approximately 17.6 inches of annual precipitation with an average temperature range from 48ºF to 71ºF (PRISM Climate Group 2020). Relative to the 30-year climate normal, the study area experienced wetter than normal conditions during the 2018/2019 wet season prior to the September 2019 survey. From November 2018 through April 2019, the area received 20.4 inches of precipitation, which is approximately 128% of the 30-year average for this same period (PRISM Climate Group 2020).

One soil unit is mapped by the National Resource Conservation Service (NRCS) in the BSA: 125 – Pits and Dumps, which consists of gravel pits, refuse dumps, and rock quarries (Appendix A, Figure 4) (NRCS 2020a). This soil series is not listed as hydric in San Mateo County on the National Hydric Soils List (NRCS 2020b).

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) map of the study area is depicted in Figure 5 in Appendix A. The NWI identified the stormwater retention ponds within the BSA as artificially flooded freshwater ponds (PUSK) (NWI 2020). Also, the NWI identified intertidal estuarine and marine wetland and open water habitat within the study area (E2USN and E2EM1N) (NWI 2020). NWI maps are based on interpretation of aerial photography, limited verification of mapped units, and/or classification of wetland types using the classification system developed by Cowardin et al. (1979). These data are available for general reference purposes and do not necessarily correspond to the presence or absence of jurisdictional waters.

5.2 Existing Land Uses, Vegetation Communities, and Habitats

The BSA is located within the San Francisco Bay Area Subregion of the Central Western Californian Region, both of which are contained within the larger California Floristic Province (Baldwin et al. 2012). Where applicable, vegetation communities were mapped using CDFW's Vegetation Classification and Mapping Program's (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2020). The reconnaissance-level field survey identified five general vegetation communities, habitats, and land cover types in the BSA: (1) developed, (2) wastewater detention pond, (3) northern coastal salt marsh (*Sarcocornia pacifica* Alliance – Pickleweed Mats), (4) tidal slough, and (5) California annual grassland (*Avena barbata* Alliance – Wild Oats Grassland).

The area of the existing land uses, vegetation communities, and habitats in the BSA is summarized below, and their distribution is depicted in Appendix A, Figure 6.

SUMMARY OF EXISTING LAND COVER TYPES, NATURAL COMMUNITIES, AND HABITATS IN THE BSA

Land Cover Types, Natural Communities, and Habitats	Area (acres)
Wastewater Detention Pond	11.33
Developed[1]	13.19
Northern Coastal Salt Marsh	4.85
California Annual Grassland	3.07
Tidal Slough	1.15
Study Area Total	**33.59**

[1]Does not include areas within road rights-of-way for the influent or distribution pipeline alignments beyond the BSA identified in Figure 6.

Wastewater Detention Ponds. Two of the basins are used for flow equalization and one basin is used for emergency storage of wastewater (Appendix B, Photo 1). The flow equalization basins provide storage for combined stormwater and sewer wastewater flows during peak flow events or during conveyance system maintenance or repairs to prevent sanitary sewer overflows (SSOs) until such times the flows can be routed to the regional treatment plant in Redwood City. These ponds are mainly used during the rainy season, or for system maintenance and reparis and therefore are empty when not in use. All retained wastewater is rerouted to the Silicon Valley Clean Water Wastewater Treatment Plant in Redwood City for treatment.

Wildlife. Because these ponds do not have a permanent pool of water, are hydrologically isolated from the Bay, and are devoid of vegetation, they do not provide breeding habitat for fish, amphibians, or reptiles. However, the ponds provide foraging habitat for species that routinely forage in the adjacent salt marsh (see Northern Coastal Salt Marsh section below) due to presence of algae and brine shrimp (Order Decapoda) when the ponds are in use. Algae and brine shrimp are assumed present based on aerial imagery of the ponds (Goggle Inc. 2020). Algae appears as green and red, and brine shrimp create an orange cast in aerial photographs. During the May 2020 site visit, American avocet (*Recurvirostra americana*) was observed foraging in the ponds; and cliff swallow (*Petrochelidon pyrrhonota*) and barn swallow (*Hirundo rustica*) were observed foraging over the ponds.

Developed. Developed land cover includes areas with permanent structures, impervious surfaces, unpaved high-use areas, or areas regularly disturbed by human activities. Generally, these areas are devoid of substantial vegetation cover but may contain areas of ruderal and landscaped vegetation. Within the study area, developed land cover includes the levees, hardpack dirt roads, buildings, staging and storage areas, and the decommissioned water treatment facility (Appendix B, Photo 2). Within the developed land cover, there are scattered areas of ruderal (disturbed) vegetation, mostly along the levee roads and perimeter of the site and landscaped trees adjacent to the buildings. The developed habitat is frequently utilized by humans, and both paved and gravel portions of this habitat are well-maintained. Non-native species are strongly dominant, generally outcompeting other forb and native grass species that may otherwise be present. Herbaceous species observed included slender oat (*Avena* barbata), black mustard (*Brassica nigra*), fennel (*Foeniculum vulgare*), bull mallow (*Malva nicaeensis*), wild radish (*Raphanus sativus*), red stemmed filaree (*Erodium cicutarium*), Jersey cudweed (*Pseudognaphalium luteoalbum*), fumitory (*Fumaria* sp.), and smilo grass (*Stipa miliacea* var. *miliacea*). Wild oat, black mustard, and fennel are ranked as a moderately invasive species by the California Invasive Plant Council (Cal-IPC). Trees observed included Lollypop tree (*Myoporum laetum*), olive (*Olea europaea*), and Mexican fan palm (*Washingtonia robusta*). The lollypop tree and Mexican fan palm are ranked as a moderately invasive species by Cal-IPC.

Wildlife. California ground squirrels (*Spermophilus beecheyi*) occur on the levee slopes within and adjacent to the study area. Their burrows provide nesting habitat for western burrowing owl (*Athene cunicularia*). Also, many of the wildlife species that use the adjacent marsh habitat may move through the developed portions of the study area when traveling between more natural habitats. In addition, the levees in the study area are important to tidal marsh species during very high tides, such as king tides. During such events, the majority of the salt marsh habitat is inundated, and animals such as California Ridgway's rails (*Rallus obsoletus obsoletus*), California black rails (*Laterallus jamaicensis coturniculus*), and salt marsh harvest mice (*Reithrodontomys raviventris*) may take refuge in the vegetation along the slopes of the levees.

During the May 2020 site visit, several nesting birds were observed in the dilapidated structures of the decommissioned water treatment plant and a colony of cliff swallows were nesting under the eaves of the Fortistar Mitigation Group Building, adjacent to the flare for the gas collection system for the landfill. In addition, a nesting pair of killdeers (*Charadrius vociferous*) were observed in the dry area of a wastewater detention pond. Also, small fish were observed in the aeration/clarifier tanks of the decommissioned wastewater treatment facility and a striped skink (*Mephitis mephitis*) was observed exiting from under the existing decommissioned building.

Northern Coastal Salt Marsh (*Sarcocornia pacifica* Alliance – Pickleweed Mats). The northern coastal salt marsh habitat extends contiguously along the western and northern edges of the BSA (Appendix B, Photo 3). This tidal salt marsh habitat is inundated with water, is subject to tidal ebbs and flows, and is heavily dominated by pickleweed with patches of California cordgrass (*Spartina foliosa)* growing in wetter areas. Along the upper margins of the salt marsh, saltgrass (*Distichlis spicata*), marsh gumplant (*Grindelia stricta*), alkali heath (*Frankenia salina*) were common.

Wildlife. Northern coastal salt marsh supports some of the rarest wildlife species in the San Francisco Bay. The California Ridgway's rail nests in cordgrass, dense stands of pickleweed, and marsh gumplant in tidal marsh habitats in and around the BSA. This species is found in the lower marsh zone where numerous small tidal channels are present. California black rails are known to occur in northern coastal salt marsh as winter residents.

The salt marsh harvest mouse occurs in the upper zone of the salt marsh where pickleweed is the dominant plant. Alameda song sparrows (*Melospiza melodia pusillula*) and Bryant's savannah sparrows (*Passerculus sandwichensis alaudinus*) also nest in salt marshes.

Alameda song sparrows prefer dense herbaceous vegetation wherever it occurs throughout the marsh, while savannah sparrows nest in shorter vegetation such as pickleweed and high transitional marshes in upland ecotones (see Section 6.2 below for detailed information on special-status species).

Shorebirds, swallows, herons, egrets, blackbirds, and other avian species roost and forage, often in large numbers, in tidal salt marsh habitats in the study area, but most do not breed in these areas. Common species that forage in salt marsh habitat include the black-necked stilt (*Himantopus mexicanus*), American avocet, and willet (*Tringa semipalmata*).

Bair Island, approximately three miles north of the BSA is a known harbor seal (*Phoca vitulina*) haul-out. Therefore, harbor seals may haul out on the mudflats, rocky outcroppings exposed at low tide, and anywhere in the salt marsh within the BSA (see Section 6.2.5 below).

California Annual Grassland (*Avena barbata* Alliance – Wild Oats Grassland). California annual grassland is an herbaceous plant community that is typically dominated by non-native annual grasses. In the BSA, this vegetation type is found in Bedwell Bayfront Park. The dominant grass observed was slender oats. Other grasses observed included foxtail barley (*Hordeum murinum*) and Harding grass (*Phalaris aquatica*). Herbaceous species observed included fennel, purple salsify (*Tragopogon porrifolius*), rose clover (*Trifolium hirtum*), bristly ox-tongue (*Helminthotheca echioides*), and smilo grass. Small stands of trees were also observed in the grassland, including Australian pine (*Casuarina equisetifolia*) and blue gum (*Eucalyptus globulus*).

Wildlife. In addition to the levees, California ground squirrels occur in the grassland areas. Other rodent species that occur in the ruderal habitat in the study area include the California vole, Botta's pocket gopher (*Thomomys bottae),* and deer mouse (*Peromyscus maniculatus*). Diurnal raptors such as red-tailed hawks (*Buteo jamaicensis*) forage for these small mammals in ruderal lands during the day, and at night nocturnal raptors, such as barn owls (*Tyto alba*), will forage for nocturnal rodents. Mammals such as the raccoon and striped skunk utilize the grassland habitat in the study area for foraging. Reptiles such as western fence lizards (*Sceloporus occidentalis*), western terrestrial garter snakes (*Thamnophis elegans*), and southern alligator lizards (*Elgaria multicarinata*) may occur in small numbers within the California annual grassland in the study area.

Tidal Slough. Tidal slough habitat includes open water and mudflat portions of the study area, including open water in Flood and Westpoint sloughs and the smaller channels interspersed with the salt marsh along the northern edge of the study area (Appendix B, Photo 4). The open water habitat is devoid of vegetation with beds of viscous bay mud, and algal growth exposed at low tide.

Wildlife. Because the open water channels are interspersed throughout the northern coastal salt marsh, the animal species that occur in this habitat are similar to those described above for the salt marsh habitat. A variety of fish also occur in the open water on the Bay and small fish are expected to occur in the smaller open water channels to some extent as well, although the limited extent, depth, and width of these channels limits the number and size of fish that may occur in these sloughs.

At low tide, mudflats are exposed along the tidal sloughs. Mudflats are formed when mud is deposited by the tides and contain high densities of invertebrate animals such as insects, bivalves, crustaceans, and polychaete worms that are food for many bird species. A variety of shorebirds, including the western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), dunlin (*Calidris alpina*), willet, marbled godwit (*Limosa fedora*), short-billed dowitcher (*Limnodromus griseus*), and black-bellied plover (*Pluvialis squatarola*), forage on these mudflats when they are exposed. Such shorebirds are most abundant during fall and spring migration and during the winter non-breeding season.

In addition, a list of species observed within the study area is included in Appendix C**.**

6 Special-Status Species and Sensitive Habitats

CEQA requires assessment of the effects of a project on species that are “threatened, rare, or endangered”; such species are typically described as “special-status species”. In order to assess the impacts of the proposed project, special-status species have been defined as described below. Impacts on these species are regulated by some of the federal, state, and local laws and ordinances described under Regulatory Setting above.

6.1 Special-Status Plants

The CNPS (2020) and CNDDB (2020) identify 70 special-status plant species as potentially occurring in the nine 7.5-minute quadrangles containing and/or surrounding the BSA. Sixty-five of those potentially occurring special-status plant species were determined to be absent from the study area for at least one of the following reasons: (1) a lack of specific habitat (e.g., freshwater marsh) and/or edaphic requirements (e.g., serpentine soils) for the species in question, (2) the elevation range of the species is outside of the range on the project site, and (3) the species is known to be extirpated from the site vicinity. Appendix D lists these plants along with the basis for the determination of absence.

Suitable habitat, edaphic requirements, and elevation range were determined to be present in the study area for five plant species: California seablite (*Suaeda californica*), coastal marsh milk-vetch (*Astragalus pycnostachyus* var. *pycnostachyus*), Point Reyes bird’s beak (*Chloropyron maritimum* ssp. *palustre*), Congdon’s tarplant (*Centromadia parryi* ssp. *congdonii*), and saline clover (*Trifolium hydrophilum*). These species are discussed in more detail below.

California seablite. Federal Listing Status: Endangered; State Listing Status: None; CNPS List: 1B.1. California seablite is a succulent, evergreen shrub in the goosefoot (Chenopodiaceae) family that occurs in coastal salt marshes along a narrow zone at the upper edge of tidal marsh (USFWS 2013). The blooming period for this species extends from July through October. It is listed as endangered under FESA and has a CRPR of 1B.1 (i.e., rare, threatened, or endangered in California and elsewhere; seriously endangered in California) (CNPS 2020). It requires well-drained marsh substrates, primarily sandy wave-built berms or ridges along marsh banks, and estuarine beaches. Because its habitat is naturally prone to destruction by wave erosion, it requires widespread populations in diverse environments over large areas to enable it to recolonize by seed after populations are destroyed by storms. It was historically known to occur throughout margins of coastal salt marshes surrounding the San Francisco Bay, but may be extirpated because of development, recreational activities, erosion, non-native plants, and habitat alteration. A review of occurrences within the San Francisco Bay estuary by the USFWS concluded that all known naturally occurring populations of California seablite are “likely extirpated” (USFWS 2010). However, this species has been successfully re-introduced in a small number of populations around the Bay in San Francisco and Alameda Counties, approximately 20 miles north of the BSA (USFWS 2013).

Within the study area, northern coastal salt marsh provides suitable habitat for California seablite. However, based on the conclusion by the USFWS in 2010 and the closest known extant occurrences are over 20 miles north of the BSA, California seablite is unlikely to be present. Additionally, this species was not detected during the reconnaissance site visit when it would have been in bloom. Therefore, California seablite is not expected to occur in the BSA.

Coastal marsh milkvetch. Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Coastal marsh milkvetch is a perennial herb in the legume (Fabaceae) family, with a CRPR of 1B.2, which occurs in mesic, typically sandy sites in coastal dune habitat, in coastal scrub habitat, coastal salt marsh, and freshwater marshes at elevations from 0 to 100 feet above sea level. The blooming period for this species extends from June through October, although it has been observed in flower as early as April (CNPS 2020). The only nearby occurrence is located approximately 2.5 miles southeast of the study area at Ravenswood Open Space Preserve and was observed in 2015. The next closest occurrence is located approximately 10 miles from the study area at Upper Crystal Springs Reservoir, and seven other occurrences in San Mateo County are located on the opposite side of the peninsula along the Pacific Ocean (CNDDB 2020). This perennial herb was not detected within any of the suitable habitat within the study area during the reconnaissance site visit in September, when it would have been in bloom, but a focused survey has not been completed. Due to the presence of suitable habitat in the study area and a known occurrence in the local area, there is a high potential for coastal marsh milkvetch to be present within the northern coastal salt marsh in the BSA, based on the definitions provided earlier.

Congdon’s tarplant. Federal Listing Status: None; State Listing Status: None; CRPR: 1B.1. Congdon’s tarplant is an annual herb in the composite family (Asteraceae) that is endemic to California. It has a variable blooming period extending from May through November. Congdon’s tarplant occurs in valley and foothill grassland habitat, floodplains, and swales, particularly those with alkaline substrates; and in disturbed areas with non-native grasses such as wild oat (*Avena* sp.), ripgut brome (*Bromus diandrus*), Italian ryegrass (*Festuca perennis*), and seaside barley (*Hordeum marinum*) (CNDDB 2020, CNPS 2020, Baldwin et al. 2012). The closest extant populations of Congdon’s tarplant are documented from Ravenswood Open Space Preserve, approximately 2.5 miles southeast of the study area, and Mountain View Shoreline Park, approximately 5.5 miles south of the study area. Additionally, Congdon’s tarplant has been documented at Don Edwards National Wildlife Refuge on the east side of the Bay in 2018, about five miles from the project site. This annual herb was not detected within any of the suitable habitat within the study area during the reconnaissance site visit in September, when it would have been in bloom. Due to the presence of suitable habitat in the study area and known occurrences in the region, there is a high potential for Congdon's tarplant to be present in the California annual grassland within the BSA; including the swale on the east side of the project site where project activities are proposed. The majority of the project site does not contain grassland habitat suitable for this species.

Point Reyes bird's beak. Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Point Reyes bird's beak is an annual, hemiparasitic herb in the figwort family (Orobanchaceae) that blooms from June through October. This subspecies occurs only in coastal salt marshes and swamps at elevations from 0 to 34 feet above sea level (CNPS 2020). Three occurrences of Point Reyes bird's beak are documented in the project vicinity. However, none of these populations have been observed since 1915 and all are listed by the CNDDB as "possibly extirpated" as site conditions have changed dramatically due to increased development and degradation of water quality since their original documentation (CNDDB 2020). However, Point Reyes bird's beak was documented at Don Edwards National Wildlife Refuge on the east side of the Bay in 2018, about five miles from the project site. This annual was not detected within any of the suitable habitat within the study area during the reconnaissance site visit in September when it would have been in bloom, but a species-specific survey was not completed. Due to the presence of suitable habitat, a recent occurrence in the Don Edwards Refuge, and the possibility of extant, remnant populations in coastal salt marshes surrounding the Bay, there is a moderate potential for this species to be present within the northern coastal salt marsh in the BSA.

Saline clover. Federal Listing Status: None; State Listing Status: None; CNPS List: 1B.2. Saline clover is an annual herb in the legume (Fabaceae) family that occurs in mesic, alkaline, or saline sites in valley and foothill grassland habitat, in vernal pool habitat, and in marshes and swamps at elevations from 0 to 984 feet above sea level. The blooming period extends from April through June, although in salt marshes the species may flower slightly later than in alkaline grassland areas. Many sites where this species historically occurred have been altered through development, trampling, road construction, and vehicular use, and thus no longer contain suitable habitat (CNPS 2020). The CNPS notes that there is a current need for information on the rarity and endangerment of this species (CNPS 2020). The only nearby occurrence of saline clover is from the Don Edwards National Wildlife Refuge on the east side of the Bay from 2004 (CNDDB 2020). This plant would not have been detected during the reconnaissance site visit is September since the site visit was outside of the bloom period. However, due to the presence of suitable habitat in the study area and a known occurrence in the region, saline clover has a moderate potential to be present within and around the margins of the northern coastal salt marsh in the BSA.

6.2 Special-Status Animals

Based on a review of the USFWS and CNDDB databases, the biologist's knowledge of sensitive species, and an assessment of the types of habitats within the project site, it was determined that 20 wildlife species could potentially occur within or near the study area. This determination was made due to the presence of essential habitat requirements for the species, the presence of known occurrences within five miles of the study area, and/or the study area's location within the species' known range of distribution. The legal status and likelihood of occurrence of the 20 wildlife species is summarized below and discussed in greater detail in this section.

Special-status species that are not expected to occur in the study area because it lacks suitable habitat, is outside the known range of the species, and/or is isolated from the nearest known extant populations by development or otherwise unsuitable habitat were excluded from the analysis. Animal species not expected to occur in the study area for these reasons include the bay checkerspot butterfly (*Euphydryas editha bayensis*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), San Francisco garter snake (*Thamnophis sirtalis tetrataenia*), western pond turtle (*Actinemys marmorata*), and western red bat (*Lasiurus blossevillii*).

SPECIAL-STATUS ANIMAL SPECIES WITH POTENTIAL TO OCCUR IN THE BSA

Common Name	Regulatory Status	Detected in the BSA	Likelihood of Occurrence in the BSA
Fish			
Central California Coast steelhead (*Oncorhynchus mykiss*)	FT	No	High (non-breeding)
Longfin smelt (*Spirinchus thaleichthys*)	ST	No	High (non-breeding)
North American green sturgeon (*Acipenser medirostris*)	FT, CSSC	No	High (non-breeding)
Mammals			
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	FE, SE, FP	No	High
Salt marsh wandering shrew (*Sorex vagrans halicoetes*)	CSSC	No	High
Birds			
Alameda song sparrow (*Melospiza melodia pusillula*)	CSSC	No	High (breeding)
American peregrine falcon (*Falco peregrinus anatum*)	FP	No	High (non-breeding); Not Expected (breeding)
Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*)	CSSC	No	High (breeding)
Black skimmer (*Rynchops niger*)	CSSC (nesting)	No	High (non-breeding); Not Expected (breeding)
California black rail (*Laterallus jamaicensis coturniculus*)	ST, FP	No	High (non-breeding); Not Expected (breeding)
California brown pelican (*Pelecanus occidentalis californicus*)	FP	No	High (non-breeding); Not Expected (breeding)
California Least Tern (*Sterna antillarum browni*)	FE, SE	Yes	High (non-breeding); Not Expected (breeding)
California Ridgway's Rail (*Rallus obsoletus obsoletus*)	FE, SE, SP	Yes	Present (breeding)
Loggerhead shrike (*Lanius ludovicianus*)	CSSC (nesting)		High (breeding)
Northern harrier (*Circus cyaneus*)	CSSC (nesting)	No	High (breeding)
San Francisco common yellowthroat (*Geothlypis trichas sinuosa*)	CSSC	No	High (breeding)
Short-eared owl (Asio flammeus)	CSSC (nesting)	No	High (non-breeding); Low (breeding)
Western burrowing owl (*Athene cunicularia*)	CSSC	Yes	Present (breeding)
Western snowy plover (*Charadrius nivosus nivosus*)	FT, CSSC	No	High (non-breeding); Not Expected (breeding)
White-tailed kite (*Elanus leucurus*)	FP	No	High (breeding)

Key to Status Abbreviations: Federally Listed as Endangered (FE); Federally Listed as Threatened (FT); Federal Candidate for Listing (FC), Federal Species of Concern (FSC), State Listed as Endangered (SE); State Listed as Threatened (ST); State Candidate for Listing (SC); State Fully Protected (FP); California Species of Special Concern (CSSC)

Other special-status species have some potential to occur on the project site only as visitors, migrants, or transients, but are not expected to reside or breed on the site, occur in large numbers, or otherwise make substantial use of the site. These include Bald eagle (*Haliaeetus leucocephalus*), listed as state endangered and state fully protected; Golden eagle (*Aquila chrysaetos*), listed as state fully protected; and pallid bat (*Antrozous pallidus*), a California species of special concern.

6.2.1 Special-Status Fish

Central California Coast Steelhead. Federal Listing Status: Threatened; State Listing Status: None. The Central California Coast (CCC) steelhead DPS was listed as a threatened species on August 18, 1997 (NMFS 1997), and the threatened status was reaffirmed on January 5, 2006 (NMFS 2006a). Critical habitat for the Central California Coast steelhead DPS was designated on September 2, 2005 and includes all river reaches and estuarine areas accessible to listed steelhead in coastal river basins from the Russian River to Aptos Creek, California (inclusive), and the drainages of San Francisco and San Pablo Bays (NMFS 2000, 2005, 2006). A final recovery plan was published in October 2016. Thus, Flood Slough and all other tidally influenced portions of the study area are included within designated critical habitat. (Appendix A, Figure 7).

Similar to CCC coho salmon, steelhead populations in many areas have declined due to degradation of spawning habitat, introduction of barriers to upstream migration, over-harvesting by recreational fisheries, and reduction in winter flows due to damming and spring flows due to water diversions (NMFS 1997). In addition, non-native fish species, such as striped bass (*Morone saxatilis*), common carp (*Cyprinus carpio*), and white catfish (*Ameiurus catus*), may pose risks to native steelhead populations through predation, competition, and habitat modification. Increasing predation pressure at river mouths and in the ocean from the growing California sea lion population is also posing significant risk to CCC steelhead.

Steelhead are found along the entire Pacific Coast of the United States. The CCC steelhead DPS includes all naturally spawned populations of steelhead in coastal streams from the Russian River (inclusive) to Aptos Creek (inclusive), and the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers; and tributary streams to Suisun Marsh including Suisun Creek, Green Valley Creek, and an unnamed tributary to Cordelia Slough (commonly referred to as Red Top Creek), exclusive of the Sacramento-San Joaquin River Basin of the California Central Valley.

Steelhead in the CCC DPS are winter-spawning steelhead, maturing in the ocean and spawning shortly after entering freshwater. Winter steelhead enter rivers and streams in the late fall and winter months when higher flows and associated lower water temperatures occur. Adult female steelhead will prepare a redd (or nest) in a gravel-bottomed, fast-flowing, well-oxygenated rivers and streams. Preferred streams typically support dense canopy cover that provides shade, woody debris, and organic matter, and are usually free of rooted or aquatic vegetation. The length of the incubation period is dependent on water temperature. Fry emerge from the gravel, and rear along the stream margins, moving gradually into pools and riffles as they grow larger. Young juveniles feed primarily on aquatic invertebrate drift.

In California, juveniles usually live in freshwater for one to three years (Shapovalov and Taft 1954; Barnhart 1986; Busby et al. 1996) then smolt and migrate to the sea; because of this multi-year rearing time period, steelhead can only spawn in tributaries that maintain suitable temperature and other water quality parameters year-round. Most downstream smolt migration takes place between February and June, with peak timing of steelhead smolt outmigration in Central California occurring from March to May (Barnhart 1986; Fukushima and Lesh 1998).

Steelhead are known to occur in several stream systems in the south San Francisco Bay, and could potentially spawn in virtually any stream reach with suitable spawning habitat that lacks downstream barriers to dispersal. CCC steelhead are known to occur in, and suitable spawning habitat is present in, San Francisquito Creek, Los Trancos Creek, Stevens Creek, Guadalupe River, Los Gatos Creek, Guadalupe Creek, Alamitos Creek, Calero Creek, Coyote Creek, Upper Penitencia Creek, and Arroyo Aguague (Leidy et al. 2005, NMFS 2005). Little is known about how juvenile steelhead use San Francisco Bay and its estuarine habitats; however, studies of juvenile salmon and steelhead estuary use suggest that in general, juvenile steelhead are more likely to use surface current flow, move through estuarine habitats rapidly (thereby having low residence times), and are more likely to occur in deeper channels (Truelove 2005, Melnychuck et al. 2007, Lower Columbia River Estuary Partnership 2007).

Small numbers of steelhead migrate late fall into spring through open waters of the bay between marine foraging areas and riverine spawning habitat in South San Francisco Bay, including San Francisquito Creek, Los Trancos Creek, Stevens Creek, Guadalupe River, and Los Gatos Creek, (Leidy et al. 2005, NMFS 2005). Therefore, there is some potential for occasional foraging individuals to occur within the tidal sloughs within the study area.

Longfin Smelt. Federal Listing Status: None; State Listing Status: Threatened. This southernmost population of longfin smelt is found as far north as Prince William Sound, Alaska, and occurs in the San Francisco Bay. The longfin smelt was declared a threatened species under the CESA in March 2009 and has been petitioned for listing as endangered under the FESA (USFWS 2008).

Longfin smelt are anadromous fish that spawn in fresher waters and disperse to more saline estuarine and marine waters to mature (Moyle 2002). Although little is known about the breeding biology of longfin smelt in the San Francisco Bay, the species is thought to spawn at the interface between fresh and brackish water in tidal portions of San Francisco Bay tributaries (Robinson and Greenfield 2011). Spawning in the Bay is thought to occur mainly below Medford Island in the San Joaquin River and below Rio Vista on the Sacramento River, while the lower end of spawning habitat seems to be upper Suisun Bay around Pittsburg and Montezuma Slough, in Suisun Marsh (Larson et al. 1983, Wang 1986). Winter sampling conducted in 2010 found high numbers of longfin smelt in Coyote Creek and Alviso Slough in the South Bay, and study data from 1982 and 1983 show use of Coyote Creek by spawning adults and larvae (Robinson and Greenfield 2011). The distribution of larvae is strongly influenced by freshwater outflow to the Delta (Baxter 1999, Dege and Brown 2004). In dry years, larvae are concentrated primarily in the West Delta and Suisun Bay, and in wet years, larvae are found throughout the San Francisco Estuary, including the South Bay, with the greatest concentrations in San Pablo and Suisun Bay early in the season and into the Central Bay later in the season (Rosenfield 2009). Within these areas, spawning may occur from November to June, with the peak of spawning activity likely occurring from February to April (Moyle 2002).

Fish surveys conducted for the South Bay Salt Ponds Restoration Project by Hobbs et al. (2012), which included otter trawls in sloughs and Bay waters around the Bair Island, Eden Landing, Ravenswood, and Alviso pond complexes, detected a single longfin smelt in the Bair Island marsh in January 2010. Elsewhere in the South Bay sampling areas, longfin smelt were captured in December 2010, February 2011, and from October 2011 to March 2012. The species was not detected during other surveys, which were conducted at least monthly from 2010 through 2012, indicating absence between the months of May and October, inclusively. However, sampling in the wet winter of 2016-2017 detected gravid adults and larvae in the Alviso area, suggesting that the species may spawn in the South Bay at least in wetter years.

Nonbreeding longfin smelt can potentially be present in any fully tidal waters in the South Bay as long as water temperatures do not exceed 22 °C. Thus, occasional individuals may forage in the open waters on and adjacent to the BSA. Based on this species' life history and habitat use, as well as the results of recent sampling in the Bair Island area by Hobbs et al. (2012), there is a high potential for longfin smelt to occur in the BSA from late fall to early spring (i.e., November to April). However, due to the absence of suitable brackish/fresh spawning habitat in the study area, this species is not expected to spawn there, and thus they are not expected to be present from late spring to mid-fall.

North American Green Sturgeon. Southern Distinct Population Segment. **Federal Listing Status: Threatened; State Listing Status: Species of Special Concern.** The Southern Distinct Population Segment (DPS) of the North American green sturgeon was federally listed as threatened on April 7, 2006 (NMFS 2006b). Critical habitat for the Southern green sturgeon was designated on October 9, 2009 and includes all tidally influenced waters of the San Francisco Bay and coastal waters of Northern California, south to Monterey Bay to a depth of 360 feet (NMFS 2009) (Appendix A, Figure 7).

Green sturgeon are the most broadly distributed and wide-ranging species of the sturgeon family, occurring in ocean waters from Ensenada, Mexico to the Bering Sea, and commonly occur in coastal waters from San Francisco Bay to Canada (Erickson and Hightower 2007). The historical and current distribution of where this species spawns is unclear because the original spawning distribution may have been reduced due to harvest and other anthropogenic effects and because they make non-spawning movements into estuaries during summer and fall (Lindley et al. 2008). Spawning has been documented in the Rogue (Erickson et al. 2002), Klamath (Scheiff et al. 2001), Trinity (Scheiff et al. 2001), Sacramento, and Eel rivers (Lindley et al. 2008).

Green sturgeon are long-lived, slow-growing fish and the most marine-oriented of the sturgeon species. Green sturgeon exhibit delayed sexual maturity, somewhere between 13 and 20 years, and spawn every 2 to 5 years (Moyle 2002). They live to a maximum age of 60 to 70 years (Moyle 2002).

Juveniles reside in fresh water, with adults returning to freshwater to spawn when they are more than 15 years of age and more than 4 feet in size. Spawning is believed to occur every 2 to 5 years (Moyle 2002). In the Sacramento River, green sturgeon spawn in late spring and early summer (NMFS 2003). Adults typically migrate into fresh water beginning in late February; spawning occurs March-July, with peak activity in April-June (Moyle et al. 1995). Juveniles spend 1 to 4 years in fresh and estuarine waters before migrating to the ocean (Beamesderfer and Webb 2002).

Green sturgeon spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. In summer and fall, they commonly occur in estuaries where there has been no known spawning activity and where there are no records of their occurrence farther up the river system (Adams et al. 2007), suggesting that the species may wander widely in accessible estuarine habitat. Studies in the Sacramento-San Joaquin Delta found that juveniles feed on opossum shrimp (Mysidacea) and amphipods (Radtke 1966) and adults feed on benthic invertebrates and even small fish (Moyle et al. 1995).

Green sturgeon spawn in deep pools or “holes” in large, turbulent, freshwater rivers (Moyle et al. 1995). Specific spawning habitat preferences are unclear, but it is likely that cold, clean water and suitable substrate (large cobble, but also clean sand and bedrock) are important for spawning and embryonic development (Moyle et al. 1995).

There is a high potential for Southern green sturgeon to be present year-round as non-breeders in the tidal sloughs within the study area. However, there is no suitable breeding habitat within or nearby the BSA.

Essential Fish Habitat. All subtidal and intertidal habitats adjacent to the project site are designated as EFH (Appendix A, Figure 7) for species federally managed under the following three fisheries management plans (FMPs) (Pacific Fisheries Management Council 1998, 2011, 2012):

- Coastal Pelagic FMP – including Pacific sardine (*Sardinops sagax caerulea*), Pacific mackerel (*Scomber japonicus*), and jack mackeral (*Trachurus symmetricus)*, and market squid (Doryteuthis opalescens); and
- Pacific Groundfish FMP – various rockfish, flatfish, roundfish, sharks, and skates; and
- Pacific Salmon FMP – Chinook salmon (*Oncorhynchus tshawytscha*).

A number of fish species regulated by these FMPs, 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 South San Francisco Bay and are expected to occasionally disperse upstream into the tidal sloughs in the BSA, such as Flood Slough. Species such as the northern anchovy, Pacific sardine, and jack mackerel (*Trachurus symmetricus*) also occur in the South Bay. These species are less likely to occur in the study area, but small numbers could potentially occur there.

Chinook salmon are not expected to spawn near or in the BSA due to the lack of suitable spawning substrate and lack of direct connectivity between tidal channels in the BSA and any suitable freshwater spawning habitat. It is possible that occasional strays from Central Valley streams, Guadalupe River, and Coyote Creek may wander up Flood, but their presence in Flood Slough would be rare and in small numbers lack due to lack of freshwater outflow into Flood Slough.

6.2.2 Special-Status Mammals

Salt Marsh Harvest Mouse. Federal Listing Status: Endangered; State Listing Status: Endangered and Fully Protected. The salt marsh harvest mouse is found only in saline wetlands of the San Francisco Bay and its tributaries. There are two subspecies: the southern (*Reithrodontomys raviventris raviventris*), which occurs in salt marshes around San Francisco Bay, and the northern (*Reithrodontomys raviventris halicoetes*), which occurs in brackish marshes around Suisun Bay and San Pablo Bay (Fisler 1965, Shellhammer 1982). The southern subspecies raviventris is restricted to an area along both sides of San Francisco Bay, from San Mateo County and Alameda County south to Santa Clara County. The optimal habitat for salt marsh harvest mouse habitat is generally considered tidal marsh dominated by pickleweed (*Salicornia* spp.; Shellhammer et al. 1982; Shellhammer 1989; USFWS 2010). However, habitats not dominated by pickleweed, within both tidal and diked marshes, are also known to support long term populations (Sustaita et al. 2011). The salt marsh harvest mouse occurs with the closely related, ubiquitous, and abundant western harvest mouse (*Reithrodontomys megalotis*) at upper edges of marshes and in marginal areas. Both animals occur in pickleweed, but the salt marsh harvest mouse replaces the western harvest mouse in denser areas of pickleweed.

The salt marsh harvest mouse has declined substantially in recent decades. This decline is due primarily to diking and filling of marshes, subsidence, and changes in salinity brought about by increasing volumes of freshwater discharge into the Bay. In response to habitat loss and population declines, the salt marsh harvest mouse was listed as endangered by the USFWS in 1970 (USFWS 1970) and is a fully protected species under California law (See California Fish and Game Code Section 4700). Critical habitat has not been designated for this species.

Salt marsh harvest mice are known to occur in salt marsh habitats north of the study area in the Don Edwards National Wildlife Refuge, and suitable breeding and foraging habitat for the salt marsh harvest mouse is located in the salt marsh habitat within the BSA. This habitat is part of a larger tidal salt marsh to the north of the BSA that likely supports this species. Therefore, salt marsh harvest mouse has a high potential to be present in the salt marsh in the BSA.

Salt Marsh Wandering Shrew. Federal Listing Status: None; State Listing Status: Species of Special Concern. The salt marsh wandering shrew occurs primarily in medium-high, wet tidal marsh (six to eight feet above mean sea level) with abundant driftwood and other debris for cover (Shellhammer 2000). This species also has been recorded in diked marsh habitat. Within these habitats, individuals typically prefer patches of tall pickleweed, in which they build nests. Salt marsh wandering shrew breed and give birth during the spring; however, very little is known about the natural history of this species.

The salt marsh wandering shrew historically was more widely distributed in the San Francisco Bay, but it is currently confined to salt marshes in the South Bay (Findley 1955). The salt marsh wandering shrew occasionally is captured during salt marsh harvest mouse trapping studies, but the difficulty in identifying it to species has precluded a better understanding of its current distribution in the South Bay. The shrew was formerly recorded from marshes of San Pablo and San Francisco Bays in Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara Counties, but captures in recent decades have been very infrequent in these areas. However, salt marsh wandering shrew are known to share many of the same habitats as the salt marsh harvest mouse; therefore, there is a high potential for salt marsh wandering shrew to occur in the BSA.

6.2.3 Special-Status Birds

Alameda Song Sparrow. Federal Listing Status: None; State Listing Status: Species of Special Concern. The Alameda song sparrow is one of three subspecies of song sparrows that nest only in salt marsh habitats in the San Francisco Bay area (Chan and Spautz 2008). Prime habitat for Alameda song sparrows consists of large areas of tidally influenced salt marsh dominated by cordgrass and gumplant and intersected by tidal sloughs, offering dense vegetative cover and singing perches. Although this subspecies is occasionally found in brackish marshes dominated by bulrushes, it is apparently very sedentary and is not known to disperse upstream into freshwater habitats (Basham and Mewaldt 1987). While the range of the Alameda song sparrow has remained relatively unchanged over time, populations have been reduced substantially and are continually threatened by the loss and fragmentation of salt marshes around the Bay (Nur et al. 1997, Chan and Spautz 2008). Alameda song sparrow nest as early as March, but peak nesting activity probably occurs in May and June. Early nesting is apparently an adaptation to breeding in a tidal environment, as high tides in late spring and early summer may destroy large numbers of nests.

In the northern portion of the study area, the taller vegetation within and adjacent to the northern coastal salt marsh provides suitable breeding and foraging habitat for this species. Based on suitable breeding habitat in the study area and known nearby occurrences (Cornell Lab of Ornithology 2020), there is a high potential for Alameda song sparrow to breed within the BSA.

American Peregrine Falcon. Federal Listing Status: None; State Listing Status: Fully Protected. The American peregrine falcon occurs throughout much of the world and is known as one of the fastest flying birds of prey. Peregrine falcons prey almost entirely on birds, which they kill while in flight. Peregrine falcon nest on ledges and caves on steep cliffs, as well as on human-made structures such as buildings, bridges, and electrical transmission towers. In California, they are known to nest along the entire coastline, the northern Coast, and the Cascade Ranges and Sierra Nevada.

A severe decline in populations of the widespread North American subspecies *anatum* began in the late 1940s. This decline was attributed to the accumulation of dichlorodiphenyldichloroethylene (DDE), a metabolite of the organochlorine pesticide dichlorodiphenyltrichloroethane (DDT), in aquatic food chains. When concentrated in the bodies of predatory birds such as the peregrine falcon, this contaminant led to reproductive effects, such as the thinning of eggshells. The American peregrine falcon was listed as endangered by the USFWS in 1970 (USFWS 1970) and by the State of California in 1971. Recovery efforts included the banning of DDT in North America, and captive breeding programs to help bolster populations. The USFWS removed the American peregrine falcon from the endangered species list in 1999 (USFWS 1999), and from the state endangered species list in 2009.

The only locations within the project region where peregrines have been detected nesting are in old common raven and hawk nests on electrical transmission towers within the salt ponds in the Don Edwards National Wildlife Refuge northeast of the study area. Peregrine falcons have been observed at Bedwell Bayfront Park, but the species is not expected to nest in the BSA or in the Park due to the lack of suitable nesting habitat. However, peregrine falcon may forage occasionally in the BSA.

Black Skimmer. Federal status: None; State status: Species of Special Concern (nesting). The black skimmer is found along shorelines and is commonly observed around sheltered bays, inlets, and lagoons where it can forage for small fish and crustaceans in calm, shallow waters (Sibley 2000). Feeding is done primarily during dawn and dusk by skimming the top of the water with their bills to catch their prey (Terres 1980). Black skimmers primarily nest on gravel bars, low islands, or sandy beaches in colonies (Harrison 1978). In the Bay, black skimmers nest on abandoned levees and islands in saline managed ponds and marshes. Nationally, black skimmer populations have declined due to breeding habitat disturbance from humans, predation by introduced species and fish population declines (Holt and Leasure 1998).

There is no suitable nesting habitat within the study area, but black skimmers may forage in the open water habitat in the study area, particularly Flood Slough where they have been regularly observed (Cornell Lab of Ornithology 2020). There are also several documented occurrences of black skimmer from nearby Don Edwards National Wildlife Refuge. Black skimmer is not expected to nest in the study area, but there is high potential for this species to forage in the study area.

Bryant's Savannah Sparrow. Federal status: None; State status: Species of Special Concern. The Bryant's savannah sparrow is one of four subspecies of savannah sparrow that breed in California. This subspecies occurs primarily in coastal and bayshore areas, from Humboldt Bay to Morro Bay, and is found year-round in low-elevation, tidally influenced habitat, specifically pickleweed-dominated salt marshes, and in grasslands and ruderal areas. Along the edge of the Bay, levee tops with short vegetative growth and levee banks with high pickleweed are the preferred nesting habitat of this sparrow (Fitton 2008).

In the northern and western portion of the study area, the northern coastal salt marsh and the levee banks with short ruderal vegetation provide suitable breeding and foraging habitat for the species. There are numerous documented occurrences of Bryant's savannah sparrow from Bedwell Bayfront Park and Ravenswood Open Space Preserve (Cornell Lab of Ornithology 2020). Based on suitable breeding habitat in the study area and documented nearby occurrences, there is a high potential for Bryant's savannah sparrow to breed in the BSA.

California Black Rail. Federal Listing Status: None; State Listing Status: Threatened and Fully Protected. The California black rail was listed as threatened by the State of California in 1971 and is fully protected under the California Fish and Game Code (Section 3511). The California black rail is a small rail that inhabits a variety of marsh types. California black rails are most abundant in extensive tidal marshes with some freshwater input (Evens et al. 1991). They nest primarily in pickleweed-dominated marshes with patches or borders of bulrushes, often near the mouths of creeks. Black rails build nests in tall grasses or marsh vegetation during spring and lay about six eggs. Nests are usually constructed of pickleweed and are placed directly on the ground or slightly above ground in vegetation. Black rails feed on terrestrial insects, aquatic invertebrates, and possibly seeds (Trulio and Evens 2000).

The California black rail reportedly nested in the South Bay in the early 1900s (Wheelock 1916), but until recently it was known to occur in the South Bay primarily as a non-breeder. The distribution of nonbreeding black rails in the South Bay is poorly understood, as they are extremely difficult to detect during the winter. However, recent records of black rails calling in south bay marshes suggest that small numbers of black rails could be breeding.

California black rails are known to be a regular winter visitor in the tidal marsh at the Palo Alto Baylands and Ravenswood Open Space Preserve in small numbers, typically being observed only during king tides, when this secretive species may be forced to find cover along the edge of the tidal marsh. However, there are no nesting records for black rails in the Baylands and surrounding areas. However, suitable nesting habitat is present in the study area, and, with this species' apparent expansion in other South Bay marshes during the breeding season, their presence as breeders during the spring and summer cannot be ruled out. If present as a non-breeder during the winter, this species may forage along sloughs and anywhere in the salt marsh within the study area. Based on suitable habitat, but lack of specific nesting records in the project region, black rail has a low potential to breed in the BSA. However, black rail has a high potential to be present as a non-breeder during the winter months.

California Brown Pelican. Federal Listing Status: None; State Listing Status: Fully Protected. The California brown pelican is a permanent resident of the coastal marine environment on the Pacific Coast and the range extends from British Columbia, Canada, south to Nayarit, Mexico. The bulk of the population (about 90%) nests in Mexico. The only long-term breeding colonies of California brown pelicans in the United States are on Anacapa and Santa Barbara Islands.

California brown pelicans are aquatic birds and are typically found on rocky, sandy or vegetated offshore islands, beaches, open sea (for feeding), harbors, marinas, estuaries, and breakwaters. Nesting colonies are established on islands without mammalian predators and permanent human habitation. Forages close to shore usually within five miles of land. There are numerous documented occurrences of brown pelican from Bedwell Bayfront Park, Don Edwards National Wildlife Refuge adjacent to the study area, and Ravenswood Open Space Preserve (Cornell Lab of Ornithology 2020). There is no suitable nesting habitat for this species in the project area, but there is a high potential for California brown pelican to forage in the BSA.

California Least Tern. Federal Listing Status: Endangered; State Listing Status: Endangered and Fully Protected. The California least tern was designated as federally endangered in 1970 (USFWS 1970). Critical habitat has not been designated for this species. California least terns forage, roost, nest, and migrate in colonies. In California, nesting occurs from April to September (Baron and Takekawa 1994; Rigney and Granholm 1990) with a typical colony size of 25 pairs (USFWS 2006). Nesting habitat consists of large tracts of undisturbed beaches kept free of vegetation by natural scouring, with shallow nests scraped in the sand or shell fragments (Baron and Takekawa 1994, USFWS 2006a, Marschalek 2008). Both adults incubate and care for the young. Least terns typically leave California breeding sites by September for wintering locations along Baja California, mainland Mexico, and Central and South America.

Least terns search for prey by hovering over shallow to deep waters in bays, lagoons, estuaries, river and creek mouths, marshes, lakes, and offshore areas and diving to the surface. They feed primarily on small surface-swimming, non-spiny fish. During the breeding season, most foraging occurs within two miles of the nest site because it reduces the energy cost of flying to feeding locations and the time needed to bring a load of fish back to the nest (Atwood and Minsky 1983). After breeding, least terns gather to roost and forage in "staging areas" from about late June through late August, prior to their southward migration. Both adult and juvenile least terns roost on salt pond levees (both outboard levees and interior levees between ponds) posts, and boardwalks, and forage both in the salt ponds and over the open waters of the San Francisco Bay.

They nest in small colonies and, due to their endangered status, nesting locations are closely monitored and well known. In recent decades, the closest least tern colony site is in the Eden Landing Ecological Preserve, just south of Highway 92 in Fremont, Alameda County. Least tern formerly nested on Bair island in the Don Edwards National Wildlife Refuge approximately three miles north of the study area. Therefore, California least terns are not expected to nest in or adjacent to the Project site.

However, the South Bay is an important post-breeding staging area for least terns to gather before migration, and this species forages in late summer and early fall in saline managed ponds and over the open waters of the Bay from Redwood City through Sunnyvale into the Alviso area. However, there are no documented occurrences of least tern from the salt marshes or tidal sloughs adjacent to the study area (Cornell Lab of Ornithology 2020). Based on the lack of suitable breeding and forging habitat as well as the lack of documented occurrences in and near the study area, least tern is not expected to breed or forage within the BSA.

California Ridgway's Rail. Federal Listing Status: Endangered; State Listing Status: Endangered and Fully Protected. The California Ridgway's rail, formerly the California clapper rail, was federally listed as endangered in 1970 (USFWS 1970) and was listed as endangered by the State of California in 1971. This species is fully protected under the California Fish and Game Code (Section 3511). The USFWS approved a joint recovery plan for the salt marsh harvest mouse and the Ridgway's rail in 1984 (USFWS 1984), and an updated Tidal Marsh Species Recovery Plan was completed in 2013 (USFWS 2013). Critical habitat for this species has not been proposed or designated.

The California Ridgway's rail is a secretive marsh bird that is currently endemic to marshes of the San Francisco Bay. The species is typically found in the intertidal zone and sloughs of salt and brackish marshes dominated by pickleweed, Pacific cordgrass, marsh gumplant, saltgrass, jaumea, and contain a complex network of tidal channels. It generally nests in taller vegetation, often along tidal channels. Upland transitional areas adjacent to or within these marshes are also important for predator avoidance at high tides. Ridgway's rails do not occur in muted tidal or diked salt marshes but have been documented in brackish marshes in the South Bay. Ridgway's rails formerly nested at Humboldt Bay (Humboldt County), Elkhorn Slough (Monterey County), and Morro Bay (San Luis Obispo County), but are now extirpated from all sites outside of the San Francisco Bay (Harding-Smith 1993).

Ridgway's rail is well documented from the project region. Annual surveys for Ridgway's rails have been conducted during the breeding season in marshes in the South San Francisco Bay (south of the Dumbarton Bridge) as part of the Invasive Spartina Project since 2006 (McBroom 2016). These surveys have found that large, intact marshes such as Laumeister Marsh, Faber Marsh, the Palo Alto Baylands, and Palo Alto Harbor have the highest densities of Ridgway's rails in the San Francisco Bay. Additionally, there are numerous documented occurrences of Ridgway's rail at Greco Island in the Don Edwards National Wildlife Refuge and Flood Slough, both of which are contiguous with the salt marsh in the study area (Cornell Lab of Ornithology 2020). During a reconnaissance site visit in 2017, Ridgway's rails were heard calling from the salt marsh in the study area. Based on suitable nesting habitat and documented occurrences of Ridgway's rail in the BSA, this species is assumed to be present in the salt marsh within the BSA as a breeder.

Loggerhead Shrike. Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). The loggerhead shrike is a predatory songbird associated with open habitats interspersed with shrubs, trees, poles, fences, or other perches from which it can hunt (Yosef 1996). Nests are built in densely foliated shrubs or trees, often containing thorns, which offer protection from predators and upon which prey items are impaled. The breeding season for loggerhead shrikes may begin as early as mid-February and lasts through July (Yosef 1996). Nationwide, loggerhead shrike populations have declined significantly over the last 20 years. Loggerhead shrikes are still fairly common in parts of the San Francisco Bay area, but urbanization has reduced available habitat, and local populations are likely declining (Cade and Woods 1997, Humple 2008).

Loggerhead shrike nest in a number of locations in the project region where open grassland, ruderal, or agricultural habitat with scattered brush, chaparral, or trees that provide perches and nesting sites occurs (Bousman 2007). This species occurs slightly more widely (i.e., in smaller patches of open areas providing foraging habitat) during the nonbreeding season. Dense stands of coyote brush and other woody vegetation found just outside of the study area in Bedwell Bayfront Park as well as stands of dense vegetation around the northern coastal salt marsh within the study area provide suitable nesting habitat for the loggerhead shrike and the species may forage in the grassland and marsh habitats in and adjacent to the study area. Loggerhead shrike have been observed at Bedwell Bayfront Park (Cornell Lab of Ornithology 2020). Based on known nearby occurrences and suitable nesting habitat in the study area, loggerhead shrike has a high potential to breed in the BSA.

Northern Harrier (*Circus cyaneus*). Federal Listing Status: None; State Listing Status: Species of Special Concern (Nesting). The northern harrier nests in marshes and grasslands with tall vegetation and sufficient moisture to inhibit accessibility of nest sites to predators. This species forages primarily on small mammals and birds in a variety of open grassland, ruderal, and agricultural habitats. The species is widespread as a forager in grasslands and other open areas in the project region, especially during migration and winter (Davis and Niemela 2008; Cornell Lab of Ornithology 2020). During the breeding season, the northern harrier occurs primarily along the coast, where it nests in extensive marshes and grasslands, and in tidal marsh along South San Francisco Bay (Cornell Lab of Ornithology 2020). Suitable nesting and foraging habitat for the northern harrier is present in the extensive tidal salt marsh located partially within the northern portion of the study area. This species is unlikely the nest close to the levees due to proximity to upland habitat accessible to mammalian predators. However, it is expected to forage in the upland area. Based on suitable habitat in the study area and known nearby occurrences, Northern harrier has a high potential to nest and forage in the BSA.

San Francisco Common Yellowthroat. Federal Listing Status: None; State Listing Status: Species of Special Concern. The San Francisco common yellowthroat inhabits emergent vegetation and constructs nests in fresh and brackish marshes and moist floodplain vegetation around the San Francisco Bay. Common yellowthroats will use small and isolated patches of habitat if groundwater is close enough to the surface to encourage the establishment of dense stands of rushes (*Scirpus* and *Juncus* spp.), cattails, willows, and other emergent vegetation (Nur et al. 1997, Gardali and Evens 2008). Ideal habitat, however, is comprised of extensive, thick riparian, marsh, or herbaceous floodplain vegetation in perpetually moist areas, where populations of brown-headed cowbirds are low (Menges 1998). San Francisco common yellowthroats nest primarily in fresh and brackish marshes, although they nest in salt marsh habitats that support tall vegetation (Guzy and Ritchison 1999). This subspecies builds open-cup nests low in the vegetation, and nests from mid-March through late July (Guzy and Ritchison 1999, Gardali and Evens 2008).

In the nearby Don Edwards National Wildlife Refuge, north of the study area, the San Francisco common yellowthroat is a common breeder in fresh and brackish marshes. It also breeds in the nearby Palo Alto Bayland marshes and the Ravenswood Open Space Preserve (Cornell Lab of Ornithology 2020). Within the northern portion of the study area, the northern coastal salt marsh provides suitable breeding and foraging habitat for the species. Based on suitable habitat in the study area and known nearby occurrences, San Francisco yellowthroat has a high potential to breed in the BSA.

Short-eared Owl. Federal Listing Status: None; State Listing Status: Species of Special Concern (nesting). The short-eared owl is found in perennial grasslands, prairies, dunes, meadows and both fresh and saline water wetlands (Sibley 2000). The short-eared owl primarily feeds on small mammals, including mice and voles but is known to also feed on reptiles and birds in some regions (Holt 1992). The short-eared owl nests on the ground in marshes and moist fields, and usually choose dry sites, often on small knolls, ridges, or hummocks, with dense vegetation to conceal the nest. Nationally, short-eared owl’s populations have been declining due to habitat loss and fragmentation, increased grazing, and increased predation from non-native predators (Holt and Leasure 1993).

The short-eared owl has been recorded nesting in the project region only in the Palo Alto Flood Control Basin, though it has not been confirmed nesting there since the 1970s. They are known to be primarily winter residents in the South Bay and have been observed periodically in Bedwell Bay Park and Don Edwards National Wildlife Refuge (Cornell Lab of Ornithology 2020). However, when food is plentiful winter areas often become breeding areas.

Suitable nesting habitat is present in the salt marsh within the study area and short-eared owls may forage in the developed portions of the study area but are expected to do so infrequently and in low numbers. Based on the presence of suitable habitat and lack of breeding records for the project area there is a low potential for short-eared owl to nest in the area, but a high potential for this species to forage in the study area, particularly in the non-breeding season.

Western Burrowing Owl. Federal Listing Status: None; State Listing Status: Species of Special Concern. Burrowing owls occur year-round in the San Mateo County, using open, agricultural or grassland areas with active small mammal burrows, which they use for nesting and roosting. Typical burrowing owl habitat is treeless (because tall trees provide perches for raptors that can easily prey on burrowing owls), with minimal shrub cover and woody plant encroachment, and low density and foliage height diversity, which allows the owls to observe approaches to their nest or roost burrows. In the San Francisco Bay Area, burrowing owls are chiefly associated with burrows of California ground squirrels, which, in addition to providing nesting, roosting, and escape burrows, improve habitat for burrowing owls in other ways. For example, burrowing owls are known to favor areas with short, sparse vegetation (Coulombe 1971, Haug and Oliphant 1990, Plumpton and Lutz 1993a), which provides visual protection from avian predators and foraging habitat, and ground squirrel colonies maintain short vegetation height. In the absence of ground squirrel populations, habitats soon become unsuitable for occupancy by owls.

Burrowing owls are diet generalists. Insects, small mammals, birds, and occasionally amphibians and reptiles may be eaten (Errington and Bennett 1935, Thomsen 1971, Green et al. 1993, Plumpton and Lutz 1993b). The burrowing owl nesting season as recognized by the CDFW runs from February 1 through August 31. In nearby Santa Clara County, burrowing owl families with non-flying young have been found as early as March 30, suggesting egg-laying dates in mid to late February, and fledged young still dependent on adults have been found into late August (Trulio 2007). After nesting is completed, adult owls may remain in their nesting burrows or in nearby burrows, or they may migrate and over-winter elsewhere (Gorman et al.

2003). Young birds disperse across the landscape from 0.1 mile to 35 miles from their natal burrows (Rosier et al. 2006). Philopatry (the tendency for individuals to breed at or near their place of birth), site tenacity (the tendency for individuals to breed at or near their prior nest location), and nest burrow reuse have been well documented for burrowing owls (Martin 1973, Rich 1984, Plumpton and Lutz 1993a), and burrowing owls may return to a nesting site and attempt to nest even after the site has been developed. Further, past reproductive success may influence future site reoccupancy. Female burrowing owls with large broods tend to return to previously occupied nest sites, while females that fail to breed, or which produce small broods, may change nest territories in subsequent years (Lutz and Plumpton 1999).

Within the BSA, burrowing owl have been observed near a burrow on the levee in March 2017. However, burrowing owl were not observed during the September 2019 site visit. Also, there is one documented occurrence of burrowing owl from Bedwell Bayfront Park in 2003 (Cornell Lab of Ornithology 2020). Additionally, numerous burrows of California ground squirrel were observed during the reconnaissance site visit in September 2019 and May 2020. Based on suitable nesting habitat and documented occurrence within the BSA, nesting burrowing owl are assumed to be present.

Western Snowy Plover. Federal Listing Status: Threatened; State Listing Status: Species of Special Concern. Snowy plover is a resident along the Pacific Coast from British Columbia to Mexico and along the Gulf Coast from Texas to the Florida Panhandle. It also breeds locally in the interior from California and Nevada east to Oklahoma and Texas. The Pacific Coast population of the snowy plover is defined as those individuals that nest adjacent to tidal waters of the Pacific Ocean, and includes all nesting birds on the mainland coast, peninsulas, offshore islands, adjacent bays, estuaries, and coastal rivers (USFWS 2004). The current known breeding range of this population extends from Damon Point, Washington, to Bahia Magdelena, Baja California, Mexico (USFWS 2006b).

Snowy plover winter and breed in the same habitats, consisting of mostly sandy, ocean fronting beaches, dry salt flats, and gravel bars (Page et al. 1995; Colwell et al. 2005; Brinfock and Colwell 2011). Many beaches that support snowy plover nesting, foraging, and wintering, are bordered to the east by dense stands of European beachgrass, which often form an abrupt boundary that defines unsuitable habitat for snowy plover (Patrick and Colwell 2014). Snowy plover typically nests, forage, and winter on flat to gently sloping, wide beaches with plentiful food sources and sparse vegetation (Page et al. 1995; Colwell et al. 2005), (MacDonald et al. 2010; Muir and Colwell 2010; Brinfock and Colwell 2011). Selecting habitats that are open (or wide) and have less vegetative cover can facilitate early detection of predators and reduce predation risk (Muir and Colwell 2010; Brinfock and Colwell 2011; Patrick and Colwell 2014). Snowy plover nests have been found adjacent to small clumps of vegetation or other beach debris that likely provides additional cover making it more difficult for predators to spot (Page, Stenzel, & Ribic 1985; Powell 2001). In addition, snowy plover broods have been observed hiding in vegetation clumps in response to adult alarm calls (Webber et al. 2013). In general, SNPL nests are most often located within 328 feet of water, or at least within sight of it (Stenzel et al. 1981) (USFWS 2007). Shortly after hatching, chicks move into areas where there is at least some vegetation or beach debris, which provides cover from the heat of the sun, inclement weather, and predators.

On March 5, 1993, the Pacific coast population of the western snowy plover was listed as threatened under the federal Endangered Species Act. On June 19, 2012, a final rule of critical habitat for western snowy plovers along the coasts of California, Oregon, and Washington was published (*Federal Register* 77 FR 36728). There is designated critical habitat (Ravenswood Unit) for western snowy plover approximately two miles southeast of the BSA (Appendix A, Figure 7).

Although western snowy plover is known to nest in salt panne habitat located two miles to the southeast of the study area in the Don Edwards National Wildlife Refuge Ravenswood complex (CNDDB 2020), no suitable nesting is present in the study area. However, there are numerous documented occurrences of snowy plover foraging along Flood Slough at Bedwell Bayfront Park (Cornell Lab of Ornithology 2020). Based on documented nearby occurrences and suitable foraging habitat in the tidal slough habitat in the study area, snowy plover has a high potential to forage within the salt marsh habitat in the BSA.

White-tailed Kite. Federal Listing Status: None; State Listing Status: Fully Protected. In California, white-tailed kites can be found in the Central Valley and along the coast, in grasslands, agricultural fields, cismontane woodlands, and other open habitats (Zeiner et al. 1990b, Dunk 1995, Erichsen et al. 1996). White-tailed kites are year-round residents of the state, establishing nesting territories that encompass open areas with healthy prey populations, and snags, shrubs, trees, or other nesting substrates (Dunk 1995). Nonbreeding birds typically remain in the same area over the winter, although some movements do occur (Polite 1990). The presence of white-tailed kites is closely tied to the presence of prey species, particularly voles, and prey base may be the most important factor in determining habitat quality for white-tailed kites (Dunk and Cooper 1994, Skonieczny and Dunk 1997). Although the species recovered after population declines during the early 20th century, its populations may be exhibiting new declines as a result of recent increases in habitat loss and disturbance (Dunk 1995, Erichsen et al. 1996).

White-tailed kites are known to nest in the project vicinity, along the eastern edge of San Mateo County throughout the open areas edging the San Francisco Bay (Cornell Lab of Ornithology 2020). The blue gum and Australian pine trees found along the southern edge of the BSA as well as just outside of the BSA in Bedwell Bayfront Park provide suitable nesting habitat for white-tailed kite. Based on suitable nesting habitat and documented nearby occurrences, there is a high potential for white-tailed to nest and forage in the BSA.

6.2.4 Nesting Birds

Nesting birds may nest within vegetation, shallow scrapes on bare ground, and buildings in and around the study area. Several bird species were noted during the field survey (see Section 5.2). All bird species are protected under California Fish and Game code.

6.2.5 Marine Mammals

All marine mammals are protected by the Marine Mammal Protection Act of 1972.

Harbor Seal (*Phoca vitulina*). Harbor seals are widely distributed in the coastal areas of the northern Pacific and northern Atlantic. Harbor seals in the eastern Pacific range from the Pribilof Islands in Alaska to Isla San Martin off Baja (CDFG 2007a; Greig and Allen 2015).

The highest concentrations of harbor seals outside of the southern Channel Islands occur at Point Reyes and at several other locations, including Tomales Bay, Tomales Point, Drakes Estero-Estero de Limantour, Double Point, and Bolinas Lagoon. Estuaries provide habitat for large numbers of harbor seals, and Drakes Estero is the largest colony in the region and one of the largest in the state. Harbor seals are also abundant south of the Golden Gate and haul out at several locations, including Fitzgerald State Marine Park (NCCOS 2007). Additionally, harbor seals are the only marine mammal present in San Francisco Bay year-round where they rest ashore on islands, tidal rocks, mudflats, and sand bars. Individual seals may frequent multiple haul outs within the Bay, and also move outside of the bay to coastal sites to the north and south. Harbor seals eat a wide variety of pelagic and benthic prey, including small schooling fishes such as northern anchovy, many species of flatfishes, bivalves, and cephalopods (Greig and Allen 2015).

The seals are year-round residents at the haul out sites but are seasonally abundant with the highest numbers of seals present during the breeding season (March-June) and the molt (June-July). There are 13 known haul-out sites in the South Bay (south of San Mateo Bridge), of which six are located on the west side of the South Bay. Sites near the BSA include Bair Island, Greco Island, and Ravenswood Point. Based on the presence of nearby haul-out sites, harbor seals could be present year-round in the open water habitat as well as areas exposed by low tides (Fox 2008).

6.3 Sensitive and Regulated Plant Communities and Habitats

Natural communities have been considered part of the Natural Heritage Conservation triad, along with plants and animals of conservation significance, since the state inception of the Natural Heritage Program in 1979. The CDFW determines the level of rarity and imperilment of vegetation types; and tracks sensitive communities in its Rarefind database (CNDDB 2020). Global rankings (G) of natural communities reflect the overall condition (rarity and endangerment) of a habitat throughout its range, whereas state (S) rankings reflect the condition of a habitat within California. Natural communities are defined using NatureServe's standard heritage program methodology as follows (CDFG 2007):

- G1/S1: Less than 6 viable occurrences or less than 2,000 acres
- G2/S2: Between 6 and 20 occurrences or 2,000 to 10,000 acres
- G3/S3: Between 21 and 100 occurrences or 10,000 to 50,000 acres
- G4/S4: The community is apparently secure, but factors and threats exist to cause some concern
- G5/S4: The community is demonstrably secure to ineradicable due to being common throughout the world (for global rank) or the state of California (for state rank)

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

- S1.1: Very threatened
- S1.2: Threatened
- S1.3: No current threats known

In addition to tracking sensitive natural communities, the CDFW also ranks vegetation alliances, defined by repeating patterns of plants across a landscape that reflect climate, soil, water, disturbance, and other environmental factors (Sawyer et al. 1995). If an alliance is marked G1-G3, all the vegetation associations within it will also be of high priority (CDFG 2007). The CDFW provides the Vegetation Classification and Mapping Program's (VegCAMP) currently accepted list of vegetation alliances and associations (CDFW 2020).

Natural Communities of Special Concern. There is one CDFW classified sensitive natural communities within the study area.

- Northern coastal salt marsh. Northern coastal saltmarsh is a wetland plant community found in tidal areas and is dominated by salt-tolerant hydrophytic vegetation that typically forms a dense mat of vegetation. This plant community occurs along the California coast from Oregon to near Point Conception and is especially extensive around San Francisco Bay. Typical species include pickleweed, California cordgrass, alkali heath, salt grass, saltmarsh dodder (*Cuscuta pacifica*), jaumea (*Jaumea carnosa*), sea lavender (*Limonium californicum*), and marsh gumplant (*Grindelia stricta*).

Sensitive Vegetation Alliances. Sensitive plant communities identified by CDFW within the study area include *Sarcocornia pacifica* Alliance – Pickleweed Mats, which is the dominant vegetation alliance in the northern coastal salt marsh habitat in the BSA (Appendix A, Figure 6). This plant community has been identified by CDFW as "G4 S3", which means that it is rare and threatened throughout its range in California.

CDFW Stream/Riparian Habitat. There is no stream or riparian habitat within the project site.

Critical Habitat/EFH/Habitat Areas of Special Concern (HAPC). All tidally influenced areas of the BSA have been designated as critical habitat for the Southern DPS of green sturgeon. San Francisquito Creek, approximately five miles to the south of the BSA, is designated critical habitat for CCC Steelhead. In addition, there is designated critical habitat (Ravenswood Unit) for western snowy plover approximately two miles southeast of the BSA (Appendix A, Figure 7).

All tidal waters within the BSA are designated EFH (Pacific Fisheries Management Council. 1998, 2012) (Appendix A, Figure 7). In addition, all tidal waters in the BSA occur within areas designated as HAPC for various federally managed fish species within the Pacific Groundfish FMP (Pacific Fisheries Management Council 2011).

Waters of the U.S./State. A Preliminary Delineation of Wetlands and Waters report was prepared for the BSA in February 2020. Approximately 6.46 aces of the northern coastal salt marsh and tidal open water habitat (tidal sloughs) in the study area meet the definition of waters of the U.S./State (Appendix A, Figure 8). Any impacts on verified waters of the U.S./state within the project site would require a Section 404 permit and a Section 401 Water Quality Certification from the San Francisco Bay RWQCB.

6.4 Wildlife Corridors

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

The study area is centered on an existing developed facility, including three active wastewater detention ponds and a maintained levee surrounding the facility. The study area is surrounded by Flood Slough, Westpoint Slough, salt ponds to the west; and Bedwell Bayfront Park and salt ponds to the east and south. There are expansive tidal marshes in Don Edwards National Wildlife Refuge to the north and east. Dense urban development occurs to the west, preventing substantive movement of terrestrial wildlife to or from open space and habitat in the foothills of the Santa Cruz Mountains, approximately six miles away. Although there may be a connection via Atherton Channel, the channel is intermittent, empties into Flood Slough via a tide gate (0.6 miles upstream of the study area), and is a highly engineered linear channel with long culverted sections for most of its length. Although California red-legged frog and San Francisco garter snake are found at the headwaters of Atherton Channel, these species are not expected to disperse down the channel and into the bay due to its engineered design, underground sections, and low quality habitat for dispersal. Likewise, extensive salt ponds and urban development to the west and east prevent movement of terrestrial species between the study area and Bair Island State Marine Park and Ecological Preserve, three miles to the northwest, and Ravenswood Open Space Preserve, 2.5 miles to the southeast. Therefore, the site is isolated as a dispersal stepping-stone for many terrestrial species.

The project site is locally connected to open, upland wildlife habitat in Bedwell Bayfront Park and salt marsh habitat in the Don Edwards National Wildlife Refuge. The upland habitat areas of Bedwell Bayfront Park are limited in size and isolated from extensive open space habitat by urban development and salt ponds as discussed above. As a result, any movement by mammals, reptiles, and amphibians through the study area would facilitate exchange of individuals or genes only very locally, along the immediate edge of the Bay in the project area. Although connectivity to adjacent open space is important, the project site is not part of a regional wildlife corridor for terrestrial species.

Even though developed portions of the site generally have low habitat connectivity value for native species, the levees within the study area provide important connectivity between the salt marsh and upland areas. Upland areas are likely important refugia habitat for native salt marsh species during high tides as well as extreme tide events. The study area supports important aquatic habitats and tidal marsh habitats, including Flood Slough. These habitats are directly connected to Bay waters and the tidal marshes in Don Edwards National Wildlife Refuge and provide important habitat for fish, species endemic to salt marsh habitat, and birds migrating through the area as part of the Pacific flyway.

7 Biological Impact Assessment and Mitigation Measures

This section describes potential impacts to sensitive biological resources—including special-status plants and animals, and waters of the U.S. and the state—that may occur in or near the project site. Each impact discussion includes measures to minimize or mitigate impacts. These measures should be implemented during the project to avoid significant biological impacts. With the implementation of the mitigation measures below, all impacts to biological resources are anticipated to be less than significant under CEQA.

The CEQA Guidelines define which impacts are considered significant. The Act defines “significant effect on the environment” as “a substantial adverse change in the physical conditions which exist in the area affected by the proposed project.” Potential impacts to biological resources were determined in accordance with Appendix G of the CEQA Guidelines. Impacts would be considered potentially significant if the proposed project will:

A. "have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service"

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

Direct take of a federally or state listed species is considered a significant impact. Temporary and/or permanent habitat loss is not considered a significant impact to sensitive species (other than for listed or candidate species under the FESA and CESA), unless a significant percentage of total suitable habitat throughout the species' range is degraded or somehow made unsuitable, or areas supporting a large proportion of the species' population are substantially and adversely impacted. Potential impacts to nesting bird species would be considered significant due to their protection under California Fish and Game Code.

Approach to Analysis. Because aspects of the project are still in the design phase and subject to change, the following impact analysis was prepared assuming project development could occur in any portion of the BSA as well as developed, paved rights of ways for the influent and distribution pipelines outside of the BSA. However, this analysis assumes that all of the proposed pipeline alignments and the influent pump house will be built within the existing street rights-of-way and will avoid sensitive wetland and aquatic habitat.

7.1 Impacts to Special-Status Plant Species – Less than Significant Impact with Mitigation

Four plant species, Coastal marsh milkvetch, Congdon's tarplant, Point Reyes bird's-beak, and saline clover, categorized by the CNPS as CRPR 1 or 2 have the potential to occur within the California annual grassland and northern coastal salt marsh habitats in the BSA. If present, project development may affect special-status plants due to disturbance or destruction of individuals or suitable habitat. Direct impacts could include grading or filling areas supporting these species, trampling or crushing of plants, and soil compaction. Indirect impacts could include increased mobilization of dust onto plants, which can affect their photosynthesis and respiration, or changes to hydrology supporting these plants within adjacent wetlands due to grading or construction in nearby habitats.

Conservation of CRPR 1 and 2 species is important because their populations contribute to preserving the genetic resources for the species ensuring persistence of these rare species. For these four species, extirpation of any population in the San Francisco Bay region could negatively impact the species' genetic resources, and in the case of Point Reyes bird's-beak and saline clover, could represent a reduction in range. These impacts would be considered significant under CEQA (Criterion E). Implementation of the following mitigation measures will avoid and reduce impacts on special-status plants to a less than significant level. Suitable habitat for these species is limited to the perimeter of the FERRF site, including the stormwater swale and the area planned for the ecotone levee. The proposed RWF is internal to the project site which is highly disturbed and does not provide habitat for these rare plant species. The following measures are necessary to assure that project actions in the perimeter areas will not significantly impact rare plants.

Mitigation Measure BIO-1a. Pre-Activity Surveys for Special-Status Plants. Prior to initial ground disturbance in grassland and wetland habitats, and during the appropriate blooming period (Coastal marsh milkvetch and Point Reyes bird's-beak, June–October; Congdon's tarplant, May–November; saline clover, April–June), a focused survey for these four potentially occurring special-status plant species will be conducted by a qualified plant ecologist within suitable habitat in areas to be disturbed by the project and a 50-foot buffer around the project footprint, where feasible. The purpose of the survey will be to assess the presence or absence of the potentially occurring species. If none of the target species are found in the impact area or the identified buffer, then no further mitigation will be warranted. If Point Reyes bird's-beak, Coastal marsh milkvetch, Congdon's tarplant, or saline clover individuals are found in the impact area, then Mitigation Measures BIO-1b will be implemented. The results of the survey will be documented.

Mitigation Measure BIO-1b. Avoidance Buffers. The project proponent, in consultation with a qualified plant ecologist, will take measures to protect all populations of special-status plant species found to occur within the project site or within 50 feet of the impact area, to the extent feasible. Avoided special-status plant populations will be protected by establishing and observing the identified buffer between plant populations and the impact area. All such populations located in the impact area or the identified buffer, and their associated designated avoidance areas, will be clearly depicted on any construction plans. In addition, prior to initial ground disturbance or vegetation removal, the limits of the identified buffer around special-status plants to be avoided will be flagged or fenced. The flagging will be maintained intact and in good condition throughout project-related construction activities.

If avoidance is not feasible, then the appropriate resource agencies will be consulted to determine the appropriate mitigation measures, which may include salvage of seeds and/or plants, relocation of individual plants, and/or off-site preservation, enhancement, and management of occupied habitat for the species.

7.2 Impacts to Special-Status Fish and EFH – Less than Significant Impact with Mitigation

Green sturgeon, longfin smelt, and steelhead may be present in tidally influenced habitat within and adjacent to the study area, particularly Flood Slough. Even though fish are expected to occur in the smaller tidal sloughs in the study area, the extent, depth, and width of these channels likely limits the number and size of fish that may occur in these sloughs. Because project activities are proposed to take place below the HTL during construction of the ecotone levee, the project may indirectly impact special-status fish and EFH through the degradation of surface or ground water quality due to erosion and transport of fine sediments, unintentional release of contaminants, and soil compaction from access and equipment in tidal areas.

During the construction of the ecotone levee, individuals of these species may also be directly impacted if they are present in the tidal sloughs during construction activities because they could be crushed or injured by personnel or equipment working in water. Based on the current conceptual design, approximately 0.13 acres of tidal sloughs will be impacted during construction of the ecotone levee. The acreage is based on the conceptual design for the ecotone levee and final acreages for temporary and permanent impacts will be finalized when the final design for the ecotone levee is completed. Permanent impacts will result in the loss of EFH as well as the loss of critical habitat for green sturgeon and steelhead.

Additionally, the project proposes installing sheet piles with a vibratory or impact hammer along Flood Slough, which is along the western edge of the study area. The sheet piles will be installed above the HTL in terrestrial habitat; therefore, it is not expected that fish will be exposed to elevated levels of underwater sound produced during pile driving, and therefore will not be adversely impacted.

Physical characteristics of the RO effluent that could adversely affect marine organisms include pH, salinity, and temperature, all of which may alter water chemistry (NRC 1993; Judd 2010; Naidoo and Olaniran 2014).

Discharge of excessive levels of nutrients into the Bay generally have not resulted in harmful effects since the San Francisco Bay has long been recognized as a nutrient-enriched estuary, that has exhibited resistance to some of the symptoms of nutrient over enrichment, such as high phytoplankton biomass and low dissolved oxygen. The Bay’s resistance to high nutrient loads results from its high turbidity, strong tidal mixing, and large filter-feeding clam populations, all of which limit the efficiency with which abundant nitrogen and phosphorous are converted into phytoplankton biomass. However, recent observations indicate that the Bay's resistance to high nutrient loads is weakening, and that conditions are trending toward increased productivity and potential impairment (Senn and Novick 2014).

When treating secondary treated wastewater, MBR and RO processes can produce effluent of high enough quality to be discharged to coastal, surface, or brackish waterways or to be reclaimed for urban irrigation. The capabilities of MBR processes include efficient reduction of BOD, nitrification of ammonia (removal of ammonia), removal of solids, and de-nitrification (removal of nutrients) through microbial action and filtration. The capabilities of the RO process include removal of pathogens (viruses and bacteria), dissolved solids, organic pollutants, and metal ions (e.g., sodium).

Discharge of treated RO effluent is considered a point source discharge that requires a National Pollutant Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board (RWQCB) and the Environmental Protection Agency (EPA). In California, NPDES permits are also referred to as waste discharge requirements (WDRs). The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the RWQCB's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes implementation programs to achieve water quality objectives. Any treated RO effluent discharge will be evaluated against the objectives set forth in the Basin Plan for over 126 priority pollutants and must meet water quality criteria set forth in any NPDES permits issued by the Regional Water Quality Control Board. The permits may also include criteria for nutrients, particularly nitrogen, and salinity levels. In this case, the water quality criteria may be determined in collaboration with wildlife agencies in addition to the RWQCB.

Project-related impacts on EFH or individual green sturgeon, longfin smelt, and steelhead would be significant under CEQA (Criteria A and B). However, implementation of Mitigation Measures BIO-2a, BIO-2b, and BIO-2c will protect water quality and reduce impacts to these special-status fish species and EFH to less than significant levels. Discharge of any treated RO effluent will require agency review and permits and must meet certain standards before discharge would be allowed.

Mitigation Measure BIO-2a. Biological Monitoring During Construction in the Marsh. A qualified biological monitor will be present during all construction activities within the marsh or in vegetated areas within five (5) feet of the marsh to look for special-status animals that may be impacted by construction. For example, when construction personnel need to install the ecotone levee coffer dam and remove vegetation, the biological monitor will first inspect the vegetation to determine whether any salt marsh harvest mice or salt marsh wandering shrews are present. If any animals are present, they will be allowed to leave the area on their own, or the location of the in-marsh work will be adjusted to ensure that no impacts to individual mice or shrews occur at that time. The biologist will have stop-work authority if any individual of a federally listed species is detected in an area where it may be injured or killed by construction activities. The results of the monitoring will be documented. If found necessary by the agency approved biological monitor. Mitigation Measure BIO-2b will be implemented to include an approved dewatering plan and relocate any stranded fish found within the ecotone levee construction site. If recommended by the approved biologist, Mitigation Measure BIO-3h (exclusion fencing) will be implemented to include additional exclusion fencing along the coffer dam during ecotone levee construction. The biological monitor will also ensure that Mitigation Measure BIO-3h is implemented as necessary to protect species.

Mitigation Measure BIO-2b. Dewatering Plan and Relocation of Stranded Fish. An agency approved dewatering plan shall be implemented if necessary, to complete the ecotone levee grading once the coffer dams are installed. If necessary, as the coffer dams are being placed, a qualified biologist will relocate any stranded fish to an area outside of the work area. The method of relocation will be determined by the qualified biologist, in consultation with NMFS, based on site conditions and species present. Implementation of this measure will avoid loss of fish due to stranding. The methods and results of fish relocation efforts will be documented.

Mitigation Measure BIO-2c. Measures to Protect Water Quality. During all construction in and near tidal aquatic habitat, standard BMPs will be used to minimize erosion and impacts to water quality as well as direct impacts to special-status fish. These are reported in the EIR and will be included in the SWPPP prepared for the project. Compliance measures that protect water quality help reduce potential impacts to biological resources to less than significant.

7.3 Impacts to Salt Marsh Habitat Supporting Salt Marsh Harvest Mouse and Salt Marsh Wandering Shrew – Less than Significant Impact with Mitigation and Permit Compliance

Small numbers of salt marsh harvest mice and salt marsh wandering shrews may occur in pickleweed-dominated habitats in the northern portion of the study area and on the levee slopes, particularly during high tide events. In the absence of protective measures, direct impacts to salt marsh harvest mouse and salt marsh wandering shrew could potentially occur as a result of installing sheet pile walls around the perimeter of the levees and construction of an ecotone levee in the northern portion of the study area. Indirect impacts may be caused by artificial lighting if it disrupts animal behavior, adversely impacts breeding and foraging activities, or exposes animals to predation.

Project activities may result in the injury or mortality of salt marsh harvest mice and salt marsh wandering shrews as a result of crushing by equipment, vehicle traffic, grading, removal of vegetation, and worker foot traffic. Individuals that vacate the area because of increased levels of noise and disturbance may be exposed to increased competition from conspecifics already occupying the area to which they were displaced and increased levels of predation because of unfamiliarity with the new area or lack of sufficient cover. Project construction and the removal of salt marsh vegetation may expose individual mice and shrews to predation, particularly if construction activities occur during high or king tides, when cover for these species is very limited. Due to the rarity of these species, any of these project-related impacts on individual salt marsh harvest mice or salt marsh wandering shrews is assumed to be significant under CEQA. I

Based on the conceptual design the ecotone levee will impact approximately 3.1 acres of tidal salt marsh that is primary habitat for salt marsh harvest mouse and salt marsh wandering shrew. Final acreages will be determined once the design is completed and reviewed by several state and federal agencies during the permit process. Impacts to salt marsh habitat containing pickleweed would be considered significant due to the importance of pickleweed to these two rare mammals. However, the ecotone levee will immediately provide upland habitat and refugia for these species and fits within the framework for resiliency in San Francisco Bay that protects salt marsh in the face of sea level rise. Therefore, the ecotone levee will not significantly impact salt marsh harvest mouse or salt marsh wandering shrew. Protection measures are necessary during construction to avoid impacts to these species.

Even though there will be a net loss of salt marsh habitat, the newly created upland areas above the HTL will be restored with native plantings and salt marsh habitat, including tidal sloughs, will remain in the tidal zone at the base of the levee slope and will include plantings of native marsh vegetation salvaged prior to construction activities. The restoration design will create conditions conducive to supporting diverse habitats, including tidal aquatic, estuarine wetland, bayside mesic scrub, and upland xeric scrub. The diverse habitats will provide higher quality native upland refugia habitat for salt marsh harvest mouse, salt marsh wandering shrew, California Ridgway's rail, and California black rail; and increased resilience of the tidal habitat to climate change by allowing for sea level rise while maintaining upland habitat and tidal sloughs (see Section 2.1).

The project is subject to permits from the USACE (in consultation with USFWS and NMFS), RWQCB, and BCDC. While the ecotone levee fulfills the goals of the Adaptation Atlas and will restore saltmarsh in the long term and protect salt marsh values from sea level rise, it results in near-term (e.g., 30 year) loss of salt marsh. However, a benefit of the ecotone levee is it expands the area of transitional habitat available to salt marsh species in this location in the immediate term, providing important refuge during high tide and sea level rise. It counteracts the loss of salt marsh habitat in the near term with the creation of salt marsh that would otherwise be lost to sea level rise (a project benefit).

The agencies that will review this project and issue permits for it will make the final determination of the mitigation value of the ecotone levee. The permits will require an approved mitigation and monitoring plan that would contain the following basic components:

- Description of the Impact and Mitigation;

- Responsible parties;
- Goals;
- A detailed implementation plan, including, if appropriate, a schedule, financial assurances, construction drawings for a planting/restoration plan, soil amendments and other site preparation elements as appropriate; an irrigation plan; and maintenance requirements including weed control;
- Monitoring requirements and a minimum monitoring period, with annual reports; and
- Contingency and adaptive management measures if restoration is not meeting performance standards.

Implementation of Mitigation Measures BIO-3a through BIO-3j, below, will ensure avoidance of impacts to salt marsh harvest mice and salt marsh wandering shrews, and will reduce impacts to these special-status mammal species to less than significant.

Mitigation Measure BIO-3a. Worker Environmental Awareness Training. A resource agency approved biologist will prepare a worker environmental awareness fact sheet with 1) the description and status of the species; 2) the habitat of the species; 3) the legal ramifications of impacting the species; 4) a list of measures being taken to reduce impacts on these species during project construction (including preconstruction surveys, minimizing trash that attracts predators, and other measures); and 5) what to do if the species are encountered. All construction personnel working on the site and in the pipeline alignments and pump station areas adjacent to wetlands will participate in a worker environmental awareness training conducted by a resource agency approved biologist, and will sign an acknowledgment that they have participated in the worker environmental awareness training.

Mitigation Measure BIO-3b. No Pets. No pets (e.g., dogs or cats) will be brought to the project site to avoid harassment, killing or injuring of wildlife.

Mitigation Measure BIO-3c. Food Trash Removal. To minimize attraction of predators such as racoons and feral cats all workers will be required to secure their food related trash and remove it daily. The site foreman shall assure that all food trash related to the construction work is secured and removed.

Mitigation Measure BIO-3d. Minimize Non-daylight Work; Prepare Lighting Plan. Project lighting during construction activities shall be limited in consideration of the potential impacts to special status species. If early morning, early evening, or night lighting is necessary during construction, a lighting plan shall be prepared in consultation with an agency approved biologist. 24-hour work that requires night lighting shall only be conducted with approval from the US Fish and Wildlife Service and the California Department of Fish and Wildlife due to potential impacts to species protected under FESA and CESA. See also Mitigation Measure BIO-3i Artificial Lighting regarding permanent site lighting.

Mitigation Measure BIO-3e. Work During Extreme High Tides. To avoid the loss of individual salt marsh harvest mice, salt marsh wandering shrew, California Ridgway's rail, and California black rail that may shelter in the work area during extreme high tides, an agency approved biological monitor shall be present when work around the perimeter of the FERRF site occurs during extreme high tides, such as King Tides. The agency approved biological monitor shall complete a pre-construction survey prior to construction activities in areas where extreme high tide has limited upland habitat available for refuge before approving construction to proceed.

Mitigation Measure BIO-3f. Limit Vegetation Removal. To avoid the loss of individual harvest mice and wandering shrews from any excavation, fill, or construction activities in suitable habitat, vegetation removal will be limited to the minimum amount necessary.

Mitigation Measure BIO-3g. Vegetation Removal Methods. Vegetation removal will occur under the supervision of a qualified biologist as noted in Mitigation Measure BIO-2a. The biologist will give consideration to requiring the vegetation be removed on a progressive basis, such that it allows species to find adjacent cover. The qualified biologist would also make specific recommendations with respect to the rate of vegetation removal (to ensure that any harvest mice or wandering shrews present are able to escape to cover that will not be impacted), and whether vegetation needs to remain in a certain area temporarily to facilitate dispersal of mice/shrews into habitat outside of the impact area.

Mitigation Measure BIO-3h. Exclusion Fence. Following the hand-removal of vegetation, exclusion fencing will be erected around the outer boundary of the work area that is adjacent to harvest mouse/wandering shrew habitat that is to remain intact, if the coffer dam design does not exclude species. This will define and isolate protected harvest mouse habitat. The installation of the fence will be supervised by a qualified biologist. This fencing will consist of heavy plastic sheeting or metal material that cannot be climbed by harvest mice, buried at least 4 inches below the ground's surface, and with at least 1 foot (but no more than 4 feet) above the ground. All supports for the fencing will be placed on the inside of the work area. A 4-foot buffer will be maintained free of vegetation around the outside of the exclusion fencing. The fencing will be inspected daily during construction, and any necessary repairs will be made within 24 hours of when they are found. If any breaks in the fencing are found, the qualified biologist will inspect the work area for salt marsh harvest mice and salt marsh wandering shrews. If any individuals are found, all work that could impact these individuals will cease until the individuals have left the impact area on their own.

Mitigation Measure BIO-3i. Artificial Lighting. During and after project construction, the spillover of lighting into the salt marsh habitat and adjacent levees will be minimized using low-intensity lighting or other appropriate low-dispersion lighting technology; orientation of lights so that they are placed on the perimeter of the work area and directed inward (rather than directing any lighting toward the marsh) and downward toward the ground; and shielding of lights from behind. Low-intensity lighting, downcast lighting, or other appropriate lighting technology will be incorporated into the project design where permanent lighting is to be placed within 200 feet of the salt marsh to reduce potential adverse effects on animals within this habitat.

Mitigation Measure BIO-3j. Prohibition of Plastic Mono-filament Netting. Monofilament plastic netting, including in temporary and permanent erosion control measures (such as straw wattles), shall not be used.

7.4 Impacts to Black Rail and Ridgway's Rail – Less than Significant Impact with Mitigation

The California Ridgway's rail is a year-round resident in the salt marsh and the open water channels in the study area. The status of the California black rail in the study area is less well understood, but this species has been known to occur in nearby marshes during the non-breeding season, and its presence during the breeding season cannot be ruled out. As a result, there is the potential for the project to result in direct and indirect impacts to California Ridgway's rail and California black rail. If individuals or nests of these species are present during construction activities in salt marsh habitat, individuals or nests may be crushed or injured by personnel or equipment. The project will result in the direct removal of tidal marsh nesting and foraging habitat for California black rail and Ridgway's rail. Construction activities may also result in the indirect disturbance of nesting and foraging California Ridgway's rails and California black rails due to the noise and activity of workers and equipment during project activities. The USFWS and CDFW recommend a buffer of 700 feet around rail nesting areas, and thus, the area in which potential disturbance of rails may occur includes all vegetated tidal marsh within 700 feet of the project footprint.

Noise may alter rail behavior in ways that result in injury, mortality, or reduced nesting success. Noise and other human disturbance could be disruptive to rail breeding efforts if they occur in or near occupied habitat during the breeding season. Disturbance could cause short-term effects such as failure to breed, nest abandonment, lower numbers of eggs, juvenile abandonment, and overall lower juvenile survivorship. If disturbed during the breeding season, rails could disperse, but may not successfully establish new breeding territories and breed. Loss of any female rails from a breeding site would be compounded by the loss of potential future progeny. Disturbance could also result in a reduction in foraging efficiency in foraging areas, increased movement or flushing from cover, or altered activity patterns that reduce energy reserves and increase predation risk. Rails could be forced to adjust the boundaries of their territories or to disperse to other habitat areas. Potential impacts of the project on even one nest of either species would be significant under CEQA due to these species' rarity.

Construction Outside of the Nesting Season

The nesting season for these rails generally extends from February 1 through August 31. Outside of the nesting season (September 1 to January 31), Mitigation Measure BIO-2a (see Section 7.2 above) is required to ensure that any foraging California Ridgway's rails or California black rails that are present on site when construction commences will be allowed to disperse before they could be killed or injured. Therefore, foraging individuals will not be directly lost due to construction activities. There would still be some potential for disturbance of foraging individuals of these species in the adjacent marsh as a result of noise or movement of humans during project construction. However, such impacts would have minimal direct effects due to habituation to the existing human activity in the vicinity (at the project site and at Bedwell Bayfront Park) and the large contiguous high-quality marsh habitat adjacent to the project area available foraging rails. Such effects would not result in substantial harassment or disturbance of individuals and would not result in a reduction in the populations of any of these species. However, sudden disturbance could cause rails to flush, making them more susceptible to predation, or could preclude them from using high-quality cover that might otherwise conceal them from predators. In particular, if construction were to occur during king tides, when concealing cover is limited, rails that are flushed due to project disturbance would be susceptible to predation.

In addition to Implementation of Mitigation Measure BIO-2a, the implementation of Mitigation Measures BIO-3a (worker training), BIO-3b (no pets), BIO-3c (remove food trash), BIO-3d (minimize lighting impacts), BIO-3e (work during extreme high tides), BIO-3f (limit vegetation removal), BIO-3g (vegetation removal methods), BIO-3i (artificial lighting) and BIO-3j (prohibit plastic monofilament netting) would reduce impacts on foraging California black rail and California Ridgway's rail to less than significant levels.

Construction During the Nesting Season

Construction disturbance during the nesting season (February 1 through August 31) could result in the incidental loss of eggs or nestlings, either directly through the destruction or disturbance of active nests or indirectly by causing the abandonment of nests. In addition, noise and increased construction activity could temporarily affect foraging behavior, potentially resulting in the abandonment of nest sites.

Implementation of Mitigation Measure BIO-4a would avoid impacts on active nests of California black rail and Ridgway's rail and reduce impacts to nesting rails to less than a significant level.

Mitigation Measure BIO-4a. Pre-Construction/Pre-Disturbance Survey for California Black Rail and California Ridgway's Rail. If construction activities occur during the nesting season (February 1 through August 31), a qualified biologist shall conduct protocol level surveys for California black rail and Ridgway's rail before initiation of any ground disturbing activities within the salt marsh habitat and a 700-foot buffer. Protocol surveys are required to be completed over **several visits between January and April,** and may significantly impact the construction schedule if they have not been completed in time. The qualified biologist will be experienced with the various calls, estimating distances to calls under field conditions, and the USFWS Ridgway's rail survey methodology (USFWS 2015). The qualified biologist shall submit the proposed survey methods to CDFW and USFWS for review and approval prior to commencing the surveys. The results of the survey will be documented.

If an active nest is found within the survey area, the qualified biologist shall consult with CDFW and/or USFWS to determine the appropriate construction-free buffer zone (typically 700 feet) and/or other mitigation measures to be implemented. If no rail call centers or nests are found, then further mitigation is not required.

If Ridgway's rail is assumed present, then construction activities would need to avoid the breeding season each year (February 1 through August 31).

Loss of Habitat

Installation of the sheet piles to protect the FERFF will not result in a permanent loss of habitat for rails. Under the current concept plan the construction of the proposed ecotone levee will impact approximately 3.1 acres of tidal salt marsh habitat of the 6.0 acres of tidal salt marsh habitat in the project area. The acreage is based on the conceptual design for the ecotone levee and final impact acreages will be determined when the design for the ecotone levee has undergone resource agency review. The finished ecotone levee will retain about 0.77 acre of tidal salt marsh and add about 2.33 acres of native upland scrub habitat. The net loss of salt marsh habitat in the near term will be offset when new salt marsh habitat is created under sea level rise conditions. Also, the loss of 2.33 acres of existing tidal salt marsh habitat is a small portion of the adjacent 500-acre Greco island tidal marsh complex.

The proposed ecotone levee will provide higher quality native upland refugia habitat for special-status species and migratory birds; and increase the resilience of tidal habitat in the project area to climate change by allowing for sea level rise. Even though there will be an immediate loss of salt marsh habitat, the ecotone levee will allow upland areas to become inundated as water levels rise and transform back into marsh habitat, while still maintaining vital upland habitat. The ecotone levee will also protect the existing flow equalization facility and the proposed water recycling facility from future flooding caused by sea level rise, which are essential for protecting water quality in the Bay. The change in habitat for rails is less than significant.

7.5 Impacts to Western Burrowing Owl – Less than Significant with Mitigation

A burrowing owl was observed near a burrow during a March 2017 site visit and there is a documented occurrence from 2003 of burrowing owl from Bedwell Bayfront Park. No burrowing owls were observed during several subsequent site visits in 2018, 2019, and 2020. However, the levees within the study area contain ground squirrel burrows that provide potential nesting, wintering, and foraging habitat for burrowing owls. If active burrowing owl nests are present on the project site at the time of construction, construction-related disturbance could result in injury or mortality of an owl. In addition, construction-related disturbance could lead to the incidental loss of fertile eggs or nestlings or otherwise lead to nest abandonment. Even if burrowing owls are not breeding on the site, construction could result in injury or mortality of an owl if an occupied burrow is filled or compacted during construction. The project will temporarily impact the levees during construction, mainly from the movement of construction equipment and personnel and the installation of sheet piles. The installation of the sheet piles is not expected to remove or affect the existing burrows on the project site. While burrowing owls may be disturbed during construction the project does not remove burrowing owl breeding habitat. The ecotone levee may increase the area available to burrowing owls for forage, cover, and breeding in the short term until the ecotone levee reverts to marsh due to sea level rise.

Mitigation Measure BIO-5a: Conduct Pre-construction Surveys for Burrowing Owls. Pre-construction surveys for burrowing owls will be conducted prior to the initiation of all project activities within suitable burrowing owl nesting and roosting habitat (i.e., grassland habitat and levees with burrows of California ground squirrels). Pre-construction surveys will be completed in conformance with the CDFW’s 2012 guidelines (CDFG 2012). An initial habitat assessment will be conducted by a qualified biologist to determine if suitable burrowing owl habitat is present. During the initial site visit, which will be conducted not less than 14 days prior to the onset of ground disturbing activities, a qualified biologist will survey the entire activity area and (to the extent that access allows) the area within 250 feet of the site for suitable burrows that could be used by burrowing owls for nesting or roosting. If no suitable burrowing owl habitat is present, no additional surveys will be required. If suitable burrows are determined to be present within 250 feet of work areas, a qualified biologist will conduct at least one additional survey to investigate each burrow within the survey area for signs of owl use and to determine whether owls are present in areas where they could be affected by proposed activities. The final survey will be conducted within the 24-hour period prior to the initiation of project activities in any given area. The results of the survey will be documented.

Mitigation Measure BIO-5b: Implement Buffer Zones for Burrowing Owls. If burrowing owls are present during the nonbreeding season (generally September 1 to January 31), a 150-foot buffer zone will be maintained around the occupied burrow(s), if feasible. If maintaining such a buffer is not feasible, then the buffer must be great enough to avoid injury or mortality of individual owls. During the breeding season (generally February 1 to August 31), a 250-foot buffer, within which no newly initiated project-related activities will be permissible, will be maintained between project activities and occupied burrows. Owls present between February 1 and August 31 will be assumed to be nesting, and the 250-foot protected area will remain in effect until August 31. If monitoring evidence indicates that the owls are no longer nesting or the young owls are foraging independently, the buffer may be reduced, or the owls may be relocated prior to August 31. If necessary, relocation of owls in any season will be completed by a qualified biologist using one-way doors, which should be installed in all burrows within the impact area and left in-place for at least two nights. These one-way doors will then be removed and the burrows back-filled immediately prior to the initiation of grading.

Mitigation Measure BIO-5c: Monitor Owls During Construction to Determine if a Reduced Buffer is Feasible. As an alternative to Mitigation Measure 5b, which requires a 250-foot buffer around owl nests (assuming they have not been relocated), this measure provides for monitoring of owl behavior to determine if the size of the buffer can be reduced. Any owls occupying the study area are likely habituated to frequent human disturbance due to regular activity at the project site and in nearby Bedwell Bayfront Park. As a result, they may exhibit a tolerance of greater levels of human disturbance than owls in more natural settings, and construction within the standard 250-foot buffer during the nesting season may be able to proceed without disturbing the owls. Therefore, if nesting owls are determined to be present on the site, and project activities cannot feasibly avoid disturbance of the area within 250 ft of the occupied burrow during the nesting season (i.e., February 1 through August 31), under this measure a qualified biologist will be present during all activities within 250 feet of the nest to monitor the owls' behavior. If in the opinion of the qualified biologist, the owls are disturbed to the point of harm or possible reduced reproductive success, all work within 250 feet of the occupied burrow will cease until the nest is determined by a qualified biologist to no longer be active.

7.6 Impacts to White-tailed Kite – Less than Significant with Mitigation

The white-tailed kite is a year-round resident in the project region. The blue gum and Australian pine trees found along the southern edge of the study area as well as just outside of the study area in Bedwell Bayfront Park provide suitable nesting habitat for white-tailed kite. The entire study area provides suitable foraging habitat for white-tailed kite.

Construction Outside of the Nesting Season

Impacts outside of nesting season (September 16 to January 31) will be less than significant since any foraging white-tailed kites will disperse in response to construction activities before they could be killed or injured. As a result, no direct disturbance of these species will occur.

There would still be some potential for disturbance of foraging individuals in the adjacent areas as a result of construction noise and/or movement of construction equipment and personnel. However, such impacts would have minimal effects due to the presence of nearby suitable foraging habitat. Such effects would not result in substantial harassment or disturbance of individuals and would not result in a reduction in the populations of white-tailed kites. Therefore, impacts to foraging white-tailed kites will be less than significant.

Construction During Nesting Season

Project activities during the nesting season (February 1 to September 15) that cause a substantial increase in noise, movement of equipment, or human presence near active nests could result in the abandonment of active white-tailed kite nests with eggs or nestlings. However, adult birds are not expected to be killed or injured, as they could easily fly from the work site, and the project will not result in the loss of nesting habitat for white-tailed kite.

Implementation of Mitigation Measures BIO-6a and BIO-6b would avoid impacts on active nests of white-tailed kite so that impacts would be less than significant.

7.7 Impacts to American Peregrine Falcon, Black Skimmer, California Brown Pelican, California Least Tern, and Western Snowy Plover – Less than Significant Impact

American peregrine falcon, Black skimmer, California brown pelican, California least tern, and Western snowy plover are seen regularly in the project region and may fly through or forage in the project site. However, these species are unlikely to nest in the project site or immediate area because of the lack of suitable nesting habitat. All five species will only be temporarily displaced by construction noise and can forage in areas surrounding the project. Therefore, impacts to American peregrine falcon, black skimmer, California brown pelican, California least tern, and western snowy plover will be less than significant. In the unlikely event that any of these species nest in the project site, compliance with Mitigation Measure BIO-6a (pre-construction survey for nesting birds) would reduce project impacts on these species to less than significant.

7.8 Impacts on the Alameda Song Sparrow, Bryant’s Savannah Sparrow, Loggerhead Shrike, Northern Harrier, San Francisco Common Yellowthroat, and Short-eared owl – Less than Significant with Mitigation

The Alameda Song Sparrow, Bryant’s Savannah Sparrow, Loggerhead Shrike, Northern Harrier, San Francisco Common Yellowthroat, and Short-eared owl (all California species of special concern) are associated with marsh habitats and are known to nest in or near the study area. These species are assessed together because the impacts of the proposed project on these nesting special-status bird species would be similar.

Construction Outside of the Nesting Season

Outside of the nesting season (September 16 to January 31), any foraging Alameda song sparrow, Bryant’s savannah sparrow, loggerhead shrike, northern harrier, San Francisco common yellowthroat, and short-eared owl present on site when construction commences are expected to disperse to adjacent marsh areas before they could be killed or injured. As a result, no direct disturbance of these species is expected to occur.

There would still be some potential for disturbance of foraging individuals of these species in the adjacent marsh as a result of construction noise and/or movement of construction equipment and personnel. However, such impacts would have minimal effects due to the presence of nearby suitable foraging habitat. Such effects would not result in substantial harassment or disturbance of individuals and would not result in a reduction in the populations of any of these species. Therefore, impacts to these special-status birds will be less than significant.

Construction During the Nesting Season

Construction disturbance during the typical nesting season defined by CDFW (February 1 to September 15) could result in the incidental loss of eggs or nestlings, either directly through the destruction or disturbance of active nests or indirectly by causing the abandonment of nests. In addition, noise and increased construction activity could temporarily foraging behavior, potentially resulting in the abandonment of nest sites. This would violate California Fish and Game Code.

Implementation of Mitigation Measures BIO-6a (preconstruction survey for nesting birds) and BIO-6b (nesting bird protection) would avoid impacts on active nests of Alameda song sparrow, Bryant’s savannah sparrow, loggerhead shrike, northern harrier, San Francisco common yellowthroat, and short-eared owl and reduce impacts to less than a significant level.

Loss of Habitat

The Installation of the sheet piles to protect the FERFF will not result in a permanent loss of habitat for birds. Based on the conceptual design the construction of the proposed ecotone levee will impact approximately 3.1 acres of tidal salt marsh habitat of the 6.0 acres of tidal salt marsh habitat in the project area. The acreage is based on the conceptual design for the ecotone levee and final impact acreages will be determined when the design for the ecotone levee has undergone resource agency review. The finished ecotone levee will retain 0.77 acre of tidal salt marsh and add 2.33 acres of native upland scrub habitat. The loss of salt marsh habitat in the near term will be offset when new salt marsh habitat is created under sea level rise conditions. Also, the loss of 2.33 acres of existing tidal salt marsh habitat is a small portion of the adjacent 500-acre Greco island tidal marsh complex.

The proposed ecotone levee will provide higher quality native upland refugia habitat for special-status species and migratory birds; and increase the resilience of tidal habitat in the project area to climate change by allowing for sea level rise. Even though there will be an immediate loss of salt marsh habitat, the ecotone levee will allow upland areas to become inundated as water levels rise and transform back into marsh habitat, while still maintaining vital upland habitat. The ecotone levee will also protect the existing flow equalization facility and the proposed water recycling facility from future flooding caused by sea level rise, which are essential for protecting water quality in the Bay. The loss of habitat is less than significant, and the project includes measures to mitigate habitat loss.

Collision with Building Glass

Development of the proposed project involves the construction of new buildings. Glass windows and building facades can result in injury or mortality of birds due to collisions with these surfaces. Because birds do not perceive glass as an obstruction the way humans do, they may collide with glass when the sky or vegetation is reflected in glass (e.g., they see the glass as sky or vegetated areas) or when transparent windows allow birds to perceive an unobstructed flight route through the glass (such as at corners). The majority of avian collisions with buildings occur within the first 60 feet of the ground (City of San Francisco 2011), where birds spend the majority of their time engaged in foraging, territorial defense, nesting, and roosting activities, and where vegetation is most likely to be reflected in glazed surfaces.

Even though the construction of buildings will occur in the developed portions of the study area, the adjacent marsh and open water habitats in the study area can potentially attract large numbers of birds, especially since the site is contiguous with the Don Edwards National Wildlife Refuge, a major stopover point along the Pacific Flyway. In addition, the wastewater detention ponds provide suitable foraging habitat and could attract large numbers of birds. Birds using these habitats to forage could fly over the study area at altitudes low enough for bird-strike mortality to occur.

Compliance with the bird-friendly design requirements such as those in Menlo Park Municipal Code Chapter 16.43.140 (6) will minimize the number of bird collisions with the new buildings and result in a less than significant impact. Mitigation measure BIO-6c is included to assure compliance with the measures to reduce bird collision hazard.

7.9 Impacts to Nesting Birds – Less than Significant Impact with Mitigation

All migratory bird species and their nests are protected under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. Project activities must comply with the provisions of the MBTA and California Fish and Game Code (i.e., avoid take of protected nesting birds).

Construction disturbance during the avian breeding season (February 1 through September 15, for most species) could result in the incidental loss of eggs or nestlings, either directly through the destruction or disturbance of active nests or indirectly by causing the abandonment of nests. In addition, noise and increased construction activity could temporarily foraging behavior, potentially resulting in the abandonment of nest sites. Thus project-related impacts to nesting birds would be considered significant under CEQA (Criterion A). However, implementation of Mitigation Measures BIO-6a and BIO-6b would avoid impacts on active nests of birds protected by the MBTA or California Fish and Game Code and Mitigation Measure BIO-6c would minimize bird collision hazards with new buildings. These measures would reduce impacts to a less than significant level.

Mitigation Measure BIO-6a. Pre-Construction/Pre-Disturbance Surveys for Nesting Birds

Avoidance. To the extent feasible, construction activities should be scheduled to avoid the nesting season. If construction activities are scheduled to take place outside the nesting season, all impacts to nesting birds protected under the MBTA and California Fish and Game Code would be avoided. The nesting season for most birds in San Mateo County extends from February 1 through September 15.

Pre-Construction Surveys. If it is not possible to schedule construction activities between September 15 and January 31, then preconstruction surveys for nesting birds will be conducted by a qualified biologist to ensure that no nests would be disturbed during project implementation. These surveys will be conducted no more than five days prior to the initiation of any site disturbance activities and equipment mobilization in the BSA as well as the right of ways for the distribution pipelines and the influent pump station. If project activities are delayed by more than five days, an additional nesting bird survey will be performed. During this survey, the biologist will inspect all potential nesting habitats (e.g., shrubs, developed areas, structures, etc.) in and immediately adjacent to the impact area for nests. Active nesting is present if a bird is building a nest, sitting in a nest, a nest has eggs or chicks in it, or adults are observed carrying food to the nest. The results of the surveys will be documented.

Mitigation Measure BIO-6b. Nesting Bird Protection. If an active nest is found sufficiently close to work areas to be disturbed by these activities, the biologist will determine the extent of a construction-free buffer zone to be established around the nest (typically up to 1000 feet for raptors and up to 250 feet for other species), to ensure that no nests of species protected by the MBTA and California Fish and Game Code will be disturbed during project implementation. Within the buffer zone, no site disturbance and mobilization of heavy equipment, including but not limited to equipment staging, fence installation, clearing, grubbing, vegetation removal, demolition, and grading will be permitted until the chicks have fledged. Monitoring will be required to ensure compliance with MBTA and relevant California Fish and Game Code requirements. Monitoring dates and findings will be documented.

Mitigation Measure BIO-6c. Reduce Collision Hazard. The project design shall comply with measures such as those identified in Menlo Park Municipal Code Chapter 16.43.140 (6) to minimize the number of bird collisions with new buildings and reduce bird collision hazard to a less than significant impact.

7.10 Impacts to Harbor Seals – Less than Significant Impact

There are known haul out sites or rookery sites for harbor seals near the project site and harbor seals are seen regularly in the project region. Therefore, harbor seals can forage or haul out within the study area at any time of the year. Harbor seals will only be temporarily displaced by construction activities and can forage or haul out in areas surrounding the study area. Also, harbor seals are not expected to be killed or injured, as they could easily move from the work site. In addition, the proposed project would not result in permanent substantial changes to the availability of foraging or haul out habitat after construction is completed. Therefore, impacts to foraging or resting harbor seals will be less than significant.

7.11 Impacts on Wildlife from Artificial Lighting – Less than Significant with Mitigation

Many animals, including special-status species, are extremely sensitive to light cues, which influence their physiology and influence their behaviors, particularly during the breeding season (de Molenaar et al. 2006). It is known that photoperiod (the relative amount of light and dark in a 24-hour period), is an essential cue triggering physiological processes such as growth, metabolism, development, breeding behavior, and molting in birds, mammals, and many other taxa, suggesting that increases in ambient light may interfere with these processes across a wide range of species and result in impacts on wildlife populations (Beier 2006; de Molenaar et al. 2006).

Artificial lighting may also indirectly affect mammals and birds by increasing the nocturnal activity of predators like owls, hawks, and mammals (Negro et al 2000, Longcore and Rich 2004, DeCandido and Allen 2006, Beier 2006). The presence of artificial light may influence habitat use by rodents and by breeding birds (Beier 2006; de Molenaar et al. 2006) by causing avoidance of well-lit areas, resulting in a net loss of habitat availability and quality.

The proposed project includes and a recycled water facility. Both facilities include the construction of buildings and installation of influent and effluent piping in existing street rights-of-way and the pump station located at Marsh Road, and both the existing rights-of-way and pump station are adjacent to marsh habitat in Flood Slough.

If the proposed project includes the installation of lighting that illuminates marsh habitat and the adjacent levees, such lighting could potentially have adverse effects on special-status species in the wetlands and adjacent levee refugia habitat. However, implementation of Mitigation Measure BIO-3i would reduce artificial lighting impacts on wildlife to a less than significant level.

7.12 Impacts on Native Species and Communities from Introduction or Spread of Invasive Species – Less than Significant Impact with Mitigation

Invasive plants degrade habitat quality for native plants and animals by altering vegetative structure and often reducing specific food and structural resources required by native animals. As a result, invasion of native habitats by non-natives results in adverse effects on both the native plants being displaced and native animals that would otherwise use those habitats. Because many invasive plants are able to easily colonize recently disturbed areas and/or tolerate repeated disturbance better than many natives, Project construction activities, such as clearing and grading, could create conditions suitable for spreading of invasive plant species. In addition, bare upland soils left after construction of temporary staging areas could encourage growth of weedy species; and mulching or erosion control mixes could include and thus introduce invasive, non-native plant species.

In salt marsh habitat, invasive weeds, such as perennial pepperweed (*Lepidium latifolium*) or non-native cordgrass (*Spartina* sp.) could spread into marsh habitats when seeds are attached to vehicles, equipment, and clothing. The spread of pepperweed and other invasive plants can displace native marsh vegetation and reduce habitat quality of the salt marsh by reducing refugia and foraging habitat for native species.

The study area contains alkali Russian thistle (*Salsola soda*) and stinkwort (*Dittrichia graveolens)*, both moderately invasive species (Cal-IPC 2020). Even though alkali Russian thistle is already present along the fringes of the salt marsh in the study area and stinkwort is present along the levees, project activities could cause both species to spread further into previously unoccupied areas within the salt marsh and the upland areas of the proposed native ecotone, respectively. Thus project-related impacts to natural habitats would be considered significant under CEQA (Criteria A, B, and C). However, implementation of Mitigation Measures BIO-7a and BIO-7b will reduce potential invasive species-related impacts on sensitive habitats and the species they support to a less than significant level. Further, the project would comply with the City of Menlo Park Municipal Code, Chapter 12.44.090(1)(G), which discourages the use of invasive and/or noxious plant species for landscaping.

Mitigation Measure BIO-7a. Integrate Invasive Plant Management into the Ecotone Levee Restoration Plan. Prior to the start of construction activities, measures to control invasive plant species shall be specified and integrated with the Habitat Mitigation and Monitoring Plan (HMMP) for the ecotone levee restoration, with the purpose of protecting restoration areas from being significantly impacted by invasive weeds. Invasive plant removal in the salt marsh and on the adjacent levees shall be limited to hand tools as specified in Measure BIO-3h and shall be removed before grading starts. If specified in the HMMP for the restoration area, invasive species management will extend into developed areas of the parcel as needed to protect the restoration area.

Mitigation Measure BIO-7b. Construction Measures to Minimize Invasive Plant Infestations. The following measures shall be taken during construction to minimize invasive plant infestation and potential impacts of invasive plants on adjacent natural habitats, particularly the wetlands:

- All ground disturbing equipment used adjacent to native habitats will be washed (including wheels, tracks, and undercarriages) both before and after being used at the site. Worker personal gear, including boots, should also be cleaned and clear of plant material prior to entering the work area.
- All seeds and straw materials used on site shall be weed-free rice straw, and all gravel and fill material shall be certified weed free.
- The project will follow a Stormwater Pollution Prevention Plan as per the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit; Water Board Order No. 2009-0009-DWQ), to reduce stormwater runoff which can carry the seed of invasive plants to other locations.
- All disturbed soils within sensitive habitats and adjacent levee slopes will be stabilized and planted in accordance with a restoration plan prepared for the project as part of an approved ecotone levee project.
- Soil and vegetation removed from weed-infested areas will not be used in general soil stockpiles and will not be redistributed as topsoil cover for the newly filled areas. All weed-infested soil will be disposed of off-site at a landfill or buried at least 2.5 feet below final grade.

7.13 Impacts to Sensitive Communities – Less than Significant with Mitigation

Sensitive natural communities on the project site include the *Sarcocornia pacifica* Alliance – Pickleweed Mats, which is found in the northern coastal salt marsh habitat within the study area. Impacts to pickleweed mats are discussed in Section 7.14 below.

7.14 Impacts to Jurisdictional Waters – Less than Significant with Mitigation

The northern coastal salt marsh habitat present within the study area is subject to the regulatory jurisdiction of the USACE and RWQCB and will require CWA 401/404 permits, if impacted. The project proposes to install an ecotone levee to protect the wastewater treatment ponds from flooding under current conditions and due to sea level rise in the future. The ecotone levee would convert existing salt marsh habitat into native upland habitat at present, but over time would revert to salt marsh as water levels rise. The project also includes the installation of sheet piles along a section of existing levee (above the top of bank), and stormwater runoff will be discharged to an existing swale on the east property boundary that discharges to the bay. The recycled water facility includes an outfall in the bay to dispose of the remainder effluent from the RO process. Therefore, salt marsh habitat will be directly impacted by project activities, including trampling and removal of vegetation and placement of soil fill. Also, construction activities could cause the degradation of surface or ground water quality in bay waters due to erosion and transport of fine sediments or unintentional release of contaminants. Project-related impacts to tidal habitat would be considered significant under CEQA (Criteria A, B, and C).

Construction projects in California causing land disturbances that are equal to 1.0 acre or greater must comply with State requirements to control the discharge of stormwater pollutants under National Pollutant Discharge Elimination System (NPDES)/Construction General Permit. Prior to the start of construction/demolition, a Notice of Intent must be filed with the State Water Board describing the project. A Storm Water Pollution Prevention Plan (SWPPP) must be developed and maintained during the project and it must include the use of BMPs to protect water quality until the site is stabilized. Standard permit conditions under the NPDES/Construction General Permit require that the applicant utilize various measures including on-site sediment control best management practices, damp street sweeping, temporary cover of disturbed land surfaces to control erosion during construction, and utilization of stabilized construction entrances and/or wash racks, among other factors.

A stormwater management plan will be developed to ensure that, during rain events, construction activities do not increase the levels of erosion and sedimentation. This plan will include the use of erosion-control materials (e.g., baffles, fiber rolls, or hay bales; temporary containment berms) and erosion-control measures such as straw application or hydroseeding with native grasses on disturbed slopes; and floating sediment booms and/or curtains to minimize any impacts that may occur due to increased mobilization of sediments. Suitable erosion control, sediment control, source control, treatment control, material management, and non-stormwater management best management practices will be implemented.

Accidental spills during construction could affect surface water quality. An accidental spill plan will be developed prior to construction as part of the SWPPP and implemented as part of Mitigation Measure BIO-2c. The plan will describe what actions will be taken in the event of a spill. The plan will also incorporate preventative measures to be implemented, such as vehicle and equipment staging, cleaning, maintenance, and refueling; and contaminant (including fuel) management and storage. In the event of a contaminant spill, work at the site will immediately cease until the contractor has contained and mitigated the spill. The contractor will immediately prevent further contamination and notify appropriate authorities and mitigate damage as appropriate. Adequate spill containment materials, such as oil diapers and hydrocarbon cleanup kits, shall always be available on site. Containers for storage, transportation, and disposal of contaminated absorbent materials will be provided in the project site.

Also, in many Bay Area counties, including San Mateo County, projects must also comply with the RWQCB, San Francisco Bay Region, Municipal Regional Stormwater NPDES Permit (Water Board Order No. R2-2009-0074). This permit requires that all projects implement BMPs and incorporate Low Impact Development practices into the design that prevents stormwater runoff pollution, promotes infiltration, and holds/slows down the volume of water coming from a site. In order to meet these permit and policy requirements, projects must incorporate the use of green roofs, impervious surfaces, tree planters, grassy swales, bioretention and/or detention basins, among other factors.

During the construction phase, compliance with the requirements to control the discharge of stormwater pollutants under the NPDES Construction General Permit and Municipal Regional Stormwater NPDES Permit will reduce impacts to tidal habitat to a less than significant level. In addition, the project would require permits from the USACE, RWQCB, and BCDC for impacts on tidal habitat during construction.

The construction of the proposed ecotone levee will impact approximately 3.1 acres of tidal salt marsh habitat of the 6.0 acres of tidal salt marsh habitat in the project area. The finished ecotone will retain 0.77 acre of tidal salt marsh and add 2.33 acres of native upland scrub habitat. The loss of salt marsh habitat in the near term will allow new salt marsh habitat to be created under sea level rise conditions. Also, the loss of 2.33 acres of existing tidal salt marsh habitat is a small portion of the adjacent 500-acre Greco island tidal marsh complex. The impact acreages are based on the conceptual design for the ecotone levee and final acreages for temporary and permanent impacts will be determined when the design for the ecotone levee is completed, prior to obtaining permit applications from the resource agencies.

The proposed ecotone levee will provide higher quality native upland refugia habitat for special-status species and migratory birds; and increase the resilience of tidal habitat in the project area to climate change by allowing for sea level rise. Even though there will be an immediate loss of salt marsh habitat, the ecotone levee will allow upland areas to become inundated as water levels rise and transform back into marsh habitat, while still maintaining important upland habitat and refugia. The ecotone levee will also protect the existing flow equalization facility and the proposed water recycling facility from future flooding caused by sea level rise, which are essential for protecting water quality in the Bay.

The operation of the new water recycling facility will require a separate NPDES permit from the RWQCB and EPA for the discharge of effluent into jurisdictional waters (San Francisco Bay). In addition to compliance with the requirements of the NPDES permit, the project will also implement Mitigation Measure BIO-8a to reduce impacts on water quality from the discharge of treated RO effluent in Bay tidal waters and wetlands, and essential fish habitat to less than significant levels.

Mitigation Measure BIO-8a. Water Quality Monitoring Plan. The West Bay Sanitary District will develop a water quality monitoring plan in consultation with the EPA, which will consult with NMFS. The water plan will include an impact assessment, water quality standards and protections of those standards, monitoring methodology, and reporting requirements. The goal of the plan is to ensure that the discharge from the water recycling facility complies with the discharge requirements set by the regulatory agencies to protect Bay waters. Depending on the requirements of the regulatory agencies, the plan may include, for example, quarterly surface and effluent water monitoring for suspended solids, settable solids, ammonia, pH, and temperature. If required, the water quality monitoring plan will be submitted as part of the NPDES permit package.

7.15 Impacts to Wildlife Movement– Less than Significant

Because the site is isolated and surrounded by land uses that limit wildlife movement, construction-related activities in the study area will not have a significant impact on the movement of terrestrial wildlife regionally. It is also not expected to significantly affect wildlife movement around or through the site.

The salt marsh and levees in the study area function as a wildlife corridor, allowing species to move from the salt marsh into upland areas during high tide events. connecting natural areas along the coast. Other natural habitats (e.g., tidal sloughs) function as pathways for fish and bird species to move throughout the salt marsh within the study area. Grading and excavation activities as well as removal of vegetation in the salt marsh during the construction of the ecotone levee could restrict some wildlife species, particularly salt marsh harvest mouse and Ridgway's rail from moving between suitable habitat patches during construction. This will be a temporary impact to local wildlife movement. Salt marsh harvest mouse, Ridgway's rail, and other species will be able to access upland areas immediately adjacent to the study area at Bedwell Bayfront Park and along Flood Slough.

Once construction activities are complete, wildlife movement conditions in the developed areas of the site would be similar to pre-project conditions, and wildlife dispersal through the site is expected to return to existing conditions. The ecotone levee will include diverse native habitats, including tidal aquatic, estuarine wetland, bayside mesic scrub, and upland xeric scrub. The diverse habitats will provide higher quality native upland refugia habitat and increase the quality of habitat of the salt marsh-levee wildlife corridor for several special-status species, including salt marsh harvest mouse, salt marsh wandering shrew, California Ridgway's rail, and California black rail. The ecotone levee will also increase resilience of the tidal habitat to climate change by allowing for sea level rise while maintaining an intact salt marsh-levee wildlife corridor.

7.16 Impacts due to Conflicts with Local Policies – Less than Significant

Compliance with Municipal Code Chapter 13.24, Heritage Trees (Less than Significant). Per City of Menlo Park Municipal Code Chapter 13.24, Heritage Trees, permits from the City's Director of Public Works or his or her designee and payment of a fee are required for the removal of any trees which meet the definition of heritage tree, as defined in Section 3.3.3 above. The proposed plan does not currently identify any heritage trees to be removed.

However, if the project requires the removal or pruning of trees protected by the City of Menlo Park municipal code, such impacts are considered potentially significant under CEQA, and the project would be required to would comply with the City's heritage tree ordinance, including obtaining a permit from the City to remove protected trees and paying any applicable fee. Since it is expected that the project will comply with the local tree ordinance, impacts related to conflict with local policies or ordinances protecting heritage trees would be less than significant.

7.17 Impact due to Conflicts with an Adopted Habitat Conservation Plan – No Impact

The proposed project does not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

8 References

Literature Cited

Adams, P.B., C. Grimes, J.E. Hightower, S.T. Lindley, M.L. Moser, and M.J. Parsley. 2007. Population status of North American green sturgeon, *Acipenser medirostris*. Environmental Biology of Fishes 79:339-356.

Atwood, J.L. and D.E. Minsky. 1983. Least tern foraging ecology at three major California breeding colonies. Western Birds 14:57-72.

Baldwin, B.G., D.H. Goldman, D. J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson Manual: Vascular plants of California, second edition. University of California Press, Berkeley.

Barnhart, R.A. 1986. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) - Steelhead. U.S. Fish and Wildlife Service Biol. Rep. 82(11.60). U.S. Army Corps of Engineers TR EL-82-4.

Baron, T. and J. Takekawa. 1994. California least tern *Sterna antillarum browni*. Pages 184-187 In C.G. Thelander, D.C. Pearson, and G.E. Olson, editors. Life on the Edge: A Guide to California's Endangered Natural Resources.

Basham, M. P. and L. R. Mewaldt. 1987. Saltwater tolerance and the distribution of South San Francisco Bay song sparrows. Condor 89:697–709.

Baxter, R. D. 1999. Osmeridae. Page 501 in J. J. Orsi, editor, Report on the 1980–1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California. The Interagency Ecological Program for the Sacramento-San Joaquin Estuary (IEP), Sacramento, California.

Beier, P. 2006. Effects of artificial night lighting on mammals in Rich, C., and T. Longcore, editors. Ecological Consequences of Artificial Night Lighting. Covelo, CA: Island Press, pp 19-42.

[BCDC] Bay Conservation and Development Commission. 2020. San Francisco Bay Plan. Accessed April 2020 from https://bcdc.ca.gov/plans/sfbay_plan.html.

Beamesderfer, R.C.P. and M.A.H. Webb. 2002. Green Sturgeon Status Review Information. S. P. Cramer and Associates, Gresham, Oregon.

Bousman, W. G. 2007. Loggerhead shrike *Lanius ludovicianus*. Pages 288-289 in W. G. Bousman, editor. Breeding bird atlas of Santa Clara County. Santa Clara Valley Audubon Society, Cupertino, California.

Brinfock, K. M., and M.A. Colwell. 2011. Habitat Selection by Western Snowy Plovers During the Nonbreeding Season. The Journal of Wildlife Mangement, 75(4), 786-793.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino. 1996. Status Review of West Coast Steelhead from Washington, Idaho, Oregon, and California. National Marine Fisheries Service. NOAA Tech. Memo. NMFS-NWFSC-27.

Cade, T. J., and C. P. Woods. 1997. Changes in distribution and abundance of the loggerhead shrike. Conservation Biology 11:21-31.

Cadenasso, M.L., Pickett, S.T A, Weathers, K.E., and C.D. Jones. 2003. A Framework for a Theory of Ecological Boundaries, BioScience, Volume 53, Issue 8, August 2003, Pages 750–758.

[Cal-IPC] California Invasive Plant Council. 2020. The Cal-IPC Inventory. Accessed April 2020 from https://www.cal-ipc.org/plants/inventory/.

Callaway, J. C., V. T. Parker, M.C. Vasey, L. M. Schile, and E.R. Herbert. 2011. Tidal Wetland Restoration in San Francisco Bay: History and Current Issues. San Francisco Estuary and Watershed Science. Volume 9, Issue 3.

[CDFG] California Department of Fish and Game. 2007. Vegetation Classification and Mapping Program List of California Vegetation Alliances and Rarity Ranking.

[CDFG] California Department of Fish and Game. 2012. Staff Report on Burrowing Owl Mitigation. March 7, 2012.

[CDFW] California Department of Fish and Wildlife. 2020. VegCAMP Natural Communities Lists. Accessed April 2020 from https://www.wildlife.ca.gov/data/vegcamp/natural-communities.

Chan, Y., and H. Spautz. 2008. Alameda song sparrow (*Melospiza melodia pusillula*) in W. D. Shuford and T. Gardali, editors, California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Western Field Ornithologists and California Department of Fish and Game, Camarillo and Sacramento, California.

Chen, X., Zhang, X., Church, J.A., Watson, C.S., King, M.A., Monselesan, D., Legresy, B., and C.H. Harig. 2017. The increasing rate of global mean sea-level rise during 1993–2014. Nature Climate Change 7:492–495.

City of San Francisco. 2011. Standards for Bird-Safe Buildings. San Francisco Planning Department. Adopted 14 July 2011.

[CNDDB] California Natural Diversity Data Base. 2020. Results of electronic records search. Rarefind 5. California Department of Fish and Wildlife, Biogeographic Data Branch. Accessed April 2020 from http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp.

[CNPS] California Native Plant Society. 2020. Inventory of Rare, Threatened, and Endangered Plants of California. Version 8-02. Accessed April 2020 from http://www.rareplants.cnps.org/advanced.html.

Coulombe, H. N. 1971. Behavior and population ecology of the burrowing owl, *Speotyto cunicularia*, in the Imperial Valley of California. Condor 73:162-176.

Colwell, M. A., Millett, C. B., Meyer, J. J., Hall, J. N., Hurley, S. J., McAllister, S. E., . . . R.R. LeValley. 2005.. Snowy Plover Reproductive Success in Beach and River Habitats. Journal of Field Ornithology, 76, 373-382.

Cornell Lab of Ornithology. 2020. eBird. http://www.ebird.org/. Accessed April 2020.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, DC and Northern Prairie Wildlife Research Center, Jamestown, ND. Accessed 4 September 2012. http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm.

Davis J.N. and C.A. Niemela. 2008. Northern Harrier (*Circus cyaneus*) in Shuford W.D. and T. Gardali (editors). 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

DeCandido R. and D. Allen. 2006. Nocturnal hunting by peregrine falcons at the Empire State Building, New York City. Wilson Journal of Ornithology 118(1): 53-58.

de Molenaar, J. G., M. E. Sanders, and D. A. Jonkers. 2006. Road lighting and grassland birds: local influence of road lighting on a black-tailed godwit population in Rich, C., and T.

Longcore, editors. Ecological Consequences of Artificial Night Lighting. Covelo, CA: Island Press, pp 114-136.

Dege, M., and L. R. Brown. 2004. Effect of outflow on spring and summertime distribution and abundance of larval and juvenile fishes in the upper San Francisco Estuary. Pages 49–65 in L. R. B. Feyrer, R. L. Brown, and J. J. Orsi, editors, Early Life History of Fishes in the San Francisco Estuary and Watershed. American Fisheries Society, Bethesda, Maryland.

Dunk, J.R. 1995. White-tailed Kite (*Elanus leucurus),* The Birds of North America Online. Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/178.

Dunk, J.R., and R.J. Cooper. 1994. Territory-size regulation in black-shouldered kites. Auk 111:588-595.

Erichsen, E.L., K.S. Smallwood, A.M. Commandatore, B.W. Wilson, and M.D. Fry. 1996. White-tailed kite movement and nesting patterns in an agricultural landscape. Raptors in Human Landscapes. Academic Press, San Diego, California.

Erickson, D.L., J.A. North, J.E. Hightower, J. Weber, and L. Lauck. 2002. Movement and habitat use of green sturgeon *Acipenser medirostris* in the Rogue River, Oregon, USA. Journal of Applied Ichthyology 18:565-569.

Erickson, D.L., and J.E. Hightower. 2007. Oceanic distribution and behavior of green sturgeon. American Fisheries Society Symposium 56:197-211.

Errington, P. L., and L. J. Bennett. 1935. Food habits of burrowing owls in northwestern Iowa. Wilson Bulletin 47:125-128.

Fisler, G. F. 1965. Adaptations and speciation in harvest mice of the San Francisco Bay. University of California Publication in Zoology 77:1–108.

Findley, J. S. 1955. Speciation of the wandering shrew. Occasional Papers of the Museum of Natural History 9:1–68.

Fitton, S. D. 2008. Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*) in W. D. Shuford and T. Gardali, editors, California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Western Field Ornithologists and California Department of Fish and Game, Camarillo and Sacramento, California.

Fox, K. S. 2008. Harbor seal behavioral response to boaters at Bair Island refuge. Master's Theses. 3591. Accessed April 2020 from https://scholarworks.sjsu.edu/etd_theses/3591.

Fukushima, L. and E.W. Lesh. 1998. Adult and juvenile anadromous salmonid migration timing in California streams. California Fish and Game 84:133-145.

Gardali, T., and J. G. Evens. 2008. San Francisco common yellowthroat (*Geothlypis trichas sinuosa*) in W. D. Shuford and T. Gardali, editors, California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Western Field Ornithologists and California Department of Fish and Game, Camarillo and Sacramento, California.

Google Inc. 2020. Google Earth Pro (Version 7.1.5.1557) [Software]. Available from earth.google.com.

Gorman, L. R., D. K. Rosenberg, N. A. Ronan, K. L. Haley, J. A. Gervais, and V. Franke. 2003. Estimation of reproductive rates of burrowing owls. Journal of Wildlife Management 67:493-500.

Green, G. A., R. E. Fitzner, R. G. Anthony, and L. E. Rogers. 1993. Comparative diets of burrowing owls in Oregon and Washington. Northwest Science 67:88-93.

Greig, D.J. and S.G. Allen. 2015. Science Foundation Chapter 5 Appendix 5.1 – Case Study Harbor Seal (*Phoca vitulina*) in Letitia Grenier and Andrew Gunther (lead authors). 2015. The Baylands and Climate Change, What Can We Do, Baylands Ecosystem Habitat Goals Science Update 2015.

Guzy, M. J., and G. Ritchison. 1999. Common yellowthroat (*Geothlypis trichas*) in A. Poole and F. Gill, editors, The Birds of North America. The Birds of North America, Inc., Philadelphia, Pennsylvania.

Harding-Smith, E.K. 1993. Summary of California Clapper Rail Winter Populations in the San Francisco Bay, 1989 to 1993. U.S. Fish and Wildlife Service.

Harrison, C. 1978. A field guide to the nests, eggs and nestlings of North American birds. W. Collins Sons and Co., Cleveland, OH. 416pp.

Harvey, T. E., Miller, K.J., Hothem, R.L., Rauzon, M.J., Page, G.W., and R. A. Keck. 1992. Status and trends report on the wildlife of the San Francisco Bay estuary. EPA Coop. agreement CE-009519-01-0 Final Report, U.S. Fish and Wildlife Service, Sacramento, CA: 283 pp.

Haug, E. A., and L. W. Oliphant. 1990. Movements, activity patterns, and habitat use of burrowing owls in Saskatchewan. Journal of Wildlife Management 54:27-35.

Hobbs, J. A., P. Moyle, and N. Buckmaster. 2012. Monitoring the Response of Fish Communities to Salt Pond Restoration. Final report. University of California, Davis. Prepared for South Bay Salt Pond Restoration Program and Resource Legacy Fund.

Holt, D. W. 1992. Notes on short-eared owl (*Asio flammeus*) nest sites, reproduction, and territory size in coastal Massachusetts. The Canadian Field-Naturalist 106: 352-356.

Holt, D. W., and S. M. Leasure. 1996. Short-eared owl (*Asio flammeus*). The birds of North America, No. 62 (A. Poole and F. Gill, eds.) Acad. Nat. Sci., Philadelphia, PA, Am. Ornithol. Union, Washington D.C.

Humple, D. 2008. Loggerhead shrike (*Lanius ludovicianus*) (mainland populations) in W. D. Shuford and T. Gardali, editors. California bird species of special concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Western Field Ornithologists and California Department of Fish and Game, Camarillo and Sacramento, California.

Judd, S. 2010.The MBR Book, Principles and Applications of Membrane Bioreactors for Water and Wastewater Treatment, 2nd Edition. Butterworth-Heinemann, Oxford.

Leidy, R. A., G. Becker, and B.N. Harvey. 2005. Historical status of coho salmon in streams of the urbanized San Francisco Estuary, California. Calif. Fish Game 91: 219-254.

Lindenmayer, D.B. and J. Fischer. 2006. Habitat fragmentation and landscape change: An ecological and conservation synthesis. Washington D.C: Island Press.

Lindley, S.T., M.L. Moser, D.L. Erickson, M. Belchik, D.W. Welch, E. Rechisky, J.T. Kelly, J. Heublein, and A.P. Klimley. 2008. Marine migration of North American green sturgeon. Transactions of the American Fisheries Society 137:182-194.

Longcore, T. and C. Rich. 2004. Ecological light pollution. Frontiers in Ecology and the Environment 2(4): 191-198.

Lower Columbia River Estuary Partnership. 2007. Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead - Proposed Plan. National Marine Fisheries Service.

MacDonald, B., Longcore, T., and S. Dark. 2010. Habitat Suitability Modeling for Western Snowy Plover in Central California, 129. Los Angeles, California: The Urban Wildlands Group.

Melnychuck, M.C., D.W. Welch, C.J. Walters, and V. Christensen. 2007. Riverine and early ocean migration and mortality patterns of juvenile steelhead trout (Oncorhynchus mykiss) from the Cheakamus River, British Columbia. Hydrobiologia 582:55-65.

Marschalek, D.A. 2008. California least tern breeding survey, 2007 season. California Department of Fish and Game, Wildlife Branch, Nongame Wildlife Program Report 2008-01.

Martin, D. J. 1973. Selected aspects of burrowing owl ecology and behavior. Condor 75:446-456.

McBroom, J. 2016. California Ridgway's Rail Surveys for the San Francisco Estuary Invasive Spartina Project 2016. November.

Menges, T. 1998. Common yellowthroat (*Geothlypis trichas*) in The Riparian Bird Conservation Plan: A Strategy for Reversing the Decline of Riparian-Associated Birds in California. California Partners in Flight.

Moyle, P. 2002. Inland Fishes of California, 2nd Edition, Berkeley, University of California Press.

Moyle, P.B., R.M. Yoshiyama, J.E. Williams, and E.D. Wikramanayake. 1995. Fish Species of Special Concern in California. 2nd ed. California Department of Fish and Game, Rancho Cordova, California. Final Report for Contract No. 21281F.

Muir, J. J., & Colwell, M. A. 2010. Snowy Plover Select Open Habitats for Courtship Scrapes and Nests. The Condor, 112, 507-510.

Naidoo, S. and A.O. Olaniran. 2014. Treated Wastewater Effluent as a Source of Microbial Pollution of Surface Water Resources. International Journal of Environmental Research and Public Health 11: 249-270.

Negro, J. J., J. Bustamante, C. Melguizo, J. L. Ruiz, and J. M. Grande. 2000. Nocturnal activity of lesser kestrels under artificial lighting conditions in Seville, Spain. Journal of Raptor Research 34(4): 327-329.

[NMFS] National Marine Fisheries Service. 1997. Endangered and Threatened Species: Listing of several Evolutionary Significant Units (ESUs) of West Coast Steelhead. Final rule. Federal Register 62:43937-43954.

[NMFS] National Marine Fisheries Service. 2000. Designated Critical Habitat: Critical Habitat for 19 Evolutionarily Significant Units of Salmon and Steelhead in Washington, Oregon, Idaho, and California. Final rule. Federal Register 65:7764-7787.

[NMFS] National Marine Fisheries Service. 2003. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List North American Green Sturgeon as a Threatened or Endangered Species. Federal Register 68:4433-4441.

[NMFS] National Marine Fisheries Service. 2005. Endangered and Threatened species: Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Steelhead and Salmon in California. Final rule. Federal Register 70:52488-52626.

[NMFS] National Marine Fisheries Service. 2006a. Endangered and Threatened Species: Final listing determination for 10 Distinct Population Segments of West Coast Steelhead. Federal Register 71:834-862.

[NMFS] National Marine Fisheries Service. 2006b. Endangered and Threatened Wildlife and Plants; Threatened status for Southern Distinct Population Segment of North American Green Sturgeon. Federal Register 67:17757-17766.

[NMFS] National Marine Fisheries Service. 2009. Endangered and threatened wildlife and plants: final rulemaking to designate critical habitat for the threatened southern distinct population segment of North American green sturgeon: Final Rule. Federal Register 74:52300-52351.

[NRC] National Research Council. 1993. Managing Wastewater in Coastal Urban Areas. Washington, DC: The National Academies Press. https://doi.org/10.17226/2049.

[NRCS] Natural Resources Conservation Service. 2020a. Web Soil Survey. U.S. Department of Agriculture. Accessed April 2020 from http://websoilsurvey.nrcs.usda.gov.

[NRCS] National Resource Conservation Service. 2020b. National Hydric Soils List. Accessed April 2020 from http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

[NWI] National Wetlands Inventory. 2020. Wetlands Mapper. U.S. Fish and Wildlife Service Accessed April 2020 from http://www.fws.gov/wetlands/Wetlands-Mapper.html.

Nur, N., S. Zack, J. Evans, and T. Gardali. 1997. Tidal Marsh Birds of the San Francisco Bay Region: Status Distribution, and Conservation of Five Category 2 Taxa. Final draft report. PRBO Conservation Science. Report to U.S. Geological Survey.

[OPC] California Ocean Protection Council. 2018. State of California Sea-Level Rise Guidance 2018 Update. California Ocean Protection Council, California Natural Resources Agency.

Overton, C. and J. Wood. 2015. Science Foundation Chapter 5, Appendix 5.1 – Case Study California Ridgway's Rail (*Rallus obseoletus obsoletus*) from Baylands Ecosystem Habitat Goals Science Update (2015).

Pacific Fisheries Management Council. 1998. Essential Fish Habitat Coastal Pelagic Species. Amendment 8. Pacific Fisheries Management Council, Portland, Oregon.

Pacific Fisheries Management Council. 2011. Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery.

Pacific Fisheries Management Council. 2012. Essential Fish Habitat for Krill. Amendment 12. Pacific Fisheries Management Council, Portland, Oregon.

Page, G. W., Stenzel, L. E., & Ribic, C. A. 1985. Nest Site Selection and Clutch Predation in the Snowy Plover. The Auk*, 102,* 347-353.

Page, G. W., Warriner, J. S., Warriner, J. C., and P.C. Paton. 1995. Snowy Plover (Charadrius alexandrinus). The Birds of North America, 154, 1-24. (A. Poole, & F. Gill, Eds.) The Academy of Natural Sciences, Philadelphia, Pennsylvania and The American Ornithologists' Union, Washington, D. C.

Patrick, A. M., and M.A. Colwell. 2014. Snowy Plovers Select Wide Beaches for Nesting. Wader Study Group Bulletin, 121(2*)*, 17-20.

Plumpton, D. L., and R. S. Lutz. 1993a. Nesting habitat use by burrowing owls in Colorado. Journal of Raptor Research 27:175-179.

Plumpton, D. L., and R. S. Lutz. 1993b. Prey selection and food habits of burrowing owls in Colorado. Great Basin Naturalist 53:299-304.

Point Blue Conservation Science, San Francisco Estuary Institute, and County of Marin. 2019. Sea Level Rise Adaptation Framework - A user guide to planning with nature as demonstrated in Marin County. Point Blue Conservation Science (Contribution #2239), Petaluma, CA. San Francisco Estuary Institute (Publication #946), Richmond, CA. Version: 1.0, August 2019.

Polite, C. 1990. Black-shouldered Kite *Elanus caeruleus*. California Department of Fish and Game, California Statewide Wildlife Habitat Relationships System. California's Wildlife, Vol II: Birds. Pp 120-121.

Powell, A. N. 2001. Habitat Characteristics and Nest Success of Snowy Plovers Associated with California Least Tern Colonies. Condor 103, 785-792.

PRISM Climate Group. 2020. Online PRISM Data Explorer. Oregon State University, Corvallis, Oregon. Accessed April 2020 from http://www.prism.oregonstate.edu/.

Radtke, L.C. 1966. Distribution of smelt, juvenile sturgeon and starry flounder in the Sacramento – San Joaquin Delta. In S.L. Turner and D.W. Kelley, editors. Ecological studies of the Sacramento - San Joaquin Delta, Part II. p 115-119. California Department of Fish and Game, Fish Bulletin 136.

Rahmstorf, S. 2017. Rising hazard of storm-surge flooding. Proceedings of the National Academy of Sciences 114 (45): 11806-11808.

Rich, T. 1984. Monitoring burrowing owl populations: implications of burrow re-use. Wildlife Society Bulletin 12:178-180.

Rigney, M., and S. L. Granholm. 1990. Least tern *Sterna antillarum* in D. C. Zeiner, W. F. Laudenslayer Jr., K. E. Mayer, and M. White, editors. California's wildlife. Vol. II: Birds. California Department of Fish and Game, California Statewide Wildlife Habitat Relationships System.

Robinson, A., and B. K. Greenfield. 2011. LTMS Longfin Smelt Literature Review and Study Plan. San Francisco Estuary Institute, Richmond, California. Prepared for Long-Term Management Strategy for Dredged Materials in San Francisco Bay.

Rosenfield, J. A. 2009. Distribution and Abundance Trends of Longfin Smelt in the San Francisco Estuary. Green Sturgeon, Longfin Smelt, and Dredging Operations Symposium. San Francisco Estuary Institute, Oakland, California.

Rosier, J. R., N. A. Ronan, and D. K. Rosenberg. 2006. Post-breeding dispersal of burrowing owls in an extensive California grassland. American Midland Naturalist 155:162-167.

San Francisco Estuary Partnership. 2016 Comprehensive Conservation and Management Plan for the San Francisco Estuary (Estuary Blueprint).

San Francisco Regional Water Quality Control Board Order No. R2-2017-0041 and National Pollutant Discharge Elimination System No. CA0038849

Senn D.B, and E. Novick. 2014. Scientific Foundation for the San Francisco Bay Nutrient Management Strategy. San Francisco Estuary Institute Contribution #979. Accessed September 2020 from https://sfbaynutrients.sfei.org/sites/default/files/2014_scientificfoundation_sfb_nms.pdf

[SCCWRP] Southern California Coastal Water Research Project. 2012. Management of Brine Discharges to Coastal Waters Recommendations of a Science Advisory Panel; Panel Members Scott Jenkins, Jeffrey Paduan, Philip Roberts (Chair), Daniel Schlenk, and Judith Weis. Submitted at the request of the California Water Resources Control Board. Technical Report 694

Sawyer, J.O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society. Sacramento, CA.

Scheiff, A.J., J.S. Lang, and W.D. Pinnix. 2001. Juvenile salmonid monitoring on the mainstem Klamath River at Big Bar and mainstem Trinity River at Willow Creek, 1997-2000. U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Arcata, California.

[SFEI and SPUR] San Francisco Estuary Institute and San Francisco Bay Area Planning and Urban Research Association. 2019. San Francisco Bay Shoreline Adaptation Atlas: Working with Nature to Plan for Sea Level Rise Using Operational Landscape Units. Publication #915, San Francisco Estuary Institute, Richmond, CA.

Shellhammer, H. S., R. Duke, H. T. Harvey, V. Jennings, V. Johnson, and M. Newcomer. 1988. Salt marsh harvest mice in the diked marshes of southern San Francisco Bay. Wasmann Journal of Biology 46:89–103.

Shellhammer, H. S., R. Jackson, W. DaVilla, A. M. Gilroy, H. T. Harvey, and L. Simons. 1982. Habitat preference of salt marsh harvest mice (*Reithrodontomys raviventris*). Wasmann Journal of Biology 40:102–114.

Shellhammer, H. S. 2000. Salt marsh wandering shrew, *Sorex vagrans halicoetes*. Pages 109–113 in P. R. Olofson, editor, Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife. San Francisco Bay Area Wetlands Ecosystem Goals Project. San Francisco Bay Regional Water Quality Control Board, Oakland, California.

Sibley, D.A. 2000. The Sibley Guide to Birds. New York: Chanticleer Press, Inc.

Sustaita, D., P. F. Quickert, L. Patterson, L. Barthman-Thompson, and S. Estrella. 2011. Salt Marsh Harvest Mouse Demography and Habitat Use in the Suisun Marsh, California. The Journal of Wildlife Management 75(6): 1498-1507.

Shapovalov, L., and A.C. Taft. 1954. The life histories of the steelhead rainbow trout (*Salmo gairdneri gairdneri*) and silver salmon (*Oncorhynchus kisutch*) with special reference to Waddell Creek, California, and recommendations regarding their management. DFG Bulletin No. 98.

Skonieczny, M.F., and J.R. Dunk. 1997. Hunting synchrony in white-tailed kites. Journal of Raptor.

Stenzel, L., Peaslee, S., and G. Page. 1981. The Breeding Status of the Snowy Plover in California. II(12), 6-16. Mainland Coast.

Terres, J. K. 1980. The Audubon Society encyclopedia of North American birds. A. Knopf, New York. 1100pp.

Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73:177-192.

Truelove, N.K. 2005. Effects of Estuarine Circulation Patterns and Stress on Migratory Behavior of Juvenile Salmonids (*Oncorhynchus* sp.). Master's thesis. Oregon State University. Corvallis, Oregon.

Trulio, L. A. 2007. Burrowing owl *Athene cunicularia hypugaea*. Pages 236-237 in W. G. Bousman, editor. Breeding Bird Atlas of Santa Clara County. Santa Clara Valley Audubon Society, Cupertino, California.

Trulio, L. A., and J. G. Evens. 2000. California black rail. Pages 342–345 in P. R. Olofson, editor, Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife. San Francisco Bay Area Wetlands Ecosystem Goals Project. San Francisco Bay Regional Water Quality Control Board, Oakland, California.

[USFWS] U.S. Fish and Wildlife Service. 1970. Conservation of endangered species and other fish or wildlife: Appendix D. United States list of endangered native fish and wildlife. Federal Register 35:16047-16048.

[USFWS] U.S. Fish and Wildlife Service. 1984. Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan. U.S. Fish and Wildlife Service. Portland, Oregon.

[USFWS] U.S. Fish and Wildlife Service. 1999. Endangered and threatened wildlife and plants: Final rule to remove the American peregrine falcon from the federal list of endangered and threatened wildlife, and to remove the similarity of appearance provision for free-flying peregrines in the conterminous United States; Final rule. Federal Register 64:46542-46558.

[USFWS] U.S. Fish and Wildlife Service. 2004. Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Pacific Coast Population of the Western snowy plover. 69 Federal Register, 75608-75771.

[USFWS] U.S. Fish and Wildlife Service. 2006a. California least tern (*Sternula antillarum browni*) 5-year review summary and evaluation. Carlsbad Fish and Wildlife Office, Carlsbad, California.

[USFWS] U.S. Fish and Wildlife Service. 2006b. Pacific Coast Breeding Window Survey for Snowy Plover.

[USFWS] U.S. Fish and Wildlife Service. 2007. Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (*Charadrius nivosus nivosus*). I & II, xiv + 751 pp. Sacramento, CA.

[USFWS] U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; petition to list the San Francisco-Bay Delta population of the longfin smelt (*Spirinchus thaleichthys*) as endangered; notice of 90-day petition finding and initiation of status review. Federal Register 73:24911–24915.

[USFWS] U.S. Fish and Wildlife Service. 2010. Draft Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California. Federal Register 75:6696-6697.

[USFWS] U.S. Fish and Wildlife Service. 2013. Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California. Sacramento, California.

[USFWS] U.S. Fish and Wildlife Service. 2020. IPaC Information for Planning and Conservation. Accessed April 2020 from https://ecos.fws.gov/ipac/t69.

Wasson, K., Woolfolk, A., and C. Fresquez. Ecotones as Indicators of Changing Environmental Conditions: Rapid Migration of Salt Marsh–Upland Boundaries. Estuaries and Coasts 36, 654–664 (2013).

Webber, A., Heath, J., and R. Fischer. 2013. Human Disturbance and Stage-specific Habitat Requirements Influence Snowy Plover Site Occupancy During the Breeding Season. *Ecology and Evolution*(3), 853-863.

Zeiner, D.C., W.F. Laudenslayer Jr., K.E. Mayer, and M. White, editors. 1990a. California's Wildlife. Volume III: Mammals. California Department of Fish and Game, Sacramento, California.

Wheelock, I. G. 1916. Birds of California. A. C. McClurg & Co., Chicago, Illinois.

Whitcraft, C.R., B.J. Grewell, and R.P. Baye. 2011. Estuarine Vegetation at Rush Ranch Open Space Preserve, San Francisco Bay National Estuarine Research Reserve, California. San Francisco Estuary and Watershed Science 9(3).

Yosef, R. 1996. Loggerhead Shrike (*Lanius ludovicianus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/231.

Zeiner, D.C., W.F. Laudenslayer Jr., K.E. Mayer, and M. White, editors. 1990b. California's Wildlife. Volume II: Birds. California Department of Fish and Game, Sacramento, California.

Personal Communication

Lorraine Htoo, Freyer and Laureta email correspondence date of 12/13/2020

Laura Moran, SWCA Consultants, teleconference regarding the ecotone levee preliminary design considerations, 12/09/2020

This page intentionally left blank

Appendix A Figures

This page intentionally left blank

Source: ESRI 2019; MIG 2019

★ Project Location

0 2 4 8 Miles

Figure 1 Vicinity Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Levee Improvements and Bayfront Recycled Water Facility Project

Z:\Shared\San Jose\Env\16105_01_MP EQ Basin CEQA & Permitting\GIS\MXDs\Wetland_Delineation\New\Figure_2b_Project_Site_Map_09142020_New.mxd 10/29/2020

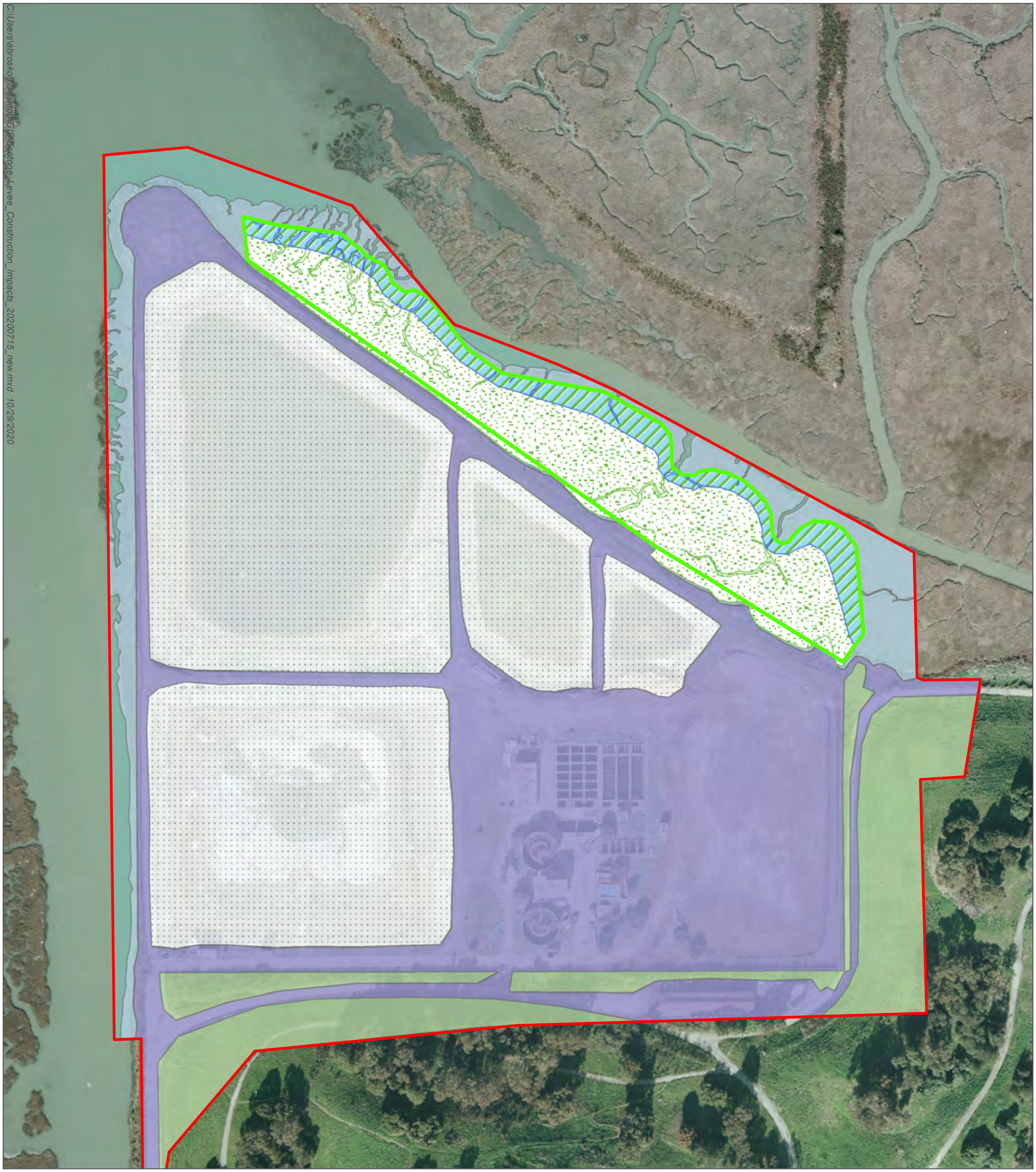
Source: ESRI 2020; Google Earth 2020; MIG 2020

Biological Study Area (33.59 acres)

Figure 2 Project Area Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Levee Improvements and Bayfront Recycled Water Facility Project

MIG



Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

Vegetation Community

- Northern Coastal Salt Marsh
- Tidal Slough
- California Annual Grassland
- Wastewater Detention Pond
- Developed

Base Map Features

- Study Area (33.59 acres)
- Ecotone Levee Boundary

Ecotone Levee

- Bayside Scrub (2.33 acres)
- Estuarine Wetland (0.77 acres)

0 125 250 500 Feet

Figure 3 Proposed Ecotone Levee

West Bay Sanitary District Flow Equalization and Resource Recovery Facility
Levee Improvements and Bayfront Recycled Water Facility Project

MIG

Map Unit Symbol	Map Unit Name	Acreage
125	Pits and Dumps	27.12 acres
W	Water	4.71 acres

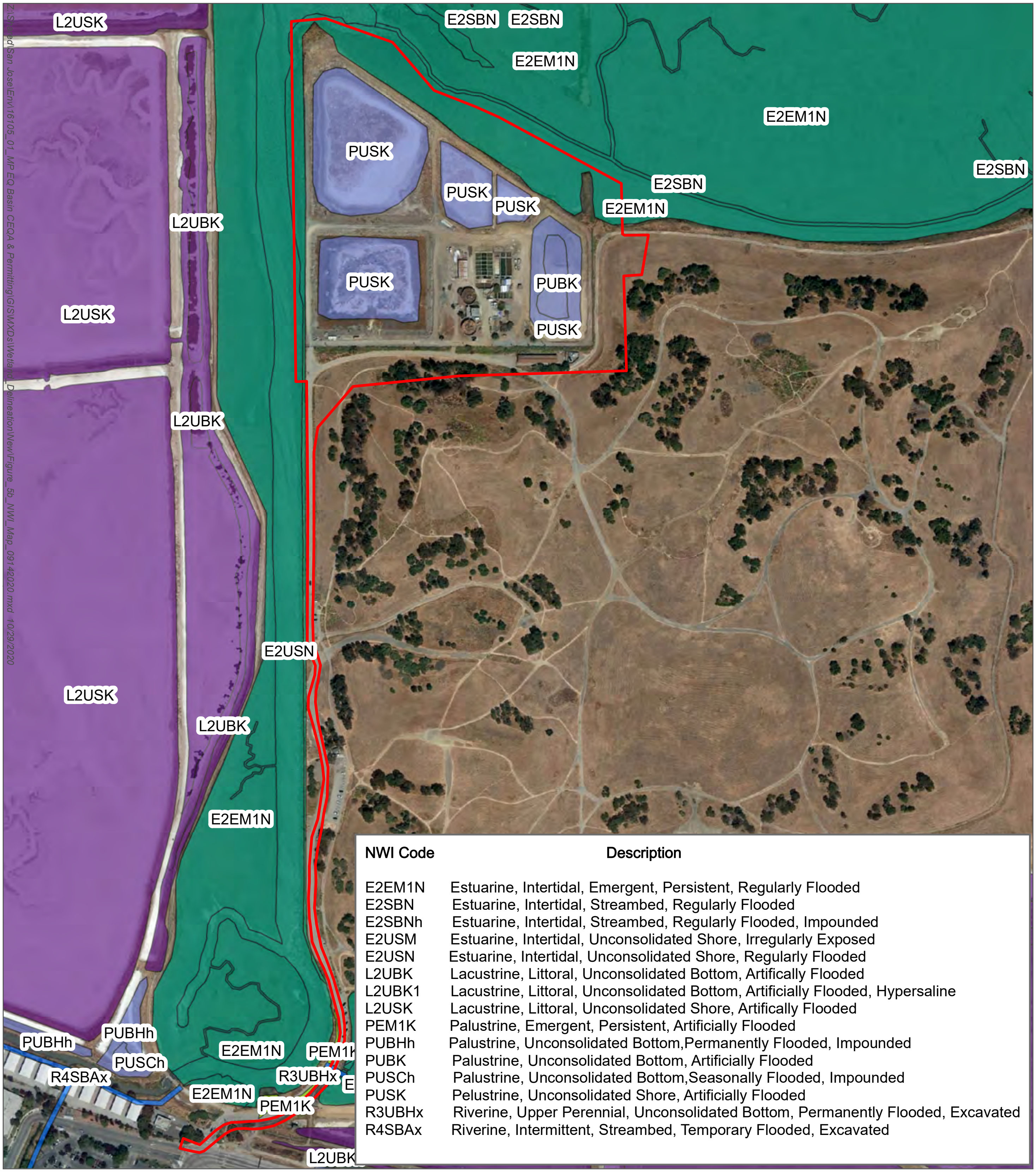
Source: ESRI 2020 Google Earth 2020; NRCS 2019; MIG 2020

Base Map Features

Biological Study Area (33.59 acres)

Figure 4 NRCS Soils Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility
Levee Improvements and Bayfront Recycled Water Facility Project



NWI Code	Description
E2EM1N	Estuarine, Intertidal, Emergent, Persistent, Regularly Flooded
E2SBN	Estuarine, Intertidal, Streambed, Regularly Flooded
E2SBNh	Estuarine, Intertidal, Streambed, Regularly Flooded, Impounded
E2USM	Estuarine, Intertidal, Unconsolidated Shore, Irregularly Exposed
E2USN	Estuarine, Intertidal, Unconsolidated Shore, Regularly Flooded
L2UBK	Lacustrine, Littoral, Unconsolidated Bottom, Artifically Flooded
L2UBK1	Lacustrine, Littoral, Unconsolidated Bottom, Artificially Flooded, Hypersaline
L2USK	Lacustrine, Littoral, Unconsolidated Shore, Artifically Flooded
PEM1K	Palustrine, Emergent, Persistent, Artificially Flooded
PUBHh	Palustrine, Unconsolidated Bottom,Permanently Flooded, Impounded
PUBK	Palustrine, Unconsolidated Bottom, Artificially Flooded
PUSCh	Palustrine, Unconsolidated Bottom,Seasonally Flooded, Impounded
PUSK	Pelustrine, Unconsolidated Shore, Artificially Flooded
R3UBHx	Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded, Excavated
R4SBAx	Riverine, Intermittent, Streambed, Temporary Flooded, Excavated

Source: ESRI 2020; NWI 2019; Google Earth 2020; MIG 2020

NWI Wetland Type

- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Lake
- Riverine

Base Map Features

- Study Area (33.59 acres)

0 290 580 1,160 Feet

Figure 5 NWI Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Levee Improvements and Bayfront Recycled Water Facility Project

Source: ESRI 2020; Google Earth 2020; NWI 2019; MIG 2020

Vegetation Communities

California Annual Grassland (3.07 acres)

Northern Coastal Salt Marsh (4.85 acres)

Wastewater Detention Pond (11.33 acres)

Tidal Slough (1.15 acres)

Developed (13.19 acres)

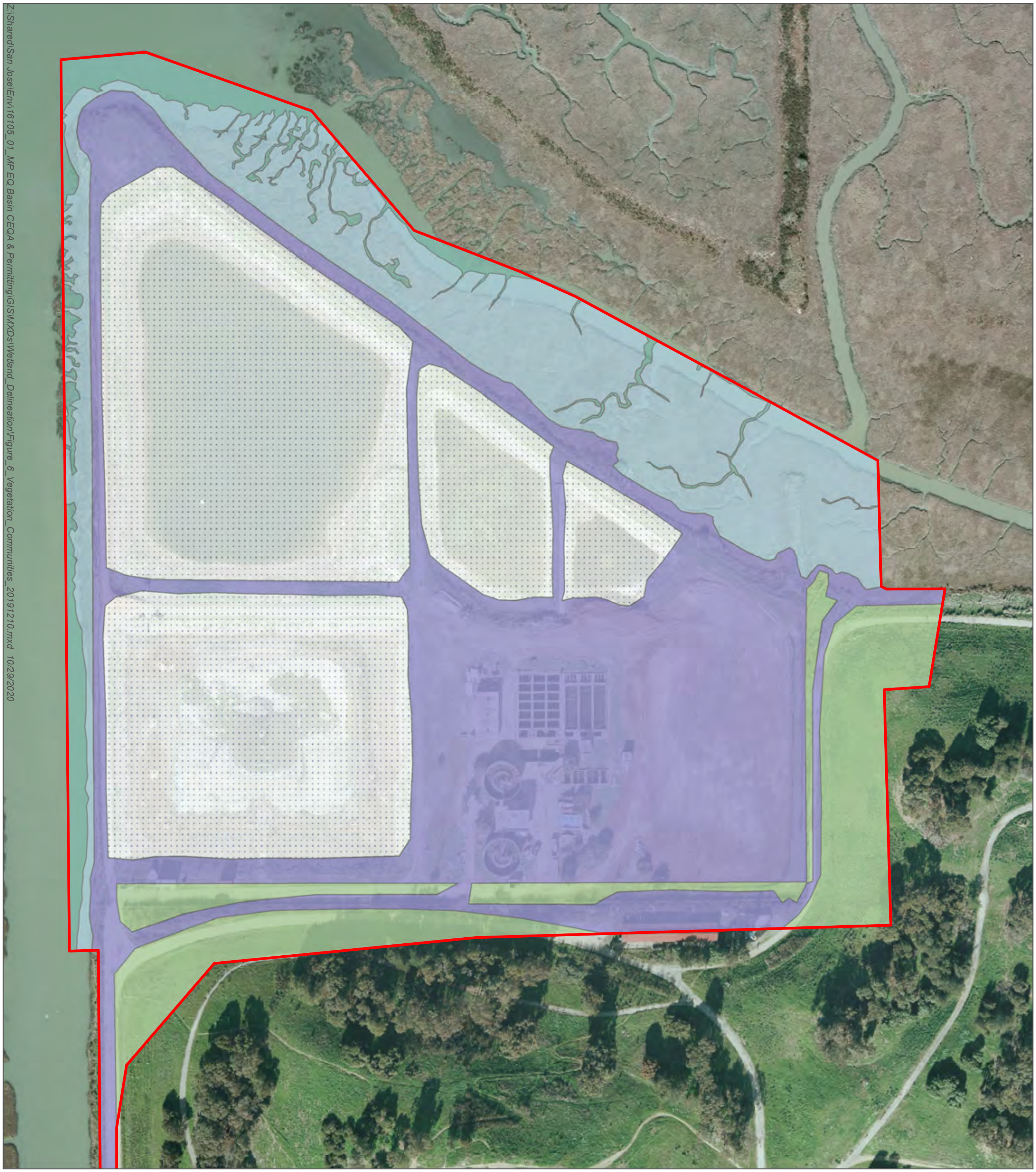
Base Map Features

Biological Study Area (33.59 acres)

Figure 6a Vegetation Communities

MIG

West Bay Sanitary District Flow Equalization and Resource Recovery Facility
Levee Improvements and Bayfront Recycled Water Facility Project



Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

Vegetation Communities

- California Annual Grassland (3.07 acres)
- Northern Coastal Salt Marsh (4.85 acres)
- Wastewater Detention Pond (11.33 acres)
- Tidal Slough (1.15 acres)
- Developed (13.19 acres)

Base Map Features

- Biological Study Area (33.59 acres)

0 115 230 460 Feet

Figure 6b Vegetation Communities

West Bay Sanitary District Flow Equalization and Resource Recovery Facility
Levee Improvements and Bayfront Recycled Water Facility Project

Source: NOAA, 2019; USFWS, 2019; ESRI, 2020; MIG, 2020

Essential Fish Habitat (EFH)

Coastal Pelagic Species; Finfish and Market Squid; Groundfish; Southern DPS Green Sturgeon

Crititcal Habitat

Central California Coast Steelhead

Western Snowy Plover

Base Map Features

Biological Study Area

Miles 0 0.5 1 2

Figure 7 Critical Habitat and Essential Fish Habitat

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Levee Improvements and Bayfront Recycled Water Facility Project

MIG

Source: ESRI 2020; Google Earth 2020; NWI 2019; MIG 2020

Base Map Features

- Study Area (33.59 acres)
- Mean High Water
- High Tide Line
- Top of Bank

Vegetation Communities

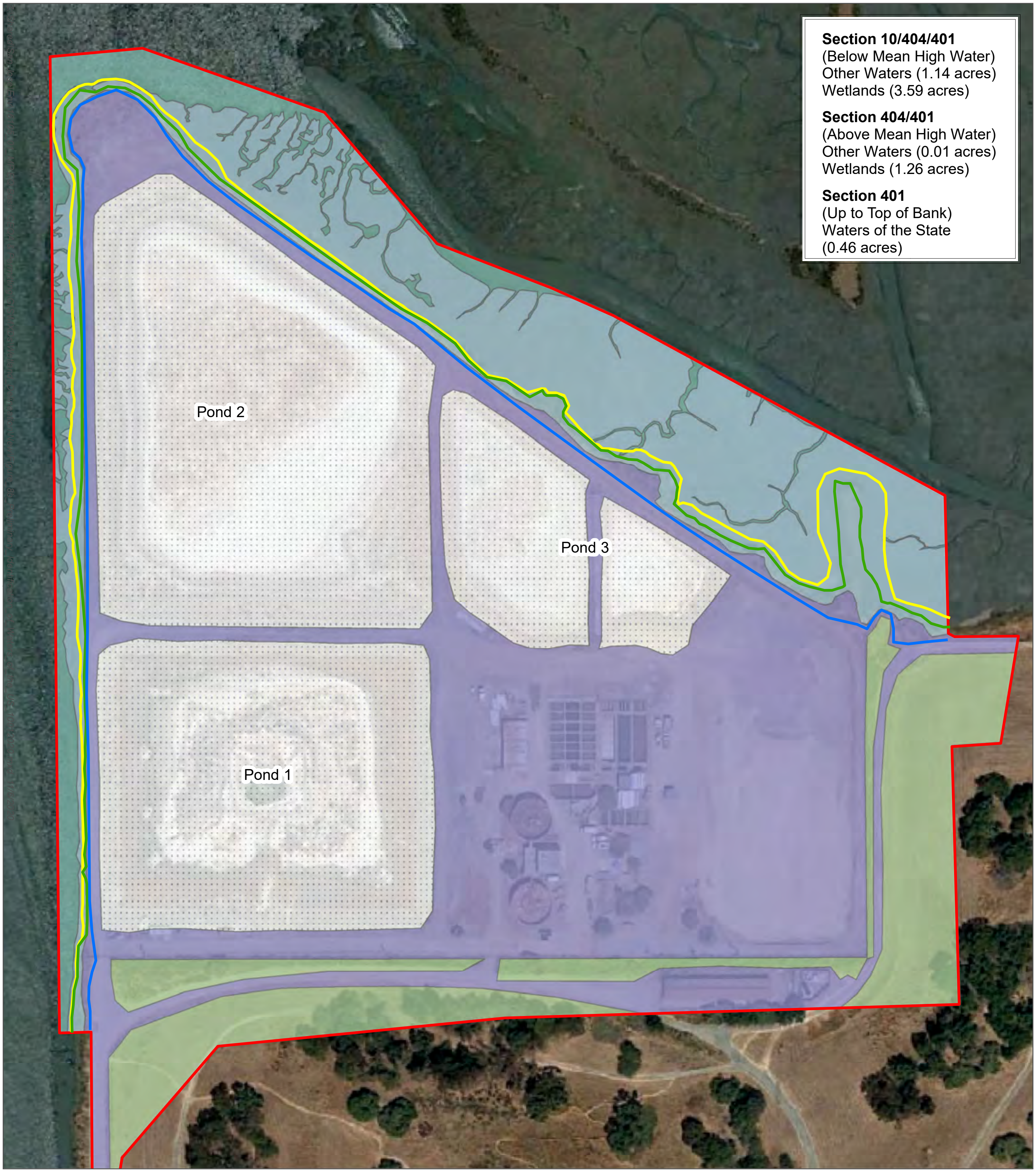
- California Annual Grassland (3.07 acres)
- Northern Coastal Salt Marsh (4.85 acres)
- Wastewater Detention Pond (11.33 acres)
- Tidal Slough (1.15 acres)
- Developed (13.19 acres)

0 295 590 1,180 Feet

Figure 8a Preliminary Identification of Waters of the U.S./State

West Bay Sanitary District Flow Equalization and Resource Recovery Facility
Levee Improvements and Bayfront Recycled Water Facility Project

M I G



Source: ESRI 2020; Google Earth 2020; NWI 2019; MIG 2020

Base Map Features

- Study Area (33.59 acres)
- Mean High Water
- High Tide Line
- Top of Bank

Vegetation Communities

- California Annual Grassland (3.07 acres)
- Northern Coastal Salt Marsh (4.85 acres)
- Wastewater Detention Pond (11.33 acres)
- Tidal Slough (1.15 acres)
- Developed (13.19 acres)

Feet: 0, 105, 210, 420

Figure 8b Preliminary Identification of Waters of the U.S./State

West Bay Sanitary District Flow Equalization and Resource Recovery Facility
Levee Improvements and Bayfront Recycled Water Facility Project

MIG

Appendix B Photographs

This page intentionally left blank

Photo 1. Wastewater detention pond within the study area.

Photo 2. Developed land cover within the study area.

Photo 3. Northern coastal salt marsh habitat along the northern edge of the study area.

Photo 4. Tidal slough (open water habitat) along the northern edge of the study area.

Appendix C Species Observed in the Study Area

This page intentionally left blank

Common Name	Scientific Name	In Flow Equalization Facility	In Adjacent Slough/ Salt Marsh
Birds			
American avocet	*Recurvirostra americana*		X
American coot	*Fulica americana*		X
American crow	*Corvus brachyrhynchos*	X	
American wigeon	*Anas americana*		X
Barn swallow	*Hirundo rustica*		X
Bewick's wren	*Thryomanes bewickii*	X	
Black-necked stilt	*Himantopus mexicanus*	X	X
Black phoebe	*Sayornis nigricans*	X	
Brewer's blackbird	*Euphagus cyanocephalus*	X	X
California Ridgway's rail	*Rallus obsoletus obsoletus*		X
California towhee	*Melozone crissalis*		X
Canada goose	*Branta canadensis*	X	X
Canvasback	*Aythya valisineria*		X
Cliff swallow	*Petrochelidon pyrrhonota*	X	
European starling	*Sturnus vulgaris*	X	
Golden-crowned sparrow	*Zonotrichia atricapilla*		X
Greater or lesser scaup	*Athya marila* or *A. affinis*		X
Green-winged teal	*Anas crecca*		X
House finch	*Haemorhous mexicanus*	X	
Killdeer	*Charadrius vociferus*	X	
Northern shoveler	*Anas clypeata*		X
Northern mockingbird	*Mimus polyglottos*	X	
Marbled godwit	*Limosa fedoa*		X
Ring-billed gull	*Larus delawarensis*	X	X
Rock pigeon	*Columba livia*	X	
Song sparrow	*Melospiza melodia*		X
Snowy egret	*Egretta thula*		X
Western burrowing owl	*Athene cunicularia*	X	
Western meadowlark	*Sturnella neglecta*	X	X
Western sandpiper	*Calidris mauri*		X
White-crowned sparrow	*Zonotrichia leucophrys*	X	X
Whimbrel	*Numenius phaeopus*		X
Willet	*Tringa semipalmata*		X
Mammals			
Black-tailed jackrabbit	*Lepus californicus*	X	
California ground squirrel	*Spermophilus beecheyi*	X	
Cat	*Felis catus*	X	
Striped skunk	*Mephitis mephitis*	X	

This page intentionally left blank

Appendix D Special-status Species Evaluated for Potential to Occur

This page intentionally left blank

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
San Mateo thorn-mint (*Acanthomintha duttonii*)	FE, SE, CRPR1B.1	Endemic to San Mateo County.	Chaparral, valley and foothill grassland, or coastal scrub. Locally occurs in serpentine bunchgrass grassland; 50-300 m.	Annual herb, April - June	**Not Expected.** There is no suitable habitat in the Study area. No serpentine soils to support this endemic.
Franciscan onion (*Allium peninsulare var. franciscanum*)	CRPR 1B.2	Coastal mid California, from Monterey to Mendocino Counties.	Cismontane woodland, valley and foothill grasslands. Often on dry hillsides and in serpentine bunchgrass grasslands; 52-300 m.	Perennial bulbiferous herb, May - June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
bent-flowered fiddleneck (*Amsinckia lunaris*)	CRPR 1B.2	Mid California, including Monterey, Santa Cruz, San Mateo, Marin, Alameda, Contra Costa, Napa, Lake and Colusa counties.	Coastal bluff scrub, cismontane woodland or valley and foothill grassland; 3-500 m.	Annual herb, March - June	**Not Expected.** There is no suitable habitat in the Study area.
California androsae (*Androsace elongata* ssp. *acuta*)	CRPR 4.2	Various counties throughout the entirety of California.	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, valley and foothill grassland, 150-1305 m.	Annual herb, March – June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Anderson's manzanita (*Arctostaphylos andersonii*)	CRPR 1B.2	Mid California including Monterey, Santa Cruz, San Mateo, Santa Clara, and Alameda counties.	Broadleaved upland forest, mixed evergreen forest, North coast coniferous forest including open sites in redwood forest, chaparral; 60-760 m.	Perennial evergreen shrub, November - May	**Not Expected.** There is no suitable habitat in the Study area and the study area is below the required elevation for this species.
Montara manzanita (*Arctostaphylos montaraensis*)	CRPR 1B.2	Endemic to San Mateo County.	Maritime chaparral or coastal; 150-500 m.	Perennial evergreen shrub, January - March	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
Kings Mountain manzanita (*Arctostaphylos regismontana*)	CRPR 1B.2	Mid California including Santa Cruz, San Mateo, and Santa Clara counties.	Granite or sandstone outcrops in chaparral, coniferous, broadleaved upland and evergreen forests; 305-730 m.	Perennial evergreen shrub, January – April	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Coastal marsh milk-vetch (*Astragalus pycnostachyus* var. *pycnostachyus*)	CRPR 1B.2	Endemic to Humboldt, Marin and San Mateo Counties.	Coastal dunes (mesic), coastal scrub or marshes and swamps (coastal salt, streamside); 0-30 m.	Perennial herb, April-October	**High.** There is plenty of suitable habitat in the Study area and the known distribution of this species is within the region.
Alkali milk-vetch (*Astragalus tener* var. *tener*)	CRPR 1B.2	Endemic to the San Francisco Bay Area and surrounding counties.	Playas, valley and foothill grassland (adobe clay) or vernal pools on alkaline soils; 1-60 m.	Annual herb, March-June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Brewer's calandrinia (*Calandrinia breweri*)	CRPR 4.2	Scattered along the California coast, occasional in the northern central valley.	Sandy or loamy soils, disturbed sites and burns, chaparral, coastal scrub, 10-1220m.	Annual herb, (January) March-June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Oakland star-tulip (*Calochortus umbellatus*)	CRPR 4.2	Only within the San Francisco Bay Area.	Often in serpentinite soils, broadleafed and upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland, 100-700m.	Perennial bulbiferous herb, March-May	**Not Expected.** There is no suitable habitat in the Study area and the study area is below the typical elevation requirements for this species.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
Johnny-nip (*Castilleja ambigua* ssp. *ambigua*)	CRPR 4.2	Northern coastal California until just south of the San Francisco Bay Area.	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, vernal pool margins, 0-435m.	Annual herb, March-August.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*)	CRPR 1B.1	Throughout western California from San Luis Obispo to Solano County.	Valley and foothill grasslands with alkaline or clay soils; 0-230 m.	Annual herb, May - November	**High.** There is suitable habitat in the Study area and there is a known distribution of this species within the region.
San Francisco Bay spineflower (*Chorizanthe cuspidata* var. *cuspidata*)	CRPR 1B.2	Endemic to Marin, San Francisco, San Mateo and possibly Sonoma Counties.	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub on sandy soils; 3-215 m.	Annual herb, April-August	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Point Reyes bird's beak (*Chloropyron maritimum* ssp. *palustre*)	CRPR 1B.2	Extant occurrences in Humboldt, Marin, San Francisco, Alameda, and Sonoma Counties.	Marshes and swamps (coastal salt); 0-10 m.	Annual herb (hemiparasitic), June-October	**Moderate.** There is suitable habitat in the Study area, and the species was found in the Don Edwards Preserve approximately five miles from the site in 2018.t .
Crystal Springs fountain thistle (*Cirsium fontinale* var. *fontinale*)	FE, SE, CRPR 1B.1	Found exclusively in San Mateo county.	Valley and foothill grasslands and chaparral including serpentine seeps and grassland; 45-175 m.	Perennial herb, May - October	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
lost thistle (*Cirsium praeteriens*)	CRPR 1A	Endemic to Santa Clara County but extirpated from the County.	Unknown habitat; 0-100 m.	Perennial herb, June-July	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*)	CRPR 4.3	Southeast of the San Francisco Bay Area.	Chaparral and cismontane woodland, 90-1500m.	Annual herb, (April) May-June (July).	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Round-headed Chinese-houses (*Collinsia corymbosa*)	CRPR 1B.2	In very limited regions in the San Francisco Bay Area and very northern California coast.	Coastal dunes, 0-20m.	Annual herb, April-June.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area, the nearest occurrence of this species is 4.5 miles southeast of the study area.
San Francisco collinsia (*Collinsia multicolor*)	CRPR 1B.2	Mid-coastal California from Monterey to Marin county including Santa Clara county.	Moist shady woodland, closed-cone coniferous forests and coastal scrub. Occasionally found in serpentine; 30-250 m.	Annual herb, March – May	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area, the nearest occurrence of this species is 4.5 miles south of the study area.
Clustered lady's-slipper (*Cypripedium fasciculatum*)	CRPR 4.2	Throughout the mountainous regions of northern California.	Usually serpentinite seeps and streambanks, lower montane coniferous forest, north coast coniferous forest, 100-2435m.	Perennial rhizomatous herb, March-August.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Mountain's lady's-slipper (*Cypripedium montanum*)	CRPR 4.2	In the very mountainous regions of Northern California.	Broadleafed upland forest, cismontane woodland, lower montane coniferous forest, north coast coniferous forest, 185-2225m.	Perennial rhizomatous herb, March-August.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
western leatherwood (*Dirca occidentalis*)	CRPR 1B.2	San Francisco Bay area including Santa Clara to Marin county and east to Alameda county.	Cool, moist slopes in foothill woodland and riparian forests. Mesic environments in broadleaved upland forests, chaparral and coniferous woodlands and mixed evergreen and oak woodlands; 25-425 m.	Perennial deciduous shrub, January – April.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area, the nearest occurrences are approximately 5 miles south of the study area.
California bottle-brush grass (*Elymus californicus*)	CRPR 4.3	To the north, west, and south of the San Francisco Bay.	Broadleafed upland forest, cismontane woodland, north coast coniferous forest, riparian woodland, 15-470m.	Perennial herb, May-August (November)	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Ben Lomond buckwheat (*Eriogonum nudum* var. *decurrens*)	CRPR 1B.1	Endemic to Alameda, Santa Clara and Santa Cruz Counties.	Chaparral, cismontane woodland, lower montane coniferous forest (maritime ponderosa pine sandhills); 50-800 m.	Perennial herb, June-October	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
San Mateo woolly sunflower (*Eriophyllum latilobum*)	FE, SE, CRPR 1B.1	San Mateo and Napa counties.	Cismontane and oak woodland, often on roadcuts; found on and off of serpentine and on grassy hillsides; 45-150m.	Perennial herb, April – June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area, the nearest occurrence of this species is approximately 4.5 mile south of the study area.
Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*)	CRPR 1B.1	Endemic to Alameda, San Benito, Santa Clara, San Diego and San Luis Obispo Counties.	Vernal pools; 3-45 m.	Annual/perennial herb, July-August	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area, the nearest occurrence is approximately 4.5 miles southeast of the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
Jepson's coyote thistle (*Eryngium jepsonii*)	CRPR 1B.2	Scattered throughout northern California.	Clay soils, valley and foothill grassland, vernal pools, 3-300m.	Perennial herb, April-August.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area, the nearest occurrence of this species is approximately 6.5 miles southwest of the study area.
San Francisco wallflower (*Erysimum franciscanum*)	CRPR 4.2	In very limited areas to the north and west of the San Francisco Bay.	Often in serpentinite or granitic soils, sometimes on roadsides, chaparral, coastal dunes, coastal scrub, valley and foothill grassland, 0-550m.	Perennial herb, March-June.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
San Joaquin spearscale (*Extriplex joaquinana*)	CRPR 1B.2	Endemic to the Coast Ranges and Central Valley of central California.	Chenopod scrub, meadows and seeps, playas and valley and foothill grassland in alkaline soils; 1-835 m.	Annual herb, April-October	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
minute pocket moss (*Fissidens pauperculus*)	CRPR 1B.2	Along the coast from Santa Cruz to the northern border of California.	North Coast coniferous forest on damp soil along the coast, in dry streambeds and on stream banks; 10-1000 m.	Moss	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Hillsborough chocolate lily (*Fritillaria biflora* var. *ineziana*)	CRPR 1B.1	Endemic to San Mateo County.	Cismontane woodland or valley and foothill grasslands on serpentine soils.	Perennial herb, March – April	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
fragrant fritillary (*Fritillaria liliacea*)	CRPR 1B.2	Found throughout northern and central California wherever there is suitable habitat.	Cismontane woodland and coastal scrub and prairie, in valley and foothill grasslands (often serpentine bunchgrass grassland); 3-410 m.	Perennial bulbiferous herb, February – April	**Not Expected.** There is no suitable habitat in the Study area and nearby documented occurrences have likely been extirpated within the heavily urbanized general vicinity of the study area. The nearest extant occurrences are approximately 6 miles west of the study area in hilly, more rural habitat.
short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*)	CRPR 1B.2	Occurs along the coast from the Oregon border to near Santa Cruz.	Coastal bluff scrub (sandy), coastal dunes or coastal prairie; 0-215 m.	Annual herb, March-June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Marin western flax (*Hesperolinon congestum*)	FT, ST, CRPR 1B.1	Known only from San Mateo and Marin Counties.	Chaparral, valley and foothill grassland, especially in serpentine bunchgrass grassland and serpentine barrens; 5-370 m.	Annual herb, April – July	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Coast iris (*Iris longipetala*)	CRPR 4.2	Scattered throughout northwest California.	Mesic, coastal prairie, lower montane coniferous forest, meadows and seeps, 0-600m.	Perennial rhizomatous herb, March-May.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Contra Costa goldfields (*Lasthenia conjugens*)	FE, CRPR 1B.1	Endemic to western California from Santa Rosa to Monterey.	Cismontane woodland, playas (alkaline), valley and foothill grassland and vernal pools; 0-470 m. elevation.	Annual herb, March-June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
legenere (*Legenere limosa*)	CRPR 1B.1	Endemic to the Central Valley and Inner Coast Ranges from Redding to Salinas.	Vernal pools; 0-880 m.	Annual herb, April-June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
Serpentine leptosiphon (*Leptosiphon ambiguus*)	CRPR 4.2	Within rural regions around the San Jose area.	Usually in serpentinite soil, cismontane woodland, coastal scrub, valley and foothill grassland, 120-1130m.	Annual herb, March-June.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Crystal Springs lessingia (*Lessingia arachnoidea*)	CRPR 1B.2	Endemic to San Mateo county and Sonoma Counties.	Cismontane woodland, coastal scrub or valley and foothill grassland on serpentine soils, often on roadsides; 60 – 200m.	Annual herb, July – October	**Not Expected.** There is no suitable habitat in the Study area and the nearest documented occurrence is approximately 7 miles west of the study area.
Woolly-headed lessingia (*Lessingia hololeuca*)	CRPR 3	Scattered throughout northwest California.	Clay, serpentinite soils, broadleafed upland forests, coastal scrub, lower montane coniferous forests, valley and foothill grassland, 15-305m.	Annual herb, June-October.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
coast lily (*Lilium maritimum*)	CRPR 1B.1	California endemic; extant occurrences in Mendocino, Marin, and Sonoma Counties.	Broad-leafed upland forest, closed-cone coniferous forest, coastal prairie, coastal scrub, marshes, and swamps (freshwater) or North Coast coniferous forest, sometimes on roadsides; 5-475 m.	Perennial bulbiferous herb, May-August	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
San Mateo tree lupine (*Lupinus eximus*)	CRPR 3.2	Limited populations southwest and north of the San Francisco Bay area.	Chaparral and coastal scrub, 90-550m.	Perennial evergreen shrub, April-July.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
arcuate bush mallow (*Malacothamnus arcuatus*)	CRPR 1B.2	Known from San Mateo, Santa Clara, and Merced counties.	Ultramafic chaparral, gravelly alluvium. Locally, in openings in mixed evergreen forests; 15-355 m.	Perennial evergreen shrub, April – September	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
Davidson's bush mallow (*Malacothamnus davidsonii*)	CRPR 1B.2	Throughout California, found in San Mateo, Monterey, San Luis Obispo, and Los Angeles counties.	Sandy washes within coastal scrub, chaparral, and riparian woodland, at elevations 185 – 855m.	Perennial deciduous shrub, June – January	**Not Expected.** There is no suitable habitat in the Study area and the nearest documented occurrence is approximately 4.5 miles south of the study area.
Hall's bush-mallow (*Malacothamnus hallii*)	CRPR 1B.2	Occurs to the west, east, and south of the San Francisco Bay.	Chaparral, coastal scrub, 10-760m.	Perennial evergreen shrub, (April) May-September (October).	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Mt. Diablo cottonweed (*Micropus amphibolus*)	CRPR 3.2	Scattered throughout northwest California.	Rocky soils, broadleafed upland forest, chaparral, cismontane woodland, valley and foothill grassland, 45-825m.	Annual herb, March-May.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
San Antonio Hills monardella (*Monardella antonina* ssp. *antonina*)	CRPR 3	**None.** There is no potential habitat in the Study area	Chaparral and cistmontane woodland, 320-1000m.	Perennial rhizomatous herb, June-August.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
woodland woolythreads (*Monolopia gracilens*)	CRPR 1B.2	Through central California from San Mateo and Contra Costa counties south to San Luis Obispo county.	Grassy openings in chaparral, valley and foothill grasslands (serpentine), cismontane woodland, broadleafed upland forests, North coast coniferous forest. Sandy to rocky soils; 100-1200 m.	Annual herb, February – July	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
pincushion navarettia (*Navarretia myersii* ssp. *myersii*)	CRPR 1B.1	Mainly central part of Central Valley and one location on the San Francisco Peninsula.	Vernal pools, often acidic; 20-330 m.	Annual herb, April – May	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO					
Common Name (*Scientific Name*)	**Listing Status[a]**	**Geographic Distribution in California**	**Habitat Requirements**	**Life Form, Blooming Period**	**Potential Occurrence in the Study Area[b]**
Patterson's navarretia (*Navarretia paradoxiclara*)	CRPR 1B.3	One extant population north of San Jose, other populations southeast of Sacramento near Stanislaus National Forest.	Serpentinite soils, openings, vernally mesic, often in drainages, meadows, and seeps, 150-430m.	Annual herb, May-June (July)	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Dudley's lousewort (*Pedicularis dudleyi*)	SR, CRPR 1B.2	Throughout central coastal California from San Mateo county south to San Luis Obispo county.	Chaparral, valley and foothill grassland and North coast coniferous forest, particularly deep shady woods and steep cut banks in older coast redwood forests and maritime chaparral; 60-900 m.	Perennial herb, April – June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
white-rayed pentachaeta (*Pentachaeta bellidiflora*)	FE, SE, CRPR 1B.1	California endemic; extant occurrences in San Mateo County.	Cismontane woodland or valley and foothills grassland (often serpentinite); 35-620 m.	Annual herb, March – May	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
white-flowered rein orchid (*Piperia candida*)	CRPR 1B.2	Through northern coastal California from Del Norte county south to Santa Cruz county.	Broadleafed upland forest, lower montane coniferous forest, North Coast coniferous forest. Often on mossy banks and rock outcrops or in the forest duff; 30-1310 m.	Perennial herb, May - September	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Choris' popcornflower (*Plagiobothrys chorisianus* var. *chorisianus*)	CRPR 1B.2	Endemic to coastal central California including Santa Cruz, San Francisco, and San Mateo Counties.	Chaparral, coastal prairie or coastal scrub on mesic sites; 15-160 m.	Annual herb, March – June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
hairless popcornflower (*Plagiobothrys glaber*)	CRPR 1A	Endemic to Alameda, Marin, San Benito, and Santa Clara Counties.	Meadows and seeps (alkaline) and marshes and swamps (coastal salt); 15-180 m. elevation.	Annual herb, March-May	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

Special-status Plants with Documented Occurrences within a CNDDB search of the U.S. Geological Survey (USGS) 7.5-minute quadrangles: Newark, Mountain View, Palo Alto, Redwood Point, San Mateo, Woodside, La Honda, Mindego Hill, and Cupertino					
Common Name (*Scientific Name*)	**Listing Status[a]**	**Geographic Distribution in California**	**Habitat Requirements**	**Life Form, Blooming Period**	**Potential Occurrence in the Study Area[b]**
Oregnon polemonium (*Polemonium carneum*)	CRPR 2B.2	Occurs in northern California and in the San Francisco Bay Area.	Coastal prairie, coastal scrub or lower montane coniferous forest; 0-1830 m.	Perennial herb, April-September	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Lobb's aquatic buttercup (*Ranunculus lobbii*)	CRPR 4.2	Mostly in the north San Francisco Bay/Sonoma/Napa region, few populations east and south of the San Francisco Bay.	Mesic, cismontane woodland, north coast coniferous forest, valley and foothill grassland, vernal pools, 15-470m.	Annual herb (aquatic), February-May	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
chaparral ragwort (*Senecio aphanactis*)	CRPR 2B.2	Occurs in western California from Concord to the Mexican border.	Chaparral, cismontane woodland and coastal scrub, sometimes in serpentine soils; 15-800 m.	Annual herb, January-April	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Scouler's catchfly (*Silene scouleri* ssp. *scouleri*)	CRPR 2B.2	Occurs throughout California, Oregon, Washington, Idaho, and Montana.	Coastal bluff scrub, coastal prairie, valley and foothill grassland, 0-600m.	Perennial herb, (March-May) June-August (September)	**Not Expected.** There is no suitable habitat in the Study area in the Study area and there are no CNDDB occurrences within 5 miles.
San Francisco campion (*Silene verecunda* ssp. *verecunda*)	CRPR 1B.2	Endemic to Santa Cruz, San Francisco, San Mateo, and Sutter Counties.	Coastal bluff scrub, chaparral, coastal prairie, coastal scrub or valley and foothills grassland on sandy soils; 30-645 m.	Perennial herb, March – August	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Long-styled sand-spurrey (*Spergularia macrotheca* var. *longistyla*)	CRPR 1B.2	Only in Alameda, Contra Costa, Napa, and Solano Counties in the San Francisco Bay-Delta region.	Alkaline soils, meadows and seeps, marshes and swamps, 0-255 m.	Perennial herb, February – May.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
slender-leaved pondweed (*Stuckenia filiformis* ssp. *alpina*)	CRPR 2B.2	Occurs in Northern California in the Inner Coast Ranges and Sierra Nevadas from east of Redding to near San Jose.	Marshes and swamps (assorted shallow freshwater); 300-2150 m.	Perennial rhizomatous herb, May-July	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
California seablite (*Suaeda californica*)	FE, CRPR 1B.1	Endemic to coastal California in the San Francisco Bay Area and near San Luis Obispo.	Marshes and swamps (coastal salt); 0-15 m.	Perennial evergreen shrub, July-October	**Low.** There is potential suitable habitat in the Study area. However, the known distribution of this species does not overlap the study area
showy rancheria clover (*Trifolium amoenum*)	FE, CRPR 1B.1	Marin, Sonoma, Napa Solano, and San Mateo counties.	Coastal bluff scrub, valley and foothill grassland (sometimes serpentine), often open sunny sites; 5-415 m.	Annual herb, April – June	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Santa Cruz clover (*Trifolium buckwestiorum*)	CRPR 1B.1	Scattered throughout northwest California.	Gravelly soils, and occurring on margins, broadleafed upland forest, cismontane woodland, coastal prairie, 105-610m.	Annual herb, April-October.	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
saline clover (*Trifolium hydrophilum*)	CRPR 1B.2	Endemic to San Francisco Bay Area and surrounding counties.	Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools; 0-300 m.	Annual herb, April – June	**Moderate.** There is some suitable habitat in the Study area and the known distribution of this species is within the region of the study area.
San Francisco owl's clover (*Triphysaria floribunda*)	CRPR 1B.2	Endemic to Marin, San Francisco and San Mateo Counties.	Coastal prairie, coastal scrub or valley and foothill grassland, usually serpentinite; 10-160 m.	Annual herb, April-June	**Not Expected.** There is no suitable habitat in the Study area and the nearest documented occurrence is approximately 6.75 miles northwest from the study area.

SPECIAL-STATUS PLANTS WITH DOCUMENTED OCCURRENCES WITHIN A CNDDB SEARCH OF THE U.S. GEOLOGICAL SURVEY (USGS) 7.5-MINUTE QUADRANGLES: NEWARK, MOUNTAIN VIEW, PALO ALTO, REDWOOD POINT, SAN MATEO, WOODSIDE, LA HONDA, MINDEGO HILL, AND CUPERTINO

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Life Form, Blooming Period	Potential Occurrence in the Study Area[b]
caper-fruited tropidocarpum (*Tropidocarpum capparideum*)	CRPR 1B.1	California endemic; extant occurrences in Fresno, Monterey, and San Luis Obispo Counties.	Valley and foothill grassland (alkaline hills); 1-455 m.	Annual herb, March-May	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.
Methuselah's beard lichen (*Usnea longissima*)	CRPR 4.2	Throughout the northern California coast.	On tree branches, usually on old growth hardwoods and conifers, broadleafed upland forest, north coast coniferous forest, 50-1460m.	Fructicose lichen (epiphytic)	**Not Expected.** There is no suitable habitat in the Study area and the known distribution of this species does not overlap the study area.

[a] Status explanations:

Federal:

FE = Listed as endangered under the Federal Endangered Species Act.

FT = Listed as threatened under the Federal Endangered Species Act.

State:

SE= Listed as endangered under the California Endangered Species Act. **None.** There is no potential habitat in the Study area and there are no known occurrences within 5 miles.jmn

ST= Listed as threatened under the California Endangered Species Act.

SR= Listed as rare under the California Endangered Species Act.

California Rare Plant Rank:

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

2B= Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

3 = Knowledge on plant lacking, unable to determine accurate population numbers

4 = Plants have a limited distribution or are infrequent through California and their status should be monitored regularly

[b] Potential Occurrence explanations:

Present: Species was observed on the project site, or recent species records (within five years) from literature are known within the study area.

High: The CNDDB or other reputable documents record the occurrence of the species off-site, but within a 10-mile radius of the study area and within the last 10 years. High-quality suitable habitat is present within the study area.

Moderate: Species does not meet all terms of High or Low category. For example: CNDDB or other reputable documents may record the occurrence of the species near but beyond a 10-mile radius of the study area, or some of the components representing suitable habitat are present within or adjacent to the study area, but the habitat is substantially degraded or fragmented.

Low: The CNDDB or other documents may or may not record the occurrence of the species within a 10-mile radius of the study area. However, few components of suitable habitat are present within or adjacent to the study area.

Not Expected: CNDDB or other documents do not record the occurrence of the species within or reasonably near the study area and within the last 10 years, and no or extremely few components of suitable habitat are present within or adjacent to the study area.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Potential Occurrence in the Study Area[b]
Invertebrates				
Bay checkerspot butterfly (*Euphydryas editha bayensis*)	FT	Restricted to native grasslands on outcrops of serpentine soil in the vicinity of San Francisco Bay.	*Plantago erecta* is the primary host plant, *Castilleja densiflorus* and *C. purpurscens* are secondary host plants.	**Not Expected.** There is no serpentine soil or otherwise suitable habitat in the Study area and there are no CNDDB occurrences within 5 miles.
Mrytle's silverspot (*Speyeria zerene myrtleae*)	FE	Restricted to foggy coastal dunes/hills of the Point Reyes peninsula; extirpated from coastal San Mateo County.	Larval foodplant thought to be *Viola adunca.*	**Not Expected.** There is no suitable habitat in the Study area and there are no CNDDB occurrences within 5 miles.
Fish				
longfin smelt (*Spirinchus thaleichthys*)	FC, ST, CSSC	Slightly upstream from Rio Vista and Medford Island through Suisun Bay and Suisun Marsh; San Pablo Bay; San Francisco Bay; Gulf of the Farallones; Humboldt Bay and Eel River estuary	Found in open water of estuaries, mostly in the middle or bottom of water columns, prefer salinities of 15-30 ppt. but can be found in completely fresh water to almost pure sea water.	**Moderate.** There is no suitable habitat in the Study area, and no known occurrences within 5 miles, however there is potential habitat directly adjacent to the study area.
steelhead- Central California Coast DPS (*Oncorhynchus mykiss irideus*)	FT	This distinct population segment (DPS) includes all anadromous *O. mykiss* (steelhead) populations from the Russian River south to Soquel Creek and to, but not including, the Pajaro River. Populations in the San Francisco and San Pablo Basins are also included.	Adults migrate from a marine environment into the freshwater streams and rivers of their birth in order to mate (called anadromy). Unlike other Pacific salmonids, they can spawn more than one time (called iteroparity). Migrations can be hundreds of miles (USFWS 2017).	**Moderate.** There is no suitable habitat in the Study area, and no known occurrences within 5 miles, however there is potential habitat directly adjacent to the study area.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Potential Occurrence in the Study Area[b]
North American Green Sturgeon. Southern DSP (*Acipenser medirostris*)	FT, CSSC	Anadromous fish found in tidally influenced water in the San Francisco Bay, coastal waters of North America and down to the coast of Monterey to depth of 360 feet. Non-spawning individuals are found in estuaries during summer and fall while spawning has been observed in the Klamath, Rogue, Trinity, Sacramento, and Eel rivers.	Sturgeon spend a majority of their lives in nearshore oceanic waters, bays, and estuaries Juveniles reside in freshwater while more mature individuals and adults spend most of their time in saltwater until they are mature enough to spawn in a freshwater system. Deep pools or "holes" with turbulence is required for spawning.	**High.** There is a high potential for non-breeding individuals of this species to be present within the tidal sloughs year-round. However, there no suitable breeding habitat within or nearby the study area.
Amphibians and Reptiles				
Alameda whipsnake (*Masticophis lateralis euryxanthus*)	FE, SE	Are found in the inner coast range of California, most Alameda whipsnakes area in Contra Costa and Alameda counties. Some have been found in San Joaquin and Santa Clara counties (USFWS 2017).	Typically found in chaparral — northern coastal sage scrub and coastal sage. Rock outcrops, rock crevices and mammal burrows are important features of their habitat.	**Not Expected.** There is no suitable habitat in the Study area and the study area is not near any known extant populations.
California giant salamander (*Dicamptodon ensatus*)	CSSC	Found in two, possibly three isolated regions, from Mendocino County near Point Arena east into the coast rages into Lake and Glenn counties, south to Sonoma and Marin Counties, continuing south of the San Francisco Bay from San Mateo County to southern Santa Cruz County. Does not occur east of the SF Bay (CalHerps 2018).	Occurs in wet coastal forests in or near clear, cold permanent and semi-permanent streams and seepages (CalHerps 2018).	**Not Expected.** There is no suitable habitat in the Study area, and no known occurrences within 5 miles.

Special-status Animals Potentially Occurring in the Study Area				
Common Name (*Scientific Name*)	**Listing Status[a]**	**Geographic Distribution in California**	**Habitat Requirements**	**Potential Occurrence in the Study Area[b]**
California red-legged frog (*Rana draytonii*)	FT	Endemic to California and northern Baja California.	Inhabits lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	**Not Expected.** There is no suitable habitat in the Study area, however there are several documented occurrences approximately 5 miles southwest of the study area. Heavy urbanization and major freeways likely preclude this species from the study area.
California tiger salamander (*Ambystoma californiense*)	FT, ST, CSSC	Endemic to California, found in isolated populations the Central Valley and Central Coast ranges.	This species needs underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal wetlands for breeding.	**Not Expected.** There is no suitable habitat in the study area and the only documented occurrence within 5 miles is listed as “extirpated” from the region.
foothill yellow-legged frog (*Rana boylii*)	CSSC	Occurs in the foothills of the western side of the Sierra Nevada mountains from the northern border of the state to the Tehachapi mountains.	Inhabits partly shaded, shallow streams and rifles with a rocky substrate in a variety of habitats. Need at least some cobble-sized substrate for egg laying, need at least 15 weeks for metamorphosis.	**Not Expected.** There is no suitable habitat in the study area and there are no CNDDB occurrences within 5 miles.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Potential Occurrence in the Study Area[b]
Red-bellied newt (*Taricha rivularisi*)	CSSC	Endemic to California. Occurs along the coast from near Bodega, Sonoma county, to near Honeydew, Humboldt county, and inland to Lower lake and Kelsey Creek, Lake County. A small isolated population known in the Stevens Creek watershed of Santa Clara County. (CalHerps 2018).	A stream or river dweller. Found in coastal woodlands and redwood forest along the coast of northern California (CalHerps 2018).	**Not Expected.** There is no suitable habitat in the study area and there are no CNDDB occurrences within 5 miles.
San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)	FE, SE	Occurs in the vicinity of freshwater marshes, ponds and slow-moving streams in San Mateo County and extreme northern Santa Cruz County.	Prefers dense cover and water depths of at least 1 foot, and upland areas near water are also very important.	**Not Expected.** There is no suitable habitat in the study area and heavy urbanization and major freeways near the study area likely preclude this species.
Santa Cruz black salamander (*Aneides flavipunctatus niger*)	CSSC	This subspecies is endemic to California, with a limited range west of the San Francisco Bay and south of the San Francisco Peninsula from Santa Cruz County and western Santa Clara County, north to southern San Mateo County. The species also occurs from Sonoma county north along the coast and coast ranges to southwest Oregon in Jackson and Josephine Counties, and east to near Mt. Shasta (CalHerps 2018).	Occurs in mixed deciduous woodland, coniferous forests, coastal grasslands. Found under rocks near streams, in talus, under damp logs, and other objects (CalHerps 2018d.	**Not Expected.** There is no suitable habitat in the study area and there are no CNDDB occurrences within 5 miles.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Potential Occurrence in the Study Area[b]
Western pond turtle (*Emys marmorata*)	CSSC	Occurs from Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley and on western slope of Sierra Nevada.	Inhabits ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests.	**Not Expected.** There are two documented occurrences approximately 4.5 miles south of the study area, however the study area does not provide any suitable habitat for this species and is not interconnected with occupied waterbodies.
Birds				
Alameda song sparrow (*Melospiza melodia pusillula*)	CSSC	This California endemic subspecies of song sparrow (*Melospiza melodia*) is a resident of salt marshes bordering south arm of San Francisco Bay.	Inhabits *Salicornia* marshes, nests low in *Grindelia* bushes (high enough to escape high tides) and in *Salicornia.*	**Low.** There is marginal foraging habitat for this species within the study area, but no nesting habitat; there are several documented occurrences within 1 mile of both the eastern and western segments of the study area.
American peregrine falcon (*Falco peregrine anatus*)	CFP	Occurs throughout the Central Valley, coastal areas and northern mountains of California.	Riparian areas, wetlands, lakes and other aquatic features provide important breeding and foraging habitat for this species. Nests on cliffs or man-made structures such as buildings and bridges; feeds on birds.	**Not Expected.** The study area does not provide suitable habitat for this species and there are no CNDDB occurrences within 5 miles.
Bald eagle (*Haliaeetus leucocephalus*)	SE, CFP	Throughout North America.	Typically nest in forested areas adjacent to large bodies of water, staying away from heavily developed areas when possible (Cornell Lab 2017).	**Not Expected.** There is no suitable habitat in the study area and there are no known occurrences within 5 miles.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA				
Common Name (*Scientific Name*)	**Listing Status[a]**	**Geographic Distribution in California**	**Habitat Requirements**	**Potential Occurrence in the Study Area[b]**
bank swallow (*Riparia riparia*)	ST	Occurs primarily around the remaining natural river banks of the Sacramento and Feather Rivers in the Sacramento Valley.	Colonial nester, nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine textured/sandy soils near streams, rivers, lakes or ocean to dig nesting hole.	**Not Expected.** There is no suitable habitat in the study area and there are no known occurrences within 5 miles.
Black skimmer (*Rynchops niger*)	CSSC	Occurs on most oceanic coasts throughout North America.	On open sandy beaches, on gravel or shell bars with sparse vegetation, or on mats of sea wrack (tide-stranded debris) in saltmarsh (Cornell Lab 2017).	**Moderate.** There is semi-suitable habitat for this species within the study area and one documented occurrence approximately 5.5 miles southeast of the study area.
burrowing owl (*Athene cunicularia*)	CSSC	Year-round resident throughout much of the State, except the coastal counties north of Marin and mountainous areas.	Occurs in open, dry annual or perennial grasslands, deserts and scrublands characterized by low growing vegetation. Nests in small mammal burrows, particularly those of the California ground squirrel.	**Present.** This species was repeatedly observed by MIG biologists within the study area.
California black rail (*Laterallus jamaicensis* ssp. *coturniculus*)	ST	This California endemic subspecies of the black rail (*Laterallus jamaicensis*) occurs in the San Francisco Bay region, parts of the Central Valley and at the southeastern border of the State.	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. It needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	**Low.** The study area does not provide the taller marsh vegetation required by this cryptic species, however there is suitable habitat directly adjacent to the study area to the north and several documented occurrences within 5 miles of the study area.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Potential Occurrence in the Study Area[b]
California least tern (*Sternula antillarum browni*)	FE, SE	Nests along the coast from San Francisco Bay south to Northern Baja California.	Colonial breeder on bare or sparsely vegetated flat substrates, sandy beaches, alkali flats, landfills, or paved areas.	**Not Expected.** There is no suitable habitat in the Study area and a nearby documented occurrence is listed as "extirpated." The study area does not lie within and of the well-known nesting colonies of this species.
long-eared owl (*Asio otus*)	CSSC	Occurs throughout the state except in the Central Valley, in pockets along the coast and in the far central south.	Inhabits riparian bottomlands grown to tall willows and cottonwoods and belts of live oak parallel to streams. Require adjacent open land productive of mice and the presence of old nests of crows, hawks, or magpies for breeding.	**Not Expected.** There is no suitable habitat in the study area and there are no known occurrences within 5 miles.
marbled murrelet (*Brachyramphus marmoratus*)	FT, SE	Feeds near-shore; nests inland along coast from Eureka to Oregon border & from Half Moon Bay to Santa Cruz.	Nests in old-growth redwood-dominated forests, up to six miles inland, often in Douglas-fir.	**Not Expected.** There is no suitable habitat in the study area and there are no known occurrences within 5 miles.
northern harrier (*Circus cyaneus*)	CSSC	Occurs throughout lowland California; has been recorded in fall at high elevations	Inhabits grasslands, meadows, marshes, and seasonal and agricultural wetlands	**Low.** There is suitable habitat for this species directly adjacent to the north of the study area, however there is no suitable foraging no nesting habitat for this species within the study area and no CNDDB occurrences within 5 miles of the study area.

Special-status Animals Potentially Occurring in the Study Area

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Potential Occurrence in the Study Area[b]
Ridgeway (California clapper) rail (*Rallus obsoletus* spp. *obsoletus*)	FE, SE	This California endemic inhabits salt water and brackish marshes traversed by tidal sloughs in the vicinity of the San Francisco Bay.	Associated with abundant growths of pickleweed. Also, feeds away from cover on invertebrates from mud-bottomed sloughs.	**Low.** The study area does not provide the taller marsh vegetation required by this cryptic species, however there is suitable habitat directly adjacent to the study area to the north and several documented occurrences within the general vicinity of the study area.
saltmarsh common yellow throat (*Geothlypis trichas sinuosa*)	CSSC	This supspecies of the common yellow throat (*Geothlypis trichas*) is endemic to the fresh and saltwater marshes of the San Francisco Bay region.	Requires thick, continuous cover down to water surface for foraging; and tall grasses, tule patches and willows for nesting.	**Low.** There is suitable habitat for this species directly adjacent to the north of the study area, however there is no suitable foraging no nesting habitat for this species within the study area and no CNDDB occurrences within 5 miles of the study area.
short-eared owl (*Asio flammeus*)	CSSC	Year-round resident in certain parts of California; breeds regularly in the Great Basin region and locally in the Sacramento-San Joaquin River Delta, breeds periodically in the Central Coast and San Joaquin Delta.	Found in swamp lands, both fresh and salt, lowland meadows, and agricultural fields. Tule patches or tall grass are needed for nesting and daytime seclusion; nests on dry ground in depression concealed in vegetation.	**Not Expected.** There is no suitable habitat in the study area, although there is one documented occurrence approximately 3.2 miles northwest of the study area.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Potential Occurrence in the Study Area[b]
Tricolored blackbird (*Agelaius tricolor*)	CSSC (nesting colony)	Permanent resident in Central Valley from Butte to Kern Counties; breeds at scattered coastal locations from Marin to San Diego Counties and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties.	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony.	**Not Expected.** There is no suitable habitat in the study area and there are no known occurrences within 5 miles.
western snowy plover (*Charadrius alexandrinuss nivosus*- Pacific population)	FT, CSSC	The Pacific population of western snowy plover occurs along the entire coastline of California.	Occurs on sandy beaches, salt pond levees and shores of large alkali lakes. Needs sandy, gravelly, or friable soils for nesting.	**Low.** There is marginally suitable habitat within the study area and 6 documented occurrences within 5 miles of the study area. This species is unlikely to nest in the heavily trafficked study area habitat.
white-tailed kite (*Elanus lecurus*)	CFP	Year-round resident in lowland areas west of Sierra Nevada from head of Sacramento Valley south, including coastal valleys and foothills, to western San Diego County at Mexico border.	Inhabits low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands that are used for foraging	**Low.** There is marginally suitable habitat for this species within the Study area and 3 documented occurrences within 5 miles on Bair Island.
Yellow rail (*Coturnicops noveboracensis*)	CSSC	Mostly through Canada, the Midwest, and southeast US. Small wintering population in the San Francisco Bay Area. Small breeding population on the California-Oregon border.	Shallow marshes, and wet meadows; in winter, drier freshwater and brackish marshes, as well as dense, deep grass, and rice fields (Cornell Lab 2017).	**Low.** The study area does not provide the taller marsh vegetation preferred by this species, however there is suitable habitat directly adjacent to the study area to the north and 2 documented occurrences within the general vicinity of the study area.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA				
Common Name (*Scientific Name*)	**Listing Status[a]**	**Geographic Distribution in California**	**Habitat Requirements**	**Potential Occurrence in the Study Area[b]**
Mammals				
pallid bat (*Antrozous pallidus*)	CSSC	Throughout California except high Sierra from Shasta to Kern Counties and northwest coast, primarily at lower and mid-elevations	Inhabits deserts, grasslands, shrublands, woodlands, and forests. This species is most common in open dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures, very sensitive to disturbance of roosting sites.	**Not Expected.** There is 1 documented occurrence of this species approximately 4.5 miles south of the study area, however there is no roosting habitat for this species within the study area.
Townsend's big-eared bat (*Corynorthinus townsendii*)	SC, CSSC	Throughout California in a wide variety of habitats; most common in mesic sites.	Requires caves, mines, tunnels, buildings, or other human-made structures for roosting, extremely sensitive to human disturbance.	**Not Expected.** There is no suitable roosting habitat within the study area and no documented occurrences within 5 miles of the study area.
San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)	CSSC	This California endemic is found throughout the San Francisco Bay area in grasslands, scrub and wooded areas.	Forest habitats of moderate canopy and moderate to dense understory. May prefer chaparral and redwood habitats. Constructs nests of shredded leaves, grass, and other material. May be limited by availability of nest-building materials.	**Not Expected.** There is no suitable habitat in the Study area and there are no CNDDB occurrences within 5 miles of the alignment.
saltmarsh harvest mouse (*Reithrodontomys raviventris*)	FE, SE, CFP	This California endemic occurs only in the saline emergent wetlands of the San Francisco Bay and its tributaries.	Pickleweed is the primary habitat of this non-burrowing mammal. It builds loosely organized nests and requires higher areas to escape flooding.	**Moderate.** There is a very thin strip of pickleweed habitat along the eastern and northern portion of the study area, and there are several documented occurrences within 5 miles of the study area.

SPECIAL-STATUS ANIMALS POTENTIALLY OCCURRING IN THE STUDY AREA

Common Name (*Scientific Name*)	Listing Status[a]	Geographic Distribution in California	Habitat Requirements	Potential Occurrence in the Study Area[b]
Salt marsh wandering shrew (*Sorex vagrans halicoetes*)	CSSC	Endemic to the salt marshes of the south arm of the San Francisco Bay.	Inhabits medium-high marsh 6-8 feet above sea level where abundant driftwood is scattered among *Salicornia.*	**Moderate.** There is a very thin strip of pickleweed habitat along the eastern and northern portion of the study area, and there is one documented occurrence of this species approximately 1.5 miles east of the study area.
American badger (*Taxidea taxus*)	CSSC	Occurs throughout California and the western United States and Canada.	Inhabits a variety of open habitats with friable soils.	**Not Expected.** There is no suitable habitat in the study area, however there is 1 documented occurrence approximately 3 miles south of the study area. The heavy traffic and urbanization surrounding the study area likely precludes this species.

[a] Status explanations: **Federal:** FE = Listed as endangered under the Federal Endangered Species Act. FT = Listed as threatened under the Federal Endangered Species Act. FC = Candidate for listing under the federal Endangered Species Act **State:** SE= Listed as endangered under the California Endangered Species Act. ST= Listed as threatened under the California Endangered Species Act. SC= Candidate for listing under the California Endangered Species Act. CSSC = Species of Special Concern designated by California Department of Fish and Game CFP = Fully Protected Species under California Fish and Game Code.	[b] Potential Occurrence explanations: **Present:** Species was observed on the project site, or recent species records (within five years) from literature are known within the study area. **High:** The CNDDB or other reputable documents record the occurrence of the species off-site, but within a 10-mile radius of the study area and within the last 10 years. High-quality suitable habitat is present within the study area. **Moderate:** Species does not meet all terms of High or Low category. For example: CNDDB or other reputable documents may record the occurrence of the species near but beyond a 10-mile radius of the study area, or some of the components representing suitable habitat are present within or adjacent to the study area, but the habitat is substantially degraded or fragmented. **Low:** The CNDDB or other documents may or may not record the occurrence of the species within a 10-mile radius of the study area. However, few components of suitable habitat are present within or adjacent to the study area. **Not Expected:** CNDDB or other documents do not record the occurrence of the species within or reasonably near the study area and within the last 10 years, and no or extremely few components of suitable habitat are present within or adjacent to the study area.

This page intentionally left blank

Appendix E Wetland Delineation Report

This page intentionally left blank

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102

June 18, 2020

Regulatory Division

Subject: File Number SPN-2018-00371

Mr. David Gallagher
MIG
2055 Junction Avenue, Suite 205
San Jose, CA 95134
dgallagher@migcom.com

Dear Mr. Gallagher:

This correspondence is in response to your submittal of April 23, 2020, on behalf of the West Bay Sanitary District, requesting an approved jurisdictional determination of the extent of waters of the United States occurring on a 29.43-acre site in the City of Menlo Park, San Mateo County, California (Lat: 37.496°, Long: -122.176°).

All proposed discharges of dredged or fill material occurring below the plane of ordinary high water in non-tidal waters of the United States; or below the high tide line in tidal waters of the United States; or within the lateral extent of wetlands adjacent to these waters, typically require Department of the Army authorization and the issuance of a permit under Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq*.). Waters of the United States generally include the territorial seas; all traditional navigable waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters subject to the ebb and flow of the tide; wetlands adjacent to traditional navigable waters; non-navigable tributaries of traditional navigable waters that are relatively permanent, where the tributaries typically flow year-round or have continuous flow at least seasonally; and wetlands directly abutting such tributaries. Where a case-specific analysis determines the existence of a "significant nexus" effect with a traditional navigable water, waters of the United States may also include non-navigable tributaries that are not relatively permanent; wetlands adjacent to non-navigable tributaries that are not relatively permanent; wetlands adjacent to but not directly abutting a relatively permanent non-navigable tributary; and certain ephemeral streams in the arid West.

All proposed structures and work, including excavation, dredging, and discharges of dredged or fill material, occurring below the plane of mean high water in tidal waters of the United States; in former diked baylands currently below mean high water; outside the limits of mean high water but affecting the navigable capacity of tidal waters; or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States, typically require Department of the Army authorization and the issuance of a permit under Section 10 of the Rivers and Harbors Act of 1899, as amended (33 U.S.C. § 403 *et seq*.). Navigable waters of the United States generally include all waters subject to the ebb and flow of the tide; and/or all waters presently used, or have been used in the past, or may be susceptible for future use to transport interstate or foreign commerce.

The enclosed delineation maps titled "Approved Jurisdictional Determination, pursuant to Section 10 Rivers and Harbors Act, and Section 404 Clean Water Act, West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project, Menlo Park, San Mateo County (Lat: 37.496°, Long: -122.176°)," in two sheets, date certified June 18, 2020, accurately depicts the extent and location of wetlands, other waters of the United States, and navigable waters of the United States within the study area of the site that are subject to U.S. Army Corps of Engineers' regulatory authority under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. This approved jurisdictional determination is based on the current conditions of the site, as verified during a field investigation of August 6, 2019, a review of available digital photographic imagery, and a review of other data included in your submittal. This approved jurisdictional determination will expire in three years from the date of this letter unless new information or a change in field conditions warrants a revision to the delineation map prior to the expiration date. The basis for this approved jurisdictional determination is explained in the enclosed *Approved Jurisdictional Determination Form*. This approved jurisdictional determination is presumed to be consistent with the official interagency guidance of June 5, 2007, interpreting the Supreme Court decision *Rapanos v. United States*, 126 S. Ct. 2208 (2006).

The enclosed delineation map further depicts the extent and location of wastewater detention ponds within the study area of the site that are **not** subject to U.S. Army Corps of Engineers' regulatory authority under Section 404 of the Clean Water Act. Waters of the United States do not generally include non-tidal drainage and irrigation ditches excavated on dry land; artificially irrigated areas which would revert to upland if the irrigation ceased; artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons; and water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel, unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of a waters of the United States (51 Fed. Reg. 41,217; Nov. 13, 1986). Based on a case-by-case analysis, the U.S. Army Corps of Engineers may elect to not exert jurisdiction over these categories of water bodies. These delineated water bodies, however, may be considered as "waters of the State" and, therefore, subject to regulation by the California Regional Water Quality Control Board, San Francisco Bay Region, under the Porter-Cologne Water Quality Control Act, as amended (California Water Code § 1300 *et seq*.).

You are advised that the approved jurisdictional determination may be appealed through the U.S. Army Corps of Engineers' *Administrative Appeal Process*, as described in 33 C.F.R. § 331 (65 Fed. Reg. 16,486; Mar. 28, 2000) and outlined in the enclosed flowchart and *Notification of Administrative Appeal Options, Process, and Request for Appeal* (NAO-RFA) Form. If you do not intend to accept the approved jurisdictional determination, you may elect to provide new information to this office for reconsideration of this decision. If you do not provide new information to this office, you may elect to submit a completed NAO-RFA Form to the Division Engineer to initiate the appeal process; the completed NAO-RFA Form must be submitted directly to the Appeal Review Officer at the address specified on the NAO-RFA Form. You will relinquish all rights to a review or an appeal unless this office or the Division Engineer receives new information or a completed NAO-RFA Form within 60 days of the date on the NAO-RFA Form. If you intend to accept the approved jurisdictional determination, you do not need to take any further action associated with the Administrative Appeal Process.

You may refer any questions on this matter to Bryan Matsumoto by telephone at 415-503-6786 or by e-mail at Bryan.T.Matsumoto@usace.army.mil. All correspondence should be addressed to the Regulatory Division, South Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. The Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner while preserving and protecting our nation's aquatic resources. If you would like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website:
https://www.spn.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,

Digitally signed by MATSUMOTO.BRYAN.T.1258523683
Date: 2020.06.18 18:25:29 -07'00'

Bryan Matsumoto
Senior Project Manager
Regulatory Division

Enclosures

cc:
RWQCB, Tahsa Sturgis, Tahsa.Sturgis@Waterboards.ca.gov
West Bay Sanitary District, Bill Kitajima, bkitajima@westbaysanitary.org
West Bay Sanitary District, Phil Scott, PScott@westbaysanitary.org

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

Preliminary Delineation of Wetlands and Other Waters

Prepared for:
West Bay Sanitary District
500 Laurel Street
Menlo Park, CA 94025

Prepared by:
MIG
2055 Junction Avenue, Suite 205
San José, CA 95134
(650) 400-5767

February 2020

Executive Summary

MIG surveyed the West Bay Sanitary District Flow Equalization and Resource Recovery Facility (FERRF) Flood Protection Project study area located in the City of Menlo Park in San Mateo County, California for wetlands and other waters potentially subject to regulation under Section 404 of the Clean Water Act as administered by the United States Army Corps of Engineers (USACE). The survey also delineated the extent of waters of the state that may be subject to regulation by the Regional Water Quality Control Board (RWQCB) under Section 401 of the Clean Water Act and under the Porter Cologne Water Quality Control Act. Lastly, the extent of waters that are likely subject to regulation under the McAteer-Petris Act of 1965, which is administered by the San Francisco Bay Conservation and Development Commission (BCDC), are included in this delineation.

In total, approximately 6.46 acres of potentially USACE and RWQCB jurisdictional features were identified in the study area (not including historic Section 10 waters). These include approximately 4.73 acres of Section 404, Section 10, and Section 401 waters situated below the mean high water (MHW) line of the San Francisco Bay. Jurisdictional waters and wetlands that are subject only to Sections 404 and 401 occur above the MHW line and comprise 1.27 acres of the study area. Section 401 waters of the state extend farther up to the top of the levees for an additional 0.46 acres. In addition, approximately 2.89 acres of the wastewater detention ponds meet the definition of Historic Section 10 waters. Also, BCDC jurisdictional areas are present and encompass 11.75 acres of the study area. Potentially jurisdictional habitats are summarized in the table below.

Summary of Jurisdictional Waters and Habitats within the Study Area

Potentially Jurisdictional Waters	Acres[1]
USACE Jurisdictional Total (not including historic Section 10)	6.00
Section 10/Section 404 (below MHW)	
Tidal sloughs (open water habitat)	1.14
Northern coastal salt marsh	3.59
Section 404 Other Waters and Wetlands (above MHW)	
Tidal sloughs (open water habitat)	0.01
Northern coastal salt marsh	1.26
Historic Section 10 Total	2.**89**
Wastewater detention ponds	2.89
RWQCB Jurisdiction Total	6.46
Section 401 Waters of the State (Up to Top of Bank)	
Developed (levee slopes)	0.46
Northern coastal salt marsh	4.85
Tidal sloughs (open water habitat)	1.15
BCDC Jurisdiction Total	11.75
Bay shoreline	5.66
Shoreline band	6.09

[1]Note: Values are approximate due to rounding.

Table of Contents

Figures

Tables

Appendices

1. Introduction

1.1 Project Study Area Description

The West Bay Sanitary District (WBSD) owns and operates a flow equalization facility located in the City of Menlo Park (Figure 1). The facility currently operates to store wastewater during high flow events to prevent overflow at District facilities and the Silicon Valley Clean Water Wastewater Treatment Plant in Redwood City. The site is surrounded on the north east and west sides by San Francisco Bay and Bedwell Bayfront Park abuts the site's southern boundary. The 29.43-acre study area for the delineation extends into the Bay and Bedwell Bayfront Park (Figure 2). The site contains the remnants of a decommissioned wastewater treatment plant (WWTP) which operated from 1952-1980. The site also contains three wastewater detention ponds on the west and north side of the study area which are used for wet weather flow storage (Figure 2). The study area is situated in the *Palo Alto* U.S. Geological Survey (USGS) 7.5-minute quadrangle (Figure 3). Elevation of the study area is approximately 0 to 40 feet North American Vertical Datum of 1988 (NAVD88) (Google Inc. 2019).

The climate at the study area is coastal Mediterranean, with most rain falling in the winter and spring. Mild cool temperatures are common in the winter. Hot to mild temperatures are common in the summer. Climate conditions in the study area include a 30-year average of approximately 17.6 inches of annual precipitation with an average temperature range from 48ºF to 71ºF (PRISM Climate Group 2019). Relative to the 30-year climate normal, the study area experienced wetter than normal conditions during the 2018/2019 wet season prior to the September 2019 survey. From November 2018 through April 2019, the area received 20.4 inches of precipitation, which is approximately 128% of the 30-year average for this same period (PRISM Climate Group 2019).

Figure 4 shows the one soil unit mapped by the National Resource Conservation Service (NRCS) in the study area, and Table 1 summarizes the associated texture, drainage classification, and hydric soil status (NRCS 2019a). The study area includes the following soil unit: 125 – Pits and Dumps, which consists of gravel pits, refuse dumps, and rock quarries. This soil series is not listed as hydric in San Mateo County on the National Hydric Soils List (NRCS 2019b). A detailed description of this soil type is provided in Appendix A.

Table 1. Soil Type, Texture, Drainage Classification, and Hydric Status for Soils Occurring in the Study Area

Soil Symbol	Soil Name	Soil Texture	Drainage Classification	Hydric Status
125	Pits and Dumps	N/A	N/A	No

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) map of the study area is depicted in Figure 5. The NWI identified the wastewater detention ponds within the study area as artificially flooded freshwater ponds (PUSK) (NWI 2019). Also, the NWI identified intertidal estuarine and marine wetland and open water habitat within the study area (E2USN and E2EM1N) (NWI 2019). NWI maps are based on interpretation of aerial photography, limited verification of mapped units, and/or classification of wetland types using the classification system developed by Cowardin et al. (1979). These data are available for general reference purposes and do not necessarily correspond to the presence or absence of jurisdictional waters.

1.2 Proposed Project

The flow equalization facility is in a FEMA 100-year flood zone. The District is proposing to improve the site and bring it out of the FEMA flood zone and plan for 50-year sea level rise projections. The existing facility is surrounded by earthen levees that are not FEMA certified, and therefore require improvement/repairs to ensure the facility remains separated from adjacent Bay/tidal waters. In order to receive FEMA certification, the project proposes to protect the site from flooding and sea level rise by installing sheet pile walls on the west side of the site, an ecotone levee on the north side, and fill on the east and south sides. The ecotone levee would provide additional habitat for special status species and is incorporated as part of the project for sea level rise and climate change adaptations. Project construction is anticipated to begin in 2021.

In addition to flood improvements, the project would also install a new water recycling facility (WRF) at the site, adjacent to the existing decommissioned water treatment plant. The WRF would occupy approximately 10,000 square feet of the study area and sized to produce up to 1.0 million gallons of recycled water per day. Remnant structures of the decommissioned water treatment plant would remain unaffected by the proposed project facilities. Other than the WRF itself, the system would require new influent and effluent piping to connect the facility with customers (end users) for the recycled water. Preliminary pipeline alignments would primarily be installed in existing street rights-of-way.

1.3 Survey Purpose

The purpose of the field survey was to identify the extent and distribution of potentially jurisdictional waters, such as wetlands and other waters, and other jurisdictional habitats occurring within the study area under conditions existing at the time of the September 30, 2019 survey. The results of the field survey in combination with aerial imagery and topographic data were used to map potential jurisdictional features in the study area.

Source: ESRI 2019; MIG 2019

★ Project Location

Miles 0 2 4 8

Figure 1 Vicinity Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

Source: Freyer & Laureta, Inc. 2020; MIG 2019

Base Map Features

Study Area (29.43 acres)

Figure 2 Project Site Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

Source: ESRI 2019; MIG 2019

Base Map Features

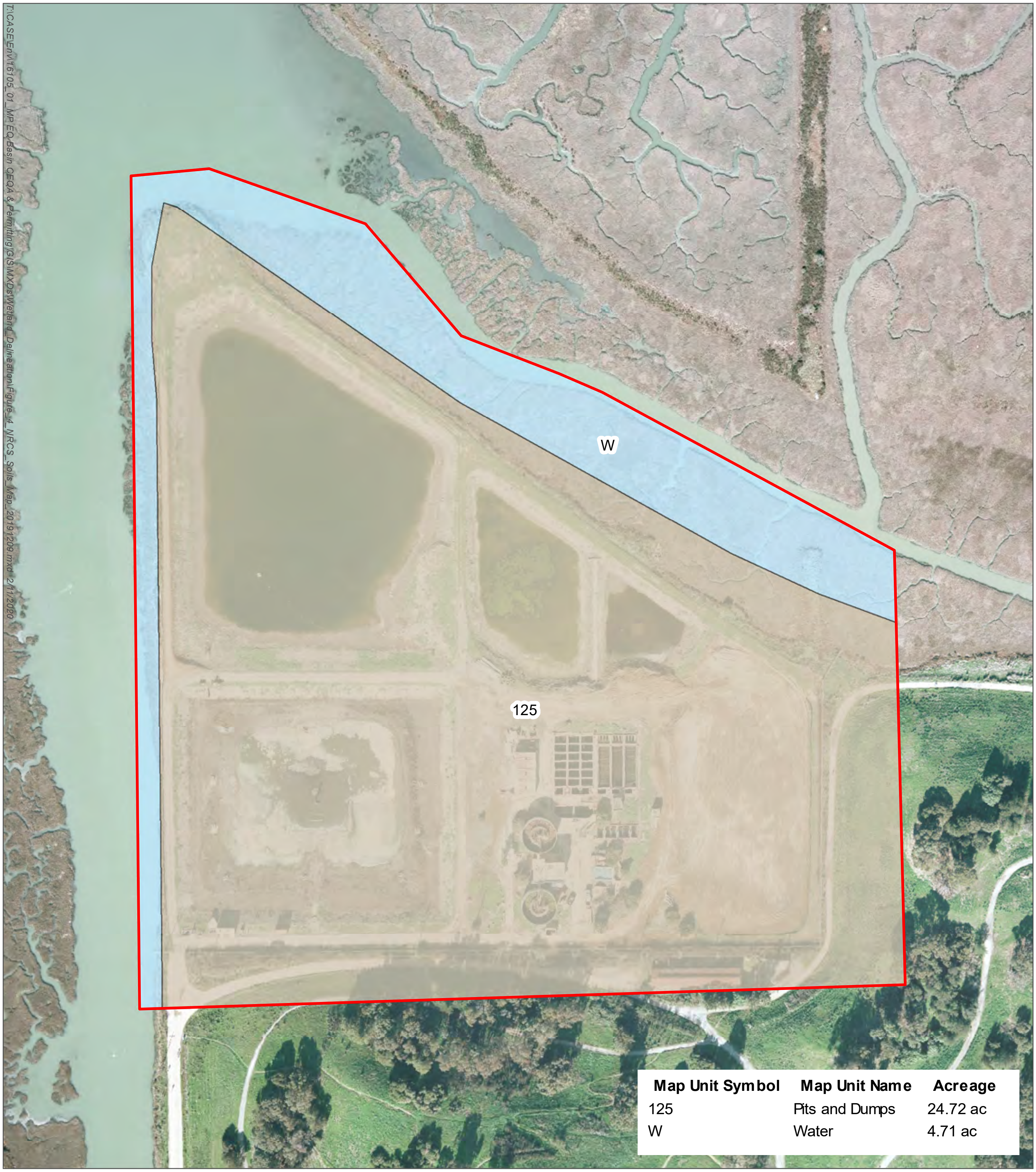
Study Area (29.43 acres)

0 0.2 0.4 0.8 Miles

MIG

Figure 3 USGS Topographic Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project



Source: Freyer & Laureta, Inc. 2020; NRCS 2019; MIG 2019

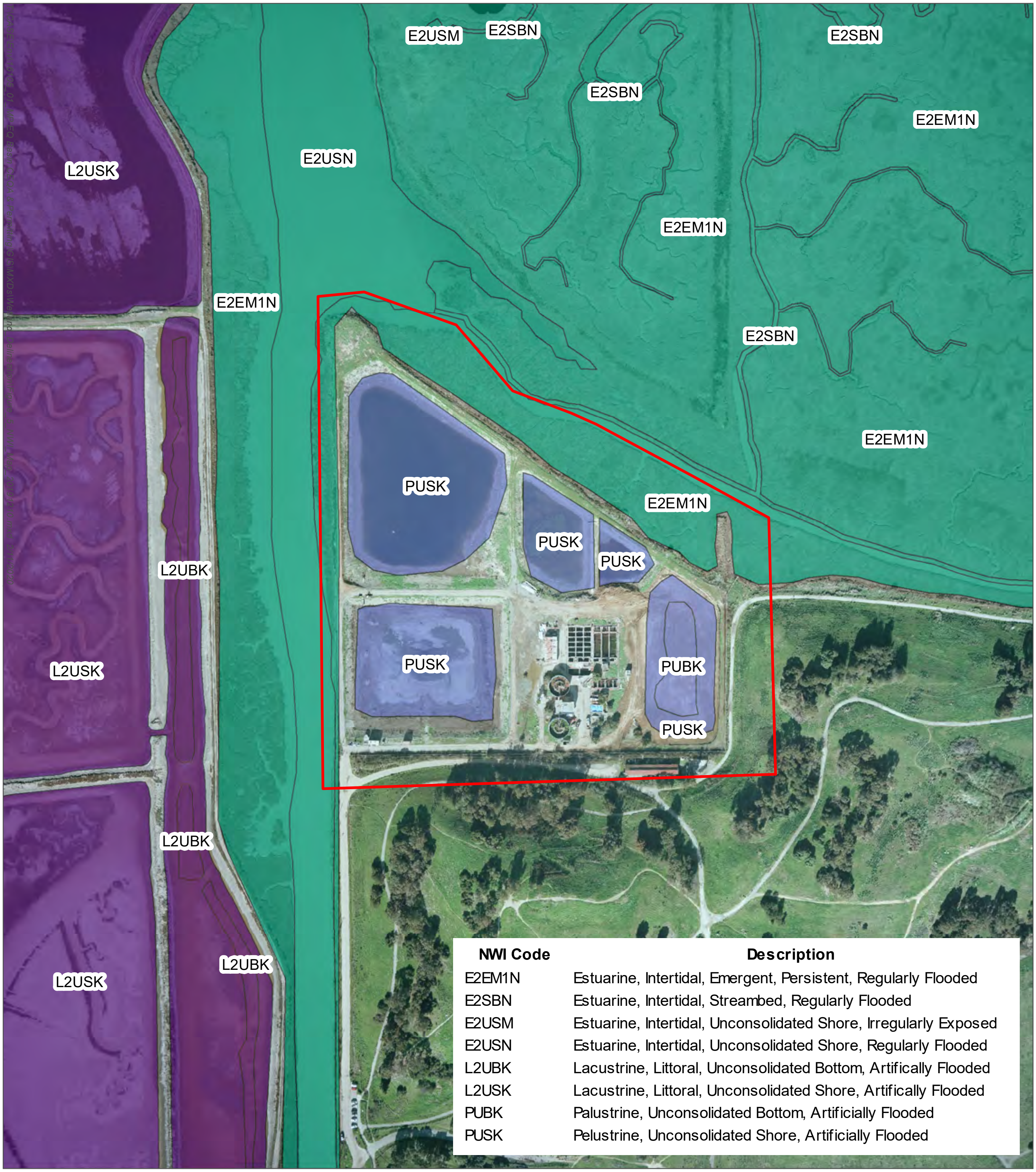
Base Map Features

Study Area (29.43 acres)

0 125 250 500 Feet

Figure 4 NRCS Soils Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project



NWI Code	Description
E2EM1N	Estuarine, Intertidal, Emergent, Persistent, Regularly Flooded
E2SBN	Estuarine, Intertidal, Streambed, Regularly Flooded
E2USM	Estuarine, Intertidal, Unconsolidated Shore, Irregularly Exposed
E2USN	Estuarine, Intertidal, Unconsolidated Shore, Regularly Flooded
L2UBK	Lacustrine, Littoral, Unconsolidated Bottom, Artifically Flooded
L2USK	Lacustrine, Littoral, Unconsolidated Shore, Artifically Flooded
PUBK	Palustrine, Unconsolidated Bottom, Artificially Flooded
PUSK	Pelustrine, Unconsolidated Shore, Artificially Flooded

Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

NWI Wetland Type

- Estuarine and Marine Wetland
- Freshwater Pond
- Lake

Base Map Features

- Study Area (29.43 acres)

0 212.5 425 850 Feet

Figure 5 NWI Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

2. Survey Methods

Before the delineation survey was conducted, topographic maps and aerial photos of the study area were obtained and reviewed from several sources, such as the USGS (Figure 3), NRCS (Figure 4), NWI (Figure 5), and Google Earth software (Google Inc. 2019), and UC Santa Barbara Library's collection of aerial photography (UCSB 2019).

On September 30, 2019, MIG senior biologist David Gallagher performed a technical delineation of wetlands and other waters in the study area, in accordance with the *Corps of Engineers 1987 Wetlands Delineation Manual* (Corps Manual; Environmental Laboratory 1987). Additionally, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West (Version 2.0)* (Regional Supplement) (USACE 2008a) and *A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008b) were followed to document site conditions relative to hydrophytic vegetation, hydric soils, and wetland hydrology. Mr. Gallagher performed preliminary mapping of the extent and distribution of wetlands and other waters of the U.S. that may be subject to regulation under Section 404 of the Clean Water Act (CWA), waters of the state that may be subject to regulation under the Porter Cologne Water Quality Control Act, which is administered by the RWQCB, and waters that may be subject to regulation under the McAteer-Petris Act of 1965, which is administered by BCDC. Mr. Gallagher also surveyed for aquatic and riparian habitat that may be subject to regulation under Sections 1600-1607 of the California Fish and Game Code, which is administered by California Department of Fish and Wildlife (CDFW).

2.1 Identification of Jurisdictional Waters

The “Routine Determination Method, On-Study area Inspection Necessary (Section D)” outlined in the Corps Manual (Environmental Laboratory 1987), and the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Regional Supplement (USACE 2010) were used to examine the vegetation, soils, and hydrology in the study area. This three-parameter approach to identifying wetlands is based on the presence of a prevalence or dominance of hydrophytic vegetation, hydric soils, and wetland hydrology.

In addition to applying these survey methods, Mr. Gallagher compiled this report in accordance with guidance provided in *Updated Map and Drawing Standards for the South Pacific Division Regulatory Program* (USACE 2016a) and *Information Requested for Verification of Corps Jurisdiction* (USACE 2016b). These documents list the information that must be submitted as part of a request for a jurisdictional determination, including:

- Vicinity map (Figure 1)
- Project area map (Figure 2)
- USGS quadrangle sheet (Figure 3)
- Soils map (Figure 4)

- National Wetlands Inventory map (Figure 5)
- Vegetation communities map (Figure 6)
- Delineation map (Figure 7)
- Current soil survey report (Appendix A)
- Plant species observed (Appendix B)
- Arid West Wetland Determination Data Forms (Appendix C)
- Written rationale for sample point choice (Section 3.1, "Observations, Rationales, and Assumptions")
- Color photos (Appendix D)
- Aquatic resources table (Appendix E)

During the survey, the study area was examined for topographic features, drainages, alterations to hydrology or vegetation, and recent significant disturbance. A determination was then made as to whether normal environmental conditions were present at the time of the field survey. In the field, the techniques used to identify wetlands included observing the vegetation growing near the soil sample points and characterizing the current surface and subsurface hydrologic features present near the sample points through both observation of indicators and direct observation of hydrology. Features meeting wetland vegetation, soil, and hydrology criteria were then mapped in the field. Geospatial data were collected using a tablet with an Arrow 100 sub-meter GPS receiver and a geo-spatial mobile-device application.

2.2 Identification of Section 404 Jurisdictional Wetlands (Special Aquatic Study areas)

Where wetland field characteristics were present, Mr. Gallagher examined vegetation, soils, and hydrology using the Routine Determination Method outlined in the Corps Manual (Environmental Laboratory 1987) and the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Regional Supplement (USACE 2010).

Hydrophytic Vegetation. Plants that can grow in soils that are saturated or inundated for long periods of time, which contain little or no oxygen when wetted, are considered adapted to those soils and are called hydrophytic. There are different levels of adaptation, as summarized in Table 2. Some plants can only grow in soils saturated with water (and depleted of oxygen), some are mostly found in this condition, and some are found equally in wet soils and in dry soils. Plants observed at each of the sample study areas were identified to species, where possible, using *The Jepson Manual, Vascular Plans of California, Second Edition* (Baldwin et al. 2012). The wetland indicator status of each species was obtained from the *Arid West 2016 Regional Wetland Plant List* (Lichvar et al. 2016). Wetland indicator species are designated according to their frequency of occurrence in wetlands. For instance, a species with a presumed frequency of occurrence of 67 to 99 percent in wetlands is designated a facultative wetland indicator species. The wetland indicator groups, indicator symbol, and the frequency of occurrence of species, provided as a percentage, within wetlands are shown in Table 2.

Table 2. Wetland Indicator Status Categories for Vascular Plants

Indicator Category	Symbol	Frequency (Percent) of Occurrence in Wetlands[1]
Obligate	OBL	>99 (Almost always is a hydrophyte, rarely in uplands)
Facultative wetland	FACW	67 – 99 (Usually a hydrophyte but occasionally found in uplands)
Facultative	FAC	34 – 66 (Commonly occurs as either a hydrophyte or non-hydrophyte)
Facultative upland	FACU	1 – 33 (Occasionally is a hydrophyte, but usually occurs in uplands)
Upland[2]	UPL	<1% (Rarely is a hydrophyte, almost always in uplands)
Not listed[2]	NI	Considered to be an upland species

Obligate and facultative wetland indicator species are hydrophytes that occur “in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present” (Environmental Laboratory 1987). Facultative indicator species may be considered wetland indicators when found growing in hydric soils that experience periodic saturation. Plant species that are not on the regional list of wetland indicator species are considered upland species. A complete list of the vascular plants observed in the project study area, including their current indicator statuses, is provided in Appendix B.

Hydric Soils. Up to 12 inches of the soil profile were examined for hydric soil indicators. The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as one formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper 12 inches of soil (NRCS 2010). Hydric soils include soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. In general, evidence of a hydric soil includes characteristics such as organic soils (histosols), reducing soil conditions, gleyed soils, soils with bright mottles and/or low matrix chroma, soils listed as hydric by the U.S. Department of Agriculture (USDA) on the National Hydric Soils List (NRCS 2018b), and iron and manganese concretions. Reducing soil conditions can also include circumstances where there is evidence of frequent ponding for long or very long duration. A long duration is defined as a period of inundation for a single event that ranges from 7 days to a month and very long is greater than one month (Environmental Laboratory 1987).

Munsell Soil Notations (Munsell 2009) were recorded for the soil matrix of each soil sample. The Munsell color system is based on three color properties: hue, value, and chroma. A brief description of each component of the system is described below, in the order they are used in describing soil color (i.e., hue/value/chroma):

[1] Based on information contained in the Corps Manual.
[2] Plant species that are not listed in the *Arid West 2016 Regional Wetland Plant List* (Lichvar et al. 2016) are considered UPL species

1. **Hue.** The Munsell Soil Color Chart is divided into five principal hues: yellow (Y), green (G), purple (P), blue (B), and red (R), along with intermediate hues such as yellow-red (YR) and green-yellow (GY). Example of commonly encountered hue numbers include 2.5YR, 10YR, and 5Y.
2. **Value.** *Value* refers to lightness, ranging from white to grey to black. Common numerical values for value in the Munsell Soil Color Chart range from 2 for saturated soils to 8 for faded or light colors. Hydric soils often show low-value colors when soils have accumulated sufficient organic material to indicate development under wetland conditions but can show high-value colors when iron depletion has occurred, removing color value from the soil matrix. Value numbers are commonly reported as 8/, 2.5/, and 6/.
3. **Chroma.** *Chroma* describes the purity of the color, from “true” or “pure” colors to “pastel” or “washed out” colors. Chromas commonly range from 1 to 8 but can be higher for gleys. Soil matrix chroma values that are 1 or less, or 2 or less when mottling is present, are typical of soils that have developed under anaerobic conditions. Chroma numbers are listed, for example, as /1, /5, and /8.

The NRCS Web Soil Survey (NRCS 2018a) was consulted to determine which soil types have been mapped in the project study area (Table 1, Figure 4). Detailed descriptions of these soil types are provided in Appendix A.

Wetland Hydrology. Wetland hydrology is defined as an area that is inundated either permanently or periodically at mean water depths less than 6.6 feet, or where the soil is saturated at the surface at some time during the growing season of the prevalent vegetation. The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and non-tidal situations.

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Wetland hydrology indicators provide evidence that the study area has a continuing wetland hydrologic regime. Primary indicators might include visual observation of surface water (A1), high water table (A2), soil saturation (B1), water-stained leaves (B9), and hydrogen sulfide odor (C1). Secondary indicators might include riverine drift deposits (B3), drainage patterns (B10), and passing score for the FAC-neutral test (D5). Each of the sample points was examined for positive field indicators (primary and secondary) of wetland hydrology, following the guidance provided in the Regional Supplement. Potential jurisdictional wetlands were identified within the project study area.

2.3 Identification of Section 404 Jurisdictional Other Waters

“Other waters” includes lakes, slough channels, seasonal ponds, tributary waters, non-wetland linear drainages, and salt ponds. Such areas are identified by the (seasonal or perennial) presence of standing or running water and generally lack hydrophytic vegetation. In non-tidal or muted tidal waters USACE jurisdiction extends to the OHWM which is defined in 33 CFR Part 328.3 as “the line on the shore 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 the soil, destruction of terrestrial vegetation or the presence of litter and debris." In tidal waters, USACE jurisdiction extends to the landward extent of vegetation associated with salt or brackish water or the high tide line (HTL) (see 33 CFR, Part 328.4). The HTL is defined in 33 CFR, Part 328.3 as "the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The HTL may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gauges, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other tides that occur with periodic frequency, but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm."

Identification of Section 10 Waters

Due to the study area's proximity to the Bay, background review and study area surveys were conducted to determine if current and/or Historical Section 10 waters occur within the study area. Section 10 of the Rivers and Harbors Appropriation Act of 1899 applies to "navigable waters of the U.S.", which is defined in 33 CFR, Part 329.4 to include all waters subject to the ebb and flow of the tide, and/or those which are presently or have historically been used to transport commerce. The shoreward jurisdictional limit of tidal waters is further defined in 33 CFR, Part 329.12 as "the line on the shore reached by the plane of the MHW. Where precise definition of the actual location of the MHW line becomes necessary, it must be established by survey with reference to the available tidal datum, preferably averaged over a period of 18.6 years."

2.4 Current Section 10 Waters

Navigable waters of the U.S., which are defined in 33 CFR, Part 329.4, include all waters subject to the ebb and flow of the tide, and/or those which are presently or have historically been used to transport commerce. The shoreward jurisdictional limit of tidal waters is further defined in 33 CFR, Part 329.12 as "the line on the shore reached by the plane of the mean (average) high water." According to 33 CFR, Part 329.9, a waterbody that was once navigable in its natural or improved state retains its character as "navigable in law" even though it is not presently used for commerce as a result of changed conditions and/or the presence of obstructions. The height of the MHW was obtained from long-term monitoring records (i.e., average over 18.6-year tidal epoch) maintained by the National Oceanic and Atmospheric Administration (NOAA). Based on the benchmark datum for the station nearest the study area with data reported relative to NAVD88 (Dumbarton Bridge Station 9414509), the MHW is calculated to be 6.8 feet NAVD88 (NOAA 2013). Current Section 10 waters were identified within the study area.

2.5 Historic Section 10 Waters

According to 33 CFR, Part 329.9, a waterbody that was once navigable in its natural or improved state retains its character as "navigable in law" even though it is not presently used for commerce as a result of changed conditions and/or the presence of obstructions. Historical Section 10 waters may occur behind levees, are not currently exposed to tidal or muted-tidal influence, and meet the following criteria: (1) the area is presently at or below the MHW; (2) the area was historically at or below MHW in its "unobstructed, natural state"; and (3) there is no evidence that the area was ever above MHW. In the Bay region, historical Section 10 waters will typically occur within the extent of historical sloughs that once drained into the Bay and have now been filled or diked. The United States Coast Survey (USCS; later US Coast and Geodetic Survey) is a federal agency renowned for the accuracy and detail of its 19th-century maps of America's shoreline. In most parts of the country, these maps provide the best early pictures of coastal and estuarine habitats prior to substantial Euro-American modification. The San Francisco Estuary Institute (SFEI) has assembled a Geographic Information System (GIS) dataset that uses USCS historical maps as the primary source to depict the extent of historical sloughs in the Bay region. Historic Section 10 waters were identified within the study area.

2.6 Identification of Waters of the State

The Porter-Cologne Water Quality Control Act (PWQCA) broadly defines waters of the state as "any surface water or groundwater, including saline waters, within the boundaries of the state." Because PWQCA applies to any water, whereas the CWA applies only to certain waters, California's jurisdictional reach overlaps and may exceed the boundaries of waters of the U.S. For example, Water Quality Order No. 2004-0004-DWQ states that "shallow" waters of the state include headwaters, wetlands, and riparian areas. Where forested habitat occurs, the outer canopy of any riparian trees rooted within top of bank may be considered jurisdictional as these trees can provide allochthonous[3] input to the channel below. Waters of the state were identified within the study area.

2.7 Identification of CDFW Jurisdiction

Ephemeral and intermittent streams, rivers, creeks, dry washes, sloughs, blue line streams on USGS maps, and watercourses with subsurface flows fall under CDFW jurisdiction. Canals, aqueducts, irrigation ditches, and other means of water conveyance may also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. A stream is defined in Title 14, California Code of Regulations §1.72, as "a body of water that follows at least periodically or intermittently through a bed or channel having banks and that supports fish and other aquatic life. Jurisdiction does not include tidal areas such as tidal sloughs unless there is freshwater input. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." Using this definition, CDFW

[3] Allochthonous is a term used describe nutrients and carbon that come from outside the aquatic system.

extends its jurisdiction to encompass riparian habitats that function as a part of a watercourse. California Fish and Game Code §2786 defines riparian habitat as "lands which contain habitat which grows close to and which depends upon soil moisture from a nearby freshwater source."

The lateral extent of a stream and associated riparian habitat that would fall under the jurisdiction of CDFW can be measured in several ways, depending on the particular situation and the type of fish or wildlife at risk. At a minimum, CDFW would claim jurisdiction over a stream's bed and bank. Where riparian habitat is present, the outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats. CDFW jurisdictional habitats were not identified within the study area.

2.8 Identification of BCDC Jurisdiction

In response to uncoordinated and indiscriminate filling of the Bay, the California legislature passed the McAteer-Petris Act in 1965, establishing the BCDC as the management and regulatory agency for the San Francisco Bay and Delta. The limits of BCDC jurisdiction are defined in the Bay Plan (BCDC 2012) and include a 100-ft wide band along the shoreline of the Bay. The "Bay Shoreline" is defined as line below which all areas are subject to tidal action from the south end of the Bay to the Golden Gate (Point Bonita-Point Lobos), and to the Sacramento River line (a line between Stake Point and Simmons Point, extended northeasterly to the mouth of Marshall Cut). The Bay Shoreline includes the upper extent of marshlands lying between mean high tide and up to 5 feet above mean sea level (MSL), and at a minimum where marshlands are not present, the mean tide line elevation. BCDC Bay jurisdiction includes all areas subject to tidal action bayward of the Bay Shoreline. In relation to salt ponds, the BCDC will claim "salt ponds consisting of all areas which have been diked off from the Bay and have been used during the three years immediately preceding 1969 for the solar evaporation of Bay water in the course of salt production" (BCDC 2012). BCDC Salt Pond jurisdiction extends to include levees for the salt ponds, and even when historical salt ponds are restored, the areas still retain this Salt Pond jurisdiction under BCDC. Finally, BCDC exerts Managed Wetland jurisdiction over bayside wetlands and impoundments managed with tide gates or other structures. Features meeting BCDC criteria were identified in the study area.

3. Survey Results and Discussion

The following vegetation/land use communities were mapped in the study area: (1) developed, (2) wastewater detention ponds (3) northern coastal salt marsh, (4) tidal slough, and (5) California annual grassland (Figure 6). A total of five sample points (SP1 to SP5) were examined to identify jurisdictional features (Appendix C; Figure 7). In the study area, 6.46 acres of potentially jurisdictional waters regulated by USACE and RWQCB (does not include historic Section 10 waters) were identified. Also, 11.75 acres within BCDC jurisdiction were also identified throughout the study area (Table 3). The results of the September 2019 delineation are described below.

Table 3. Summary of Jurisdictional Waters and Habitats within the Study Area

Potentially Jurisdictional Waters	Acres[1]
USACE Jurisdictional Total (not including historic Section 10)	6.00
Section 10/Section 404 (below MHW)	
Tidal sloughs (open water habitat)	1.14
Northern coastal salt marsh	3.59
Section 404 Other Waters and Wetlands (above MHW)	
Tidal sloughs (open water habitat)	0.01
Northern coastal salt marsh	1.26
Historic Section 10 Total	2.**89**
Wastewater detention ponds	2.89
RWQCB Jurisdiction Total	6.46
Section 401 Waters of the State (Up to Top of Bank)	
Developed (levee slopes)	0.46
Northern coastal salt marsh	4.85
Tidal sloughs (open water habitat)	1.15
BCDC Jurisdiction Total	11.75
Bay shoreline	5.66
Shoreline band	6.09

[1]Note: Values are approximate due to rounding.

Information assembled during this investigation and pertinent to the identification of jurisdictional wetlands and other waters is presented in the six appendices of this report.

- Appendix A—Soil Reports for the Study Area
- Appendix B—Plants Observed in the Study Area
- Appendix C—USACE Western Mountains, Valley and Coast Wetland Data Forms
- Appendix D—Photographic Documentation of the Study Area
- Appendix E—Aquatic Resources Table

3.1 Precipitation Data

The survey took place at the end of the 2019 dry season. Relative to the 30-year climate normal, precipitation in the study area was wetter than average for the 2018-2019 wet season prior to the delineation. Total precipitation recorded in the area from November 2018 through April 2019 was 20.4 inches, which is approximately 128% of the 30-year average (1989-2018) (PRISM Climate Group 2019). The wetter than average conditions were taken into account when assessing the biotic habitats present on the study area. The boundaries of waters remained clear owing to the presence of hydrology indicators and hydrophytic vegetation.

3.2 Study Area Conditions and Observations

- This preliminary delineation assumes that normal circumstances prevailed at the time of the September 2019 delineation, and results are based upon the conditions present. The survey was performed using the “Routine Method of Determination” using three parameters, as outlined in the Regional Supplement.
- The study area is within the San Francisco Bay Sub Region (18050004) of the California Water Resources Region hydrologic unit (USGS 2019).
- Flood Slough is a tidal channel that is located along the western edge of the site and receives freshwater runoff from Atherton Channel and the Bayfront Canal.
- There are three detention ponds within the study area, and all were dry at the time of the delineation. The slopes of the ponds were sparsely vegetated with upland forbs (Appendix D, Photo 3). Based on aerial imagery, there were four detention ponds prior to April 2018 (Google Inc. 2019). The detention ponds along the eastern boundary of the project site was completely filled in at the time of the site visit.
- Elevation data for the study area were obtained from the topographic line data provided by Light Detection and Ranging (LIDAR) data. The LIDAR data were acquired via drone flyover in 2019 and provided by Freyer & Laureta, Inc.
- The HTL within the Bay marshland habitat was demarcated in the field by the wrack line, change in plant community, elevation, and bank slope. The upper levee slopes were characterized by upland ruderal vegetation that show no indications of experiencing tidal hydrology.
- The northern coastal salt marsh sampled in the study area exhibited surface water, a high water table, saturation, hydric soil, and hydrophytic vegetation. Dominant vegetation included pickleweed (OBL, *Salicornia pacifica*), which grows in dense mats that are nearly ubiquitous on and around the study area. California cord grass (OBL, *Spartina foliosa*), alkali heath (FACW, *Frankenia salina*), fat-hen (FACW, *Atriplex prostrata*), gumweed (FACW, *Grindelia stricta*), and Alkali russian thistle (FACW, *Salsola soda*) were also found in small quantities in the northern coastal salt marsh habitat in the study area.
- Along the upper slopes of the levee banks throughout the study area, the vegetation is dominated by upland nonnative forbs and grasses. This ruderal upland vegetation is characterized by black mustard (*Brassica nigra*), wild oat (*Avena fatua*), fennel (*Foeniculum vulgare*), stinkwort (*Dittrichia graveolens*), and smilo grass (*Stipa miliacea*).
- Though not relevant to delineation of waters of the U.S., the top of the banks are mapped for clarity and shown on Figure 7 as Section 401 waters of the State. The

current practice of California Regional Water Quality Control Boards is to claim all areas up to the top of bank.

3.3 Rationale for Sample Point Choice

- SP1 was selected to examine the tidal coastal salt marsh along the northern edge of the study area (Figure 7, Appendix C). Vegetation present was comprised of OBL species (pickleweed) and the soil exhibited a depleted matrix. Hydrological indicators, such as high water table and saturation were also observed.
- SP2 was chosen to examine a raised section of coastal salt marsh above the HTL in the study area. Based on aerial imagery, the raised section is likely the remnants of an abandoned levee road (Google Inc. 2019) (Figure 7, Appendix C). It is located immediately adjacent to SP1 and the area is densely vegetated with OBL (pickleweed) and FAC (salt grass) species. Hydrological indicators included soils with a depleted dark surface and high water table.
- SP3 was selected to investigate uplands along the northern edge of the study area (Figure 7, Appendix C). It is located on the upper slope of a levee and is near SP1 and SP2. This area was dominated by upland forbs and grasses.
- SP4 was chosen to represent uplands along the northern edge of the study area (Figure 7, Appendix C). It is located on the top of a levee and is adjacent to SP5 in an area sparsely vegetated with upland forbs that is likely mowed regularly.
- SP5 was selected to represent the tidal salt marsh community below the MHW in the study area (Figure 7, Appendix C). This area was dominated by pickleweed and the soil exhibited a loamy gleyed matrix. Hydrological indicators, such as surface water and saturation were observed.

3.4 Photo Points

Photo point labels, coordinates, and rationale for the photos are include in Table 4. Photos are included in Appendix D.

Table 4. Coordinates and Rationale for Photo Points

Label	Latitude	Longitude	Rationale
Photo 1	37.497401º	-122.176498º	Northern coastal salt marsh
Photo 2	37.497919º	-122.177228º	Tidal slough
Photo 3	37.494992º	-122.177516º	Wastewater Detention pond
Photo 4	37.494767º	-122.175895º	Developed

3.5 Identification of Section 10/Section 404 Potentially Jurisdictional Waters

The tidal waters of the Bay occur throughout the northern and western portions of the study area. As such, tidal waters in the study area are subject to regulation under both Section 404 of the CWA, and below the MHW elevation as defined by Section 10 of the River and Harbors Act. The jurisdictional limits of Section 404 other waters in the study area are broader than Section 10.

Areas Considered Current Section 10 Waters

Approximately 4.73 acres of current Section 10 waters were mapped up to the MHW line elevation in the study area (Figure 7; Appendix D, Photos 1 and 2). For this site, the MHW elevation (approximately 6.8 feet NAVD88) was obtained from the long-term average over the most recent tidal epoch (1983 – 2001) based on the benchmark datum for the nearest tidal NOAA station to the site (Dumbarton Bridge Station 9414509) (NOAA 2013). Benchmark MHW line data is relative to the mean lower low water (MLLW) at the monitoring station. Differences between MLLW and the National Geodetic Survey NAVD88 datum were calculated using the guidance provided by Foxgrover et al. (2005).

Areas Considered Section 404 Other Waters (includes current Section 10 Waters)

Approximately 1.15 acres of Section 404 other waters (tidal sloughs) were mapped within the study area (includes current Section 10 waters) (Figure 7). Tidal sloughs are channels within tidal wetlands that are characterized by open water habitat.

Historic Section 10 Waters

The entire study area was once part of the historical baylands as mapped by SFEI (2017), which included tidal sloughs and Northern coastal salt marsh (Figure 8). However, sections of the wastewater detention ponds still occur below the MHW elevation of 6.3 feet NAVD88 and are isolated from Bay waters. Therefore, approximately 2.89 acres of the wastewater detention ponds that are mapped as historical tidal sloughs by SFEI were mapped as historic Section 10 waters (Figure 8).

3.6 Identification of Section 404 Potentially Jurisdictional Wetlands (Special Aquatic Sites)

Approximately 4.85 acres of Section 404 wetlands (northern coastal salt marsh) were mapped in the study area (includes current Section 10 waters) (Figure 7). A summary of the wetland data form results is presented in Table 5. The data are also presented on the complete forms in Appendix C. Northern coastal salt marsh wetlands dominated by pickleweed, occurs on the northern and western edges of the study area.

Three of the five sample point locations (Figure 7, SP1, SP2, and SP5; Appendix C) had sufficient three-parameter characteristics to meet the definition of a jurisdictional wetland. These sample sites represent the coastal salt marsh conditions throughout the study area.

Northern coastal salt marsh. Northern coastal salt marsh is a wetland plant community found tidal areas and is dominated by salt-tolerant hydrophytic vegetation that typically forms a dense mat of vegetation. This plant community occurs along the California coast from Oregon to near Point Conception and is especially extensive around San Francisco Bay. Typical species include pickleweed, California cordgrass, alkali heath, salt grass, dodder, jaumea (*Jaumea carnosa*), sea lavender (*Limonium californicum*), and marsh gumplant.

Table 5. Summary of Wetland Data Forms

Name	Sampling Rationale	Hydrophytic Vegetation?	Hydric Soil?	Wetland Hydrology?	Overall Wetland Assessment
SP1	Salt marsh community along northern edge of study area	Yes	Yes	Yes	A 3-parameter wetland
SP2	Salt march community on abandoned levee above the HTL	Yes	Yes	Yes	A 3-parameter wetland
SP5	Salt marsh community adjacent to Flood Slough below the MHW	Yes	Yes	Yes	A 3-parameter wetland

3.7 Identification of Section 401 Potentially Jurisdictional Waters of the State

The extent of Section 401 waters of the state (RWQCB jurisdiction) in the study area includes a total of 6.46 acres including areas within Section 404 jurisdiction as described above, in addition to areas up to the top of the levee banks. In the field, the top of bank was determined by mapping the first significant topographic break in levee slope. Waters of the state jurisdiction include all waters of the U.S. and cover approximately 1.15 acres of tidal sloughs, 4.85 acres of northern coastal salt marsh, 0.46 acres of developed areas (levee slopes). Characteristics of waters of the U.S. including wetlands are described above in Sections 3.2 and 3.3.

Throughout the study area, the upper slope of the levee banks above the wetland vegetation is dominated by upland nonnative species including invasive forbs and grasses. This ruderal upland vegetation is characterized by wild oat, black mustard, fennel, and smilo grass.

3.8 Identification of CDFW Potentially Jurisdictional Habitats

The open water habitat and associated wetlands in the study area are not the downstream continuation of streams conveying waters from the uplands to the San Francisco Bay (Bay), but are tidal channels fed entirely by Bay waters with no connection within the study area to upland sources of freshwater. As such, these features are not expected to be considered rivers or streams or be regulated by the California Department of Fish and Wildlife under California Fish and Game Code Section 1603.

3.9 Identification of BCDC Potentially Jurisdictional Areas

Because tidal marshlands occur in the study area, the Bay Shoreline would be located at 5 feet above MSL, and this elevation line would be used to demarcate the limit of BCDC Bay jurisdiction. Additionally, a 100-ft area extending laterally landward of the Bay Shoreline would be jurisdictional as Shoreline Band. A MSL elevation of 3.48 feet NAVD88 was obtained from the nearest NOAA tidal benchmark station at Dumbarton Bridge (Station 9414509)[4], thus the Bay Shoreline and the shoreward limit of BCDC Bay jurisdiction is approximately 8.48 feet NAVD88. As such, approximately 11.75 acres of the study area fall within BCDC jurisdiction, including 5.66 acres of areas within Section 404 jurisdiction as described above and an additional 6.09 acres within the Shoreline Band, which includes 2.28 acres of developed land cover, 3.23 acres of wastewater detention ponds, 0.34 acres of northern coastal salt marsh, and 0.24 acres of California annual grassland (Figure 9).

3.10 Areas Not Meeting the Regulatory Definition of Section 404/401 Wetlands and Waters

In general, areas that were not considered to be Waters of the U.S./state were not dominated by hydrophytic vegetation and did not exhibit hydrology indicators. Approximately 23.43 acres of the study area met none of the regulatory definitions of jurisdictional waters or jurisdictional habitats, including the developed land cover, the detention ponds, and California annual grassland (Appendix D, Photo 4; Figure 6).

Wastewater Detention Ponds. Two of the ponds are used for flow equalization (Ponds 1 and 2) and one pond is used for emergency storage (Pond 3) (Figure 7)**.** All retained wastewater is rerouted back to the Silicon Valley Clean Water Wastewater Treatment Plant in Redwood City

[4] Benchmark MSL data for the Dumbarton Bridge (NOAA 2013) is relative to the mean lower low water (MLLW) at the monitoring station. The difference between MLLW and the NAVD88 datum were calculated using the guidanceprovided by Foxgrover et al. (2005). An orthometric height conversion was then performed to calculate the datum shift from the local datum to NAVD88. Finally, the MSL elevation was determined to be approximately 3.48 feet.

prior to discharge into the Bay. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA are not waters of the U.S. 33 CFR § 328.3(a); 40 CFR § 230.3(s).

Developed. Developed land cover includes areas with permanent structures, impervious surfaces, unpaved high-use areas, or areas regularly disturbed by human activities. Generally, these areas are devoid of substantial vegetation cover but may contain areas of ruderal vegetation. Within the study area, developed land cover includes the levees, hardpack dirt roads, buildings, staging and storage areas, and the water treatment facility. Within the developed land cover, there are scattered areas of ruderal (disturbed) vegetation, mostly along the levee roads and perimeter of the site.

California Annual Grassland. California annual grassland is an herbaceous plant community that is typically dominated by non-native annual grasses. In the study area, this vegetation type is found in Bedwell Bayfront Park.

Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

Vegetation Communities

- California Annual Grassland (2.40 acres)
- Developed (9.70 acres)
- Northern Coastal Salt Marsh (4.85 acres)
- Wastewater Detention Pond (11.33 acres)
- Tidal Slough (1.15 acres)

Base Map Features

- Study Area (29.43 acres)

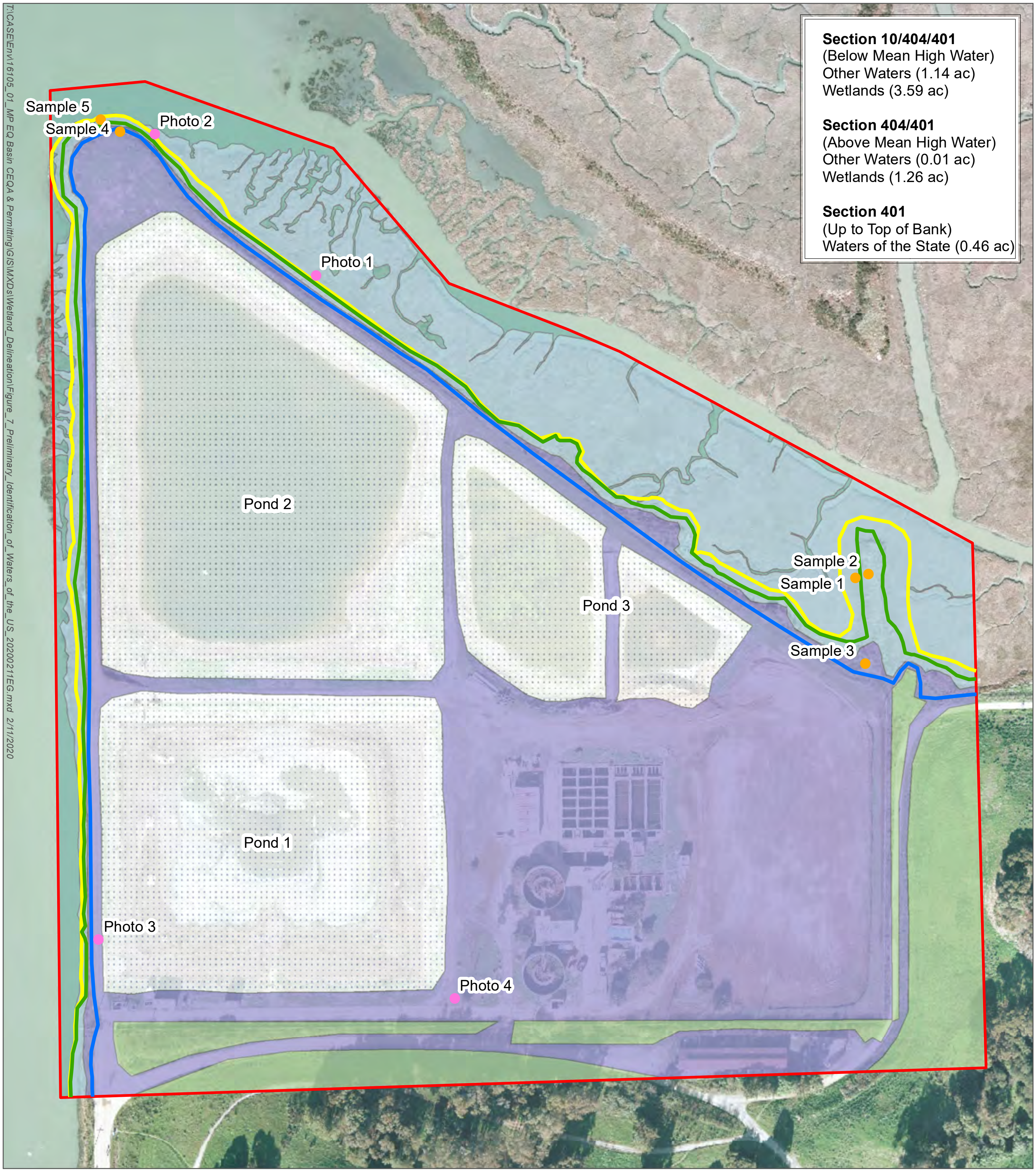
0 100 200 400 Feet

N

MIG

Figure 6 Vegetation Communities

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project



Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

Base Map Features

- Study Area (29.43 acres)
- Sample Point
- Photo Point
- Mean High Water
- High Tide Line
- Top of Bank

Vegetation Communities

- California Annual Grassland (2.40 acres)
- Developed (9.70 acres)
- Northern Coastal Salt Marsh (4.85 acres)
- Wastewater Detention Pond (11.33 acres)
- Tidal Slough (1.15 acres)

0 100 200 400 Feet

MIG

Figure 7 Preliminary Identification of Waters of the U.S./State

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

Source: Freyer & Laureta, Inc. 2020; NWI 2019; EcoAtlas 2020; MIG 2020

Vegetation Communities

- California Annual Grassland (2.40 ac)
- Developed (9.70 ac)
- Northern Coastal Salt Marsh (4.85 ac)
- Wastewater Detention Pond (11.33 ac)
- Tidal Slough (1.15 ac)

Base Map Features

- Study Area (29.43 ac)
- Historic Section 10 Waters (2.89 ac)

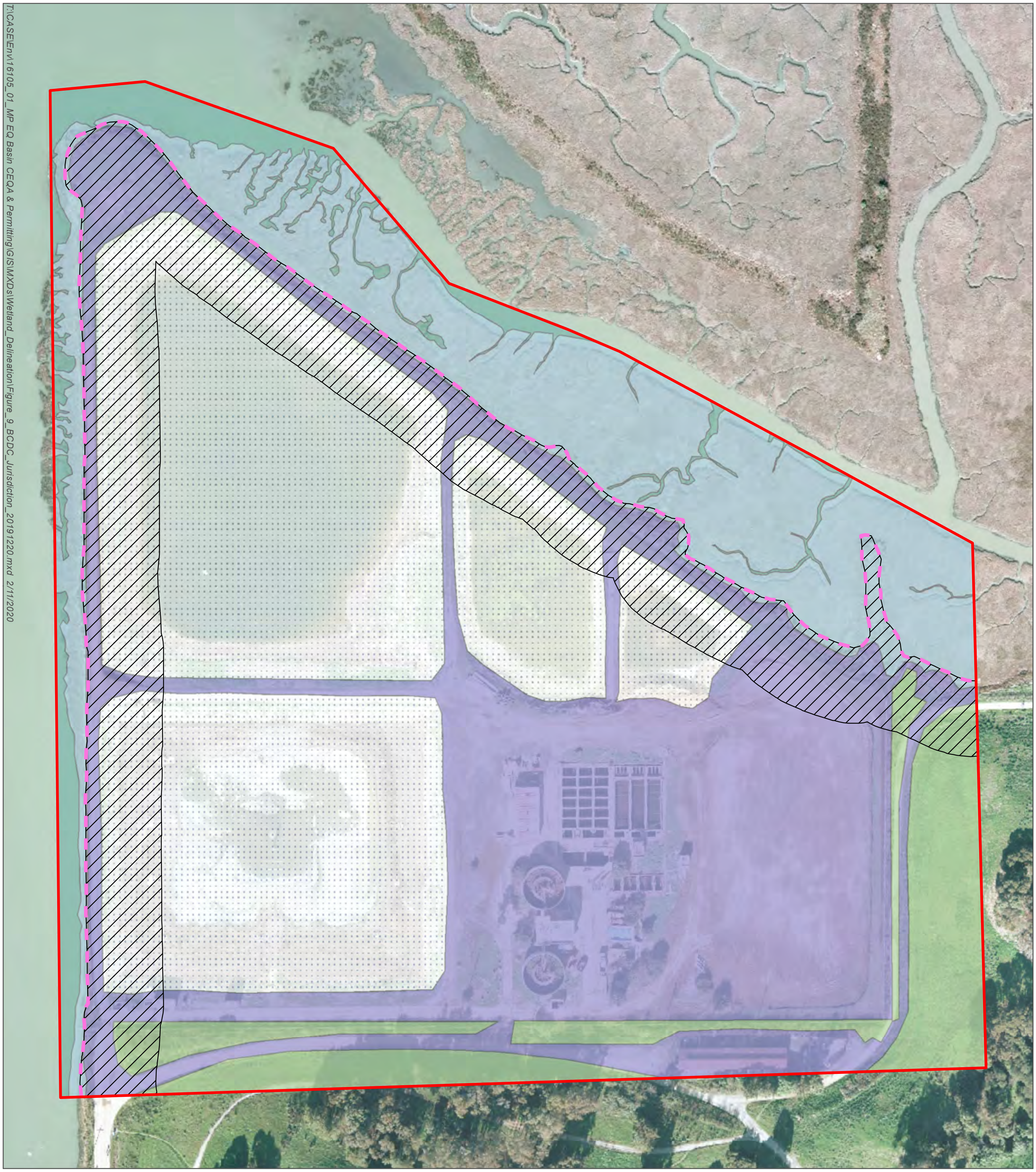
0 100 200 400 Feet

N

Figure 8 Historic Section 10 Waters

MIG

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project



Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

MIG

Figure 9 BCDC Jurisdiction

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

4. Literature Cited

Baldwin, Goldman, Keil, Patterson, Ronatti, and Wilkin (eds.) 2012. The Jepson Manual: Vascular Plants of California. 2nd Edition. University of California Press, Berkeley, California.

[BCDC] Bay Conservation and Development Commission. 2012. San Francisco Bay Plan. Accessed November 2019 from http://www.bcdc.ca.gov/pdf/bayplan/bayplan.pdf.

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. (Version 04DEC98).

Environmental Laboratory. 1987. U.S. Corps of Engineers Wetlands Delineation Manual. Department of the Army.

Foxgrover, A.C., B.E. Jaffe. G.T. Hovis, C.A. Martin, J.R. Hubbard, M.R. Samant, and S.M. Sullivan. 2005. Hydrographic Survey of South San Francisco Bay, California. U.S. Geological Survey Open File Report 2007-1169.

Google Inc. 2019. Google Earth Pro (Version 7.1.5.1557) [Software]. Available from earth.google.com.

Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2016. Western Mountains, Valleys, and Coast 2016 Regional Plant List. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Prepared for the U.S. Army Corps of Engineers.

Munsell. 2009. Soil Color Charts, Munsell Color X-rite. Grand Rapids, Michigan.

[NOAA] National Oceanic and Atmospheric Administration. 2013. Tidal Benchmark Datum for the Dumbarton Bridge (Station ID: 9414509). Accessed November 2019 from https://tidesandcurrents.noaa.gov/datums.html?id=9414509.

[NRCS] Natural Resources Conservation Service. 2010. Field Indicators of Hydric Soils in the U.S.: A Guide for Identifying and Delineating Hydric Soils (Version 7.0). U.S. Department of Agriculture. Prepared with the National Technical Committee for Hydric Soils.

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

[NRCS] National Resource Conservation Service. 2019b. National Hydric Soils List. Accessed November 2019 from http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

[NWI] National Wetlands Inventory. 2019. Wetlands Mapper. U.S. Fish and Wildlife Service Accessed November 2019 from http://www.fws.gov/wetlands/Wetlands-Mapper.html.

PRISM Climate Group. 2019. Online PRISM Data Explorer. Oregon State University, Corvallis, Oregon. Accessed November 2019 from http://www.prism.oregonstate.edu/.

[SFEI] San Francisco Estuary Institute and Aquatic Science Center. 2017. Data Center. Accessed December 2019 from http://www.sfei.org/sfeidata.htm#

[UCSB] University of California Santa Barbara Library. 2019. Digital Aerial Photography Collections. Accessed November 2019 from https://www.library.ucsb.edu/src/airphotos

[USACE] U.S. Army Corps of Engineers. 2004. Review of Ordinary High Water Mark Indicators for Delineating Arid Streams in the Southwestern United States. January 2004.

[USACE] U.S. Army Corps of Engineers. 2007. Review and Synopsis of Natural and Human Controls on Fluvial Channel Processes in the Arid West. September 2007.

[USACE] U.S. Army Corps of Engineers. 2008a. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region. May 2010. U.S. Army Engineer Research and Development Center.

[USACE] U.S. Army Corps of Engineers. 2008b. A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States. August 2008. U.S. Army Engineer Research and Development Center.

[USACE] U.S. Army Corps of Engineers. 2016a. Updated Map and Drawing Standards for the South Pacific Division Regulatory Program.

[USACE] U.S. Army Corps of Engineers. 2016b. Information Needed for Verification of Corps Jurisdiction, San Francisco District. Revised April 2016. https://www.spn.usace.army.mil/Portals/68/docs/regulatory/2%20-%20Info%20Req.pdf

[USGS] U.S. Geological Survey. 2019. Water Resources of the United States. Accessed November 2019 from https://water.usgs.gov/GIS/huc_name.html#Region18

Appendix A. Soils Report for the Study Area

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 San Mateo County, Eastern Part, and San Francisco County, California

December 4, 2019

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

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.

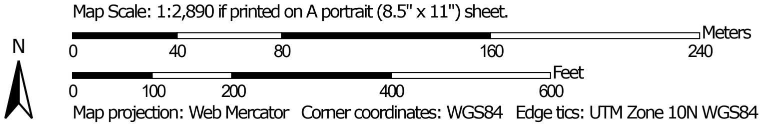
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in 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.

Soil Map

Map Scale: 1:2,890 if printed on A portrait (8.5" x 11") sheet.



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 Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: San Mateo County, Eastern Part, and San Francisco County, California
Survey Area Data: Version 15, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 12, 2019—Apr 24, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
125	Pits and Dumps	24.7	84.0%
W	Water	4.7	16.0%
Totals for Area of Interest		**29.4**	**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.

San Mateo County, Eastern Part, and San Francisco County, California

125—Pits and Dumps

Map Unit Composition

Pits: 50 percent
Dumps: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Dumps

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

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

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix B. Plants Observed in the Study Area

Common Name	Scientific Name	Wetland Indicator Status[1]
Alkali heath	*Frankenia salina*	FACW
Alkali Russian thistle	*Salsola soda*	FACW
Big saltbrush	*Atriplex lentiformis*	FAC
Black mustard	*Brassica nigra*	NI
Bull thistle	*Cirsium vulgare*	FACU
California cord grass	*Spartina foliosa*	OBL
Canada horseweed	*Erigeron canadensis*	NI
Coyote brush	*Baacharis pilularis*	NI
Curly dock	*Rumex crispus*	FAC
Dodder	*Cuscuta* sp.	NI
Fat-hen	*Atriplex prostrata*	FACW
Fennel	*Foeniculum vulgare*	NI
Gumweed	*Grindelia stricta*	FACW
Italian rye grass	*Festuca perennis*	FAC
Ngaio tree	*Myoporum laetum*	FACU
Pickleweed	*Salicornia pacifica*	OBL
Prostrate knotweed	*Polygonum aviculare*	FAC
Smilo grass	*Stipa miliacea*	NI
Stinkwort	*Dittrichia graveolens*	NI
Virginia glasswort	*Salicornia depressa*	OBL
Wild oat	*Avena fatua*	NI

Notes:

[1]Wetland Indicator Status obtained from Lichvar et al. (2016)

Wetland Indicator Status Key:

OBL = Obligate wetland species, occur almost always in wetlands (>99% probability).
FACW = Facultative Wetland species, usually occur in wetlands (67 to 99% probability), but occasionally found in non-wetlands.
FAC = Facultative species, equally likely to occur in wetlands or non-wetlands (34 to 66% probability).
FACU = Facultative Upland, usually occur in non-wetlands (67% to 99%), but occasionally found in wetlands.
UPL = Obligate Upland species, occur almost always in non-wetlands (>99% probability).
NI = Non-Indicator, not present on list. Considered to be an upland species.

Appendix C. USACE Western Mountains, Valley, and Coast Wetland Data Forms

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project　City/County: Menlo Park　Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc.　State: CA　Sampling Point: SP1
Investigator(s): DWG　Section, Township, Range: ______
Landform (hillslope, terrace, etc): Basin　Local relief (concave, convex, none): Concave　Slope (%): 2
Subregion (LRR): LRR C　Lat: 37.49628　Long: -122.174051　Datum: WGS84
Soil Map Unit Name: Water　NWI classification: E2EM1N
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:
Tidal marsh

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Salicornia* / Pickleweed	80	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20　% Cover of Biotic Crust ______

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: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		80 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
__ Prevalence Index ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0 to 6	10YR 3/2	85	5YR 5/8	15	D	PL	Silty clay	
6 to 14	10GY 4/1	85	5YR 6/8	15	C	M	Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
X Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils³:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ___
Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:
Gleyed Matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

___ Surface Water (A1)
X High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1) **(Nonriverine)**
___ Sediment Deposits (B2) **(Nonriverine)**
___ Drift Deposits (B3) **(Nonriverine)**
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Surface Soil Cracks (B6)
___ 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:

	Yes	No	Depth (inches):
Surface Water Present?		X	
Water Table Present?	X		12
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project　City/County: Menlo Park　Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc.　State: CA　Sampling Point: SP2
Investigator(s): DWG　Section, Township, Range: ______
Landform (hillslope, terrace, etc): Bench　Local relief (concave, convex, none): Convex　Slope (%): 2%
Subregion (LRR): LRR C　Lat: 37.496297　Long: -122.17399　Datum: WGS84
Soil Map Unit Name: Water　NWI classification: E2EM1P
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed?　Are "Normal Circumstances" present? Yes X 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 X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? Yes X No ___

Remarks:
On bench above HTL

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Distichlis spicata* / Salt grass	40	Yes	FAC
2. *Salicornia* / Pickleweed	20	Yes	OBL
3. *Frankenia salina* / Yerba reuma, Alkali heath	15	No	FACW
4. *Bromus diandrus* / Ripgut brome, Ripgut grass	5	No	UPL
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20　% Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	15	x 2 =	30
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	80 (A)		195 (B)

Prevalence Index = B/A = 2.44

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0 to 18	10YR 3/1	90	5YR 5/8	10	C	M	Silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
X Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils³:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes X No ___

Remarks:
Above HTL

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)
___ Surface Soil Cracks (B6)
___ 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)
X 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	X	Depth (inches):	
Water Table Present?	Yes	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Soil moisture at 18 inches. Likely water table present due to location in tidal marsh. Site Visit during the dry season/draw down of soil moisture.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project City/County: Menlo Park Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc. State: CA Sampling Point: SP3
Investigator(s): DWG Section, Township, Range:
Landform (hillslope, terrace, etc): Shoulder slope Local relief (concave, convex, none): Convex Slope (%): 3%
Subregion (LRR): LRR C Lat: 37.495973 Long: -122.173985 Datum: WGS84
Soil Map Unit Name: 125-Pits and Dumps NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X		
Hydric Soil Present?	Yes ___	No X	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes ___	No X	**within a Wetland?**	Yes ___ No X

Remarks:
Upland/levee

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Avena* / Oat	50	Yes	UPL
2. *Foeniculum vulgare* / Fennel	25	Yes	UPL
3. *Raphanus sativus* / Jointed charlock, Radish	15	No	UPL
4.			
5.			
6.			
7.			
8.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting
___ 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 X

Remarks:

SOIL

Sampling Point: SP3

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 to 8	10 YR 3/2	100					Silty clay loam	No redox observed

[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) (except MLRA 1)
___ 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 __X__

Remarks:

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)
___ Surface Soil Cracks (B6)
___ 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 __X__	Depth (inches):	
Water Table Present?	Yes ______	No __X__	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ______	No __X__	Depth (inches):	

Wetland Hydrology Present? Yes ______ No __X__

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Upland adjacent to tidal marsh.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project City/County: Menlo Park Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc. State: CA Sampling Point: SP4
Investigator(s): DWG Section, Township, Range:
Landform (hillslope, terrace, etc): Levee Local relief (concave, convex, none): Convex Slope (%): 2
Subregion (LRR): LRR C Lat: 37.497927 Long: -122.177383 Datum: WGS84
Soil Map Unit Name: Water NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? Yes ____ No X

Remarks:
Levee was mowed.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Foeniculum vulgare* / Fennel	5	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0.0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	5 (A)		25 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting
- ___ 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 X

Remarks:
Thatch present from mowing; mostly bare ground; upland area

SOIL

Sampling Point: SP4

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 %	Type¹	Loc²	Texture	Remarks
0 to 6 inches	10YR 4/3	100					Silty clay loam	Very rocky with pebbles, dry, no redox

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
___ 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 Soils³:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

³Indicators 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 X

Remarks:
Rocky. Hard to dig.

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)
___ Surface Soil Cracks (B6)
___ 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:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Upland area on levee

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project City/County: Menlo Park Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc. State: CA Sampling Point: SP5
Investigator(s): DWG Section, Township, Range: ______
Landform (hillslope, terrace, etc): Terrace Local relief (concave, convex, none): Convex Slope (%): 2
Subregion (LRR): LRR C Lat: 37.497974 Long: -122.177476 Datum: WGS84
Soil Map Unit Name: Water NWI classification: E2EM1N
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:
Tidal marsh below the HTL

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Salicornia* / Pickleweed	60	Yes	OBL
2. *Spartina foliosa* / Pacific cordgrass, California cord grass	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		80 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
___ Prevalence Index ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP5

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 %	Type¹	Loc²	Texture	Remarks
0 to 18	10GY 4/1	95	5YR 5/6	5	D	M	Silty clay	Organic matter throughout matrix

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
_X_ 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 Soils³:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes _X_ No ___

Remarks:
Gleyed matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

___ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1) **(Nonriverine)**
___ Sediment Deposits (B2) **(Nonriverine)**
___ Drift Deposits (B3) **(Nonriverine)**
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Surface Soil Cracks (B6)
___ 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:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?	X		4
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo of SP1

Photo of SP2

Photo of SP3

Photo of SP4

Photo of SP5

Appendix D. Photographic Documentation of the Study Area

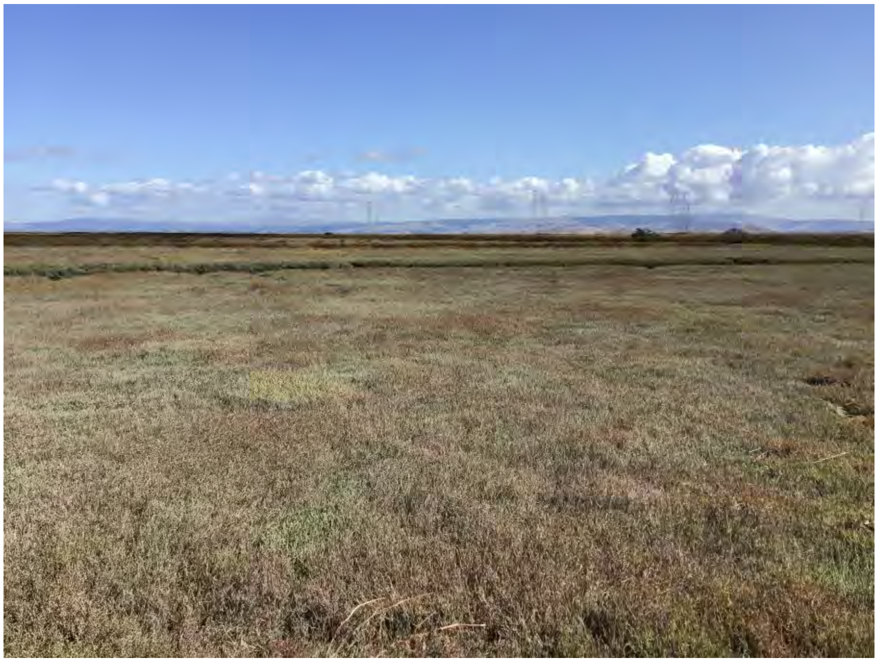


Photo 1. Northern coastal salt marsh habitat along the northern edge of the study area.

Photo 2. Tidal slough (open water habitat) along the northern edge of the study area.


Photo 3. Detention pond within the study area.


Photo 4. Developed land cover within the study area.

Appendix E. Aquatic Resources Table

Waters Name	State	Cowardin Code	HGM Code	Measurement Type	Amount	Units	Water Type	Latitude	Longitude	Local Waterway
Northern Coastal Salt Marsh	CA	E2EM1N	ESTUARINEF	Area	4.85	Acres	TNWW	37.496994º	-122.175525º	San Francisco Bay
Tidal Slough	CA	E2US3N	ESTUARINEF	Area	1.15	Acres	TNW	37.496994º	-122.175525º	San Francisco Bay

APPENDIX D

WETLAND DELINEATION REPORT

This page intentionally left blank.

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102

June 18, 2020

Regulatory Division

Subject: File Number SPN-2018-00371

Mr. David Gallagher
MIG
2055 Junction Avenue, Suite 205
San Jose, CA 95134
dgallagher@migcom.com

Dear Mr. Gallagher:

This correspondence is in response to your submittal of April 23, 2020, on behalf of the West Bay Sanitary District, requesting an approved jurisdictional determination of the extent of waters of the United States occurring on a 29.43-acre site in the City of Menlo Park, San Mateo County, California (Lat: 37.496°, Long: -122.176°).

All proposed discharges of dredged or fill material occurring below the plane of ordinary high water in non-tidal waters of the United States; or below the high tide line in tidal waters of the United States; or within the lateral extent of wetlands adjacent to these waters, typically require Department of the Army authorization and the issuance of a permit under Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq*.). Waters of the United States generally include the territorial seas; all traditional navigable waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters subject to the ebb and flow of the tide; wetlands adjacent to traditional navigable waters; non-navigable tributaries of traditional navigable waters that are relatively permanent, where the tributaries typically flow year-round or have continuous flow at least seasonally; and wetlands directly abutting such tributaries. Where a case-specific analysis determines the existence of a "significant nexus" effect with a traditional navigable water, waters of the United States may also include non-navigable tributaries that are not relatively permanent; wetlands adjacent to non-navigable tributaries that are not relatively permanent; wetlands adjacent to but not directly abutting a relatively permanent non-navigable tributary; and certain ephemeral streams in the arid West.

All proposed structures and work, including excavation, dredging, and discharges of dredged or fill material, occurring below the plane of mean high water in tidal waters of the United States; in former diked baylands currently below mean high water; outside the limits of mean high water but affecting the navigable capacity of tidal waters; or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States, typically require Department of the Army authorization and the issuance of a permit under Section 10 of the Rivers and Harbors Act of 1899, as amended (33 U.S.C. § 403 *et seq*.). Navigable waters of the United States generally include all waters subject to the ebb and flow of the tide; and/or all waters presently used, or have been used in the past, or may be susceptible for future use to transport interstate or foreign commerce.

The enclosed delineation maps titled "Approved Jurisdictional Determination, pursuant to Section 10 Rivers and Harbors Act, and Section 404 Clean Water Act, West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project, Menlo Park, San Mateo County (Lat: 37.496°, Long: -122.176°)," in two sheets, date certified June 18, 2020, accurately depicts the extent and location of wetlands, other waters of the United States, and navigable waters of the United States within the study area of the site that are subject to U.S. Army Corps of Engineers' regulatory authority under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. This approved jurisdictional determination is based on the current conditions of the site, as verified during a field investigation of August 6, 2019, a review of available digital photographic imagery, and a review of other data included in your submittal. This approved jurisdictional determination will expire in three years from the date of this letter unless new information or a change in field conditions warrants a revision to the delineation map prior to the expiration date. The basis for this approved jurisdictional determination is explained in the enclosed *Approved Jurisdictional Determination Form*. This approved jurisdictional determination is presumed to be consistent with the official interagency guidance of June 5, 2007, interpreting the Supreme Court decision *Rapanos v. United States*, 126 S. Ct. 2208 (2006).

The enclosed delineation map further depicts the extent and location of wastewater detention ponds within the study area of the site that are **not** subject to U.S. Army Corps of Engineers' regulatory authority under Section 404 of the Clean Water Act. Waters of the United States do not generally include non-tidal drainage and irrigation ditches excavated on dry land; artificially irrigated areas which would revert to upland if the irrigation ceased; artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons; and water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel, unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of a waters of the United States (51 Fed. Reg. 41,217; Nov. 13, 1986). Based on a case-by-case analysis, the U.S. Army Corps of Engineers may elect to not exert jurisdiction over these categories of water bodies. These delineated water bodies, however, may be considered as "waters of the State" and, therefore, subject to regulation by the California Regional Water Quality Control Board, San Francisco Bay Region, under the Porter-Cologne Water Quality Control Act, as amended (California Water Code § 1300 *et seq*.).

You are advised that the approved jurisdictional determination may be appealed through the U.S. Army Corps of Engineers' *Administrative Appeal Process*, as described in 33 C.F.R. § 331 (65 Fed. Reg. 16,486; Mar. 28, 2000) and outlined in the enclosed flowchart and *Notification of Administrative Appeal Options, Process, and Request for Appeal* (NAO-RFA) Form. If you do not intend to accept the approved jurisdictional determination, you may elect to provide new information to this office for reconsideration of this decision. If you do not provide new information to this office, you may elect to submit a completed NAO-RFA Form to the Division Engineer to initiate the appeal process; the completed NAO-RFA Form must be submitted directly to the Appeal Review Officer at the address specified on the NAO-RFA Form. You will relinquish all rights to a review or an appeal unless this office or the Division Engineer receives new information or a completed NAO-RFA Form within 60 days of the date on the NAO-RFA Form. If you intend to accept the approved jurisdictional determination, you do not need to take any further action associated with the Administrative Appeal Process.

You may refer any questions on this matter to Bryan Matsumoto by telephone at 415-503-6786 or by e-mail at Bryan.T.Matsumoto@usace.army.mil. All correspondence should be addressed to the Regulatory Division, South Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. The Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner while preserving and protecting our nation's aquatic resources. If you would like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website:
https://www.spn.usace.army.mil/Missions/Regulatory.aspx.

Sincerely,

Digitally signed by MATSUMOTO.BRYAN.T.1258523683
Date: 2020.06.18 18:25:29 -07'00'

Bryan Matsumoto
Senior Project Manager
Regulatory Division

Enclosures

cc:
RWQCB, Tahsa Sturgis, Tahsa.Sturgis@Waterboards.ca.gov
West Bay Sanitary District, Bill Kitajima, bkitajima@westbaysanitary.org
West Bay Sanitary District, Phil Scott, PScott@westbaysanitary.org

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

Preliminary Delineation of Wetlands and Other Waters

Prepared for:
West Bay Sanitary District
500 Laurel Street
Menlo Park, CA 94025

Prepared by:
MIG
2055 Junction Avenue, Suite 205
San José, CA 95134
(650) 400-5767

February 2020

Executive Summary

MIG surveyed the West Bay Sanitary District Flow Equalization and Resource Recovery Facility (FERRF) Flood Protection Project study area located in the City of Menlo Park in San Mateo County, California for wetlands and other waters potentially subject to regulation under Section 404 of the Clean Water Act as administered by the United States Army Corps of Engineers (USACE). The survey also delineated the extent of waters of the state that may be subject to regulation by the Regional Water Quality Control Board (RWQCB) under Section 401 of the Clean Water Act and under the Porter Cologne Water Quality Control Act. Lastly, the extent of waters that are likely subject to regulation under the McAteer-Petris Act of 1965, which is administered by the San Francisco Bay Conservation and Development Commission (BCDC), are included in this delineation.

In total, approximately 6.46 acres of potentially USACE and RWQCB jurisdictional features were identified in the study area (not including historic Section 10 waters). These include approximately 4.73 acres of Section 404, Section 10, and Section 401 waters situated below the mean high water (MHW) line of the San Francisco Bay. Jurisdictional waters and wetlands that are subject only to Sections 404 and 401 occur above the MHW line and comprise 1.27 acres of the study area. Section 401 waters of the state extend farther up to the top of the levees for an additional 0.46 acres. In addition, approximately 2.89 acres of the wastewater detention ponds meet the definition of Historic Section 10 waters. Also, BCDC jurisdictional areas are present and encompass 11.75 acres of the study area. Potentially jurisdictional habitats are summarized in the table below.

Summary of Jurisdictional Waters and Habitats within the Study Area

Potentially Jurisdictional Waters	Acres[1]
USACE Jurisdictional Total (not including historic Section 10)	**6.00**
Section 10/Section 404 (below MHW)	
Tidal sloughs (open water habitat)	1.14
Northern coastal salt marsh	3.59
Section 404 Other Waters and Wetlands (above MHW)	
Tidal sloughs (open water habitat)	0.01
Northern coastal salt marsh	1.26
Historic Section 10 Total	**2.89**
Wastewater detention ponds	2.89

RWQCB Jurisdiction Total	**6.46**
Section 401 Waters of the State (Up to Top of Bank)	
Developed (levee slopes)	0.46
Northern coastal salt marsh	4.85
Tidal sloughs (open water habitat)	1.15
BCDC Jurisdiction Total	**11.75**
Bay shoreline	5.66
Shoreline band	6.09

[1]Note: Values are approximate due to rounding.

Table of Contents

Figures

Tables

Appendices

1. Introduction

1.1 Project Study Area Description

The West Bay Sanitary District (WBSD) owns and operates a flow equalization facility located in the City of Menlo Park (Figure 1). The facility currently operates to store wastewater during high flow events to prevent overflow at District facilities and the Silicon Valley Clean Water Wastewater Treatment Plant in Redwood City. The site is surrounded on the north east and west sides by San Francisco Bay and Bedwell Bayfront Park abuts the site's southern boundary. The 29.43-acre study area for the delineation extends into the Bay and Bedwell Bayfront Park (Figure 2). The site contains the remnants of a decommissioned wastewater treatment plant (WWTP) which operated from 1952-1980. The site also contains three wastewater detention ponds on the west and north side of the study area which are used for wet weather flow storage (Figure 2). The study area is situated in the *Palo Alto* U.S. Geological Survey (USGS) 7.5-minute quadrangle (Figure 3). Elevation of the study area is approximately 0 to 40 feet North American Vertical Datum of 1988 (NAVD88) (Google Inc. 2019).

The climate at the study area is coastal Mediterranean, with most rain falling in the winter and spring. Mild cool temperatures are common in the winter. Hot to mild temperatures are common in the summer. Climate conditions in the study area include a 30-year average of approximately 17.6 inches of annual precipitation with an average temperature range from 48ºF to 71ºF (PRISM Climate Group 2019). Relative to the 30-year climate normal, the study area experienced wetter than normal conditions during the 2018/2019 wet season prior to the September 2019 survey. From November 2018 through April 2019, the area received 20.4 inches of precipitation, which is approximately 128% of the 30-year average for this same period (PRISM Climate Group 2019).

Figure 4 shows the one soil unit mapped by the National Resource Conservation Service (NRCS) in the study area, and Table 1 summarizes the associated texture, drainage classification, and hydric soil status (NRCS 2019a). The study area includes the following soil unit: 125 – Pits and Dumps, which consists of gravel pits, refuse dumps, and rock quarries. This soil series is not listed as hydric in San Mateo County on the National Hydric Soils List (NRCS 2019b). A detailed description of this soil type is provided in Appendix A.

Table 1. Soil Type, Texture, Drainage Classification, and Hydric Status for Soils Occurring in the Study Area

Soil Symbol	Soil Name	Soil Texture	Drainage Classification	Hydric Status
125	Pits and Dumps	N/A	N/A	No

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) map of the study area is depicted in Figure 5. The NWI identified the wastewater detention ponds within the study area as artificially flooded freshwater ponds (PUSK) (NWI 2019). Also, the NWI identified intertidal estuarine and marine wetland and open water habitat within the study area (E2USN and E2EM1N) (NWI 2019). NWI maps are based on interpretation of aerial photography, limited verification of mapped units, and/or classification of wetland types using the classification system developed by Cowardin et al. (1979). These data are available for general reference purposes and do not necessarily correspond to the presence or absence of jurisdictional waters.

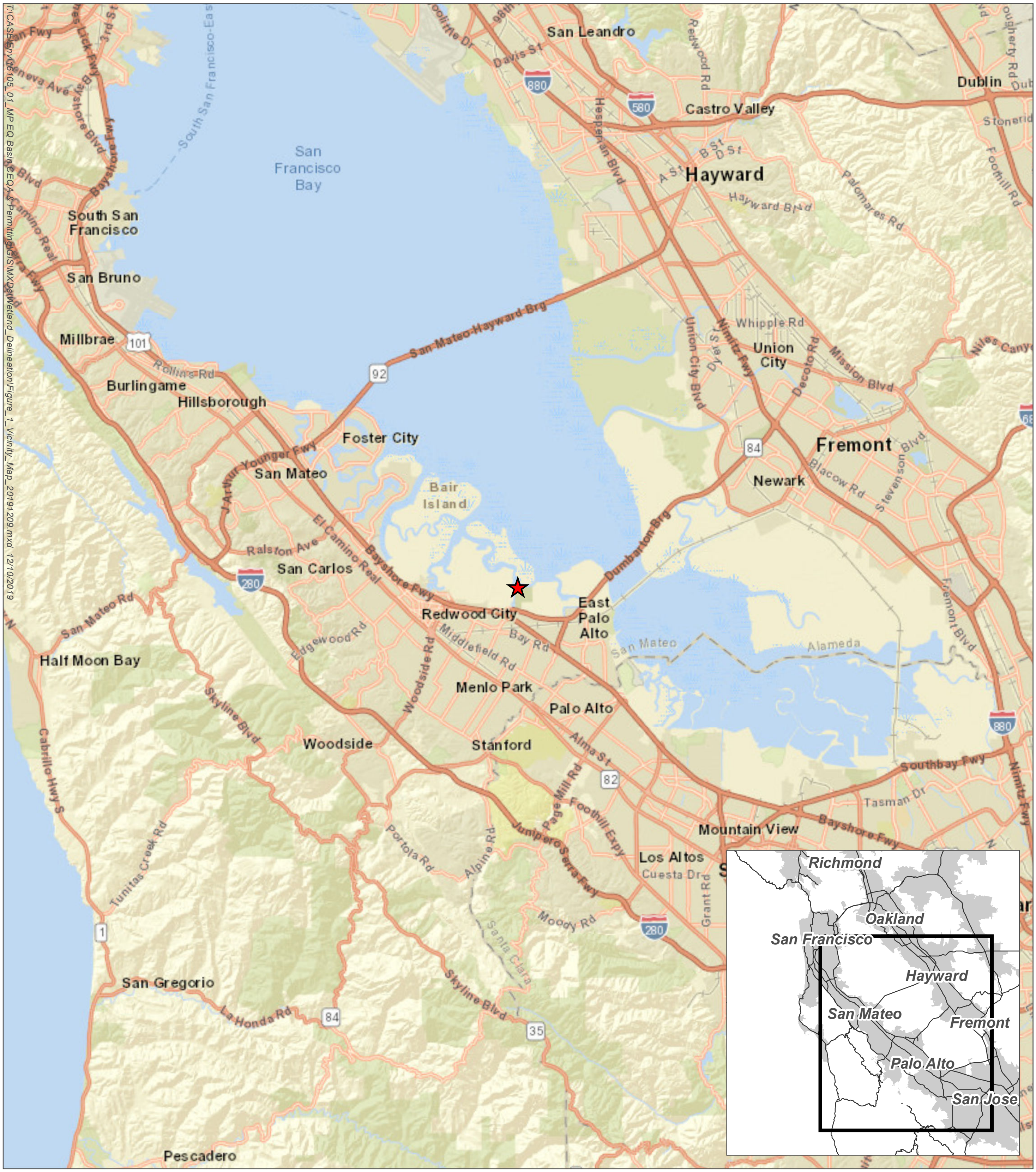
1.2 Proposed Project

The flow equalization facility is in a FEMA 100-year flood zone. The District is proposing to improve the site and bring it out of the FEMA flood zone and plan for 50-year sea level rise projections. The existing facility is surrounded by earthen levees that are not FEMA certified, and therefore require improvement/repairs to ensure the facility remains separated from adjacent Bay/tidal waters. In order to receive FEMA certification, the project proposes to protect the site from flooding and sea level rise by installing sheet pile walls on the west side of the site, an ecotone levee on the north side, and fill on the east and south sides. The ecotone levee would provide additional habitat for special status species and is incorporated as part of the project for sea level rise and climate change adaptations. Project construction is anticipated to begin in 2021.

In addition to flood improvements, the project would also install a new water recycling facility (WRF) at the site, adjacent to the existing decommissioned water treatment plant. The WRF would occupy approximately 10,000 square feet of the study area and sized to produce up to 1.0 million gallons of recycled water per day. Remnant structures of the decommissioned water treatment plant would remain unaffected by the proposed project facilities. Other than the WRF itself, the system would require new influent and effluent piping to connect the facility with customers (end users) for the recycled water. Preliminary pipeline alignments would primarily be installed in existing street rights-of-way.

1.3 Survey Purpose

The purpose of the field survey was to identify the extent and distribution of potentially jurisdictional waters, such as wetlands and other waters, and other jurisdictional habitats occurring within the study area under conditions existing at the time of the September 30, 2019 survey. The results of the field survey in combination with aerial imagery and topographic data were used to map potential jurisdictional features in the study area.



Source: ESRI 2019; MIG 2019

★ Project Location

0 2 4 8 Miles

Figure 1 Vicinity Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

MIG

Source: Freyer & Laureta, Inc. 2020; MIG 2019

Base Map Features

Study Area (29.43 acres)

0 200 400 800 Feet

Figure 2 Project Site Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

Source: ESRI 2019; MIG 2019

Base Map Features

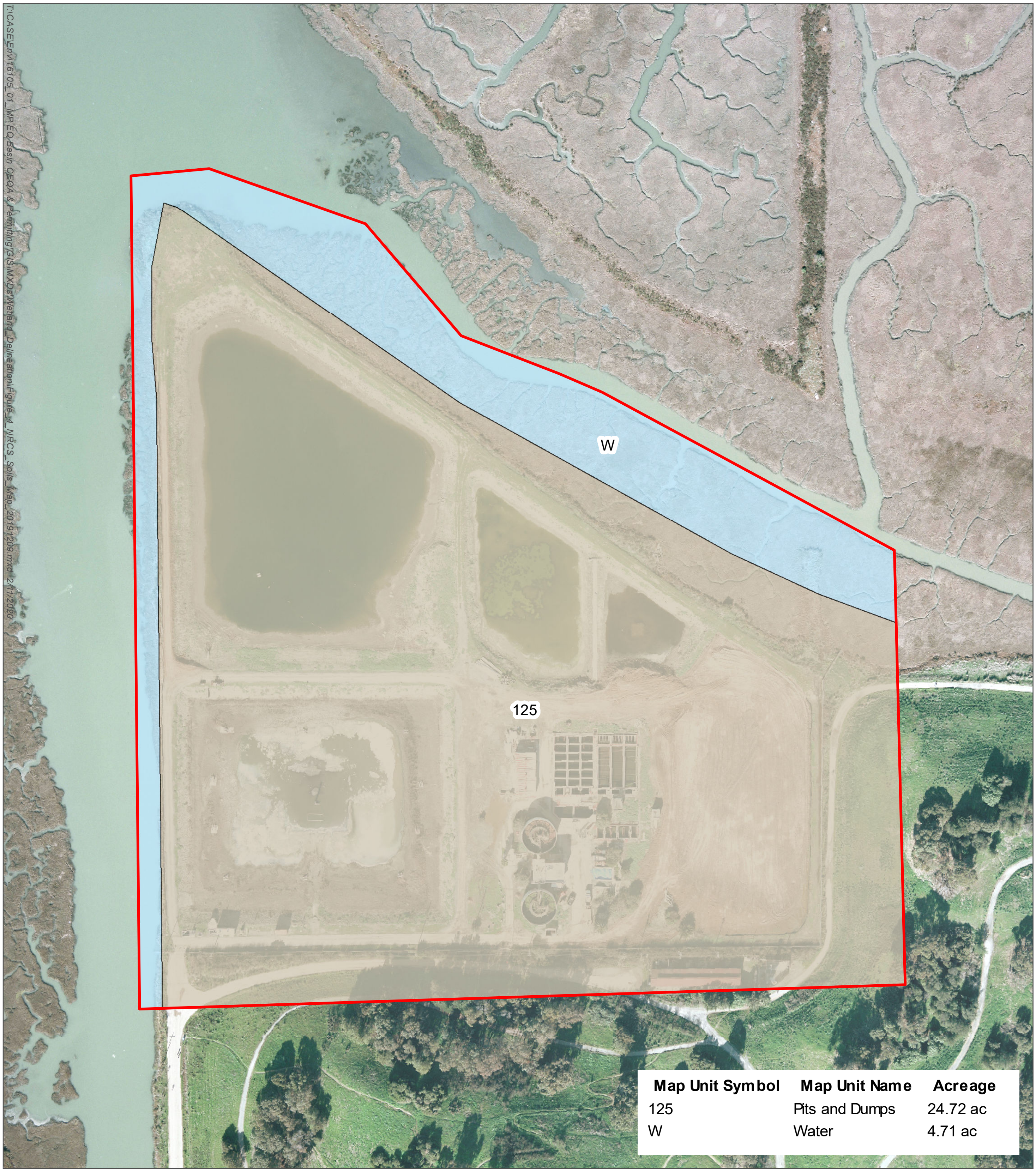
Study Area (29.43 acres)

Miles
0 0.2 0.4 0.8

MIG

Figure 3 USGS Topographic Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project



Source: Freyer & Laureta, Inc. 2020; NRCS 2019; MIG 2019

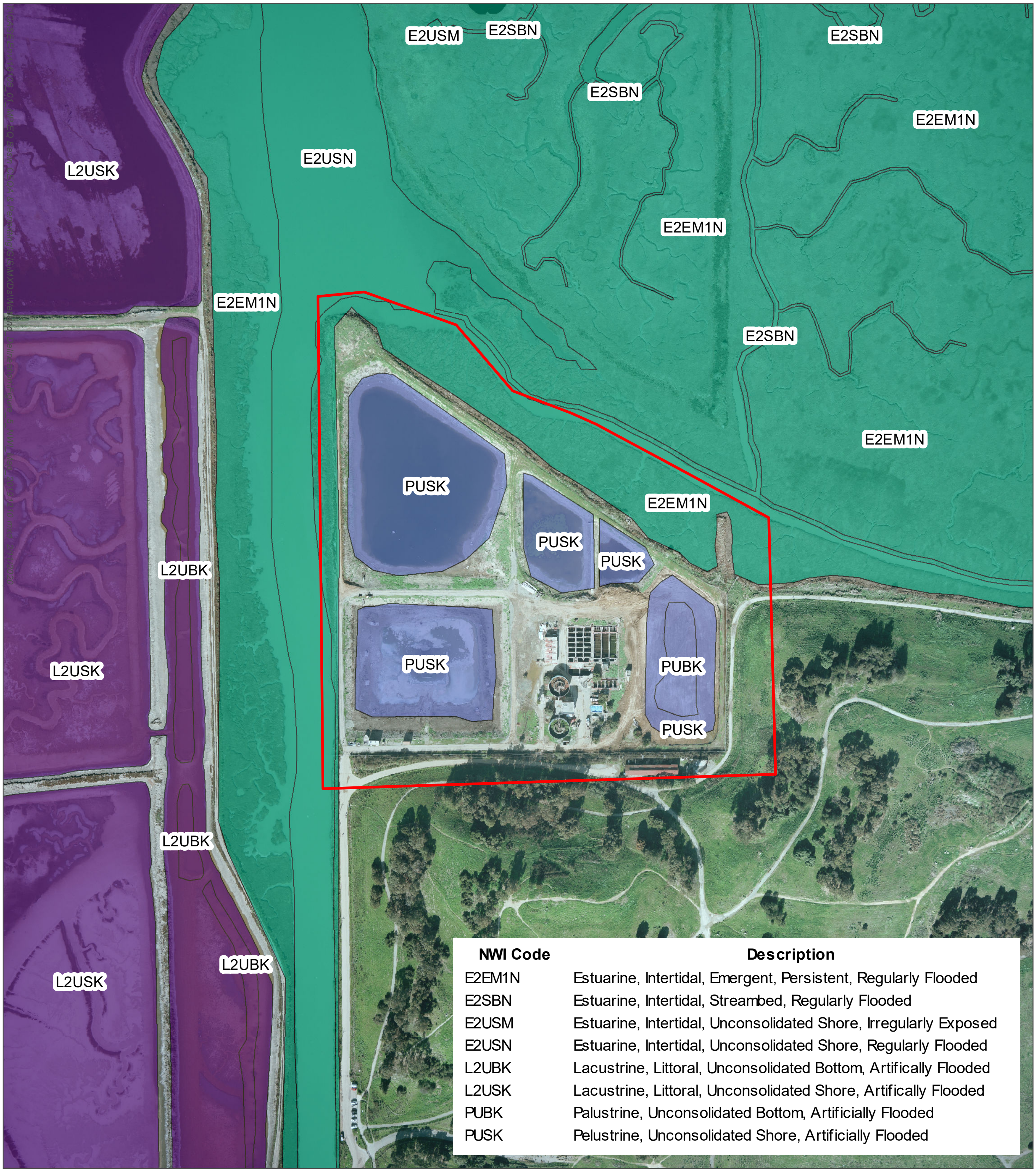
Base Map Features

Study Area (29.43 acres)

0 125 250 500 Feet

Figure 4 NRCS Soils Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project



NWI Code	Description
E2EM1N	Estuarine, Intertidal, Emergent, Persistent, Regularly Flooded
E2SBN	Estuarine, Intertidal, Streambed, Regularly Flooded
E2USM	Estuarine, Intertidal, Unconsolidated Shore, Irregularly Exposed
E2USN	Estuarine, Intertidal, Unconsolidated Shore, Regularly Flooded
L2UBK	Lacustrine, Littoral, Unconsolidated Bottom, Artifically Flooded
L2USK	Lacustrine, Littoral, Unconsolidated Shore, Artifically Flooded
PUBK	Palustrine, Unconsolidated Bottom, Artificially Flooded
PUSK	Pelustrine, Unconsolidated Shore, Artificially Flooded

Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

NWI Wetland Type

- Estuarine and Marine Wetland
- Freshwater Pond
- Lake

Base Map Features

- Study Area (29.43 acres)

0 212.5 425 850 Feet

M I G

Figure 5 NWI Map

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

2. Survey Methods

Before the delineation survey was conducted, topographic maps and aerial photos of the study area were obtained and reviewed from several sources, such as the USGS (Figure 3), NRCS (Figure 4), NWI (Figure 5), and Google Earth software (Google Inc. 2019), and UC Santa Barbara Library's collection of aerial photography (UCSB 2019).

On September 30, 2019, MIG senior biologist David Gallagher performed a technical delineation of wetlands and other waters in the study area, in accordance with the *Corps of Engineers 1987 Wetlands Delineation Manual* (Corps Manual; Environmental Laboratory 1987). Additionally, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West (Version 2.0)* (Regional Supplement) (USACE 2008a) and *A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008b) were followed to document site conditions relative to hydrophytic vegetation, hydric soils, and wetland hydrology. Mr. Gallagher performed preliminary mapping of the extent and distribution of wetlands and other waters of the U.S. that may be subject to regulation under Section 404 of the Clean Water Act (CWA), waters of the state that may be subject to regulation under the Porter Cologne Water Quality Control Act, which is administered by the RWQCB, and waters that may be subject to regulation under the McAteer-Petris Act of 1965, which is administered by BCDC. Mr. Gallagher also surveyed for aquatic and riparian habitat that may be subject to regulation under Sections 1600-1607 of the California Fish and Game Code, which is administered by California Department of Fish and Wildlife (CDFW).

2.1 Identification of Jurisdictional Waters

The “Routine Determination Method, On-Study area Inspection Necessary (Section D)” outlined in the Corps Manual (Environmental Laboratory 1987), and the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Regional Supplement (USACE 2010) were used to examine the vegetation, soils, and hydrology in the study area. This three-parameter approach to identifying wetlands is based on the presence of a prevalence or dominance of hydrophytic vegetation, hydric soils, and wetland hydrology.

In addition to applying these survey methods, Mr. Gallagher compiled this report in accordance with guidance provided in *Updated Map and Drawing Standards for the South Pacific Division Regulatory Program* (USACE 2016a) and *Information Requested for Verification of Corps Jurisdiction* (USACE 2016b). These documents list the information that must be submitted as part of a request for a jurisdictional determination, including:

- Vicinity map (Figure 1)
- Project area map (Figure 2)
- USGS quadrangle sheet (Figure 3)
- Soils map (Figure 4)

- National Wetlands Inventory map (Figure 5)
- Vegetation communities map (Figure 6)
- Delineation map (Figure 7)
- Current soil survey report (Appendix A)
- Plant species observed (Appendix B)
- Arid West Wetland Determination Data Forms (Appendix C)
- Written rationale for sample point choice (Section 3.1, "Observations, Rationales, and Assumptions")
- Color photos (Appendix D)
- Aquatic resources table (Appendix E)

During the survey, the study area was examined for topographic features, drainages, alterations to hydrology or vegetation, and recent significant disturbance. A determination was then made as to whether normal environmental conditions were present at the time of the field survey. In the field, the techniques used to identify wetlands included observing the vegetation growing near the soil sample points and characterizing the current surface and subsurface hydrologic features present near the sample points through both observation of indicators and direct observation of hydrology. Features meeting wetland vegetation, soil, and hydrology criteria were then mapped in the field. Geospatial data were collected using a tablet with an Arrow 100 sub-meter GPS receiver and a geo-spatial mobile-device application.

2.2 Identification of Section 404 Jurisdictional Wetlands (Special Aquatic Study areas)

Where wetland field characteristics were present, Mr. Gallagher examined vegetation, soils, and hydrology using the Routine Determination Method outlined in the Corps Manual (Environmental Laboratory 1987) and the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Regional Supplement (USACE 2010).

Hydrophytic Vegetation. Plants that can grow in soils that are saturated or inundated for long periods of time, which contain little or no oxygen when wetted, are considered adapted to those soils and are called hydrophytic. There are different levels of adaptation, as summarized in Table 2. Some plants can only grow in soils saturated with water (and depleted of oxygen), some are mostly found in this condition, and some are found equally in wet soils and in dry soils. Plants observed at each of the sample study areas were identified to species, where possible, using *The Jepson Manual, Vascular Plans of California, Second Edition* (Baldwin et al. 2012). The wetland indicator status of each species was obtained from the *Arid West 2016 Regional Wetland Plant List* (Lichvar et al. 2016). Wetland indicator species are designated according to their frequency of occurrence in wetlands. For instance, a species with a presumed frequency of occurrence of 67 to 99 percent in wetlands is designated a facultative wetland indicator species. The wetland indicator groups, indicator symbol, and the frequency of occurrence of species, provided as a percentage, within wetlands are shown in Table 2.

Table 2. Wetland Indicator Status Categories for Vascular Plants

Indicator Category	Symbol	Frequency (Percent) of Occurrence in Wetlands[1]
Obligate	OBL	>99 (Almost always is a hydrophyte, rarely in uplands)
Facultative wetland	FACW	67 – 99 (Usually a hydrophyte but occasionally found in uplands)
Facultative	FAC	34 – 66 (Commonly occurs as either a hydrophyte or non-hydrophyte)
Facultative upland	FACU	1 – 33 (Occasionally is a hydrophyte, but usually occurs in uplands)
Upland[2]	UPL	<1% (Rarely is a hydrophyte, almost always in uplands)
Not listed[2]	NI	Considered to be an upland species

Obligate and facultative wetland indicator species are hydrophytes that occur "in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present" (Environmental Laboratory 1987). Facultative indicator species may be considered wetland indicators when found growing in hydric soils that experience periodic saturation. Plant species that are not on the regional list of wetland indicator species are considered upland species. A complete list of the vascular plants observed in the project study area, including their current indicator statuses, is provided in Appendix B.

Hydric Soils. Up to 12 inches of the soil profile were examined for hydric soil indicators. The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as one formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper 12 inches of soil (NRCS 2010). Hydric soils include soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. In general, evidence of a hydric soil includes characteristics such as organic soils (histosols), reducing soil conditions, gleyed soils, soils with bright mottles and/or low matrix chroma, soils listed as hydric by the U.S. Department of Agriculture (USDA) on the National Hydric Soils List (NRCS 2018b), and iron and manganese concretions. Reducing soil conditions can also include circumstances where there is evidence of frequent ponding for long or very long duration. A long duration is defined as a period of inundation for a single event that ranges from 7 days to a month and very long is greater than one month (Environmental Laboratory 1987).

Munsell Soil Notations (Munsell 2009) were recorded for the soil matrix of each soil sample. The Munsell color system is based on three color properties: hue, value, and chroma. A brief description of each component of the system is described below, in the order they are used in describing soil color (i.e., hue/value/chroma):

---

[1] Based on information contained in the Corps Manual.
[2] Plant species that are not listed in the *Arid West 2016 Regional Wetland Plant List* (Lichvar et al. 2016) are considered UPL species

1. **Hue.** The Munsell Soil Color Chart is divided into five principal hues: yellow (Y), green (G), purple (P), blue (B), and red (R), along with intermediate hues such as yellow-red (YR) and green-yellow (GY). Example of commonly encountered hue numbers include 2.5YR, 10YR, and 5Y.
2. **Value.** *Value* refers to lightness, ranging from white to grey to black. Common numerical values for value in the Munsell Soil Color Chart range from 2 for saturated soils to 8 for faded or light colors. Hydric soils often show low-value colors when soils have accumulated sufficient organic material to indicate development under wetland conditions but can show high-value colors when iron depletion has occurred, removing color value from the soil matrix. Value numbers are commonly reported as 8/, 2.5/, and 6/.
3. **Chroma.** *Chroma* describes the purity of the color, from “true” or “pure” colors to “pastel” or “washed out” colors. Chromas commonly range from 1 to 8 but can be higher for gleys. Soil matrix chroma values that are 1 or less, or 2 or less when mottling is present, are typical of soils that have developed under anaerobic conditions. Chroma numbers are listed, for example, as /1, /5, and /8.

The NRCS Web Soil Survey (NRCS 2018a) was consulted to determine which soil types have been mapped in the project study area (Table 1, Figure 4). Detailed descriptions of these soil types are provided in Appendix A.

Wetland Hydrology. Wetland hydrology is defined as an area that is inundated either permanently or periodically at mean water depths less than 6.6 feet, or where the soil is saturated at the surface at some time during the growing season of the prevalent vegetation. The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and non-tidal situations.

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Wetland hydrology indicators provide evidence that the study area has a continuing wetland hydrologic regime. Primary indicators might include visual observation of surface water (A1), high water table (A2), soil saturation (B1), water-stained leaves (B9), and hydrogen sulfide odor (C1). Secondary indicators might include riverine drift deposits (B3), drainage patterns (B10), and passing score for the FAC-neutral test (D5). Each of the sample points was examined for positive field indicators (primary and secondary) of wetland hydrology, following the guidance provided in the Regional Supplement. Potential jurisdictional wetlands were identified within the project study area.

2.3 Identification of Section 404 Jurisdictional Other Waters

“Other waters” includes lakes, slough channels, seasonal ponds, tributary waters, non-wetland linear drainages, and salt ponds. Such areas are identified by the (seasonal or perennial) presence of standing or running water and generally lack hydrophytic vegetation. In non-tidal or muted tidal waters USACE jurisdiction extends to the OHWM which is defined in 33 CFR Part 328.3 as “the line on the shore 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 the soil, destruction of terrestrial vegetation or the presence of litter and debris." In tidal waters, USACE jurisdiction extends to the landward extent of vegetation associated with salt or brackish water or the high tide line (HTL) (see 33 CFR, Part 328.4). The HTL is defined in 33 CFR, Part 328.3 as "the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The HTL may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gauges, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other tides that occur with periodic frequency, but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm."

Identification of Section 10 Waters

Due to the study area's proximity to the Bay, background review and study area surveys were conducted to determine if current and/or Historical Section 10 waters occur within the study area. Section 10 of the Rivers and Harbors Appropriation Act of 1899 applies to "navigable waters of the U.S.", which is defined in 33 CFR, Part 329.4 to include all waters subject to the ebb and flow of the tide, and/or those which are presently or have historically been used to transport commerce. The shoreward jurisdictional limit of tidal waters is further defined in 33 CFR, Part 329.12 as "the line on the shore reached by the plane of the MHW. Where precise definition of the actual location of the MHW line becomes necessary, it must be established by survey with reference to the available tidal datum, preferably averaged over a period of 18.6 years."

2.4 Current Section 10 Waters

Navigable waters of the U.S., which are defined in 33 CFR, Part 329.4, include all waters subject to the ebb and flow of the tide, and/or those which are presently or have historically been used to transport commerce. The shoreward jurisdictional limit of tidal waters is further defined in 33 CFR, Part 329.12 as "the line on the shore reached by the plane of the mean (average) high water." According to 33 CFR, Part 329.9, a waterbody that was once navigable in its natural or improved state retains its character as "navigable in law" even though it is not presently used for commerce as a result of changed conditions and/or the presence of obstructions. The height of the MHW was obtained from long-term monitoring records (i.e., average over 18.6-year tidal epoch) maintained by the National Oceanic and Atmospheric Administration (NOAA). Based on the benchmark datum for the station nearest the study area with data reported relative to NAVD88 (Dumbarton Bridge Station 9414509), the MHW is calculated to be 6.8 feet NAVD88 (NOAA 2013). Current Section 10 waters were identified within the study area.

2.5 Historic Section 10 Waters

According to 33 CFR, Part 329.9, a waterbody that was once navigable in its natural or improved state retains its character as "navigable in law" even though it is not presently used for commerce as a result of changed conditions and/or the presence of obstructions. Historical Section 10 waters may occur behind levees, are not currently exposed to tidal or muted-tidal influence, and meet the following criteria: (1) the area is presently at or below the MHW; (2) the area was historically at or below MHW in its "unobstructed, natural state"; and (3) there is no evidence that the area was ever above MHW. In the Bay region, historical Section 10 waters will typically occur within the extent of historical sloughs that once drained into the Bay and have now been filled or diked. The United States Coast Survey (USCS; later US Coast and Geodetic Survey) is a federal agency renowned for the accuracy and detail of its 19th-century maps of America's shoreline. In most parts of the country, these maps provide the best early pictures of coastal and estuarine habitats prior to substantial Euro-American modification. The San Francisco Estuary Institute (SFEI) has assembled a Geographic Information System (GIS) dataset that uses USCS historical maps as the primary source to depict the extent of historical sloughs in the Bay region. Historic Section 10 waters were identified within the study area.

2.6 Identification of Waters of the State

The Porter-Cologne Water Quality Control Act (PWQCA) broadly defines waters of the state as "any surface water or groundwater, including saline waters, within the boundaries of the state." Because PWQCA applies to any water, whereas the CWA applies only to certain waters, California's jurisdictional reach overlaps and may exceed the boundaries of waters of the U.S. For example, Water Quality Order No. 2004-0004-DWQ states that "shallow" waters of the state include headwaters, wetlands, and riparian areas. Where forested habitat occurs, the outer canopy of any riparian trees rooted within top of bank may be considered jurisdictional as these trees can provide allochthonous[3] input to the channel below. Waters of the state were identified within the study area.

2.7 Identification of CDFW Jurisdiction

Ephemeral and intermittent streams, rivers, creeks, dry washes, sloughs, blue line streams on USGS maps, and watercourses with subsurface flows fall under CDFW jurisdiction. Canals, aqueducts, irrigation ditches, and other means of water conveyance may also be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. A stream is defined in Title 14, California Code of Regulations §1.72, as "a body of water that follows at least periodically or intermittently through a bed or channel having banks and that supports fish and other aquatic life. Jurisdiction does not include tidal areas such as tidal sloughs unless there is freshwater input. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." Using this definition, CDFW

[3] Allochthonous is a term used describe nutrients and carbon that come from outside the aquatic system.

extends its jurisdiction to encompass riparian habitats that function as a part of a watercourse. California Fish and Game Code §2786 defines riparian habitat as “lands which contain habitat which grows close to and which depends upon soil moisture from a nearby freshwater source.”

The lateral extent of a stream and associated riparian habitat that would fall under the jurisdiction of CDFW can be measured in several ways, depending on the particular situation and the type of fish or wildlife at risk. At a minimum, CDFW would claim jurisdiction over a stream’s bed and bank. Where riparian habitat is present, the outer edge of riparian vegetation is generally used as the line of demarcation between riparian and upland habitats. CDFW jurisdictional habitats were not identified within the study area.

2.8 Identification of BCDC Jurisdiction

In response to uncoordinated and indiscriminate filling of the Bay, the California legislature passed the McAteer-Petris Act in 1965, establishing the BCDC as the management and regulatory agency for the San Francisco Bay and Delta. The limits of BCDC jurisdiction are defined in the Bay Plan (BCDC 2012) and include a 100-ft wide band along the shoreline of the Bay. The “Bay Shoreline” is defined as line below which all areas are subject to tidal action from the south end of the Bay to the Golden Gate (Point Bonita-Point Lobos), and to the Sacramento River line (a line between Stake Point and Simmons Point, extended northeasterly to the mouth of Marshall Cut). The Bay Shoreline includes the upper extent of marshlands lying between mean high tide and up to 5 feet above mean sea level (MSL), and at a minimum where marshlands are not present, the mean tide line elevation. BCDC Bay jurisdiction includes all areas subject to tidal action bayward of the Bay Shoreline. In relation to salt ponds, the BCDC will claim “salt ponds consisting of all areas which have been diked off from the Bay and have been used during the three years immediately preceding 1969 for the solar evaporation of Bay water in the course of salt production” (BCDC 2012). BCDC Salt Pond jurisdiction extends to include levees for the salt ponds, and even when historical salt ponds are restored, the areas still retain this Salt Pond jurisdiction under BCDC. Finally, BCDC exerts Managed Wetland jurisdiction over bayside wetlands and impoundments managed with tide gates or other structures. Features meeting BCDC criteria were identified in the study area.

3. Survey Results and Discussion

The following vegetation/land use communities were mapped in the study area: (1) developed, (2) wastewater detention ponds (3) northern coastal salt marsh, (4) tidal slough, and (5) California annual grassland (Figure 6). A total of five sample points (SP1 to SP5) were examined to identify jurisdictional features (Appendix C; Figure 7). In the study area, 6.46 acres of potentially jurisdictional waters regulated by USACE and RWQCB (does not include historic Section 10 waters) were identified. Also, 11.75 acres within BCDC jurisdiction were also identified throughout the study area (Table 3). The results of the September 2019 delineation are described below.

Table 3. Summary of Jurisdictional Waters and Habitats within the Study Area

Potentially Jurisdictional Waters	Acres[1]
USACE Jurisdictional Total (not including historic Section 10)	**6.00**
Section 10/Section 404 (below MHW)	
Tidal sloughs (open water habitat)	1.14
Northern coastal salt marsh	3.59
Section 404 Other Waters and Wetlands (above MHW)	
Tidal sloughs (open water habitat)	0.01
Northern coastal salt marsh	1.26
Historic Section 10 Total	**2.89**
Wastewater detention ponds	2.89
RWQCB Jurisdiction Total	**6.46**
Section 401 Waters of the State (Up to Top of Bank)	
Developed (levee slopes)	0.46
Northern coastal salt marsh	4.85
Tidal sloughs (open water habitat)	1.15
BCDC Jurisdiction Total	**11.75**
Bay shoreline	5.66
Shoreline band	6.09

[1]Note: Values are approximate due to rounding.

Information assembled during this investigation and pertinent to the identification of jurisdictional wetlands and other waters is presented in the six appendices of this report.

- Appendix A—Soil Reports for the Study Area
- Appendix B—Plants Observed in the Study Area
- Appendix C—USACE Western Mountains, Valley and Coast Wetland Data Forms
- Appendix D—Photographic Documentation of the Study Area
- Appendix E—Aquatic Resources Table

3.1 Precipitation Data

The survey took place at the end of the 2019 dry season. Relative to the 30-year climate normal, precipitation in the study area was wetter than average for the 2018-2019 wet season prior to the delineation. Total precipitation recorded in the area from November 2018 through April 2019 was 20.4 inches, which is approximately 128% of the 30-year average (1989-2018) (PRISM Climate Group 2019). The wetter than average conditions were taken into account when assessing the biotic habitats present on the study area. The boundaries of waters remained clear owing to the presence of hydrology indicators and hydrophytic vegetation.

3.2 Study Area Conditions and Observations

- This preliminary delineation assumes that normal circumstances prevailed at the time of the September 2019 delineation, and results are based upon the conditions present. The survey was performed using the "Routine Method of Determination" using three parameters, as outlined in the Regional Supplement.
- The study area is within the San Francisco Bay Sub Region (18050004) of the California Water Resources Region hydrologic unit (USGS 2019).
- Flood Slough is a tidal channel that is located along the western edge of the site and receives freshwater runoff from Atherton Channel and the Bayfront Canal.
- There are three detention ponds within the study area, and all were dry at the time of the delineation. The slopes of the ponds were sparsely vegetated with upland forbs (Appendix D, Photo 3). Based on aerial imagery, there were four detention ponds prior to April 2018 (Google Inc. 2019). The detention ponds along the eastern boundary of the project site was completely filled in at the time of the site visit.
- Elevation data for the study area were obtained from the topographic line data provided by Light Detection and Ranging (LIDAR) data. The LIDAR data were acquired via drone flyover in 2019 and provided by Freyer & Laureta, Inc.
- The HTL within the Bay marshland habitat was demarcated in the field by the wrack line, change in plant community, elevation, and bank slope. The upper levee slopes were characterized by upland ruderal vegetation that show no indications of experiencing tidal hydrology.
- The northern coastal salt marsh sampled in the study area exhibited surface water, a high water table, saturation, hydric soil, and hydrophytic vegetation. Dominant vegetation included pickleweed (OBL, *Salicornia pacifica*), which grows in dense mats that are nearly ubiquitous on and around the study area. California cord grass (OBL, *Spartina foliosa*), alkali heath (FACW, *Frankenia salina*), fat-hen (FACW, *Atriplex prostrata*), gumweed (FACW, *Grindelia stricta*), and Alkali russian thistle (FACW, *Salsola soda*) were also found in small quantities in the northern coastal salt marsh habitat in the study area.
- Along the upper slopes of the levee banks throughout the study area, the vegetation is dominated by upland nonnative forbs and grasses. This ruderal upland vegetation is characterized by black mustard (*Brassica nigra*), wild oat (*Avena fatua*), fennel (*Foeniculum vulgare*), stinkwort (*Dittrichia graveolens*), and smilo grass (*Stipa miliacea*).
- Though not relevant to delineation of waters of the U.S., the top of the banks are mapped for clarity and shown on Figure 7 as Section 401 waters of the State. The

current practice of California Regional Water Quality Control Boards is to claim all areas up to the top of bank.

3.3 Rationale for Sample Point Choice

- SP1 was selected to examine the tidal coastal salt marsh along the northern edge of the study area (Figure 7, Appendix C). Vegetation present was comprised of OBL species (pickleweed) and the soil exhibited a depleted matrix. Hydrological indicators, such as high water table and saturation were also observed.
- SP2 was chosen to examine a raised section of coastal salt marsh above the HTL in the study area. Based on aerial imagery, the raised section is likely the remnants of an abandoned levee road (Google Inc. 2019) (Figure 7, Appendix C). It is located immediately adjacent to SP1 and the area is densely vegetated with OBL (pickleweed) and FAC (salt grass) species. Hydrological indicators included soils with a depleted dark surface and high water table.
- SP3 was selected to investigate uplands along the northern edge of the study area (Figure 7, Appendix C). It is located on the upper slope of a levee and is near SP1 and SP2. This area was dominated by upland forbs and grasses.
- SP4 was chosen to represent uplands along the northern edge of the study area (Figure 7, Appendix C). It is located on the top of a levee and is adjacent to SP5 in an area sparsely vegetated with upland forbs that is likely mowed regularly.
- SP5 was selected to represent the tidal salt marsh community below the MHW in the study area (Figure 7, Appendix C). This area was dominated by pickleweed and the soil exhibited a loamy gleyed matrix. Hydrological indicators, such as surface water and saturation were observed.

3.4 Photo Points

Photo point labels, coordinates, and rationale for the photos are include in Table 4. Photos are included in Appendix D.

Table 4. Coordinates and Rationale for Photo Points

Label	Latitude	Longitude	Rationale
Photo 1	37.497401°	-122.176498°	Northern coastal salt marsh
Photo 2	37.497919°	-122.177228°	Tidal slough
Photo 3	37.494992°	-122.177516°	Wastewater Detention pond
Photo 4	37.494767°	-122.175895°	Developed

3.5 Identification of Section 10/Section 404 Potentially Jurisdictional Waters

The tidal waters of the Bay occur throughout the northern and western portions of the study area. As such, tidal waters in the study area are subject to regulation under both Section 404 of the CWA, and below the MHW elevation as defined by Section 10 of the River and Harbors Act. The jurisdictional limits of Section 404 other waters in the study area are broader than Section 10.

Areas Considered Current Section 10 Waters

Approximately 4.73 acres of current Section 10 waters were mapped up to the MHW line elevation in the study area (Figure 7; Appendix D, Photos 1 and 2). For this site, the MHW elevation (approximately 6.8 feet NAVD88) was obtained from the long-term average over the most recent tidal epoch (1983 – 2001) based on the benchmark datum for the nearest tidal NOAA station to the site (Dumbarton Bridge Station 9414509) (NOAA 2013). Benchmark MHW line data is relative to the mean lower low water (MLLW) at the monitoring station. Differences between MLLW and the National Geodetic Survey NAVD88 datum were calculated using the guidance provided by Foxgrover et al. (2005).

Areas Considered Section 404 Other Waters (includes current Section 10 Waters)

Approximately 1.15 acres of Section 404 other waters (tidal sloughs) were mapped within the study area (includes current Section 10 waters) (Figure 7). Tidal sloughs are channels within tidal wetlands that are characterized by open water habitat.

Historic Section 10 Waters

The entire study area was once part of the historical baylands as mapped by SFEI (2017), which included tidal sloughs and Northern coastal salt marsh (Figure 8). However, sections of the wastewater detention ponds still occur below the MHW elevation of 6.3 feet NAVD88 and are isolated from Bay waters. Therefore, approximately 2.89 acres of the wastewater detention ponds that are mapped as historical tidal sloughs by SFEI were mapped as historic Section 10 waters (Figure 8).

3.6 Identification of Section 404 Potentially Jurisdictional Wetlands (Special Aquatic Sites)

Approximately 4.85 acres of Section 404 wetlands (northern coastal salt marsh) were mapped in the study area (includes current Section 10 waters) (Figure 7). A summary of the wetland data form results is presented in Table 5. The data are also presented on the complete forms in Appendix C. Northern coastal salt marsh wetlands dominated by pickleweed, occurs on the northern and western edges of the study area.

Three of the five sample point locations (Figure 7, SP1, SP2, and SP5; Appendix C) had sufficient three-parameter characteristics to meet the definition of a jurisdictional wetland. These sample sites represent the coastal salt marsh conditions throughout the study area.

Northern coastal salt marsh. Northern coastal salt marsh is a wetland plant community found tidal areas and is dominated by salt-tolerant hydrophytic vegetation that typically forms a dense mat of vegetation. This plant community occurs along the California coast from Oregon to near Point Conception and is especially extensive around San Francisco Bay. Typical species include pickleweed, California cordgrass, alkali heath, salt grass, dodder, jaumea (*Jaumea carnosa*), sea lavender (*Limonium californicum*), and marsh gumplant.

Table 5. Summary of Wetland Data Forms

Name	Sampling Rationale	Hydrophytic Vegetation?	Hydric Soil?	Wetland Hydrology?	Overall Wetland Assessment
SP1	Salt marsh community along northern edge of study area	Yes	Yes	Yes	A 3-parameter wetland
SP2	Salt march community on abandoned levee above the HTL	Yes	Yes	Yes	A 3-parameter wetland
SP5	Salt marsh community adjacent to Flood Slough below the MHW	Yes	Yes	Yes	A 3-parameter wetland

3.7 Identification of Section 401 Potentially Jurisdictional Waters of the State

The extent of Section 401 waters of the state (RWQCB jurisdiction) in the study area includes a total of 6.46 acres including areas within Section 404 jurisdiction as described above, in addition to areas up to the top of the levee banks. In the field, the top of bank was determined by mapping the first significant topographic break in levee slope. Waters of the state jurisdiction include all waters of the U.S. and cover approximately 1.15 acres of tidal sloughs, 4.85 acres of northern coastal salt marsh, 0.46 acres of developed areas (levee slopes). Characteristics of waters of the U.S. including wetlands are described above in Sections 3.2 and 3.3.

Throughout the study area, the upper slope of the levee banks above the wetland vegetation is dominated by upland nonnative species including invasive forbs and grasses. This ruderal upland vegetation is characterized by wild oat, black mustard, fennel, and smilo grass.

3.8 Identification of CDFW Potentially Jurisdictional Habitats

The open water habitat and associated wetlands in the study area are not the downstream continuation of streams conveying waters from the uplands to the San Francisco Bay (Bay), but are tidal channels fed entirely by Bay waters with no connection within the study area to upland sources of freshwater. As such, these features are not expected to be considered rivers or streams or be regulated by the California Department of Fish and Wildlife under California Fish and Game Code Section 1603.

3.9 Identification of BCDC Potentially Jurisdictional Areas

Because tidal marshlands occur in the study area, the Bay Shoreline would be located at 5 feet above MSL, and this elevation line would be used to demarcate the limit of BCDC Bay jurisdiction. Additionally, a 100-ft area extending laterally landward of the Bay Shoreline would be jurisdictional as Shoreline Band. A MSL elevation of 3.48 feet NAVD88 was obtained from the nearest NOAA tidal benchmark station at Dumbarton Bridge (Station 9414509)[4], thus the Bay Shoreline and the shoreward limit of BCDC Bay jurisdiction is approximately 8.48 feet NAVD88. As such, approximately 11.75 acres of the study area fall within BCDC jurisdiction, including 5.66 acres of areas within Section 404 jurisdiction as described above and an additional 6.09 acres within the Shoreline Band, which includes 2.28 acres of developed land cover, 3.23 acres of wastewater detention ponds, 0.34 acres of northern coastal salt marsh, and 0.24 acres of California annual grassland (Figure 9).

3.10 Areas Not Meeting the Regulatory Definition of Section 404/401 Wetlands and Waters

In general, areas that were not considered to be Waters of the U.S./state were not dominated by hydrophytic vegetation and did not exhibit hydrology indicators. Approximately 23.43 acres of the study area met none of the regulatory definitions of jurisdictional waters or jurisdictional habitats, including the developed land cover, the detention ponds, and California annual grassland (Appendix D, Photo 4; Figure 6).

Wastewater Detention Ponds. Two of the ponds are used for flow equalization (Ponds 1 and 2) and one pond is used for emergency storage (Pond 3) (Figure 7)**.** All retained wastewater is rerouted back to the Silicon Valley Clean Water Wastewater Treatment Plant in Redwood City

[4] Benchmark MSL data for the Dumbarton Bridge (NOAA 2013) is relative to the mean lower low water (MLLW) at the monitoring station. The difference between MLLW and the NAVD88 datum were calculated using the guidanceprovided by Foxgrover et al. (2005). An orthometric height conversion was then performed to calculate the datum shift from the local datum to NAVD88. Finally, the MSL elevation was determined to be approximately 3.48 feet.

prior to discharge into the Bay. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA are not waters of the U.S. 33 CFR § 328.3(a); 40 CFR § 230.3(s).

Developed. Developed land cover includes areas with permanent structures, impervious surfaces, unpaved high-use areas, or areas regularly disturbed by human activities. Generally, these areas are devoid of substantial vegetation cover but may contain areas of ruderal vegetation. Within the study area, developed land cover includes the levees, hardpack dirt roads, buildings, staging and storage areas, and the water treatment facility. Within the developed land cover, there are scattered areas of ruderal (disturbed) vegetation, mostly along the levee roads and perimeter of the site.

California Annual Grassland. California annual grassland is an herbaceous plant community that is typically dominated by non-native annual grasses. In the study area, this vegetation type is found in Bedwell Bayfront Park.

Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

Vegetation Communities

- California Annual Grassland (2.40 acres)
- Developed (9.70 acres)
- Northern Coastal Salt Marsh (4.85 acres)
- Wastewater Detention Pond (11.33 acres)
- Tidal Slough (1.15 acres)

Base Map Features

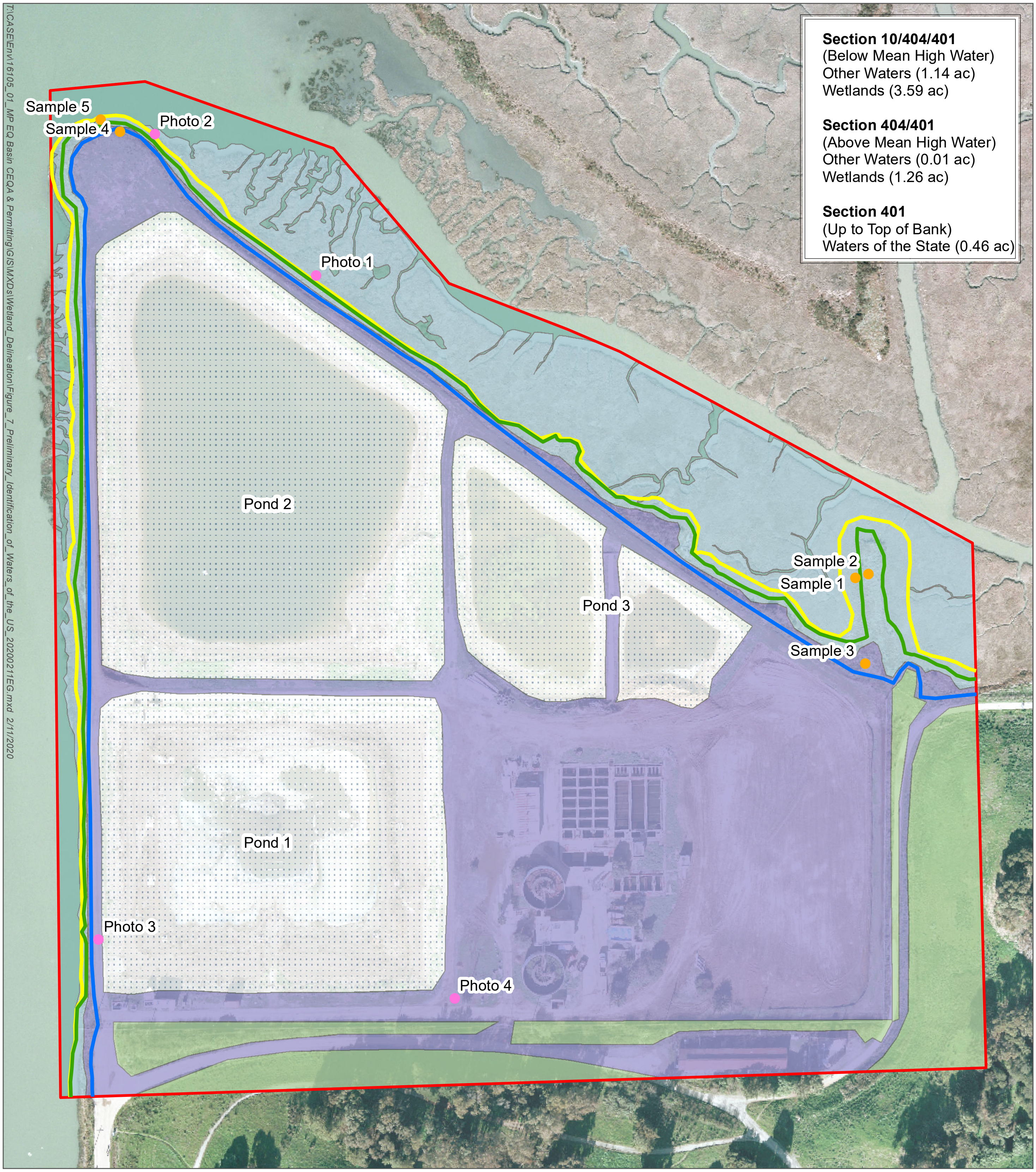
- Study Area (29.43 acres)

Feet
0 100 200 400

MIG

Figure 6 Vegetation Communities

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project



Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

Base Map Features

- Study Area (29.43 acres)
- Sample Point
- Photo Point
- Mean High Water
- High Tide Line
- Top of Bank

Vegetation Communities

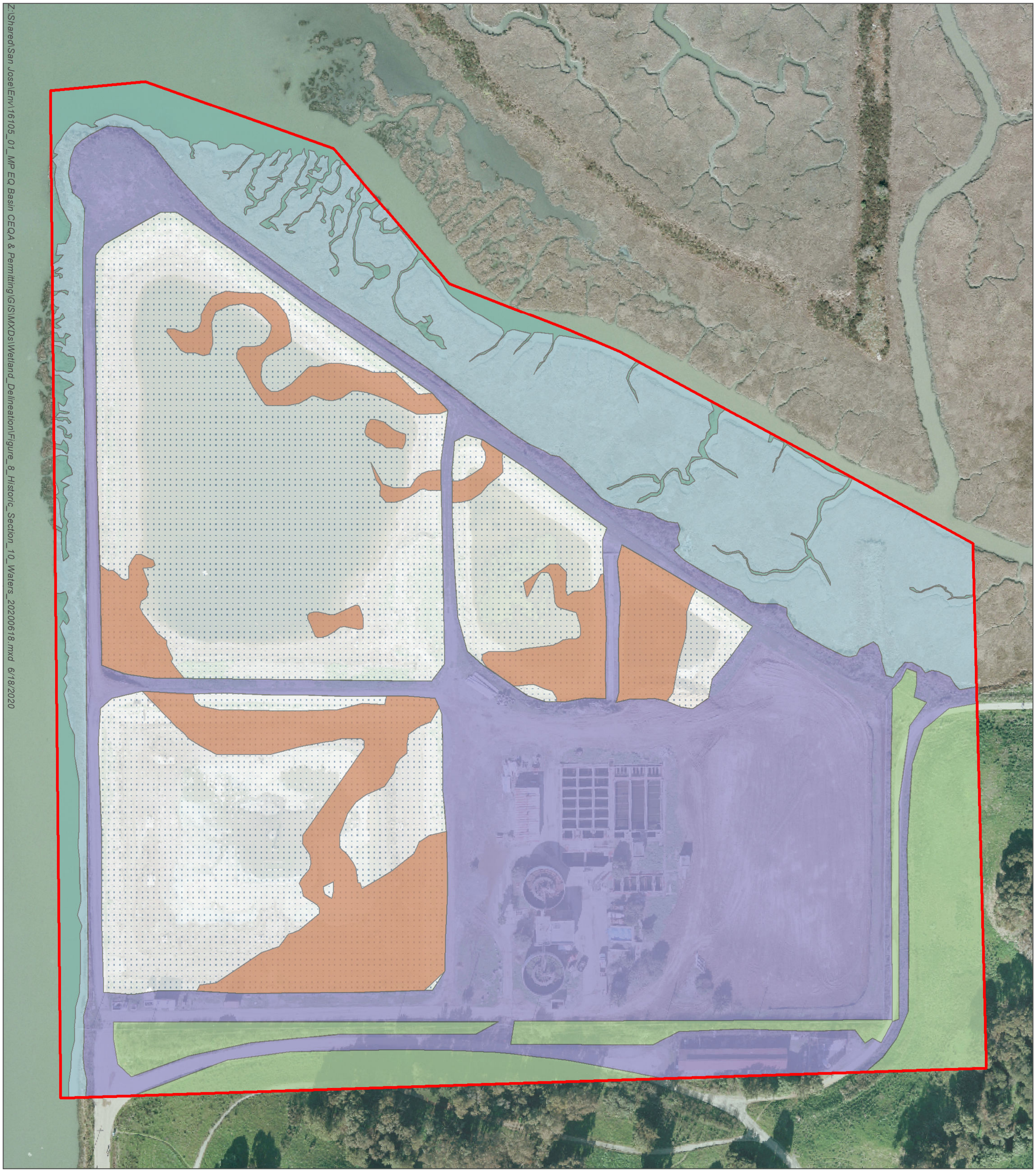
- California Annual Grassland (2.40 acres)
- Developed (9.70 acres)
- Northern Coastal Salt Marsh (4.85 acres)
- Wastewater Detention Pond (11.33 acres)
- Tidal Slough (1.15 acres)

0 100 200 400 Feet

MIG

Figure 7 Preliminary Identification of Waters of the U.S./State

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project



Source: Freyer & Laureta, Inc. 2020; NWI 2019; EcoAtlas 2020; MIG 2020

Vegetation Communities

- California Annual Grassland (2.40 ac)
- Developed (9.70 ac)
- Northern Coastal Salt Marsh (4.85 ac)
- Wastewater Detention Pond (11.33 ac)
- Tidal Slough (1.15 ac)

Base Map Features

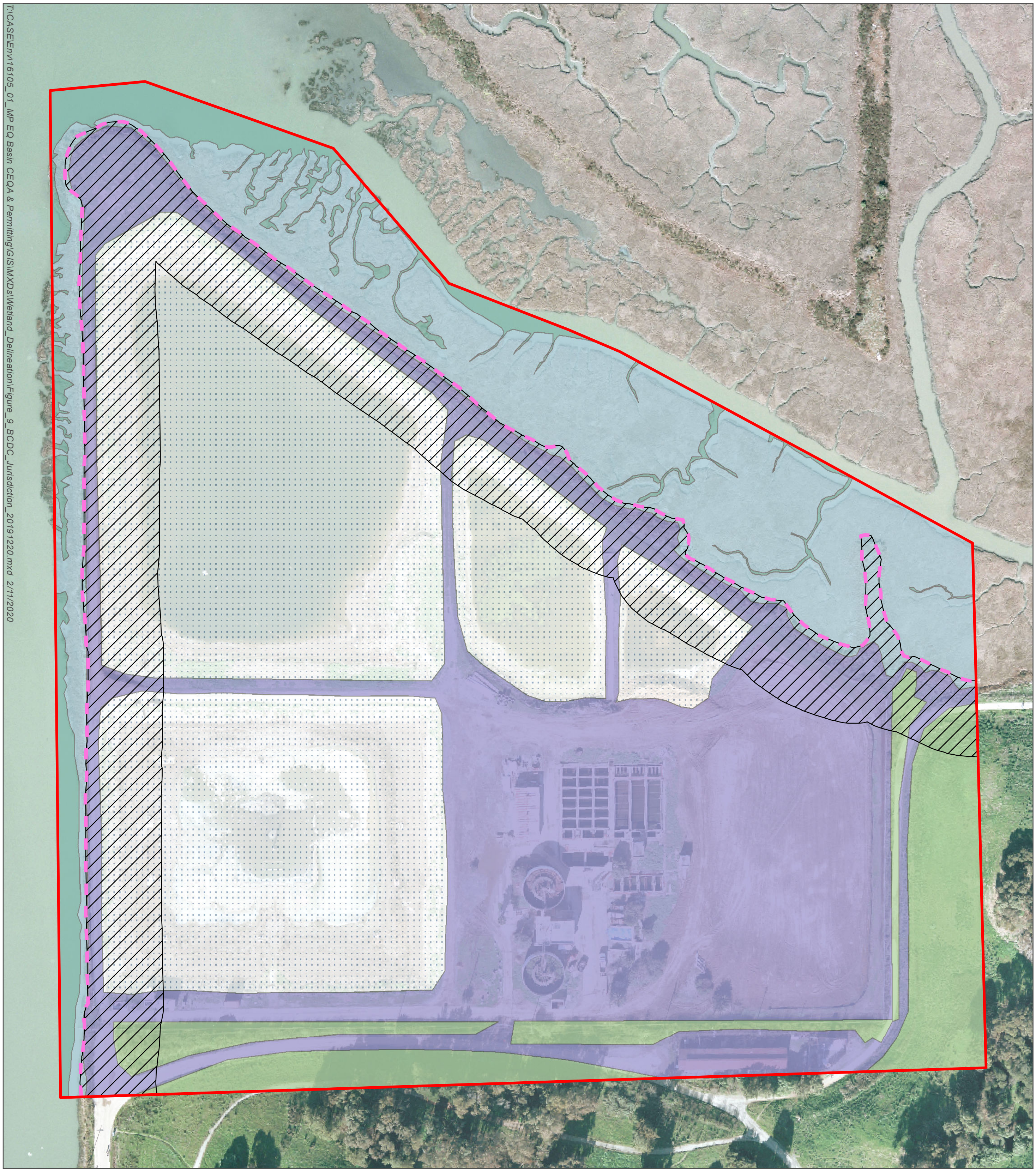
- Study Area (29.43 ac)
- Historic Section 10 Waters (2.89 ac)

0 100 200 400 Feet

Figure 8 Historic Section 10 Waters

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

MIG



Source: Freyer & Laureta, Inc. 2020; NWI 2019; MIG 2019

Vegetation Communities

- California Annual Grassland (2.40 acres)
- Developed (9.70 acres)
- Northern Coastal Salt Marsh (4.85 acres)
- Wastewater Detention Pond (11.33 acres)
- Tidal Slough (1.15 acres)

Base Map Features

- Study Area (29.43 acres)
- Bay Shoreline (5.66 acres)
- Shoreline Band (6.09 acres)

0 100 200 400 Feet

MIG

Figure 9 BCDC Jurisdiction

West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project

4. Literature Cited

Baldwin, Goldman, Keil, Patterson, Ronatti, and Wilkin (eds.) 2012. The Jepson Manual: Vascular Plants of California. 2nd Edition. University of California Press, Berkeley, California.

[BCDC] Bay Conservation and Development Commission. 2012. San Francisco Bay Plan. Accessed November 2019 from http://www.bcdc.ca.gov/pdf/bayplan/bayplan.pdf.

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. (Version 04DEC98).

Environmental Laboratory. 1987. U.S. Corps of Engineers Wetlands Delineation Manual. Department of the Army.

Foxgrover, A.C., B.E. Jaffe. G.T. Hovis, C.A. Martin, J.R. Hubbard, M.R. Samant, and S.M. Sullivan. 2005. Hydrographic Survey of South San Francisco Bay, California. U.S. Geological Survey Open File Report 2007-1169.

Google Inc. 2019. Google Earth Pro (Version 7.1.5.1557) [Software]. Available from earth.google.com.

Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2016. Western Mountains, Valleys, and Coast 2016 Regional Plant List. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Prepared for the U.S. Army Corps of Engineers.

Munsell. 2009. Soil Color Charts, Munsell Color X-rite. Grand Rapids, Michigan.

[NOAA] National Oceanic and Atmospheric Administration. 2013. Tidal Benchmark Datum for the Dumbarton Bridge (Station ID: 9414509). Accessed November 2019 from https://tidesandcurrents.noaa.gov/datums.html?id=9414509.

[NRCS] Natural Resources Conservation Service. 2010. Field Indicators of Hydric Soils in the U.S.: A Guide for Identifying and Delineating Hydric Soils (Version 7.0). U.S. Department of Agriculture. Prepared with the National Technical Committee for Hydric Soils.

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

[NRCS] National Resource Conservation Service. 2019b. National Hydric Soils List. Accessed November 2019 from http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

[NWI] National Wetlands Inventory. 2019. Wetlands Mapper. U.S. Fish and Wildlife Service Accessed November 2019 from http://www.fws.gov/wetlands/Wetlands-Mapper.html.

PRISM Climate Group. 2019. Online PRISM Data Explorer. Oregon State University, Corvallis, Oregon. Accessed November 2019 from http://www.prism.oregonstate.edu/.

[SFEI] San Francisco Estuary Institute and Aquatic Science Center. 2017. Data Center. Accessed December 2019 from http://www.sfei.org/sfeidata.htm#

[UCSB] University of California Santa Barbara Library. 2019. Digital Aerial Photography Collections. Accessed November 2019 from https://www.library.ucsb.edu/src/airphotos

[USACE] U.S. Army Corps of Engineers. 2004. Review of Ordinary High Water Mark Indicators for Delineating Arid Streams in the Southwestern United States. January 2004.

[USACE] U.S. Army Corps of Engineers. 2007. Review and Synopsis of Natural and Human Controls on Fluvial Channel Processes in the Arid West. September 2007.

[USACE] U.S. Army Corps of Engineers. 2008a. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region. May 2010. U.S. Army Engineer Research and Development Center.

[USACE] U.S. Army Corps of Engineers. 2008b. A Field Guide to the Identification of the Ordinary High-Water Mark (OHWM) in the Arid West Region of the Western United States. August 2008. U.S. Army Engineer Research and Development Center.

[USACE] U.S. Army Corps of Engineers. 2016a. Updated Map and Drawing Standards for the South Pacific Division Regulatory Program.

[USACE] U.S. Army Corps of Engineers. 2016b. Information Needed for Verification of Corps Jurisdiction, San Francisco District. Revised April 2016. https://www.spn.usace.army.mil/Portals/68/docs/regulatory/2%20-%20Info%20Req.pdf

[USGS] U.S. Geological Survey. 2019. Water Resources of the United States. Accessed November 2019 from https://water.usgs.gov/GIS/huc_name.html#Region18

Appendix A. Soils Report for the Study Area

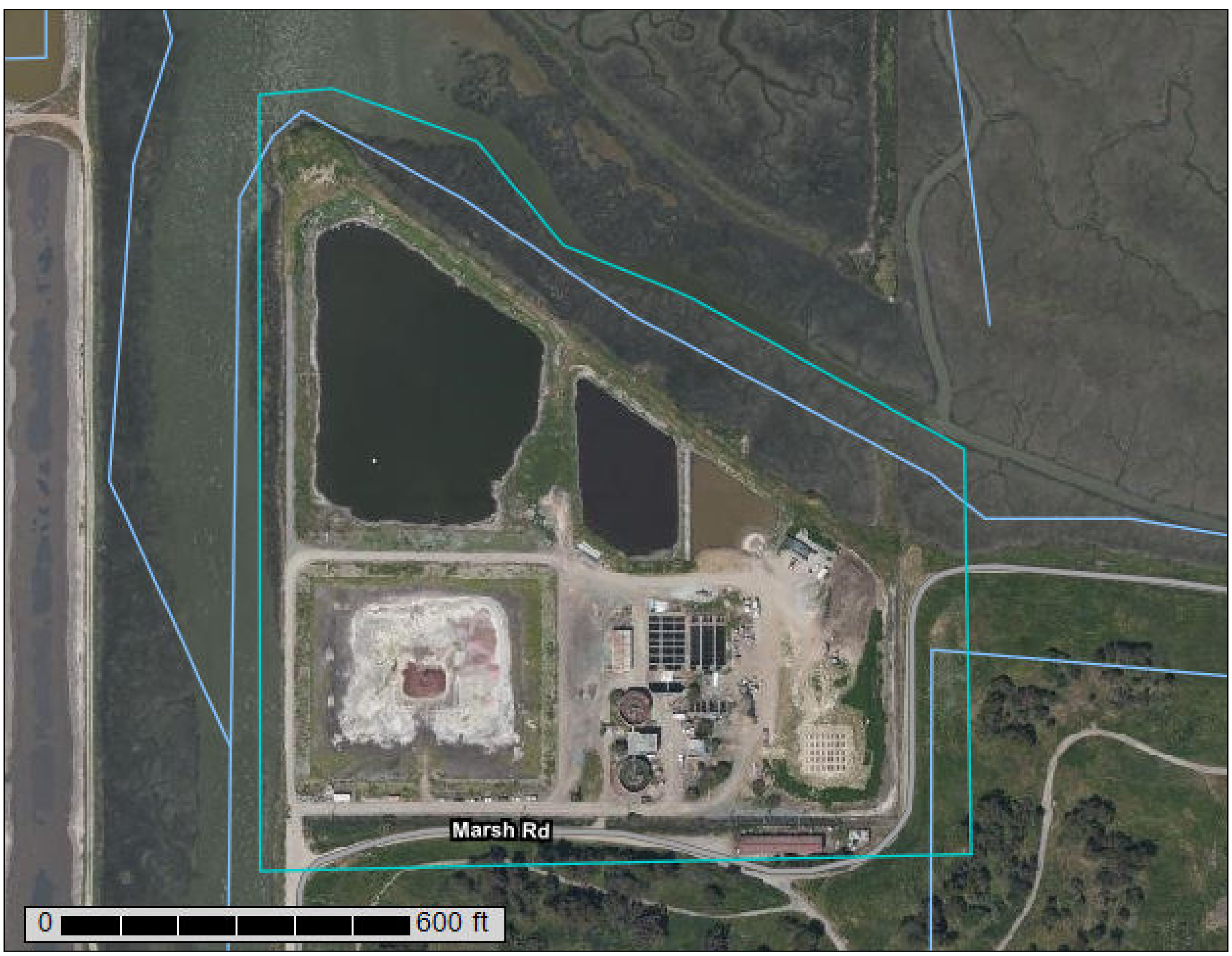
United States Department of Agriculture

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 San Mateo County, Eastern Part, and San Francisco County, California



December 4, 2019

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

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.

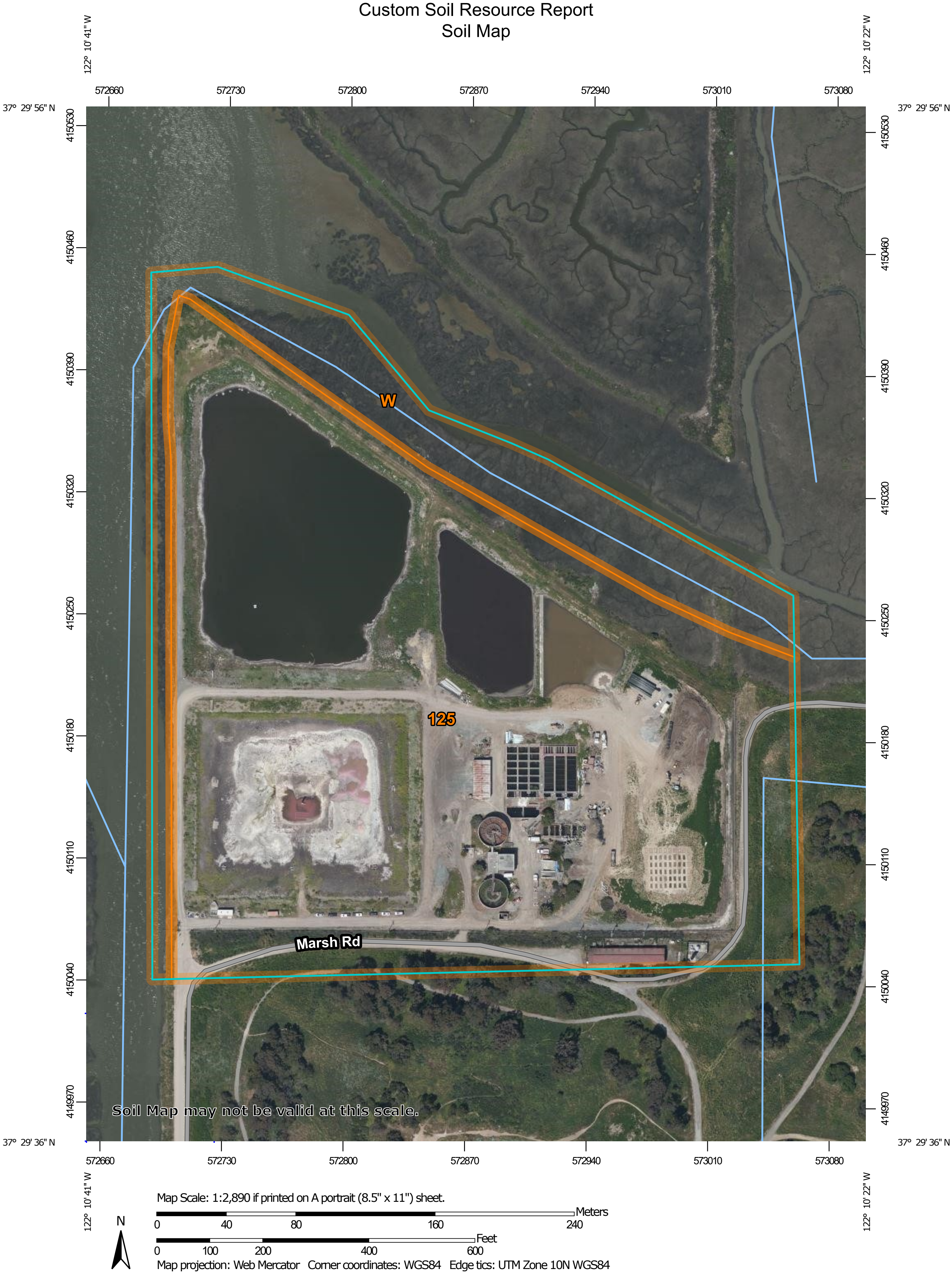
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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.

Soil Map


122° 10' 41" W
122° 10' 22" W
572660
572730
572800
572870
572940
573010
573080
37° 29' 56" N
37° 29' 36" N
4150530
4150460
4150390
4150320
4150250
4150180
4150110
4150040
4149970
W
125
Marsh Rd
Soil Map may not be valid at this scale.
Map Scale: 1:2,890 if printed on A portrait (8.5" x 11") sheet.
Meters
0
40
80
160
240
Feet
0
100
200
400
600
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 Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: San Mateo County, Eastern Part, and San Francisco County, California
Survey Area Data: Version 15, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 12, 2019—Apr 24, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
125	Pits and Dumps	24.7	84.0%
W	Water	4.7	16.0%
Totals for Area of Interest		**29.4**	**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.

San Mateo County, Eastern Part, and San Francisco County, California

125—Pits and Dumps

Map Unit Composition

Pits: 50 percent
Dumps: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Dumps

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

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

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix B. Plants Observed in the Study Area

Common Name	Scientific Name	Wetland Indicator Status[1]
Alkali heath	*Frankenia salina*	FACW
Alkali Russian thistle	*Salsola soda*	FACW
Big saltbrush	*Atriplex lentiformis*	FAC
Black mustard	*Brassica nigra*	NI
Bull thistle	*Cirsium vulgare*	FACU
California cord grass	*Spartina foliosa*	OBL
Canada horseweed	*Erigeron canadensis*	NI
Coyote brush	*Baacharis pilularis*	NI
Curly dock	*Rumex crispus*	FAC
Dodder	*Cuscuta* sp.	NI
Fat-hen	*Atriplex prostrata*	FACW
Fennel	*Foeniculum vulgare*	NI
Gumweed	*Grindelia stricta*	FACW
Italian rye grass	*Festuca perennis*	FAC
Ngaio tree	*Myoporum laetum*	FACU
Pickleweed	*Salicornia pacifica*	OBL
Prostrate knotweed	*Polygonum aviculare*	FAC
Smilo grass	*Stipa miliacea*	NI
Stinkwort	*Dittrichia graveolens*	NI
Virginia glasswort	*Salicornia depressa*	OBL
Wild oat	*Avena fatua*	NI

Notes:

[1]Wetland Indicator Status obtained from Lichvar et al. (2016)

Wetland Indicator Status Key:

OBL = Obligate wetland species, occur almost always in wetlands (>99% probability).

FACW = Facultative Wetland species, usually occur in wetlands (67 to 99% probability), but occasionally found in non-wetlands.

FAC = Facultative species, equally likely to occur in wetlands or non-wetlands (34 to 66% probability).

FACU = Facultative Upland, usually occur in non-wetlands (67% to 99%), but occasionally found in wetlands.

UPL = Obligate Upland species, occur almost always in non-wetlands (>99% probability).

NI = Non-Indicator, not present on list. Considered to be an upland species.

Appendix C. USACE Western Mountains, Valley, and Coast Wetland Data Forms

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project City/County: Menlo Park Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc. State: CA Sampling Point: SP1
Investigator(s): DWG Section, Township, Range: ______
Landform (hillslope, terrace, etc): Basin Local relief (concave, convex, none): Concave Slope (%): 2
Subregion (LRR): LRR C Lat: 37.49628 Long: -122.174051 Datum: WGS84
Soil Map Unit Name: Water NWI classification: E2EM1N
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:
Tidal marsh

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Salicornia* / Pickleweed	80	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: ______)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ______

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: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		80 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP1

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 %	Type¹	Loc²	Texture	Remarks
0 to 6	10YR 3/2	85	5YR 5/8	15	D	PL	Silty clay	
6 to 14	10GY 4/1	85	5YR 6/8	15	C	M	Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
_X_ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils³:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes _X_ No ___

Remarks:
Gleyed Matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

___ Surface Water (A1)
_X_ High Water Table (A2)
_X_ Saturation (A3)
___ Water Marks (B1) **(Nonriverine)**
___ Sediment Deposits (B2) **(Nonriverine)**
___ Drift Deposits (B3) **(Nonriverine)**
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Surface Soil Cracks (B6)
___ 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 _X_	Depth (inches):		
Water Table Present?	Yes _X_	No ___	Depth (inches):	12	
Saturation Present? (includes capillary fringe)	Yes _X_	No ___	Depth (inches):	0	

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project City/County: Menlo Park Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc. State: CA Sampling Point: SP2
Investigator(s): DWG Section, Township, Range: ______
Landform (hillslope, terrace, etc): Bench Local relief (concave, convex, none): Convex Slope (%): 2%
Subregion (LRR): LRR C Lat: 37.496297 Long: -122.17399 Datum: WGS84
Soil Map Unit Name: Water NWI classification: E2EM1P
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? Yes X No ____

Remarks:
On bench above HTL

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Distichlis spicata* / Salt grass	40	Yes	FAC
2. *Salicornia* / Pickleweed	20	Yes	OBL
3. *Frankenia salina* / Yerba reuma, Alkali heath	15	No	FACW
4. *Bromus diandrus* / Ripgut brome, Ripgut grass	5	No	UPL
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	15	x 2 =	30
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	80 (A)		195 (B)

Prevalence Index = B/A = 2.44

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
__ Prevalence Index ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 to 18	10YR 3/1	90	5YR 5/8	10	C	M	Silty 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) (except MLRA 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- X 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 X No ___

Remarks:

Above HTL

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)
- ___ Surface Soil Cracks (B6)
- ___ 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)
- X 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 X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Soil moisture at 18 inches. Likely water table present due to location in tidal marsh. Site Visit during the dry season/draw down of soil moisture.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project City/County: Menlo Park Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc. State: CA Sampling Point: SP3
Investigator(s): DWG Section, Township, Range:
Landform (hillslope, terrace, etc): Shoulder slope Local relief (concave, convex, none): Convex Slope (%): 3%
Subregion (LRR): LRR C Lat: 37.495973 Long: -122.173985 Datum: WGS84
Soil Map Unit Name: 125-Pits and Dumps NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:
Upland/levee

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Avena* / Oat	50	Yes	UPL
2. *Foeniculum vulgare* / Fennel	25	Yes	UPL
3. *Raphanus sativus* / Jointed charlock, Radish	15	No	UPL
4.			
5.			
6.			
7.			
8.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index ≤3.0¹
___ Morphological Adaptations¹ (Provide supporting
___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL

Sampling Point: SP3

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 %	Type¹	Loc²	Texture	Remarks
0 to 8	10 YR 3/2	100					Silty clay loam	No redox observed

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
___ 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 Soils³:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

³Indicators 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 X

Remarks:

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)
___ Surface Soil Cracks (B6)
___ 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 X	Depth (inches): ______
Water Table Present?	Yes ____	No X	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ______

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Upland adjacent to tidal marsh.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project City/County: Menlo Park Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc. State: CA Sampling Point: SP4
Investigator(s): DWG Section, Township, Range:
Landform (hillslope, terrace, etc): Levee Local relief (concave, convex, none): Convex Slope (%): 2
Subregion (LRR): LRR C Lat: 37.497927 Long: -122.177383 Datum: WGS84
Soil Map Unit Name: Water NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X , Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? Yes ___ No X

Remarks:
Levee was mowed.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Foeniculum vulgare* / Fennel	5	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	5 (A)		25 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting
___ 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 X

Remarks:
Thatch present from mowing; mostly bare ground; upland area

SOIL

Sampling Point: SP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type¹	Loc²	Texture	Remarks
0 to 6 inches	10YR 4/3	100					Silty clay loam	Very rocky with pebbles, dry, no redox

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
___ 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 Soils³:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

³Indicators 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 X

Remarks:

Rocky. Hard to dig.

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)
___ Surface Soil Cracks (B6)
___ 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 X	Depth (inches):	
Water Table Present?	Yes ______	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ______	No X	Depth (inches):	

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Upland area on levee

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: FERRF Project City/County: Menlo Park Sampling Date: 09/30/2019
Applicant/Owner: Freyer and Laureta, Inc. State: CA Sampling Point: SP5
Investigator(s): DWG Section, Township, Range: ______
Landform (hillslope, terrace, etc): Terrace Local relief (concave, convex, none): Convex Slope (%): 2
Subregion (LRR): LRR C Lat: 37.497974 Long: -122.177476 Datum: WGS84
Soil Map Unit Name: Water NWI classification: E2EM1N
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Area**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	Yes X No ____

Remarks:
Tidal marsh below the HTL

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft x 5 ft)			
1. *Salicornia* / Pickleweed	60	Yes	OBL
2. *Spartina foliosa* / Pacific cordgrass, California cord grass	20	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100.0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		80 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
__ Prevalence Index ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: SP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 to 18	10GY 4/1	95	5YR 5/6	5	D	M	Silty clay	Organic matter throughout matrix

[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) (except MLRA 1)
- X 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 X No ___

Remarks:

Gleyed matrix

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Surface Soil Cracks (B6)
- ___ 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:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?	X		4
Saturation Present? (includes capillary fringe)	X		0

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo of SP1

Photo of SP2

Photo of SP3

Photo of SP4

Photo of SP5

Appendix D. Photographic Documentation of the Study Area

Photo 1. Northern coastal salt marsh habitat along the northern edge of the study area.

Photo 2. Tidal slough (open water habitat) along the northern edge of the study area.


Photo 3. Detention pond within the study area.


Photo 4. Developed land cover within the study area.

Appendix E. Aquatic Resources Table

Waters Name	State	Cowardin Code	HGM Code	Measurement Type	Amount	Units	Water Type	Latitude	Longitude	Local Waterway
Northern Coastal Salt Marsh	CA	E2EM1N	ESTUARINEF	Area	4.85	Acres	TNWW	37.496994°	-122.175525°	San Francisco Bay
Tidal Slough	CA	E2US3N	ESTUARINEF	Area	1.15	Acres	TNW	37.496994°	-122.175525°	San Francisco Bay

APPENDIX E

CULTURAL RESOURCES REPORT

This page intentionally left blank.

Abstract

Tom Origer & Associates conducted a cultural resources study for the Flow Equalization and Resource Recovery Facility Levee Improvements and Recycled Water Facility Project, Menlo Park, San Mateo County, California, November 2020. This study was conducted to meet the requirements of Section 106 of the National Historic Preservation Act, and those of the California Environmental Quality Act. The purpose of the report is to identify potential historical resources other than Tribal Cultural Resources, as defined in Public Resources Code [PRC] 21074 (a)(1)(A)-(B) and discussed in the Regulatory Context section). Tribal Cultural Resources are defined in Public Resources Code [PRC] 21074 (a)(1)(A)-(B).

The study included archival research at the Northwest Information Center, Sonoma State University, review of the State Lands Commission's Shipwreck Database, examination of the library and files of Tom Origer & Associates, and field inspection of the Area of Potential Effects. The buildings of the decommissioned Menlo Park Wastewater Treatment Plant and the levees that surround the Menlo Park Flow Equalization and Resource Recovery Facility are being evaluated by an architectural historian and are not addressed in the report. No historic properties that are archaeological in nature were found during the course of this study.

An intensive field survey of the APE was completed on November 9, 2020. Ground visibility ranged from excellent to poor, with vegetation, imported soils, and asphalt being the primary hindrances. Both sides of the roads along the APE were examined to look for archaeological deposits that could extend under the road. Because much of the APE is covered with asphalt the yards of adjacent properties were examined to look for archaeological No archaeological resources were found within the APE.

Report Findings

No archaeological site indicators were found within the APE. Application of the buried sites model indicates a low to moderate potential for buried archaeological resources within the APE.

Report Recommendations

<u>Accidental Discovery</u>

If buried materials are encountered, all soil disturbing work should be halted within 60 feet of any discovery. An archaeologist who meets the Secretary of the Interior's Standards for Archaeology must be contacted and the requirements under 36 CFR 800.13 followed. Work should not commence in the vicinity of the inadvertent discovery until a qualified archaeologist completes a significance evaluation of the find(s) pursuant to Section 106 of the National Historic Preservation Act (36 CFR 60.4).

The following actions are promulgated in the CEQA Guidelines Section 15064.5(d) and pertain to the discovery of human remains. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

The Cultural Resources Report contains information about the locations of archaeological sites. For the protection of these resources, the report, and such location information, will not be publicly circulated. The report is held by the West Bay Sanitary District and inquires regarding the report should be directed to the District.

APPENDIX F

HISTORIC RESOURCES EVALUATION REPORT

This page intentionally left blank.

Historic Resources Evaluation Report

West Bay Sanitary District
Flow Equalization and Resource Recovery Facility
1700 Marsh Road, Menlo Park, San Mateo County, CA

Submitted
to
MIG, Inc.
2055 Junction Avenue, Suite 205
San Jose, California 95131

Prepared
by
Ward Hill, Architectural Historian
3124 Octavia Street, No. 102
San Francisco, CA 94123

and

Denise Bradley, Cultural Landscape Historian
1388 Haight Street, No. 79
San Francisco, CA 94117

November 2020

TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION

Project Location and Overview[1]

The West Bay Sanitary District (District and WBSD) maintains and operates over 200 miles of main line sewer in the City of Menlo Park and portions of the cities of East Palo Alto and Redwood City, the towns of Atherton, Woodside and Portola Valley, and portions of unincorporated San Mateo and Santa Clara Counties. The raw wastewater collected by the District is conveyed to its Menlo Park Flow Equalization and Resource Recovery Facility (FERRF) then pumped to Silicon Valley Clean Water (SVCW) wastewater treatment plant, located adjacent to San Francisco Bay in Redwood City, where the wastewater is treated and discharged or reused.

The District's FERRF site is located at 1700 Marsh Road (Assessor's Parcel Number 055-400-010) in the northern part of Menlo Park, northwest of Bedwell Bayfront Park and at the northern terminus of Marsh Road. Access to the site is provided via Highway 101, Bayfront Expressway (State Route 84), and Marsh Road. Westpoint Slough and Don Edwards National Wildlife Refuge are located to the north of the site; Flood Slough and salt evaporation ponds are located to the west; and Bedwell Bayfront Park abuts the site's southern and eastern boundaries. **Figure 1** provides the site's regional context and **Figure 2** provides its location in relationship to surrounding features such as the sloughs and park.

The FERRF property is approximately 20 acres in size and contains three open storage (flow equalization) basins, the remnants of the Menlo Park decommissioned Waste Water Treatment Plant (WWTP), and a small native plant nursery operated by the non-profit organization *Save the Bay*. The facility is closed to public access with chain link fencing along the eastern and southern property lines. Access to the site for District personnel is controlled by a gated entrance driveway from Marsh Road at the southwest corner of the site.

The District is proposing to improve the FERRF site and bring it out of the FEMA 100-year flood zone and plan for 50-year sea level rise projections. The site is surrounded by earthen levees that are not FEMA certified, and therefore require improvement/repairs to ensure the FERRF remains separated from adjacent tidal waters. The District is also proposing to construct a new recycled water facility at their FERRF site. **Figure 3** provides a graphic of the locations of the various components of the proposed project.

The proposed on-site improvements include the following:

- Construction of FEMA flood protection improvements through the installation of sheet piles (large metal plates), raising existing grades with imported fill, and an ecotone levee;
- Improving an existing stormwater ditch along the eastern portion of the FERRF site with one-way check valves to prevent tidal flows into the ditch;

[1] The Project Overview information was provided by MIG, Inc. via email (MIG 2020).

- Capping the existing stormwater drainage system discharge point (outfall) for the decommissioned on-site wastewater treatment plant and rerouting on-site drainage to discharge into one of the existing flow equalization basins; and
- Construction of a new 1.0 million gallon per day (MGD) Bayfront Recycled Water Facility (Bayfront RWF) including a discharge outfall, construction of an off-site influent pump station, and off-site influent and distribution pipelines.

The project also includes various off-site improvements related to the operation of the proposed Bayfront RWF and associated off-site infrastructure to provide recycled water to customers in Menlo Park, Redwood City, and East Palo Alto. An influent pump station as well as influent and distribution pipelines would be installed primarily within existing road rights-of-way, or existing District-owned property. The offsite improvements would include the following:

- An influent pump station would be located near the SVCW's existing Menlo Park pump station near the intersection of Marsh Road and Bayfront Expressway. Currently, this site is mostly unpaved and contains a WBSD manhole and above ground controls in the northwest corner of the site. A portion of the site is covered in ice plant, and there are approximately four trees.
- Influent and distribution pipelines would be located within the road right-of-way for Marsh Road connecting from the influent pump station to the Bayfront RWF. The road is entirely paved with varying widths of unpaved shoulders to the east and west of the roadway. Flood Slough and Bedwell Bayfront Park abut Marsh Road to the east and west, respectively.
- Distribution pipelines would also be constructed within the road right-of-way for Bayfront Expressway, Constitution Drive, Chilco Street, and Hamilton Avenue. The Chilco Street segment also includes crossings for the Caltrain railroad (not currently in use, San Mateo County Transit District) and a PG&E high pressure gas line. Existing uses along the alignment is largely office/commercial uses along Constitution, office/commercial, railroad right-of-way, and single-family residential uses along Chilco Street, and single-family and multi-family uses along Hamilton Avenue.

The District anticipates beginning construction in January 2022 with the new RWF becoming operational in 2024; however, the proposed project's construction schedule may change depending on the timing and availability of future funding.

Purpose of Report

This Historic Resources Evaluation Report has been prepared to provide National Register of Historic Places and California Register of Historical Resources evaluations of the built environment resources within the FERRF, none of which have been previously been evaluated under federal, state, or local criteria.

CHAPTER 2. REGULATORY CONTEXT

The evaluation of the built environment features within the FERRF was conducted for compliance with the California Environmental Quality Act (CEQA). Additionally, a National

Register of Historic Places evaluation is provided to assist in any future Section 106 compliance that may be required. Provided below is a summary of the federal and state regulatory context for the evaluation of built environment resources.

National Register of Historic Places Criteria

The National Historic Preservation Act (NHPA) of 1966, as amended, administers the National Register of Historic Places (NRHP), which sets forth evaluation criteria described in 36 CFR Part 60.4. The following criteria are designed to guide the states, federal agencies, and the Secretary of the Interior in evaluating potential entries for the NRHP. The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that:

A. Are associated with events that have made significant contribution to the broad patterns of our history; or

B. Are associated with the lives of persons significant in our past; or

C. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master or that possess high artistic values or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

The question of integrity is another factor that must be addressed when determining the eligibility of a resource for listing in the NRHP. The Secretary of the Interior describes integrity as “the ability of a property to convey its significance.” A property must retain certain intact physical features in order to convey its significance under one or more of the NRHP criteria. Integrity is judged on seven aspects; location, design, setting, workmanship, materials, feeling, and association.

If a particular resource meets one or more of these criteria and retains sufficient integrity to convey its historical significance, it is considered as an eligible “historic property” for listing in the NRHP. Additionally, unless exceptionally significant under *Criteria Consideration G: Properties That Have Achieved Significance Within the Past Fifty Years*, a property must be at least 50 years old to be eligible for listing.

CEQA & The California Register of Historical Resources

Under the California Environmental Quality Act (CEQA), public agencies must consider the effects of their actions on both “historical resources” and “unique archaeological resources.” Pursuant to Public Resources Code (PRC), Section 21084.1, a “project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.”

"Historical resource" is defined by statute (see PRC, Section 21084.1 and CEQA Guidelines section 15064.5 [a] and [b]). The term covers any resource listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR). The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest.

Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be "historical resources" for the purposes of CEQA unless a preponderance of evidence indicates otherwise (PRC, Section 5024.1; California Code of Regulations, Title 14, section 4850). Unless a resource listed in a survey has been demolished, lost substantial integrity, or there is a preponderance of evidence indicating that it is otherwise not eligible for listing, a lead agency should consider the resource to be potentially eligible for the CRHR. Menlo Park does not maintain a local inventory or register of historical resources.

In addition to assessing whether historical resources potentially affected by a proposed project are listed or have been identified in a survey process, lead agencies have a responsibility to evaluate them against the CRHR criteria prior to making a finding as to a proposed project's impacts on historical resources (PRC, Section 21084.1; CEQA Guidelines, section 15064.5[a][3]). In general, a historical resource, under this approach, is defined as any object, building, structure, site, area, place, record, or manuscript that:

a. Is historically or archaeologically significant; or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political or cultural annals of California; and,

b. Meets any of the following criteria:

    1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

    2. Is associated with the lives of persons important in our past;

    3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or,

    4. Has yielded, or may be likely to yield, information important in prehistory or history.

Potential eligibility for the CRHR also rests upon the integrity of the resource. Integrity is defined as the retention of the resource's physical identity that existed during its period of significance. Integrity is determined through consideration of the setting, design, workmanship, materials, location, feeling, and association of the resource.

CHAPTER 3. METHODS

Preparers

This Historic Resources Evaluation Report was prepared by Ward Hill (M.A., Architectural History, University of Virginia, 1982) and Denise Bradley (Master of Landscape Architecture, Louisiana State University, 1986). Mr. Hill and Ms. Bradley have worked together on similar projects that contain both building and cultural landscape features. Each has over 25 years of experience preparing evaluations of historical significance under NRHP, CRHR, and local criteria. They meet the professional qualifications in their respective disciplines. Mr. Hill meets the Secretary of the Interior's Historic Preservation Professional Qualifications for Architectural History, and Ms. Bradley meets the National Park Service's (NPS) qualifications standards for Historical Landscape Architects.

MIG., Inc. historian and archaeologist Robert Templar (M.A., Medieval and Early Modern History, University of Kent, Canterbury, UK, 2011) conducted research as part of an initial historic resource evaluation prepared by MIG in 2018 (MIG 2018). Mr. Templar meets the Secretary of the Interior's Standards for History and Archaeology. The research and information in the 2018 historic resource evaluation were utilized in the preparation of this report.

Research Methods

Prior to the preparation of the *West Bay Sanitary District Flow Equalization Facility Levee Project Environmental Constraints Analysis* (MIG 2018), MIG conducted a Record Search. The California Historic Resource Inventory System (CHRIS) was searched through the Northwest Information Center (NWIC) for known historic and archaeological resources within the project area and within a one-half mile radius of the site. NWIC provided one historic resource evaluation (P-41-002351) within a half mile radius of the project site (Neal 2017). This NRHP evaluation was prepared in 2007 by the U.S. Fish and Wildlife Service for the seven surviving Ravenswood salt ponds. This evaluation concluded that the Ravenswood salt ponds lack adequate integrity to convey a clear association with the solar salt industry and thus are not eligible under NRHP criteria as a historic property (Speulda-Drews and Valentine 2007). MIG conducted a search of both the CRHR and the NRHP for listed historic properties and sites; none were located on the project site.

Primary and secondary sources were reviewed to aid in the development of historic contexts and the site history. The focus of the research was information that would aid in the evaluation of the potential significance and integrity of the property's buildings, structures, and cultural landscape features. Sources that were reviewed included the San Mateo County Records, Menlo Park City Records, information at the West Bay Sanitary District, Menlo Park Historical Association, historical newspapers, historic maps and aerial photographs, online sources, and previously prepared reports and secondary sources. A complete list of references is provided in Chapter 9: Bibliography.

This Historic Resources Evaluation Report provides NRHP and CRHR evaluations of the built environment resources within the FERRF, none of which have been previously been evaluated under federal, state, or local criteria. The results of the evaluation are presented in Chapter 7: Evaluation and are documented on DPR523 Records which are found in Appendix C.

Field Methods

Mr. Hill and Ms. Bradley conducted an intensive field survey of the buildings, structures, and cultural landscape features on the FERRF property on October 26, 2020. Field notes and photographs were taken to aid in the preparation of the description and the evaluation of the property. All photographs used in the report and DPR523 record were taken by Hill and Bradley on that day.

CHAPTER 4. HISTORIC CONTEXTS

Solar Salt Industry: Historic Background

Settlement in the San Francisco Bay Area (Bay Area) likely dates from around 8,000 BCE onwards, and prior to European settlement of the Bay Area, native peoples gathered salt where Bay water became trapped and then evaporated in shallow impoundments or low spots during high tides. The Spanish and Mexicans adapted these practices during the late eighteenth and early nineteenth centuries to harvest salt (Sandoval 1988:4).

In 1850, the federally regulated Arkansas Swamp Lands Act was enacted which enabled states to reclaim land from swampland with the use of drainage or levees and allowed individuals who made those lands profitable to buy back the land from the state (California State Lands Commission 2015). After the implementation of the Arkansas Act, large swathes of the marshlands surrounding the Bay were bought to utilize for salt production, and the solar salt industry expanded along the shores of Alameda County in the 1850s. The increased population after the discovery of gold in 1849, the growth of San Francisco's local food-curing industry, and the use of salt in silver processing all contributed to the growing market for salt in the 1850s and 1860s. Farmers and other land holders along the shoreline of Alameda County adapted the Ohlone-Spanish era gathering practices to increase production to meet the growing market's demands. By the 1860s, the pioneering salt producers had developed the salt-making technique that is still followed in principle today. This technique directed the inflow of San Francisco Bay water via a natural slough into a receiving pond; the water (brine) then moved through a series of ponds where evaporation increased its salinity; the saturated brine was finally transferred into crystallizer beds where salt crystals formed and salt was harvested (Dobkin and Anderson 1994:8).

By the turn of the twentieth century, the industry had spread to the western shores of the Bay, and several plants—including the Leslie Salt Refining Company, Greco Salt Company, Redwood Salt Works, and West Shore Salt Company—operated in the vicinity of Redwood City during the early 1900s (Ver Planck 1958:110, 112). The facilities of these plants were subsequently acquired by larger companies and ceased to operate as independent entities.[2] The consolidation process of several small companies into a larger corporation began after 1900, intensified during the 1920s, and was completed in 1936 by the incorporation of Leslie Salt Company. As a result, with the exception of two independent operations on the eastern shoreline, Leslie controlled the salt pond infrastructure (receiving ponds, concentrator ponds, crystallizer beds, ditch systems, pumps, washers, loading docks, etc.) of the South Bay from the smaller companies that it acquired.[3]

Around 1943, Leslie began construction of a new plant along the west shoreline in San Mateo County that was intended to operate in conjunction with a shipping terminal at the Port of Redwood City; this new plant became known as the Redwood City Crude Salt Plant and was completed in 1951. According to the history of the plant provided by William E. Ver Planck in *Salt in California*, little of the infrastructure from older plants that had been in this area was incorporated into the new plant (Ver Planck 1958:45). The core of the new plant was located on either side of a Southern Pacific rail spur and the road (today's Seaport Boulevard) that connected Redwood City to the Port of Redwood City. The plant's washer and ship loading terminal were located immediately west of the railroad/road, and the crystallizer beds were located immediately east.

There were two separate areas of concentrator ponds which supplied the crystallizer beds with concentrated brine. One was located west of the washer and ship loading terminal on the west side of Redwood Creek on Bair Island and in the vicinity of Belmont Slough. A second group of concentrator ponds—often referred to as the Ravenswood ponds after the Ravenswood Slough which provided inflow into the ponds—began east of Flood Slough (the slough separated these ponds from the crystallizer bed facility) and extended down the shoreline to just south of the Southern Pacific rail trestle below the Dumbarton Bridge. See **Figure 4** for a map that identifies the Project Site in relationship to these components of the Redwood City Crude Salt Plant.

Based on a review of USGS maps and aerial photographs, levees were constructed to create the westernmost ponds in the Ravenswood pond complex between 1937 and 1941 (HistoricAerials.com and USGS 1941). These two ponds were immediately east of Flood Slough, and the westernmost pond included the future location of the Menlo Park Sanitary District's sewage treatment plant (the Project Site). In 1942, the Menlo Park Sanitary District purchased 20 acres at the north end of the pond immediately east of Flood Slough, and by the

---

[2] The Greco Salt Company operated from 1905 through 1920 (Ver Planck 1958:112).

Redwood City Salt Works first reported production in 1901. In 1920, the family who ran the operation retired from the salt business, and the operation was acquired by Stauffer Chemical Company (Ver Planck 1958:112).

The West Shore Salt Company, located in the vicinity of the present Port of Redwood City, began production in 1906. In 1912, the San Francisco Salt Refinery, an affiliate of Stauffer, took over West Shore's crude salt infrastructure, possibly combining it with the Redwood City Salt Works, and produced crude salt there through 1925. Stauffer reopened the plant in 1929 and operated it under its own name through 1940. In 1942, Leslie-California Salt Company (a 1924 incorporation of Leslie Salt Refining Company, California Salt Company, and the Continental Salt and Chemical Company) purchased the entire operation (Ver Planck 1958:110, 112).

[3] The 900-acre American Salt Company at Mount Eden and the 200-acre Oliver Brothers Salt Company located on either side of the eastern approach to the San Mateo Bridge were the two independent operations that survived into the 1950s.

mid-1940s had constructed a levee to separate their property from the larger pond. In 1952, a sewage treatment plant was constructed on this property. In 1957, San Mateo County purchased the 15 acres adjacent to the south side of the sewage treatment plant for the Menlo Park Municipal Dump (San Mateo Times 1957), and began the process of infilling the remaining portion of this pond. Over the next three decades more of the remaining salt pond was filled to extend the dump to the south and then east to infill another pond. As the State enacted regulations to manage dumps and waste disposal sites, the original dump transitioned into an actively managed landfill (MIG 2018). The landfill was closed in 1982 (Callander Associates 2018:4), and the process began for the conversion of the land to a public park. Construction of Bedwell Bayfront Park began in 1984 and was completed in 1995 (Callander Associates 2018:5).

The remaining salt ponds in the Ravenswood unit continued in operation through the early 2000s. In 2003, Cargill Salt, which had acquired all of the Leslie Salt Co.'s Bay Area solar salt facilities in 1978, transferred 15,100 acres of its Bayfront salt ponds in San Mateo, Alameda, and Santa Clara counties to the State of California and the federal government in conjunction with the South Bay Salt Pond Restoration Project, with a goal to restore and enhance a mix of wetland habitats. Included in this transfer were the Redwood City Crude Salt Plant's salt concentrator ponds located east of Flood Slough (i.e., the Ravenswood ponds); these ponds became part of the Don Edwards San Francisco Bay National Wildlife Refuge. (The land where the former Leslie concentrator ponds had been located on Bair Island became part of the Bair Island Ecological Reserve.) Cargill's Redwood City barging and docking facilities were sold in 2003, and the majority of the equipment and facilities for the portion of the Redwood City operation located on the west side of Seaport Boulevard (i.e., related to the washer and the two loading towers) was dismantled and sold (Basin Research Associates 2009:14). In 2020, Cargill continued to operate the 1,400 acres of crystallizer beds to the west of Flood Slough (Schuessler 2018; Rogers 2020) and this site was the last remaining part of Leslie Salt Co.'s Redwood City Crude Salt Plant (shown on Figure 4) that remained in operation.

Menlo Park: Historic Background

The land where Menlo Park is located was inhabited by the Ohlone Indians prior to European settlement. Spanish explorer Don Gaspar de Portola ushered in an era of Spanish rule starting in 1769. Mission padres, explorers, military personnel, travelers, and settlers populated the area through the early 1800s. Father Junipero Serra founded the original Mission Santa Clara de Asis on the banks of the Guadalupe River in January 1777; this location today is near the Central Expressway and De La Cruz Boulevard in Santa Clara. The *Pueblo de San Jose de Guadalupe* was established in November 1777 as the first civic settlement in Alta California. Today, the locations of Santa Clara Mission and the *Pueblo de San Jose* are approximately 20 miles south of the City of Menlo Park.

In 1851, Dennis Oliver and his brother-in-law D.C. McGlynn acquired about 1,700 acres in the southeasterly portion of *Rancho de las Pulgas*, in what is now San Mateo County. Three years later they built two houses with a common entrance and erected a gate with an arch bearing the words "Menlo Park, August 1854" at a point just south of where Santa Cruz Avenue now enters El Camino Real, Menlo Park (known originally as just Menlo) included all of the land of southern San Mateo County adjacent to San Francisco Bay. The town of Atherton was originally known as the "Fair Oaks" area of Menlo Park (Hill 2013:16).

The San Francisco to San Jose Railway arrived in Menlo Park in 1863 and shortened the travel time between the community and San Francisco. This was a key event in the development of the community of Menlo Park. The railroad provided fast and easy transportation for the wealthy of San Francisco to their large country estates which took advantage of the Peninsula's amenable climate during the summer. Before the railroad, the round trip from San Francisco to Menlo Park by stage coach took the entire day. In 1864, a round trip ticket on the railway from San Francisco to Menlo Park cost $2.50, and the one-way trip took about 80 minutes (Kreuz 1974:10). The Menlo Park railroad depot, the oldest one on the Peninsula, opened in 1867.

The original large estates of Milton Latham's *Thurlow Lodge* and James Flood's *Linden Towers* were locate in the vicinity of the railroad station. In 1871, the Southern Pacific Railroad purchased the Peninsula line. Soon after Southern Pacific Railroad owner's Leland Stanford and Mary Hopkins (widow of Stanford's partner Mark Hopkins) purchased large tracts of land in the Menlo Park area. By 1870, a small commercial district of about a dozen buildings—mostly businesses, saloons, and three hotels—were grouped around the railroad depot. Menlo Park developed over the years as a community of shop keepers and servants serving the estates of the wealthy in Fair Oaks. A separate railroad depot to serve the Fair Oaks area (later the town of Atherton) was built in 1902.

Menlo Park retained its rural flavor into the early twentieth century. Then during World War I Camp Fremont—which would eventually train nearly 50,000 men—was built, and a military hospital and related facilities were soon constructed where the Veteran's Administration hospital in Menlo Park now stands. Menlo Park was officially incorporated in 1927. During World War II, the U.S. Army bought the estate of Timothy Hopkins, which included the mansion formerly known as *Thurlow Lodge*, to care for the thousands of soldiers injured in the South Pacific. Originally, the post was named Palo Alto General Hospital but was soon renamed, "Dibble Army Hospital" to honor Colonel John Dibble who was killed in an aircraft crash in 1943. Menlo Park's wartime population soared when the U.S. Army chose to build Dibble General Hospital on the site where the Stanford Research Institute and the Menlo Park Civic Center stand today (California State Military History and Museum Program 2016).

World War II sparked a major development boom in Menlo Park and the entire Bay Area. This explosive period of growth continued throughout the 1950s and 1960s. The city's population increased from 3,358 in 1940 to 13,587 in 1950. The population then doubled again to about 27,000 in 1960. Technology replaced agriculture and the large estates of the wealthy as the town's main source of revenue. The growth of California's famed Silicon Valley beginning in the 1950s extended into Menlo Park. Technology related companies like Hewlett Packard, Fairchild Semiconductor and later Intel and Apple located in the nearby communities of Santa Clara County and contributed to the growth of the Menlo Park.

West Bay Sanitary District: Historic Background

The collection of sewage in San Mateo County is handled by 36 agencies (including County and city sewage collection systems in addition to the six independent sanitary districts). This organization is a legacy of the County's origins as a rural, low density area in contrast to dense urban development of San Francisco to the north. Menlo Park developed as a community to serve country estates which were built in the vicinity during the latter part of the nineteenth century. The history provided on the District's webpage provided the following description of the organization of the Menlo Park Sanitary District.

> *As is ever the case coincident with the development of a new community, a sewerage problem arose. Shortly after the turn of the century, a group of citizens began the process of deciding that the installation of sanitary sewers was in order. Since neither Atherton nor Menlo Park was yet incorporated, the formation of a special district was indicated. In October 1902, a petition signed by 35 residents was presented to the Board of Supervisors of San Mateo County requesting that an election be called for voting on the formation of the sanitary district.*
>
> *The election, which brought the district into being, was held at the Menlo Park Hotel on December 10, 1902 [and the Menlo Park Sanitary District was created that same day.] Senator C. N. Felton was selected as the first President of the Menlo Park Sanitary District Board. One of the first acts of the District Board was to enact a series of ordinances covering a wide variety of subjects. In addition to assuming jurisdiction over sewerage and providing sanitary sewers, the district attempted to control certain functions that today are handled by federal, state, county, and municipal agencies; these included the licensing of plumbers, domestic animal control, slaughtering of cattle, inspection of meat, fumigation of buildings, and quarantining of infectious diseases (WBSD n.d.).*

As the population of the Bay Area expanded significantly in the post-World War II period, dumping raw sewage in San Francisco Bay was recognized as an important public health issue. In March 1946, the California State Board of Health announced it would no longer issue permits allowing dumping of untreated sewage in San Francisco Bay after January 1, 1947. This regulation presaged the environmental movement which began in the early 1960s, with the creation of Save the Bay in 1961 and the San Francisco Bay Conservation and Development Commission in 1965, to control development around the Bay and to protect and restore tidal marshland habit.

Many cities around the Bay continued illegally dumping untreated sewage in the Bay until they could construct the sewage treatment plants to comply with the Board of Health requirements (San Mateo Times 1947:8). Menlo Park Sanitary District was one of four San Mateo county sewage districts that was cited by the State Board of Health for this practice in January 1948 (San Mateo Times 1948:2).

The District had known of the sewage contamination problem since before the war and had suggested internally the need for a treatment plant as early as 1933 (MIG, Inc. 2018:3). In 1942, the District had purchased 20 acres adjacent to Flood and Westpoint sloughs from Leslie Salt Company anticipating the ban on releasing untreated sewage in the Bay. However, their plans to build a sewage treatment plant were delayed by World War II and by obtaining financing (the first bond issue was voted down). The new sewage treatment facility was designed in 1950-51 and facility was completed in October 1952. Around 1960, the District's name was changed to the West Bay Sanitary District.

Today, the West Bay Sanitary District serves the south end of San Mateo County, and is one of the six independent sanitary districts in San Mateo County. The six independent sanitary districts were established over the course of six decades in response to population growth in San Mateo County. For example, a subdivision developer in South San Francisco founded the most recently established district—Westborough—in 1961. Some districts are responsible for more than just collecting sewage. The Montara and Westborough also provide drinking water. Three of the districts provide garbage collection services within their districts. These other missions have little synergy with the core mission of sewage collection (San Mateo County Grand Jury 2015-16:16-17).

CHAPTER 5. SITE HISTORY

Until the late 1930s, the FERRF site was part of the tidal marshlands of the San Francisco Bay. Between 1937 and 1941, levees were constructed to create two large ponds to the east of Flood Slough and south of Westpoint Slough (HistoricAerials.com and USGS 1941). **Figure 5** shows the location of the FERRF site in relationship to these two ponds. In 1942, the Menlo Park Sanitary District, purchased 20 acres of land at the north end of the pond that was on the east side of Flood Slough from Leslie for the purpose of building a sewage treatment plant (MIG 2018:3).

By 1946, a levee had been added to the south side of this parcel separating it from the remaining portion of the salt pond to the south (Pacific Aerial Survey 1946). The design and construction of the District's sewage treatment plant did not occur until after World War II. In 1951, plans were prepared by the district's acting engineer, Lawrence H. Cook, (West Bay Sewage District 1951). Construction began in May 1951, and the new sewage treatment plant was completed and put into operation in October 1952 (MIG 2018:3). Access to the facility was via a road that ran along the top of levee on the east side of Flood Slough (Marsh Road). The new facility included inlet works, pretreatment tanks, chlorination building, pump house, sedimentation tanks, and an outlet pipe to the Bay that emptied into Westpoint Slough. These features were arranged on a north-south axis in the central portion of the property. To the west of these structures were the District's Operations Building and two digester structures. Two large two large sludge beds were to the west of these features. **Figure 6** shows the arrangement of the sewage treatment plant on an aerial photograph flown in 1955.

A second group of sedimentation tanks were added immediately west of the original tanks between 1961 and 1968 (Pacific Aerial Surveys 1961; HistoricAerials.com 1968). A warehouse was added during the same period to the west of the new sedimentation tanks and north of Digester No. 2.

Between 1968 and 1973, four flow equalization basins were excavated at the property to provide storage for the District's wastewater (HistoricAerials.com 1968; USGS 1973). These basins occupied the open land that surrounded the sewage treatment plant. Two basins (Ponds 1 and 2) were located along the western portion of the property; they were separated by an earthen berm located along the north side of Pond 1 and the south side of Pond 2. An open channel at the west end of the berm connected the flow between the two basins. A third basin (Pond 3) occupied the land north of the sewage treatment plant, and a fourth basin (Pond 4) occupied the land to its east (USGS 1968 and 1973; Pacific Aerial Surveys 1977).

The sewage treatment facility was decommissioned in 1980 after the formation of the South Bayside Systems Authority (renamed Silicon Valley Clean Water in 2014) and the redirection of wastewater to the new Redwood City Wastewater Treatment Plant.

Between 1987 and 1991, the opening in the earthen berm between Ponds 1 and 2 was closed and flow between the two basins was facilitated via a pipe through the berm (HistoricAerials.com 1987; GoogleEarth 1991).

In early 2018, Pond 4 was filled and in 2020 a large mound of soil was added to its north end. In 2018-19, a small native plant nursery, operated by the non-profit organization Save the Bay, was added to land at the south end of the former Pond 4 site (Google Earth 2017-19).

CHAPTER 6. DESCRIPTION

The following description provides an overview of the property and a description of the cultural landscape features. This is followed by a description of the buildings and structures on the site. See **Appendix B** for a figure showing the location of the features (**Figure 7**), representative photographs of the features (**Photos 1-34**), and the location of the photographs (**Figure 8**). All photographs were taken by Ward Hill and Denise Bradley during their intensive field survey on October 26, 2020. See **Appendix C** for DPR523 Records for the FERRF property.

Overview and Cultural Landscape Features

The West Bay Sanitary District Flow Equalization and Resource Recovery Facility (FERRF) is located at 1700 Marsh Road (Assessor's Parcel Number 055-400-010) in the northern part of Menlo Park at the northern terminus of Marsh Road. The property is approximately 20 acres in size and contains three open storage (flow equalization) basins, a group of features associated with the decommissioned Menlo Park Wastewater Treatment Plant (WTP), and a small native plant nursery.

Westpoint Slough borders the property on its north side and Flood Slough borders it on the west. Earthen levees run along the north and west edges of the property separating it from these sloughs. Bedwell Bayfront Park borders the property's east and west sides; a chain-link fence runs along the boundary on these two sides. Access to the site is via Marsh Road and a gate in the chain-link fence at the southwest corner of the property. An asphalt-paved road continues from this gate along the southern edge of the property for approximately 650 feet. This road provides access to the grouping of features associated with the decommissioned wastewater treatment plant, which occupy approximately 2.5 acres of land in the central portion of the property.

The WBSD system flows in a northwest direction and terminates at the Menlo Park Pump Station, which is owned by the District and operated by Silicon Valley Clean Water (SVCW). (The District along with the cities of Belmont, San Carlos, and Redwood City are the four members of the Joint Powers Agency that forms the SVCW.) The Menlo Park Pump Station is located on a separate property about one-half mile south of the FERRF property, at the northwest corner of Marsh Road and Haven Avenue. From the Menlo Park Pump Station, flow is routinely pumped to the SVCW Wastewater Treatment Plant in Redwood City. However, the District has the capability to bypass the Menlo Park Pump Station and send flow to the FERRF during peak flow events to prevent overflows within the system or for conveyance system maintenance during extreme wet weather events where the flow (combined stormwater and sewer flows) is temporarily stored in the three basins. A transfer pump station returns the flow back to the Menlo Park Pump Station (WBSD 2011: 2-1 and 2-5; MIG, Inc. 2020).

The transfer pump station is located adjacent to the road to the sewage treatment plant and the first basin (Pond 1). The rectangular plan building has bolted metal panel walls and a flat roof with shallow eaves. The building has no windows and a single hinged door on the east facade. A metal electrical transformer box is adjacent to the east facade.

The three flow equalization basins (Ponds 1, 2, and 3) occupy the majority of land within the property. The basins are concrete lined and are surrounded by earthen levees and berms. The inner side/bank of the levee along Flood Slough forms the west side of Ponds 1 and 2, and the inner side/bank of the levee along Westpoint Slough forms the north side of the Ponds 2 and 3. The other sides of the ponds are formed by internal earthen berms. The levees and berms vary in dimensions but are approximately 80 feet side at their base, between 5 and 6 feet high, and approximately 15-20 feet wide across the top. Circulation around the ponds is via gravel or dirt paths along the leveled tops of the levees and berms.

Pond 1 is located in the southwest corner of the property, immediately north of the entrance road. From an aerial view, the top of the basin is roughly square in shape and measures approximately 450 feet by 400 feet. It has a storage capacity of approximately 10 million gallons. Pond 1 is the primary storage basin and flow enters it through a standing pipe in the center of the basin. A pipe through the berm on its north side provides the connection for the flow between it and Pond 2.

Pond 2 is located in the northwest corner of the property, immediately to the north of Pond 1. From an aerial view, the top of the basin is roughly trapezoidal in shape. It has a storage capacity of approximately 10 million gallons. Two pipes through the berm on its on east side provide a connection for the flow between it and Pond 3; these pipes are no longer functional (Htoo 2020).

Pond 3 is located immediately east of Pond 2. From an aerial view, the top of the basin is roughly triangular in shape. It has a storage capacity of approximately 4 million gallons. A earthen berm and concrete structure (the remnants of the non-functioning overflow pipes for the decommissioned wastewater treatment plant) bisect Pond 3 from north to south.

A fourth flow equalization basin (Pond 4) previously occupied the east side of the property. Pond 4 was filled in 2018. A large mound of dirt has been added to what would have been its north end. The non-profit organization Save the Bay operates a small native plant nursery in the southeast corner of the FERRF site on what would have been the south end of Pond 4. The nursery, with an overall footprint of 100 feet by 85 feet, consists of a grid of small raised planting beds (with wood board sides) and unpaved paths.

Buildings and Structures

The FERRF property contains buildings and structures associated with the decommissioned Menlo Park Sanitary District’s Sewage Treatment Plant which was in operation from 1952 to 1980. These features are arranged in two groupings to the east of Pond 1. The Main Building complex has five buildings—the Diversion Box, two cylindrical Digesters, the Operations Buildings, and a metal warehouse—arranged on a north/south axis that is approximately 100 feet to the east of Pond 1. The open space between the pond and this row of structures is used for parking and circulation. The second group of structures consists of the various tanks and wastewater treatment structures—inlet works, pre-treatment tanks, and sedimentation tanks)—is located east of the main buildings and is also on a north/south axis. A small pump house and chlorination building are included in this second group. The open space between the main buildings and treatment structures is used for parking and storage.

A description of these features is provided in more detail below following the overview of the wastewater treatment process.

The Wastewater Treatment Process

The following overview describes the typical wastewater treatment process and how the District's Sewage Treatment Plant would have operated before it was decommissioned in 1980. This overview helps to explain the extant structures and buildings and their relationship to each other and to this process. The overview is based on the description of the process in the publication *Wastewater Treatment Process in California* published by the Water Education Foundation (n.d.).

The initial step in the wastewater treatment process is called preliminary treatment and begins as all raw sewage from domestic and commercial sources enters the treatment plant's "headworks" or "inlet works." Large objects—ranging from trash and toys to rocks and branches that could clog or damage plant machinery—are mechanically raked and screened out from the sewage using influent screens.

After screening, the wastewater enters pre-treatment tanks where objects small enough to get through the influent screens (which can be large as coins or jewelry but also smaller material like coffee grounds or sand) sink to the bottom by gravity.

After leaving the pre-treatment tanks, wastewater is ready for primary treatment. The wastewater is piped into primary settling or sedimentation tanks where heavy particles sink and light particles float.

During secondary treatment, biological processes are incorporated to remove contaminants dissolved in wastewater with the use of naturally occurring microorganisms that feed on organic materials. Anaerobic digestion uses the process of fermentation to break down organic matter from animals, plants or sewage to produce biogas. The process takes place within a centralized system in a unit called a digester, also known as a biogas reactor or a bio-digester. After the microorganisms have absorbed and digested the organic materials, the wastewater is sent into secondary sedimentation tanks.

The accumulated solids—called sludge—that sinks to the bottom of the sedimentation tanks is removed to the sludge beds to dry out. The sludge slurry is spread on an open bed of sand and allowed to remain until dry. The dried sludge is removed to various dump sites.[4]

In most situations, secondary treatment must be followed by a disinfection process to kill harmful pathogens (protozoa, bacteria and viruses). The District's Sewage Treatment Plant used a common disinfectant like chlorine (originally stored in the Chlorine Building) for the disinfection process.

Main Building Complex

The five features in the Main Building complex—the Diversion Box, two cylindrical Digesters, the Operations Buildings, and a metal warehouse—are described from the south end of the complex to the north.

Diversion Box

The rectangular plan Diversion Box at the southern end of the building complex is a small, plain concrete building with no windows or doors and a flat roof. The building has a ladder on the north façade leading to the roof. The structure controlled the two lines that entered the sewage treatment plant (Htoo 2020).

Digester No. 1 and No. 2

Adjacent to and north of the Diversion Box is one of the two Digesters. Digester No. 1 is south of the Operations Building and Digester No. 2 is north of the Operations Building. The digesters are identical and each is a cylindrical reinforced concrete structure with horizontal tie rods. Each Digester is 25 feet tall and 14 feet in diameter. Mechanical equipment on the roofs of the Digesters supports the chemical process—anaerobic digestion that breaks down organic matter in the water from animals, plants or sewage to produce biogas—contained in these structures.

Operations Building

The Operations Building is a square plan, two-story structure with plain reinforced concrete walls and a flat roof. The front (east) façade has a single hinged door and two roll-up garage doors on the first floor. The front façade's second floor has three modern tripartite metal windows. A fourth modern tripartite window is on the second floor of the north façade. The north façade also retains three original multi-pane industrial sash windows. Incised white letters (Menlo Park Sanitary District / Sewage Treatment Plant / Operations Building) are written into the center of the front façade. Additionally, there is a small commemorative plaque identifying the building's construction date (1952), the Sanitary District Board of Trustees, and the District engineers and building contractor.

---

[4] When in operation, the District's Sewage Treatment Plant had two large sludge beds west of the sedimentation tanks in the area that now contains Ponds 1 and 2. The sludge beds were removed after the plant was decommissioned in 1980.

The south façade of the Operations Building has a roll-up garage door and two industrial sash windows.

The back (west) façade has a single story rear extension. The extension has modern metal windows and a single roll-up garage door. A concrete stair leads to the roof of the extension. Ladders on the north and south sides of the roof lead to the roofs of Digesters No. 1 and No. 2, which flank the Operations Building.

The Operations Building originally functioned as the administration and control building for the sewage treatment plant. Today it houses offices, shop space, and storage for the West Bay Sanitary District.

The front entrance door on the east leads into a small entry area where stairs lead up to the second floor. A door on the right side of the entry area leads to a first floor shop area. The second floor has offices and storage space.

Warehouse

A long, rectangular plan warehouse is north of Digester No. 2. The steel-frame warehouse has exterior walls and roof covered with bolted vertical metal panels. The exposed steel-frame structure is visible in the free-span open interior.

Wastewater Treatment Structures

Inlet Works and Pre-Treatment Tanks

When in operation, raw sewage entered the treatment plant at the Inlet Works, a concrete tank with a tube steel railing, located at the south end of the treatment structures. A series of concrete Pre-Treatment Tanks are adjacent to and north of the inlet works. A raised concrete platform with a variety of mechanical equipment is adjacent to the west side of the pre-treatment tanks.

Pump House

North of the Pre-Treatment Tanks is a rectangular plan Pump House with reinforced concrete walls and a flat roof. The Pump House has industrial sash windows on the south and west walls (now covered with boards). A single hinged glazed door on the north leads inside the Pump House. The east wall inside has electrical equipment. An interior stair on the west leads to a lower level which was not accessible because it was filled with water.

Chlorination Building

The small Chlorination Building east of the pump house is a square plan, concrete building with a flat roof. The building has glass block windows on the east and west. A double, metal, hinged door with a six light window on the south opens into the single room interior. A second single hinged door is on the north façade.

Sedimentation Tanks

North of the Pump House and the Chlorination Building are a series of concrete Sedimentation Tanks arranged on an east/west axis. The concrete walls of the tanks appear to be about one foot wide. The three original Sedimentation Tanks (1952) are on the east, and a second set of tanks (added in the 1960s) are immediately west of the original tanks. The 1960s Sedimentation Tanks have a checker board series of walkways with tube steel railings above the concrete tanks.

CHAPTER 7. EVALUATION

Criterion A/1: Event

None of the features—individually or collectively—on the West Bay Sanitary District Flow Equalization and Resource Removal Facility (FERRF) property appear to be significant under NRHP/CRHR Criterion A/1 for their association with an event in history.

Association with the History of Wastewater Management in the Bay Area

The Menlo Park Sanitary District's sewage treatment plant was originally constructed in 1952 as a sewage treatment plant in response to a regulation enacted by the California State Board of Health in 1946 that prohibited dumping of untreated sewage in the San Francisco Bay. The sewage treatment operations on the property ended in 1980. With the exception of the sludge beds (removed post-1980), the property retains all of its features that were in use during its operation (1952-1980) and retains its integrity. However, the property is not significant under NRHP/CRHR Criterion A/1 for its association with history of wastewater management in the Bay Area. It was one of many such facilities constructed around the San Francisco Bay during the post-World War II era. It was not the first or largest of the Bay Area's wastewater treatment plants, and it played no significant role in the history of the development of wastewater treatment in the Bay Area.

The flow equalization basins (Ponds 1, 2, and 3) were constructed between 1968 and 1973, and are approaching the 50 years of age criteria for evaluation under the NRHP and CRHR. These basins are one of many facilities around the San Francisco Bay associated with the continued development of wastewater treatment and management in the late twentieth century, and they are not significant under NRHP/CRHR Criterion A/1 in association with this history. Additionally, they do not meet the criteria for significance under NHRP Criterion Consideration G for properties that have achieved significance in the past 50 years.

Association with the History of Menlo Park

The West Bay Sanitary District FERRF property played no significant role and represents no significant milestone in Menlo Park history. The property is not significant under NRHP/CRHR Criterion A/1 for its association with the history and development of Menlo Park.

Association with the History of Solar Salt Production in the South Bay

The potential significance of the two external levees along the north and west sides of the West Bay Sanitary District FERRF property is derived from their association with the South Bay's solar salt industry. These two levees were constructed in the late 1930-early 1940s as part of a levee system that enclosed a 90-acre salt concentrator pond on the east side of Flood Slough; the pond extended from Westpoint Slough southward to the end of Flood Slough. This pond was part of a larger complex of salt concentrator ponds east of Flood Slough—often referred to as the Ravenswood ponds or unit—which were used to create the initial brine stage in the solar salt production process.

The significance of the Ravenswood unit in association with the history of the solar salt industry in the South Bay was documented in a NRHP evaluation prepared in 2007 by the U.S. Fish and Wildlife Service. This evaluation noted that the ponds were originally part of an extensive system of approximately 35 evaporation ponds that were used to create the initial brine stage of the process. Today, only seven ponds remain extant, and these are no longer connected with the process of evaporative salt production. This evaluation concluded that the Ravenswood salt ponds lack adequate integrity to convey a clear association with the solar salt industry and thus are not eligible for listing in the NRHP as a historic property (Speulda-Drews and Valentine 2007).

Similarly, the levees along the north and west sides of the FERRF property no longer retain any of the seven aspects of integrity (i.e., location, design, materials, workmanship, feeling, setting, and association). The levees and the land uses and activities associated with these levees no longer convey a connection or association with the solar salt production. The original design of the levee system enclosing a large salt concentrator pond is non-extant. The construction of the Menlo Park Sanitary District's sewage treatment plant in 1952 and the operation of the county dump between 1957 and 1982 (today the site of the Bedwell Bayfront Park) resulted in the infill of the majority of the pond.[5] Additionally, the levee that ran along the east side of the pond (and the east side of the FERRF property and through what is now Bedwell Bayfront Park) is no longer extant. In summary, due to this lack of integrity, the two levees along the north and west sides of the FERRF are not eligible for listing in the NRHP or CRHR under Criterion A/1.

Criterion B/2: Person

None of the features—individually or collectively—within the West Bay Sanitary District FERRF property are significant under NRHP/CRHR Criterion B/2 for their association with a person who is significant to the history of the region.

Criterion C/3: Design/Construction

None of the features—individually or collectively—within the West Bay Sanitary District FERRF property are significant under NRHP/CRHR Criterion C/3 for their design or construction.

Buildings and structures associated with the West Bay Sanitary District's FERRF and its decommissioned Sewage Treatment Plant are all common examples of their type and are not significant for their design or construction.

[5] Two small ponds (ca. 1960-1968) which together cover approximately 13 acres remain between the south side of Bedwell Bayfront Park and the expressway; the levees for these two ponds were created between 1960 and 1968.

The three flow equalization basins (Ponds 1, 2, and 3) are common examples of their type and are not significant for their design or construction. Additionally, they do meet the criteria of significance under NRHP Criterion Consideration G as a property that has achieved significance within the past 50 years.

The external levees along the north and west sides of the West Bay Sanitary District FERRF are common examples of the type of levee that was constructed in association with solar salt pond production during the early-to-mid twentieth century. The levees are not significant for their design or construction, and, as described under Criterion A/1, the levees lack integrity.

Criterion D/4: Information Potential

Criterion D/4 typically applies to archaeological resources. None of the features—individually or collectively—within the West Bay Sanitary District FERRF appear to be significant under NRHP/CRHR Criterion D/4 for the potential to yield information important to history or prehistory.

CHAPTER 8. CONCLUSION

In conclusion, the West Bay Sanitary District's Menlo Park FERRF (1700 March Road, Menlo Park, San Mateo County, California) does not appear eligible for listing in the NRHP or CRHR under Criteria A/1, B/2, C/3, or D/4. Additionally, none of the individual features—levees, operation building, and other wastewater treatment structures at the site—appear to be individually eligible for listing in the NRHP or CRHR under Criteria A/1, B/2, C/3, or D/4. No historical resources were identified under the NRHP/CRHR criteria and no mitigation is required for historical resources under CEQA or Section 106 of the NHPA for the levee improvements and new Recycled Water Facility (RWF) proposed for the District's Menlo Park FERRF site.

CHAPTER 9. BIBLIOGRAPHY

Basin Research Associates. 2009. *Cultural Resources Assessment Report In Support of Initial Study and Environmental Impact Report Redwood City Saltworks Project, City of Redwood City, San Mateo County for DMB Redwood City Saltworks*.

Bradley, Denise. 2010. *Revised Draft Cultural Landscape Evaluation Report* [for] *Redwood City Saltworks Project, Redwood City, San Mateo County, California*. Prepared for DMB Redwood City Saltworks. September 2010.

Busch, Ray. 2016. "The Golden Age of Wastewater" 2016. https://meetingoftheminds.org/golden-age-wastewater-15790. Accessed October 28, 2020.

California Office of Historic Preservation. 2011. *Technical Assistance Series #6: California Register and National Register: A Comparison (for purposes of determining eligibility for the California Register)*. Sacramento: Office of Historic Preservation. https://ohp.parks.ca.gov/pages/1069/files/technical%20assistance%20bulletin%206%202011%20update.pdf. Accessed October 28, 2020.

————. 2001. *Technical Assistance Series #7: How to Nominate a Resource to the California Register of Historical Resources.* Sacramento: Office of Historic Preservation.

————. 2017. California Register of Historic Resources. http://ohp.parks.ca.gov/ListedResources/. Accessed October 28, 2020.

California State Lands Commission. 2015. Swamp & Overflow Lands. http://www.slc.ca.gov/Info/Swamp_Overflow.html. Last accessed December 22, 2017. Cited in MIG, *Historic Resource Evaluation for the West Bay Sanitary District Levee Project*. May 8, 2018.

California State Military History and Museums Program. 2016. *Historic California Posts, Camps, Stations and Airfields: Dibble General Hospital (Palo Alto General Hospital*). http://www.militarymuseum.org/DibbleGH.html. Accessed October 28, 2020.

Callander Associates Landscape Architecture. 2018. *Bedwell Bayfront Park Master Plan*. https://www.menlopark.org/DocumentCenter/View/18558/Bedwell-Bayfront-Park-Master-Plan?bidId. Accessed October 28, 2020.

Cargill, Inc. 2008. *Cargill Salt – San Francisco Bay*. http://www.cargill.com/sf_bay/about_history.htm. Accessed December 6, 2008. Cited in Basin Research Associates, *Cultural Resources Assessment Report . . . Redwood City Saltworks Project City of Redwood City, San Mateo County for DMB Redwood City Saltworks, 2009.*

Dobkin, Marjorie and Robert Bruce Anderson. 1994. *Oliver Bros. Salt Co., Alameda County, California, Historic Resource Evaluation Report, Contract 04F828-EP, Task Order #1, ALA-92, P.M. R0.0/R6.4, EA # 003050*. Prepared for Mara Melandry, Environmental Planning Branch, South, District 4-Oakland, California Department of Transportation.

Goggle Earth. 1948, 1991, 1993, 2002-2020. Aerial photographs (assembled from various sources) that include the West Bay Sanitary District FERRF Site (pre and post development).

Hill, Ward. 2013. *The Houses of the San Francisco Peninsula.* Unpublished manuscript on file at author's San Francisco office.

Historic Aerials by Netroline. 1946, 1948, 1958, 1960, 1968, 1980, 1982, and 1987. Aerial photographs (assembled from various sources) that include the West Bay Sanitary District FERRF Site (pre and post development). https://www.historicaerials.com/viewer. Accessed October 28, 2020.

Historic Aerials by Netroline. 1937. Topographic map that includes the West Bay Sanitary District FERRF Site (pre-development). https://www.historicaerials.com/viewer. Accessed October 28, 2020.

Historic Newspapers, 2017. https://www.newspapers.com. Accessed December 22, 2017. Cited in MIG, Inc., *Historic Resource Evaluation for the West Bay Sanitary District Levee Project*. May 8, 2018.

Htoo, Lorraine (Freyer & Laureta Inc.). 2020. Email communication with Barbara Beard (MIG, Inc.). October 27, 2020.

Kreuz, Charmayne. 1974. *A Tradition of New Horizons-The Story of Menlo Park*. City of Menlo Park, Menlo Park, California, 1974.

MenloPark.com. n.d. *History of Menlo Park*. www.menlopark.com/channel/History-Of-Menlo Park/6922. Accessed October 28, 2020.

Menlo Park Historical Association (eds.), 1995. A Short History of the Menlo Park Sanitary District. https://goo.gl/eVC9Fx Accessed December 22, 2017. Cited in MIG, Inc., *Historic Resource Evaluation for the West Bay Sanitary District Levee Project*, 2018.

Menlo Park Sanitary District. 1951. New Treatment Works, Project Plan [and] Drawing Schedule. Sheet 2000, Revised 2-12-1951; Treatment Plant: General View. Sheet 2023, Revised 2-9-51; By Pass Outfall: Plot and Profile. Sheet 2062. ?-22-51. Provided in MIG Inc., *Historic Resource Evaluation for the West Bay Sanitary District Levee Project, May 8, 2018*.

————. 1951. *New Treatment Works, Project Plan [and] Drawing Schedule. Sheet 2000, Revised 2-12-1951*. Provided in MIG Inc., *Historic Resource Evaluation for the West Bay Sanitary District Levee Project, May 8, 2018*.

————. 1951. *Treatment Plant: General View. Sheet 2023, Revised 2-9-51*; Provided in MIG Inc., *Historic Resource Evaluation for the West Bay Sanitary District Levee Project, May 8, 2018*.

————. 1951. *By Pass Outfall: Plot and Profile. Sheet 2062. ?-22-51*. Provided in MIG Inc., *Historic Resource Evaluation for the West Bay Sanitary District Levee Project, May 8, 2018*.

MIG, Inc. 2018. *Historic Resource Evaluation for the West Bay Sanitary District Levee Project*. Prepared for Freyer & Laureta, Inc. May 8, 2018.

————. 2018. *West Bay Sanitary District Flow Equalization Facility Levee Project Environmental Constraints Analysis*. Prepared for Freyer & Laureta, Inc. January 2018.

————. 2020. Administrative Draft: Project Description. Provided by Christina Lau via email. October 23, October 26, and November 9, 2020.

National Park Service, 2017. National Register of Historic Places. https://npgallery.nps.gov/nrhp. Accessed December 22, 2017. Cited in MIG, *Historic Resource Evaluation for the West Bay Sanitary District Levee Project*, 2018.

Neal, Annette (Research Northwest Information Center). 2017. NWIC File No. 17-0561. September 19, 2017.

Pacific Aerial Surveys. 1946, 1955, 1961, and 1977. Aerial photographs (assembled from various sources) that include the West Bay Sanitary District FERRF Site (pre and post development).

Rodgers, Paul. 2020. "San Francisco Bay: Court rejects Trump administration ruling on Cargill Redwood City property." *San Jose Mercury News*, October 6, 2020. https://www.mercurynews.com/2020/10/06/san-francisco-bay-cargills-redwood-city-development-plans-dealt-setback-by-court/. Accessed October 28, 2020.

Sandoval, John S. 1988. *Mt. Eden, Cradle of the Salt Industry in California.* Hayward: Mt. Eden Historical Publishers.

San Mateo County Civil Grand Jury. 2015-16. *San Mateo County's Cottage Industry of Sanitary District.* https://yellowdragonblogdotcom.files.wordpress.com/2018/06/sanitary_district-1.pdf. Accessed October 28, 2020.

San Mateo Times.

"New Sewage Disposal Plans Should Get Encouragement." January 25, 1947:8.

"Sewage in Bay Banned by State." January 24, 1948:2.

"South County District to Sign $1,035,000 Dump Deal." February 6, 1957:17.

"To Buy Dump." March 27, 1957:23.

Schuessler, Anna. 2018. "Ravenswood salt pond improvements take shape: Tidal marsh restoration to provide flood protection and public access." *The Daily Journal*, July 7, 2018. https://www.smdailyjournal.com/news/local/ravenswood-salt-pond-improvements-take-shape/article_6e1e7d7c-819f-11e8-adb2-a390d6722370.html. Accessed October 28, 2020.

Speulda-Drews, Lou Ann and Nick Valentine. 2007. Ravenswood Salt Works District, DPR523 District Record, P-41-002351, Northwest Information Center.

United States Department of the Interior, Geological Survey (USGS). 1941, 1943, 1947, 1948, and 1961 *Palo Alto, Calif*. [Quadrangle]. Topographic map, 15-minute series (scale 1:62,500).

————. 1953, 1961, 1968 (photorevised), 1973 (photorevised), 1991, 1997, and 2018. *Palo Alto, Calif*. [Quadrangle]. Topographic map, 7.5-minute series (scale 1:24,000).

United States Department of the Interior, National Park Service (NPS). 2002. *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf. Accessed October 28, 2020.

United States Environmental Protection Agency, Office of Water. 1998. *How Wastewater Treatment Works…The Basics*. https://www3.epa.gov/npdes/pubs/bastre.pdf. Accessed October 28, 2020.

Ver Planck, William E, 1957. *Salt in California*. San Francisco, CA: California Division of Mines Bulletin 175.

Water Education Foundation. n.d. "Wastewater Treatment Process in California." https://www.watereducation.org/aquapedia/wastewater-treatment-process-california. Accessed October 28, 2020.

West Bay Sanitary District, 2011. Wastewater Collection System Master Plan, West Bay Sanitary District & West Yost Associates. Menlo Park. https://westbaysanitary.org/wsbd-prod/resources/824/WBSD_Master_Plan_2011.pdf. Accessed October 28, 2020.

West Bay Sanitary District. 2014. *News Alert: SBSA's New Name: Silicon Valley Clean Water*. https://westbaysanitary.org/wsbd_production/resources/1071/Silicon_Valley_Clean_Water.pdf. Accessed October 28, 2020.

West Bay Sanitary District. n.d. *History*. https://westbaysanitary.org/about-us/mission-history. Accessed October 28, 2020.

Appendix A

Source: ESRI

★ Project Location
Distribution Pipeline
Existing Pipeline
Sanitary Sewer Forceman

Figure 1: Regional Location
(Source: MIG 2020)

Figure 2: Project Location
(Source of Base Photo GoogleEarth 6-2020)

Figure 3: Project Components
(Source: Freyer & Laureta, Inc.)

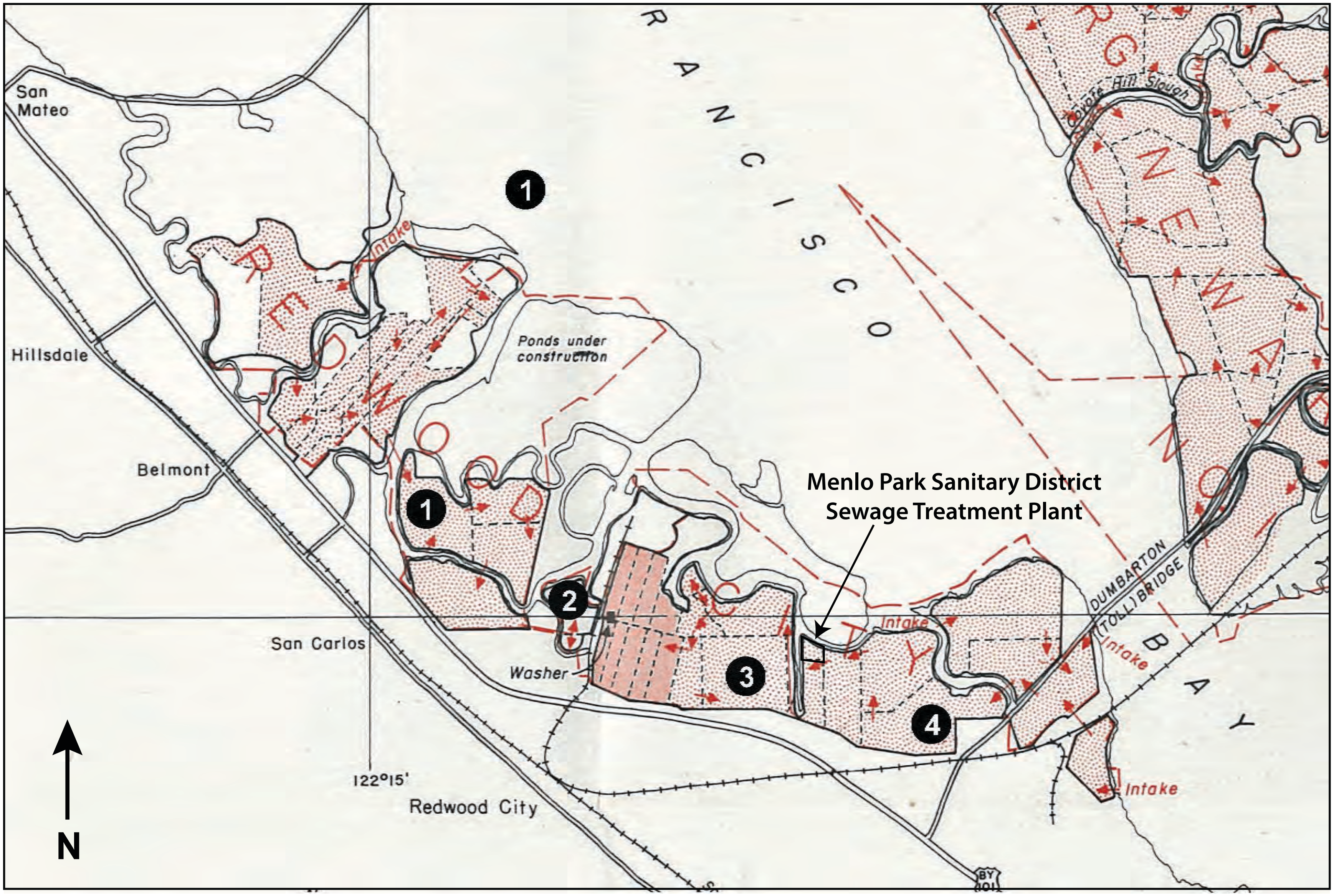


Figure 4: Components of the Redwood City Crude Salt Plant (1951) labeled as follows: (1) Concentrator Ponds in vicinity of Belmont Slough and on Bair Island, (2) Shipping Terminal, Washer, and Salt Stack at the Port of Redwood City, (3) Crystallizer Beds, Pickle and Bittern Ponds (Redwood City Plant Site), and (4) Concentrator Ponds east of Flood Slough (Source: Plate 1, Salt In California [Ver Planck 1953])

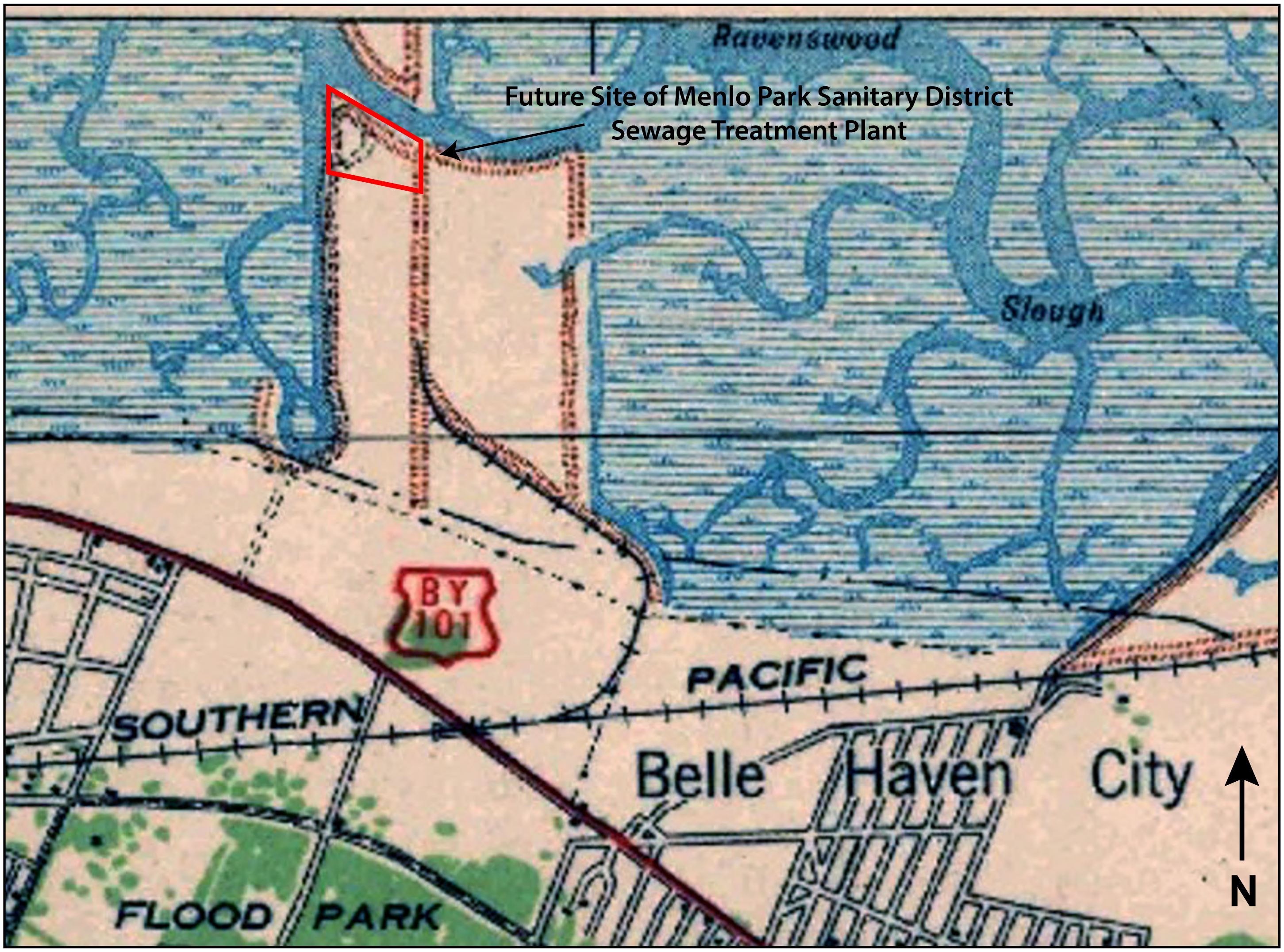


Figure 5: Salt Ponds to East of Flood Slough in 1941
(Source of Base Map: USGS Palo Alto 15 Minute Series 1941)

Figure 6: Menlo Park Sanitary District Sewage Treatment Plant in 1955
(Source of Base Map: Pacific Aerial Surveys 1955)

Appendix B

Figure 7. Features at FERRF

Figure 8. Location of Photos

Photos 1 to 34

Figure 7: Features of FERRF
(Source of Base Map: GoogleEarth 6-2020)

Figure 8: Location of Photos
(Source of Base Map: GoogleEarth 6-2020)

Photo 1. Entrance gate to FERRF property at Marsh Road. View looking north.

Photo 2. Entrance road and boundary fence along south side. Bedwell Bayfront Park on south side of fence. View looking southeast.

Photo 3. Return pump station. View looking northwest.

Photo 4. Pond 1. View looking northeast.

Photo 5. Pond 2 showing pipe connection to Pond 1. View looking northeast.

Photo 6. Levee and gravel road between Pond 1 (left) and Pond 2 (right). Typical example of internal earthen berms around ponds and circulation. View looking southwest.

Photo 7. Levee and gravel/dirt road along the west side of FERRF property. Levee separates the property from Flood Slough (right) and forms the west side of Ponds 1 and 2 (left). View looking south.

Photo 8. Levee and dirt road along the north side of the FERRF property. Levee provides separates the property from Westpoint Slough (left) and forms the north side of Pond 2 (right foreground) and Pond 3 (right background). View looking east.

Photo 9. Levee and dirt road along the north side of the property. Pond 3 (left) and Westpoint Slough (right). View looking west.

Photo 10. Pond 3. View looking southeast.

Photo 11. Earth mound at the north end of the former site of Pond 4. View looking east.

Photo 12. Native plant nursery located at the south end of the former site of Pond 4. View looking south.

Photo 13. Facilities of the decommissioned Menlo Park sewage treatment plant. View looking northeast.

Photo 14. Facilities of the decommissioned Menlo Park sewage treatment plant. View looking west.

Photo 15 Diversion Box. View looking west.

Photo 16. Digester No. 1. View looking northwest.

Photo 17. Operations Building. View looking northwest.

Photo 18. Operations Building. Rear stair to Digester No. 2. View looking north.

Photo 19. Operations Building. First floor interior. Shop area.

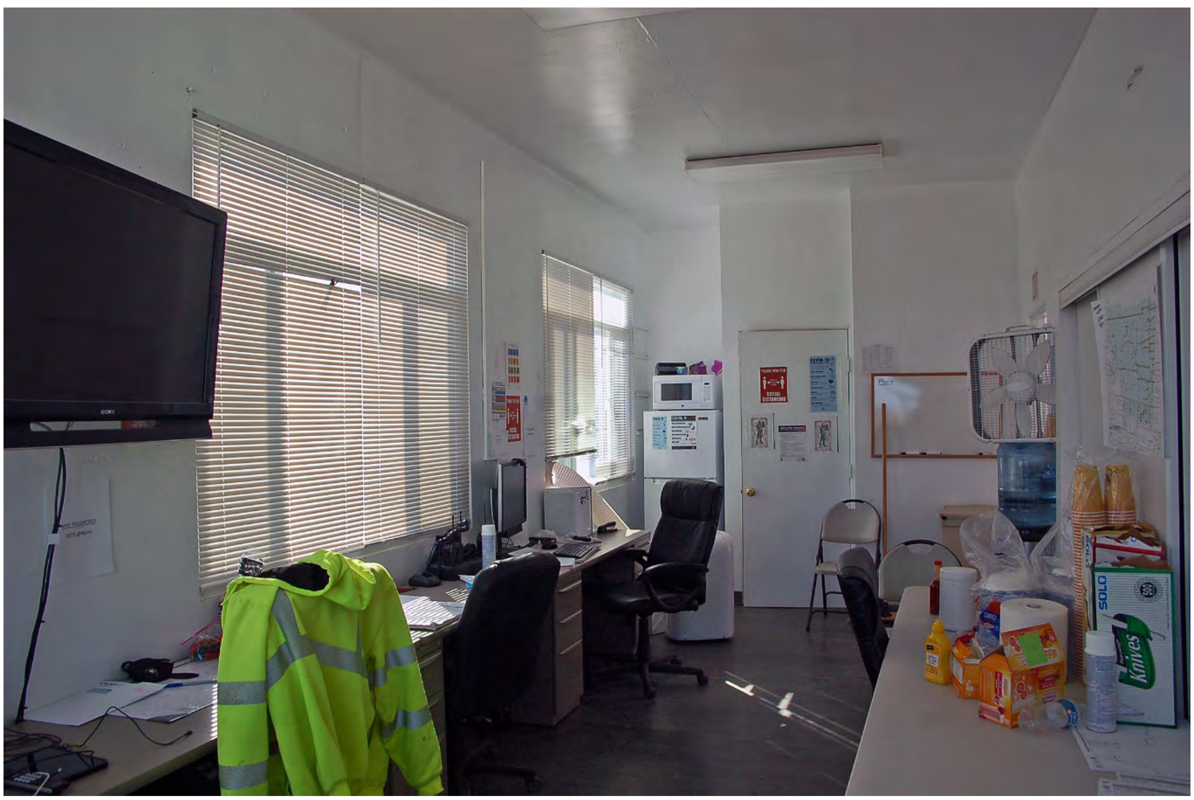


Photo 20. Operations Building. Second floor interior. Second floor office.

Photo 21. Digester No. 2. View looking southwest.

Photo 22. Warehouse. View looking northwest.

Photo 23. Warehouse. Interior.

Photo 24. Inlet Works. View looking northwest.

Photo 25. Inlet Works. View looking southwest.

Photo 26. Pre-Treatment Tanks. View looking east.

Photo 27. Pump House: View looking northwest.

Photo 28. Pump House: View looking southeast.

Photo 29. Pump House. Interior view.

Photo 30. Chlorination Building. View looking northeast.


Photo 31. Chlorination Building. Interior view.

Photo 32. Sedimentation Tanks (1952). View looking north.

Photos 33. Sedimentation Tanks (1960s). View looking east.

Photos 34. Sedimentation Tanks (1960s). View looking southwest.

Appendix C

DPR523 Records for FERRF

PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code 7

Other Listings ______
Review Code ______ **Reviewer** ______ **Date** ______

 ***Resource Name or #:** (Assigned by recorder) West Bay Sanitary District FERRF

P1. Other Identifier: ______
P2. Location: ¨ **Not for Publication** x **Unrestricted** ***a: County** San Mateo
and (P2c,P2e, and P2b or P2d. Attach Location Map as necessary.)
*b. **USGS 7.5' Quad** Palo Alto **Date** 2018 **T** 5S ; **R** 3W ; SE ¼ **of Sec** 15 ; Mt. Diablo **B.M.**
c. Address 1700 Marsh Road City Menlo Park Zip 94025
d. UTM: (Give more than one for large and/or linear resources) Zone ______ ; ______mE/ ______ mN
*e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
At north terminus of Marsh Road.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The following description provides an overview of the property and a description of the cultural landscape features. This is followed by a description of the buildings and structures on the site. All photographs were taken by Ward Hill and Denise Bradley during their intensive field survey on October 26, 2020.

Overview and Cultural Landscape Features

The West Bay Sanitary District Flow Equalization and Resource Recovery Facility (FERRF) is located at 1700 Marsh Road (Assessor's Parcel Number 055-400-010) in the northern part of Menlo Park at the northern terminus of Marsh Road. The property is approximately 20 acres in size and contains three open storage (flow equalization) basins, a group of features associated with the decommissioned Menlo Park Wastewater Treatment Plant (WTP), and a small native plant nursery.

see continuation sheet

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial Building; HP11: Engineering Structure; HP39: Other
***P4. Resources Present:** x Building x Structure ¨ Object ¨ Site ¨ District ¨ Element of District ¨ Other (isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

P5b. Description of Photo: (View, date, accession #) Facilities of the decommissioned Menlo Park sewage treatment plant. View looking west.

***P6. Date Constructed/Age and Source:** x Historic ¨ Prehistoric ¨ Both
1952 (WBSD records)

***P7. Owner and Address:**
West Bay Sanitary District
500 Laurel Street ,
Menlo Park, CA 94025

***P8. Recorded by:** (Name, affiliation, and address)
Ward Hill
3124 Octavia St, No. 102
San Francisco, CA 94123
Denise Bradley
1388 Haight St. No 79
San Francisco, CA 94117

***P9. Date Recorded:**
10-26-2020

***P10. Survey Type:** (Describe)
Intensive

P11. Report Citation*: (Cite survey report and other sources, or enter "none".) Historic Resources Evaluation Report for West Bay Sanitary District Flow Equalization and Resource Recovery Facility, 1700 Marsh Road, Menlo Park, San Mateo County, CA (Hill and Bradley, November 2020)

***Attachments:** ¨ NONE x Location Map x Sketch Map x Continuation Sheet x Building, Structure and Object Record ¨ Archaeological Record ¨ District Record ¨ Linear Feature Record ¨ Milling Station Record ¨ Rock Art Record ¨ Artifact Record ¨ Photograph Record ¨ Other (List)

Description (continued)

Westpoint Slough borders the property on its north side and Flood Slough borders it on the west. Earthen levees run along the north and west edges of the property separating it from these sloughs. Bedwell Bayfront Park borders the property's east and west sides; a chain-link fence runs along the boundary on these two sides. Access to the site is via Marsh Road and a gate in the chain-link fence at the southwest corner of the property. An asphalt-paved road continues from this gate along the southern edge of the property for approximately 650 feet. This road provides access to the grouping of features associated with the decommissioned wastewater treatment plant, which occupy approximately 2.5 acres of land in the central portion of the property.

The WBSD system flows in a northwest direction and terminates at the Menlo Park Pump Station, which is owned by the District and operated by Silicon Valley Clean Water (SVCW). (The District along with the cities of Belmont, San Carlos, and Redwood City are the four members of the Joint Powers Agency that forms the SVCW.) The Menlo Park Pump Station is located on a separate property about one-half mile south of the FERRF property, at the northwest corner of Marsh Road and Haven Avenue. From the Menlo Park Pump Station, flow is routinely pumped to the SVCW Wastewater Treatment Plant in Redwood City. However, the District has the capability to bypass the Menlo Park Pump Station and send flow to the FERRF during peak flow events to prevent overflows within the system or for conveyance system maintenance during extreme wet weather events where the flow (combined stormwater and sewer flows) is temporarily stored in the three basins. A transfer pump station returns the flow back to the Menlo Park Pump Station (WBSD 2011: 2-1 and 2-5; MIG, Inc. 2020).

The transfer pump station is located adjacent to the road to the sewage treatment plant and the first basin (Pond 1). The rectangular plan building has bolted metal panel walls and a flat roof with shallow eaves. The building has no windows and a single hinged door on the east facade. A metal electrical transformer box is adjacent to the east facade.

The three flow equalization basins (Ponds 1, 2, and 3) occupy the majority of land within the property. The basins are concrete lined and are surrounded by earthen levees and berms. The inner side/bank of the levee along Flood Slough forms the west side of Ponds 1 and 2, and the inner side/bank of the levee along Westpoint Slough forms the north side of the Ponds 2 and 3. The other sides of the ponds are formed by internal earthen berms. The levees and berms vary in dimensions but are approximately 80 feet side at their base, between 5 and 6 feet high, and approximately 15-20 feet wide across the top. Circulation around the ponds is via gravel or dirt paths along the leveled tops of the levees and berms.

Pond 1 is located in the southwest corner of the property, immediately north of the entrance road. From an aerial view, the top of the basin is roughly square in shape and measures approximately 450 feet by 400 feet. It has a storage capacity of approximately 10 million gallons. Pond 1 is the primary storage basin and flow enters it through a standing pipe in the center of the basin. A pipe through the berm on its north side provides the connection for the flow between it and Pond 2.

Pond 2 is located in the northwest corner of the property, immediately to the north of Pond 1. From an aerial view, the top of the basin is roughly trapezoidal in shape. It has a storage capacity of approximately 10 million gallons. Two pipes through the berm on its on east side provide a connection for the flow between it and Pond 3; these pipes are no longer functional (Htoo 2020).

Pond 3 is located immediately east of Pond 2. From an aerial view, the top of the basin is roughly triangular in shape. It has a storage capacity of approximately 4 million gallons. A earthen berm and concrete structure (the remnants of the non-functioning overflow pipes for the decommissioned wastewater treatment plant) bisect Pond 3 from north to south.

A fourth flow equalization basin (Pond 4) previously occupied the east side of the property. Pond 4 was filled in 2018. A large mound of dirt has been added to what would have been its north end. The non-profit organization Save the Bay operates a small native plant nursery in the southeast corner of the FERRF site on what would have been the south end of Pond 4. The nursery, with an overall footprint of 100 feet by 85 feet, consists of a grid of small raised planting beds (with wood board sides) and unpaved paths.

Buildings and Structures

The FERRF property contains buildings and structures associated with the decommissioned Menlo Park Sanitary District's Sewage Treatment Plant which was in operation from 1952 to 1980. These features are arranged in two groupings to the east of Pond 1. The Main Building complex has five buildings—the Diversion Box, two cylindrical Digesters, the Operations Buildings, and a metal warehouse—arranged on a north/south axis that is approximately 100 feet to the east of Pond 1. The open space between the pond and this row of structures is used for parking and circulation. The second group of structures consists of the various tanks and wastewater treatment structures—inlet works, pre-treatment tanks, and sedimentation tanks)—is located east of the main buildings and is also on a north/south axis. A small pump house and chlorination building

Description (continued)

are included in this second group. The open space between the main buildings and treatment structures is used for parking and storage.

A description of these features is provided in more detail below following the overview of the wastewater treatment process.

The Wastewater Treatment Process

The following overview describes the typical wastewater treatment process and how the District's Sewage Treatment Plant would have operated before it was decommissioned in 1980. This overview helps to explain the extant structures and buildings and their relationship to each other and to this process. The overview is based on the description of the process in the publication *□ aste□ater □reatment □rocess in □alifornia* published by the Water Education Foundation (n.d.).

The initial step in the wastewater treatment process is called preliminary treatment and begins as all raw sewage from domestic and commercial sources enters the treatment plant's "headworks" or "inlet works." Large objects—ranging from trash and toys to rocks and branches that could clog or damage plant machinery—are mechanically raked and screened out from the sewage using influent screens.

After screening, the wastewater enters pre-treatment tanks where objects small enough to get through the influent screens (which can be large as coins or jewelry but also smaller material like coffee grounds or sand) sink to the bottom by gravity.

After leaving the pre-treatment tanks, wastewater is ready for primary treatment. The wastewater is piped into primary settling or sedimentation tanks where heavy particles sink and light particles float.

During **s**econdary treatment, biological processes are incorporated to remove contaminants dissolved in wastewater with the use of naturally occurring microorganisms that feed on organic materials. Anaerobic digestion uses the process of fermentation to break down organic matter from animals, plants or sewage to produce biogas. The process takes place within a centralized system in a unit called a digester, also known as a biogas reactor or a bio-digester. After the microorganisms have absorbed and digested the organic materials, the wastewater is sent into secondary sedimentation tanks.

The accumulated solids—called sludge—that sinks to the bottom of the sedimentation tanks is removed to the sludge beds to dry out. The sludge slurry is spread on an open bed of sand and allowed to remain until dry. The dried sludge is removed to various dump sites.[1]

In most situations, secondary treatment must be followed by a disinfection process to kill harmful pathogens (protozoa, bacteria and viruses). The District's Sewage Treatment Plant used a common disinfectant like chlorine (originally stored in the Chlorine Building) for the disinfection process.

Main Building Complex

The five features in the Main Building complex—the Diversion Box, two cylindrical Digesters, the Operations Buildings, and a metal warehouse—are described from the south end of the complex to the north.

Diversion Bo□

The rectangular plan Diversion Box at the southern end of the building complex is a small, plain concrete building with no windows or doors and a flat roof. The building has a ladder on the north façade leading to the roof. The structure controlled the two lines that entered the sewage treatment plant (Htoo 2020).

Digester □o□□ and □o□□

Adjacent to and north of the Diversion Box is one of the two Digesters. Digester No. 1 is south of the Operations Building and Digester No. 2 is north of the Operations Building. The digesters are identical and each is a cylindrical reinforced concrete structure with horizontal tie rods. Each Digester is 25 feet tall and 14 feet in diameter. Mechanical equipment on the roofs of the Digesters supports the chemical process—anaerobic digestion that breaks down organic matter in the water from animals, plants or sewage to produce biogas—contained in these structures.

[1] When in operation, the District's Sewage Treatment Plant had two large sludge beds west of the sedimentation tanks in the area that now contains Ponds 1 and 2. The sludge beds were removed after the plant was decommissioned in 1980.

Description (continued)

Operations Building

The Operations Building is a square plan, two-story structure with plain reinforced concrete walls and a flat roof. The front (east) façade has a single hinged door and two roll-up garage doors on the first floor. The front façade's second floor has three modern tripartite metal windows. A fourth modern tripartite window is on the second floor of the north façade. The north façade also retains three original multi-pane industrial sash windows. Incised white letters (Menlo Park Sanitary District / Sewage Treatment Plant / Operations Building) are written into the center of the front façade. Additionally, there is a small commemorative plaque identifying the building's construction date (1952), the Sanitary District Board of Trustees, and the District engineers and building contractor.

The south façade of the Operations Building has a roll-up garage door and two industrial sash windows.

The back (west) façade has a single story rear extension. The extension has modern metal windows and a single roll-up garage door. A concrete stair leads to the roof of the extension. Ladders on the north and south sides of the roof lead to the roofs of Digesters No. 1 and No. 2, which flank the Operations Building.

The Operations Building originally functioned as the administration and control building for the sewage treatment plant. Today it houses offices, shop space, and storage for the West Bay Sanitary District.

The front entrance door on the east leads into a small entry area where stairs lead up to the second floor. A door on the right side of the entry area leads to a first floor shop area. The second floor has offices and storage space.

Warehouse

A long, rectangular plan warehouse is north of Digester No. 2. The steel-frame warehouse has exterior walls and roof covered with bolted vertical metal panels. The exposed steel-frame structure is visible in the free-span open interior.

Wastewater Treatment Structures

Inlet Works and Pre-Treatment Tanks

When in operation, raw sewage entered the treatment plant at the Inlet Works, a concrete tank with a tube steel railing, located at the south end of the treatment structures. A series of concrete Pre-Treatment Tanks are adjacent to and north of the inlet works. A raised concrete platform with a variety of mechanical equipment is adjacent to the west side of the pre-treatment tanks.

Pump House

North of the Pre-Treatment Tanks is a rectangular plan Pump House with reinforced concrete walls and a flat roof. The Pump House has industrial sash windows on the south and west walls (now covered with boards). A single hinged glazed door on the north leads inside the Pump House. The east wall inside has electrical equipment. An interior stair on the west leads to a lower level which was not accessible because it was filled with water.

Chlorination Building

The small Chlorination Building east of the pump house is a square plan, concrete building with a flat roof. The building has glass block windows on the east and west. A double, metal, hinged door with a six light window on the south opens into the single room interior. A second single hinged door is on the north façade.

Sedimentation Tanks

North of the Pump House and the Chlorination Building are a series of concrete Sedimentation Tanks arranged on an east/west axis. The concrete walls of the tanks appear to be about one foot wide. The three original Sedimentation Tanks (1952) are on the east, and a second set of tanks (added in the 1960s) are immediately west of the original tanks. The 1960s Sedimentation Tanks have a checker board series of walkways with tube steel railings above the concrete tanks.

Features of FERRF (Source of Base Map: GoogleEarth 6-2020)

Location of Photos (Source of Base Map: GoogleEarth 6-2020)

Photo 1. Entrance gate to FERRF property at Marsh Road. View looking north.

Photo 2. Entrance road and boundary fence along south side. Bedwell Bayfront Park on south side of fence. View looking southeast.

Photo 3. Return pump station. View looking northwest.

Photo 4. Pond 1. View looking northeast.

Photo 5. Pond 2 showing pipe connection to Pond 1. View looking northeast.

Photo 6. Levee and gravel road between Pond 1 (left) and Pond 2 (right). Typical example of internal earthen berms around ponds and circulation. View looking southwest.

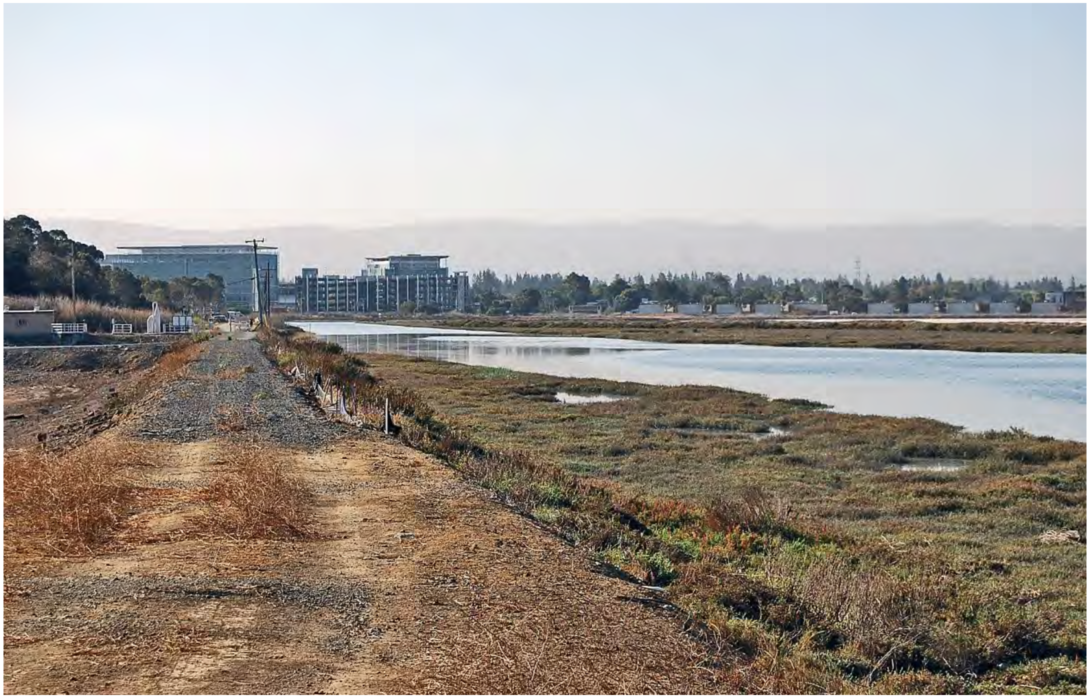


Photo 7. Levee and gravel/dirt road along the west side of FERRF property. Levee separates the property from Flood Slough (right) and forms the west side of Ponds 1 and 2 (left). View looking south.

Photo 8. Levee and dirt road along the north side of the FERRF property. Levee provides separates the property from Westpoint Slough (left) and forms the north side of Pond 2 (right foreground) and Pond 3 (right background). View looking east.

Photo 9. Levee and dirt road along the north side of the property. Pond 3 (left) and Westpoint Slough (right). View looking west.

Photo 10. Pond 3. View looking southeast.

Photo 11. Earth mound at the north end of the former site of Pond 4. View looking east.

Photo 12. Native plant nursery located at the south end of the former site of Pond 4. View looking south.

Photo 13. Facilities of the decommissioned Menlo Park sewage treatment plant. View looking northeast.

Photo 14. Facilities of the decommissioned Menlo Park sewage treatment plant. View looking west.

Photo 15 Diversion Box. View looking west.

Photo 16. Digester No. 1. View looking northwest.

Photo 17. Operations Building. View looking northwest.

Photo 18. Operations Building. Rear stair to Digester No. 2. View looking north.

Photo 19. Operations Building. First floor interior. Shop area.

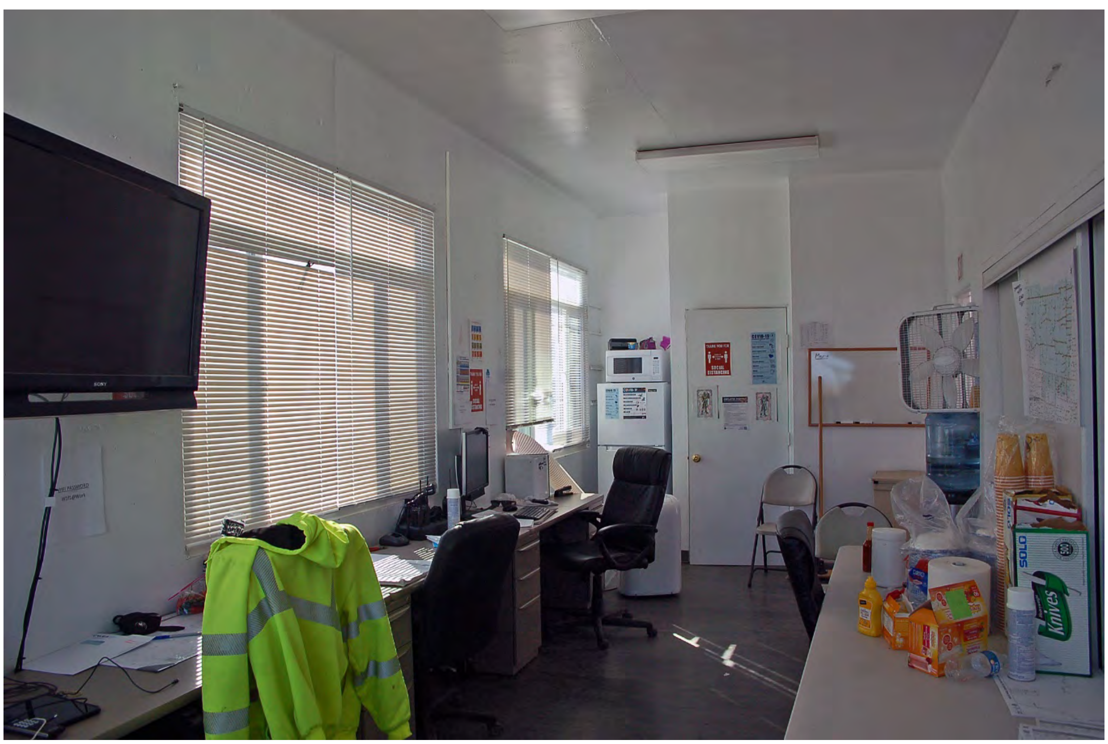


Photo 20. Operations Building. Second floor interior. Second floor office.

Photo 21. Digester No. 2. View looking southwest.

Photo 22. Warehouse. View looking northwest.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # ______________________
HRI/Trinomial ______________________

Page 18 of 36 **Resource Identifier:** West Bay Sanitary District FERRF
Recorded by Ward Hill and Denise Bradley ***Date** 10-26-2020 ☒ Continuation ☐ Update

Photo 23. Warehouse. Interior.

Photo 24. Inlet Works. View looking northwest.

Photo 25. Inlet Works. View looking southwest.

Photo 26. Pre-Treatment Tanks. View looking east.

Photo 27. Pump House: View looking northwest.

Photo 28. Pump House: View looking southeast.

Photo 29. Pump House. Interior view.

Photo 30. Chlorination Building. View looking northeast.

Photo 31. Chlorination Building. Interior view.

Photo 32. Sedimentation Tanks (1952). View looking north.

Photos 33. Sedimentation Tanks (1960s). View looking east.

Photos 34. Sedimentation Tanks (1960s). View looking southwest.

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 7

***Resource Name or #** (Assigned by recorder) West Bay Sanitary District FERRF

B1. Historic Name: Menlo Park Sanitary District Sewage Treatment Plant
B2. Common Name:
B3. Original Use: wastewater treatment B4. Present Use: wastewater treatment
***B5. Architectural Style:** N/A
***B6. Construction History:** (Construction date, alterations, and date of alterations)
sewage treatment plant constructed in 1952; second set of sedimentation tanks and steel-frame warehouse added in 1960s; four flow equalization basins added in ca. late 1960s-early 1970s; one of flow equalization basins (Pond 4) infilled in 2018; native plant nursery added ca. 2018-19.

***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**
***B8. Related Features:**
None

B9a. Architect: Lawrence H Cook (Acting Engineer, Menlo Park Sanitary District) b. Builder: ..Unknown
***B10. Significance: Theme** **Area**
Period of Significance **Property Type** I **Applicable Criteria** NA
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Historic Contexts

Solar Salt Industry: Historic Background

Settlement in the San Francisco Bay Area (Bay Area) likely dates from around 8,000 BCE onwards, and prior to European settlement of the Bay Area, native peoples gathered salt where Bay water became trapped and then evaporated in shallow impoundments or low spots during high tides. The Spanish and Mexicans adapted these practices during the late eighteenth and early nineteenth centuries to harvest salt (Sandoval 1988:4).

In 1850, the federally regulated Arkansas Swamp Lands Act was enacted which enabled states to reclaim land from swampland with the use of drainage or levees and allowed individuals who made those lands profitable to buy back the land from the state (California State Lands Commission 2015). After the implementation of the Arkansas Act, large swathes of the marshlands surrounding the Bay were bought to utilize for salt production, and the solar salt industry expanded along the shores of Alameda County in the 1850s. The increased population after the discovery of gold in 1849, the growth of San Francisco's local food-curing industry, and the use of salt in silver processing all contributed to the growing market for salt in

see continuation sheet

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See continuation sheet.

B13. Remarks:

***B14. Evaluator:** Ward Hill and Denise Bradley
Date of Evaluation 11-6-2020

(This space reserved for official comments.)

Sketch Map
(See Location of Features on page 5)

Historic Contexts (continued)

the 1850s and 1860s. Farmers and other land holders along the shoreline of Alameda County adapted the Ohlone-Spanish era gathering practices to increase production to meet the growing market's demands. By the 1860s, the pioneering salt producers had developed the salt-making technique that is still followed in principle today. This technique directed the inflow of San Francisco Bay water via a natural slough into a receiving pond; the water (brine) then moved through a series of ponds where evaporation increased its salinity; the saturated brine was finally transferred into crystallizer beds where salt crystals formed and salt was harvested (Dobkin and Anderson 1994:8).

By the turn of the twentieth century, the industry had spread to the western shores of the Bay, and several plants—including the Leslie Salt Refining Company, Greco Salt Company, Redwood Salt Works, and West Shore Salt Company—operated in the vicinity of Redwood City during the early 1900s (Ver Planck 1958:110, 112). The facilities of these plants were subsequently acquired by larger companies and ceased to operate as independent entities.[1] The consolidation process of several small companies into a larger corporation began after 1900, intensified during the 1920s, and was completed in 1936 by the incorporation of Leslie Salt Company. As a result, with the exception of two independent operations on the eastern shoreline, Leslie controlled the salt pond infrastructure (receiving ponds, concentrator ponds, crystallizer beds, ditch systems, pumps, washers, loading docks, etc.) of the South Bay from the smaller companies that it acquired.[2]

Around 1943, Leslie began construction of a new plant along the west shoreline in San Mateo County that was intended to operate in conjunction with a shipping terminal at the Port of Redwood City; this new plant became known as the Redwood City Crude Salt Plant and was completed in 1951. According to the history of the plant provided by William E. Ver Planck in *Salt in California*, little of the infrastructure from older plants that had been in this area was incorporated into the new plant (Ver Planck 1958:45). The core of the new plant was located on either side of a Southern Pacific rail spur and the road (today's Seaport Boulevard) that connected Redwood City to the Port of Redwood City. The plant's washer and ship loading terminal were located immediately west of the railroad/road, and the crystallizer beds were located immediately east.

There were two separate areas of concentrator ponds which supplied the crystallizer beds with concentrated brine. One was located west of the washer and ship loading terminal on the west side of Redwood Creek on Bair Island and in the vicinity of Belmont Slough. A second group of concentrator ponds—often referred to as the Ravenswood ponds after the Ravenswood Slough which provided inflow into the ponds—began east of Flood Slough (the slough separated these ponds from the crystallizer bed facility) and extended down the shoreline to just south of the Southern Pacific rail trestle below the Dumbarton Bridge. See **Figure 1** for a map that identifies the relationship of these components of the Redwood City Crude Salt Plant.

Based on a review of USGS maps and aerial photographs, levees were constructed to create the westernmost ponds in the Ravenswood pond complex between 1937 and 1941 (HistoricAerials.com and USGS 1941). These two ponds were immediately east of Flood Slough, and the westernmost pond included the future location of the Menlo Park Sanitary District's sewage treatment plant (the Project Site). In 1942, the Menlo Park Sanitary District purchased 20 acres at the north end of the pond immediately east of Flood Slough, and by the mid-1940s had constructed a levee to separate their property from the larger pond. In 1952, a sewage treatment plant was constructed on this property. In 1957, San Mateo County purchased the 15 acres adjacent to the south side of the sewage treatment plant for the Menlo Park Municipal Dump (San Mateo Times 1957), and began the process of infilling the remaining portion of this pond. Over the next three decades more of the remaining salt pond was filled to extend the dump to the south and then east to infill another pond. As the State enacted regulations to manage dumps and waste disposal sites, the original dump transitioned into an actively managed landfill (MIG 2018). The landfill was closed in 1982 (Callander Associates 2018:4), and the process began for the conversion of the land to a public park. Construction of Bedwell Bayfront Park began in 1984 and was completed in 1995 (Callander Associates 2018:5).

---

[1] The Greco Salt Company operated from 1905 through 1920 (Ver Planck 1958:112).

Redwood City Salt Works first reported production in 1901. In 1920, the family who ran the operation retired from the salt business, and the operation was acquired by Stauffer Chemical Company (Ver Planck 1958:112).

The West Shore Salt Company, located in the vicinity of the present Port of Redwood City, began production in 1906. In 1912, the San Francisco Salt Refinery, an affiliate of Stauffer, took over West Shore's crude salt infrastructure, possibly combining it with the Redwood City Salt Works, and produced crude salt there through 1925. Stauffer reopened the plant in 1929 and operated it under its own name through 1940. In 1942, Leslie-California Salt Company (a 1924 incorporation of Leslie Salt Refining Company, California Salt Company, and the Continental Salt and Chemical Company) purchased the entire operation (Ver Planck 1958:110, 112).

[2] The 900-acre American Salt Company at Mount Eden and the 200-acre Oliver Brothers Salt Company located on either side of the eastern approach to the San Mateo Bridge were the two independent operations that survived into the 1950s.

Historic Contexts (continued)

The remaining salt ponds in the Ravenswood unit continued in operation through the early 2000s. In 2003, Cargill Salt, which had acquired all of the Leslie Salt Co.'s Bay Area solar salt facilities in 1978, transferred 15,100 acres of its Bayfront salt ponds in San Mateo, Alameda, and Santa Clara counties to the State of California and the federal government in conjunction with the South Bay Salt Pond Restoration Project, with a goal to restore and enhance a mix of wetland habitats. Included in this transfer were the Redwood City Crude Salt Plant's salt concentrator ponds located east of Flood Slough (i.e., the Ravenswood ponds); these ponds became part of the Don Edwards San Francisco Bay National Wildlife Refuge. (The land where the former Leslie concentrator ponds had been located on Bair Island became part of the Bair Island Ecological Reserve.) Cargill's Redwood City barging and docking facilities were sold in 2003, and the majority of the equipment and facilities for the portion of the Redwood City operation located on the west side of Seaport Boulevard (i.e., related to the washer and the two loading towers) was dismantled and sold (Basin Research Associates 2009:14). In 2020, Cargill continued to operate the 1,400 acres of crystallizer beds to the west of Flood Slough (Schuessler 2018; Rogers 2020) and this site was the last remaining part of Leslie Salt Co.'s Redwood City Crude Salt Plant (shown on Figure 1) that remained in operation.

Menlo Park: Historic Background

The land where Menlo Park is located was inhabited by the Ohlone Indians prior to European settlement. Spanish explorer Don Gaspar de Portola ushered in an era of Spanish rule starting in 1769. Mission padres, explorers, military personnel, travelers, and settlers populated the area through the early 1800s. Father Junipero Serra founded the original Mission Santa Clara de Asis on the banks of the Guadalupe River in January 1777; this location today is near the Central Expressway and De La Cruz Boulevard in Santa Clara. The *□ue□lo de San □ose de □uadalupe* was established in November 1777 as the first civic settlement in Alta California. Today, the locations of Santa Clara Mission and the *□ue□lo de San □ose* are approximately 20 miles south of the City of Menlo Park.

In 1851, Dennis Oliver and his brother-in-law D.C. McGlynn acquired about 1,700 acres in the southeasterly portion of *Rancho de las □ulgas*, in what is now San Mateo County. Three years later they built two houses with a common entrance and erected a gate with an arch bearing the words "Menlo Park, August 1854" at a point just south of where Santa Cruz Avenue now enters El Camino Real, Menlo Park (known originally as just Menlo) included all of the land of southern San Mateo County adjacent to San Francisco Bay. The town of Atherton was originally known as the "Fair Oaks" area of Menlo Park (Hill 2013:16).

The San Francisco to San Jose Railway arrived in Menlo Park in 1863 and shortened the travel time between the community and San Francisco. This was a key event in the development of the community of Menlo Park. The railroad provided fast and easy transportation for the wealthy of San Francisco to their large country estates which took advantage of the Peninsula's amenable climate during the summer. Before the railroad, the round trip from San Francisco to Menlo Park by stage coach took the entire day. In 1864, a round trip ticket on the railway from San Francisco to Menlo Park cost $2.50, and the one-way trip took about 80 minutes (Kreuz 1974:10). The Menlo Park railroad depot, the oldest one on the Peninsula, opened in 1867.

The original large estates of Milton Latham's *□hurlo□ □odge* and James Flood's *□inden □o□ers* were locate in the vicinity of the railroad station. In 1871, the Southern Pacific Railroad purchased the Peninsula line. Soon after Southern Pacific Railroad owner's Leland Stanford and Mary Hopkins (widow of Stanford's partner Mark Hopkins) purchased large tracts of land in the Menlo Park area. By 1870, a small commercial district of about a dozen buildings—mostly businesses, saloons, and three hotels—were grouped around the railroad depot. Menlo Park developed over the years as a community of shop keepers and servants serving the estates of the wealthy in Fair Oaks. A separate railroad depot to serve the Fair Oaks area (later the town of Atherton) was built in 1902.

Menlo Park retained its rural flavor into the early twentieth century. Then during World War I Camp Fremont—which would eventually train nearly 50,000 men—was built, and a military hospital and related facilities were soon constructed where the Veteran's Administration hospital in Menlo Park now stands. Menlo Park was officially incorporated in 1927. During World War II, the U.S. Army bought the estate of Timothy Hopkins, which included the mansion formerly known as *□hurlo□ □odge*, to care for the thousands of soldiers injured in the South Pacific. Originally, the post was named Palo Alto General Hospital but was soon renamed, "Dibble Army Hospital" to honor Colonel John Dibble who was killed in an aircraft crash in 1943. Menlo Park's wartime population soared when the U.S. Army chose to build Dibble General Hospital on the site where the Stanford Research Institute and the Menlo Park Civic Center stand today (California State Military History and Museum Program 2016).

World War II sparked a major development boom in Menlo Park and the entire Bay Area. This explosive period of growth continued throughout the 1950s and 1960s. The city's population increased from 3,358 in 1940 to 13,587 in 1950. The population then doubled again to about 27,000 in 1960. Technology replaced agriculture and the large estates of the wealthy as the town's main source of revenue. The growth of California's famed Silicon Valley beginning in the 1950s extended into

Historic Contexts (continued)

Menlo Park. Technology related companies like Hewlett Packard, Fairchild Semiconductor and later Intel and Apple located in the nearby communities of Santa Clara County and contributed to the growth of the Menlo Park.

West Bay Sanitary District: Historic Background

The collection of sewage in San Mateo County is handled by 36 agencies (including County and city sewage collection systems in addition to the six independent sanitary districts). This organization is a legacy of the County's origins as a rural, low density area in contrast to dense urban development of San Francisco to the north. Menlo Park developed as a community to serve country estates which were built in the vicinity during the latter part of the nineteenth century. The history provided on the District's webpage provided the following description of the organization of the Menlo Park Sanitary District.

> *As is ever the case coincident with the development of a new community, a sewerage problem arose. Shortly after the turn of the century, a group of citizens began the process of deciding that the installation of sanitary sewers was in order. Since neither Atherton nor Menlo Park was yet incorporated, the formation of a special district was indicated. In October [illegible], a petition signed by [illegible] residents was presented to the Board of Supervisors of San Mateo County requesting that an election be called for voting on the formation of the sanitary district.*
>
> *The election, which brought the district into being, was held at the Menlo Park Hotel on December [illegible], and the Menlo Park Sanitary District was created that same day. Senator [illegible] Felton was selected as the first president of the Menlo Park Sanitary District Board. One of the first acts of the District Board was to enact a series of ordinances covering a wide variety of subjects. In addition to assuming jurisdiction over sewerage and providing sanitary sewers, the district attempted to control certain functions that today are handled by federal, state, county, and municipal agencies; these included the licensing of plumbers, domestic animal control, slaughtering of cattle, inspection of meat, fumigation of buildings, and quarantining of infectious diseases ([illegible]BSD n.d.).*

As the population of the Bay Area expanded significantly in the post-World War II period, dumping raw sewage in San Francisco Bay was recognized as an important public health issue. In March 1946, the California State Board of Health announced it would no longer issue permits allowing dumping of untreated sewage in San Francisco Bay after January 1, 1947. This regulation presaged the environmental movement which began in the early 1960s, with the creation of Save the Bay in 1961 and the San Francisco Bay Conservation and Development Commission in 1965, to control development around the Bay and to protect and restore tidal marshland habit.

Many cities around the Bay continued illegally dumping untreated sewage in the Bay until they could construct the sewage treatment plants to comply with the Board of Health requirements (San Mateo Times 1947:8). Menlo Park Sanitary District was one of four San Mateo county sewage districts that was cited by the State Board of Health for this practice in January 1948 (San Mateo Times 1948:2).

The District had known of the sewage contamination problem since before the war and had suggested internally the need for a treatment plant as early as 1933 (MIG, Inc. 2018:3). In 1942, the District had purchased 20 acres adjacent to Flood and Westpoint sloughs from Leslie Salt Company anticipating the ban on releasing untreated sewage in the Bay. However, their plans to build a sewage treatment plant were delayed by World War II and by obtaining financing (the first bond issue was voted down). The new sewage treatment facility was designed in 1950-51 and facility was completed in October 1952. Around 1960, the District's name was changed to the West Bay Sanitary District.

Today, the West Bay Sanitary District serves the south end of San Mateo County, and is one of the six independent sanitary districts in San Mateo County. The six independent sanitary districts were established over the course of six decades in response to population growth in San Mateo County. For example, a subdivision developer in South San Francisco founded the most recently established district—Westborough—in 1961. Some districts are responsible for more than just collecting sewage. The Montara and Westborough also provide drinking water. Three of the districts provide garbage collection services within their districts. These other missions have little synergy with the core mission of sewage collection (San Mateo County Grand Jury 2015-16:16-17).

HISTORY

Until the late 1930s, the FERRF site was part of the tidal marshlands of the San Francisco Bay. Between 1937 and 1941, levees were constructed to create two large ponds to the east of Flood Slough and south of Westpoint Slough

Historic Contexts (continued)

(HistoricAerials.com and USGS 1941). **Figure 2** shows the location of the FERRF site in relationship to these two ponds. In 1942, the Menlo Park Sanitary District, purchased 20 acres of land at the north end of the pond that was on the east side of Flood Slough from Leslie for the purpose of building a sewage treatment plant (MIG 2018:3).

By 1946, a levee had been added to the south side of this parcel separating it from the remaining portion of the salt pond to the south (Pacific Aerial Survey 1946). The design and construction of the District's sewage treatment plant did not occur until after World War II. In 1951, plans were prepared by the district's acting engineer, Lawrence H. Cook, (West Bay Sewage District 1951). Construction began in May 1951, and the new sewage treatment plant was completed and put into operation in October 1952 (MIG 2018:3). Access to the facility was via a road that ran along the top of levee on the east side of Flood Slough (Marsh Road). The new facility included inlet works, pretreatment tanks, chlorination building, pump house, sedimentation tanks, and an outlet pipe to the Bay that emptied into Westpoint Slough. These features were arranged on a north-south axis in the central portion of the property. To the west of these structures were the District's Operations Building and two digester structures. Two large two large sludge beds were to the west of these features. **Figure 3** shows the arrangement of the sewage treatment plant on an aerial photograph flown in 1955.

A second group of sedimentation tanks were added immediately west of the original tanks between 1961 and 1968 (Pacific Aerial Surveys 1961; HistoricAerials.com 1968). A warehouse was added during the same period to the west of the new sedimentation tanks and north of Digester No. 2.

Between 1968 and 1973, four flow equalization basins were excavated at the property to provide storage for the District's wastewater (HistoricAerials.com 1968; USGS 1973). These basins occupied the open land that surrounded the sewage treatment plant. Two basins (Ponds 1 and 2) were located along the western portion of the property; they were separated by an earthen berm located along the north side of Pond 1 and the south side of Pond 2. An open channel at the west end of the berm connected the flow between the two basins. A third basin (Pond 3) occupied the land north of the sewage treatment plant, and a fourth basin (Pond 4) occupied the land to its east (USGS 1968 and 1973; Pacific Aerial Surveys 1977).

The sewage treatment facility was decommissioned in 1980 after the formation of the South Bayside Systems Authority (renamed Silicon Valley Clean Water in 2014) and the redirection of wastewater to the new Redwood City Wastewater Treatment Plant.

Between 1987 and 1991, the opening in the earthen berm between Ponds 1 and 2 was closed and flow between the two basins was facilitated via a pipe through the berm (HistoricAerials.com 1987; GoogleEarth 1991).

In early 2018, Pond 4 was filled and in 2020 a large mound of soil was added to its north end. In 2018-19, a small native plant nursery, operated by the non-profit organization Save the Bay, was added to land at the south end of the former Pond 4 site (Google Earth 2017-19).

EVALUATION

Criterion A/1: Event

None of the features—individually or collectively—on the West Bay Sanitary District Flow Equalization and Resource Removal Facility (FERRF) property appear to be significant under NRHP/CRHR Criterion A/1 for their association with an event in history.

Association with the History of Wastewater Management in the Bay Area

The Menlo Park Sanitary District's sewage treatment plant was originally constructed in 1952 as a sewage treatment plant in response to a regulation enacted by the California State Board of Health in 1946 that prohibited dumping of untreated sewage in the San Francisco Bay. The sewage treatment operations on the property ended in 1980. With the exception of the sludge beds (removed post-1980), the property retains all of its features that were in use during its operation (1952-1980) and retains its integrity. However, the property is not significant under NRHP/CRHR Criterion A/1 for its association with history of wastewater management in the Bay Area. It was one of many such facilities constructed around the San Francisco Bay during the post-World War II era. It was not the first or largest of the Bay Area's wastewater treatment plants, and it played no significant role in the history of the development of wastewater treatment in the Bay Area.

The flow equalization basins (Ponds 1, 2, and 3) were constructed between 1968 and 1973, and are approaching the 50 years of age criteria for evaluation under the NRHP and CRHR. These basins are one of many facilities around the San Francisco Bay associated with the continued development of wastewater treatment and management in the late twentieth century, and

Evaluation (continued)

they are not significant under NRHP/CRHR Criterion A/1 in association with this history. Additionally, they do not meet the criteria for significance under NHRP Criterion Consideration G for properties that have achieved significance in the past 50 years.

Association with the History of Menlo Park

The West Bay Sanitary District FERRF property played no significant role and represents no significant milestone in Menlo Park history. The property is not significant under NRHP/CRHR Criterion A/1 for its association with the history and development of Menlo Park.

Association with the History of Solar Salt Production in the South Bay

The potential significance of the two external levees along the north and west sides of the West Bay Sanitary District FERRF property is derived from their association with the South Bay's solar salt industry. These two levees were constructed in the late 1930-early 1940s as part of a levee system that enclosed a 90-acre salt concentrator pond on the east side of Flood Slough; the pond extended from Westpoint Slough southward to the end of Flood Slough. This pond was part of a larger complex of salt concentrator ponds east of Flood Slough—often referred to as the Ravenswood ponds or unit—which were used to create the initial brine stage in the solar salt production process.

The significance of the Ravenswood unit in association with the history of the solar salt industry in the South Bay was documented in a NRHP evaluation prepared in 2007 by the U.S. Fish and Wildlife Service. This evaluation noted that the ponds were originally part of an extensive system of approximately 35 evaporation ponds that were used to create the initial brine stage of the process. Today, only seven ponds remain extant, and these are no longer connected with the process of evaporative salt production. This evaluation concluded that the Ravenswood salt ponds lack adequate integrity to convey a clear association with the solar salt industry and thus are not eligible for listing in the NRHP as a historic property (Speulda-Drews and Valentine 2007).

Similarly, the levees along the north and west sides of the FERRF property no longer retain any of the seven aspects of integrity (i.e., location, design, materials, workmanship, feeling, setting, and association). The levees and the land uses and activities associated with these levees no longer convey a connection or association with the solar salt production. The original design of the levee system enclosing a large salt concentrator pond is non-extant. The construction of the Menlo Park Sanitary District's sewage treatment plant in 1952 and the operation of the county dump between 1957 and 1982 (today the site of the Bedwell Bayfront Park) resulted in the infill of the majority of the pond.[1] Additionally, the levee that ran along the east side of the pond (and the east side of the FERRF property and through what is now Bedwell Bayfront Park) is no longer extant. In summary, due to this lack of integrity, the two levees along the north and west sides of the FERRF are not eligible for listing in the NRHP or CRHR under Criterion A/1.

Criterion B/2: Person

None of the features—individually or collectively—within the West Bay Sanitary District FERRF property are significant under NRHP/CRHR Criterion B/2 for their association with a person who is significant to the history of the region.

Criterion C/3: Design/Construction

None of the features—individually or collectively—within the West Bay Sanitary District FERRF property are significant under NRHP/CRHR Criterion C/3 for their design or construction.

Buildings and structures associated with the West Bay Sanitary District's FERRF and its decommissioned Sewage Treatment Plant are all common examples of their type and are not significant for their design or construction.

The three flow equalization basins (Ponds 1, 2, and 3) are common examples of their type and are not significant for their design or construction. Additionally, they do meet the criteria of significance under NRHP Criterion Consideration G as a property that has achieved significance within the past 50 years.

[1] Two small ponds (ca. 1960-1968) which together cover approximately 13 acres remain between the south side of Bedwell Bayfront Park and the expressway; the levees for these two ponds were created between 1960 and 1968.

Evaluation (continued)

The external levees along the north and west sides of the West Bay Sanitary District FERRF are common examples of the type of levee that was constructed in association with solar salt pond production during the early-to-mid twentieth century. The levees are not significant for their design or construction, and, as described under Criterion A/1, the levees lack integrity.

Criterion D/4: Information Potential

Criterion D/4 typically applies to archaeological resources. None of the features—individually or collectively—within the West Bay Sanitary District FERRF appear to be significant under NRHP/CRHR Criterion D/4 for the potential to yield information important to history or prehistory.

Summary

In conclusion, the West Bay Sanitary District's Menlo Park FERRF (1700 March Road, Menlo Park, San Mateo County, California) does not appear eligible for listing in the NRHP or CRHR under Criteria A/1, B/2, C/3, or D/4. Additionally, none of the individual features—levees, operation building, and other wastewater treatment structures at the site—appear to be individually eligible for listing in the NRHP or CRHR under Criteria A/1, B/2, C/3, or D/4.

REFERENCES

Basin Research Associates. 2009. *Cultural Resources Assessment Report In Support of Initial Study and Environmental Impact Report Redwood City Saltworks Project, City of Redwood City, San Mateo County for DMB Redwood City Saltworks*.

Bradley, Denise. 2010. *Revised Draft Cultural Landscape Evaluation Report* [for] *Redwood City Saltworks Project, Redwood City, San Mateo County, California*. Prepared for DMB Redwood City Saltworks. September 2010.

Busch, Ray. 2016. "The Golden Age of Wastewater" 2016. https://meetingoftheminds.org/golden-age-wastewater-15790. Accessed October 28, 2020.

California Office of Historic Preservation. 2011. *Technical Assistance Series #6: California Register and National Register: A Comparison (for purposes of determining eligibility for the California Register)*. Sacramento: Office of Historic Preservation. https://ohp.parks.ca.gov/pages/1069/files/technical%20assistance%20bulletin%206%202011%20update.pdf. Accessed October 28, 2020.

————. 2001. *Technical Assistance Series #7: How to Nominate a Resource to the California Register of Historical Resources*. Sacramento: Office of Historic Preservation.

————. 2017. California Register of Historic Resources. http://ohp.parks.ca.gov/ListedResources/. Accessed October 28, 2020.

California State Lands Commission. 2015. Swamp & Overflow Lands. http://www.slc.ca.gov/Info/Swamp_Overflow.html. Last accessed December 22, 2017. Cited in MIG, *Historic Resource Evaluation for the West Bay Sanitary District Levee Project*. May 8, 2018.

California State Military History and Museums Program. 2016. *Historic California Posts, Camps, Stations and Airfields: Dibble General Hospital (Palo Alto General Hospital)*. http://www.militarymuseum.org/DibbleGH.html. Accessed October 28, 2020.

Callander Associates Landscape Architecture. 2018. *Bedwell Bayfront Park Master Plan*. https://www.menlopark.org/DocumentCenter/View/18558/Bedwell-Bayfront-Park-Master-Plan?bidId. Accessed October 28, 2020.

Cargill, Inc. 2008. *Cargill Salt – San Francisco Bay*. http://www.cargill.com/sf_bay/about_history.htm. Accessed December 6, 2008. Cited in Basin Research Associates, *Cultural Resources Assessment Report, Redwood City Saltworks Project, City of Redwood City, San Mateo County for DMB Redwood City Saltworks*.

References (continued)

Dobkin, Marjorie and Robert Bruce Anderson. 1994. *□liver Bros□Salt □o□Alameda □ount□□alifornia□□istoric Resource □valuation Report□□ontract □□F□□□□□□ask □rder □□□A□A□□□□□ □R□□R□□□□A □ □□□□□□*. Prepared for Mara Melandry, Environmental Planning Branch, South, District 4-Oakland, California Department of Transportation.

Goggle Earth. 1948, 1991, 1993, 2002-2020. Aerial photographs (assembled from various sources) that include the West Bay Sanitary District FERRF Site (pre and post development).

Hill, Ward. 2013. *□he □ouses of the San Francisco □eninsula□*Unpublished manuscript on file at author's San Francisco office.

Historic Aerials by Netroline. 1946, 1948, 1958, 1960, 1968, 1980, 1982, and 1987. Aerial photographs (assembled from various sources) that include the West Bay Sanitary District FERRF Site (pre and post development). https://www.historicaerials.com/viewer. Accessed October 28, 2020.

Historic Aerials by Netroline. 1937. Topographic map that includes the West Bay Sanitary District FERRF Site (pre-development). https://www.historicaerials.com/viewer. Accessed October 28, 2020.

Historic Newspapers, 2017. https://www.newspapers.com. Accessed December 22, 2017. Cited in MIG, Inc., *□istoric Resource □valuation for the □ est Ba□ Sanitar□ District □evee □ro□ect*. May 8, 2018.

Htoo, Lorraine (Freyer & Laureta Inc.). 2020. Email communication with Barbara Beard (MIG, Inc.). October 27, 2020.

Kreuz, Charmayne. 1974. *A □radition of □e□ □ori□ons□□he Stor□ of □ enlo □ark*. City of Menlo Park, Menlo Park, California, 1974.

MenloPark.com. n.d. *□istor□ of □ enlo □ark*. www.menlopark.com/channel/History-Of-Menlo Park/6922. Accessed October 28, 2020.

Menlo Park Historical Association (eds.), 1995. A Short History of the Menlo Park Sanitary District. https://goo.gl/eVC9Fx Accessed December 22, 2017. Cited in MIG, Inc., *□istoric Resource □valuation for the □ est Ba□ Sanitar□ District □evee □ro□ect□*2018.

Menlo Park Sanitary District. 1951. New Treatment Works, Project Plan [and] Drawing Schedule. Sheet 2000, Revised 2-12-1951; Treatment Plant: General View. Sheet 2023, Revised 2-9-51; By Pass Outfall: Plot and Profile. Sheet 2062. ?-22-51. Provided in MIG Inc., *□istoric Resource □valuation for the □ est Ba□ Sanitar□ District □evee □ro□ect□□ a□ □□ □□□□*.

————. 1951. *□e□ □reatment □ orks□□ro□ect □lan □and□Dra□ing Schedule□Sheet □□□□□Revised □□□□□□□*. Provided in MIG Inc., *□istoric Resource □valuation for the □ est Ba□ Sanitar□ District □evee □ro□ect□□ a□ □□□□□□*.

————. 1951. *□reatment □lant□□eneral □ie□□Sheet □□□□□Revised □□□□□*; Provided in MIG Inc., *□istoric Resource □valuation for the □ est Ba□ Sanitar□ District □evee □ro□ect□□ a□ □□□□□□*.

————. 1951. *B□□ass □utfall□□lot and □rofile□Sheet □□□□□□□□□□□*. Provided in MIG Inc., *□istoric Resource □valuation for the □ est Ba□ Sanitar□ District □evee □ro□ect□□ a□ □□□□□□*.

MIG, Inc. 2018. *□istoric Resource □valuation for the □ est Ba□ Sanitar□ District □evee □ro□ect*. Prepared for Freyer & Laureta, Inc. May 8, 2018.

————. 2018. *□ est Ba□ Sanitar□ District Flo□ □□uali□ation Facilit□ □evee □ro□ect □nvironmental □onstraints Anal□sis□* Prepared for Freyer & Laureta, Inc. January 2018.

————. 2020. Administrative Draft: Project Description. Provided by Christina Lau via email. October 23, October 26, and November 9, 2020.

National Park Service, 2017. National Register of Historic Places. https://npgallery.nps.gov/nrhp. Accessed December 22, 2017. Cited in MIG, *□istoric Resource □valuation for the □ est Ba□ Sanitar□ District □evee □ro□ect□*2018.

Neal, Annette (Research Northwest Information Center). 2017. NWIC File No. 17-0561. September 19, 2017.

References (continued)

Pacific Aerial Surveys. 1946, 1955, 1961, and 1977. Aerial photographs (assembled from various sources) that include the West Bay Sanitary District FERRF Site (pre and post development).

Rodgers, Paul. 2020. "San Francisco Bay: Court rejects Trump administration ruling on Cargill Redwood City property." *San Jose Mercury News*, October 6, 2020. https://www.mercurynews.com/2020/10/06/san-francisco-bay-cargills-redwood-city-development-plans-dealt-setback-by-court/. Accessed October 28, 2020.

Sandoval, John S. 1988. *Mt. Eden: Cradle of the Salt Industry in California*. Hayward: Mt. Eden Historical Publishers.

San Mateo County Civil Grand Jury. 2015-16. *San Mateo County's Cottage Industry of Sanitary Districts*. https://yellowdragonblogdotcom.files.wordpress.com/2018/06/sanitary_district-1.pdf. Accessed October 28, 2020.

San Mateo Times.

"New Sewage Disposal Plans Should Get Encouragement." January 25, 1947:8.

"Sewage in Bay Banned by State." January 24, 1948:2.

"South County District to Sign $1,035,000 Dump Deal." February 6, 1957:17.

"To Buy Dump." March 27, 1957:23.

Schuessler, Anna. 2018. "Ravenswood salt pond improvements take shape: Tidal marsh restoration to provide flood protection and public access." *The Daily Journal*, July 7, 2018. https://www.smdailyjournal.com/news/local/ravenswood-salt-pond-improvements-take-shape/article_6e1e7d7c-819f-11e8-adb2-a390d6722370.html. Accessed October 28, 2020.

Speulda-Drews, Lou Ann and Nick Valentine. 2007. Ravenswood Salt Works District, DPR523 District Record, P-41-002351, Northwest Information Center.

United States Department of the Interior, Geological Survey (USGS). 1941, 1943, 1947, 1948, and 1961 *Palo Alto, Calif.* [Quadrangle]. Topographic map, 15-minute series (scale 1:62,500).

————. 1953, 1961, 1968 (photorevised), 1973 (photorevised), 1991, 1997, and 2018. *Palo Alto, Calif.* [Quadrangle]. Topographic map, 7.5-minute series (scale 1:24,000).

United States Department of the Interior, National Park Service (NPS). 2002. *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf. Accessed October 28, 2020.

United States Environmental Protection Agency, Office of Water. 1998. *How Wastewater Treatment Works: The Basics*. https://www3.epa.gov/npdes/pubs/bastre.pdf. Accessed October 28, 2020.

Ver Planck, William E, 1957. *Salt in California*. San Francisco, CA: California Division of Mines Bulletin 175.

Water Education Foundation. n.d. "Wastewater Treatment Process in California." https://www.watereducation.org/aquapedia/wastewater-treatment-process-california. Accessed October 28, 2020.

West Bay Sanitary District, 2011. Wastewater Collection System Master Plan, West Bay Sanitary District & West Yost Associates. Menlo Park. https://westbaysanitary.org/wsbd-prod/resources/824/WBSD_Master_Plan_2011.pdf. Accessed October 28, 2020.

West Bay Sanitary District. 2014. *News Alert: SBSA's New Name: Silicon Valley Clean Water*. https://westbaysanitary.org/wsbd_production/resources/1071/Silicon_Valley_Clean_Water.pdf. Accessed October 28, 2020.

West Bay Sanitary District. n.d. *History*. https://westbaysanitary.org/about-us/mission-history. Accessed October 28, 2020.

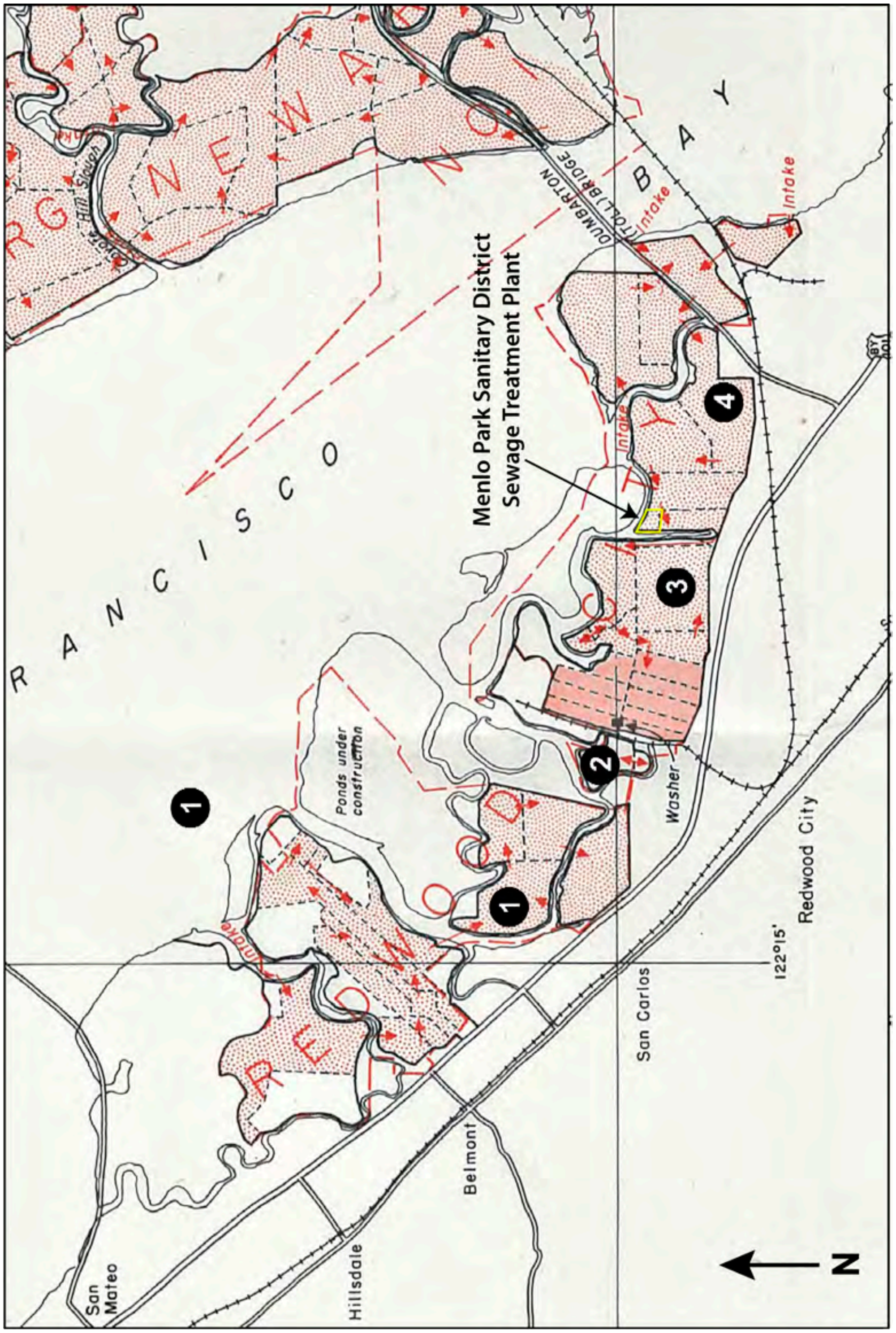


Figure 1. Components of the Redwood City Crude Salt Plant (1951) labeled as follows: (1) Concentrator Ponds in vicinity of Belmont Slough and on Bair Island, (2) Shipping Terminal, Washer, and Salt Stack at the Port of Redwood City, (3) Crystallizer Beds, Pickle and Bittern Ponds (Redwood City Plant Site), and (4) Concentrator Ponds east of Flood Slough (Source: Plate 1, Salt In California [Ver Planck 1953])

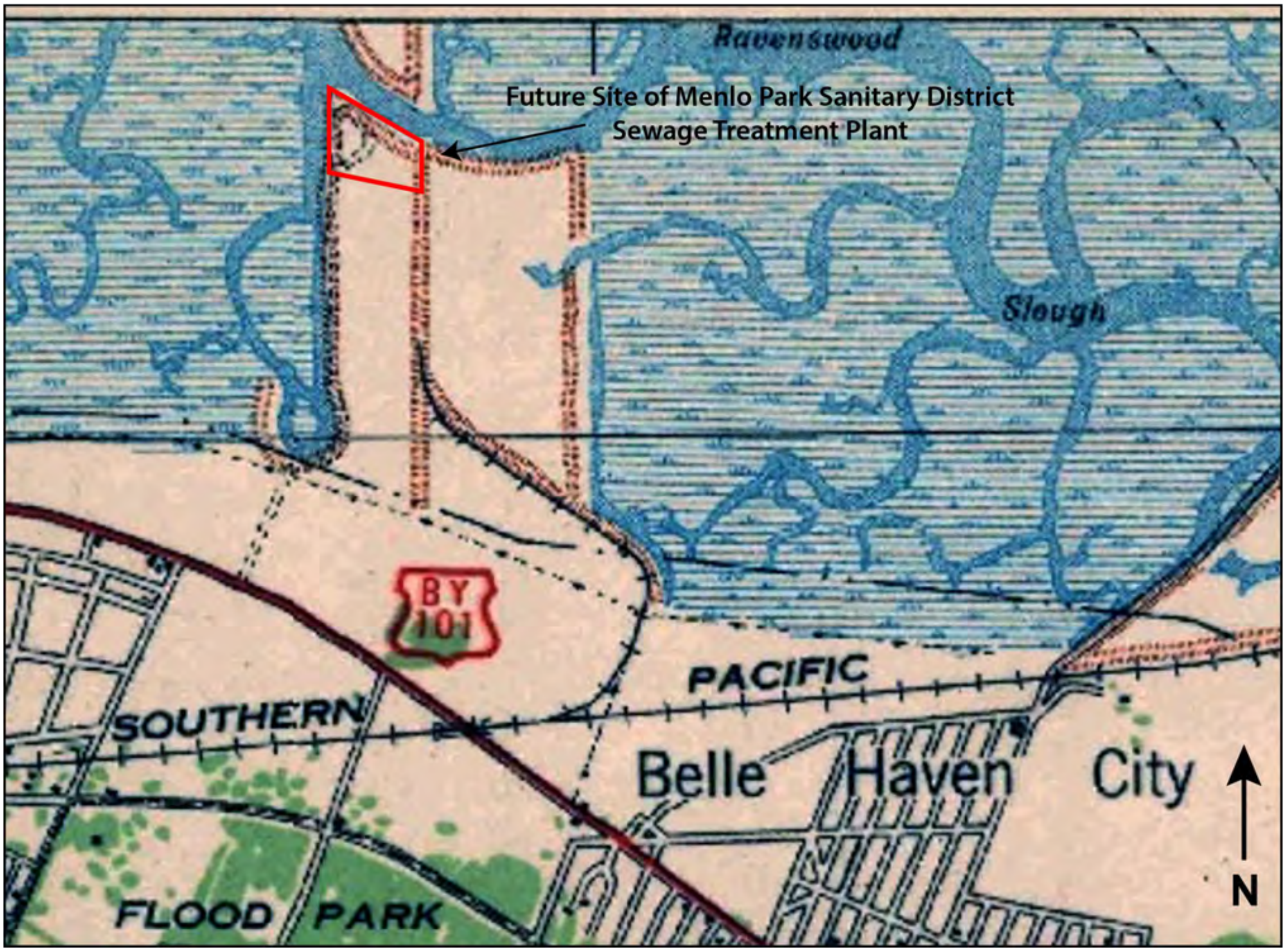


Figure 2. Salt Ponds to East of Flood Slough in 1941 (Source of Base Map: USGS Palo Alto 15 Minute Series 1941)

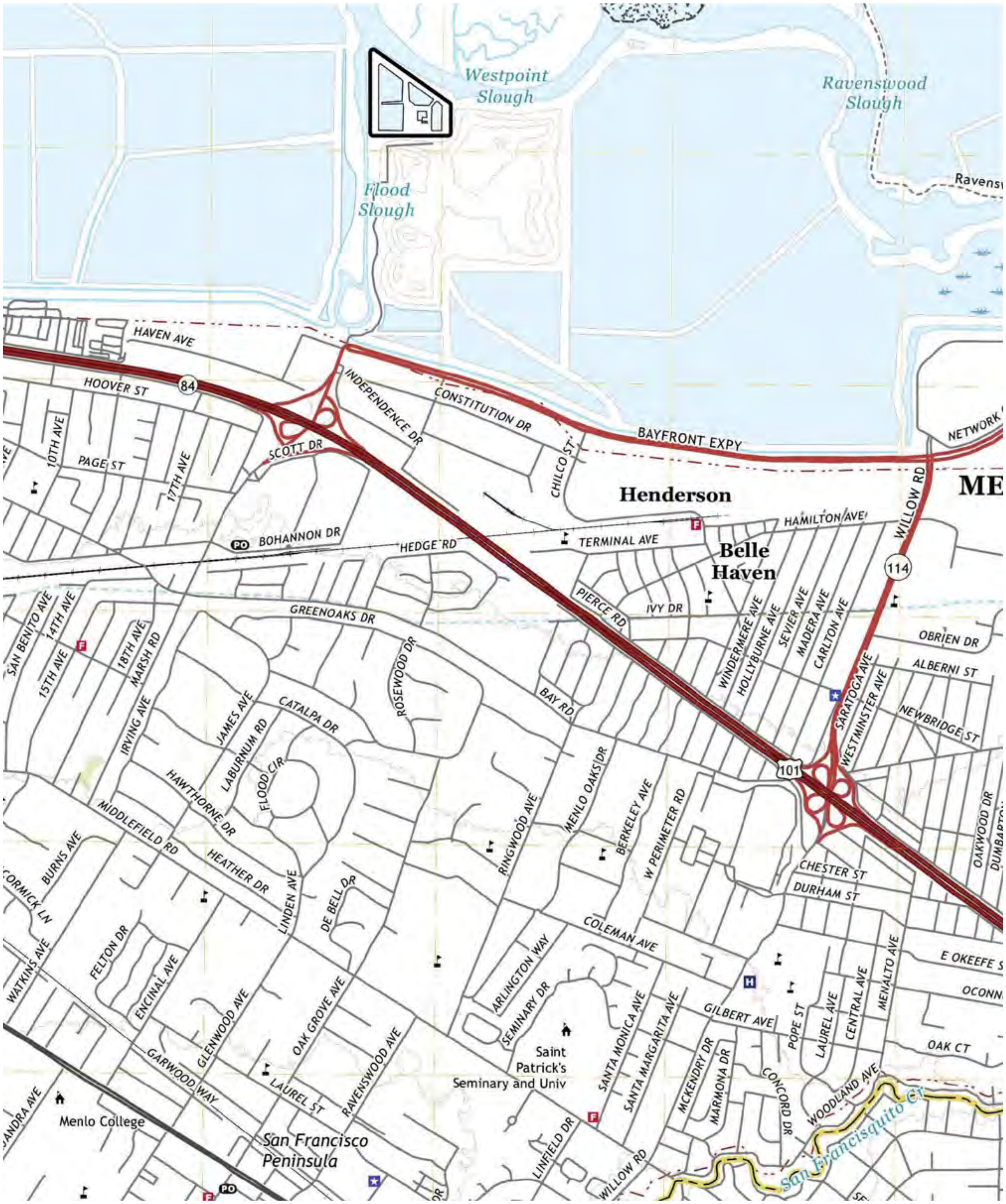
Figure 3. Menlo Park Sanitary District Sewage Treatment Plant in 1955 (Source of Base Map: Pacific Aerial Surveys 1955)

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # ____________
HRI# ____________
Trinomial# ____________

Page 36 of 36 ***Resource Name or #** (Assigned by recorder) West Bay Sanitary District FERRF
***Map Name:** Palo Alto, Calif. Topographic Map, 7.5 minute series ***Scale:** 1:24,000 ***Date of Map:** 2018



APPENDIX G

BALANCE HYDROLOGY REPORT

This page intentionally left blank.

MEMORANDUM

To: Christina Lau, MIG

From: Montana Marshall, PE, CFM, and Mark Woyshner

Date: November 12, 2020

Subject: CEQA Hydrology and Water Quality Section for the Flow Equalization and Resource Recovery Facility Levee Improvements and Bayfront Recycled Water Facility Project, Menlo Park, CA

Project Overview

The West Bay Sanitary District (District, or WBSD) proposes to construct levee improvements and a new Bayfront Recycled Water Facility (Bayfront RWF) at the District's Menlo Park Flow Equalization and Resource Recovery Facility (FERRF) site in San Mateo County. The Bayfront RWF Project also includes off-site influent and distribution system improvements.

The FERRF site is approximately 20 acres in size and is located at 1700 Marsh Road at APN 055-400-010, situated along the San Francisco Bay (Bay) shoreline adjacent to Bedwell Bayfront Park. With earthen levees on the north and west Bayside boundaries of the property, the site provides temporary storage of sewer flows within three open air basins, having a combined storage capacity of approximately 24 million gallons (MG). The elevation of the site is ranges from 0 to 40 feet (NAVD88). The remnants of the decommissioned Menlo Park Wastewater Treatment Plant, which was in service from 1952 to 1980, is also found on the site, and Save the Bay operates a small nursery in the southeast corner of the site to grows wetland vegetation in raised planter beds for local wetland restoration projects.

The FERRF site is in a FEMA 100-year flood zone and the earthen levees, originally constructed in the late 1960s, require improvements and FEMA certification. The District proposes to improve the site with a plan that incorporates both FEMA flood protection improvements and 50-year sea-level rise projections[1]. The Project proposes to bring the site out of the FEMA 100-year flood zone with the installation of sheet-pile walls at the northern and western perimeters of the site, thereby raising the existing levee elevation of 10 to 12 feet to an elevation of 15 feet

[1] The 50-year sea level rise projection used to establish the proposed sheet pile height is the San Mateo County Sea Level Rise and Overtopping Analysis for San Mateo County's Bayshore, developed using the Bay Conservation and Development Commission's (BCDC) Adapting to Rising Tides Methodology (May 2016).

(NAVD88). In addition, the project proposes construction of an ecotone levee at the northern boundary of the site, using locally sourced imported fill to raise slopes with a grade from 20:1 to 10:1. The internal access road along northern levee will also be brought up to 15 feet with imported fill. The ecotone levee design proposes to maintain some of the existing channel characteristics of Westpoint Slough in the area, improve shoreline resiliency, and provide Estuarine Wetland habitat and Bayside Scrub refuse under a projected rising sea-level condition.

The proposed levee improvements require that the existing ditch on the eastern boundary (eastern ditch) of the FERRF site be improved with one-way check valves to allow water to drain off the site, but not allow bay waters to flow back on site. In addition, the existing stormwater drainage system remaining from the decommissioned on-site wastewater treatment plant and former WTP discharge outfall to Westpoint Slough would be capped. The project would re-direct existing on-site drainage on developed portions of the site to either a) flow into the existing ditch on the east boundary of the site or b) discharge into one of the existing flow equalization basins. The proposed new Bayfront RWF would increase on-site impervious area of approximately 13,620 square feet at the FERRF site[2]. The proposed new Bayfront RWF also includes construction of an off-site influent pump station and off-site influent and distribution pipelines. Impervious area at the influent wastewater pump station would increase approximately 493 square feet. The influent and distribution pipelines would create no new impervious area since they will be installed in already existing paved road rights-of-way. No new impervious surfaces created by the project would discharge stormwater off-site.

The proposed new Bayfront RWF would produce disinfected tertiary recycled water, commonly referred to as “purple pipe” water. The facility would produce several waste streams:

1. Grit (solids) from the initial screening of the influent wastewater would be collected, compacted, and stored on site until hauled to an off-site sanitary landfill.
2. Waste sludge, washwater, and cleaning solutions would be discharged the existing sanitary sewer to the treatment plant.
3. RO concentrate is proposed for discharge to two locations: a) to Basin 3, which has a capacity of 3.5 MG, and b) to Westpoint Slough. RO concentrate in Basin 3 would be managed to achieve approximately 50 percent solids then hauled to an off-site sanitary landfill. RO concentrate within Basin 3 is not proposed for discharge to Westpoint

[2] The impervious area calculations include the future metal warehouse (not part of the proposed FERRF Levee Improvement and Bayfront RWF project. The Project’s proposed stormwater controls would account for this warehouse as well.

Slough. The new Bayfront RWF would be designed to treat an average wastewater flow of 0.5 million gallons per day (MGD) and an estimated peak flow of 1.0 MGD. The estimated average flow of RO concentrate produced would be 0.025 MGD (or 25,000 gallons per day), and the estimated peak flow would be 0.05 MGD. The RO concentrate would be discharged continuously at an estimated average temperature of 25 degrees Celsius (77 degrees Fahrenheit). **Table 1** summarizes estimated concentrations of primary pollutants of concern potentially in the RO concentrate, based on data from the Silicon Valley Clean Water (SVCW) wastewater treatment plant.

Table 1. Estimate Constituent Concentrations of Reverse Osmosis Concentrate

Pollutant	# of Samples	SVCW Effluent Concentration (assumed RO influent)		Projected Constituent Concentrations of RO Concentrate	
		95th Percentile (ug/L)	Average (ug/L)	Estimated 95th Percentile (ug/L)	Estimated Average Concentration (ug/L)
Arsenic, Total	60	1.4	1.00	7.0	5.0
Copper, Total	60	11	7.41	55	37
Lead, Total	60	0.28	0.19	1.4	0.93
Nickel, Total	60	5.3	3.97	27	20
Mercury, Total	60	0.0082	0.0050	0.041	0.025
Selenium, Total	60	0.79	0.48	4.0	2.4
Zinc, Total	60	19	14.40	95.3	72
Cyanide, Total (as CN)	60	4.3	2.84	22	14

Source: Woodard & Curran (W&C) 2020. SVCW effluent data for the period June 2015 – May 2020 was used for all pollutants analyzed. All available data was used, without removing any potential outliers. W&C assumed the water quality of the SVCW effluent will be similar to the influent RO water quality for WBSD. W&C assumed 80% RO flow recovery and RO rejection of 100% for all pollutants.

Note: Estimates based on data from Sharon Heights facility may result in lower concentrations. Additional treatment processes are also available to lower concentrations and remove certain constituents of concern from the RO concentrate discharge stream.

Regulatory Setting

This section describes the federal, state, and local regulatory context to be considered for the proposed Project, and addresses hydrology and water quality concerns, including development strategies, stormwater pollution prevention plans, and stormwater management practices.

U.S. Clean Water Act Section 402

The Clean Water Act (CWA) authorizes the U.S. Environmental Protection Agency to regulate water quality in California by controlling the discharge of pollutants to water bodies from point and non-point sources through the National Pollution Discharge Elimination System (NPDES). In San Mateo County, as with the rest of the Bay Area, NPDES permits are administered by the San Francisco Bay Regional Water Quality Control Board (RWQCB Region 2), a division of the State Water Resources Control Board (SWRCB). The San Francisco Bay Basin Water Quality Control Plan (RWQCB Region 2 Basin Plan adopted November 5, 2019) is the master policy document that drives the management of water quality and NPDES permits.

NPDES permits are adopted to address the water quality and flow-related impacts of stormwater runoff. It is a comprehensive permit, which regulates activities related to construction sites, industrial sites, illegal discharges and illicit connections, new development, and municipal operations. It also requires a public education program, implementing targeted pollutant reduction strategies, and a monitoring program to help characterize local water quality conditions and to begin evaluating the overall effectiveness of the permit's implementation. Phase I of the NPDES program covered discharges from industrial sites, construction sites larger than five acres, and municipal separate storm sewer systems (MS4s) serving populations of more than 100,000 people.

Discharge of RO Concentrate to Westpoint Slough

An NPDES permit would be required for the proposed discharge of RO Concentrate to Westpoint Slough. Five beneficial uses of wetland areas are identified in the Basin Plan for Bair Island, Belmont Slough, and Redwood City Area, which would apply to Westpoint Slough.

- Estuarine habitat (EST). Uses of water that support estuarine ecosystems, including, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds), and the propagation, sustenance, and migration of estuarine organisms.

- Preservation of rare and endangered species (RARE). Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law as rare, threatened, or endangered.

- Water contact recreation (REC1). Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs.

- Noncontact water recreation (REC2). Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

- Wildlife habitat (WILD). Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.

The Basin Plan describes water quality objectives and effluent limitations which take into account the identified beneficial uses. The water quality objectives define appropriate levels of environmental quality and are used to control activities that can adversely affect aquatic systems. Objectives for pollutant concentrations and physical/chemical conditions represent the maximum amount of pollutants that can remain in the water column without causing any adverse effect on organisms using the aquatic system as habitat, on people consuming those organisms or water, and on other current or potential beneficial uses. For the pollutant concentrations of RO Concentrate estimated for the proposed Project (**Table 1**), the Basin Plan identifies (but is not confined to) effluent limitations as listed in **Table 2.**

Table 2. Water Quality Objectives Identified in Basin Plan Applicable for Westpoint Slough

Pollutant	4-day Average (ug/L)	1-hr Average (ug/L)	Reference
Arsenic, Total	36	69	Table 3-3 of Basin Plan
Copper, Total	6.9	10.8	Table 3-3A of Basin Plan
Lead, Total	8.1	210	Table 3-3 of Basin Plan
Nickel, Total	11.9	62.4	Table 3-3A of Basin Plan
Mercury, Total	0.025	2.1	Table 3-3 of Basin Plan
Selenium, Total	none	none	Table 3-3 of Basin Plan
Zinc, Total	81	90	Table 3-3 of Basin Plan
Cyanide, Total (as CN)	2.9	9.4	Table 3-3C of Basin Plan
Note: Water quality objectives may be updated in December 2020.			

ndustrial Storm ater ater Discharge

The Statewide General Permit for Storm Water Discharges Associated with Industrial Activities, Order 2014-0057-DWQ (Industrial General Permit or IGP) implements the federally required storm water regulations in California for stormwater associated with industrial activities discharging to waters of the United States. The IGP includes facilities used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge, that are located within the confines of the facility, with a design flow of one million gallons per day or more, or required to have an approved pretreatment program under 40 Code of Federal Regulations part 403.

The IGP requires that each facility notify the state, prepare, and implement a Stormwater Pollution Prevention Plan (SWPPP), and monitor to determine the amount of pollutants leaving the site. Although the plan does not have to be submitted to the Water Board it must be available at each facility. The permitted company must submit an annual report to the RWQCB. For the project SWPPP, the District proposes to use standard specifications from the City of Menlo Park Stormwater Pollution Prevention Program, San Mateo County's Construction BMPs, and California Stormwater Quality Association (CASQA) BMP handbook.

□unicipal Storm □ater Discharge

Regardless of Industrial General Permit requirement and compliance, any development regulated under the relevant MS4 permit would need to also comply with the municipal NPDES C.3 regulations to include low impact development (LID) and stormwater treatment controls for projects resulting in 10,000 square feet of new or replaced impervious surface.

Each of the incorporated cities and towns in San Mateo County share a common municipal NPDES permit. On November 19, 2015, the San Francisco Bay RWQCB issued the most updated NPDES Permit No. CAS612008 (Order No. R2-2015-0049) to implement the Municipal Regional Stormwater Permit (MRP) for all Bay Area communities, including the San Mateo Permittees. The requirements of the MRP address subjects such as erosion and sedimentation reduction, general stormwater pollution prevention, post-construction best management practices and controls incorporation, impervious surface minimization, sensitive area restoration and protection, and watershed planning.

The goal of Provision C.3 is for the Permittees to include appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address both soluble and insoluble stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects. This goal is to be accomplished primarily through the implementation of LID techniques.

Storm□ater □ater Discharge for □onstruction Sites

Dischargers whose projects disturb one (1) or more acres of soil are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2009-0009-DWQ.

Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development of a Storm Water Pollution Prevention Plan (SWPPP), identifying potential sources of pollution and specifying runoff controls during construction for the purpose of minimizing the discharge of pollutants in stormwater from the construction area. The SWPPP should contain a site map which shows the construction site perimeter, existing and proposed buildings, lots, roadways, storm water collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP must list best management practices (BMPs) the discharger will use to protect storm water runoff and the placement of those BMPs. Construction-related BMPs are a set of specific guidelines for reducing pollutants (including sedimentation and turbidity) in stormwater discharges and runoff both during construction and post-construction. Countywide standard BMPs can be found in the County of San Mateo Watershed Protection Program’s Maintenance Standards (County of San Mateo 2004) and through guidance published by the San Mateo Countywide Water Pollution Prevention Program.

Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

The permit also includes post-construction standards with the requirement for all construction sites to match pre-project hydrology to ensure that the physical and biological integrity of aquatic ecosystems is maintained. This “runoff reduction” approach is analogous in principle to Low Impact Development (LID) and serves to protect related watersheds and water bodies from both hydrologic-based and pollution impacts associated with the post-construction landscape.

U.S. Clean Water Act Section 401

Under the auspices of the CWA, the USACE administers permitting programs that authorize impacts to "waters of the United States" including "wetlands" and "other waters." Such impacts may not be permitted until the SWRCB, acting through its regional boards, certifies that the activities covered by the permit will not violate water quality standards. Certification must be consistent with the requirements of the federal CWA, CEQA and CESA, and with the SWRCB's mandate to protect beneficial uses of waters of the state.

The San Francisco Bay RWQCB has adopted the USACE policy that there shall be "no net loss" of wetlands. Thus, prior to waiving or certifying water quality, the RWQCB requires a proposed project to ensure there are no impacts on existing wetlands, or, if such impacts are unavoidable, that they are fully mitigated.

California Porter-Cologne Act

The Porter-Cologne Act requires "any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the State (any surface water or groundwater, including saline waters) to file a report of discharge" with the local RWQCB by submitting an application for waste discharge. The RWQCB determines if a project should be regulated pursuant to this act based on the likelihood that it would pose any "threat" to water quality. The San Francisco Bay RWQCB considers the placement of clean fill in waters of the State to constitute "pollution," because it can potentially alter existing water quality, which may adversely affect its beneficial uses.

California Fish and Game Code

Existing stream channels in California are protected under sections 1600-1603 of the State Fish and Game Code. These regulations specify that it is a landowner's responsibility to obtain a state permit before undertaking any modifications within an existing stream channel up to the top of bank. Stream channels are defined by the California Department of Fish and Wildlife (CDFW) as exhibiting evidence of scour, having a definable bank, or having or being capable of supporting riparian vegetation.

California Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) requires governments and water agencies with management responsivities in medium- and high-priority sub-basins to halt groundwater overdraft through development of a Groundwater Sustainability Plan (GSP). The proposed Project site overlies the Santa Clara Valley - San Mateo Plain subbasin (no. 2-009.03), which has a “very low” SGMA prioritization. As such, an exclusive groundwater management agency (GSA) has not been formed, nor has a groundwater management plan (GSP) been developed for the subbasin.

San Mateo Countywide Water Pollution Prevention Program

The San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), formerly known as the San Mateo Countywide Stormwater Pollution Prevention Program (STOPPP), combines the countywide program and local programs while providing regional support and oversight for the local programs. The SMCWPPP was established to reduce pollutant discharge in stormwater runoff so as to minimize pollution of surface water resources (local creeks, San Francisco Bay, the Pacific Ocean). As part of this program, the comprehensive plan includes guidance on pollution reduction activities for construction sites, industrial sites, illegal discharges, and illicit connections, new development, and municipal operations. The program also includes public education efforts, target pollutant reduction strategies, and a monitoring program. These local programs are now in force in all major cities in San Mateo County.

City of Menlo Park Stormwater Pollution Prevention Program *(during construction)*

The City of Menlo Park adopted an ordinance to control the discharge of pollutants into storm sewers for protecting the water quality pursuant to the Clean Water Act. In order to implement the Federal Regulatory requirements, the Contractor and his subcontractors shall undertake all practicable measures specified herein to reduce pollutants.

The following are recommended construction materials handling and disposal practices for construction sites and a list of recyclers and disposal services to guide contractors/subcontractors in safe and non-polluting methods of disposal. The City of Menlo Park will enforce any of the provisions of this Section. The violation of any provisions of this Section or failure to comply with any of the mandatory requirements of this Section shall constitute a misdemeanor to be charged and prosecuted as provided by City code. Further information on roadwork/paving and heavy equipment operation can be found in Section 2.3 and Table 2-4 in the Project Description.

Environmental Setting

Regional Hydrology

The FERRF site is bounded by Westpoint Slough on the north, Flood Slough on the west, and Bedwell Bayfront Park on the south and east. The influent wastewater pump station (IPS) site is located adjacent to the confluence of the Bayfront Canal and Flood Slough, and the distribution pipelines will be constructed in several of the road rights-of-way nearby.

The average annual rainfall in the vicinity of the project is approximately 17 inches. Most of this precipitation falls during the winter rainy season, October through April, with the heaviest rainfall typically occurring in December, January, and February.

Both the FERRF site and IPS site are located at the downstream end of the Atherton Creek watershed (**Figure 1**), which is a highly urban watershed running through Atherton, Redwood City, Menlo Park, Woodside, and unincorporated parts of San Mateo County. The watershed flows in its historical position from its headwaters near Interstate 280 to Alameda de las Pulgas. The creek is highly engineered and flows through a concrete channel to El Camino Real and then a combination of concrete channels, storm drains, and culverts to San Francisco Bay. Elevations in the watershed range from roughly 400 feet at the upstream end, to sea level at the downstream end.

Historically, FERRF site was marshland within a complex dendritic tidal channel system at the margin of San Francisco Bay (**Figure 2)**. With very subtle changes in elevation, Westpoint Slough (formerly identified as West Point Slough) is at a local tidal watershed divide of Westpoint Creek – its channel fills and drains with the tide and connects with Ravenswood Slough at high tide. By 1930, drainage improvements at the site and vicinity included dredging Flood Slough to the bay shore at Marsh Road, as well as levee building and placement of artificial fill (**Figure 3**). The tidal watershed divide in West Point Slough also appears to have been dredged and diked. Currently, Westpoint Slough comprises the water feature formerly identified as Westpoint Creek, which has its confluence with Redwood Creek (**Figure 4**). The shoreline along Westpoint Slough includes Northern Coastal Saltmarsh wetland and tidal sloughs. Westpoint Slough forms the south and west shore of Greco Island. Greco Island and areas to the east and south of Bedwell Bayfront Park are part of Don Edwards National Wildlife Refuge, a 30,000-acre wetland/shoreline area across the southern end of San Francisco Bay.

Flood Slough has its confluence with Westpoint Slough. Cargill Industrial Saltworks owns and operates salt ponds (evaporators) to the west of Flood Slough, and the FERRF site and Bedwell Bayfront Park are to the east of the slough. Flood Slough terminates at the limit of historical marshlands at the 'Bayfront'. Flood Slough conveys stormwater from Atherton Channel and Bayfront Canal through a five-gate tide control structure (the Bayfront Canal Tide Gates) at the eastern terminus of Bayfront Canal, adjacent to Marsh Road (Horizon, 2019). The intended use of the tide gates is to prevent Bay water in Flood Slough from flowing back into Bayfront Canal. The tide gates close automatically when tide levels in the Bay are high, preventing storm flow from emptying into Flood Slough. Flood Slough also conveys stormwater through a Caltrans culvert from a 4,000-ft channel along north side of Bayshore Expressway.

The drainage area above the Bayfront Canal tide gates is 9.5 square mile area which includes sections of the cities of Menlo Park and Redwood City, the towns of Atherton and Woodside and unincorporated areas of San Mateo County. The Bayfront Canal begins in Redwood City by Douglas Court and runs west to east along the southern edge of salt ponds owned and operated by Cargill, Inc. The Atherton Channel, which runs along the jurisdictional boundary between Redwood City and the Menlo Park between Florence Street and Haven Court, joins the Canal a few hundred feet west of Marsh Road. The combined flow from the Atherton Channel and the Bayfront Canal empty into Flood Slough through the tide gate control structure, operated and maintained by the City of Redwood City.

The drainage areas along the Bayfront Canal are subject to frequent flooding due to conveyance issues associated with capacity during large storm events as well as flow restrictions when tide levels are high (City of Menlo Park Staff Report Number 17-204-CC). Chronic flooding occurs in the East Bayshore area located along the Canal in Redwood City and at the Atherton Channel in the Haven Avenue and Marsh Road area of the Menlo Park. The flooding typically results in road closures.

The Redwood City Bayfront Canal and Atherton Channel Flood Improvement and Habitat Restoration Project (Horizon 2019) is designed to provide adequate flood conveyance capacity and effectiveness during times of peak flood flow to protect residences and businesses in the communities south and southwest of the Bayfront Canal. The Project involves the construction of two parallel underground box culverts and associated drainage connections to route a portion of peak flood flows from Bayfront Canal into managed ponds that are part of the Ravenswood Pond Complex portion of the South Bay Salt Pond (SBSP) Restoration Project.

Tidal Dynamics

Tidal wetlands are the margins of the estuary that are periodically inundated by tides and include all habitats within the elevation range between the lowest and highest tides (a.k.a. the "tidal frame"). Structural diversity and species richness increase landward of the estuarine ecosystem boundary.

- Intertidal mudflats form below the mean tide level (MTL) to the mean lower low water (MLLW). Mudflats are frequently inundated by tide water, and the mud is worked by tidal action. At the upper portion of the mudflat to mean high water (MHW), a low marsh of Pacific cordgrass (*Spartina foliosa*) generally develops.

- Regularly inundated tidal marsh plains develop from MHW to mean higher high water (MHHW) comprising a wide middle marsh zone dominated by perennial pickleweed (*Salicornia virginica*) and a high marsh zone dominated by saltgrass (*Distichlis spicata*), with a complex network of dendritic tidal channels reaching into the marsh. Tidal marsh plains serve as critical habitat and refugia for several species, most notably the salt marsh harvest mouse (*Reithrodontomys raviventris*) and the California black rail (*Laterallus jamaicensis corturniculus*). It also serves as a buffer from landward intrusions of human influences including cats and dogs and predators such as the red fox.

- Infrequently inundated and spatially variable transition zones form at the edge of the high marsh and upland habitats. Responding to annual rainfall and storm surges as well as a rising sea level, the landward boundary of the high marsh generally shifts from year to year within the transition zone.

To evaluate if current and/or historical Section 10 waters occur within the area of the FERRF site, surveys were conducted to establish the MHW at the site (MIG, 2020). Section 10 of the

Rivers and Harbors Appropriation Act of 1899 applies to “navigable waters of the U.S. and include all waters subject to the ebb and flow of the tide, of which the MHW is taken as the shoreward jurisdictional limit of tidal waters. Based on data reported for the National Oceanic and Atmospheric Administration (NOAA) Dumbarton Bridge Station (No. 9414509), the MHW was calculated to be 6.8 feet relative to NAVD88 datum (MIG, 2020), or 8.00 feet relative to MLLW datum**. Table 3** summarizes the tidal statistics for the station.

Table 3. Tide statistics for NOAA station 9414509, Dumbarton Bridge, CA, 1983 to 2001. [3]

Datum	**MLLW (ft)**	**NAVD88 (ft)**	**Description**
MHHW	8.61	7.41	Mean Higher-High Water
MHW	8.00	6.80	Mean High Water
MTL	4.63	3.43	Mean Tide Level
MSL	4.68	3.48	Mean Sea Level
DTL	4.31	3.11	Mean Diurnal Tide Level
MLW	1.26	0.06	Mean Low Water
NAVD88	1.20	0.00	Based on 6.8 ft MHW reported in MIG, 2020
MLLW	0.00	-1.2	Mean Lower-Low Water
STND	-12	-13.2	Station Datum

Source: NOAA tidal benchmark sheets 09/27/2012.

NOAA also operates tide gaging station No. 9414501 at Redwood City. The station is located on Redwood Creek about ¾ of a mile from Westpoint Slough, near the SW end of the port from the entrance gate to Wharf No 5 off Seaport Boulevard. **Table 4** summarizes the tidal statistics for that station.

Table 4. Tide statistics for NOAA station 9414523, Redwood City, CA, 1983 to 2001. [4]

Datum	**MLLW (ft)**	**NAVD88 (ft)**	**Description**
MHHW	8.20	7.02	Mean Higher-High Water
MHW	7.57	6.39	Mean High Water
MTL	4.38	3.20	Mean Tide Level
MSL	4.40	3.22	Mean Sea Level
DTL	4.10	2.92	Mean Diurnal Tide Level
MLW	1.20	0.02	Mean Low Water
NAVD88	1.18	0.00	North American Vertical Datum of 1988
MLLW	0.00	-1.18	Mean Lower-Low Water
STND	-6.74	-7.92	Station Datum

Source: NOAA tidal benchmark sheets 06/22/2020.

[3] https://tidesandcurrents.noaa.gov/stationhome.html?id=9414509

[4] https://tidesandcurrents.noaa.gov/stationhome.html?id=9414523

The extent of inundation at high tide in the vicinity of the site, within Westpoint Slough, Redwood Creek, and the Bay, is shown in an April 5, 2016 aerial photo (**Figure 5**) for a tide level of about MHHW. The extent of slough drainage at low tide is shown in an April 12, 2016 aerial photo (**Figure 6**) for a tide level of about MLLW. Most notably, the tidal prism inundating the mudflats and tidal marsh plains of Westpoint Slough and Flood Slough at high tide, drain to the Bay at low tide. Broad bayside mudflats are exposed at low tide from Redwood Point to Ravenwood Point, including the mouth of Redwood Creek, along Greco Island, and the mouth of Ravenwood Slough. Westpoint Slough and Flood Slough drain to single-thread channel at low tide, exposing mudflats on the bed of the sloughs and with the marsh channels. At the FERRF site (**Figure 6**), the entire reach of Westpoint Slough along the north shore of the property, the location of the proposed ecotone levee, is situated at the uppermost portion of the tidal watershed of Westpoint Slough and drains west toward Redwood Creek and not directly toward the mouth of Ravenwood Slough; the tidal watershed divide is beyond the location of the proposed ecotone levee. Photos at low tide of Flood Slough and Westpoint Slough at the proposed Project site is shown in **Figures 8, 9, and 10**.

Balance Hydrologics monitored Redwood Creek Slough water at Deepwater Slough Island, Redwood City, CA (White et al., 2003, 2002, 2001). Hand measurements of specific conductance were in the range of 36 to 47 millisiemens per centimeter (mS/cm), normalized to 25 degrees Celsius (25°C). These values are typical of those observed in San Francisco Bay.

Project Site Hydrology

As stated above, the project includes improvements to the FERRF site, a new influent pump station, and associated influent/distribution pipelines.

The existing drainage system on-site at the FERRF was originally part of the decommissioned on-site wastewater treatment plant. An existing 30-inch pipeline served as the decommissioned wastewater treatment plant effluent outfall and stormwater drain for impervious areas surrounding the wastewater treatment plant, which originates approximately 20 feet east of the WTP, drained the impervious area of this plant to an outfall into Westpoint Slough. There is also an existing ditch in Bedwell Bayfront Park, along the south and eastern portion of the FERRF site that conveys stormwater from Bedwell Bayfront Park and discharges to Westpoint Slough.

Besides the decommissioned treatment plant elements, the FERRF site is largely unpaved. The only impervious areas at the site are the remnant WTP facilities and a portion of the entrance driveway into the site.

The FERRF site is generally flat. Surface elevations (excepting the equalization basins) are approximately 8 to 12 feet above mean sea level (AMSL) on the western portion of the site while the eastern portion of the site is roughly 10 to 17 feet AMSL. The levees on the west and north of the site vary between 10 and 12 feet AMSL. The equalization basins' floor elevation (bottom depth) is approximately 3 to -3 feet AMSL.

With earthen levees on the north and west Bayside boundaries of the property, the site provides temporary storage of sewer flows within three open air basins, having a combined storage capacity of approximately 23.5 million gallons (MG). Basin 1 serves as the primary location for handing excess flows during maximum flow events (e.g., during a storm event). If the Regional Plant (in Redwood City) were to shut down for some unforeseen reason during a storm event, it would not take long for Basin 1 to fill up and overflow into Basin 2. Events that require the use of Basin 2 are uncommon but do occur. The last time Basin 2 was used for overflow purposes was approximately 12 years ago. Historically, Basins 2 and 3 were connected, but this is no longer the case; only Basins 1 and 2 are connected under current conditions.

The proposed location of the IPS is already paved, and the proposed alignments of the influent/distribution pipelines are along already paved road rights-of-way.

Soils and Groundwater

The proposed Project is located within the Santa Clara Valley Groundwater Basin, a structural depression extending southeastward from San Francisco, and lying between the Diablo Range on the northeast and the Santa Cruz and Gabilan ranges on the southwest. Mid-Pleistocene uplift and large-scale block faulting – generally controlled by movement along the Hayward fault and the San Andreas fault – has elevated older consolidated sedimentary and igneous basement rocks, forming the boundaries of the basin. The San Francisco Bay occupies the central portion of the geologic trough, and streams draining the mountain watersheds have deposited alluvial fans and flood plains within the basin. Glacial stages globally during the Pleistocene have changed the base level for the streams, fluctuating as much as 400 feet. During the interglacial stages, when the depression was partially inundated, extensive blue clay layers were deposited, while extensive gravel and sand layers and other water-bearing materials were deposited during glacial stages of lowered sea level. This depositional environment (or stratigraphic facies) resulted in a series of interfingering aquifers and aquicludes of limited extent which are poorly correlated locally within the basin (**Figure 11**).

The Department of Water Resources (DWR) has divided the Santa Clara Valley Groundwater Basin into four subbasins: Niles Cone (No. 2-009.01), Santa Clara (No. 2-009.02), San Mateo Plain (No. 2-009.03), and East Bay Plain (No. 2-009.04). The proposed Project site is located within the San Mateo Plain Subbasin on artificial fill and bay mud (Holocene) deposits. These alluvial deposits are characterized as water-saturated estuarine mud, predominantly gray, green and blue clay and silty clay underlying marshlands and tidal mud flats of the San Francisco Bay (Brabb and others, 2000, USGS MF-2332; Atwater and others, 1977, USGS Prof. Paper 1014). **Figure 2** shows the location of the site on former marshlands mapped on the USGS topographic map dated 1899. By 1930, drainage improvements at the site and vicinity included dredging Flood Slough to the bay shore at Marsh Road, levee improvements, and artificial fill (**Figure 3**). The driller's well completion report (WCR or well log) for an on-site well identified 10 feet of fill overlying blue clay (estuarine mud) to a depth of 144 feet, below which the blue clay interfingers with gravel and sand units (**Figure 12**). These sand and gravel aquifers at depth were the source of groundwater for the former Menlo Park Wastewater Treatment Plant, which operated from 1952 to 1980. Water was used in treatment processes, cleaning equipment and floors of buildings, and for sprinklers (Wood, 1975). Other wells in the area also identify deep clay which function to confine underlying aquifers.

Two monitoring wells are located onsite near the existing equalization basins: one at the north point of the site near Basin 2 (MW-1) and the other at the south center portion of the site near the southeast corner of Basin 1 (MW-2). On May 26, 2020 Balance measured depth to water (DTW) in the monitoring wells: DTW in MW-1 was 10.3 ft with a stickup of 2.3 ft, and DTW in MW-2 was 7.8 ft with a 2.0 ft stickup at 11:07 AM. Neither of the wells had WCRs on file at DWR.

Bay mud has very low hydraulic conductivity (Helley and Lajoie, 1979) – commonly on the order of 10^{-6} centimeters per second (cm/sec) – and is considered an aquiclude. Marsh soils in the area (such as on Greco Island) are classified as Novato Series. The Novato series consists of very deep, very poorly drained soils that formed in alluvium deposited along the margin of bays, in tidal marshes with slopes of 0 to 2 percent. Novato soils are characterized with a permeability of 0.06 to 0.2 inches per hour (in/hr).

Project Impacts

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, the impact of the proposed Project on hydrology and water quality would be considered significant if it would:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

   a. result in a substantial erosion or siltation on- or off-site;

   b. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

   c. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

   d. impede or redirect flood flows?

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Surface Water Quality

Construction Phase

During construction, clearing and grading of the Project levees would increase the potential for increased turbidity and sedimentation in Westpoint and Flood Sloughs. Sedimentation may degrade Slough habitat and reduce their flow capacity, potentially inducing or exacerbating flooding. Other pollutants that might impact surface water quality during project construction include petroleum products (gasoline, diesel, kerosene, oil, and grease), hydrocarbons from asphalt paving, paints, solvents, and litter.

Because the project would disturb more than one acre of land, the applicant is required to prepare a Stormwater Pollution Prevention Plan (SWPPP), per NPDES general construction permit requirements through the State Water Resources Control Board (SWRCB). The SWPPP would address potential erosion and sedimentation issues through a project-specific erosion control plan, as well as other best management practices (BMPs) to reduce the potential for sediment, pollution, and other contamination from on-site construction activities. BMP implementation shall be consistent with the BMP requirements in the most recent version of the California Stormwater Quality Association Stormwater Best Management Handbook-Construction or the

Caltrans Stormwater Quality Handbook Construction Site BMPs Manual. Section 2.3 and Table 2-4 in the Project Description outline the BMPs that are included in this project.

Proper implementation of the project-specific SWPPP would reduce the potential construction-related water quality impacts to a ***less-than-significant*** level during the construction phase.

Operational Phase

The proposed new Bayfront RWF would increase on-site impervious area and includes construction of an off-site influent pump station and off-site influent and distribution pipelines. No new impervious surfaces created by the project would discharge stormwater off-site with the exception of the ditch draining at the northeast corner of the FERRF site, which borders the FERRF property line.

The Statewide Industrial General Permit requires that each facility notify the state, prepare, and implement a Stormwater Pollution Prevention Plan (SWPPP), and monitor to determine the amount of pollutants leaving the site. For the project SWPPP, the District proposes to use standard specifications from the City of Menlo Park Stormwater Pollution Prevention Program, San Mateo County’s Construction BMPs, and California Stormwater Quality Association (CASQA) BMP handbook (see Table 2-4 and Section 2.3 of the Project Description).

Additionally, the Project would also need to comply with the municipal NPDES C.3 regulations to include low impact development (LID) and stormwater treatment controls to address subjects such as erosion and sedimentation reduction, general stormwater pollution prevention, post-construction best management practices and controls incorporation, impervious surface minimization, sensitive area restoration and protection, and watershed planning.

Grit (solids) from the initial screening of the influent wastewater would be collected, compacted, and stored on site until hauled to an off-site sanitary landfill. Waste sludge, washwater, and cleaning solutions would be discharged the existing sanitary sewer to the treatment plant.

RO concentrate is proposed for discharge to two location: a) to Basin 3, which has a capacity of 3.5 MG, and when Basin 3 reaches capacity, b) to Westpoint Slough. RO concentrate in Basin 3 would be managed to achieve approximately 50 percent solids then hauled to an off-site sanitary landfill. RO concentrate within Basin 3 is not proposed for discharge to Westpoint Slough.

The proposed Project would likely have ***no impact*** to water quality during the operational phase.

Discharge of RO Concentrate to Westpoint Slough

The pollutant concentration of copper, nickel, mercury, zinc, and cyanide estimated for Project RO concentrate exceed Basin Plan objectives applicable to Westpoint Slough for those pollutants (**Table 5**); copper and cyanide exceed both 1-hour and 4-day objectives. These elevated concentrations thus suggest that dilution within the tidal prism of Westpoint Slough and circulation to the Bay would be required to lower pollutant levels to acceptable levels. As described in the environmental setting, the tidal prism inundating the mudflats and tidal marsh plains of Westpoint Slough and Flood Slough at high tide drains to the Bay at low tide. Westpoint Slough and Flood Slough drain to single-thread channel at low tide, exposing mudflats on the bed of the sloughs and marsh channels (**Figure 7**). Intertidal mudflats form below the mean tide level (MTL) which is 4.4 ft at the Redwood City tide gage on Redwood Creek (**Table 4**).[5] Based on aerial photos, a rough area of the mudflats of Westpoint Slough and Flood Slough about 350 acres, not including marsh channels. The estimated MTL prism of Westpoint Slough (350 acres x 4.4 ft) is roughly 500 million gallons (MG). Furthermore, the design maximum daily discharge of RO concentrate is 50,000 gallons, which is 0.01 percent of the MTL prism of Westpoint Slough. The dilution in Westpoint Slough at MTL would be roughly 10,000 times the maximum daily discharge of RO concentrate, which suggests that dilution and circulation to the Bay would be suitable.

This first-order analysis is considered a conservative analysis because it does not include the tidal prism above MTL, which would inundate the tidal marsh plain and its species richness. Maximum dilution and circulation to the bay would conceivably be achieved during the outgoing tide, therefore preliminary analysis indicates the discharge of RO concentrate to Westpoint Slough would have a ***less-than-significant*** impact on water quality given positive results of modeling to achieve an acceptable protocol for discharge.

However, modeling of the slough would be necessary to further assess the potential water quality impacts and would assess concentrations of all water quality objectives in the Basin Plan. An outcome of the modeling would be to identify optimal tidal conditions for discharge of RO concentrate. The modeling shall be done prior to the final project design when projected pollutant concentrations are confirmed and additional treatment processes could be identified, as necessary, to reduce pollutant loads to meet Basin Plan Objectives.

[5] Note: The MTL is similar to the mean sea level at the gage.

Table 5. Estimated Pollutant Concentrations of RO Concentrate Relative to Basin Plan Objectives.

Pollutant	Projected Pollutant Concentrations of RO Concentrate (Table 1)[1]		Water Quality Objectives in Basin Plan (Table 2)[2]		Remarks
	Estimated 95th Percentile (ug/L)	*Estimated Average Concentration (ug/L)*	*4-day Average (ug/L)*	*1-hr Average (ug/L)*	
Arsenic	7.0	5.0	36	69	Not exceeding Basin Plan objectives
Copper	55	37	6.9	10.8	Exceeds both 1-hr and 4-day objectives
Lead	1.4	0.93	8.1	210	Not exceeding Basin Plan objectives
Nickel	27	20	11.9	62.4	Exceeds 4-day objective
Mercury	0.041	0.025	0.025	2.1	Exceeds 4-day objective
Selenium	4.000	2.4	none	none	not applicable
Zinc	95.3	72	81	90	95th percentile exceeds both objectives
Cyanide	22	14	2.9	9.4	Exceeds both 1-hr and 4-day objectives

Notes:
[1] Estimates of projected pollutant concentrations based on data from SVCW. Data from Sharon Heights facility may result in lower concentrations. Additional treatment processes are also available to lower concentrations and remove certain constituents of concern from the RO concentrate discharge stream.
[2] Water quality objectives may be updated in December 2020.

Groundwater Quality, Supply, and Recharge

The proposed Project site overlies the Santa Clara Valley - San Mateo Plain subbasin (No. 2-009.03), which has a "very low" SGMA prioritization. As such, an exclusive groundwater management agency (GSA) has not been formed, nor has a groundwater management plan (GSP) been developed for the subbasin. Based on the lithologic log on the drillers WCR for the on-site well and other wells and borehole data (Brabb and others, 2000; Iwamura, 1995; Atwater and others, 1977), the proposed Project site overlies thick deposits of bay mud and clay, as illustrated in **Figure 11**. Confined aquifers at depth would likely receive recharge from upgradient unconfined areas to the west or are at the fringe of broad basin aquifers underlying the Bay and extending to the East Bay such as the Newark Aquifer and Centerville Aquifer.

Increases in impervious area at the Project site could incrementally decrease stormwater recharge which could impact recharge to the underlying aquifer. However, the small increase in impervious cover at the project site is unlikely to impact recharge to a significant degree in comparison to the rest of the watershed size and land use. In addition, with very low hydraulic conductivity, the clay aquicludes function to confine or semi-confine the aquifers at depth and potentially isolate the aquifers from overlying surface waters. As illustrated in **Figure 11**, recharge likely occurs somewhere upgradient in an unconfined aquifer zone.

One water well exists on site. The groundwater from the well was used in treatment processes, cleaning equipment and floors of buildings, and for sprinklers, but not for potable use. There is no record of destruction if the well in the DWR online files. The well draws groundwater from sand and gravel aquifers interfingered in clay aquicludes below 144 feet of clay (**Figure 12**). With very low hydraulic conductivity, the clay aquicludes function to confine or semi-confine the aquifers at depth and potentially isolate the aquifers from overlying surface waters. As illustrated in **Figure 11**, recharge likely occurs somewhere upgradient in an unconfined aquifer zone. The yield of the well was not recorded on the driller's WCR but identified as 30 gallons per minute (gpm) in USGS Open File Report 75-43 (Wood, 1975). If the well is kept in place, water quality testing would be recommended for future use, although use of this potential source of water is not anticipated as part of this project. Currently, the site is supplied with potable water by the City of Menlo Park and as part of the future warehouse currently being permitted at the site, the existing water supply pipe to the site will be upgraded to a 6-inch diameter pipe.

Given these physical limitations, the proposed Project would likely have ***no impact*** on the aquifer groundwater quality, supply, or recharge.

Stormwater Drainage System (on- and/or off-site)

The proposed Project would increase the impervious area at the site by a total of approximately 14,113 square feet (approximately 13,620 square feet for the FERRF and approximately 493 square feet for the influent wastewater pump station (IPS))[6]. The influent and distribution pipelines would create no new impervious area since they will be installed in already existing paved road rights-of-way. This change represents an approximately 13% increase in impervious area on-site. That said, no new impervious surfaces created by the project would discharge stormwater off-site, with the exception of the ditch draining at the northeast corner of the FERRF site, which borders the FERRF property line.

Due to the proposed one-way check valves that are planned to be installed at the outlet of the eastern ditch, bay waters will not be able to flow back on site (including during high tide events). In addition, the existing stormwater drainage system remaining from the decommissioned on-site wastewater treatment plant and discharge outfall to Westpoint Slough would be capped. As a result, on-site drainage would either a) flow into the existing ditch on the eastern boundary of the site or b) discharge into one of the three existing flow equalization basins. According to information provided on current FERRF operations, the last time Basin 2 was used for overflow purposes after Basin 1 was full was approximately 12 years ago. As such, it appears that using the existing on-site basins is a feasible approach to handle large stormwater runoff events.

[6] The impervious area calculations include the future metal warehouse. The Project's proposed stormwater controls would account for this warehouse as well.

Because stormwater from the post-project layout will only be directed into the eastern ditch (and then into Westpoint Slough) or into one of the large basins on-site, no off-site stormwater systems will be impacted as a result of this project, and there will be adequate storage on-site for the increase in stormwater runoff. Improvements to the eastern ditch, including maximizing its cross-sectional geometry, would allow for it to have proper capacity for these redirected flows (in addition to the off-site flows that are already directed to it) and therefore reduce the risk of localized flooding to below the level of significance.

As such, the updates to the proposed stormwater drainage system will likely have ***no impact*** to off-site stormwater drainage systems, if the eastern ditch and associated outfall are improved appropriately.

Erosion or Siltation (on- and/or off-site)

Because on-site stormwater runoff may be routed to the (improved) eastern ditch, design of the improvements should focus on measures that reduce any erosion and siltation issues that stem from this increase in routed stormwater. Higher flows of the improved outfall could cause or exacerbate erosion of the Slough banks. As such, energy dissipation and protection should be incorporated into the outfall design to reduce impacts to the Slough banks. This could also include a planting plan that reduces velocities prior to entering the Slough and therefore increasing the bank's resistance to erosion. Improvements to the eastern ditch and its outfall to Westpoint Slough, including an appropriate slope and channel bed protection, could prevent excessive erosion and/or siltation following construction and reduce the risk of localized erosion/siltation to below the level of significance.

Additionally, the outboard banks of the improved project levees would incorporate vegetation and other stabilizing techniques to prevent erosion of the constructed levee banks as described in Chapter 2 Project Description and Chapter 5 Biological Resources.

Lastly, implementation of the project SWPPP in compliance with County regulations would reduce erosion and siltation during project construction.

The resulting impact of the proposed project on erosion and siltation would likely be ***less-than-significant*** if the eastern ditch and associated outfall are improved appropriately and the outboard banks of the Project levees incorporate stabilizing techniques**.**

Flood Risk (on- and/or off-site)

Proposed Levees Improvement

In order to receive FEMA certification, the project proposes to protect the site from flooding and sea level rise by installing sheet pile walls around the northern and western perimeters of the facility, raising the grades of the northern portion of the perimeter access road within the property, and construction of an ecotone levee to promote shoreline resiliency.

Approximately 3,400 linear feet of sheet piles (large metal plates) would be placed along the western and northern portions of the FERRF site, with a short, approximately 200-foot section extending onto Menlo Park land at the site's Marsh Road entrance. The sheet piles would be driven or vibrated into the ground approximately 30 feet deep, while leaving the top of the sheet pile at a height of 15 feet (North American Vertical Datum of 1988, or NAVD88) elevation.

On the northern perimeter of the Project (adjacent to Westpoint Slough), an ecotone levee would be constructed. Ecotone levees are nature-based ramps that provide a gradual transition zone between tidal marshes and flood risk management levees. They are designed to provide high-tide and wetland-upland transition zone habitat, protection against storm surge (i.e. wave attenuation), and resiliency against long-term sea level rise. The ecotone levee proposed would be located along the northern perimeter of the FERRF site, with a height of 15 feet (NAVD88), and slopes ranging from 20:1 (horizontal to vertical) to 10:1.

The design elevation of 15 feet (NAVD88) for both the sheet pile levees and the ecotone levees would be an increase from the existing levee elevations which range from 10 to 12 feet (NAVD88).

On-Site Flood Risk

<u>FERRF Site</u>

No riverine/upland water sources are present in the vicinity of this project, and as such, riverine/upland flooding is negligible. To our knowledge, there is no record of flooding history for Westpoint Slough, Flood Slough, or to the adjacent salt ponds. However, due to the proximity to the coast, the Project is subject to flooding from the San Francisco Bay.

The project area is located within a Federal Emergency Management Agency (FEMA)-defined Special Flood Hazard Area (FEMA 2012), Zone AE (**Figure 13**). Zone AE is defined as an area subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods with base flood elevations (BFEs) provided. The BFE is defined by FEMA as the computed elevation to which floodwater is anticipated to rise during the base flood. The base flood is defined as the 100-year flood, or the "one-percent annual chance flood."

The effective Flood Insurance Rate Map (FIRM) panel in the project vicinity specifies a BFE of 12 feet (NAVD88). The current design elevation of both the sheet pile levees and the ecotone levee is 15 feet NAVD88. In addition to the FEMA-defined BFE in the vicinity of the Project, it should be verified that the following considerations are taken in account when finalizing the design elevation of the Project levees: future (50-year) sea level rise projections, local geotechnical settlement, tidal dynamics, storm surge, wave runup, erosion rate and potential, as well as FEMA levee design criteria (including freeboard).

Flooding from the San Francisco Bay is a potentially significant impact that can be mitigated through appropriate design of the proposed Project levee improvements (i.e. taking into account the above considerations). Additionally, FEMA certification of the levees should be obtained prior to provision of the grading permit and the start of construction.

If designed with proper consideration of the above elements, the proposed levee improvements proposed would reduce flood risks at the project site under a variety of conditions, and therefore create ***beneficial impact*** to flood risks.

Influent Pump Station Site

The Redwood City Bayfront Canal and Atherton Channel Flood Improvement and Habitat Restoration Project IS/MND document (Horizon 2019) shows that the influent pump station site is currently flooded during the 25-year design storm event. However, this project is designed to provide adequate flood conveyance capacity and effectiveness during times of peak flood flow to protect residences and businesses in the communities south and southwest of the Bayfront Canal and will therefore alleviate the flood risk to the influent pump station site.

Off-Site Flood Risk

The elevations of the levees for the adjacent salt ponds (to the west of Flood Slough) range from 10 to 12 feet (similar to the existing condition of the Project levees). Under an extreme event condition (during existing conditions), both the Project and the adjacent salt ponds have a risk of flooding due to the 100-year FEMA BFE. The proposed Project levee improvements are being designed to avoid this flood risk.

Due to the storage available in the slough system and San Francisco Bay generally, it is anticipated that flooding impacts to the adjacent salt ponds would ***less-than significant*** as a result of the Project levee improvements.

Tsunami, Seiche, and Mudflow Risk

A tsunami is a wave or series of waves that occurs following an earthquake, landslide, or volcanic eruption at sea. Tsunamis grow in height as they move over shallow waters and may result in coastal flooding. Although infrequent, tsunamis have been observed in San Francisco Bay since 1868, ranging in depth from 4 inches to 15 feet (California Geological Survey [CGS] 2015). Although the Project site is located on the Bay margin, the site is located outside of the tsunami inundation area (**Figure 14**, CGS 2009). As such, the risk associated with a tsunami is not considered a potential constraint or a potentially significant impact if the proposed levee improvements are designed to minimize impacts from potential tsunamis.

A seiche is a standing wave in enclosed or partially enclosed body of water, such as a lake, bay (i.e., San Francisco Bay) or estuary, which oscillates back and forth from one side of the waterbody to the other. Seiches may be triggered by moderate or large submarine or onshore earthquakes. Due to the Project's proximity to the San Francisco Bay, the plan area could experience seiche or seiche-related effects during seismic activity., The severity of the seiche energy would likely be decreased upon reaching the northern levee of the Project due to the buffer of nearby islands (i.e. Greco Island). Also, all components of the proposed Project are protected by the proposed levee improvements (described above). As such, the risk associated with a seiche is not considered a potential constraint or a potentially significant impact if the proposed levee improvements are designed to minimize impacts from potential seiche inundation risk.

Lastly, since the Project area is in a flat, coastal Bay fringe, landslides would be uncommon, and the Project would not be subject to inundation by mudflow.

If designed with proper consideration of the above elements, the proposed levee improvements proposed would reduce tsunami, seiche and mudflow risks at the project site, and therefore create ***beneficial impacts*** to these risks.

Cumulative Impacts

The cumulative context to assess project impacts includes development within the Atherton watershed in the vicinity of the project site, and potential impacts to downstream sloughs and the San Francisco Bay. The project site lies at the downstream most end of the landward watershed, and the upstream portion of the tidal watershed.

The watershed is used as the geographic unit for cumulative analysis based on the concept that many water quality problems, like the accumulation of pollutants or nonpoint source pollution, are best addressed at the watershed level. In addition, California's regulatory framework for protection of water quality focusses on the watershed.

Surface Water Quality

The proposed Project could, in conjunction with other projects within the watershed, contribute urban runoff pollutants to downstream receiving waters, resulting in degradation of water quality delivered to the San Francisco Bay. The proposed Project would incorporate BMPs, per NPDES requirements, to control and/or treat stormwater runoff. Similarly, other developments within the watershed would be required to comply with these regulations. Because the existing facility includes no BMPs, the proposed Project would likely improve stormwater quality relative to existing conditions, even with the proposed small increases in impervious area relative to the watershed areas. As such the cumulative impact of the project related to surface water quality is considered ***less-than-significant***.

Groundwater Quality, Supply, and Recharge

As part of the project's compliance with the NPDES stormwater permit, the project will incorporate BMPs that will minimize the potential impact to groundwater recharge. As such the project would result in a ***less-than-significant cumulative impact*** related to groundwater recharge. Increases in impervious area at the proposed Project site could incrementally decrease stormwater recharge which, combined with similar increases due to other potential future projects within the watershed, could cumulatively impact recharge to the underlying aquifer. The small increase in impervious cover at the project site is unlikely to cumulatively impact recharge to a significant degree in comparison to the rest of the watershed size and land use. In addition, with very low hydraulic conductivity, the clay aquicludes function to confine or semi-confine the aquifers at depth and potentially isolate the aquifers from overlying surface waters. As illustrated in **Figure 11**, recharge likely occurs somewhere upgradient in an unconfined aquifer zone.

In addition, the proposed Project site overlies thick deposits of bay mud and clay with very low hydraulic conductivity, as such the proposed Project would very likely not affect the aquifer groundwater quality. The proposed Project would likely have ***no cumulative impacts*** on groundwater supply, recharge, and quality.

Storm Water Drainage System

Although the proposed Project includes an increase in impervious areas on-site, the new impervious surfaces created by the project are designed to be contained on-site or drain to the eastern ditch, adjacent to the FERRF property line. As such, the Project would likely ***not cumulatively impact*** flooding and/or capacity in the downstream storm water drainage system.

Flood Risk

The elevations of the levees for the adjacent salt ponds (to the west of Flood Slough) range from 10 to 12 feet (similar to the existing condition of the Project levees). Under an extreme event condition (during existing conditions), both the Project and the adjacent salt ponds have a risk of flooding due to the 100-year FEMA BFE. The proposed Project levee improvements are being designed to avoid this flood risk.

Additionally, the Redwood City Bayfront Canal and Atherton Channel Flood Improvement and Habitat Restoration Project is designed to provide adequate flood conveyance capacity and effectiveness during times of peak flood flow to protect residences and businesses in the communities south and southwest of the Bayfront Canal.

Due to the storage available in the slough system and San Francisco Bay generally, it is anticipated that flooding impacts to the adjacent salt ponds would likely be ***less-than-significant*** as a result of the Project improvements.

Mitigation Measures

Surface Water Quality *(Construction and Operational Phases)*

Proper implementation of the project SWPPP would reduce the potential construction-related water quality impacts (from both the construction and operational phases) to a less-than-significant level. No further mitigation is required.

Preliminary analysis suggests that dilution and circulation to the Bay would be suitable to discharge RO concentrate to Westpoint Slough. Maximum dilution and circulation to the bay would potentially be achieved during the outgoing tide. However, modeling of the slough would be necessary to further assess the potential water quality impacts and would assess concentrations of all water quality objectives in the Basin Plan. An outcome of the modeling would be to identify optimal tidal conditions, discharge rates and schedules. This modeling shall be done prior to the final project design when projected pollutant concentrations are confirmed and additional treatment processes could be identified, as necessary, to reduce pollutant loads to meet Basin Plan Objectives.

Groundwater Quality, Supply, and Recharge

The proposed Project site overlies the Santa Clara Valley - San Mateo Plain subbasin (no. 2-009.03), which has a “very low” SGMA prioritization. As such, an exclusive groundwater management agency (GSA) has not been formed, nor has a groundwater management plan (GSP) been developed for the subbasin. ***No mitigation is required.***

Stormwater Drainage Capacity

Improvements to the eastern ditch, including maximizing its cross-sectional geometry, would allow for it to have proper capacity for these redirected flows (in addition to the off-site flows that are already directed to it) and therefore reduce the risk of localized flooding to below the level of significance.

Erosion and Siltation

Improvements to the eastern ditch and its outfall to Westpoint Slough, including an appropriate slope and channel bed protection, could prevent excessive erosion and/or siltation following construction and reduce the risk of localized erosion/siltation to below the level of significance.

Additionally, the outboard banks of the improved levees would incorporate vegetation and other stabilizing techniques to prevent erosion of the constructed levee banks. Lastly, implementation of the project SWPPP in compliance with County regulations would reduce erosion and siltation during project construction. The resulting impact would be less-than-significant.

Flood Risk

Flooding from the San Francisco Bay is a potentially significant impact that can be mitigated through appropriate design of the proposed Project levee improvement, including consideration of: future (50-year) sea level rise projections, local geotechnical settlement, tidal dynamics, storm surge, wave runup, erosion rate and potential, FEMA levee design criteria (including freeboard), as well as seiche and tsunami risk. Additionally, FEMA certification of the levees should be obtained prior to provision of the grading permit and the start of construction.

General Limitations

This memo was prepared in general accordance with the accepted standard of practice in hydrologic, geologic, groundwater sciences, and civil engineering existing in Northern California for projects of similar scale at the time the investigations were performed. No other warranties, expressed or implied, are made. The application of hydrologic and geomorphic history to inferring future landscape and wetland design has a long and respected record in the earth sciences. As with all history or archival analysis, the better the record is known and understood, the more relevant and predictive the analysis can be. We do encourage those who have knowledge of events or processes which may have affected the site to let Balance Hydrologics know at the first available opportunity.

As is customary, we note that readers should recognize that interpretation and evaluation of subsurface conditions and physical factors affecting the hydrologic context of any site is a difficult and inexact art. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive or extended studies can reduce the inherent uncertainties associated with such studies.

Concepts, findings, and interpretations contained in this memo are intended for the exclusive use of West Bay Sanitary District and their consultants under the conditions presently prevailing except where noted otherwise. Their use beyond the boundaries of the project site could lead to environmental or structural damage, and/or to noncompliance with water-quality policies, regulations or permits. Data developed or used in this report were collected and interpreted solely for developing an understanding of the hydrologic context at the site as an aid to conceptual planning and channel and wetland restoration design. They should not be used for other purposes without great care, updating, review of sampling and analytical methods used, and consultation with Balance staff familiar with the site. In particular, Balance Hydrologics, Inc. should be consulted prior to applying the contents of this report to geotechnical or facility design, routine wetland management, sale, or exchange of land, or for other purposes not specifically cited in this report.

References Cited

Atwater, B.F., Hedel, C.W., and Helley, E.J., 1977, Late Quaternary depositional history, Holocene sea-level changes, and vertical crustal movement, southern San Francisco Bay, California: U.S. Geological Survey Professional Paper 1014, 15 p., 1 plate. (Available at *https://pubs.usgs.gov/pp/1014/*.)

California Geological Survey (CGS). 2015. FAQ About Tsunamis; Historic Tsunamis in California. Available online at: *http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/pages/about_tsunamis.aspx* (last accessed November 5, 2020).

California Department of Water Resources, 1967, Evaluation of ground-water resources, South San Francisco Bay, Appendix A: Geology: Bulletin 118-1, 153 p.

California State Department of Water Resources, 1975, Evaluation of Ground Water Resources, South San Francisco Bay, Volume III: Northern Santa Clara County Area: Bulletin No.118-I.

California State Department of Water Resources, 2004, Santa Clara Valley Groundwater Basin, Niles Cone Subbasin, Bulletin 118, 4 p.

California State Department of Water Resources, 2004, Santa Clara Valley Groundwater Basin, San Mateo Subbasin, Bulletin 118, 4 p.

California State Department of Water Resources, 2004, Santa Clara Valley Groundwater Basin, Santa Clara Subbasin, Bulletin 118, 4 p.

California State Department of Water Resources, 2013, Well completion report no. e0164517: 315 El Camino Real, City of Palo Alto, Santa Clara County, February 14, 2013.

California State Department of Water Resources, 2013, Well completion report no. e0164518: 315 El Camino Real, City of Palo Alto, Santa Clara County, January 22, 2013.

California State Department of Water Resources, 2013, Well completion report no. e0164519: 315 El Camino Real, City of Palo Alto, Santa Clara County, January 18, 2013.

City of Menlo Park. 2019. Public Works Staff Report: Preliminary Bedwell Bayfront Park Entrance Improvements Plans. Staff Report Number 19-010-PRC. June 26. Accessed at *https://www.menlopark.org/DocumentCenter/View/22018/Bedwell-Bayfront-Park-Entrance-Improvements-Staff-Report?bidId=* (last accessed on September 22, 2020).

Clark, W.O., 1924, Ground water in Santa Clara Valley, California: U.S. Geological Survey Water-Supply Paper 519, 209 p.

County of San Mateo, 2004. Watershed Protection Program Maintenance Standards (Volume 1).

Dibblee, T.W., and Minch, J.A., 2007, Geologic map of the Palo Alto and Mountain View quadrangles, Alameda, San Mateo, and Santa Clara Counties, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-350, scale 1:24,000

DKI Environment and Water, Hydrofocus, and Todd Groundwater, 2018, San Mateo Plain Basin Assessment: Prepared for County of San Mateo, July 2018

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Panel 06081C0195F, effective April 5, 2019.

Fio, J.L., and Leighton, D.A., 1995, Geohydrological framework, historical development of the groundwater system, and general hydrologic and water quality conditions in 1990, South San Francisco Bay and Peninsula, CA: U.S. Geological Survey Open File Report 94-357, 46 p.

Freyer & Laureta, 2019, Flow equalization and resource recovery facility levee improvements constraints technical memorandum, project description: Prepared for West Bay Sanitary District, February 2019, 54 p. + 5 appendices

Hanson, R.T., 2016, Hydrologic framework of the Santa Clara Valley, California: Geosphere (2015) 11 (3): 606-637.

Hanson, R.T., Zhen, Li, and Faunt, C.C., 2004, Documentation of the Santa Clara Valley regional ground-water/surface-water flow model, Santa Clara County, California: U.S. Geological Survey Scientific Investigations Report 2004–5231, 75 p.

Helley, E.M., and Lajoie, K.R., 1979, Flatland deposits of the San Francisco Bay Region, California-their geology and engineering properties, and their importance to comprehensive planning: U.S. Geological Survey Professional Paper 943, 88 p.

Horizon Water and Environment. 2019. Bayfront Canal and Atherton Channel Flood Management and Restoration Project Initial Study/Mitigated Negative Declaration. Prepared for County of San Mateo Department of Public Works. July.

Iwamura, T.I., 1995, Hydrogeology of the Santa Clara and Coyote Valleys groundwater basins: in Sanginés, E.M., Andersen, D.W., Buising, A.B. (eds.), Recent Geologic Studies in the San Francisco Bay Area: Pacific Section of the Society of Economic Paleontologists and Mineralogists Book 76 (May 3-5, 1995).

Metzger, L.F., and Fio, J.L., 1997, Ground-water development and the effects on ground-water levels and water quality in the Town of Atherton, San Mateo County, California: U.S. Geological Survey Water-Resources Investigations Report 97-4033, 31 p.

Metzger, L.F., 2002, Streamflow gains and losses along San Francisquito Creek and characterization of surface-water and ground-water quality, southern San Mateo and northern Santa Clara Counties, California, 1996–97: U.S. Geological Survey Water-Resources Investigations Report 02-4078, 49 p.

MIG, 2020, West Bay Sanitary District Flow Equalization and Resource Recovery Facility Flood Protection Project, preliminary delineation of wetlands and other waters: Consulting report prepared for West Bay Sanitary District, February 2020, 31 p. + appendix.

Moffatt & Nichol, 2013. Redwood City Bayfront Canal and Atherton Channel Flood Improvement and Habitat Restoration Project Feasibility Study.

NPDES Permit No. CAS612008 issued by Order No. R2-2015-0049 on November 15, 2015.

Oliver, H.W., 1990, Preliminary ground-water-quality data and the extent of the ground-water basin from drill-hole, seismic, and gravity data in the Palo Alto 7.5' quadrangle, California: U.S. Geological Survey Open-File Report 90-74, maps at scale 1:24,000.

Philip Williams & Associates, Ltd., and P. M. Faber (2004). Design Guidelines for Tidal Wetland Restoration in San Francisco Bay. The Bay Institute and California State Coastal Conservancy, Oakland, CA. 83 pp. + figures and appendices.

Poland, J.F., and Ireland, R.L., 1988, Land subsidence in the Santa Clara Valley, California, as of 1982: U.S. Geological Survey Professional Paper 497-F, 61 p.

San Mateo Countywide Water Pollution Prevention Program (SMCWPPP). 2017. Pollutants of Concern Monitoring Report, Water Year 2017 Accomplishments and Water Year 2018 Planned Allocation of Effort. October 10.

Sokol, Daniel, 1964, The hydrogeology of the San Francisquito Creek Basin, San Mateo and Santa Clara Counties: Palo Alto, CA, Stanford University, PhD dissertation, 238 p.

State of California, 2009, Tsunami Inundation Map for Emergency Planning, Redwood Point Quadrangle/Palo Alto Quadrangle, San Mateo County; produced by California Emergency Management Agency, California Geological Survey, and University of Southern California – Tsunami Research Center; dated June 15, 2009, mapped at 1:24,000 scale.

Todd Engineers and Kennedy/Jenks Consultants, 2010, Revised Final Groundwater Vulnerability Study Santa Clara County, California: Prepared for Santa Clara Valley Water District, October 2010, 92 p. + tables, figures, and appendices.

Todd Groundwater, 2015, Groundwater management plan for City of East Palo Alto: Prepared for the City of East Palo Alto, August 2015, 71 p.

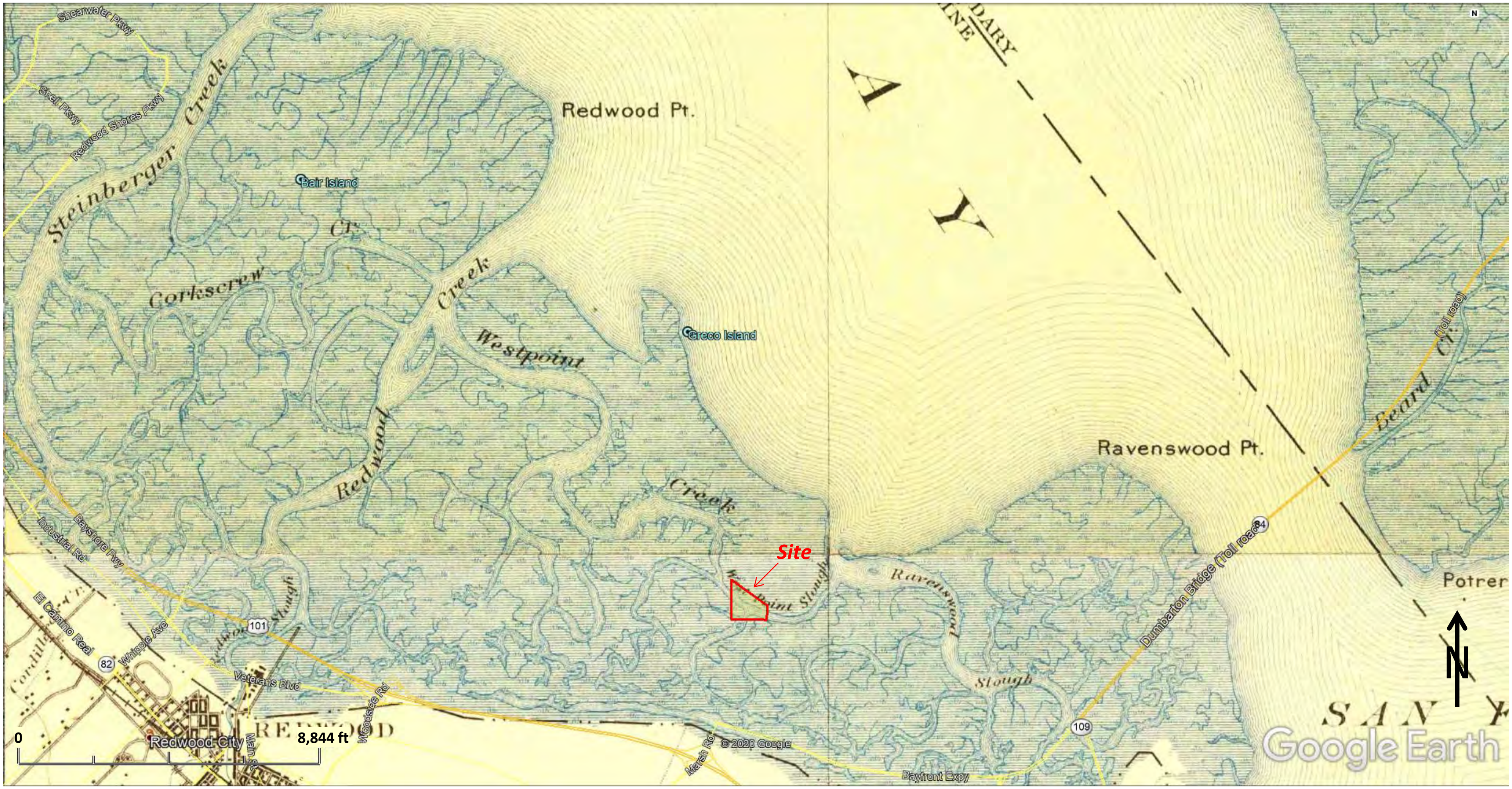
Wood, P.R., April 1975, Sources of Emergency Water Supplies in San Mateo County, California: USGS Open-file Report 75-43.

Woodard & Curran, 2019, Bayfront recycled water facilities plan: Prepared for West Bay Sanitary District, February, 2019, 54 p. + 5 appendices Atwater, B.F., Hedel, C.W., and Helley, E.J., 1977, Late Quaternary depositional history, Holocene sea-level changes, and vertical crustal movement, southern San Francisco Bay, California: U.S. Geological Survey Professional Paper 1014, 15 p., 1 plate.

Enclosures: Figures 1 through 14

Figure 1. Atherton Creek Watershed. Source: San Mateo County Public Works.

Balance Hydrologics



Balance Hydrologics

Figure 2. Site location on historical topographic map, circa 1899, Bayfront Recycled Water Facility and Levee Improvements Project. The site was located on West Point Slough which connects former Westpoint Creek with Ravenswood Slough and forms the southern shore of Greco Island. Base map: USGS 15-minute Quadrangles Haywards, 1899 and Palo Alto, 1899 georeferenced on Google Earth with existing roads.

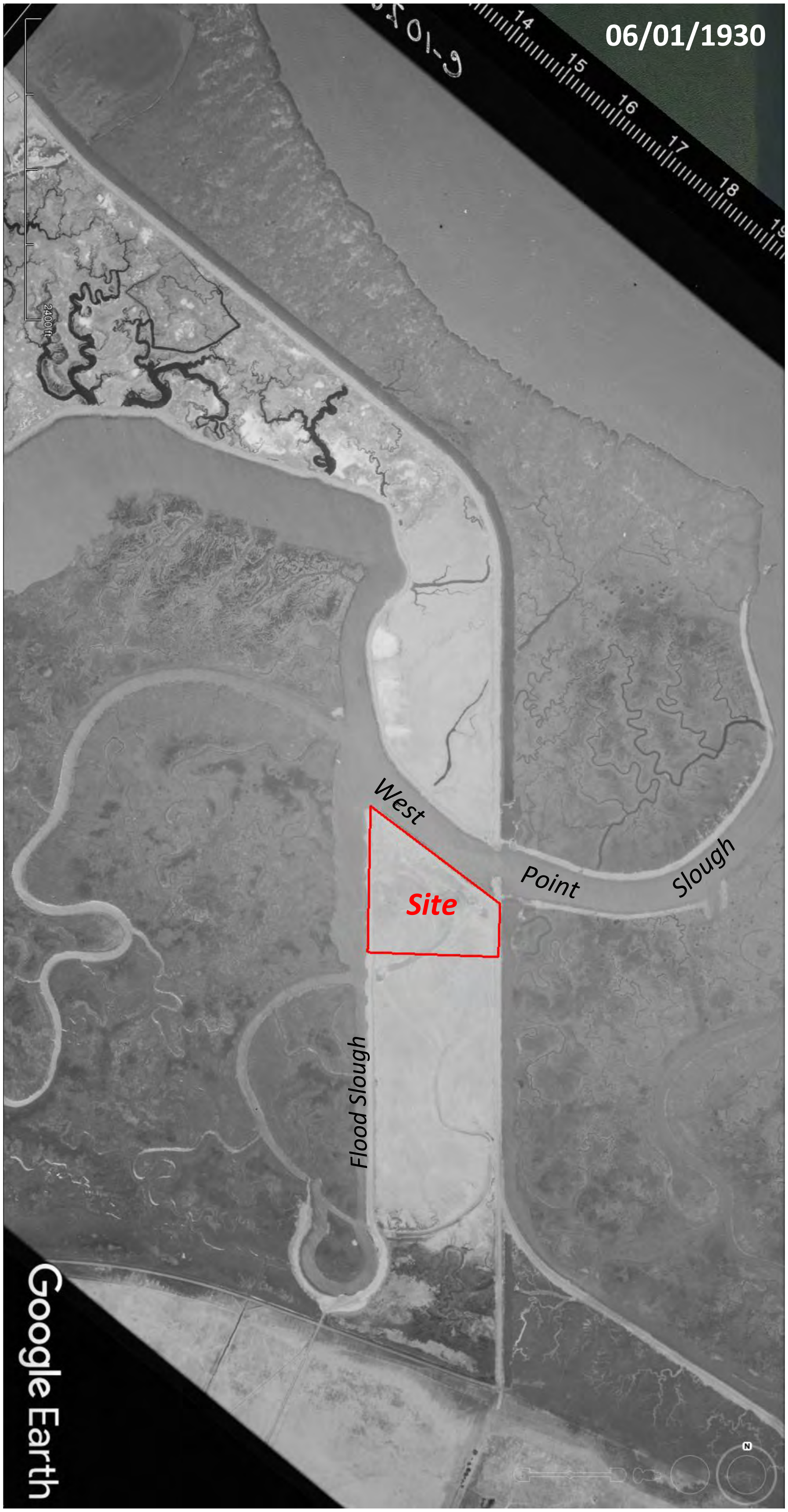


Figure 3. Site location on 1930's aerial photo, Bayfront Recycled Water Facility and Levee Improvements Project. By 1930, drainage improvements included dredging Flood Slough to the bay shore at Marsh Road. West Point Slough appears wider and deeper than seen on current aerial photos, with apparent levee improvements as well.

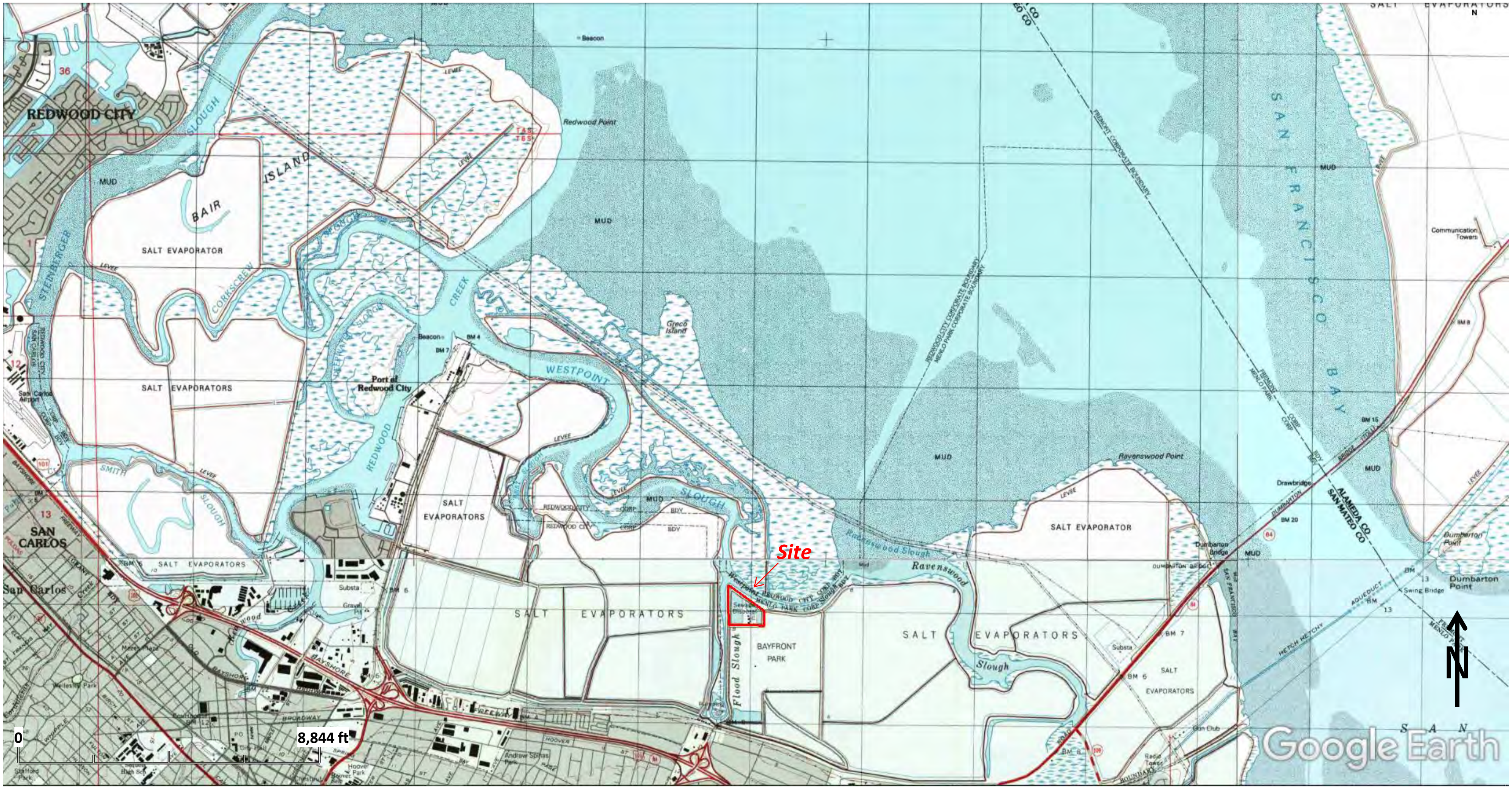


Figure 4. Site location on current topographic map, Bayfront Recycled Water Facility and Levee Improvements Project. Westpoint Slough has been re-delimited and now comprises the water feature formerly identified as Westpoint Creek. Flood Slough receives upland flow from the Bayfront Canal and Atherton Channel through a tide-gate control structure. The tide gates control bay water in Flood Slough from flowing into the Bayfront Canal. Canal drainage areas are subject to frequent flooding due to conveyance issues associated with capacity during large storm events as well as flow restrictions at high tide levels. Base topo maps georeferenced on Google Earth: USGS 7.5-minute Quadrangles Palo Alto,1997; Redwood Pt., 1993; Mt. View, 1997; and Newark, 1993.

Balance Hydrologics

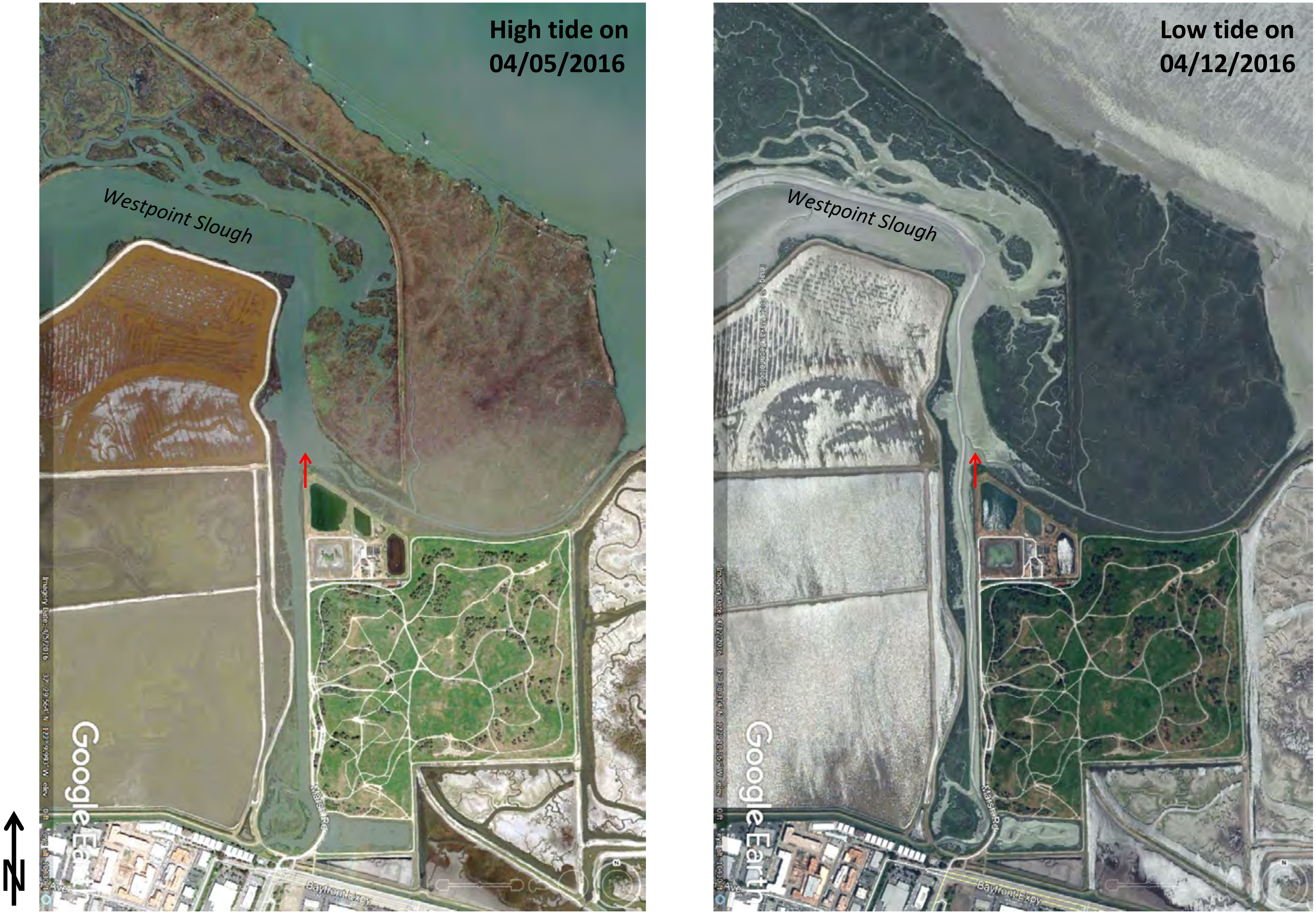
217239 photo figures, 1997 topo base

Figure 5. High tide at the project site and vicinity Bayfront Recycled Water Facility and Levee Improvements Project.
Aerial photo date: 04/05/2016

Balance Hydrologics

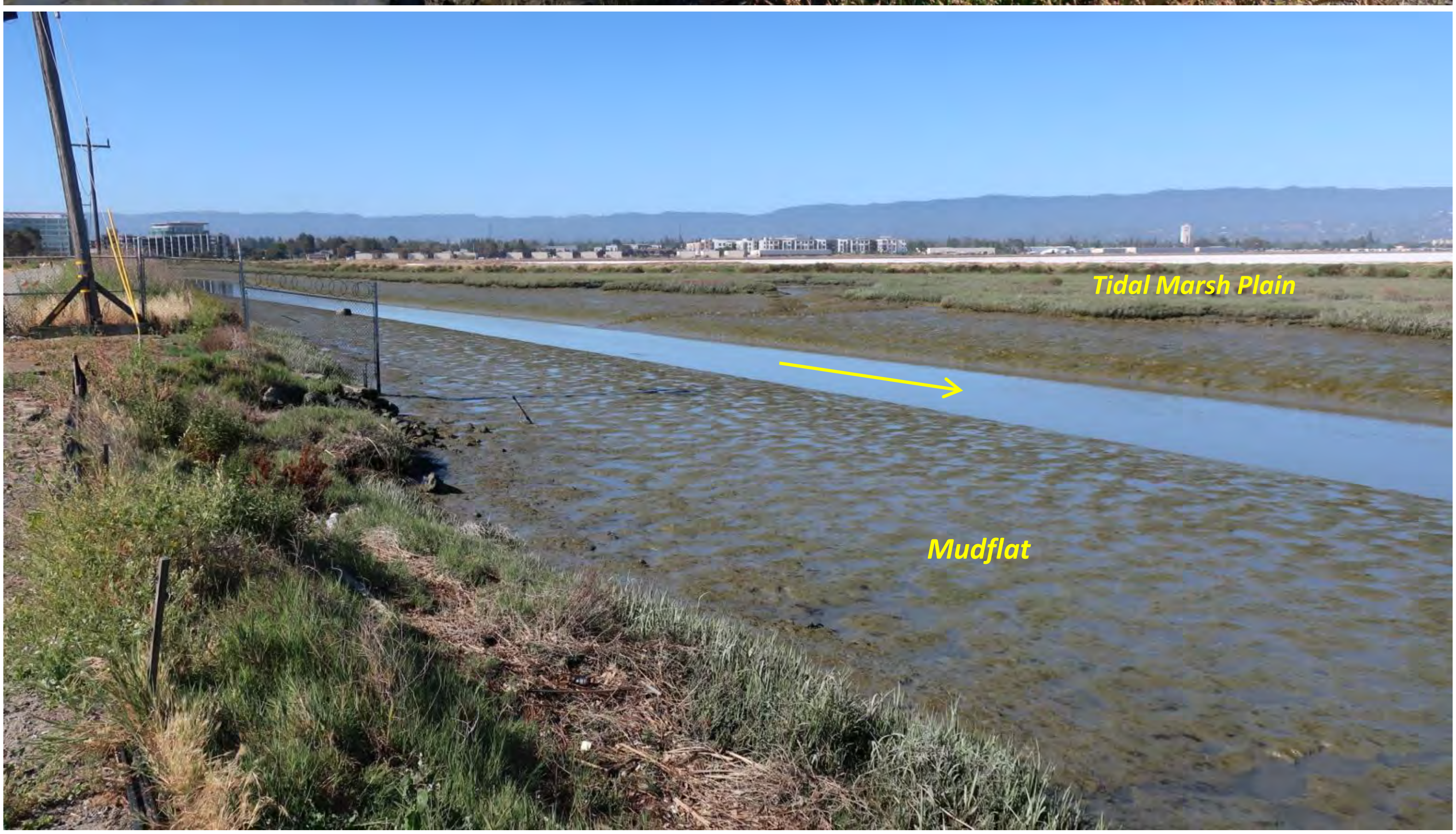
Figure 6. Low tide at the project site and vicinity, Bayfront Recycled Water Facility and Levee Improvements Project.
Aerial photo date: 04/12/2016

Balance Hydrologics



Balance Hydrologics

Figure 7. Potential RO Concentrate discharge point to Westpoint Slough, Bayfront Recycled Water Facility and Levee Improvements Project. At high tide, bay waters inundate mudflats and tidal marsh plains in the vicinity of the site. At low tide, Westpoint Slough drain to single-thread channel, exposing mudflats as tidal marshes drain. Synchronizing discharge of RO concentrate with high tide would maximize mixing and circulation to the bay. Red arrow indicates potential discharge location.



Balance Hydrologics

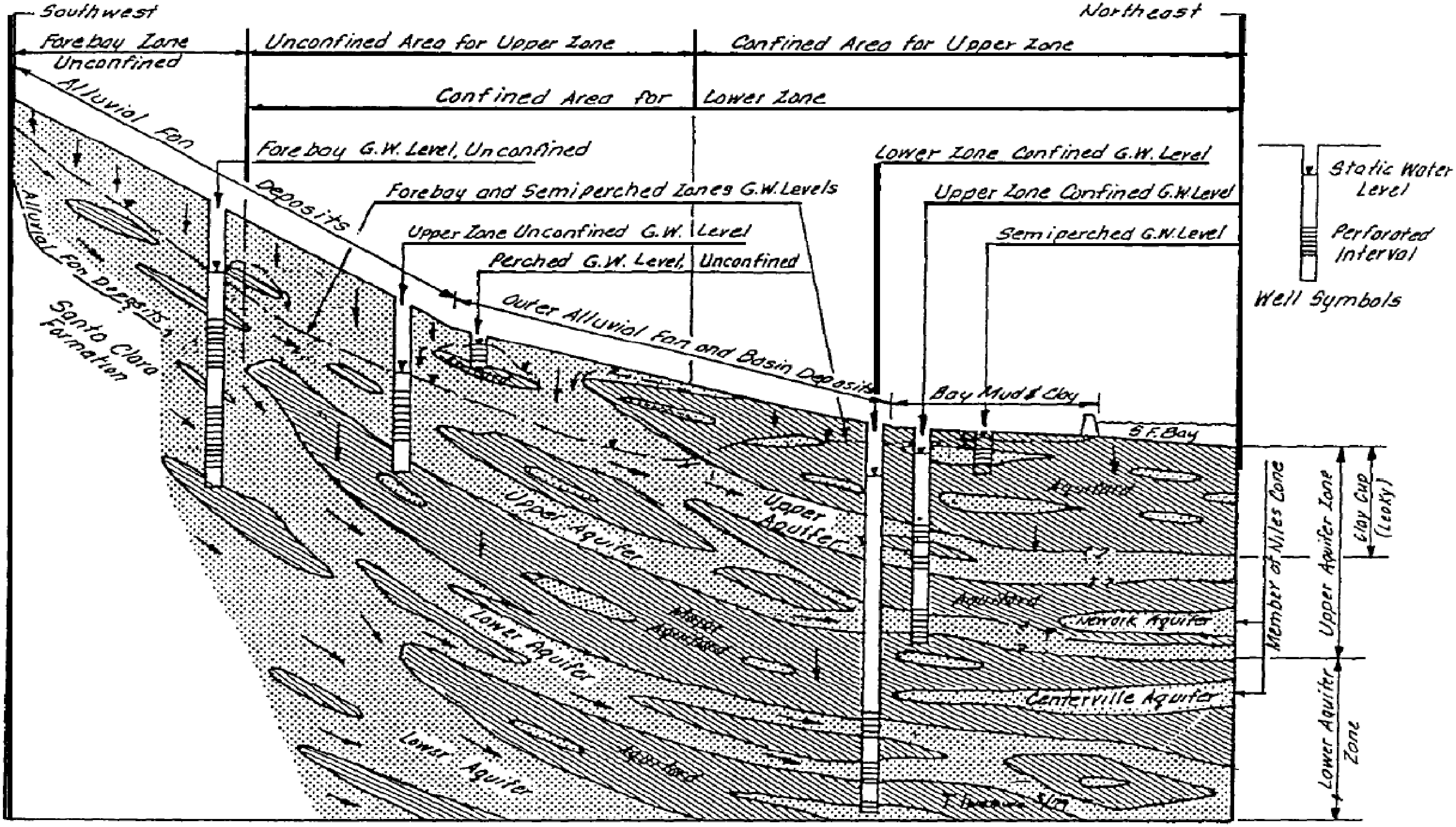
Figure 8. Flood Slough on west side of project site, Bayfront Recycled Water Facility and Levee Improvements Project. Arrows show direction of outgoing tidal drainage to Westpoint Creek, Redwood Creek, and SF Bay. Photo date: May 27, 2020, 8:30 AM PDT

Balance Hydrologics

Figure 9. Mudflats at the Westpoint Slough confluence with Flood Slough, Bayfront Recycled Water Facility and Levee Improvements Project. Arrows show direction of outgoing tidal drainage to Westpoint Creek, Redwood Creek, and SF Bay. Photo date: May 27, 2020, 8:40 AM PDT

Balance Hydrologics

Figure 10. Westpoint Slough tidal marsh plain at the site, Bayfront Recycled Water Facility and Levee Improvements Project. Arrows show direction of outgoing tidal drainage to Westpoint Creek, Redwood Creek, and SF Bay. Photo date: May 27, 2020, 9:20 AM PDT



NOTES: 1. Arrows indicate direction of groundwater movement without regard to quantity.
2. Grossly exaggerated vertical scale.
3. From Iwamura, 1980

Balance Hydrologics

Figure 11. Geologic cross-sectional schematic of Palo Alto - Mountain View area, Bayfront Recycled Water Facility and Levee Improvements Project, Menlo Park, CA. Glacial stages globally during the Pleistocene have changed the base level for streams, fluctuating as much as 400 feet, and resulting in a series of interfingering aquifers and aquicludes of limited extent, which are poorly correlated locally within the basin. Source: Iwamura, 1995.

ORIGINAL
File Original, Duplicate and Triplicate with the
REGIONAL WATER POLLUTION
CONTROL BOARD No. 2
(Insert appropriate number)

RECEIVED
REGIONAL WATER POLLUTION
CONTROL BOARD #2
FEB 24 1958

WATER WELL DRILLERS REPORT

(Sections 7076, 7077, 7078, Water Code)

STATE OF CALIFORNIA

Do Not Fill In
No 7395

State Well No.
Other Well No. 5/3-15

(1) OWNER:

Name
Address

(2) LOCATION OF WELL:

County San Mateo Owner's number, if any—

R. F. D. or Street No. Adjacent to Menlo Park Sanitary District Treatment Pland. Approx. 1 mile north of Bayshore Highway on Marsh Road extension. San Mateo County

(3) TYPE OF WORK (check):

New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary ☐
Cable ☒
Dug Well ☐

(6) CASING INSTALLED:

SINGLE ☐ DOUBLE ☒

From ft.	to ft.	Diam.	Gage or Wall
0	72	12	12
0	240	8	12

If gravel packed

Diameter of Bore	from ft.	to ft.

Type and size of shoe or well ring
Size of gravel:
Describe joint

(7) PERFORATIONS:

Type of perforator used Mills perforator

Size of perforations 1/4 in., length, by 3 in.

From ft.	to ft.	Perf. per row	Rows per ft.
145	157	4	1
186	187	4	1
196	202	4	1

(8) CONSTRUCTION:

Was a surface sanitary seal provided? ☐ Yes ☒ No To what depth ft.

Were any strata sealed against pollution? ☒ Yes ☐ No If yes, note depth of strata

From 68 ft. to top ft.

Method of Sealing cemented annular space

(9) WATER LEVELS:

Depth at which water was first found 144 ft.

Standing level before perforating ft.

Standing level after perforating 50' ft.

(10) WELL TESTS:

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

Yield: gal./min. with ft. draw down after hrs.

Temperature of water unknown Was a chemical analysis made? ☐ Yes ☒ No

Was electric log made of well? ☐ Yes ☐ No

(11) WELL LOG:

Total depth 240 ft. Depth of completed well 240 ft.

Formation: *Describe by color, character, size of material, and structure.*

ft.	to ft.	Formation
0	10	Fill boulders
10	22	Soft blue clay
22	40	Yellow clay
40	70	Soft blue clay
70	144	Solid blue clay
144	158	Cemented gravel & sand carrying water
158	185	Blue clay
185	188	Cemented gravel & sand carrying water
188	195	Yellow clay
195	203	Cemented gravel & sand carrying water
203	225	Blue clay
225	233	Fine sand
233	240	Blue clay

aquiclude

interfingering aquifers and aquicludes

FOR OFFICIAL USE ONLY

Work started Dec. 23 1957. Completed Jan. 20 1958

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Robert Garcia Well Drilling & Pump Co
(Person, firm, or corporation) (Typed or printed)

Address 1870 Bayshore Highway
Palo Alto, California

[SIGNED] Robert E. Garcia
Well Driller

License No. 29694 Dated Feb. 21, 1958

DWR FORM No. 246 (REV. 3-54)

Balance Hydrologics

Figure 12. Well completion report for on-site well, Bayfront Recycled Water Facility and Levee Improvements Project. This former Menlo Park Wastewater Treatment Plant source well extracts groundwater from gravel and sand units below 144 ft of confining clay. Water was used in treatment processes, cleaning equipment and floors of buildings, and for sprinklers. Other WCRs also show deep clay underlying surface bay mud.

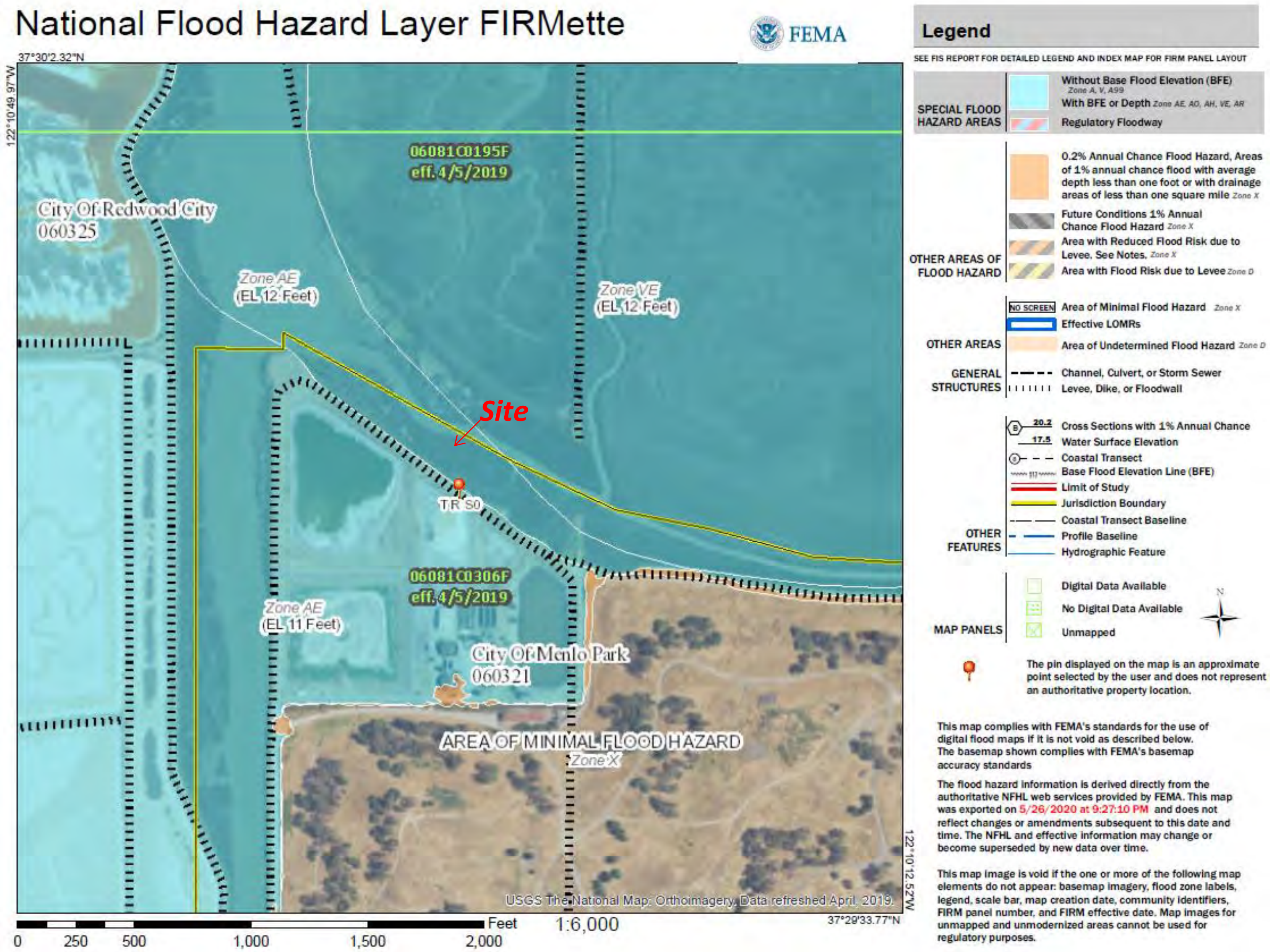


Figure 13. FEMA Flood Insurance Rate Map (FIRM) in the project vicinity, Bayfront Recycled Water Facility and Levee Improvements Project. Effective date: April, 5, 2019.

Balance Hydrologics

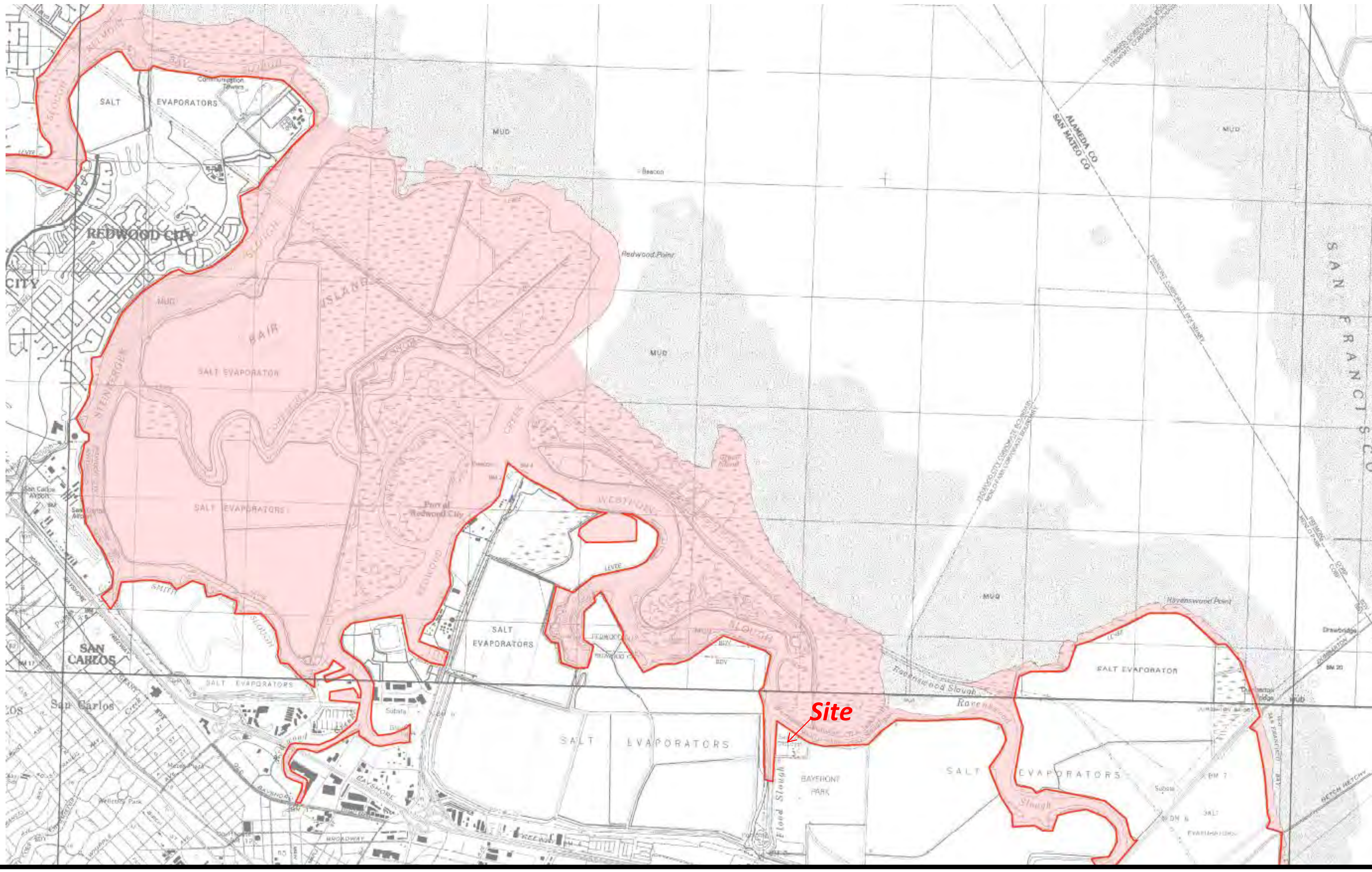


Figure 14. Tsunami Inundation Map for Emergency Planning in the project vicinity, Bayfront Recycled Water Facility and Levee Improvements Project. Source: Redwood Point Quadrangle/Palo Alto Quadrangle, California Geological Society, 2009.

Balance Hydrologics