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SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
455 Golden Gate Avenue • Suite 10600 • San Francisco, California 94102 • (415) 352-3600 • Fax: (415) 352-3606 • www.bcdc.ca.gov

BCDC Application Form

For BCDC Use Only
Application number: _____
Fee: _____

Checklist of Application Requirements
(For Applicant's Use)

	Major Permit	Administrative Permit	Regionwide Permit
☑ **Application Form**	One fully completed and signed original and seven copies	One fully completed and signed original	One fully completed and signed original
☑ **Large Scale Project Site Plan**	One copy	One copy	One copy
☑ **8.5"x11" Project Site Plan**	Seven copies	One copy	One copy
☑ **8.5"x11" Public Access and Open Space Plan**	Seven copies	One copy	None
☑ **8.5"x11" Vicinity Map**	Seven copies	One copy	One copy
☑ **Proof of Legal Property Interest**	One copy	One copy	One copy
☑ **Local Government Discretionary Approval**	One copy	One copy	None
☑ **Environmental Documentation**	One copy of environmental determination and EIR or EIS Summary	One copy of environmental determination	None
☑ **Water Quality Certification/Waiver**	One copy, if applicable	One copy, if applicable	One copy, if applicable
☑ **Dept. of Toxic Substances Control Approval**	One copy, if applicable	One copy, if applicable	One copy, if applicable
☑ **Biological Opinion/Take Authorization from state and federal agencies**	One copy, if applicable	One copy, if applicable	Not applicable
☑ **Application Processing Fee**	As specified in Commission regulations, Appendix M	As specified in Commission regulations, Appendix M	As specified in Commission regulations, Appendix M
☐ **Notice of Application***	Posted at project site	Posted at project site	Posted at project site
☐ **Certification of Posting the Notice of Application***	One signed original returned to BCDC	One signed original returned to BCDC	One signed original returned to BCDC

*BCDC staff will provide the forms for posting the Notice of application and the Certification.

Authority: Sections 66632, Government Code; and Section 29201(e), Public Resources Code.
Reference: Sections 65940-65942, 66605, 66632(b) and (f) and 84308, Government Code; Sections 2770, 2774, 21080.5, 21082, 21160 and 29520, Public Resources Code; and the San Francisco Bay Plan.

Box 1

Property Ownership and Applicant Information

(must be completed by all applicants)

a. APPLICANT:

☐ Owns project site ☐ Leases project site ☐ Homeowner Association owns/will own ☐ Other Property Rights: _____

Name/Title: John Bourgeois, SCC, SBSP Executive Manager

Address: 1515 Clay Street, 10th Floor

City, State, Zip: Oakland, CA, 94612

Telephone : (408) 314-8859 Fax: _____

Email: john.bourgeois@scc.ca.gov

APPLICANT'S REPRESENTATIVE: ☐ **None**

Name/Title: Dillon Lennebacker, AECOM

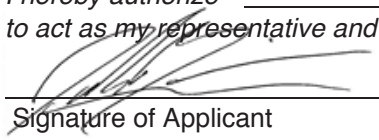
Address: 300 Lakeside Drive, Suite 400

City, State, Zip: Oakland .CA 94612

Telephone: (510) 874-3035 Fax: (510) 874-3268

Email: dillon.lennebacker@aecom.com

I hereby authorize Dillon Lennebacker *to act as my representative and bind me in all matters concerning this application.*



Signature of Applicant | John Bourgeois (Print Name) | 03/31/2016 (Date mm/dd/yyyy)

b. CO-APPLICANT:

☑ Owns project site ☐ Leases project site ☐ Homeowner Association owns/will own ☐ Other Property Rights: _____

Name/Title: Chris Barr,USFWS Don Edwards Nat. Wildlife Refuge

Address: 1 Marshlands Road

City, State, Zip: Newark, CA, 94555

Telephone: (510) 792-0222 Fax: (510) 792-5828

Email: chris_barr@fws.gov

CO-APPLICANT'S REPRESENTATIVE: ☐ **None**

Name/ Title: Dillon Lennebacker, AECOM

Address: 300 Lakeside Drive, Suite 400

City, State, Zip: Oakland, CA 94612

Telephone: (510) 874-3035 Fax: (510) 874-3268

Email: dillon.lennebacker@aecom.com

I hereby authorize Dillon Lennebacker and John Bourgeois *to act as my representative and bind me in all matters concerning this application.*

CHRISTOPHER BARR Digitally signed by CHRISTOPHER BARR Date: 2017.03.31 10:52:04 -07'00'

Signature of Co-Applicant | Chris Barr (Print Name) | 03/31/2016 (Date mm/dd/yyyy)

c. PROPERTY OWNER: ☑ Same As Applicant or Co-Applicant **OWNER'S REPRESENTATIVE:** ☐ None

Name/Title: _____

Address: _____

City, State, Zip: _____

Telephone: _____ Fax: _____

Email: _____

Name/Title: _____

Address: _____

City, State, Zip: _____

Telephone: _____ Fax: _____

Email: _____

I hereby authorize _____ *to act as my representative and bind me in all matters concerning this application.*

Signature of Owner | Print Name | Date (mm/dd/yyyy)

(Box 1, Property Ownership and Applicant Information, continued)

d. Provide documentation of property interests, such as a copy of a grant deed, lease or easement, and Conditions Covenants and Restrictions, for a homeowner's association, that demonstrates that the owner or applicant has adequate legal interest in the property to undertake the proposed project. See Commission regulations Appendix F for complete details.

e. DISCLOSURE OF CAMPAIGN CONTRIBUTIONS:

The following contributions of more than $250 were made by the applicant or applicant's representative to a BCDC commissioner or commissioner's alternate in the preceding twelve months to support the commissioner's or alternate's campaign for election to a local, state or federal office.

Contribution Made To:	Contribution Made By:	Date of Contribution:

☑ No such contributions have been made.

f. CERTIFICATION OF ACCURACY OF INFORMATION AND AUTHORIZATION TO INSPECT:

I hereby certify under penalty of perjury that to the best of my knowledge the information in this application and all attached exhibits is full, complete, and correct, and I understand that any misstatement or omission of the requested information or of any information subsequently requested shall be grounds for denying the permit, for suspending or revoking a permit issued on the basis of these or subsequent representations, or for the seeking of such other and further relief as may seem proper to the Commission. I further agree that the Commission staff may, with 24 hours notice, inspect the project site while this application is pending.

■ _____	03/31/2017
Signature of Applicant or Applicant's Representative	Date (mm/dd/yyyy)
■ Lennebacker, Dillon Digitally signed by Lennebacker, Dillon Date: 2017.03.24 15:01:39 -07'00'	03/24/2017
Signature of Co-applicant or Co-applicant's Representative	Date (mm/dd/yyyy)
■ Lennebacker, Dillon Digitally signed by Lennebacker, Dillon Date: 2017.03.31 11:03:17 -07'00'	03/31/2017
Signature of Co-applicant or Co-applicant's Representative	Date(mm/dd/yyyy)
■ Lennebacker, Dillon Digitally signed by Lennebacker, Dillon Date: 2017.03.24 15:02:22 -07'00'	03/24/2017
Signature of Co-applicant or Co-applicant's Representative	Date (mm/dd/yyyy)

Box 2

Total Project and Site Information
(must be completed by all applicants)

a. Project Street Address: See supplemental information.

b. City, County, Zip: Bay Area, Ca. (Alameda, San Mateo, and Santa Clara Counties)

c. Assessor's Parcel Number(s): See attached

d. Latitude: See attached Longitude:

e. Previous BCDC permit number(s) for work at this site: Permit No. 7-03; CN 10-03

f. Project Name: South Bay Salt Pond Restoration Project: Phase 2 Actions and On-going Phase 2 Maintenance Activities

g. Brief Project Description: Phase 2 would restore tidal marsh habitat, reconfigure and enhance managed pond habitat, maintain or improve current levels of flood protection, and provide recreation opportunities and public access. See attached supplemental information for complete project description.

h. Date work is expected to begin: 08/01/2017

Date work is expected to be completed: 12/31/2022

i. Total Project Cost: $ $31,916,000.00

j. Length of shoreline on the project site: 65,790 feet

k. Length of shoreline at adjacent property owned or controlled by the applicant: feet

l. Approximate size of project site within BCDC's "shoreline band" jurisdiction: Attached square feet

m. Approximate size of project site within BCDC's "Bay" or "certain waterway" jurisdiction: Attached square feet

n. Approximate size of project site within BCDC's managed wetland or salt pond jurisdiction: Attached square feet

o. Approximate size of project site within the Suisun Marsh: NA square feet

p. Approximate size of project site outside of BCDC's jurisdiction Attached square feet

q. Approximate total size of project site (including areas outside BCDC's jurisdiction): Attached square feet

r. Area of total project site reserved for non-public access uses: NA square feet

s. Area of total project site reserved for public access: 184,750 square feet

t. Does the project involve development within the primary management area of the Suisun Marsh?

☐ Yes ☑ No

If "Yes," provide any relevant duck club number(s):

(Box 2, Total Project and Site Information, continued)

u. Project Details. Complete all that apply. **See Attached**

Proposed Elements of the Project	**In BCDC's Bay, Certain Waterway, Managed Wetlands or Suisun Marsh Jurisdiction***	**In BCDC's Shoreline Band jurisdiction**	**Outside BCDC's jurisdiction**	**Totals**
1. Structures	_____sq.ft.	_____sq.ft.	_____sq.ft.	_____sq.ft.
2. All Roads, Parking, Pathways, Sidewalks	_____sq.ft.	_____sq.ft.	_____sq.ft.	_____sq.ft.
3. Number of Parking Spaces:				
4. All Landscaping	_____sq.ft.	_____sq.ft.	_____sq.ft.	_____sq.ft.
5. Left undeveloped	_____sq.ft.	_____sq.ft.	_____sq.ft.	_____sq.ft.
6. Shoreline Protection	_____sq.ft.	_____sq.ft.	_____sq.ft.	_____sq.ft.
7. Piers, docks and other marine-related purposes	_____sq.ft.	_____sq. ft.	_____sq.ft.	_____sq.ft.
8. Areas used for other purposes (specify)	_____sq.ft.	_____sq.ft.	_____sq.ft.	_____sq.ft.
Totals:	_____sq.ft.	_____sq.ft.	_____sq.ft.	See Attached sq.ft.

* If project will occur in more than one of these jurisdictions, provide the requested information for each area separately.

(Box 2, Total Project and Site Information, continued)

v. INFORMATION ABOUT THE TOTAL PROJECT AND SITE (PROVIDE IN AN ATTACHMENT):

1. Provide a detailed project description.

2. Describe the existing condition of the site, including the elevations, underwater topography, vegetation, structures and uses. Provide one or more photographs of existing site conditions.

3. Identify bathymetric features, tidal hydrology and sediment movement at the project site and describe how the project may influence these factors.

4. Endangered or Threatened Species.

a. Identify any known threatened or endangered species, or any species that the California Department of Fish and Game or a federal wildlife agency has determined are candidates for listing as threatened or endangered species, or any species that provide substantial public benefits that may be found at the project site.

b. Provide any "biological opinion" issued by a state or federal agency as the result of an endangered species consultation.

c. Provide any "take" authorizations issued by the state or federal resource agencies.

5. Identify any subtidal areas that are scarce or that have an abundance and diversity of fish, other aquatic organisms and wildlife (e.g., eel grass beds, sandy deep water or underwater pinnacles) at the site. Add the identified areas to the project site plan (see below).

6. Indicate whether the project would involve the release of pollutants or have the potential for accidental pollutant discharge into the Bay. If so, describe how the proposed project has been designed and would be constructed and maintained to prevent or minimize the discharge of pollutants into the Bay, including non-point source pollution (storm water runoff). Provide any storm water pollution prevention plans, when available, storm water management plans, or other water pollution or erosion and sediment control plans showing proposed best management practices developed for the project and the project site.

7. Identify any suspected or known sites of toxic contamination on or in proximity to the project site, and provide the following information: (a) the types of pollutants present; (b) the location of the pollutants (show on the site plan); (c) the extent to which the pollutants are accessible to humans, fish, wildlife or vegetation, or are moving offsite; and (d) steps being taken (including government actions) to control or clean up the pollutants.

8. Provide a copy of any water quality certification or waste discharge requirements that are required by the San Francisco Bay Regional Water Quality Control Board, and any approvals that are required by the State Department of Toxic Substances Control.

9. You must provide information to show that your project would be consistent with the Commission's laws and policies. This application addresses the most common policies raised by most projects. The Commission staff will assist you in identifying additional policies, if any, that apply to your project. Once they are identified, please explain how they offer support for your project and how the project would be consistent with them. The Commission's laws and policies may be found in the digital library at www.bcdc.ca.gov.

10. PROJECT PLANS: Provide the following types of plans: (a) vicinity map sized 8.5"x11"; (b) public access and open space exhibit; (c) project site plan reduced to 8.5"x11"; and (d) full-sized project site plan.

PLAN REQUIREMENTS: The public access and open space exhibit must include property boundaries, proposed structures, and an accurate depiction of areas to be provided as public access, open space and view corridors. At a minimum, the project site plan must include property boundaries, all existing and proposed structures and improvements (with cross sections and elevations if necessary), and any tidal marshes and tidal flats. All plans must include a graphic scale, a north arrow, the date and name of the person who prepared the plans, and a depiction of the edge of the Commission's jurisdiction over the Bay or certain waterway (mean high water or, in tidal marshlands, the inland edge of marsh vegetation up to five feet above Mean Sea Level), and the edge of the Commission's shoreline band jurisdiction (100 feet wide measured from the edge of the Bay). **See also Appendix F for details**.

Box 3

Fill Information

("Fill" means earth or any other substance or material, including pilings or structures placed on pilings, and structures floating at some or all times and moored for extended periods, such as houseboats and floating docks. Gov. Code Section 66632(a))

a. Complete this box if fill would be placed in any of these areas (check all those that apply):

- [x] San Francisco Bay
- [x] Salt pond
- [ ] Managed wetland
- [ ] "Certain waterway"
- [ ] Primary management area of the Suisun Marsh
- Other: _____

b. Surface area of tidal and subtidal property to be covered with fill: 4,569,500 square feet

c. Total volume of solid fill to be placed in tidal and subtidal areas: 607,360 cubic yards

d. **Type of Fill.** Surface area of proposed:

Solid fill:	5,480,300	square feet
Floating fill:	0	square feet
Pile-supported fill:	2,600	square feet
Cantilevered fill:	0	square feet
Total area to be filled:	5,482,900	square feet

e. **Types of Areas to be Filled.** Of the total area to be filled, what is the footprint of fill that would be placed in:

Open water:	SEE ATTACHED	square feet
Tidal marsh:	NA	square feet
Tidal flat:	NA	square feet
Salt pond:	See attached	square feet
Managed wetlands in the primary management area of the of the Suisun Marsh:	NA	square feet
Other managed wetlands:	NA	square feet

f. Area on new fill to be reserved for:

Private, commercial, or other non-public-access uses:	NA	square feet
Public access:	48,460	square feet

g. INFORMATION REGARDING FILL (PROVIDE IN AN ATTACHMENT):

1. Provide dimensions of portions of all structures to be built on new fill, including length, width, area, height and number of stories.

2. Provide one or more photographs of existing shoreline conditions.

3. Explain the purpose of fill in the Bay, salt pond, managed wetland, certain waterway, or Suisun Marsh considering that the Commission can approve new fill for only five purposes: (a) accommodating a water-oriented use; (b) minor fill for improving shoreline appearance; (c) minor fill for providing new public access to the Bay; (d) accommodating a project that is necessary to the health, safety, or welfare of the public in the entire Bay Area; and (e) accommodating a project in the Suisun Marsh that is consistent with either: (1) the Suisun Marsh Preservation Act and the Suisun Marsh Protection Plan; or (2) the Suisun Marsh Local Protection Program.

4. Explain:

(a) what possible impacts the fill would have on the Bay Area, including impacts on: (1) the volume of Bay waters, on Bay surface area, or on the circulation of Bay water; (2) water quality; (3) the fertility of marshes or fish or wildlife resources; and (4) other physical conditions that exist within the area, including land, air, water, minerals, flora, fauna, noise, or objects of historic or aesthetic significance; and

(b) how the nature, location, and extent of the fill would minimize possible harmful conditions or effects to the Bay.

5. For projects in subtidal areas that have an abundance and diversity of fish, other aquatic organisms and wildlife, or are scarce such as eelgrass beds and sandy deep water, identify feasible alternatives and public benefits associated with the project.

6. Explain: (a) why the fill would be the minimum amount necessary; and (b) why there is no alternative upland location for the project that would avoid the need for Bay fill.

7. If the fill is to be used for improving shoreline appearance or providing new public access to the Bay, explain why it is physically impossible or economically infeasible to accomplish these goals without filling the Bay.

8. Explain how the fill would result in a stable and permanent shoreline.

9. Explain the steps that would be taken to assure that the project will provide reasonable protection to persons and property against hazards of unstable geologic or soil conditions, of sea level rise, or of flood or storm waters.

10. Provide the names, addresses, and telephone numbers of any licensed geologists, engineers, or architects involved in the project design who can provide technical information and certify the safety of the project.

11. Describe in detail the anticipated impacts of the fill on the tidal and subtidal environment, and describe how these impacts would be addressed or mitigated, and explain how the public benefits of the project would clearly exceed the public detriment from the loss of water area, tidal marsh or tidal flats.

12. For marina projects, indicate how many berths, if any, are to be made available for live-aboard boats and explain how these live-aboard boats would contribute to public trust purposes.

13. For tidal, subtidal and other wetland restoration projects, including mitigation projects: (a) identify specific long-term and short-term biological and physical goals; (b) identify success criteria; (c) provide a monitoring program intended to assess the success and sustainability of the project; (d) include an adaptive management plan with corrective measures, if needed, to achieve success and sustainability; and (e) identify the provisions for long-term maintenance, as required by the Bay Plan policies on Mitigation, Tidal and Subtidal Areas. The Commission's laws and policies may be found at www.bcdc.ca.gov in the digital library.

Box 4

Shoreline Band Information

("Shoreline band" means the land area lying between the Bay shoreline and a line drawn parallel to and 100 feet from the Bay shoreline. The Bay shoreline is the Mean High Water Line, or five feet above Mean Sea Level in marshlands.)

a. Does the project involve development within the 100-foot shoreline band around San Francisco Bay?

☑ Yes ☐ No

If "Yes," complete this box.

b. Types of activities to be undertaken or fill, materials or structures to be placed within the shoreline band:

Public access trails and public viewing areas; new fill for habitat restoration, flood risk management, and levee improvement features; bridges for maintenance vehicles and public access; and water control structures.

c. Would the project be located within a priority use area designated in the San Francisco Bay Plan?

☑ Yes ☐ No

The Bay Plan and Maps that depict priority use areas can be viewed in the digital library at www.bcdc.ca.gov.

If "No," go to section (d). If "Yes," please indicate which priority use the area is reserved for: Wildlife Refuge & Tidal Marsh

Would the project use be consistent with the priority use for which the site is reserved?

☑ Yes ☐ No

If "Yes," go to section (d). If "No," attach an explanation of how the project can be approved despite this inconsistency.

d. Total shoreline band area:

Within project site:	see attached	square feet
To be reserved for private, non-public access uses:	NA	square feet
To be reserved for public access:	112,490	square feet

e. INFORMATION ABOUT WORK PROPOSED IN THE SHORELINE BAND (PROVIDE IN AN ATTACHMENT):

1. Provide dimensions of portions of all structures to be built within the shoreline band, including length, width, area, height, and number of stories.
2. Provide one or more photographs of existing conditions within the 100-foot shoreline band.

Box 5 Public Access Information

(must be completed by all applicants)

a. PUBLIC ACCESS DETAILS:

1. Does public access to the shoreline or do views to the Bay presently exist at the project site, at a contiguous property, or from nearby roads or public access areas?

☑ Yes ☐ No

If "Yes" attach a description of the existing public access and views at these areas.

If "No," explain what is preventing public access to, or views of, the shoreline.

2. Describe how the project would or would not adversely impact present and future public access and views to the Bay. If so, describe how the proposed public access would offset the impact.

3. For most large projects, identify: (1) the existing number of people or employees using the site; and (2) the existing number of cars, bicycles, and pedestrians visiting the site and the level of service of all nearby roads leading to the site. Describe how the project would change these factors.

4. Identify the public's use of existing nearby parks, public access, public parking and other recreational areas on the shoreline and the roads leading to the site and describe the impact the project is expected to have on that use.

5. Do public safety considerations or significant use conflicts make it infeasible to provide new public access to the shoreline on the project site?

☐ Yes ☑ No

If "Yes," describe the public safety considerations or significant use conflicts that make it infeasible to provide public access at the project site and either: (1) identify an offsite area where public access to the shoreline is proposed as part of the project and describe the proposed public access area and improvements at that location; or (2) explain why no offsite public access is proposed as part of the project.

(Box 5, Public Access, continued)

6. Dimensions of the public access areas: ☐ **None Proposed**

	Existing		Proposed	
Total public access area including areas outside the Commission's jurisdiction:	_____	square feet	184,750	square feet
Public access within Commission's shoreline band jurisdiction:	_____	square feet	135,850	square feet
	_____	linear feet	8,380	linear feet
	_____	average width	15.5	average width
Public access pathways, sidewalks in the shoreline band:	_____	square feet	135,850	square feet
	_____	linear feet	8,380	linear feet
	_____	average width	15	average width
Public access area, landscaping in the shoreline band:	_____	square feet	NA	square feet
Public access on fill within Commission's Bay, certain waterway, and managed wetlands jurisdiction:	_____	square feet	48,460	square feet
	_____	linear feet	2,750	linear feet
	_____	average width	17.6	average width
Public access on piers or decks over water/wetlands:	_____	square feet	NA	square feet
	_____	linear feet	_____	linear feet
	_____	average width	_____	average width
View Corridor(s):	_____	square feet	NA	square feet
	_____	linear feet	_____	linear feet
	_____	average width	_____	average width
Public Access Parking:	_____	stalls	NA	stalls

b. ADDITIONAL PUBLIC ACCESS INFORMATION (PROVIDE IN AN ATTACHMENT):

1. Describe the existing and proposed public access improvements, both on-site and off-site, including decks, piers, pathways, sidewalks, signs, benches, landscaping, parking, and any other proposed public improvements.

2. Describe how the public access area and facilities would be accessible to disabled persons.

3. Describe the proposed connections to existing public streets or offsite public pathways.

4. Specify how the public access areas would be permanently guaranteed (e.g., dedication, deed restriction, etc.) and how the areas and improvements would be maintained.

5. Describe the species present, wildlife use, and habitat conditions in and adjacent to the proposed public access areas and the likely type and degree of human use of the site (i.e., bicycling, dog walking, birding, frequency of use, etc.). Describe how any potential adverse effects on wildlife from public access would be avoided or minimized through the siting, design and management of the public access being proposed at the site.

Box 6 Dredging and Mining Information

a. Complete this box if the project involves mining, dredging or the disposal of dredged material in any of the following areas.

☑ San Francisco Bay ☑ Salt pond ☐ Managed wetland ☐ "Certain waterway"

☐ Primary management area of the Suisun Marsh ☐ Other: _____

b. Are you submitting a separate application to the Dredged Material Management Office (DMMO)?

☐ Yes ☑ No

If "Yes," attach a copy of that application; it is not necessary to complete this Box. If "No," complete this box.

c. Type of activity: ☐ Maintenance Dredging ■ New Dredging Mining

d. Method of dredging or mining: Material would be dredged from existing levees or pond bottoms using an excavator.

Dredged material would be beneficially reused on site as part of the restoration actions, public access features, or flood risk management features.

e. Total volume and area of material to be dredged or mined from:

Open waters:	See Attached	cubic yards	See Attached	square feet
Tidal marshes:	See Attached	cubic yards	See Attached	square feet
Tidal flats:	See Attached	cubic yards	See Attached	square feet
Salt ponds:	See Attached	cubic yards	See Attached	square feet
Managed wetlands in the primary management area of the Suisun Marsh:	NA	cubic yards	NA	square feet
Other managed wetlands:	See Attached	cubic yards	See Attached	square feet
Subtidal areas that are scarce or have an abundance and diversity of fish, other aquatic organisms and wildlife, such as eelgrass beds and sandy deep water:	NA	cubic yards	NA	square feet
Other (specify):	_____	cubic yards	_____	square feet

f. Are knockdowns proposed as part of the dredging project?

☐ Yes ☑ No

Number of knockdowns: _____

Volume per knockdown event: _____ cubic yards

(Box 6,Dredging and Mining Information, continued)

g. Location(s) where dredged or mined material will be deposited: Excavated material will immediately be placed within project ponds for beneficial re-use as fill for habitat enhancement or levee improvement.

h. Total volume of dredged material to be disposed: 0 cubic yards

Beneficially re-used: 50,770 cubic yards

i. Estimated future maintenance dredging required annually: 0 cubic yards

j. For dredging projects:

Proposed design depths (MLLW): (1) NA (2) _____ (3) _____

Proposed over-depth dredging (+ feet): (1) _____ (2) _____ (3) _____

Number of dredging episodes: _____

k. Does this project have an annual average dredging average of 50,000 cubic yards or less?

☑ Yes ☐ No

l. ADDITIONAL INFORMATION (PROVIDE IN AN ATTACHMENT):

1. If the dredged material is to be disposed of in the Bay, explain why the material cannot feasibly be beneficially re-used or disposed of in the ocean, upland, or inland outside of the Commission's jurisdiction.

2. Provide the results of testing for biological, chemical or physical properties of the material to be dredged.

3. Provide a copy of a water quality certification or waste discharge requirements for the dredging or disposal of dredged material from the San Francisco Bay Regional Water Quality Control Board.

4. Identify local and Bay-wide effects of the project on: (a) the possible introduction or spread of invasive species; (b) tidal hydrology and sediment movement; (c) fish, other aquatic organisms and wildlife; (d) aquatic vegetation; and (e) the Bay's bathymetry.

5. For projects in subtidal areas that have an abundance and diversity of fish, other aquatic organisms and wildlife, or are scarce such as eelgrass beds and sandy deep water, identify feasible alternatives and public benefits associated with the project.

Box 7

Information on Government Approvals
(must be completed by all applicants)

	Required YES	Required NO	Type of Approval	Date Approval Expected/Received	Agency Contact and Phone Number
Local Government Discretionary Approval(s):	☐	☐			
State Lands Commission:	☐	☑			
Regional Water Quality Control Board:	☑	☐	401 Certification/WDR	2017	Brian Wines (510) 622-5680
				Regional Board Number:	Region 2, SF Bay
California Dept. of Toxic Substances Control:	☐	☑			
California Department of Fish and Game Streambed Alteration Permit:	☐	☑			
DF&G Take Authorization:	☐	☑			
Other DF&G Permit:	☐	☑			
U.S. Army Corps Of Engineers:	☑	☐	Section 404 Individual Permit	2017	Frances Malamud-Roam, (415) 503-6792
				Public Notice Number:	27703S
U.S. Fish and Wildlife Service: Take Authorization	☐	☑			
Biological Opinion:	☑	☐	Biological Opinion	2017	
NOAA Fisheries Service: Take Authorization	☐	☐			
Biological Opinion	☑	☐	Biological Opinion	2017	
U.S. Coast Guard:	☐	☑			
Federal Funding:	☐	☐			
Other Approval (Specify):					

Box 8

Environmental Impact Documentation
(must be completed by all applicants)

a. Is the project statutorily or categorically exempt from the need to prepare any environmental documentation?

☐ Yes ☑ No

If "Yes," please attach a statement that identifies and supports this statutory or categorical exemption.

b. Has a government agency other than BCDC, serving as the lead agency, adopted a negative declaration or certified an environmental impact report or environmental impact statement on the project?

☑ Yes ☐ No

If "Yes," attach a copy of the document. If the environmental impact report or statement is longer than ten pages, also provide a summary of up to ten pages. If "No," provide sufficient information to allow the Commission to make the necessary findings regarding all applicable policies. The certified document must be submitted prior to action on the permit.

Box 9

Public Notice Information
(must be completed by all applicants)

a. Owners and residents of all properties located within 100 feet of the project site (if more than four, provide the information electronically):

North:

Name: See attached

Address: _____

City, State, Zip: _____

Telephone: _____
(415) 333-3333

East:

Name: _____

Address: _____

City, State, Zip: _____

Telephone: _____
(415) 333-3333

South:

Name: _____

Address: _____

City, State, Zip: _____

Telephone: _____
(415) 333-3333

West:

Name: _____

Address: _____

City, State, Zip: _____

Telephone: _____
(415) 333-3333

b. Other persons known to be interested in this project: ☐ None
(if more than two, provide the information electronically).

Name: See attached

Address: _____

City, State, Zip: _____

Telephone: _____
(415) 333-3333

Name: _____

Address: _____

City, State, Zip: _____

Telephone: _____
(415) 333-3333

AECOM

South Bay Salt Pond Restoration Project – Phase 2

San Francisco Bay Conservation and Development Commission (BCDC) Permit Application

Supplemental Information

March 2017

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Table of Contents

List of Appendices

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List of Acronyms and Abbreviations

AAC	All-American Canal
ABA	Architectural Barriers Act
ADA	Americans with Disabilities Act
AMP	South Bay Salt Pond Restoration Project Adaptive Management Plan
APN	Assessor's Parcel Number
Bay	San Francisco Bay
BMP	best management practice
BO	Biological Opinion
BCDC	San Francisco Bay Conservation and Development Commission
Cargill	Cargill Incorporated
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
DRERIP	Delta Regional Ecosystem Restoration Implementation Plan
EIS/R	Environmental Impact Statement/Report
ESA	Endangered Species Act
HDPE	High density polyethylene
ISP	Initial Stewardship Plan
MHHW	Mean Higher High Water
NASA	National Aeronautics and Space Administration
NAVD88	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service
NOD	CDFW Notice of Determination
QAPP	Quality Assurance Program Plan
Refuge	Don Edwards Regional National Wildlife Refuge
ROD	USFWS Record of Decision
RWQCB	Regional Water Quality Control Board
SBSP	Phase 2 South Bay Salt Pond
SCC	California State Coastal Conservancy
SCVWD	Santa Clara Valley Water District
South Bay	South San Francisco Bay
SWPPP	Stormwater Poluution Prevention Plan
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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1 Box 1. Property Ownership and Application Information

1.1 Box 1.d.

All Phase 2 ponds are owned by the U.S. Fish and Wildlife Service (USFWS) Don Edwards National Wildlife Refuge (Refuge). The land deeds for the Phase 2 Ponds are provided in **Appendix A**.

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2 Box 2. Total Project and Site Information

2.1 Box 2.a and 2.b. Project Address

Phase 2 of the South Bay Salt Pond (SBSP) Restoration Project takes place across multiple discrete locations. See **Figures 1, 2, 3, 4, 5 and 6** for general location information, Section 2.1.1 for directions. The address of the Refuge follows and may be used as a point of contact, but is not located within the project area itself.

U.S. Fish and Wildlife Service (Don Edwards)
1 Marshlands Road
Fremont, CA, 94555

SBSP Phase 2 operations would occur within the municipal jurisdictions of 3 counties and 4 cities and is subject to some regulatory concerns from the adjacent Redwood City (**Table 1**). Directions to project site locations are provided in the following section.

Table 1 Phase 2 Project Area Jurisdictions

POND COMPLEX	POND CLUSTER	JURISDICTION	
		CITY	COUNTY
Alviso	Island Ponds	Fremont	Alameda
	Mountain View Ponds	Mountain View	Santa Clara
	A8 Ponds	San Jose	Santa Clara
Ravenswood	Ravenswood Ponds	Menlo Park	San Mateo
		Redwood City*	San Mateo

** Ravenswood Ponds are not within Redwood City limits, but are adjacent to and the project is subject to some Redwood City regulatory concerns.*

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2.1.1 Directions to the Site

SBSP Restoration Project Phase 2 area consists of four pond complexes: Alviso Island Ponds, Alviso A8 Ponds, Alviso Mountain View Ponds and the Ravenswood Ponds. In addition, the project is managed by USFWS from the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) offices located in Fremont, California.

2.1.1.1 USFWS Refuge Offices

Directions to the USFWS Refuge offices where project representatives are located are provided here. From CA-84 take the Paseo Padre Parkway/Thornton Avenue Exit. Turn south onto Thornton Avenue. Continue on Thornton Avenue to Marshlands Road. Turn onto Marshlands Road heading west. The Refuge offices are located at 2 Marshlands Road, Fremont, CA 94555.

2.1.1.2 Alviso Island Pond Cluster

Ponds A19, A20 and A21 are not accessible by public roadways, and in some areas are not accessible by land. To access these ponds please coordinate with USFWS.

2.1.1.3 Alviso A8 Pond Cluster

Take Highway 237 to the Gold Street exit. Head north on Gold St. The gate entrance is on the west side of the street located between two World Financial Group buildings at 2099 Gold St. and before the overpass over Alviso Slough. Gate access is available by contacting the USFWS at Don Edwards San Francisco Bay National Wildlife Refuge.

2.1.1.4 Alviso Mountain View Pond Cluster

Pond A1: Take Highway 101 to the N Shoreline Blvd exit. Turn onto N Shoreline Blvd. Continue straight to stay on N Shoreline Blvd. Parking is available at the Shoreline Park at Mountain View Sailing Lake. From the parking lot, Ponds A1 and A2W access is available along their southern perimeters via the Bay trail. Gate access to service roads is available by contacting the USFWS at Don Edwards San Francisco Bay National Wildlife Refuge.

Pond A2W: Take Highway 101 to the N Shoreline Blvd exit. Turn onto N Shoreline Blvd. Continue straight to stay on N Shoreline Blvd. Approximately 650 feet after crossing Bill Graham Parkway is a public parking area called Kite Lot available. From Kite Lot, walk on foot approximately 2,200 feet east to access the Bay trail. Walk north on the Bay trail to access the southern perimeter of Pond A2W. Gate access to service roads is available by contacting the USFWS at Don Edwards San Francisco Bay National Wildlife Refuge.

2.1.1.5 Ravenswood Pond Cluster

Take Highway 101 to CA 84E/ Marsh Road. Head north on Marsh Road and continue straight to enter Bedwell Bayfront Park. Parking is available in Bedwell Bayfront Park. Ponds S5, R5 and the eastern and part of the northern limits of Pond R4 are publicly accessible. Gate access to service roads is available by contacting the USFWS at Don Edwards San Francisco Bay National Wildlife Refuge.

2.2 Box 2.c. Assessor's Parcel Numbers

Table 2 shows Assessor's Parcel Numbers for the SBSP Phase 2 project areas.

Table 2 Phase 2–Assessor's Parcel Numbers by Pond Cluster

POND CLUSTER	ASSESSOR'S PARCEL NUMBER	COUNTY
Alviso Mt. View	00805005	Santa Clara
	01536012	Santa Clara
	01536017	Santa Clara
	01536022	Santa Clara
	01536024	Santa Clara
	01536025	Santa Clara
	01536026	Santa Clara
	01536028	Santa Clara
	01536037	Santa Clara
	01536039	Santa Clara
	01536043	Santa Clara
	01536044	Santa Clara
	11603015	Santa Clara
	11619002	Santa Clara
Alviso A8	01533022	Santa Clara
	01533055	Santa Clara
	01535005	Santa Clara
	01535038	Santa Clara
	01535047	Santa Clara
	01535048	Santa Clara
	01545011	Santa Clara
	01545031	Santa Clara
	01535005	Santa Clara
	01533011	Santa Clara
	01535014	Santa Clara
	01501025	Santa Clara
Alviso Island	519-760-10	Alameda
	519-760-11	Alameda
	519-760-12	Alameda
	519-760-13	Alameda
	519-760-4	Alameda
	519-760-5	Alameda
	519-760-6	Alameda
	519-760-7	Alameda

POND CLUSTER	ASSESSOR'S PARCEL NUMBER	COUNTY
	519-760-8	Alameda
	519-760-9	Alameda
	519-770-1	Alameda
	519-770-10	Alameda
	519-770-11	Alameda
	519-770-12	Alameda
	519-770-13	Alameda
	519-770-14	Alameda
	519-770-15	Alameda
	519-770-16-2	Alameda
	519-770-17	Alameda
	519-770-2	Alameda
	519-770-3	Alameda
	519-770-4	Alameda
	519-770-5	Alameda
	519-770-6	Alameda
	519-770-7	Alameda
	519-770-8	Alameda
	519-770-9	Alameda
	519-780-1	Alameda
	519-800-1-17	Alameda
	519-800-1-20	Alameda
	519-800-1-21	Alameda
	519-800-1-32	Alameda
	519-800-4	Alameda
	519-800-4	Alameda
	519-800-4	Alameda
	537-801-6	Alameda
Ravenswood	055-400-570	San Mateo

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2.3 Box 2.d. Latitude and Longitude

Table 3 shows the latitude and longitude in decimal degrees.

Table 3 Phase 2–Approximate Pond Area and Location

POND CLUSTER	POND	*AREA (ACRES)	LATITUDE	LONGITUDE
ALVISO ISLAND PONDS	A19	265	37.467092	-121.957692
	A20	65	37.464876	-121.970986
	A21	150	37.465142	-121.979427
ALVISO - A8 PONDS	A8	410	37.428778	-121.991558
	A8S	160	37.420860	-121.989553
ALVISO - MOUTAIN VIEW PONDS	A1	275	37.442525	-122.086577
	A2W	435	37.441989	-122.074607
RAVENSWOOD PONDS	R3	270	37.486675	-122.155291
	R4	295	37.493048	-122.161933
	R5	30	37.488054	-122.170371
	S5	30	37.485913	-122.170712
Note: Pond areas excerpted from the 2007 SBSP FEIR/S				

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2.4 Box 2.l through 2.r. Approximate Size of Project Area within San Francisco Bay Conservation and Development Commission (BCDC) Jurisdictions

Table 4 shows the jurisdictional area values for total project study area discussed in the response to Box 4 below (shown in **Figure 8**). However, Phase 2 impacts occur in limited construction footprints within this total area. **Table 5** summarizes the total areas impacted within each pond cluster by BCDC jurisdiction for the described Phase 2 operations. Former salt ponds at the Island Ponds were breached during Phase 1 activities. The areas that were formerly Salt Pond jurisdiction now are under the Bay jurisdiction. However, these areas maintain their Salt Pond jurisdiction in perpetuity; therefore, specific areas at the Island Ponds fall under both the Bay and Salt Pond jurisdictions. Certain impacts occur within these dual jurisdictional areas and are quantified as appropriate in the summary tables of this document.

Table 4 Total Estimated Jurisdictional Areas in the Study Area by Pond Cluster

POND CLUSTER	BCDC JURISDICTION	AREA (SQUARE FEET)	AREA (ACRES)
Island Ponds	Shoreline Band	0	0.0
	Bay	9,430,200	216.5
	Salt Pond	0	0.0
	Bay/Salt Pond	21,746,000	499.2
	Non Jurisdictional	0	0.0
A8	Shoreline Band	1,195,400	27.4
	Bay	1,912,100	43.9
	Salt Pond	26,474,100	607.8

POND CLUSTER	BCDC JURISDICTION	AREA (SQUARE FEET)	AREA (ACRES)
	Bay/Salt Pond	0	0.0
	Non Jurisdictional	198,800	12.2
Mountain View	Shoreline Band	2,895,800	66.5
	Bay	4,070,400	93.4
	Salt Pond	30,985,500	711.3
	Bay/Salt Pond	0	0.0
	Non Jurisdictional	531,400	12.2
Ravenswood	Shoreline Band	1,646,900	66.5
	Bay	2,755,000	63.2
	Salt Pond	28,695,300	658.8
	Bay/Salt Pond	0	0.0
	Non Jurisdictional	958,600	22.0
Total Project Study Area	**Shoreline Band**	**5,738,100**	**131.7**
	Bay	**18,167,600**	**417.1**
	Salt Pond	**86,154,900**	**1,977.9**
	Bay/Salt Pond	**21,746,000**	**499.2**
	Non Jurisdictional	**1,688,800**	**38.8**

Notes:
Square footage values areas are rounded up to the nearest 100 square feet.
Also see **Figure 8**.
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Table 5 Total Construction Footprint Areas in BCDC Jurisdiction by Pond Cluster

POND CLUSTER	BCDC JURISDICTION	AREA (SQUARE FEET)	AREA (ACRES)
Island Ponds	Shoreline Band	0	0.0
	Bay	158,100	3.6
	Salt Pond	0	0.0
	Bay/Salt Pond	205,900	4.7
	Non Jurisdictional	0	0.0
A8	Shoreline Band	17,400	0.4
	Bay	0	0.0
	Salt Pond	1,041,300	23.9
	Bay/Salt Pond	0	0.0
	Non Jurisdictional	13,400	0.3
Mountain View*	Shoreline Band	516,400	11.9
	Bay	23,700	0.5
	Salt Pond	1,622,600	37.2
	Bay/Salt Pond	0	0.0
	Non Jurisdictional	234,700	5.4
Ravenswood	Shoreline Band	79,000	1.8
	Bay	80,200	1.8
	Salt Pond	2,097,200	48.1
	Bay/Salt Pond	0	0.0
	Non Jurisdictional	56,400	1.3
Total Project Construction footprint Area	**Shoreline Band**	**612,800**	**14.1**
	Bay	**262,000**	**6.0**
	Salt Pond	**4,761,100**	**109.3**
	Bay/Salt Pond	**205,900**	**4.7**
	Non Jurisdictional	**304,500**	**7.0**

Note:
Square footage values areas are rounded up to the nearest 100 square feet.
* Areas include proposed PG&E work impact areas that are approximately 20,900 square feet (0.5 acres) that occurs within Salt Pond and Bay jurisdictions at the Mountain View site.
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2.5 Box 2.u. Project Details

Table 6 shows the areas of project elements within the applicable BCDC jurisdiction areas. The area values in **Table 6**, row 7 include the PG&E work to improve tower foundations, install new maintenance access boardwalks and improve existing boardwalks. The areas in row 8 include construction footprints for all other project operations including construction of habitat transition zones, bird habitat islands, levee modifications (improvements, breaches, and lowering), ditch blocks,

and channel excavations. Some of these features, including the water control structures and habitat transition zones, serve concurrent flood risk management purposes. However, because specific areas are not dedicated to that sole purpose, nor are any of the Phase 2 actions proposed only for it, these types of project elements are not separated in this table. Therefore, flood risk management is included as part of the other impacts covered in Row 8.

Table 6 Box 2u Project Details

	PROJECT ELEMENT	BCDC JURISDICTION					
		BAY (SQUARE FEET)	SALT POND (SQUARE FEET)	BAY/SALT POND (SQUARE FEET)	100-FOOT SHORELINE BAND (SQUARE FEET)	OUTSIDE BCDC JURISDICTION (SQUARE FEET)	**TOTALS (SQUARE FEET)**
1	Structures *(Water Control Structures, Bridges)*	1,300	800	0	5,600	0	**7,700**
2	All Roads, Parking, Pathways, Sidewalks	-	51,200	0	109,800	23,900	**184,900**
3	Number of Parking Spaces	-	-	-	-	-	**-**
4	All Landscaping	-	-	-	-	-	**-**
5	Left Undeveloped	-	-	-	-	-	**-**
6	Shoreline Protection	-	-	-	-	-	**-**
7	Piers Docks and Other Marine Purposes (*PG&E Boardwalks and PG&E Tower Piers*)	7,000	14,000	-	-	-	21,000
8	Area Used for Other Purposes (*Levee Breaches, Levee Modifications, Habitat Islands, Pilot Channels, Ditch Blocks, Habitat Transition Zones, Flood Risk Management*)	253,700	4,695,100	205,900	497,400	280,600	5,932,700
	Totals	262,000	4,761,100	205,900	612,800	304,500	6,146,300

Note:
All values are rounded up to the nearest 100 square feet.
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2.6 Box 2.v. Information about the Total Project and Site (Box 2.v.1 Project Description)

2.6.1 Introduction

The SBSP Restoration Project is a multi-agency effort to restore tidal marsh habitat, reconfigure managed pond habitat, maintain or improve flood protection, and provide recreation opportunities and public access in 15,100 acres of former salt-evaporation ponds purchased from and donated by Cargill Incorporated (Cargill) in 2003. The former salt-production areas are no longer used for that purpose, and, in many cases, they are no more saline than San Francisco Bay (Bay) itself. Immediately after the March 2003 acquisition and subsequent transfer of those ponds from Cargill, the landowners, the U.S. Fish and Wildlife Service (USWFS) and California Department of Fish and Wildlife (CDFW), began implementation of the Initial Stewardship Plan (ISP) (USFWS and CDFG 2003), which was designed to maintain open water and unvegetated pond habitats with enough water circulation to preclude salt production and maintain habitat values and conditions until the long-term restoration actions of the SBSP Restoration Project could be implemented.

The longer-term planning effort involves a 50-year programmatic-level plan for restoration, flood risk management, and public access. This effort has already seen the implementation of Phase 1 projects, which are described in the SBSP Restoration Project's 2007 EIS/R. That longer-term planning was facilitated by the California State Coastal Conservancy (SCC) working with the two landowner agencies listed above and was completed in January 2009. The planning phase of the SBSP Restoration Project was completed in January 2009 with the publication of the Final 2007 Environmental Impact Statement/Report (EIS/R).

Phase 2 of the SBSP Restoration Project is a collaborative effort among federal, state, and local agencies working with scientists and the public to develop and implement project-level plans and designs for habitat restoration, flood management, and wildlife-oriented public access. The former salt ponds are part of the USFWS-owned and managed Don Edwards San Francisco Bay National Wildlife Refuge (Refuge), and cover approximately 9,600 acres in the South Bay. The Refuge ponds in Phase 2 are collectively nearly 2,400 acres in size.

The ponds that were neither part of Phase 1 nor part of Phase 2 will continue to be actively managed according to the goals set forth in the ISP and the Refuge's Pond Management Plan until further implementation planning and the appropriate adaptive management studies are completed. They may be included in future project phases as well.

2.6.2 Project Location

The SBSP Restoration Project is in South San Francisco Bay (South Bay) in Northern California (see **Figure 1**). Phase 2 of the SBSP Restoration Project includes parts from two complexes of former salt ponds and adjacent habitats in the South Bay that the USFWS acquired from the Cargill in 2003. The pond complexes consist of the 8,000-acre Alviso pond complex and the 1,600-acre Ravenswood pond complex, both of which are owned and managed by USFWS as part of the Refuge (see **Figure 2**). Within these two pond complexes, four groups of ponds are included in the proposed Phase 2 actions; these are shown in **Figures 3, 4, 5, and 6**. They are as follows:

- Alviso Island Ponds (Island Ponds) shown in **Figure 3** in the Alviso pond complex

- Alviso A8 Ponds (A8 Ponds) shown in **Figure 4** in the Alviso pond complex
- Alviso Mountain View Ponds (Mountain View Ponds) shown in **Figure 5** in the Alviso pond complex
- Ravenswood Ponds, shown in **Figure 6** in the Ravenswood pond complex

The Alviso pond complex consists of 25 ponds on the shores of the South Bay in the cities of Fremont, San Jose, Sunnyvale, and Mountain View, within Santa Clara and Alameda Counties. The pond complex is bordered on the west by the Palo Alto Baylands Park and Nature Preserve and the City of Mountain View's Charleston Slough; on the south by commercial and industrial land uses, Mountain View's Shoreline Park, the National Aeronautics and Space Administration (NASA) Ames Research Center, and Sunnyvale Baylands Park; and on the east by Coyote Creek in San Jose and Cushing Parkway in Fremont. The Phase 2 project actions in the Alviso pond complex focus on three clusters of ponds. The first cluster, the Island Ponds, containing Ponds A19, A20, and A21 is between Coyote Creek and Mud Slough near the eastern end of the Alviso pond complex. The Island Ponds were breached in 2006 as part of tidal marsh restoration actions covered by the ISP.

The second cluster, the A8 Ponds, containing Ponds A8, and A8S is in the southern and central portion of the Alviso pond complex. The A8 Ponds are west of the town of Alviso, north of Sunnyvale and State Route (SR) 237, and east of other parts of the Alviso pond complex. Ponds A8 and A8S were also included in the Phase 1 work; they were made reversibly tidal through the installation of a variable-size and reversible "notched" gate that opened in July 2010. Ponds A5 and A7 were also connected to Pond A8 and Pond A8S as part of Phase 1 actions. There would be no Phase 2 actions at that end of this group of ponds.

The third cluster, the Mountain View Ponds, containing Ponds A1 and A2W is on the western edge of the Alviso pond complex. The City of Mountain View lies immediately to the south, and the Charleston Slough and the Palo Alto Flood Control Basin lie to the west.

The Ravenswood pond complex consists of seven ponds on the Bay side of the Peninsula, both north and south of SR 84, west of the Dumbarton Bridge, and on the Bay side of the developed areas of the City of Menlo Park in San Mateo County. Bayfront Park in Menlo Park is directly west of the Ravenswood pond complex, and SR 84 is along its southern border. The Phase 2 project actions in the Ravenswood pond complex are focused on the western half of the pond complex, which contains Ponds R3, R4, R5, and S5, here referred to as the Ravenswood Ponds.

Table 3 lists each pond, the cluster it is part of, and its area, centroid, and latitude and longitude coordinates in decimal degrees. Pond areas in **Table 3** are sourced from the 2007 SBSP Program FEIS/R and provide general estimates for each pond. Areas calculated for Phase 2 operations have been updated and may slightly differ from those estimated in the programmatic FEIS/R.

2.6.3 Project History

Phase 2 of the SBSP Restoration Project is intended to tier from the analysis conducted for the 2007 EIS/R by advancing additional restoration activities within the SBSP project area. The 2007 EIS/R assessed the environmental consequences associated with two long-term restoration alternatives. In consideration of the environmental consequences discussed in the 2007 EIS/R, the USFWS Record of Decision (ROD) and the CDFW Notice of Determination (NOD) state that USFWS and CDFW will implement Programmatic Alternative C, to eventually convert up to 90 percent of the former salt

ponds to tidal marsh, while at least 10 percent are to remain as enhanced managed ponds. Phase 2, as the second project component of this long term restoration project, would incrementally advance the project toward achieving the 90/10 goal.

The 2007 EIS/R was not just a planning document but also included project-level analysis of several restoration, enhancement, recreation, and flood protection projects that would help fulfill the SBSP Restoration Project's goals and objectives. The selection of the Phase 1 projects considered a variety of factors. The criteria, as listed in the 2007 EIS/R, were available funding, likelihood of success, ease of implementation, visibility and accessibility, opportunities for adaptive management and applied studies, value in building support for the project, and certainty of investment.

Phase 1's restoration actions were successfully completed in December 2010; the last of the public access and recreation features were completed in April 2016. At the end of Phase 1, 1,600 acres of tidal habitats and 1,440 acres of muted tidal habitats were opened to tidal inundation. The tidal areas already show signs of estuarine sedimentation and natural vegetative colonization. These tidal habitats will contribute to the recovery of endangered, threatened, and other special-status species; tidal-marsh-dependent species; and the recovery of South Bay fisheries and water quality. Also, 710 acres of managed ponds were constructed for use by migratory birds at a range of water depths to create a variety of depth, hydrology, and salinity regimes through the use of flow control structures, grading, and other means. In addition, approximately 7 miles of new trail were built, providing new recreational opportunities. Small habitat transition zones were constructed in Eden Landing Pond E14 and vegetated with native upland species by volunteers. Islands were constructed in Ponds SF2, A16, and E12 and E13.

Phase 2 of the SBSP Restoration Project is a direct outgrowth of the acquisition of the Alviso and Ravenswood pond complexes (either in fee ownership or the salt-making rights) from Cargill in 2003 and the continued implementation of the larger SBSP Restoration Project laid out in the 2007 EIS/R. The project has focused on how best to manage and restore these lands.

In 2010, the Phase 2 planning was initiated. The initial project elements included restoration, public access, and flood protection[1] actions in all three pond complexes: Alviso, Ravenswood, and Eden Landing. In April 2016 the FEIS/R for Phase 2 at the Refuge (i.e., Alviso and Ravenswood) was completed. Phase 2 at Eden Landing is proceeding separately.

2.6.4 Project Purpose and Objectives

The overall SBSP Restoration Project purpose is to:

1. Restore and enhance a mix of wetland habitats.
2. Provide wildlife-oriented public access and recreation.
3. Provide for flood management in the South Bay.

[1] The terminology used by the SBSP Restoration Project to describe its goals has since changed from "flood protection" to "flood risk management". This document generally uses the latter term for forward-looking documents.

The purpose of Phase 2 of the SBSP Restoration Project is to meet the needs described above through implementing the proposed work to restore tidal marsh habitat, reconfigure managed pond habitat, maintain current levels of flood protection, and provide recreation opportunities and public access.

Phase 2 addresses multiple needs that include:

- Historic losses of tidal marsh ecosystems and habitats in San Francisco Bay and concomitant declines in populations of endangered species (e.g., California Ridgway's rail –formerly California clapper rail- [*Rallus obsoletus obsoletus*], and salt marsh harvest mouse [*Reithrodontomys raviventris*]);
- Increasing salinity and declining ecological value in several of the ponds within the project area;
- Long-term deterioration of non-certifiable levees (for Federal Emergency Management Agency [FEMA] purposes) within the project area, which could lead to levee breaches and flooding;
- Long-term tidal flood risk management and sea level rise adaptation; and
- Limited opportunities in South San Francisco Bay for wildlife-oriented recreation.

Phase 2 objectives are:

- Create, restore, or enhance habitats of sufficient size, function, and appropriate structure to:
    - Promote restoration of native special-status plants and animals that depend on South San Francisco Bay habitat for all or part of their life cycles.
    - Maintain current migratory bird species that utilize existing salt ponds and associated structures such as levees.
    - Support increased abundance and diversity of native species in various South San Francisco Bay aquatic and terrestrial ecosystem components, including plants, invertebrates, fish, mammals, birds, reptiles, and amphibians.
    - Maintain or improve existing levels of flood risk management in the South Bay.
    - Provide public access and recreational opportunities compatible with wildlife and habitat goals.
    - Protect or improve existing levels of water and sediment quality in the South Bay and take into account ecological risks caused by restoration.
    - Implement design and management measures to maintain or improve current levels of vector management, control predation on special-status species, and manage the spread of non-native invasive species.
    - Protect the services provided by existing infrastructure (e.g., power lines, railroads).

2.6.5 Permitting Background

A number of permits and regulatory agreements and approvals were acquired for the SBSP Restoration Project at the program level, the Phase 1 level, and for ongoing Operations and Maintenance. They are available for review at the SBSP Restoration Project website (www.southbayrestoration.org/documents/permit-related). These permits and other documents cover Endangered Species Act Section 7 consultation; Clean Water Act Sections 401, 404, and 404 (b)(1); and BCDC permits. In addition, where they were necessary, permits were obtained from the

relevant cities, counties, other federal or State agencies (e.g., California Department of Transportation; California State Lands Commission, U.S. Coast Guard), and special districts (e.g., flood control districts) for Phase 1 actions. Similar approaches are being taken for the Phase 2 work.

2.6.6 General Site Restoration Components

The Phase 2 sites include several common restoration features and operations that are proposed to meet project objectives. Detailed information for operations at each site is provided in subsequent sections. A general summary of these operations and features follows.

2.6.6.1 Habitat Transition Zones

As an adaptation to future sea level rise, the project is proposing the creation of habitat transition zones as part of Phase 2 actions. Habitat transition zones involve the beneficial reuse of material to create transitional habitats from the pond or marsh bottom to the adjacent upland habitat along portions of the upland edge. These habitat transition zones, are sometimes referred to elsewhere as "upland transition zones," "transition zone habitats," "ecotones," or "horizontal levees"; this document uses the term "habitat transition zones" for these constructed features. Habitat transition zones are specifically called out in documents such as the U.S. Fish and Wildlife Service's Tidal Marsh Recovery Plan (USFWS 2013) and the recent Science Update to the Baylands Ecosystem Habitat Goals Project Report (Goals Project 2010). A gradual transition from submerged Baylands, ponds, or open waters to uplands is largely missing in the current landscape of the South Bay, where often an abrupt boundary exists between the bay or ponds and the built environment. The SBSP Restoration Project's intention in including habitat transition zones in the Phase 2 alternatives is to restore this missing habitat feature. Doing so would:

- Establish areas in which terrestrial marsh species can take refuge during high tides and storm events, thereby reducing their vulnerability.
- Expand habitat for a variety of special status plant species that occupy this specific elevation zone.
- Provide space for marshes to migrate upslope over time as sea-level rise occurs.

Before proposing these features, the SBSP Restoration Project examined the landscape to see if there were any areas adjacent to the project site where this could occur naturally. In general, the best locations for building these features would be located adjacent to open space or park land where the project can provide an even greater extent of transition into upland habitats. However, at the edge of the Bay, these open space areas are largely former (now closed and capped) landfills which present a variety of challenges for creating the missing upland habitat. First, the existing elevation gradient between the restored marsh and the edge of the landfill is usually too steep to provide a gradual transition. Secondly, these landfills would otherwise pose a water quality risk from erosion if tidal action were introduced immediately adjacent to the protective clay liner or un-engineered rip rap slopes. In these instances, it is necessary that the project place material inside the former salt ponds to create the desired slope (generally 15:1 to 30:1 but potentially larger). At other locations, the actual elevations landward of the project sites are too low to create an uphill slope with the desired habitat functions. Therefore, after new levees are built to protect that area from tidal flooding, the only area remaining to build the transition zones is in the former salt ponds. Finally, most of the adjacent property is not within the SBSP Restoration Project's ability to acquire, whether or not it has the desired elevation profile, because it is currently developed. In addition to being very expensive to

acquire these areas, it would be infeasible to relocate all of the residences and businesses that have been built adjacent to the ponds.

For these reasons, the project plans to construct the habitat transition zones inside the former salt ponds. The transition zones would improve the habitat quality of the restored marsh, particularly for endangered and threatened species, and improve resiliency of the shoreline over time as sea levels rise.

2.6.6.2 Ditch Blocks

To create the existing salt production evaporation ponds, earth was piled in a mound around each pond's perimeter to establish a levee that separated the pond from communicating with the waters of the Bay. The material for these levees was sourced from digging ditches around the inside perimeter of the pond, leaving a borrow ditch around the raised levees. Operations and maintenance of the levee maintained this process during salt production. Phase 2 proposes the use of ditch blocks within the borrow ditches as a means of enhancing tidal flow as select ponds are restored to tidal marshes.

Ditch blocks would be built by placing fill material inside of the historic borrow ditches to direct tidal flows into the center of the ponds instead of allowing them to flow around the interior perimeter. Fill material would be sourced from levee lowering, removal and breaching operations at each pond as well as from off-site sources.

2.6.6.3 Levee Modifications

Modifications to existing pond levees are proposed at multiple locations to establish hydraulic connection with adjacent sloughs and the Bay, establish a mosaic of wildlife habitat to meet restoration goals, and provide the necessary flood risk management. Modifications proposed for Phase 2 include breaching levees, lowering levees, removing levees and improving levees. A brief summary of these proposed restoration operations follow.

2.6.6.3.1 Levee Breaching

Levee breaches are proposed at specific pond locations to open the ponds to full tidal flows and/or to establish hydraulic connections between ponds. Levees would be breached after all internal pond activities are completed. Levees would be breached mechanically using earth moving equipment. Most breaches would not be reinforced and would be allowed to scour and widen naturally. Select locations would have armored breaches to support bridges where access by levee roads would be maintained. Material from breaches would be used for levee enhancements, placed into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

2.6.6.3.2 Levee Lowering

At select locations, levees would be lowered by scraping their tops down to the local mean higher high water (MHHW) elevation. Levee lowering would enhance habitat connectivity and provide transition of some locations to tidal marsh. Levee material would be used for levee enhancements, placed into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

2.6.6.3.3 Levee Removal

Levee removal is proposed at specific ponds to restore managed ponds to tidal wetland and to enhance hydraulic connections between ponds. Levee removal would bring certain sections of levees down to the elevation of the adjoining marsh plain and would thereby help connect aquatic habitat at high tides and speed the overall restoration of tidal marsh. Levee material would be used for levee enhancement, placed into the ponds and used to create ditch blocks or pond bottom to speed the return to marsh plain elevation.

2.6.6.3.4 Levee Enhancement

Levee enhancements are proposed at some locations to maintain or improve flood control, improve levee conditions for public access features and promote the establishment of wildlife habitat and native plant composition. These activities involve raising, widening, compacting, and otherwise improving existing levees where it is necessary to do.

2.6.6.4 Habitat Islands

Within specific ponds, habitat islands would be constructed from fill and existing levees to provide isolated nesting areas for birds. These islands would increase the quality, complexity, and availability of bird habitat in the Phase 2 areas and in the Refuge in general. As the ponds transition to marsh, the island habitat would eventually become marsh mounds (possibly requiring active vegetation management), which have various ecological benefits as high-tide refugia and as focal points for further sediment aggregation and vegetation formation.

2.6.6.5 Water Control Structures

Within the Ravenswood Ponds at four locations, water control structures would be installed. Water control structures are proposed to allow management of water levels and quality in managed ponds. They would give Refuge staff more ability to avoid water quality problems, algal blooms, or other adverse impacts. The water control structures would be pipe culverts with gates at each end to provide directional control.

2.6.6.6 Initial Overbuild

To achieve final design goals, many fill operations would require that construction elevations are built at a higher elevation than the final design. This planned overbuild is to allow for compaction, address wind and water erosion, and compensate for settling that would occur after fill is placed. Constructions elevations for levee improvements, habitat transition zones, and habitat islands would typically be constructed 2 to 4 feet above the design goals and the target elevations discussed in the rest of this document. To reduce repetition, this document lists the target elevations that would result after settlement; the initial overbuild would be above those elevations, depending on the feature and its purpose and location.

2.6.7 Site Descriptions

2.6.7.1 Alviso Island Pond Cluster

As shown in **Figure 3**, the Alviso Island Ponds consists of Ponds A19, A20, and A21, the levees surrounding each pond, and some of the fringe marsh outside of these levees, including the narrow marsh between Ponds A19 and A20. Ponds A19, A20, and A21 are in the eastern portion of the Alviso pond complex. These ponds are oriented east to west between Mud Slough to the north and west and Coyote Creek to the south. Mud Slough and Coyote Creek converge at the western edge of this pond cluster. The community of Alviso and the city of Milpitas are to the south and to the east of this

cluster, respectively. The ponds are geographically isolated from urbanized and built-out areas by other waterbodies, other ponds, and a landfill. The former community of Drawbridge is on a strip of land between Pond A21 and Pond A20. That strip of land also holds an active Union Pacific Railroad (UPRR) track.

All three of these ponds were breached on their southern sides in 2006 as part of the SBSP Restoration Project's ISP, which preceded the 2007 Programmatic EIS/R for the project and the subsequent Phase 1 actions. Two breaches were made into Pond A19, the easternmost of the three, and into Pond A21, the westernmost. Pond A20 is smaller and was only breached at one location. These breaches connected these ponds with Coyote Creek and began their transition to tidal marsh.

Breaches allowed sediment to accrete and vegetation to establish in Pond A21 and, to a somewhat lesser extent, in Pond A20. However, Pond A19 has been slower in its transition, and most of its accretion and vegetation has been limited in its spatial distribution to the areas nearest to the breaches.

2.6.7.2 Alviso A8 Pond Cluster

As shown in **Figure 4**, the A8 Ponds include Ponds A8 and A8S and the levees surrounding them. This pond cluster is in the south-central portion of the Alviso pond complex, between the Guadalupe Slough and Alviso Ponds A5 and A7 to the west; Sunnyvale Baylands County Park, Guadalupe Slough, Calabazas Creek, and San Tomas Aquino Creek to the south; Alviso Slough to the east and northeast; and San Francisco Bay to the north. The cities of Sunnyvale and Santa Clara are inland of the pond cluster to the south; a capped landfill lies to the southeast.

The SBSP Restoration Project set the initial goals for this pond cluster to be reversibly tidal habitat to address mercury concerns and later to possibly become fully tidal habitat, maintain or improve current levels of flood risk management, and improve recreation and public access. Ponds A8 and A8S were physically connected in the Phase 1 actions and were made "reversibly muted tidal habitat" by removing parts of the levees (and associated vehicle access) between them and between Pond A8 and the adjacent Ponds A5/A7 to the west. A reversible, armored notch (smaller than a full breach that can be closed seasonally) was made in the eastern levee of Pond A8 to allow some muted tidal exchange and to allow the Refuge to vary the size of the notched opening.

Ambient levels of mercury are elevated in Pond A8 due to sediment inputs from the upstream, long-closed New Almaden Quicksilver Mine. Therefore, concerns exist about mercury exposure in the A8 pond complex. Before the start of any restoration actions, bioavailability and bioaccumulation of mercury were found to be greater in Pond A8 than in either Alviso Slough or its fringing tidal marsh. Methylmercury concentrations in water and sediment were greater in Pond A8 than in Alviso Slough or its fringing tidal marsh channels, and biosentinels representing benthic and shoreline habitats indicated more mercury bioaccumulation in Pond A8 than in the tidal marshes along Alviso Slough (Grenier et al. 2010).

As a result, a Phase 1 action was undertaken to better understand the level of the risk and any implications of taking actions to restore tidal flows to the pond. A variable crest weir with numerous gates (also referred to as the 'notch') was installed to incrementally allow tidal waters and to study the resulting effects. Adaptive management measures have been and will continue to be used to monitor effects from the A8 Ponds. Adaptive management monitoring has included methylmercury

concentrations in water and sediments; special studies of sediment scour and transport; and changes in food web indicators and sentinel species. Adaptive management actions would be triggered when mercury concentrations of sentinel species increase substantially, compared to the reference site, regardless of whether they are over or under desirable levels. If triggers are exceeded, then adaptive management actions would be implemented. Examples of such actions include changing hydraulic residence times or manipulating other factors.

Findings to date include that the initial Phase 1 construction activities temporarily increased mercury levels that were observed in Forster's tern (a piscivore) eggs in this pond immediately following Phase 1 construction activities and opening of the notch at A8. However, these levels reduced and stabilized to those found at nearby reference sites by the next nesting season (Ackerman et al. 2014). A similar trend was observed in fish, but the return to ambient levels was much quicker (~3 months) and has been consistent with reference sites ever since (Bourgeois, pers. comm.). Construction at this location for Phase 2 would not include excavation of pond bottom, only the addition of clean fill material on top of existing pond bottom, therefore re-suspension of existing mercury at this location is believed to be a minimal risk. In addition, the approved Quality Assurance Program Plan (QAPP) (**Appendix E**) for upland fill material would ensure that any fill used in the creation of habitat transition zones or habitat islands is free of contaminants that may enter the water.

Ponds A8 and A8S are configured and managed such that they can also be used as flood storage basins during high-rainfall events. Pond A8 contains an overflow weir. During flood events greater than a 10-year flood in the lower Guadalupe River and Alviso Slough, water can overflow into Pond A8 for initial flood storage. Recreation and public access features at these ponds themselves are limited to a hunter check-in station and a hunter-use small boat launch area along the northwestern edge of A8S.

2.6.7.3 Alviso Mountain View Pond Cluster

The Mountain View Ponds are in the western portion of the Alviso pond complex, between Charleston Slough and the Palo Alto Flood Basin to the west; City of Mountain View's Shoreline Park, Mountain View Mitigation Marsh, and Stevens Creek Mitigation Marsh to the south; Stevens Creek and Whisman Slough to the east; and the open Bay to the north. Permanente Creek, which flows into Mountain View Slough, is between Ponds A1 and A2W. The cities of Mountain View and Palo Alto are immediately inland of the pond cluster to the south and west, respectively. As shown in **Figure 5**, for the purposes of this document, the Mountain View Ponds consists of Pond A1, Pond A2W, the levees surrounding each pond, some of the fringe marsh outside of the pond and slough levees, Permanente Creek, and Mountain View Slough. Charleston Slough, which is owned by the City of Mountain View is not part of the Refuge, is not included in the proposed project itself, but one of the levees around it – the Coast Casey Forebay levee – is included because it also borders Pond A1. The improvements proposed for the Coast Casey Forebay levee extend beyond the border of Pond A1 and would provide a greater level of increased flood risk management than the improvements to other levees. These differences are discussed in more detail below.

Unlike the Island Ponds or the A8 Ponds, the Mountain View Ponds have not been subject to previous restoration actions under the SBSP Restoration Project. The ponds themselves are somewhat subsided and have water depths of approximately 2 to 4 feet above pond bottom elevations that are at approximately 0-1 feet elevation North American Vertical Datum of 1988 (NAVD88). The ponds

have limited hydrologic exchange with the Bay, because one small culverted inlet exists into Pond A1, a siphon to connect it to Pond A2W, and an outflow connection from Pond A2W back to the Bay.

2.6.7.4 Ravenswood Pond Cluster

As shown in **Figure 6**, the Phase 2 Ravenswood pond cluster consists of Ponds R3, R4, R5, and S5; the levees surrounding each pond; some of the fringe marsh outside of these levees; and the All-American Canal (AAC). The pond cluster is bordered by Menlo Park's Bedwell Bayfront Park to the west, SR 84 and the city of Menlo Park to the south, Ravenswood Slough to the east, and Greco Island and open Bay water to the north. A small triangular pond is to the immediate west of Pond S5. This pond is unnamed and is labeled or described in various documents in three different ways: part of Pond S5, a separate but unnamed pond, or as the forebay of Pond S5. This document refers to it as the Pond S5 forebay.

A number of complicated easements as well as several different landowners are in the area where Flood Slough, the Pond S5 forebay, SR 84, Marsh Road, Bedwell Bayfront Park, and the driveway into the park all come together. This area includes various parcels and their owners, as well as easements for utilities or access. Cargill holds fee title on much of Flood Slough and has a 10-foot-wide pipeline strip of property along the entire southern border of Ponds S5 and R3. Cargill's coordination and approval would be required for any proposed activities that would take place on, cross, or otherwise affect lands or properties it owns or to which it holds fee title. This includes proposed additions of fencing, building a trail that would cross Cargill's pipeline easement, and connecting Flood Slough to the S5 forebay. Similar statements would apply to the City of Menlo Park and the West Bay Sanitary District, which are also landowners, and to the California Department of Transportation and other holders of utility easements.

2.6.8 Proposed Action

The SBSP Restoration Project's proposed actions for Phase 2 provide a variety of habitat enhancements at all four pond clusters and include maintained or increased flood risk management, and additional public access and recreation features at two of the pond clusters. **Figures 3, 4, 5, and 6** show the proposed construction as it would be implemented at each of the Phase 2 pond clusters. The pond-cluster specific operations are discussed in detail in the following sections.

2.6.8.1 Alviso Island Pond Cluster

The proposed project would increase habitat connectivity, tidal flow and expedite the transition of these ponds to tidal marsh.

Proposed project activities at the Island Ponds include the following actions, all of which are shown in **Figure 3.**

2.6.8.1.1 Lower Portions of Pond A19 Northern Levee

Lower much of Pond A19's northern levee to MHHW elevation (approximately 7 feet NAVD88), but leave portions of that levee at existing elevations to provide more high-tide refugia and roosting or nesting areas. Levee lowering locations would be grubbed and cleared before constructions and would be hydroseeded with native plant seed mix after lowering is complete. The levee lowering would further increase habitat complexity and connectivity, while unchanged sections of this levee would become island-like high-tide refugia. Cut volumes and areas for levee lowering at Island Ponds are shown in **Table 7**.

2.6.8.1.2 Widen the Westernmost of the Two Existing Breaches on the Southern Levee of Pond A19

Widening the existing western breach along Pond A19's southern levee would improve the circulation and flow of sediment into the pond, speed the breakdown of the remaining levee, and increase the rate of transition to marsh habitat. Following the widening, the breach would have a bottom width of approximately 150 feet, an invert elevation near 3.5 feet NAVD88 and 3:1 (h:v) side slopes. The length of the cut would be approximately 90 feet. Cut volumes and areas for breach widening are shown in **Table 7**.

2.6.8.1.3 Remove Most of the Western Levee of Pond A19 and the Eastern Levee of Pond A20

Removing most of the levees between Ponds A19 and A20 would add more habitat connectivity by connecting the two former ponds. Removal of these levees would be to the elevation of the strip of existing marsh between the two ponds, to an approximate elevation of 6.6 feet NAVD88. Sections of these two levees would be left at their existing elevations to provide high-tide refugia for birds and other wildlife species. Their removal would create a larger area of connected marsh and aquatic habitat. Cut volumes and areas for levee removal are shown in **Table 7**.

2.6.8.1.4 Construct Two Breaches on the North Side Levee of Pond A19 to Connect the Pond with Mud Slough

By adding north side breaches, the habitat connectivity at the Island Ponds would increase, and the distribution of sediment and vegetation would improve. This action would include excavating a channel through the adjacent fringing tidal marsh. Both breaches would be roughly 50 feet wide at the bottom with an invert elevation of 3.5 feet NAVD88 with 3:1 (horizontal to vertical [h:v]) side slopes. The length of channels cut to connect Pond A19 with Mud Slough through the levees would be approximately 150 feet at the Pond A19 northwest breach and approximately 90 feet at the Pond A19 northeast breach. Cut volumes and areas for levee breaches and associated channels are shown in **Table 7**.

2.6.8.1.5 Install Ditch Blocks and Fill Existing Borrow Ditches

Placement of material from levee breaching and other modifications would be used to establish ditch blocks or placed into the ponds' borrow ditches. Placing fill into borrow ditches and constructing ditch blocks would speed the transition to tidal marsh. Phase 2 operations would build approximately 6 ditch blocks in Pond A19. Ditch blocks would be established in the existing borrow ditches to direct tidal flows into the interior of the ponds. The material for the ditch blocks would be sourced on-site from levee lowering or breaches. All fill for ditch blocks and material placed in ponds would be below MHHW elevation. Estimated fill volumes for ditch blocks and placed material are shown in **Table 8**.

2.6.8.1.6 Island Ponds Summary Tables

The only proposed fill at the Island Ponds would be the beneficial re-use of material from the Island pond levee breaches and lowerings. Therefore, no imported fill would be used at the Island Ponds.

Table 7 Island Ponds–Estimated Cut Volumes and Areas

CUT LOCATION	CUT PURPOSE	CUT (CUBIC YARDS)	CUT BELOW HTL/MHHW (CUBIC YARDS)	FOOTPRINT AREA (ACRES)	AREA BELOW HTL/MHHW (ACRES)
Pond A19	Northwest Levee Lowering	5,000	1,000	1.4	0.4
Pond A19	North Levee Lowering (Middle)	1,800	450	0.5	0.1
Pond A19	Northeast Levee Lowering	2,600	520	0.6	0.2
Pond A19	Southwest Levee Lowering	1,400	280	0.5	0.2
Pond A19	Southeast Levee Lowering	1,900	380	0.5	0.2
Subtotal	***Levee Lowering***	***12,700***	***2,630***	***3.3***	***1.0***
Pond A19	Southwest Levee Removal	1,400	4,670	0.4	0.2
Pond A19	Northwest Levee Removal	3,200	1,067	0.8	0.2
Pond A20	Northeast Levee Removal	1,400	4670	0.4	0.2
Pond A20	Southeast Levee Removal	2,900	967	0.9	0.4
Subtotal	*Levee Removal*	*8,900*	*2,967*	*2.5*	*1.0*
Pond A19	Northwest Breach	1,400	800	0.2	0.2
Pond A19	Northeast Breach	1,000	230	0.1	0.1
Pond A19	South Breach Widening	1,500	560	0.2	0.2
Subtotal	***Levee Breaches***	***3,900***	***1,590***	***0.6***	***0.4***
Totals	**Existing Levee Fill Removed**	**25,500**	**7,187**	**6.4**	**2.4**

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Table 8 Island Ponds–Estimated Fill Volumes and Areas

FILL PURPOSE	VOLUME (CUBIC YARDS)	VOLUME BELOW MHHW /HTL (CUBIC YARDS)	TOTAL FOOTPRINT AREA (ACRES)	FOOTPRINT AREA BELOW HTL/MHHW (ACRES)
Pond A19 - Northwest Breach - Ditch Block 1	1,800	1,800	0.3	0.3
Pond A19 - Northwest Breach - Ditch Block 2	1,900	1,900	0.3	0.3
Pond A19 - Northeast Breach - Ditch Block 1	1,500	1,500	0.3	0.3
Pond A19 - Northeast Breach - Ditch Block 2	1,400	1,400	0.3	0.3
Pond A19 - South Breach Widening - Ditch Block 1	2,200	2,200	0.3	0.3
Pond A19 - South Breach Widening - Ditch Block 2	2,200	2,200	0.4	0.4
Other placed Levee Material	14,500	14,500	4.7	4.7
Total	**25,500**	**25,500**	**6.6**	**6.6**

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2.6.8.2 Alviso A8 Pond Cluster

Proposed project activities at the A8 Ponds, shown in **Figure 4**, would build habitat transition zones at the southwest and southeast corners of Pond A8S to provide a range of benefits. The benefits of this operation include establishment of habitat complexity and diversity, erosion protection for the landfill and adjacent levees, and preparation for long-term sea-level rise adaptation. These benefits would provide critical components to the potential long-term restoration plan for the A8 Ponds – to restore them to full tidal action. The operations would include building the tops of the proposed habitat transition zones to approximately 9 feet elevation NAVD88. The lengths of the transition zones along the MHHW line at the southwest and southeast corners would be approximately 2,075 feet each. The habitat transition zones would be separated in the middle so that potential future connections with San Tomas Aquino Creek and Calabazas Creek to the south would not be precluded.

Establishing these habitat transition zones would require import and placement of submerged fill above and below MHHW elevation, as shown in **Table 9**. The habitat transition zones would be

constructed of fill material from upland construction projects and would extend into the center of the pond at a typical slope of 30:1 (h:v). Fill placed to build transition zones below MHHW tidal elevation would convert ponds to tidal wetlands, but fill placed above that elevation would convert waters to uplands.

Table 9 Pond A8–Estimated Fill Volumes and Areas

FILL PURPOSE	TOTAL VOLUME (CUBIC YARDS)	VOLUME BELOW MHHW /HTL (CUBIC YARDS)	TOTAL AREA (ACRES)	FOOTPRINT AREA BELOW HTL/MHHW (ACRES)
A8S West HTZ	94,100	91,500	12.1	11.7
A8S East HTZ	84,900	82,500	12.5	12.2
Total	179,000	174,000	24.6	23.9

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2.6.8.3 Alviso Mountain View Pond Cluster

The restoration goals for the Mountain View Ponds are to restore them to tidal marsh by connecting them to the Bay, adjacent streams, and sloughs through proposed breaches. After breaching, the ponds would accrete sediment until they reached marsh plain elevation and then begin to develop marsh vegetation. The proposed project includes those breaches as well as a number of other habitat enhancements, flood risk management components, and additional public access and recreation features.

Proposed project activities at the Mountain View Ponds include the following, all of which are shown in **Figure 5**.

2.6.8.3.1 Raise and Improve the Western Levee of Pond A1

Most of the western levee of Pond A1 would be raised to provide flood risk management to inland areas west and south of the Mountain View pond cluster. The levee breaches in Pond A1 would remove some of the de facto flood protection currently provided by the outboard levees of Pond A1, but raising the western levee of Pond A1 would offset that loss and maintain the current levels of flood risk management in the communities and infrastructure to the southwest of Pond A1. Much of the material for raising the levee would come from off-site, upland sources, though some would come from on-site breaching. The length of levee that would be raised is approximately 4,400 feet. The improved levee would have a 12-foot-wide crest north of the proposed viewing platform where no trail would be present and a 14-foot-wide crest from the viewing platform southward where a trail would be added. Levee side slopes would be 3.5:1 (h:v). The crest of the levee north of the proposed viewing platform would be constructed to an elevation of 11 feet NAVD88 along its length north of the viewing platform. The crest of the Pond A1 western levee at the viewing platform and southward would be raised to an elevation of approximately 14.7 NAVD88 to match that of the raised Coast Casey Forebay levee (described in the next bullet) that it connects to on its southern terminus. Estimated fill volumes and areas for A1 levee improvements are shown in **Table 10**.

2.6.8.3.2 Raise and Improve the Coast Casey Forebay Levee and Associated Structures

Improvements to the Coast Casey Forebay are shown in **Figure 5**. To offset the loss of de facto protection provided by Pond A1, the Coast Casey Forebay levee that is along the western end of the southern border of Pond A1 would be improved between the Palo Alto Flood Control Basin levee and the high ground in Shoreline Park. In accordance with that necessity, the City of Mountain View, which owns that levee, seeks to raise the entire length of that levee even beyond its intersection with the Pond A1 levee. To incorporate the highest sea-level rise prediction from the City of Mountain View's Sea Level Rise Study, Feasibility Report, and Capital Improvement Program (ESA PWA 2012), this levee improvement would build a levee base and foundation support sufficient to support a 16-foot NAVD88 cross section but to a crest elevation of 14.7 feet NAVD88. This design levee height satisfies the FEMA design criteria for 100-year flood level plus 3 feet and gives the City of Mountain View the option of future improvements to address sea-level rise. Further, the Santa Clara Valley Water District (SCVWD), which is the flood protection agency in Santa Clara County, has recommended that a levee-top elevation of 14.7 feet NAVD88 be used for long-term sea-level rise planning. This design levee height would also improve flood risk management along the southern end of Charleston Slough and the communities and infrastructure behind it. The length of the levee improvements would be approximately 1,440 feet. The top width of the improved levee would be approximately 24 feet. In and around this levee are a pump station, a valve vault, and several utility access ports, and all would remain as existing. An existing pump station control building to the southwest would remain in place and the raised levee would be built around it. The existing wooden platform and viewing station that extend into the slough from the trail near the water intake would remain in place, and an Americans with Disabilities Act (ADA)-compliant sloped path would be installed to connect it to the raised Coast Casey Forebay levee. A similar path would connect the top of the Coast Casey Forebay levee to the existing trail from the parking area to the south. Estimated fill volumes and areas for all of these levee improvements and associated structural improvements at the Coast Casey Forebay are shown in **Table 10**.

Finally, an excavation is required to place the shear key that is necessary to complete the improvements on the Coast Casey Forebay levee. A shear key is a volume of strengthened material that extends into the existing material to increase the stability and resistance to sliding for the improved levee. The volume and area for this ground excavation-and-replacement activity are included as part of the Coast Casey Forebay improvement estimates in **Table 10**. The cut volume and area for this portion of work are shown in

Table 11. All cut and fill work for the shear key excavation would occur below MHHW, though the forebay itself is not tidally connected. The shear key excavation would remove and replace an equal volume of fill over the same area and would improve material and stability to existing conditions.

2.6.8.3.3 Add Recreation and Public Access

Three recreation and public access features would be added. Estimated dimensions for these features are shown in **Table 12** and

Table 13.

- In the first, a viewing area including a platform, informational signage, and benches would be constructed within the City of Mountain View's Shoreline Park or near the existing trail on the southern border of Pond A1 near the eastern end of the pond. The viewing platform area would be graded and its surface would be improved, but no elevated structures would be built.
- In the second, a spur trail would be constructed along the improved western levee of Pond A1 to a viewing platform similar to the one described above. It would be placed near the point where the habitat transition zone meets the Pond A1 west levee. The viewing platform would be established on a somewhat widened section of the existing levee where the benches and interpretive panels can be placed. The height of the levee-top trail from its split with the Bay Trail atop the Coast Casey Forebay levee would be at 14.7 feet elevation NAVD88 to match the elevation of the Bay Trail spine. (Beyond the viewing platform area, the levee top elevation would be at approximately 11 feet NAVD88, as discussed above.) This would provide viewing access to Charleston Slough and Pond A1. Benches and interpretive signage are proposed on both sides of the trail at the A1 western levee viewing platform.
- In the third, a trail along the levee on the eastern and northeastern side of Pond A2W. The trail on the eastern and north-eastern levees of Pond A2W would be approximately 6,440 feet (1.2 miles) long. The surfaces and side slopes of those levees would be maintained for PG&E access and would also open that route for public recreational access, add signage, and include more-frequent maintenance for safety. A viewing platform, similar to the ones described above, would be added at the end of the trail. This area would provide access to views of Pond A2W and the Bay.

2.6.8.3.4 Raise Concrete Foundations of PG&E Towers in Pond A2W

Sixteen (16) transmission towers are within Pond A2W. Conversion of this pond to tidal marsh habitat would require PG&E to upgrade the tower foundations to account for the introduced tidal flux and to raise the maintenance/service boardwalks that run under the power lines and provide PG&E access to the towers. The concrete pedestals on which the towers sit would be reinforced with additional concrete placed higher on the tower legs to protect the metal portions of the towers from the corrosive action of saltwater from the highest tides. The total combined area of the new concrete foundation is estimated to be 540 square feet (about 0.013 acre), and the total combined volume of that concrete is 2,160 cubic feet (80 cubic yards). Construction details for PG&E operations are provided in **Appendix B**. Jurisdictional fill impacts are summarized in response to Box 3 (Section 3).

2.6.8.3.5 PG&E Boardwalk Improvement and Addition

Phase 2 would elevate the existing PG&E access boardwalks in Pond A2W and construct a new section of boardwalk outside of Pond A1 to connect Pond A2W's outboard levee with the existing boardwalk outside of the Palo Alto Flood Control Basin. All existing boardwalks would be raised a maximum of 4 feet, utilizing the existing boardwalk pillars. The existing boardwalks in Pond A2W are made of wooden planks on a wooden frame that rests on concrete foundations set into the pond bottom. The decking is approximately 6,700 feet long, two to three feet wide, and only intermittently used by PG&E for pedestrian access to the towers. This boardwalk would be removed and replaced with a higher one to retain PG&E access to the towers. The replacement would increase the width of the boardwalk by approximately two feet and thus increase the shaded area of the Bay. The exact amount of added surface area would not exceed 13,500 square feet (0.31 acre). In addition to raising

the boardwalk within the pond, a new section of boardwalk would be added to connect the end of the Pond A2W boardwalk with the end of an existing one that lies northwest of Pond A1. The additional boardwalk would be approximately 2,350 feet long and 3 feet wide (7,050 square feet or 0.16 acre). This area the area of new shade added to the bay. The total cross-sectional area of the piles to support this new boardwalk is less than 700 square feet (under 0.15 acre). The total volume of the piles to support the new boardwalk would be approximately 280 cubic yards, of which approximately 186 cubic yards would be below the bay floor (piles must be placed 12 vertical feet below the bay floor), and the remaining 93 cubic yards would be in the water column. The various access points to the boardwalks would be gated to protect against unauthorized human entry and would be designed to exclude terrestrial predators of marsh wildlife species that may use them. Jurisdictional fill impacts are summarized in response to Box 3 (Section 3).

2.6.8.3.6 Construct Habitat Transition Zones in Ponds A1 and A2W

Habitat transition zones would be constructed in Ponds A1 and A2W inside the southern edges of Ponds A1 and A2W to create transitional habitat between the lower elevation of the pond bottoms and the uplands and levees behind them. Once vegetated, the habitat transition zones would provide habitat for salt marsh harvest mouse and other terrestrial species. They would also provide a gentle slope for dissipation of wave energy and reduction of erosion potential, thereby protecting the closed landfill below Shoreline Park. The transition zone in Pond A1 would extend all the way across the southern border of the pond. In Pond A2W the transition zone would only cross the central portion of the pond's southern border, so that potential future connections with the existing mitigation marshes to the south (the Mountain View mitigation marsh and the Stevens Creek mitigation marsh) would not be precluded. The habitat transition zones would be constructed primarily of upland fill material from off-site projects. Roughly 3,700 linear feet and 3,200 linear feet of transition zone would be established along the inside slope of Ponds A1 and A2W, respectively. The habitat transition zones would have a top elevation of approximately 9 feet NAVD88. The slope of these features in Pond A1 would be varied to provide a range of different slopes including slopes at 10:1, 20:1, 30:1 and 40:1 (h:v). The intent of this variation is to execute a pilot project that would provide observational data about the habitat values, erosion protection, and sea-level rise adaptation that would result from these varying slopes. This approach is proposed as part of the SBSP Restoration Project's commitment to developing and sharing scientific insights to inform not only future phases of this project, but also to develop insights and test hypotheses that have broader application to other projects. In Pond A2W, the slope would be 30:1 (h:v). Estimated fill volumes, and areas for the habitat transition zones at the Mountain View Ponds are shown in **Table 10**.

2.6.8.3.7 Construct Habitat Islands in Ponds A1 and A2W for Birds

Nesting and roosting habitat for shorebirds, terns, and dabbling ducks would be created through the construction of islands in Ponds A1 and A2W. This would include building up to ten islands, with 3 to 5 islands per pond. The islands would be constructed largely of upland fill material from off-site projects. Each island would have a top area of roughly 10,100 square feet, a top elevation of 12.5 feet NAVD88 (roughly 3 feet above MHHW) and side slopes would be approximately 3:1 (h:v). As the ponds transition to marsh, the island habitat would eventually become marsh mounds, which have various ecological benefits as high-tide refugia and as focal points for further sediment aggregation and vegetation formation. Estimated fill volumes, and areas for habitat islands at Mountain View Ponds are shown in **Table 10**.

2.6.8.3.8 Breach Pond A1 at Two Locations and Pond A2W at Four Locations

These breaches and the associated channels that would be excavated to connect them to the surrounding sloughs would allow tidal flows to enter, sediment to accrete, and vegetation to become established. The two Pond A1 breaches would be at the northwest corner of the pond on the western levee and along the eastern levee into Permanente Creek/Mountain View Slough. Two of the four Pond A2W breaches would be on the western levee into Permanente Creek/Mountain View Slough. The other two breaches would be on the eastern levee into Stevens Creek/Whisman Slough. The specific locations of these breaches would be determined during advanced construction design, but their locations would generally follow the locations of historical slough traces and are also being chosen to minimize the amount of existing fringing marsh through which the channel to connect the breaches to the sloughs must be excavated. The breaches would all have an invert elevation of approximately 2 feet NAVD88 and have approximately 2:1 (h:v) side slopes. The bottom widths would be approximately 60 feet. The length of the channel cut connecting Pond A1 to adjacent Mountain View Slough would be approximately 110 feet. At Pond A2W's western levee, the channel cut through the south breach connecting Pond A2W to Permanente Creek/Mountain View Slough would be approximately 230 feet and through the north breach the channel cut would be approximately 200 feet. On Pond A2W's east levee, the channel cut through the south breach connecting A2W to Stevens Creek/Whisman Slough would be approximately 210 feet long and through the north breach it would be approximately 200 feet long. The two breaches on the eastern levee would be designed such that the top width would be wide enough to span access bridges (described below). Both of the breaches on the eastern side of Pond A2W would be armored on both sides to protect the bridge abutments from future erosion or scour. Estimated Cut volumes and areas of breaches and the associated channels are shown in **Table 11**.

2.6.8.3.9 Armor the Two Eastern Breaches of Pond A2W and Add Bridges over the Two Breaches

Two single-span precast/prestressed I-girder bridges would be installed to extend over the armored breaches on the eastern levee of Pond A2W and would provide access to existing PG&E utilities. To accommodate the load of maintenance vehicles, bridges would be designed to accommodate a vehicle load of 4,000 pounds. The bridges would consist of pile supported abutments and wing walls at each end that would provide a foundation for the superstructure and would also serve to armor the breaches and prevent further scour and widening. Foundations and wing walls would be cast in place concrete footings supported on top of piles driven into the existing levee and its edges, where it meets the fringing marsh and the pond interior. Each foundation's abutment is estimated to require 8 supporting piles. The total pile count for both bridges is estimated to be 32 piles. The superstructure would be cast-in-place concrete bridge deck on precast/prestressed 2.5 feet deep I-girders. Concrete barriers (Type 732 or similar) would be placed on each side of the bridge. Each bridge would be approximately 60 feet long and 19 feet wide. This length would allow for a minimum of 40 feet channel bottom width through the bridge opening. The bridge deck elevation would be 12.25 feet NAVD88 and the soffit would be at 9 feet NAVD 88 elevation. The dimensions of the fill for abutments and piles are included in **Table 10**. **Table 14** quantifies the area and piling information for the bridges. A trail approximately 15 feet wide with 2-foot-wide shoulders on each side with would traverse the top of the bridges.

2.6.8.3.10 Mountain View Ponds Summary Tables

Table 10 Mountain View Ponds–Estimated Fill Volumes and Areas by Purpose

FILL PURPOSE	VOLUME (CUBIC YARDS)	VOLUME BELOW MHHW /HTL (CUBIC YARDS)	TOTAL FOOTPRINT AREA (ACRES)	FOOTPRINT AREA BELOW HTL/MHHW (ACRES)
Coast Casey Forebay Levee Improvement	27,400	12,050	2.3	1.5
Pond A1 West Levee Improvement	89,100	40,320	12.7	8.3
10 Habitat Islands	53,500	40,600	5.1	5.1
Bridge Piles, Abutments	540	100	0.1	0.0
Pond A1 Habitat Transition Zone	77,100	73,480	16.9	15.9
Pond A2W Habitat Transition Zone	80,000	77,120	15.7	15.7
Totals	**327,640**	**243,670**	**52.8**	**46.4**

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Table 11 Mountain View Ponds–Estimated Cut Volumes and Areas

CUT LOCATION	CUT PURPOSE	CUT (CUBIC YARDS)	CUT BELOW HTL/MHHW (CUBIC YARDS)	FOOTPRINT AREA (ACRES)	AREA BELOW HTL/MHHW (ACRES)
Pond A1	Northwest Breach	1,700	990	0.2	0.1
Pond A1	Southeast Breach	1,700	660	0.2	0.1
Pond A2W	Northwest Breach	2,400	660	0.3	0.1
Pond A2W	Southwest Breach	3,000	880	0.4	0.1
Pond A2W	Northeast Breach	1,100	330	0.1	< 0.1
Pond A2W	Southeast Breach	2,200	1,650	0.3	0.2
Subtotal	***Mountain View Pond Breaches***	***12,100***	***5,170***	***1.5***	***0.7***
Pond A1 (Coast Casey Forebay)	Shear Key Excavation	3,100	3,100	0.7	0.7
Totals		**15,200**	**8,270**	**2.2**	**1.3**

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Table 12 Mountain View Ponds–Recreational Features: Viewing Platform Footprints

FEATURE	AREA (SQUARE FEET)
A1 West Levee Viewing platform	830
Shoreline Park Viewing platform	440
Pond A2W Northeast Viewing platform	1,900
Total	**3,170**

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Table 13 Mountain View Ponds–Recreational Features: Trail Lengths and Areas

FEATURE	LENGTH (FEET)	WIDTH (FEET)	AREA (SQUARE FEET)
Pond A1 West Levee Trail	480	14	6,720
Pond A2W East Trail	6,440	16	103,040
New Trails: Subtotal	***6,920***	***NA***	***109,760***
Coast Casey Levee Trail Replacement	1,460	16	23,360
Total	**8,380**	**NA**	**133,120**

Note:
All trail widths include 2 feet of shoulder space on each side of the trail.
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Table 14 Mountain View Ponds–A2W Bridge Details

LOCATION	BRIDGE SUPERSTRUCTURE FOOTPRINT (SQARE FEET)	PILE QUANITITY	PILE LENGTH (FEET)	PILE DIAMETER (INCHES)
Pond A2W Northeast Breach	1,131	16	45	14
Pond A2W Southeast Breach	1,131	16	45	14

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2.6.8.4 Ravenswood Pond Cluster

The restoration goals for the Ravenswood Ponds are to restore Pond R4 to tidal marsh by connecting it to the Bay through a breach into Ravenswood Slough, to improve Pond R3 as an enhanced managed pond for small shorebirds, including western snowy plover (*Charadrius alexandrines*), and to convert Ponds R5 and S5 to enhanced managed ponds for dabbling ducks and other bird guilds. The proposed project includes the breach, four water control structures, a number of other habitat enhancements and flood risk management components, and additional public access and recreation features.

Proposed project activities at the Ravenswood Ponds include the following, all of which are shown in **Figure 6**. Estimated cut volumes and areas are summarized in **Table 15**. Estimated fill volumes and areas are summarized in **Table 16**.

2.6.8.4.1 Convert Ponds R3, R5 and S5 to Enhanced Managed Ponds and Install Water Control Structures

There would be four water control structures installed within and between these ponds to allow them to be managed to achieve different habitat goals. First, a water control structure would be installed into the eastern levee of Pond R3 where the historical slough trace intersects with Ravenswood Slough. This water control structure would allow direct control and management of the water levels in

the pond to provide for better water quality, better control over water levels, and improvement of the existing western snowy plover forage habitat in Pond R3. There would also be a channel excavated through the external fringing marsh to connect the water control structure with Ravenswood Slough.

Ponds R5 and S5, which are currently seasonal ponds, would be converted into a single enhanced managed pond through removal or modification of levees within and between the ponds. There would be four water control structures (pipe culverts through levees) installed. One would be installed at the levee between Ponds R4 and R5. Another would be installed between Pond S5 and Flood Slough. A third would be installed between Ponds S5 and R3. The fourth would be installed between Pond R3 and Ravenswood Slough. By providing the means for year-round control of water levels and some control of the salinities and other aspects of water quality in the ponds, these structures would allow for separate control of different types of managed pond habitat for various guilds of birds by allowing different bottom depths and elevations.

The water control structures would be circular high density polyethylene (HDPE) pipes (culverts). The number of pipes, pipe size, and invert elevations of the water control structures that would be installed at proposed locations around the project site, are listed in **Table 17**. The water control structures would be gated at both ends to allow two-way control over flows in or out of each pond.

To support loads from the control structure gates and access to gate controls by Refuge personnel, bridges would be constructed above each pipe culvert from the proposed or existing levee grade to the end of each pipe. The bridge decks would be pre-cast/pre-stressed concrete voided slab decks on pile caps supported by driven concrete piles. Bridge decks would include cable railing on each side of the deck for safety. Areas for water control structures are shown in **Table 17**.

2.6.8.4.2 Improve Levees and Fill in the All-American Canal

Approximately 4,700 feet of improved levee would be constructed on existing levees and would fill in the AAC. The berm-like levees along both sides of the AAC would be raised and strengthened, and the AAC would be filled in, creating a single levee. Constructing this improved levee would replace the de facto flood risk protection currently provided by the outboard levees on Pond R4. Improvements at the western end of the AAC would extend north along the Ponds R4/R5 border and south along the R3/S5 border to isolate Ponds R5 and S5 from the others so that they can be managed separately. Most of the material for the improvements would come from off-site sources, though some may be from local cut activities. The improved levee would consist of a 60-foot-wide crest with side slopes at approximately 3.5:1 (h:v) on the north side and 4.5:1 (h:v) on the south side. The crest of the levee would be at elevation 11 feet NAVD88. The improved levee would become wider as it transitions to meet the sections of improved levee that would form the eastern borders of Ponds R5 and S5 and would also be the basis of a public access trail and viewing platform. The AAC would not have a trail on top, but would allow access by vehicles for maintenance and monitoring activities. A gate would be placed at the viewing platform area to restrict access.

2.6.8.4.3 Construct Two Habitat Transition Zones in Pond R4

Construct and vegetate one habitat transition zone in the western side of Pond R4, up against the Bedwell Bayfront Park (a closed landfill) border as shown in **Figure 6**. This habitat transition zone would be approximately 2,500 feet long. Construct and vegetate a second habitat transition zone to extend northward into Pond R4 from the improved AAC levees. This second habitat transition zone would be approximately 5,100 linear feet long. The habitat transition zones would be at an elevation

of 9 feet NAVD88 along the levees or the high ground of the park and have side slopes of 30:1 (h:v) with varying steeper slopes at end transitions. The transition zones would be constructed primarily of upland fill material brought in from off-site locations.

2.6.8.4.4 Remove Internal Levees in Ponds R5 and S5

As part of converting Ponds R5 and S5 to managed ponds, four water control structures (discussed above) would be installed within and between these ponds. To further enhance the habitat, most of the levee between Ponds R5 and S5 would be removed, and the levee within Pond S5 (i.e., between the forebay and the main part of Pond S5) would be removed to an elevation of 4.5 feet NAVD88 to match the surrounding pond bottoms. This would increase the area available for aquatic habitat within the ponds. As discussed below, a portion of the existing internal levee between Ponds R5 and S5 would be left in place and resurfaced to improve its suitability for use as a habitat island for bird roosting and nesting.

2.6.8.4.5 Establish a Habitat Island between Ponds R5 and S5

A habitat island would be created between Ponds R5 and S5 from the remnants of the internal levee currently between those ponds. The island would be modified to optimize its usefulness as upland wildlife habitat. The habitat island surface would be approximately 1.77 acres with a relatively flat top at elevation 9 feet NAVD88 (above the MHHW elevation) with side slopes of 2:1 (h:v) down to the adjacent pond bottom. Sand, shell, or other suitable topping would be added to the island to enhance its usefulness for the birds that would use it and to help control invasive vegetation.

2.6.8.4.6 Excavate a Pilot Channel in Pond R4

Portions of the bottom of Pond R4 would be modified to direct the new tidal flows (introduced by the levee breach) into the interior of the pond by creating and extending pilot channels from portions of former slough traces. The proposed pilot channels would together be roughly 2,890 feet long and would be excavated through the existing pond bed. The invert elevation would be at 2 feet NAVD88 to roughly match the invert elevation of the existing channels within Pond R4. The bottom width of the channel cut would be roughly 50 feet wide with side slopes of 2:1 (h:v). The moved material would be used to enhance levees, and construct habitat transition zones and ditch blocks.

2.6.8.4.7 Build Ditch Blocks in Pond R4

Build ditch blocks in the existing borrow ditches west of the R4 breach to direct tidal flows into the interior of the ponds. The material for the ditch blocks would be from a combination of imported fill material and local material from levee lowering or breaches.

2.6.8.4.8 Add Recreation and Public Access Features

A trail along the improved eastern levees of Ponds R5 and S5 would be constructed and linked to the existing trails outside of these ponds. As shown in **Figure 6**, the northern end would connect to the existing trail in Bedwell Bayfront Park; the southern end would connect to the Bay Trail spine. This trail would be approximately 2,750 feet long and 10 feet wide with 2 feet of shoulder on each side. Surfacing materials would be decomposed granite with timber or concrete edging. The proposed water control structures between Ponds R4 and R5 and between Ponds R3 and S5 would be set low enough to allow trail construction over them. This trail would necessitate a break in the new fence that borders the northern side of the Bay Trail, a gate, and appropriate signage along the southern border of Ponds R5 and S5 where it leaves the Refuge and connects to the Bay Trail. The trail would be bordered on both sides with low symbolic deterrent fencing (2- or 3-foot-high posts connected

by chains, cables, or rails) to provide a visual reminder to trail users to stay on the trail and not enter the restoration areas. Total length of fencing to be installed would be approximately 5,160 feet.

A viewing platform would be constructed near the central point of this trail, at the junction with the improved AAC levee. The viewing platform would have benches and interpretive signage on pedestals and/or information panels. This would improve public access and supplement the visual benefits the trail and the restoration project would make available. As shown in **Figure 6**, benches would be located near the exhibit's signage. This action would allow the public to enhance the recreational experiences at the relatively high-use Bedwell Bayfront Park in Menlo Park by incorporating the interpretive opportunities and providing a view of all three of the Refuge's restoration pond types at these ponds.

2.6.8.4.9 Lower the levee in the northwest corner of Pond R4

Approximately 960 linear feet of the northwestern levee on the edge of Pond R4 would be lowered to MHHW. This modification would improve habitat connectivity between Pond R4 and Greco Island/West Point Slough, and it would also provide high-tide refugia for salt marsh harvest mouse and other species. The new top elevation would be at approximately 8 feet NAVD88 and side slopes would be approximately 2:1 (h:v). Material from the lowered levee would be used to raise levees or construct habitat transition zones.

2.6.8.4.10 Breach Pond R4

Breach the northeastern corner of Pond R4 to open the pond to tidal flows from Ravenswood Slough. Material from the breached levee would be used to build ditch blocks to direct flows through the borrow ditch to the historic slough trace and into the pond's center; material could also be used to improve levees or construct habitat transition zones. The bottom width of this breach would be approximately 200 feet, with an invert elevation of 2 feet NAVD88 and with side slopes of 3:1 (h:v). The length of the excavated channel to connect the breach to Ravenswood Slough through the existing fringe tidal marsh would be approximately 470 feet.

2.6.8.4.11 Fence the Southern Border of Ponds R3 and S5

A low (3-foot-high) chain-link fence approximately 8,000 feet in length would be installed inside the Refuge property and adjacent to the existing Cargill pipeline property, north of the Bay Trail. The purpose of the fence is to deter people and their pets from leaving the trail and entering the restored habitat there. The fence would also help keep trash from blowing into the ponds and keep chicks from straying from Pond R3 onto the paved trail and roadway to the south.

2.6.8.4.12 Ravenswood Ponds Summary Tables

Table 15 Ravenswood Ponds–Estimated Cut Volumes and Areas

CUT LOCATION	CUT PURPOSE	CUT (CUBIC YARDS)	CUT BELOW HTL/MHHW (CUBIC YARDS)	AREA (ACRES)	AREA BELOW HTL/MHHW (ACRES)
Pond S5	Internal Levee Removal	2,500	1,000	0.5	0.2
Ponds R5/S5	north internal levee removal	4,100	3,900	1.5	0.9
Ponds R5/S5	South Internal Levee Removal	4,100	2,800	1.2	0.6
Subtotal	*Levee Removal*	*10,700*	7,700	*3.2*	*1.7*
Pond R4	Northwest Levee lowering	2,100	0	0.9	0.3
Pond R4	Northeast Breach	13,300	10,600	2.1	2.0
Pond R4	Pilot Channel	16,000	16,000	4.1	4.1
Pond R3	Water Control Structure	1,000	1,000	0.2	0.2
Totals		**43,100**	**35,300**	**10.4**	**8.2**

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Table 16 Ravenswood Ponds–Estimated Fill Volumes and Areas by Purpose

FILL PURPOSE	VOLUME (CUBIC YARDS)	VOLUME BELOW MHHW /HTL (CUBIC YARDS)	TOTAL FOOTPRINT AREA (ACRES)	FOOTPRINT AREA BELOW HTL/MHHW (ACRES)
R5/S5 East Levee and All American Canal Levee Improvement	182,400	46,090	17.5	7.0
All American Canal HTZ	76,300	69,460	14.9	12.0
Bedwell Bayfront Park HTZ	50,200	47,240	9.1	8.3
Ditch Block west of R4 Breach	1,000	1,000	0.3	0.3
Water Control Structures	400	400	0.2	0.2
Total	310,300	164,190	41.9	27.8

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Table 17 Ravenswood Ponds–Water Control Structures

LOCATION	PIPE QUANTITY	INSIDE DIAMETER (INCHES)	PIPE LENGTH (FEET)	INVERT ELEVATION NAVD88 (FEET)	PILE QUANTITY*	TOTAL AREA** (SQUARE FEET)
Pond R5/S5 to Flood Slough	2	48	183	2	8	3,790
Pond R5/S5 to Pond R4	2	48	78	3.5	8	1,650
Pond R5/S5 to Pond R3	1	48	67	4.5	8	690
Pond R3 to Ravenswood Slough	1	48	62	2	8	640
Total	**6**	**N/a**	**390**	**n/a**	**32**	**6,770**

Notes:
*All piles are 16-inch diameter and approximately 20 feet long.
**Total area includes pipe-culvert, gates, and bridges at each control structure.
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2.6.8.5 South Bay Salt Pond Restoration Project Phase 2 Summary Tables

Table 18 to **Table 24** summarize the lengths, areas, and volumes of the proposed features for the SBSP Phase 2 project. For ease of reference, the fill and cut estimates are provided by location (i.e., pond cluster) in one set of tables and by purpose in another set of tables (**Table 18** to **Table 21**). The cut information in **Table 18** and **Table 19** represent the same volumes and areas presented two different ways, likewise for the fill volumes and areas summarized in **Table 20** and **Table 21**. In addition, each of these tables contains the total areas and volumes at each location, or for each purpose, and then parses those areas or volumes into the amounts above and below MHHW. This split of the totals is intended to help the regulatory agencies understand the portion of these totals that would be placed into waters versus that placed into uplands.

Estimates for PG&E operations are not included in the summary tables as they are being developed separately. These impacts are provided in response to Box 3.

In addition,

Table 22 and **Table 23** show the lengths and areas of new public access features by pond cluster location. As all of these features would be placed onto existing ground or onto levees that would be enhanced regardless; these features add negligible amounts of new cut or fill areas or volumes.

Table 24 summarizes the areas for new structures to be installed during Phase 2 operations.

Table 18 Phase 2–Total Cut Volumes and Areas by Location

POND CLUSTER	CUT (CUBIC YARDS)	CUT BELOW HTL/MHHW (CUBIC YARDS)	AREA (ACRES)	AREA BELOW HTL/MHHW (ACRES)
Island Ponds	25,500	7,187	6.4	2.7
A8 Ponds	0	0	0	0
Mountain View Ponds	15,200	8,270	2.2	1.3
Ravenswood Ponds	43,100	35,300	10.4	8.2
Totals	**83,800**	**50,757**	**19.0**	**12.0**

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Table 19 Phase 2–Total Cut Volumes and Areas by Purpose

PURPOSE	CUT (CUBIC YARDS)	CUT BELOW HTL/MHHW (CUBIC YARDS)	AREA (ACRES)	AREA BELOW HTL/MHHW (ACRES)
Levee Removal	19,600	10,667	5.7	2.7
Levee Lowering	14,800	2,630	4.2	1.3
Levee Breaches, Excavations and Pilot Channels	49,400	37,460	9.1	8.0
Totals	**83,800**	**50,757**	**19.0**	**12.0**

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Table 20 Phase 2–Total Fill Volumes and Areas by Location

POND CLUSTER	NET FILL (CUBIC YARDS)	VOLUME BELOW MHHW /HTL (CUBIC YARDS)	AREA (ACRES)	FOOTPRINT AREA BELOW HTL/MHHW (ACRES)
Island Ponds	25,500	25,500	6.6	6.6
A8 Ponds	179,000	174,000	24.6	23.9
Mountain View Ponds	327,640	243,670	52.8	46.4
Ravenswood Ponds	310,300	164,190	41.9	27.8
Totals	**842,440**	**607,360**	**125.9**	**104.8**

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Table 21 Phase 2–Total Fill Volumes and Areas by Purpose

FILL PURPOSE	NET FILL (CUBIC YARDS)	VOLUME BELOW MHHW /HTL (CUBIC YARDS)	AREA (ACRES)	FOOTPRINT AREA BELOW HTL/MHHW (ACRES)
Levee Improvement	298,900	98,460	32.5	16.8
Habitat Island	53,500	40,600	5.1	5.1
Habitat Transition Zone	462,600	441,300	81.1	75.9
Ditch Blocks & Placement of Re-used Levee Material	26,500	26,500	6.9	6.9
Structures (Water Control and Bridges)	940	500	0.2	0.2
Totals	**842,440**	**607,360**	**125.9**	**104.9**

AECOM 2016

Table 22 Phase 2–Recreational Features: Trails

LOCATION	LENGTH (FEET)	AREA (SQUARE FEET)
Island Ponds	NA	NA
A8 Ponds	NA	NA
Mountain View Ponds*	8,380	133,120
Ravenswood Ponds	2,750	38,500
Total	**11,130**	**171,620**

Note:
Mountain View Pond totals include installing new trails and replacing existing trails
AECOM 2016

Table 23 Phase 2–Recreational Features: Viewing Platform Footprints

LOCATION	AREA (SQUARE FEET)
Island Ponds	NA
A8 Ponds	NA
Mountain View Ponds	3,170
Ravenswood Ponds	9,960
Totals	**13,130**

AECOM 2016

Table 24 Phase 2–Structure Areas by Type

STRUCTURE	AREA (SQUARE FEET)
Water Control Structures	5,100
Bridges	2,600
Total	**7,700**

AECOM 2016

2.6.9 Means, Methods, and Equipment

This section discusses the construction approach at each of the Phase 2 locations. It describes the means and methods of how each component listed above would be implemented, and lists the equipment that would be used to do so. Subsequent sections address details of construction schedules and of the planned operations and maintenance.

A San Francisco Regional Water Quality Control Board (RWQCB) accepted Stormwater Pollution Prevention Plan (SWPPP) for the project would be implemented for all project-related activities; appropriate Best Management Practices (BMPs) would be used for all activities with potential impact on water quality. Water quality monitoring would be undertaken in compliance with a SBSP

Restoration Project 401 Certification and Waste Discharge Requirements, after issued by the RWQCB, and the San Francisco Bay RWQCB Basin Plan.

Before the start of construction activities, areas to be disturbed by construction equipment would be cleared of existing vegetation and disposed off-site.

2.6.9.1 Alviso Island Pond Cluster

At the Island Ponds, the construction approach would include the following details.

2.6.9.1.1 Construction Access

Primary land access to the Island Ponds would be from the adjacent levees at Ponds A22 and A23. Vehicle and heavy equipment access to these ponds is available from levee roads. An amphibious excavator would be offloaded and floated across Mud Slough. Daily access for crews would be from the Fremont Boulevard exit off of Interstate 880, onto Landing Road, and then onto Coyote Creek Lagoon Trail that connects to the northeast corner of Pond A19 via a small footbridge. Construction crews would typically consist of fewer than a dozen people.

2.6.9.1.2 Construction Staging Areas

No staging areas are necessary for stockpiling at the Island Ponds. Most equipment used for construction would stay within the project footprint, and no fill material would be brought into the Island Ponds. However, a small staging area northeast of Pond A19 would be provided during construction for vehicles and equipment.

2.6.9.1.3 Levee Breach and Channel Excavation

All levee modifications – including adding new breaches, widening an existing breach, and lowering and removing levees – would be accomplished by using amphibious excavators, and other conventional construction equipment. Movement of the excavator between the perimeter levees of Ponds A19 and A20 would occur at low tide utilizing mats. The excavators would work from the existing levees.

2.6.9.1.4 Ditch Blocks

Ditch blocks would be formed by placing material from other onsite activities into the existing internal borrow ditches and compacting it. Excavators would be used for placement and initial compaction, and a vibratory hand tamper or a roller would be used for compaction.

2.6.9.1.5 Construction Equipment

Construction equipment would include excavators (amphibious and/or terrestrial, fitted with long-reach attachments), a barge (for fueling and possibly for access to the project site), low-bed truck, other common construction equipment, skiff, and pickup vehicles for transportation in and out of the project site.

2.6.9.2 Alviso A8 Pond Cluster

At the A8 Ponds, the construction approach would include the following details.

2.6.9.2.1 Construction Access

Access to the A8 Ponds would be from Gold Street or America Center Road near the southeast corner of Pond A8S and the levee crests along the perimeter levees. The ponds would be accessed by haul trucks using existing roadways and levee roads. No work would occur on the internal pond

levees. Construction crews would typically consist of fewer than a dozen people. The existing levees are known to be capable of handling heavy construction equipment and trucks carrying dirt because the SCVWD uses these access roads to import material dredged from creek channels in Santa Clara County.

2.6.9.2.2 Construction Staging Areas

A staging area would be established for equipment and material stockpiling. The location would be within the hard-pack access and turnaround areas that exist within the construction area along the southern border of Pond A8S.

2.6.9.2.3 Habitat Transition Zones

The habitat transition zones would be constructed by placing fill material along the slopes and into the pond bottom. The work would proceed from the existing levee roads outward into the pond. Material would be placed and compacted to approximately 70 percent density to enable vegetation establishment. Slope protection would be maintained by establishment of native vegetation. Hydroseeding or other seeding method with a native plant mix, development of a planting scheme, and invasive plant control would aid in establishing desirable vegetative habitat.

2.6.9.2.4 Construction Equipment

Construction equipment would include haul trucks, bulldozers, water trucks, compaction rollers, other construction equipment, and vehicles for transportation in and out of the project site.

2.6.9.3 Alviso Mountain View Pond Cluster

At the Mountain View Ponds, the construction approach would include the following details.

2.6.9.3.1 Construction Access

Primary access to the project site would be from U.S. 101 via exits for major arterials. The first of those would be to the Pond A1 portion of the project using the North San Antonio Road exit, continuing north to Terminal Boulevard and then heading east onto the levee road between the Shoreline Park sailing lake and the Coast Casey Forebay. From there, the work areas along the Coast Casey Forebay, Charleston Slough, and Pond A1 would be accessible. A secondary route is available along the levee road that forms the western boundary of the Coast Casey Forebay. To reach the work areas at Pond A2W, the Rengstorff Avenue North exit would be used to leave U.S. 101 and head north, after which, Amphitheater Parkway, North Shoreline Boulevard, and Crittenden Lane would be used to reach the large levees and existing access roads around west of Stevens Creek and the northeastern corner of Shoreline Park.

The exact route(s) and timing used for material delivery are subject to modification due to City of Mountain View requirements for traffic control, Shoreline Park activities, and burrowing owl protection. The SBSP Restoration Project would develop the final haul routes in consultation with the City of Mountain View's traffic engineers to minimize potential traffic impacts.

Construction crews would typically consist of five to ten people. The pond cluster would likely be accessed by construction crews from U.S. 101, after which various arterial, collectors, and local streets provide access to Mountain View Shoreline Park and the ponds beyond it. Heavy vehicles would avoid crossing structures in the levees if the vehicle exceeds the weight-bearing capacity. If this is not possible, engineer-approved precautions would be taken to avoid damaging the structure.

2.6.9.3.2 Construction Staging Areas

Construction staging areas would be established within Mountain View Shoreline Park in coordination with City of Mountain View. The staging areas would be adjacent to the southern border of Pond A1 north of the sailing lake and east of the Coast Casey Forebay and adjacent to the southern border of Pond A2W west of Stevens Creek Marsh in upland areas alongside existing roads and trails, as shown on project plan sheets (**Appendix C**).

2.6.9.3.3 Levee Improvement

Levee improvements along the western side of Pond A1, the eastern side of Pond A2W, and the Coast Casey Forebay levee would require clearing of vegetation, debris, and grooving. Fill would be placed in approximately 6-inch-thick lifts and compacted either through a vibratory hand tamper or a roller to achieve approximately 90 percent compaction for the A1 west levee and 95 percent compaction for the Coast Casey Forebay levee. Some material would be largely sourced from off-site excavation projects. On-site sources would include excavated material from levee lowering, channel excavation, and breaching activities. After levee improvement operations, the A1 levee north of the viewing platform would be hydroseeded with a native plant mix.

Levee crests destined for trail access would be finished with an approximately 12-inch-thick layer of aggregate base to provide all weather access and to be compliant with the Architectural Barriers Act (ABA) on federal lands and the ADA where the trails are part of the Bay Trail system or where project partners (e.g., city, county, or State agency) have compliance obligations.

2.6.9.3.4 PG&E Boardwalk and Tower Footing Improvements and Additions

The new boardwalks would be placed within the existing PG&E right-of-way (ROW), adjacent to the towers. All new sections of boardwalk would be built approximately 4 feet above the height of the existing boardwalk. The boardwalk spans would be 3-foot-wide sections and would include a double handrail. The boardwalk spans would be built in 20-foot-long sections supported by 4-inch by 4-inch vertical plastic lumber posts, known as support footings, which would be spaced 10 feet apart along the boardwalk spans. The boardwalks would parallel the transmission line towers and would include additional lateral boardwalks, which would be used to access each tower from the main boardwalk. Boardwalk work would be completed first for worker safety and to more efficiently transport materials and tools to the towers. Following the completion of boardwalk replacement and construction, work would be performed on the footings of the towers in Pond A2W. Multiple towers would be worked at the same time from each side of the boardwalks. All structures would require adding additional concrete to existing concrete foundations to a greater height of up to 4 feet above existing structure footing. Construction details for this work are provided in **Appendix B**.

2.6.9.3.5 Habitat Islands

The material for the habitat islands would be placed by long-reach excavators working from the existing levees or by using an excavator and small barges in the pond to move and place material. Material would be delivered by haul trucks to the working locations. A water truck would be used for dust control of delivered material, if necessary. An excavator would place and moderately compact material in the pond. The material would be piled in layers and compacted by a vibratory tamper or a roller. The top surface of the proposed habitat islands would be treated with a combination of rock, shell, and sand; current designs include a 12-inch-thick sand layer underlain by 6-inch-thick crushed rock to cover any surficial cracks and prevent weed establishment. The sand layer would be covered

with a 4-inch-thick layer of oyster shells, or similar appropriate material, to provide a barren land sight that is typically preferred by some nesting birds.

2.6.9.3.6 Habitat Transition Zones

Pond A1's habitat transition zone would be constructed by placing fill material along the existing levee side slopes and into the pond bottoms at a range of different side slopes including 10:1, 20:1, 30:1 and 40:1 (h:v). Pond A2W habitat transition zone would be constructed with 30:1 (h:v) a side slope. The work would proceed from the existing levee roads outward into the pond. These features would be compacted to approximately 70 percent dry density to enable vegetation establishment. Slope protection would be maintained by establishment of native vegetation. Hydroseeding or other seeding method with a native plant mix, development of a planting scheme, and invasive plant control would aid in establishing desirable vegetative habitat.

2.6.9.3.7 Levee Breach and Channel Excavation

Breaching would be accomplished from the levee crests using excavators and hauling material to locations receiving fill for beneficial re-use in the project area. The breach at the northwest corner of Pond A1 would be at the location of the current water intake gate, which would be removed as part of this breach activity.

2.6.9.3.8 Levee Bridges

The two breaches in the east levee of Pond A2W would be bridged to provide continued PG&E maintenance access and to support a public access trail. Existing levees at connection points would be raised from approximately 10 feet NAVD88 to approximately 12.5 feet NAVD88. These bridges would include prefabricated I-girder superstructure with a cast in place concrete bridge deck on precast 2.5 feet deep concrete I-girders set on seat-type abutments with wing walls that would be cast on top of driven concrete piles. Installation of the abutment foundations would require vibratory and/or impact driving to install concrete piles, installing and dewatering cofferdams at each abutment location, setting foundation forms, and pouring concrete. Support piles at each abutment would be 14-inch pre-cast concrete piles approximately 45 feet in length. Eight piles at each of four abutment footings would be driven. The total count for piles driven to support both bridges would be 32. Piles would be driven using a vibratory and/or impact hammer.

2.6.9.3.9 Dewatering

Armoring and bridging of breaches on the east levee of Pond A2W would require dry conditions. Therefore, installation of cofferdams at the breach and bridge locations would facilitate the construction of concrete abutments and wing walls. During cofferdam dewatering, pumped water would be managed in accordance with the 2007 SBSP Program FEIS/R and 2016 SBSP Phase 2 Mitigation Measure 3.4-5a. The language from this Mitigation Measure follows.

2.6.9.3.10 SBSP Mitigation Measure 3.4-5a: Stormwater Pollution Prevention Plan

This mitigates potential impacts from construction related-activities and maintenance activities. The project sponsors will obtain authorization from the RWQCB before the start of construction. As part of this application, the project sponsors will prepare aSWPPP and will require all construction contractors to implement BMPs identified in the SWPPP for controlling soil erosion and discharges of other construction-related contaminants. Routine monitoring and inspection of BMPs will be conducted to ensure that the quality of stormwater discharges is in compliance with the permit.

BMPs that will appear in the SWPPP will include the following:

- Soil stabilization measures, such as preservation of existing vegetation and use of mulch or temporary plantings to minimize soil disturbance;
- Sediment control measures to prevent disturbed soils from entering waterways;
- Tracking control measures to reduce sediments that leave the construction site on vehicle or equipment tires;
- Non-stormwater discharge control measures, such as monitoring water quality of dewatering operations and hazardous material delivery, storage, and emergency spill response requirements, and measures by the project sponsors to ensure that soil-excavation and movement activities are conducted in accordance with standard BMPs regarding excavation and dredging of bay muds as outlined in BCDC bay dredge guidance documents. These include excavating channels during low tide; using dredge equipment, such as sealing clamshell buckets, designed to minimize escape of the fine grained materials; and testing dredge materials for contaminants.

The contractor will select specific BMPs from each area, with project sponsor approval, on a site-specific basis. The construction general contractor will ensure that the BMPs are implemented as appropriate throughout the duration of construction and will be responsible for subcontractor compliance with the SWPPP requirements.

Other impacts from construction-related and maintenance activities can be mitigated by appropriate additions to stormwater pollution prevention plans, including a plan for safe refueling of vehicles and spill containment plans. An appropriate hazardous materials management plan will be developed for any activity that involves handling, transport, or removal of hazardous materials.

2.6.9.3.11 Trails, Viewing Platforms, Signs, and Benches

All rebuilt trails on existing levees that would be raised or modified as part of this project would be resurfaced with decomposed granite.

A new trail would be built on a portion of the raised and improved Pond A1 west levee. A new trail also would be built on the eastern levee of Pond A2W, which would not be raised but which would be graded and filled in places as needed to make the levee top suitable for a trail. Eroded or uneven surfaces on these levees would be regraded for ADA and ABA compliance. Surfacing materials would be decomposed granite with timber or concrete edging. These materials would be placed with dump trucks and bulldozers.

The new viewing platforms would not be elevated above the levees or existing land on which they would be placed, though the A1 west levee platform would involve local levee widening to accommodate the added space required. The viewing platforms would be graded and surfaced to meet ABA and ADA standards and would have a visual appearance matching nearby conditions. The main features at the platforms would be benches and signs or panels that provide site information to the public. These features would be constructed of metal and wood and placed on cast-in-place concrete footings. The footings would be dug with an auger attachment on a bobcat. Concrete would be imported by concrete truck and the footings would be cast-in-place. The signage at the platforms would be mounted on pedestals, and one or more benches would be located near each sign or panel.

2.6.9.3.12 Construction Equipment

Construction would be accomplished using conventional construction equipment including excavators, bulldozers, dump trucks, compaction rollers, water tankers, refueling tanks, pile-driving equipment, pumps, sheet piles, cranes, barges, skiffs, paving equipment, and pickup vehicles for transportation in and out of the project site. Helicopters may be needed in areas where new PG&E boardwalks are constructed. Temporary fill would also be used at staging locations if required. Fill material would be transported to the project area by haul trucks.

2.6.9.4 Ravenswood Pond Cluster

At the Ravenswood Ponds, the construction approach would include the following details.

2.6.9.4.1 Construction Access

Ravenswood Ponds would be primarily accessed from the Marsh Road exit on U.S. 101 via the entrance to the City of Menlo Park's Bedwell Bayfront Park. The USFWS has an access easement with the city for this purpose. Alternate access to the southern edge of Pond R3 is possible from the paved bicycle path/hiking trail just north of SR 84. The details of this access would be developed in coordination with the City of Menlo Park.

The construction areas in and around the ponds themselves would be accessed via existing trails in Bedwell Bayfront Park and on the Refuge levee crests. The USFWS Refuge staff drive on the levees for maintenance, cleanup, and other management purposes, and it is assumed that the existing levees are capable of handling heavy construction equipment. Ponds R4, R5, and S5 can be accessed via existing trails on the edge of Bayfront Park and the outboard perimeter levee in Ponds R3 and R4. The crests of the berms on either side of the AAC or the levee around the perimeter of Pond R4 would be used to access various construction areas in Ponds R3 and R4.

If conditions warrant, levee improvements, including the widening of the crest to provide adequate pathway for construction equipment, would be undertaken. Heavy vehicles would avoid crossing structures in the levees if the vehicle exceeds the weight-bearing capacity of a structure. If this is not possible, engineer-approved precautions would be taken to avoid damaging the structure.

2.6.9.4.2 Construction Staging Areas

Staging areas would be established for equipment and material storage within the Refuge boundaries. These areas may be on existing levees or in areas that would be filled as part of the Phase 2 actions later in the project. The Pond S5 forebay would be used for stockpiling before Pond S5 is hydraulically connected to Flood Slough. Material staging areas would not be located within the City of Menlo Park's Bedwell Bayfront Park.

2.6.9.4.3 Dewatering

Construction could occur in the wet or the dry. If the contractor decides to perform construction in the dry, some localized dewatering would be required. Dewatering of pond bottom would be accomplished by evaporating the pond beds to provide access to excavate pilot channels. Limited, local dewatering using portable, generator-powered pumps would likely take place during the installation of water control structures. Pumped water would be discharged per the 2007 SBSP Program FEIS/R and 2016 SBSP Phase 2 FEIS/R Mitigation Measure 3.4-5a.

2.6.9.4.4 Demolition of Existing Water Control Structures

Six existing water control structures in the Ravenswood Ponds would be removed. These remnant features of the former salt production infrastructure would be removed during construction. All associated support structures would be demolished and disposed off-site or recycled as appropriate.

2.6.9.4.5 Water Control Structures

The four water control structures would be placed into trenches cut by excavators and/or backhoes. To reduce the corrosion concerns typically expected in brackish water and to allow for management of pond habitat, solid-wall HDPE pipes would be used. Pipe bridges would be built over both ends of each structure to allow maintenance and operations access. The pipe bridges would be built pre-cast/pre-stressed concrete voided slab decks on pile caps, supported on concrete driven piles. Pile installation methods would include auguring, casting in place, and vibratory or impact driving, depending on seasonality of sensitive wildlife species nearby.

The water control structure connecting Flood Slough to the Pond S5 forebay would be the most involved installment because a portion of the existing roadway entrance into Bedwell Bayfront Park would have to be removed to allow access to the ground below it.

2.6.9.4.6 Habitat Transition Zones

The habitat transition zones would be constructed by placing fill material along the existing levee side slopes and into the pond bottoms. The work would proceed from the existing levees outward into the pond. These features would be compacted to approximately 70 percent density to enable vegetation establishment. Slope protection would be maintained by establishment of native vegetation. Hydroseeding or other seeding method with a native plant mix, development of a planting scheme, and invasive plant control would aid in establishing desirable vegetative habitat.

2.6.9.4.7 Levee Improvements

Levee improvements at the AAC would consist of preparing the subgrade to receive additional fill material by clearing vegetation, debris, and grooving. Fill would be placed in approximately 6-inch-thick lifts and compacted either through a vibratory hand tamper or a roller to achieve approximately 90 percent compaction. Borrow material would be sourced on-site from levee lowering at Pond R4, internal levee removal at Ponds R5 and S5, and pilot channel excavation, but most would be from off-site upland excavation projects.

2.6.9.4.8 Levee Removal

Earth moving machinery including an excavator and loader would be used to remove most of the levees within and between Ponds R5 and S5. Removed material would be re-used on site to improve levees, fill borrow ditches, construct ditch blocks, or to construct habitat transition zones.

Portions of the internal levees between and within Ponds R5 and S5, with lengths of approximately 880 feet at the northern segment of the levee separating R5 from S5, 530 feet at the southern segment of that same levee, and at the S5 internal levee approximately 370 feet, would be removed (i.e., lowered to match the existing pond bottom elevation of about 4.5 feet NAVD88). This activity would also use an excavator and loader. Removed material would be re-used to on site to improve levees, fill borrow ditches in Pond R4, or to construct habitat transition zones.

2.6.9.4.9 Pilot Channel Excavation

Existing soil conditions at the R4 pond bottom are likely to be too soft to support vehicles or heavy equipment. Temporary mats with gravel cover would be deployed at the pond bottom to create a firm surface that can handle heavy equipment such as an excavator, loader, or mini-dozer to access locations where pilot channels are to be established. Alternatively, amphibious equipment such as an aquatic excavator would be used to excavate in the wet to designed depths. It is likely that removed material would be unsuitable to be used as levee fill material and would instead be used to fill borrow ditches within Pond R4 or as fill for habitat transition zones.

2.6.9.4.10 Ditch Blocks

Ditch blocks would be formed by placing material from other onsite activities into the existing internal borrow ditches and compacting it. Excavators would be used for placement and initial compaction of material, and a vibratory hand tamper or a roller would be used for compaction.

2.6.9.4.11 Levee Lowering or Removal

Levee lowering at the northwest corner of Pond R4 would be accomplished by using an excavator and loader and hauling the removed material to fill borrow ditches in Pond R4 or to construct habitat transition zones. Levee lowering at Pond R4 would remain at elevations above the MHHW until construction activities within the pond that need to be performed in the dry are complete. After construction operations within the ponds are complete, these levees would be lowered to approximately 8 feet NAVD88. This would cause levee overtopping, levee erosion and allow for improved hydraulic and habitat connectivity.

2.6.9.4.12 Habitat Island

Habitat islands would be cleared, grubbed, and fine graded before surface enhancements are installed. The expected treatment for the top surface of the island is a 12-inch-thick sand layer underlain by a 6-inch-thick crushed rock to minimize weed establishment. The sand layer would be mixed with Bay mud to prevent formation of cracks. The sand layer would be covered with 4-inch-thick layer of oyster shells, or similar appropriate material, to provide a barren land site that is typically preferred by nesting birds. Other combinations of rock, sand, dirt, or other materials may be used as available. These materials would be brought in and placed prior to removal of the portions of the levee to be breached.

2.6.9.4.13 Trail, Viewing Platform, Signs, and Benches

The 2,750-foot trail on the eastern border of Ponds R5 and S5 would be at least 10 feet wide with 2-foot shoulders on each side and would be built on the improved levees described above. Erosion or uneven surfaces on existing levees would be regraded for compliance with the ABA on federal lands and the ADA elsewhere. Levees would be graded and compacted. Geotextile fabric would be laid out and gravel imported and compacted in place. Quarry fines would then be compacted over the gravel with a smooth drum compactor to create an accessible surface.

The new viewing platform would not be elevated above the levee or existing land on which it would be placed. There would be local levee widening to accommodate the added space required. The viewing platforms would be graded and surfaced to meet ABA and ADA standards and would have a visual appearance matching nearby conditions. The main features at the platforms would be benches and signs or panels that provide site information to the public. These features would be constructed of metal and wood and placed on cast-in-place concrete footings. The footings would be dug with an

auger attachment on a bobcat. Concrete would be imported by concrete truck and the footings would be cast-in-place. The signage at the platforms would be mounted on pedestals, and one or more benches would be located near each sign or panel.

2.6.9.4.14 Levee Breach and Channel Excavation

The levee breaching and associated excavation of a channel to connect to Ravenswood Slough would be accomplished from levee crests using long-reach excavators and hauling material using trucks to on-site locations receiving fill for beneficial re-use.

2.6.9.4.15 Construction Equipment

Excavators, bulldozers, amphibious equipment (e.g., an aquatic excavator), dump trucks, compaction rollers or vibratory plates, a water tanker, pumps, sheet piles, refueling tanks, and pickup vehicles for transportation in and out of the project site would be used during construction. Depending on the soil conditions within the ponds, temporary heavy equipment mats or wooden mats with gravel cover would be employed to provide access and establish working conditions to excavate pilot channels at the pond bottom. Temporary fill would also be used at staging locations if required. Upland fill material would be transported to the project area by trucks.

2.6.10 Construction Schedule and Sequence

The following section describes the general sequence, timing, and duration of activities at each of the pond clusters. First, however, a brief discussion of the construction timing is useful because it would be affected by species-specific work windows.

2.6.10.1 Species-specific Construction Timing Considerations

At all four pond clusters, certain special-status species are regulated by USFWS, National Marine Fisheries Service (NMFS), or CDFW and may be affected by construction activities. The presence of these species may limit construction activities or require certain avoidance and minimization measures. The special-status species, as well as the limits and requirements for each species and their habitats, are addressed in the Conservation Measures of the SBSP Restoration Project's Programmatic and Phase 1 EIS/R and permitting documents. These include the Biological Opinions from the NMFS and the USFWS, the Clean Water Act Section 404 and 401 permits from the U.S. Army Corps of Engineers (USACE) and the RWQCB respectively, the BCDC permit, and others. This overview information is provided here as part of the project designs to help frame the construction sequences that follow. The timing considerations below will be incorporated into detailed designs and project planning to reduce the overall potential for adverse impacts and the need for mitigation.

- Bird nesting: Regulatory work windows for bird nesting typically run from February 1 through September 15. Work occurring within this window would implement approved avoidance and minimization measures including the presence of an approved biological monitor and preconstruction surveys.
- Steelhead migration: Activities that may potentially affect upstream migration of adults or downstream migration of juveniles would be avoided. This means avoiding work from December through February (adult upstream migration period) and from April through June (juvenile downstream migration period). If applicable, the NMFS acceptable work windows for steelhead are June through November; avoidance and minimization measures including the presence of an approved biological monitor may be required during this period.

- Longfin smelt and green sturgeon: The potential exists for these species to be present year-round in the San Francisco Bay; therefore, seasonal avoidance is not possible.

2.6.10.2 Alviso Island Pond Cluster

2.6.10.2.1 Construction Sequence

In each pond, the construction scenario would likely initiate levee removal from the farthest end of the construction access point along the perimeter levees and proceed toward the starting point of the access. The likely order of construction at the Island Ponds would be as follows:

1. Site preparation including clearing and grubbing of debris and vegetation from construction areas.

2. Lower Pond A19 south perimeter levee and widen the existing western breach.

3. Remove Pond A20 east perimeter levee, leaving some high portions.

4. Remove Pond A19 west perimeter levee, leaving some high portions.

5. Lower and make two breaches in Pond A19's north perimeter levee, leaving some high portions.

2.6.10.2.2 Construction Schedule

The construction schedule would be affected by species windows, weather conditions, earthwork quantities, and land disturbance. Construction is expected to begin in 2018. A preliminary estimate shows that construction would likely be completed in approximately 4 months over single construction season. This estimate assumes that USFWS would permit heavy construction activities to occur during the bird-nesting window using avoidance and minimization measures including the presence and direction of a biological monitor.

2.6.10.3 Alviso A8 Pond Cluster

2.6.10.3.1 Construction Sequence

This part of the project would include:

1. Site preparation including clearing and grubbing of debris and vegetation from construction areas.

2. Placement of imported fill material into the southern corners of the A8 Ponds (**Figure 4**). This placement may involve brief stockpiling of material along the existing levee roads and bare ground prior to placement and subsequent compaction.

3. Hydroseeding habitat transition zones to establish native vegetation.

2.6.10.3.2 Construction Schedule

The project is anticipated to begin in the second half of 2017, depending on the material available for use in the Alviso A8 Ponds or in other Phase 2 project ponds. If sufficient quantities of material are available, construction of habitat transition zones would take approximately 12 months in 2 construction seasons.

2.6.10.4 Alviso Mountain View Pond Cluster

2.6.10.4.1 Construction Sequence

Construction operations would occur either simultaneously at both ponds, or would proceed in tandem. Earthwork activities would be sequenced such that operations which are more efficient and feasible to perform during the dry season, such as working on levee tops, would be completed first. Levee lowering and breaching along the outer bounds of the ponds that are designed to establish hydraulic connection with adjacent sloughs would be performed after all the internal pond activities are completed. Construction of habitat islands and habitat transition zones would be performed prior to breaching the perimeter levees. Breaching would not occur until all necessary flood control components and in-water habitat enhancement features are completed.

The likely order of construction at the Mountain View Ponds would be as follows, though availability of upland material for various actions could alter the sequence:

1. Site preparation including clearing and grubbing of debris and vegetation from construction areas.
2. Raise and improve Pond A1 western levee.
3. Construct trail on Pond A1 western levee to viewing platform.
4. Raise the Coast Casey Forebay levee to 17 feet; make other required improvements to existing Mountain View infrastructure (pump station access, etc.).
5. Rebuild the portion of trail (part of the Bay Trail spine) that is currently on top of the Coast Casey Forebay levee.
6. Modify the access to the existing viewing platform at the southern end of Charleston Slough.
7. Construct PG&E tower and boardwalk improvements around Pond A2W (must be completed prior to levee breaching).
8. Construct habitat transition zones and habitat islands (must be completed prior to levee breaching).
9. Breach perimeter levees at Ponds A1 and A2W.
10. Install cofferdams and construct bridges on eastern levee of Pond A2W.
11. Construct public access trail and viewing platform on eastern levee of Pond A2W.
12. Install viewing platform in Mountain View Shoreline Park and viewing platform on Pond A1 west levee.
13. Install gates at necessary locations along levees.

2.6.10.4.2 Construction Schedule

The construction schedule would be affected by seasonal work restrictions to avoid impacts to protected species, weather conditions, earthwork quantities, and land disturbance. Construction is expected to begin in 2018.

Construction would likely be completed in approximately 29 months over 4 construction seasons. This estimate is based on the assumption that some heavy construction activities would be permitted to occur during the restricted work window for nesting bird habitat under implemented avoidance and minimization measures including the presence of a biological monitor.

2.6.10.5 Ravenswood Pond Cluster

2.6.10.5.1 Construction Sequence

Earthwork activities would be sequenced such that activities which would be efficient to perform in dry conditions would be completed first. These activities include levee improvements, installation of hydraulic controls, pilot channel excavation, and internal levee lowering. Levee lowering and breaching along the outer bounds of the ponds designed to establish hydraulic connection with adjacent sloughs would be performed after the internal pond activities are completed. Once sufficient upland fill material to complete initial construction plans for habitat transition zones and levee improvements is in place, additional material would be accepted as available to expand the habitat transition zones or to raise or improve flood risk management further. Breaching would not occur until all necessary flood control components and in-water habitat enhancement features are completed.

The likely order of construction at the Ravenswood Ponds would be as follows, though availability of upland material for various actions could alter the sequence:

1. Mobilize to site, conduct clearing and grubbing (vegetation removal), and demolish existing derelict water control structure.

2. Import material and improve levees along the All-American Canal and along the eastern levees of Ponds R5 and S5.

3. Construct habitat transition zones along (1) the western edge of Pond R4 levee; and (2) the northern side of the All-American Canal.

4. Modify central portion of levee between Ponds R5 and S5 with gravel, sand, and shells in preparation for its use as a habitat island.

5. Remove unmodified parts of internal levees between Ponds R5 and S5 and within Pond S5, as described above.

6. Install external water control structures (i.e., between R3 and Ravenswood Slough; between S5 forebay and Flood Slough).

7. Excavate pilot channels in Pond R4.

8. Build ditch blocks in Pond R4's borrow ditches

9. Install internal water control structures (i.e., between Pond R3 and Pond S5; between Pond R4 and Pond R5).

10. Build public access trail along improved R5/S5 eastern levees.

11. Install viewing platform on new public access trail.

12. Lower Pond R4 levee near Greco Island.

13. Breach Pond R4 levee at its northeastern corner.

14. Install fencing along southern border of pond cluster and gates at necessary locations.

2.6.10.5.2 Construction Schedule

The construction schedule would be affected by seasonal work restrictions to avoid impacts to protected species, weather conditions, and volume of earthwork quantities to be moved. Several hundred thousand cubic yards of material would need to be imported and either placed immediately or stockpiled at the site.

Although, it is assumed that the ponds would be sufficiently dry during the beginning of the construction season and that active draining or dewatering of pond bottoms would be unnecessary, limited installation of cofferdams and dewatering of small portions of the pond would be necessary for installing water control structures.

Construction is expected to begin in 2018. Some of the construction activities could take place concurrently or in tandem, with multiple crews to achieve project goals. A preliminary estimate shows that construction would be completed over approximately a 16-month period over 2 construction seasons, assuming all upland fill material would be available. This estimate is based on the assumption that some heavy construction activities would be permitted to occur during the restricted work window for nesting bird habitat under implemented avoidance and minimization measures including the presence of a biological monitor.

2.6.11 Operations and Maintenance

Operations and maintenance activities for levee maintenance and water control structures are covered in existing project permits from BCDC and other State and federal environmental agencies for the SBSP Program. The Refuge and the SCVWD perform ongoing maintenance of levees, water control structures, and other features of the Refuge lands and the surrounding areas. These maintenance actions are not part of the proposed Phase 2 project.

Additional operations and maintenance associated with Phase 2 activities are provided in the following sections.

2.6.11.1 Alviso Island Pond Cluster

Aside from the monitoring and management activities of the SBSP Restoration Project Adaptive Management Plan (AMP) (**Appendix D**) and continued maintenance of the existing UPRR track, no other operations and maintenance activities would occur at the Island Ponds. The existing and newly proposed breaches would scour from hydraulic action and would gradually widen until equilibrium

with the tidal flux is reached. Most levees would be allowed to degrade naturally; however, the levee containing the existing railroad track would be maintained by the UPRR to allow the continued use of the tracks. Ongoing monitoring and studies to track the progress of these ponds toward restoration as tidal marsh would be a component of the continued implementation of the AMP.

2.6.11.2 Alviso A8 Pond Cluster

The USFWS would continue to operate and maintain the ponds in accordance with various Refuge operations and maintenance permits, the AMP and other ongoing management practices that have been in place since the implementation of Phase 1 actions. Phase 2 would not involve changing these ongoing management practices during or after the construction activities described above. The habitat transition zones that would be placed in Phase 2 may occasionally need maintenance such as removing invasive plant species, which would be performed in accordance with existing Refuge policies and practices for doing so.

2.6.11.3 Alviso Mountain View Pond Cluster

Operations and maintenance activities would continue to follow and be determined by various Refuge operations and maintenance permits, applicable county operations, and the AMP. PG&E would continue to operate and maintain its infrastructure, which would occur in coordination with the Refuge managers to ensure consistency with the operations and maintenance of the pond cluster. The City of Mountain View would continue to operate and maintain its properties that are adjacent to the pond cluster, and these activities would also occur in coordination with the Refuge managers.

Periodic maintenance of the pond infrastructure would be required following construction. Maintenance activities would require a maintenance staff person to travel to the pond cluster one or two times a week to perform activities such as predator control, invasive plant control, and vandalism repairs. AMP monitoring activities would also occur, which would require additional workers (e.g., staff, consultants) to access the pond clusters. The frequency of visits to the pond cluster to conduct AMP monitoring activities would depend on the actual activities and would vary by season (e.g., during the bird breeding season there may be more trips to the site than during the non-breeding season).

The improved western levee of Pond A1 would require ongoing levee maintenance because it would provide flood risk management, and the north and east levees of Pond A2W would be maintained for PG&E and trail access. This ongoing levee maintenance would continue in consistency with USACE permit #2008-00103S. These levee maintenance activities could include occasional placement of additional earth on top of, or on the sides of, the levees as the levees erode or subside, with the level of settlement dependent on geotechnical considerations. In general, pond levees that are improved to provide flood risk management would likely exhibit the greatest degree of settlement. Levees that require erosion control measures would also require routine inspections and maintenance.

The northern perimeter levee, eastern levee, northern portion of the western perimeter levee at Pond A1, and the western levee of Pond A2W would not be maintained and would be allowed to degrade naturally. The eastern and northern levees of Pond A2W would be maintained for PG&E access. The eastern levee of Pond A2W would also be maintained for recreational public access on the trail atop it.

Improved levees would be inspected and maintained for slope stability, erosion control, seepage, slides, and settlement on an annual basis. Maintenance is expected to occur every 5 years to add additional fill material in areas where settlement occurs. Most of the maintenance would be accomplished during low tides and from the levee crest.

Maintenance of the habitat islands may require weed/vegetation removal as often as quarterly and the placing of fill material (sand, gravel, and/or oyster shells) before the onset of the nesting period in some years. Habitat islands would also be periodically examined for erosion.

Maintenance of habitat transition zones would include inspections and maintenance for slope stability, erosion control, seepage, slides, and settlement on an annual basis. As necessary, vegetation removal would occur to prevent colonization by invasive species. Fill material would be placed, when needed, to respond to areas where erosion is observed. Additional maintenance activities may also be a need to address an AMP-specified management trigger.

Public access and recreation features would be maintained as needed to keep trail surfaces safe and accessible. There would be a need for trash removal along trails and more intensely at staging areas and trailheads. The viewing areas would be designed to minimize maintenance by utilizing durable and sustainable materials as much as possible to prevent degradation and the need for repeated maintenance. These would need to be checked periodically for defacement of interpretive boards and other forms of vandalism.

Access bridges placed in publicly accessible areas such as city streets and highways must be visually inspected every 2 years and a report on their condition may be required every 5 years. Because there would be a public access trail along the eastern levee of Pond A2W, the two bridges over the breaches there would need to be visually inspected and reported on as described.

The proposed bridges and the concrete abutments with wing walls at both ends of the bridge would be basically maintenance free for the design life cycle of 50 to 75 years. The bridges' superstructures include main span girders, a lateral bracing system, deck slab systems, and a safety railing would need basic erosion protection maintenance work every few years. These activities may include sanding, cleaning, and re-painting as needed, which are common activities for all steel structures permanently exposed to weather.

The PG&E towers, boardwalks, and power lines would be maintained in accordance with PG&E's current practices, which are described in **Appendix B**. The maintenance of Pond A2W's eastern and northern levees and the construction of new and improved boardwalks for PG&E's use would continue to provide the necessary access at the current levels.

2.6.11.4 Ravenswood Pond Cluster

Operations and maintenance activities for the components of the pond clusters within the Refuge would continue and be determined by various Refuge operations and maintenance permits, applicable county operations, and the AMP. The City of Menlo Park would continue to operate and maintain its properties that are adjacent to the pond cluster, in coordination with the Refuge managers.

Periodic maintenance of the pond infrastructure would be required following construction. Maintenance would require a staff person to travel to the pond cluster one or two times a week to perform activities such as water structure control operation, invasive plant control, and vandalism repairs. In addition, AMP monitoring activities would occur, which would require additional workers (e.g., staff, consultants) to access the pond clusters. The frequency of visits to the pond clusters to conduct AMP monitoring activities would depend on the actual activities and would vary by season (e.g., during the bird-breeding season, there would be more trips to the site than during the non-breeding season).

Ongoing levee maintenance would continue for existing levees that provide flood risk management (as part of the operations and maintenance activities described above and in consistency with USACE permit #2008-00103S). Levee maintenance activities would include the placement of additional earth on top of or on the pond side of the levees as the levees subside, with the level of settlement dependent on geotechnical considerations. In general, pond levees that are improved to provide flood risk management would likely exhibit the greatest degree of settlement. Levees that require erosion control measures would also require routine inspections and maintenance. The northern perimeter levee at Pond R4 would not be maintained and would be allowed to degrade naturally.

Improved levees would be inspected and maintained for slope stability, erosion control, seepage, slides and settlement on an annual basis. Maintenance is expected every 5 years to add additional fill material in areas where settlement occurs. Most of the maintenance work can be accomplished during low tides and from the levee crests.

Water control structures would require inspection for structural integrity of gates, pipes, and approach way; obstruction to flow passage and preventative maintenance such as visual functionality of gates, seals; and removal of debris. Inspection would be required every month through the first year and semi-annually thereafter. Maintenance would be required on an annual basis. Operations and maintenance activities would be conducted during low tides in Pond R4 and sloughs and by maintaining low storage conditions in the managed ponds.

Maintenance of habitat transition zones would include inspections and maintenance for slope stability, erosion control, seepage, slides, and settlement on an annual basis. As necessary, vegetation removal would occur to prevent colonization of invasive species. Fill material would be placed, when needed, to respond to areas where erosion has been observed. Maintenance activities would also be dictated under the AMP if an AMP management trigger is reached, especially a trigger related to a biological resource (e.g., salt marsh harvest mouse) that would utilize habitat transition zones as habitat.

Maintenance of public access and recreation features would address both viewing platforms and trail maintenance. The viewing areas would be designed to minimize maintenance utilizing durable and sustainable materials as much as possible to prevent degradation and the need for repeated maintenance. All features would be checked periodically for defacement of interpretive boards and other forms of vandalism. The eastern levees of Ponds R5 and S5 would also be maintained for recreational public access on the trail atop it. Trash removal would take place as needed along trails and at staging areas and trailheads.

Operations and maintenance of water levels in Ponds R3, R5, and S5 would be managed as follows:

- The water levels in Ponds R5 and S5 would be actively managed year-round by opening and closing the water control structures as needed to maintain desired surface elevations, flows, and water quality. The salinity of these ponds would also be somewhat controlled through the use of the water control structures. USFWS Refuge staff would operate the water control structures and provide maintenance and cleaning as needed.
- The water levels of Pond R3 would be actively managed using one new water control structure to provide for the improvement of the existing western snowy plover habitat in Pond R3. USFWS Refuge staff would operate all of the water control structures and provide maintenance and cleaning as needed.

2.7 Box 2.v.2. Existing Site Conditions

See above Project Description above (Section 2.6.7) describing existing site conditions. **Figure 9** provides photos of existing conditions at the site.

2.8 Box 2.v.3. Bathymetric Features and Tidal Movements

The SBSP Restoration Project is intended to restore tidal marsh habitat, reconfigure managed pond habitat, maintain flood protection, and provide recreation opportunities and public access. The SBSP Restoration Project (described in the 2007 EIS/R) would restore a mosaic of tidal and managed pond habitats over an approximately 15,100-acre footprint within Don Edwards San Francisco Bay National Wildlife Refuge (Refuge). A continuous band of tidal marsh (a "tidal marsh corridor") along the edge of the Bay would provide connectivity of habitat for tidal marsh-dependent species. Tidal habitats would experience tidal inundation of Bay water, and marshes would be created through estuarine sedimentation and natural vegetative colonization. Habitat transition zones would be restored in some areas. Managed ponds would encompass a range of water depths and salinity regimes through the use of flow control structures, grading, and other means. SBSP Restoration Project lands reflect the diversity of wildlife habitats that could be restored to tidal wetlands, brackish marsh, managed ponds, seasonal wetlands, riparian habitat, freshwater marshes, and adjacent uplands.

Phase 2 of the SBSP Restoration Project is a direct outgrowth of the acquisition of the Alviso and Ravenswood pond complexes, and of the continued implementation of the larger SBSP Restoration Project as laid out in the 2007 EIS/R. Sedimentation rates and bathymetric features for the SBSP Restoration Project are tracked as part of the AMP (**Appendix D**). Annual monitoring reports for the SBSP Restoration Project are available online at http://www.southbayrestoration.org/monitoring/.

The following discussion describes existing hydraulic conditions at each pond cluster.

2.8.1 Alviso Island Ponds

Existing Conditions

The Alviso Island Pond cluster is located at the southern extent of the Bay near Coyote Creek. The Island Ponds were middle-stage salt evaporator ponds with intermediate salinity levels. The levees surrounding the Island Ponds were outboard salt pond levees.

Tidal inundation was restored at the 475-acre Alviso Island Pond cluster in March 2006, as part of the tidal marsh restoration actions implemented under the ISP. Two breaches were cut in Pond A19, a single breach was cut in Pond A20, and two breaches were cut in Pond A21. The breaches were approximately 30 to 45 feet wide. The excavated breaches in the levees and outboard marshes were designed to have the same invert elevation (2.7 feet North American Vertical Datum of 1988 [NAVD88]). Since the original cuts, the breaches have widened and now are between 30 and 150 feet wide (SCVWD et al. 2010). The Island Ponds have been developing tidal marsh habitat since the ponds were breached. The five breaches cut along the south side of the ponds allow full tidal inundation. This restoration approach is a minimally engineered, passive design that relies on natural sedimentation processes to restore the ponds to tidal marsh habitat. The overall restoration goal is to successfully re-establish vegetation, promote recolonization by benthic organisms, and provide habitat for various wildlife species.

Because the Island Ponds are subject to tidal inundation, these ponds fill during flood events, by a combination of tidal and fluvial flows. As the ponds fill during incoming tides, the ponds could provide temporary flood storage for Coyote Creek flows and may provide temporary relief to upstream flood control facilities. (Flood control facilities in the lower 7 miles of Coyote Creek include levee setbacks and overflow channels.) However, as the ponds drain during outgoing tides, water leaving the ponds would occupy the main channel, which would otherwise be used to convey flood flows. This could delay fluvial flood flows and prolong flooding in upstream areas.

Proposed Actions and Impacts

Proposed actions at the Island Ponds are described in Section 2.6.8.1 and would include breaching the Pond at two new locations, expanding an existing southern levee at Pond A19, removing portions of the west levee of Pond 19, removing portions of the east levee of Ponds A20, and lowering levee portions on Pond A19 at both the northern and southern levee (**Figure 3**). No action is proposed at Pond A21 as part of Phase 2.

Levee removal and lowering would support hydraulic connectivity, alter circulation and sedimentation patterns, and thus increase habitat complexity in Ponds A19 and A20. Any levee material that is moved would be used locally to fill borrow ditches and further speed revegetation. Increases in sediment accumulation and/or sediment distribution in the ponds could help achieve a future flood protection goal of ensuring that the rate of sediment accretion and marsh development keeps pace with expected future sea-level rise.

Phase 2 actions would not change the total volume of water that fills and drains from the ponds immediately after construction activities. Because new breaches would occur at Mud Slough, the tidal flow in Coyote Creek would decrease, and tidal flow in Mud Slough would increase. Tidal scour likely would widen and deepen Mud Slough until equilibrium conditions are met.

Drainage patterns in Pond A19 and Mud Slough would change because Pond A19 would be breached to Mud Slough. Sediment accretion rates would increase on the northern side of Pond A19. Marsh channels in the northern portion of the pond would develop more rapidly, increasing habitat complexity. The new breaches and the Mud Slough channel would be affected by tidal scour. Levee breaches would increase tidal flows in Mud Slough downstream from the breach, widening and deepening the slough over time. Slough width and depths upstream from the breaches would be less

affected by levee breaching. Widening and deepening Mud Slough could erode levees downstream from the breach, which may be a concern for the ponds on the north bank of Mud Slough. (Ponds A20 and A21 already are fully tidal, and therefore unexpected breaches would not change the habitat in these ponds substantially.) These effects would be monitored under the AMP, and corrective actions could be implemented if downstream levees fail to meet performance standards.

Although sediment distribution within the ponds would change because of the northern breaches in Pond A19, total sediment demand from the ponds would not increase. Net accretion rates may increase somewhat, but additional accretion would be minor compared to the initial breaching of the ponds. Therefore, potential erosion to nearby mudflats also is expected to be minor. Impacts from changes in existing drainage patterns would be less than significant.

The Island Ponds do not and would not provide coastal flood protection to landward areas from high water levels because the Island Ponds are fully tidal and are surrounded by the Bay on all sides. The bayward levees may provide some level of protection from wave action because waves would break against the levees. Lowering the levees on Pond A19 may allow waves to propagate into the pond, but these waves would dissipate or break on the inside levee. If the eastern side of the levee is overtopped, water that would enter the adjacent wetland would have reduced energy and would spill into the brackish restoration area behind it.

Water from Ponds A19 and A20 would contribute to increased tidal flows in Mud Slough. Water that drains from the ponds into Mud Slough on the ebb tide could delay fluvial flood flows in Mud Slough from reaching the Bay. If flow in the channel is constrained, this could cause short-term effects on upstream fluvial flood conditions. However, breaching Pond A19 to Mud Slough would improve hydraulic connectivity and cause tidal scouring within the channel. This would improve tidal drainage and provide additional fluvial discharge capacity. Therefore, effects on upstream fluvial flood conditions are expected to be minimal.

Monitoring and adaptive management would be used to verify that the Phase 2 actions are performing as intended. Changes to coastal and fluvial flood risk would be minimal for the above-mentioned reasons.

2.8.2 Alviso A8 Ponds

Existing Conditions

The Alviso A8 ponds are between Alviso Slough and Guadalupe Slough in the South Bay. Pond A8 historically was part of a larger tidal marsh that was diked in the mid-1900s for salt production. Perimeter levees separate the pond from Alviso Slough to the northeast and Guadalupe Slough to the southwest. Internal levees formerly separated Pond A8 from adjacent Ponds A5 and A7, and they also separate Pond A8 from Pond A8S. Portions of these internal levees still remain, many of which had levee roads on them, and pieces of concrete rubble and other roadbed materials have been left in place. Deeper borrow ditches surround the ponds along the inboard side of the levees (USFWS and USGS 2012).

During Phase 1 of the SBSP Restoration Project, levees were breached between Pond A8 and Ponds A8S, A5, and A7, and a reversible armored notch was installed (see **Figure 7a**). The reversible notch was installed in the eastern levee to allow muted tidal exchange. The notch may be opened to various

widths or closed as needed for water quality or fish migration purposes. Notch operations are anticipated to naturally widen and deepen Alviso Slough over the years through tidally induced scour, thus increasing the flow conveyance of Alviso Slough.

Proposed Actions and Impacts

Proposed actions at the A8 Ponds are described in Section 2.6.8.2 and include constructing two habitat transition zones in the southwest and southeast corners of Pond A8S. As in the Mountain View Ponds, the habitat transition zones would perform several functions: they would add some flood protection, buffer against sea-level rise, add transitional habitat, and protect the adjacent landfill. The habitat transition zones would be constructed of dredged material and/or upland fill material, and would extend into the center of the pond at a slope.

Fill material would be used to create habitat transition zones in Pond A8S, but Phase 2 activities would not change existing drainage patterns. Pond accretion rates, pond circulation, and tidal scour from notch operations would continue to have effects similar to those under the current condition.

Phase 2 activities would not change water levels in the A8 Ponds or interfere with flood control functions. The habitat transition zones would consume an extremely minor portion of the capacity of Pond A8S, which could provide temporary detention for high flood flows from Alviso Slough. However, internal levees at Ponds A8, A8S, A5, A7, and A6 would be overtopped at elevations less than the overflow weir at Alviso Slough, and therefore the capacity of the A8 system's ponds would be much larger than the volume displaced by the habitat transition zones. Adaptive management would be used to actively monitor and assess the flood protection measures, and existing levels of flood protection would be maintained.

2.8.3 Alviso Mountain View Ponds

Existing Conditions

The Mountain View pond cluster is located in the western portion of the Alviso pond complex. It is bracketed by Stevens Creek on the east and Charleston Slough on the west. Ponds A1 and A2W are separated by Mountain View Slough. Perimeter outboard salt pond levees, publicly maintained flood control levees, and/or high ground surround Ponds A1 and A2W.

The Mountain View Ponds currently are operated for limited tidal circulation through Ponds A1 and A2W while maintaining discharge salinities to the Bay at less than 40 ppt (see **Figure 7b**). The intake for the Mountain View Ponds' system is located at the northwest end of Pond A1 and includes one 48-inch gate from lower Charleston Slough near the Bay. Flow moves through the system from the intake at Pond A1 though the 72-inch siphon under Mountain View Slough to Pond A2W. The system outlet is located at the northern end of Pond A2W, with one 48-inch gate to the Bay. The gates are adjusted iteratively as needed to find the correct equilibrium of water inflow and discharge, to account evaporation and salinity concentration during the summer months. Operations of the Mountain View Ponds' system require little active management of gate openings to maintain appropriate flows. However, flows can be modified based on changes in dissolved oxygen levels.

The existing outboard salt pond levees at Ponds A1 and A2W provide some measure of flood protection to inland areas. As waves break against the outboard levees, the levees are overtopped, and the ponds fill during coastal flooding conditions. The landward sides of Ponds A1 and A2W are

high ground atop the closed landfill under Shoreline Park. The levee west of Charleston Slough protects the Palo Alto Flood Basin. The southwestern corner of Charleston Slough has a relatively unprotected area between the high ground of Shoreline Park and the levee between the Palo Alto Flood Basin and Charleston Slough. This low-lying area includes the Coast Casey Forebay (a detention basin for fluvial runoff) and the similarly named levee separating the forebay from Charleston Slough.

Proposed Actions and Impacts

Proposed actions at the Mountain View Ponds are described in Section 2.6.8.3 and include four levee breaches in Pond A2W at the east and west levees, a single levee breach at Pond A1's east levee, construction of habitat transition zones at the southern borders of Ponds A2 and A2W, construction of habitat islands in both Ponds A2 and A2W, levee improvement along the central and southern portion of Pond A1's east levee, improvements to the Coast Casey Forebay levee, improvements to existing PG&E structures, and some new or improved public access features (**Figure 5**).

The proposed work would increase tidal flows in Ponds A1 and A2W by breaching levees at several points (e.g., the northwest corner of Pond A1 would be breached to Charleston Slough, and Pond A2W would be breached at two locations to Mountain View Slough on the west and at two locations to Whisman Slough on the east). The breaches to Whisman Slough would be armored and bridged to allow Bayward access along that levee by Pacific Gas and Electric Company (PG&E) for tower and power line maintenance. Habitat transition zones and islands would be constructed to increase habitat complexity. The west levee at Pond A1 would be raised to provide additional flood control protection.

Ponds A1 and A2W would be breached to introduce greater tidal flows. Therefore, existing drainage patterns within the ponds and tidal flows in adjacent sloughs would be altered. Tidal scour would widen pond breaches and would widen and deepen adjacent sloughs until equilibrium conditions are met. Sediment from the incoming tide would settle out within the ponds as they fill and drain. Marsh channels would form near the breaches, allowing the ponds to drain faster. As the pond elevation increases, vegetation would become established, stabilizing sediments and increasing habitat complexity.

Widening and deepening Mountain View Slough (below Permanente Creek) and Whisman Slough (below Stevens Creek) could erode adjacent levees. This may be of concern for the outboard salt pond levees in Ponds A2E and AB1 at Whisman Slough. These effects would be monitored under the AMP, and corrective actions could be implemented if downstream levees fail to meet performance standards.

Breaching Ponds A1 and A2W would enable sediment accretion within the ponds. This increased sediment demand could be met by local tributaries, sediment influx from Bay areas north of the Dumbarton Bridge, imported dredge materials, and/or from other nearby sediment sources. If naturally supplied sediment sources are exceeded, the breaching of the salt ponds would have the potential to cause erosion in adjacent mudflats.

The long-term regional sediment supply in the far South Bay has been studied by Shellenbarger et al. (2013) for the SBSP Restoration Project area. Between 29 and 45 million cubic meters of sediment

are expected to be necessary to raise all of the SBSP Restoration Project area to mean tidal level. Sediment influx from the South Bay (north of Dumbarton Bridge) would supply this amount of sediment in about 90 to 600 years. This estimate reflects the long-term regional sediment supply, assuming that no net loss of mudflats and marshes would occur in the area, and that the volume of sediment needed in the ponds would not change because of sea-level rise or construction.

With respect to the breaching of Ponds A1 and A2W, sediment demand in these ponds is not expected to exceed naturally supplied sediment supply because the size of the ponds is small compared to the overall restoration area. Effects on nearby mudflats would be monitored under the AMP, and corrective actions would be implemented if performance metrics are not met (i.e., phasing future tidal restoration in the project vicinity or importing fill material to the ponds). Therefore, impacts from erosion and accretion because of changes in existing drainage patterns would be less than significant.

The Mountain View Ponds currently are operated for very limited tidal circulation through Ponds A1 and A2W. The Bay-facing levees would continue to provide some level of coastal flood protection from wave action as waves break against the levees. Levee breaches would allow full tidal inundation to the ponds, and the internal side of the salt pond levees would be subject to tidal flows. Existing flood control levees also would be breached. These actions would reduce the level of flood protection provided by these levees. However, the levee along the western side of Pond A1 would be raised so that the current level of flood protection would be maintained or exceeded by preventing tidal flows from Pond A1 from entering Charleston Slough and affecting currently low and unprotected areas at its southern end. Monitoring and adaptive management would be used to verify that the Phase 2 actions are performing as intended.

2.8.4 Ravenswood Ponds

Existing Conditions

The Ravenswood Ponds are operated as seasonal ponds. The seasonal ponds are passively managed as seasonal ponds that receive direct precipitation, groundwater inflows, and minimal overland runoff during the wet season. During the dry season, the seasonal ponds are allowed to dry out by seepage and evaporation. No gated or culverted hydraulic connection that is actively managed or used exists between the ponds and the Bay or between the ponds themselves. Operation or maintenance activities include inspection of berms and bird monitoring.

The outboard salt pond levees at Ponds R3 and R4 provide some flood protection to inland areas. As waves break against the bay-facing levees, the waves break against the outboard levees, dissipating their force, and allowing only the very highest tides or storm surge/wind waves to splash into the pond or occasionally overtop the outer levees.. The ponds provide storage and dissipate wave energy.

Proposed Actions and Impacts

Proposed actions at the Ravenswood Ponds are described in Section 2.6.8.4 and would include converting Ponds R3, R5 and S5 to enhanced managed ponds, improving levees and fill in All-American Canal, constructing habitat transition zones in Pond R4, removing internal levees in Ponds R5 and S5, establishing habitat island between Ponds R5 and S4, excavating a pilot channel in Pond

R4, building ditch blocks in Pond R4, lowering the levee in the northwest corner of Pond R4, and breaching Pond R4 (**Figure 6**).

Pond R4 would be breached to tidal inundation. The Pond R4 levee adjacent to Greco Island also would be lowered to allow inundation above mean high water. Therefore, existing drainage patterns within Pond R4 and tidal flows in Ravenswood Slough would be altered. Tidal flows in sloughs between Pond R4 and Greco Island as well as within Greco Island also would be changed, but to a lesser degree. Tidal scour would widen the breach and would widen and deepen Ravenswood Slough until equilibrium conditions are met. Marsh channels near the breach would increase in complexity. Sediment from the incoming tide would settle out within Pond R4 as it fills and drains.

Water control structures also would be constructed to connect Pond R4 to Pond R5, Ponds R5 and S5 to Pond R3, and Pond S5 to Flood Slough. Water control structures would be used to manage water levels in Ponds R3, R5, and S5. A separate water control structure would be added to Pond R3 at its eastern levee to connect it to Ravenswood Slough. This structure would enable management on pond water levels, to improve forage habitat for western snowy plover. Operation of the water control structures would not cause substantial erosion or siltation. Accretion rates within these ponds could increase slightly because of settling of suspended sediments from incoming flows. Flows would be restricted by the control structures, and therefore tidal scour in adjacent sloughs near the control structures likely would be minimal..

Although sediment demand in the Ravenswood Ponds would increase, sediment demand in these ponds is not expected to exceed the naturally supplied sediment supply because the size of the ponds is small compared to the overall restoration area and because the pond bottoms are already very close to marsh plain elevation. Unlike many ponds in the Alviso pond complex, the Ravenswood Ponds are not deeply subsided. Effects on nearby mudflats would be monitored under the AMP, and corrective actions would be implemented if performance metrics are not met (i.e., by phasing future tidal restoration in the project vicinity or importing fill material to the ponds).

Phase 2 actions would begin the transition of Pond R4 from a seasonal pond to tidal marsh, while maintaining or improving the existing levees and the overall flood protection provided by the pond. Ponds R5 and S5 would be converted from seasonal ponds to managed ponds by construction of water control structures and some earth-moving. Pond R3 would become an enhanced managed pond by a water control structure, to be installed on Pond R3's outer levee (adjacent to Ravenswood Slough) to improve forage habitat for the western snowy plover.

Pond R4 would be breached to Ravenswood Slough, to allow tidal flows within the pond. The Pond R4 levee adjacent to Greco Island would be lowered to provide habitat connectivity between Pond R4 and Greco Island. The southern levee for Pond R4 would be improved to provide flood protection for areas south of the Ravenswood Ponds. Other Phase 2 actions would create a habitat transition zone along the western edge of Pond R4 and extending from the AAC into the southern portion of Pond R4, create and extend pilot channels at a slough trace, remove levees between Ponds R5 and S5 to increase pond connectivity, and improve recreation and access.

The breach in the Pond R4 levee would allow full tidal inundation, and therefore the internal side of the R4 levees would be subject to tidal flows. This would reduce the level of flood protection

provided by these levees. However, the levee along the southern side of Pond R4 (at the AAC) would be raised so that the current level of flood protection provided to landward areas would be maintained or exceeded. Monitoring and adaptive management would be used to verify that the Phase 2 actions are performing as intended, and that existing flood protection is maintained.

2.9 Box 2.v.4. Endangered or Threatened Species

a) **Table 25** shows a list of listed species under the federal Endangered Species Act (ESA) and/or the California Endangered Species Act (CESA) and State fully protected species with potential to occur in the SBSP Phase 2 project area. Three threatened or endangered species are a focus of particular management efforts by the Refuge: salt marsh harvest mouse, California Ridgway's rail, and western snowy plover. In addition, a number of special-status species occur in the Phase 2 project area as visitors, migrants, or foragers but are not known or expected to breed in the immediate project area. A complete discussion of all species that occur within the project area is provided in the SBSP Phase 2 FEIS/R in Section 3.5 of that document. Species monitoring results from the SBSP Restoration Project can be found online at: http://www.southbayrestoration.org/monitoring/. Technical documents on specific monitoring and research are available online at http://www.southbayrestoration.org/documents/technical/.

Table 25 Phase 2–ESA and CESA Listed Species

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
THREATENED OR ENDANGERED SPECIES			
Green sturgeon, Southern Distinct Population Segment (DPS) (*Acipenser medirostris*)	FT, CSSC	Spends majority of life in near-shore oceanic waters, bays, and estuaries; spawns in freshwater rivers.	Known to occur. Spawns in Sacramento River, but not known to spawn in South Bay. Present in the South Bay; unlikely to be inside ponds.
Steelhead – California Central Coast DPS (*Oncorhynchus mykiss irideus*)	FT, CSSC	Cool streams with suitable spawning habitat and conditions allowing migration and marine habitats.	Known to occur. Known to be present in several South Bay creeks (including Coyote, Stevens, San Francisquito, and Alameda Creeks and the Guadalupe River) and associated slough channels within the project area. Suitable spawning habitat is not present in the project area, but this species moves through the area to spawn upstream.
Longfin smelt (*Spirinchus thaleichthys)*	FC, ST, CSSC	Spends the majority of life in San Francisco Bay, moving upstream to spawn in low-salinity waters in winter/spring.	Known to occur. Occurs year-round in San Francisco Bay and known to occur in the South Bay. Longfin smelt have been caught in Coyote Creek and Alviso Slough and could possibly be present in Pond A8 but have not yet been detected there. They are present throughout the Bay and presumed to spawn and rear in freshwater habitats.
Salt marsh harvest mouse (*Reithrodontomys r. raviventris*)	FE,SE, SFP	Salt marsh habitat dominated by pickleweed.	Known to occur. Resident in pickleweed marshes within the project area.
Bald eagle (*Haliaeetus leucocephalus*)	Delisted, SE, SFP, BCC	Occurs mainly along seacoasts, rivers, and lakes; nests in tall trees or in cliffs. Feeds mostly on fish.	Potential to occur. Occasional visitor, primarily during winter, to the project area. May occasionally forage, but does not nest, in the project area.
California Ridgway's rail (*Rallus obsoletus obsoletus*)	FE, SE, SFP	Salt and brackish marsh habitat usually dominated by pickleweed and cordgrass.	Known to occur. Resident in many tidal marshes and sloughs in the project area. Large numbers are known to occur in tidal marsh habitats adjacent to Phase 2.
California least tern (*Sterna antillarum browni*)	FE, SE, SFP	Nests along the coast on bare or sparsely vegetated flat substrates.	Known to occur. The South Bay is an important post-breeding staging area for California least terns. Current Bay Area nesting sites include Alameda Point and Hayward Regional Shoreline. Has

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
			attempted to nest in small numbers at Eden Landing Pond E8A, but not in recent years. Forages and roosts in a number of South Bay ponds, especially Ponds A1 and A2W.
California black rail (*Laterallus jamaicensis coturniculus*)	ST, SFP	Breeds in fresh, brackish, and tidal salt marsh.	Known to occur. Non-breeding individuals winter in small numbers in tidal marsh within the project area. Have been observed in small numbers during breeding seasons around the Island Ponds and potentially breeding in small numbers.
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT, CSSC, BCC	Nests on sandy beaches and salt panne habitats, including dry ponds.	Known to occur. Resident in the project area. Greatest numbers at Eden Landing and Ravenswood pond complexes. Additional birds occur in the project area during winter.
Bank swallow (*Riparia riparia*)	ST	Colonial nester on vertical banks or cliffs with fine-textured soils near water.	Potential to occur. Observed in the project area as rare transient. No suitable breeding habitat in the project area.
STATE FULLY PROTECTED SPECIES			
California brown pelican (*Pelecanus occidentalis californicus*)	SFP	Occurs in near-shore marine habitats and coastal bays. Nests on islands in Mexico and Southern California.	Known to occur. Regular in project area during nonbreeding season (summer and fall). Roosts on levees in the interiors of pond complexes; forages in ponds and Bay.
Golden eagle (*Aquila chrysaetos*)	SFP, WL, BCC	Breeds on cliffs or in large trees or electrical towers; forages in open areas.	Potential to occur. Occasional forager, primarily during the nonbreeding season. No nesting records within the project area.
Tricolored blackbird (*Agelaius tricolor*)	Provisional Listing, CDFW (nesting), CSSC, BCC	Breeds near freshwater in dense emergent vegetation.	Potential to occur. May breed in extensive freshwater marshes around the periphery of the project area, such as at Coyote Hills. Occurs elsewhere in the project area as a nonbreeding forager.
American peregrine falcon (*Falco peregrinus anatum*)	SFP, BCC	Forages in many habitats; nests on cliffs and similar human-made	Known to occur. Regular forager (on other birds) in the project area, primarily during migration and winter. In the Alviso pond complex, individuals have nested

NAME	STATUS	HABITAT/DESCRIPTION	POTENTIAL TO OCCUR
		structures.	on electrical towers regularly since at least 2006, and two pairs nested on towers in 2007.
White-tailed kite (*Elanus caeruleus*)	SFP (nesting)	Nests in tall shrubs and trees; forages in grasslands, marshes, and ruderal habitats.	Known to occur. Common resident; breeds at inland margins of the study site, where suitable nesting habitat occurs.

Definitions:
FE – Federally Endangered
FT – Federally Threatened
FC – Candidate for Federal Listing
BCC – USFWS Bird of Conservation Concern
SE – State Endangered
ST – State Threatened
SFP – Fully Protected (California)
CSSC – California Species of Special Concern
WL – CDFW Watch List

CNDDB 2014.

AECOM 2016

Of the species listed above, the SBSP Restoration Project anticipates that the potential exists to affect salt marsh harvest mouse, California ridgeway's rail, western snowy plover, California least tern, longfin smelt, steelhead, and green sturgeon. The Refuge is seeking formal consultation under Section 7 of the ESA with the NMFS and USFWS for potential impacts on these species. However, the results from the SBSP Restoration Project, including Phase 2 work, would provide long term net benefits to protected species by creating or enhancing habitat for these species in the project area.

Longfin smelt, is a candidate species for federal listing and is listed as threatened under the CESA. By agreement between the USFWS and the CDFW, on projects for which the USFWS is the federal lead agency, take authorization under the CESA and federal ESA Section 7 would be provided by the USFWS. Therefore, longfin smelt would be covered in the USFWS Biological Opinion (BO), after it is issued.

The SBSP Restoration Project pond complexes themselves are not expected to support federally listed plants: vascular plants are entirely absent from artificial, hypersaline ponds, and levees; and remnant marshes provide peripheral halophytic habitat bearing little resemblance to the broad, relatively heterogeneous habitat of an intact upper marsh. Historic populations of federally listed plant species are largely considered to be extirpated from the project area (USFWS 2010).

b) The Refuge has initiated ESA section 7 consultations for the SBSP Restoration Project Phase 2 and submitted Biological Assessments for these species to USFWS and the NMFS. Biological Opinions from these agencies will be provided to BCDC after they are issued.

c) See 4a and 4b above.

2.10 Box 2.v.5. Scarce Subtidal Areas

There are no subtidal areas that are scarce or that have an abundance and diversity of fish, other aquatic organisms and wildlife (e.g., eel grass beds, sandy deep water or underwater pinnacles) at the site.

2.11 Box 2.v.6. Potential Discharge of Pollutants

Because the project would be discharging fill into and excavating material from State and federal jurisdictional waters, and would have potential for accidental discharge from construction related actions, the Refuges concurrently is seeking appropriate authorizations from the RWQCB and the USACE for these potential impacts. The Refuge currently is applying for a new Clean Water Act Section 401 Certification from the RWQCB for SBSP Restoration Project Phase 2 operations. After the project has received its 401 Certification and Waste Discharge Requirements, issued by the RWQCB, the project will provide its contractor's SWPPP to BCDC, and subsequent SWPPP amendments as they are accepted by the RWQCB. The following general BMPs that were implemented during Phase 1 operations BMPs also are proposed for Phase 2 operations. A summary of general BMPs follows.

The following BMPs are included in the proposed Phase 2 operations to directly or indirectly minimize or avoid potential adverse effects to environmental resources during SBSP Restoration Project-related activities:

- A water truck would be used for dust control on the site, if needed.
- If land-based equipment is used in mudflats, light, low-pressure construction equipment and/or equipment on mats would be employed.
- Vehicles driving on levees to access the Bay, tidal sloughs, or channels for construction or monitoring activities would travel at speeds slow enough to minimize noise and dust disturbance.
- Vehicle staging, cleaning, maintenance, refueling, and fuel storage would be 150 feet or more from any stream, water body, or wetland.
- A hazardous spill plan would be developed prior to construction, and would state what actions would be taken in the event of a spill. This plan would also incorporate preventative measures to be implemented, such as the placement of refueling facilities, storage and handling of hazardous materials, etc.
- Staging areas, distinct from stockpile areas, would be established in upland (rather than wetland) areas that do not provide habitat for ESA-listed species; such staging areas would typically be located on bare ground, paved or graveled areas, ruderal habitat, or non-native grassland.
- Contaminants would be stored within bermed containment areas lined with an impermeable membrane and designed to hold 125 percent of total fuel capacity. Containment areas would be located as far from live water as possible within the staging area. Contaminant absorbent materials would be stored within each containment area. Water collected within containment areas would be disposed of according to federal, State, and local regulations.
- Equipment would be refueled only in the staging area. Fuel absorbent mats would be used when refueling equipment.

- All equipment would be maintained free of petroleum leaks. No equipment would enter live water except for aquatic equipment (e.g., the "Mallard") or amphibious equipment designed specifically for aquatic or amphibious use.
- Absorbent materials would be maintained at each worksite in sufficient quantity to effectively immobilize the volume of petroleum-based fluids contained in the largest tank present at the site. Acceptable absorbent materials are those that are manufactured specifically for the containment and clean-up of hazardous materials. Sands or soil are not approved absorbent materials.
- In the event of a contaminant spill, work at the site would immediately cease while the absorbent materials are deployed to contain, control, and mitigate the spill. The contractor would immediately prevent further contamination notify appropriate authorities, and mitigate damage as appropriate.
- Site work would resume when the spill kit is resupplied with a sufficient quantity of material capable of effectively immobilizing the volume of petroleum-based fluids contained in the largest tank present at the site.
- Containers for storage, transportation, and disposal of contaminated absorbent materials would be provided on the Phase 2 Actions site. Petroleum products and contaminated soil would be disposed of according to federal, State, and local regulations.
- Any machinery that would be left on the temporary platform or parked within 150 feet of a water body including portable water pumps would be placed in a full containment cell.
- All vehicles operated within 150 feet of any water body would be inspected daily for leaks and, if necessary, repaired before leaving the staging area. Inspections would be documented in a record that is available for review on request from USFWS or NMFS.
- Machinery and implements that are used during the Phase 2 Actions would be in good repair, free of excessive leaks and steam cleaned off-site prior to entering the work area. Fluid leaks would either be repaired or contained within a suitable waste collection device (e.g., drip pads, drip pans). When changing hydraulic lines, care would be taken to keep hydraulic fluid from entering a water body or soils.
- There would be no debris introduction into the channels, wetlands, or environmentally sensitive areas from Phase 2 Action work.
- All disturbed areas would be stabilized within 12 hours of any break in work unless construction would resume work within 7 days. Earthwork would be completed as quickly as possible, and site restoration would occur immediately following use.
- A supply of emergency erosion control materials would be on hand at the Phase 2 Action site.
- Any large wood, native vegetation, and weed-free topsoil displaced by construction would be stockpiled for use during site restoration. Additional boulders, rock, large wood, and any other necessary natural construction materials would be obtained from outside the Phase 2 project area.
- Boating activities would abide by the Marine Mammal Protection Act (1972) unless otherwise authorized by an approved permit from NMFS.
- Silt fences would be erected adjacent to areas of ground disturbance to define and isolate work areas from sensitive habitats.

- In all Phase 2 Actions involving the use of heavy equipment, best management practices would be employed, including using berms and/or silt fences to contain the placement of materials, implementing remedial measures, and minimizing the area impacted.
- All activity within vegetated marsh habitat would be minimized.
- For any activities that involve walking through a marsh repeatedly (e.g., monitoring), different paths through the marsh would be taken during consecutive visits to minimize impacts to habitat in any given area. A route would be determined which would minimize the amount of foot traffic in the marsh and maximize the use of existing roads, trails, and boardwalks to the maximum extent practicable.
- A construction personnel education program would be conducted by a qualified biologist prior to the initiation of construction or maintenance activities within tidal marsh or slough habitat, within or adjacent to habitat that supports nesting western snowy plovers, California least terns, Ridgway's rails or, or other listed species. The program would consist of a brief presentation by persons knowledgeable in the biology of the pertinent species and legislative protection to explain endangered species concerns to contractors and their employees. The program would include the following: a description of the species and their habitat needs; a report of the occurrence of the relevant species in the Phase 2 project area; an explanation of the status of these species and their protection under the ESA; and a list of measures being taken to reduce impacts to these species during Phase 2 construction and implementation. A fact sheet conveying this information would be prepared for distribution to the above-mentioned people and anyone else who enters the Phase 2 project site.
- For any given Phase 2 construction project, a representative would be appointed by the applicant who would be the contact source for any employee or contractor who might inadvertently kill or injure a listed species or who finds a dead, injured, or entrapped individual. The representative(s) would be identified during the employee education program. The representative's name and telephone number would be provided to the USFWS and NMFS prior to the initiation of any construction or maintenance activities.
- Chemical concentrations and associated sampling plans and activity of upland fill material or site soils planned for use on-site would be reviewed and approved according to QAPP (**Appendix E**) developed specifically for the Phase 2 actions. That QAPP has been approved by the Regional Water Quality Control Board, as well as by the USFWS and NMFS. The data for upland fill material proposed for use in the project area would be provided to the agencies for review and approval according to the terms of the QAPP.
- Sediment suspension would be minimized when removing derelict piles or other infrastructure formerly associated with salt manufacturing or other aspects of water management. Measures to accomplish this would include cutting piles at or below the mudline or using a direct pull method to minimize sediment resuspension. Piles and other structures would be removed slowly to allow sediment to slough off at, or near, the mudline.
- Clean fill materials that would be used for islands, levees, or upland transition zones would be stockpiled on-site.
- Interpretive signage prohibiting access to areas that are closed to the public, and indicating the importance of protection of sensitive biological resources, would be placed in key locations, such as along trails near sensitive habitats, at boat launches, and near the mouths of sloughs that are

closed to boating access. Interpretive signage at boat launches would describe areas that are closed to boating access and describe measures to be implemented to avoid impacts to harbor seals, California Ridgway's rails, and other sensitive wildlife.

- Trails adjacent to some nesting areas for sensitive bird species would be closed during the breeding season. The locations of trail segments to be closed, and the periods of closure would depend on whether sensitive bird species, such as western snowy plovers or terns, are nesting in certain areas in a given year, and whether nesting areas are located in close proximity to the trails. Decisions on whether to close a particular trail segment would be made early in the breeding season (and possibly later in the season as conditions change) following surveys for nesting birds within a given pond adjacent to a trail.
- Nesting Birds: State and federally protected bird species are anticipated to nest in the project area within the months of February 1 to September 14. Impact avoidance measures during the nesting season would be implemented as required by the USFWS and CDFW.
- Salt Marsh Harvest Mouse: Avoidance and minimization measures for potential impacts to ESA listed salt marsh harvest mouse would be implemented as required by the USFWS. Measures include hand removal of vegetation in tidal marsh areas, use of silt fences to define species habitat, and minimizing access through pickle weed vegetation.
- Fish: To minimize impacts to protected fish species, for any given activity, a biological monitor would be appointed as the contact source for any employee or contractor who might encounter a listed species. The representative(s) would be identified during the environmental awareness program. The representative's name and telephone number would be provided to USFWS and NMFS prior to the initiation of any activities.
- Pile Driving: To minimize impacts to marine species during pile driving operations, pile driving would occur during low tide as feasible. This would minimize both the direct transmittal of noise through water in the work area; and the presence of special-status fish in the nearby shallow waters that remain.
- Pile Driving: A "soft start" technique will be implemented during pile installation activities to reduce hydroacoustic effects on fish. The soft start technique would allow for any protected fish in the vicinity work area to leave potential impact areas before full pile driving began.
- Steelhead migration: Activities that may affect upstream migration of adults or downstream migration of juveniles would be avoided to the maximum extent practicable. In-water work that has potential to impact steelhead from December through February (adult upstream migration period) and from April through June (juvenile downstream migration period) would be avoided to the maximum extent practicable. If in-channel work were to be performed during these periods, fish exclusion methods may be implemented, including timing work during low tide cycles to avoid or minimize potential in-water impacts. If the use of work windows is applicable, the NMFS acceptable work windows for steelhead are June through November.

2.12 Box 2.v.7. Toxic Contamination in the Project Site

The immediate project area has known mercury in Pond A8. See discussion of Pond A8 in the Project Description under the Site Descriptions (Section 2.6.7.2).

In addition, the project area is adjacent to former landfills at the A8, Mountain View and Ravenswood Ponds. The project is designed to avoid these areas and would improve conditions protecting these landfills from intrusion or leaching of landfill material. South of the A8 Ponds, a closed and capped landfill currently is in use as a business park. The Mountain View Ponds A1 and A2W southern borders abut the closed landfill that now forms Shoreline Park, and recreational trails and bicycle paths run along them. At Ravenswood Ponds, Bedwell Bayfront Park is on a capped landfill where public trails, vegetation, parking, and recreation features now cover it. The habitat transition zones proposed at each of these ponds would provide additional protection to the adjacent capped landfill.

The AMP (**Appendix D**) for the project addresses potential pollutants in or near the project area and reporting results is available online at http://www.southbayrestoration.org/monitoring/.

2.13 Box 2.v.8. Water Quality Certification

Application for a Clean Water Act Section 401 permit to the RWQCB for the project is occurring concurrently with this permit application. After the project has been issued its 401 Certification and its Waste Discharge Requirements, they will be transmitted to BCDC so that this application can be filed as complete.

No approvals for the SBSP Restoration Project Phase 2 operations are required from the State Department of Toxic Substances Control.

Permits acquired for SBSP Programmatic, Phase 1, and Operations and Maintenance operations were acquired and are available online at http://www.southbayrestoration.org/documents/permit-related/.

2.14 Box 2 v. 9. Consistency with Commission's Laws and Policies, Mitigation

2.14.1.1 Consistency with the McAteer Petris Act

The SBSP Restoration Project Phase 2 proposes to restore and enhance a mix of wetland habitats; provide wildlife-oriented public access and recreation and provide for flood management in the South Bay. The proposed project is consistent with the McAteer Petris act under the following Sections:

66602 Findings and Declarations as to Necessity for Providing Locations for Water-Oriented Land Uses and Increased Public Access to Shoreline and Waters.

The project as proposed would establish, enhance and preserve wildlife refuge in the Bay within areas found within Map 7 of the Bay Plan. The project has been planned with extensive input from wildlife experts including State and federal wildlife agencies to provide an appropriate amount of public access while protecting and avoiding impacts to sensitive habitat in the Bay that would be enhanced or created by the project. Although the Phase 2 actions would add several new public access and recreation features at two pond clusters, others features that were considered were

removed from implementation under Phase 2 because of concerns over recreation-based impacts on sensitive wildlife species. These impacts would be potentially significant and would not be consistent with the project. The Refuge asserts that this decision was correct, and that those public access features not included in the project would not have been consistent with the project goals of "wildlife-compatible recreation." Careful monitoring under the AMP would be used to measure wildlife responses to public access features and consider their addition in future project phases, if consistent with the project.. The project as proposed would provide the maximum feasible public access consistent with the project.

66602.1 Findings and Declarations as to Importance of Salt Ponds and Managed Wetlands and Development.

The project would restore and enhance former salt production ponds to wildlife refuge in the South Bay, thereby providing public benefit through habitat restoration and improvement at existing salt ponds. The project as proposed would increase the surface water of the Bay by restoring tidal input into these ponds or introducing waters into ponds as needed to manage these as beneficial habitats for special status species. The project as proposed would provide the maximum feasible public access consistent with the project.

66605 Findings and Declarations as to Benefits, Purposes and Manner of Filling.

a) Fill used for Phase 2 is consistent with this section of the McAteer-Petris Act as it would enhance and create wildlife refuge, improve shoreline appearance and improve public access to the Bay. Therefore, public benefits from the project greatly exceed public detriment.

b) As the restoration of existing salt ponds to wildlife habitat is unique to these locations, no upland alternative is available for this project.

c) The Refuge is proposing the minimum fill necessary to meet the project goals to restore and enhance a mix of wetland habitats; provide wildlife-oriented public access and recreation; and provide flood risk management in the South Bay.

d) The SBSP would have a net beneficial impact on Bay resources by opening existing ponds to tidal flow and creating, improving and restoring beneficial habitat to species in the Bay. The proposed project would convert existing former salt production ponds (much of which is salt panne or low quality habitat) into high quality marsh and open water habitat.

e) Project designs were developed with the ancillary benefit of improved flood risk management as an included benefit of the proposed fill. In addition, public access areas were designed in compliance with the safety standards provided in the Bay Trail Plan (Bay Trail 1989) and ADA Standards for Accessible Design (Department of Justice [DOJ] 2010).

f) Permanent shoreline would be established by the SBSP Phase 2 operations.

g) The Refuge holds title to lands proposed for fill.

This permit request is transmitted to meet the requirements found in Sections:

- 66632. Permit for Fill, Extraction of Materials, or Substantial Change in Use of Land, Water, or Structure; Application for Permits.
- 66632.4. Permits for Projects Within Shoreline Band Located Outside Boundaries of Water-Oriented Priority Land Uses.

- 66653 Grant or Denial of Permits; Advisory Nature of Provisions Pertaining to Activities Outside Commission's Jurisdiction.

2.14.1.2 Consistency with the Bay Plan

The SBSP Restoration Project Phase 2 is consistent with Bay Plan policies on fish, other aquatic organisms and wildlife; water quality; surface area and volume; tidal marshes and flats; climate change; safety of fill; dredging, shoreline protection and mitigation. The project is consistent with habitat creation and public access to the Bay outlined in the San Francisco Bay Plan, the San Francisco Baylands Ecosystem Habitat Goals, and the policies of the BCDC.

The project proposes to use fill to directly create and allow for the natural creation of habitat for special-status species, to enhance habitat by restoring tidal action to former salt ponds and provides for adaptive management to minimize any harmful effects from this fill in future phases of the project. In so doing, tidal marshes and tidal flats would be restored, increasing habitat, water quality, the surface area and volume of the Bay, would manage flood risk, and would conserve these areas to the fullest extent possible. All proposed fill would be reviewed and approved by the process put forth in the RWQCB accepted and USFWS- and NMFS-approved QAPP (**Appendix E**). All work proposed by the project would be in accordance with Bay Plan Map 7, would be in accord with the Baylands Ecosystem Habitat Goals, and generally would meet Bay Plan Map 7 Commission Suggestions numbers 12 and 14. The response to Box 2.v.3 (Section 2.8) provides flood risk management considerations that were part of the design. The project proposes no structures on new fill outside of the reinforced maintenance bridges at the east levee of Pond A2W and water control structures at Ravenswood ponds. None of these are habitable structures, and they would not expose people to potential injury or death during a tsunami, seiche, or similar major storm event.

Commission Suggestion number 12 in Map 7 states, “South Bay - Enhance and restore valuable wildlife habitat. Bay tidal marshes and salt ponds may be acquired as part of Don Edwards San Francisco Bay National Wildlife Refuge and managed to maximize wildlife and aquatic life values. Salt ponds can be managed for the benefit of aquatic life and wildlife. Provide continuous public access to the Bay and salt ponds along levees if in a manner protective of sensitive wildlife. Provide opportunities for non-motorized small boat launching facility where compatible with wildlife and habitat protection.”

Phase 2 does not propose any new non-motorized boat launch facility as no feasible location compatible with wildlife habitat protection could be identified.

Commission Suggestion number 14 in Map 7 states, “Regional Restoration Goal for South Bay - Restore large areas of tidal marsh connected by wide corridors of similar habitat along the perimeter of the Bay. Several complexes of salt ponds, managed to optimize shorebird and waterfowl habitat functions, should be interspersed throughout the region, and natural unmanaged salt ponds should be restored on the San Leandro shoreline. Natural transitions from tidal flat to tidal marsh and into adjacent transition zones and upland habitats should be restored wherever possible. See the Baylands Ecosystem Habitat Goals report for more information.”

Phase 2 operations as proposed would realize the general goals and nearly all specific goals set forth in the Bay Plan.

2.15 Box 2.v. 10. Project Plans

Project plan sheets are provided in **Appendix C**. In addition, **Figure 8** shows BCDC jurisdictional areas and construction features in the project site.

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3 Box 3. Fill Information

3.1 Box 3.e. Types of Areas to be Filled

Fill for the SBSP Restoration Project occurs across multiple BCDC jurisdictions. In many cases, a single project feature may occur within multiple BCDC jurisdictions. The following tables summarize the approximate fill areas within BCDC jurisdictions for specific features at each pond complex. **Table 8**, **Table 9**, **Table 10**, **Table 16**, **Table 20**, and **Table 21** in the Project Description (Section 2.6.8.1.6; Section 2.6.8.2; Section 2.6.8.3.10; Section 2.6.8.4.12; and Section 2.6.8.5) show the total impact areas and volumes for each feature.

Table 26 Island Ponds–Estimated Fill Volumes and Areas within BCDC Jurisdictions

FILL PURPOSE	BCDC JURISDICTION IMPACT AREA	BCDC JURISDICTION IMPACT VOLUME
	BAY/SALT POND (SQUARE FEET)	BAY/SALT POND FILL BELOW MHHW/HTL (CUBIC YARDS)
Pond A19 - Northwest Breach - Ditch Block 1	12,800	1,800
Pond A19 - Northwest Breach - Ditch Block 2	13,900	1,900
Pond A19 - Northeast Breach - Ditch Block 1	13,600	1,500
Pond A19 - Northeast Breach - Ditch Block 2	13,200	1,400
Pond A19 - South Breach Widening - Ditch Block 1	14,600	2,200
Pond A19 - South Breach Widening - Ditch Block 2	16,100	2,200
Other Sidecast Levee Material	204,800	14,500
Total	**289,000**	**25,500**

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Table 27 A8 Ponds–Fill Areas and Volumes within BCDC Jurisdictions

FILL PURPOSE	BCDC JURISDICTION IMPACT AREA			BCDC JURISDICTION IMPACT VOLUME		
	100-FOOT SHORELINE BAND (SQUARE FEET)	SALT PONDS (SQUARE FEET)	NON-JURISDICTIONAL (SQUARE FEET)	100-FOOT SHORELINE BAND FILL BELOW HTL (CUBIC YARDS)	SALT PONDS FILL BELOW HTL (CUBIC YARDS)	NON JURISDICTIONAL FILL BELOW HTL (CUBIC YARDS)
A8S West HTZ	17,200	511,300	0	2,980	88,520	0
A8S East HTZ	200	530,100	13,400	30	80,440	2,030
Total	**17,400**	**1,041,400**	**13,400**	**3,010**	**168,960**	**2,030**

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Table 28 Mountain View Ponds–Estimated Fill Volumes and Areas within BCDC Jurisdictions

FILL PURPOSE	BCDC JURISDICTION IMPACT AREA			BCDC JURISDICTION IMPACT VOLUME		
	100-FOOT SHORELINE BAND (SQUARE FEET)	SALT POND (SQUARE FEET)	NON-JURISDICTIONAL (SQUARE FEET)	100-FOOT SHORELINE BAND FILL BELOW HTL (CUBIC YARDS)	SALT POND FILL BELOW HTL (SQUARE FEET)	NON JURISDICTIONAL FILL BELOW HTL (CUBIC YARDS)
Coast Casey Forebay Levee Improvement	10,100	0	90,800	1,210	0	10,840
Pond A1 West Levee Improvement	389,200	120,000	43,400	28,400	8,760	3,170
10 Habitat Islands	0	222,200	0	0	40,600	0
Bridge Piles, Abutments	2,600	0	0	100	0	0
Pond A1 Habitat Transition Zone	17,200	596,200	123,800	1,710	59,430	12,340
Pond A2W Habitat Transition Zone	0	665,600	175,00	0	75,140	1,980
Totals	**419,100**	**1,604,000**	**275,500**	**31,420**	**183,930**	**28,330**

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Table 29 Ravenswood Ponds–Estimated Fill Areas and Volumes within BCDC Jurisdictions

FILL PURPOSE	BCDC JURISDICTION IMPACT AREA				BCDC JURISDICTION IMPACT VOLUME			
	100-FOOT SHORELINE BAND (SQUARE FEET)	SALT PONDS (SQUARE FEET)	BAY (SQUARE FEET)	NON-JURISDICTIONAL (SQUARE FEET)	100-FOOT SHORELINE BAND FILL BELOW HTL (CUBIC YARDS)	SALT PONDS FILL BELOW HTL (CUBIC YARDS)	BAY FILL BELOW HTL (CUBIC YARDS)	NON JURISDICTIONAL FILL BELOW HTL (CUBIC YARDS)
R5/S5 East Levee and All American Canal Levee Improvement	10,400	747,700	300	5,400	630	45,120	20	330
All American Canal HTZ	8,400	638,700	0	0	900	68,560	0	0
Bedwell Bayfront Park HTZ	100	345,000	0	49,600	10	41,290	0	5,940
Ditch Block west of R4 Breach	400	12,000	0	0	30	970	0	0
Water Control Structures	3,000	800	1,300	0	240	60	100	0
Total	**22,300**	**1,744,200**	**1,600**	**55,000**	**1,810**	**156,000**	**120**	**6,270**

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Table 30 BCDC Net Fill Impacts by Jurisdiction

BCDC JURISDICTION	IMPACT AREA (SQUARE FEET)	IMPACT AREA (ACRES)	VOLUME OF FILL (CUBIC YARDS)
100-Foot Shoreline Band	458,800	10.5	36,240
Bay	1,600	0.0	120
Salt Pond	4,389,600	100.8	508,890
Bay/Salt Pond	289,000	6.6	25,500
Total Fill in BCDC Jurisdiction	***5,139,000***	***118.0***	***570,750***
Non-Jurisdictional	343,900	7.9	36,630
Total Fill Impact	**5,482,900**	**125.9**	**607,380**

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Table 31 Estimated Fill Impacts from PG&E Work

ITEM	TOTAL AREA (SQUARE FEET)	TOTAL AREA (ACRES)	TOTAL VOLUME (CUBIC YARDS)	VOLUME BELOW MHHW/HTL (CUBIC YARDS)	BCDC JURISDICTION
Replace boardwalks in Pond A2W	13,100	0.3	187	37	Salt Ponds
Add new boardwalk outside of Pond A1	7,000	0.16	93	47	Bay
Enlarge concrete tower footings	900	0.02	80	40	Salt Ponds
Total	**21,000**	**0.48**	**360**	**124**	

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3.2 3.g.1. Dimensions of Structures

Proposed structures include bridges at Pond A2W on its eastern levee and water control structures at Mountain View and Ravenswood ponds. Dimensions of proposed structures are detailed in the above tables, in the Project Description (see **Table 14**, **Table 17**, and **Table 24**), and in the project plan sheets (**Appendix C**).

3.3 Box 3.g.2 Photographs of Existing Shoreline Condition

Figure 9 shows representative photos of existing site conditions in the project area.

3.4 Box 3.g.3. Purpose of Fill in BCDC Jurisdiction

In addition to the following text, please review the Project Description provided above in Section 2.6.4, which outlines the specific goals and benefits that would result from the project. The following language addresses the Commission's specific requirements for approving fill in the Bay:

- The SBSP Restoration Project would accommodate water-oriented use by restoring, enhancing, and creating high-quality habitat within a wildlife refuge. Fill for the project is proposed to meet this goal and would be added for habitat transition zones, habitat islands, ditch blocks, and beneficial re-use of levee material, to enhance pond bottom topography and expedite transition to tidal marsh habitat.

- The project would improve the existing shoreline appearance through restoration efforts that would provide improved wildlife viewing opportunities and enhance and increase the biodiversity within the project location. The project would result in restored and enhanced wildlife habitat that is part of the Refuge.

- The project proposes new public access features and improvements to existing public access features that are quantified in the response to Box 5. These features also would improve the existing shoreline band appearance. The project is would create new viewing areas and trails, and would make improvements to existing trails. The project would integrate new features with existing public assets, such as the Bay Trail, Bedwell Bayfront Park, Shoreline Park, and others.

- The project has been designed to maintain existing flood risk management, to protect the health, safety, and welfare of the public. Fill for habitat transition zones, water control structures, and levee improvements would enhance flood control management at the A8, Mountain View, and Ravenswood Ponds.

3.5 Box 3.g.4. Results from Fill in BCDC Jurisdiction

(a) Possible impacts on the Bay from proposed fill.

1. Impacts on volume area and circulation of the Bay water: Phase 2 would add fill within BCDC jurisdictions. These volumes and acres are provided in response to Box 2 and to Box 3.e, and are detailed in the Project Description (Section 2.6.8). The result of restoration activities would be conversion of the current 128 acres of wetlands and 1,610 acres of open waters (not including the managed ponds and salt pannes at Ravenswood Ponds) to 1,250 acres of tidal marsh wetlands (929 acres of new tidal marsh habitat and 321 acres of enhanced tidal marsh habitat) and 900 acres of enhanced open water habitat. The conversion of significant areas of open water salt ponds to new and enhanced tidal marsh wetlands is a conversion from one type of system to another type of system. This conversion is a major benefit, because a net increase to habitat would occur in area and function. The values shown in **Table 33** summarize the project impacts versus benefits from the proposed fill. Effects on circulation from the project are described in the response to Box 2.v.3 in Section 2.8.

2. Water quality: Temporary impacts on water quality from Phase 2 operations, including levee breaching, cofferdam installation and dewatering, and restoration of tidal function into existing salt ponds, would include short-term increases in turbidity and salinity. With implementation of BMPs as proposed, these impacts would be minimal, temporary, and reversible over the long term. The long-term impact from the project would be a net benefit to water quality by providing marsh habitat that would offer valuable ecosystem services, including water quality improvement.

3. Fertility of marshes or fish or wildlife resources: The proposed fill and discharge necessary to achieve project goals have been designed to maximize beneficial environmental effects and increase the quality and amount of aquatic habitat on the site compared to existing conditions. The proposed fill and discharge would result in a very small impact in terms of total lost Bay waters (i.e., where the uppermost portions of the habitat transition zones, islands, and raised levees would be above HTL) (**Figure 10**). These impacts would occur primarily on areas that are relatively poor quality, have little topographic variation, have low diversity in vegetation (horizontal or vertical), and are (at least in some cases) substantially hydrologically altered from ideal tidal conditions. However, the overall quality and ecological value of the aquatic habitat in the SBSP Restoration Project Phase 2 area would increase substantially because the overwhelming majority of the change would be from open waters to tidal marsh wetlands and/or from seasonally dry salt pannes (currently unavailable to aquatic species) to tidal marsh wetlands and enhanced ponds. These changes are designed and expected to increase the South Bay's resilience to sea-level rise and the higher tides that are anticipated in the coming decades (**Figure 11)**. It also would result in a more beneficial and sustainable shoreline by improving or maintaining existing flood control parameters. The project would have temporary and permanent impacts on habitat for protected wildlife species. The permanent impacts on federally listed species' habitats are shown in **Table 344**.

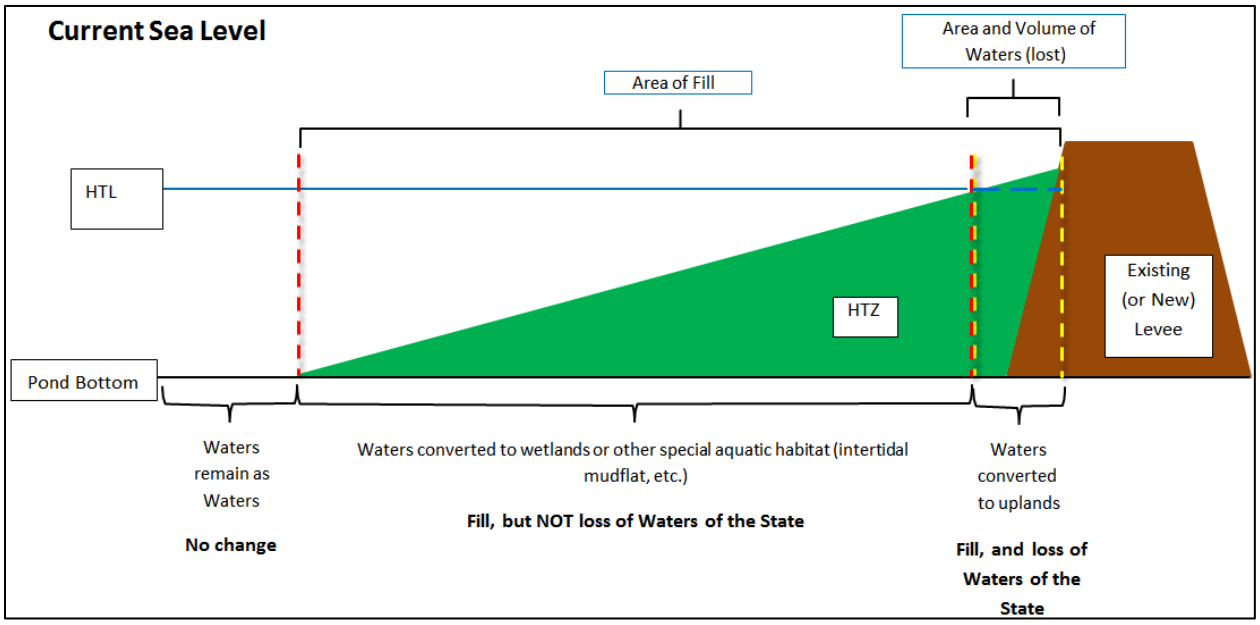

Figure 10. Habitat Transition Zone Current Sea Level

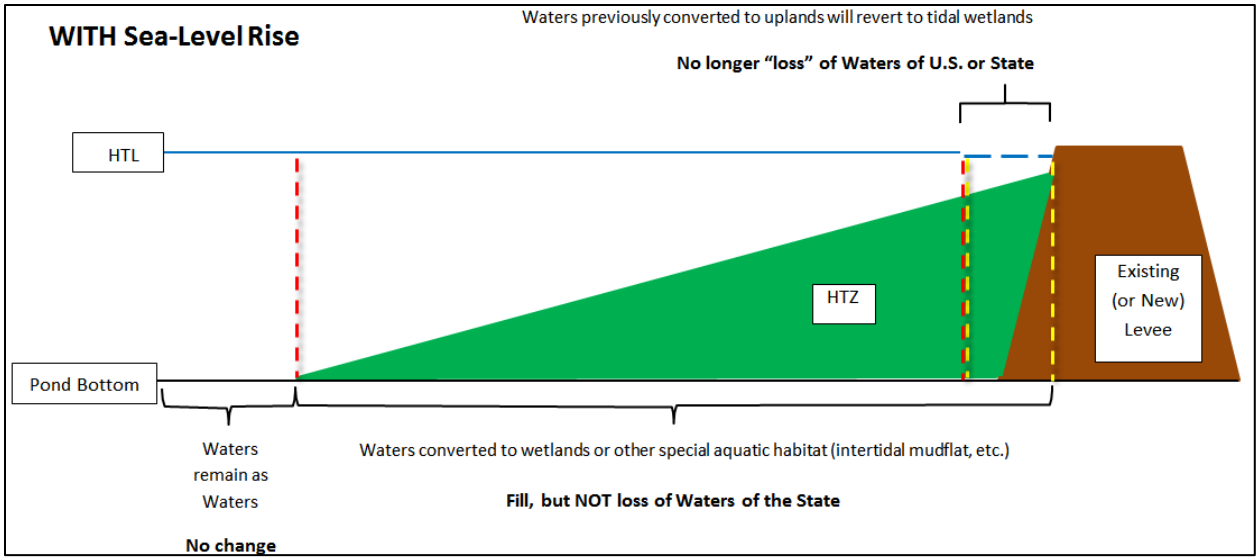

Figure 11. Habitat Transition Zone – Expected Sea Level Rise

4. Other physical conditions. The responses above, in conjunction with the details provided in the Project Description, address the project's impacts on the conditions within the project area. In addition, the potential impacts on land, air, water, minerals, flora, fauna, noise, or other objects of historical or aesthetic significance were discussed in the Phase 2 FEIS/R **Table 32** shows the results of the significance determinations by impact for the Phase 2 Preferred Alternative. For reference, the table also presents the significance determinations made in Chapter 3 of the Phase 2 FEIS/R for each enumerated impact and for each action and no action alternative at each pond cluster. The impact analysis and significance determination conducted for the 2016 Final EIS/R identified the potentially significant impacts listed below. They are those impacts that could not be reduced to a less-than-significant level, even after implementation of project-specific mitigation measures or because no appropriate project-level mitigation measures exist that would that have that effect. In these rare cases, these impacts would be significant.

Phase 2 Impact 3.6-1: Provision of new public access and recreation facilities, including the opening of new areas for recreational purposes and completion of the Bay Trail spine.

One of the thresholds of significance for this impact includes not providing "maximum feasible public access, consistent with the proposed project." Although the Phase 2 actions would add several new public access and recreation features at two pond clusters, other features that were considered were removed from implementation under Phase 2 because of concerns over recreation-based impacts on sensitive wildlife species. These impacts would be potentially significant and would not be consistent with the project. The Refuge asserts that this decision was correct, and that those public access features not included in the project would not have been consistent with the project goals of "wildlife-compatible recreation." Careful monitoring under the AMP would be used to measure wildlife responses to public access features and consider their addition in future project phases, if consistent with the project.

Phase 2 Impact 3.6-5: Result in the temporary construction-related closure of adjacent public parks or other recreation facilities, making such facilities unavailable for public use during construction activities.

These impacts would be significant and unavoidable at the Alviso Mountain View Ponds and Ravenswood Ponds, where existing parking areas, park access, and some trails necessarily would be temporarily closed during portions of the construction work. This would be a matter of public safety in combination with the need to bring materials and equipment through existing city parks to reach the ponds.

Table 32 Phase 2–EIS/R Summary Impact Table

IMPACT	Proposed Phase 2 Operations
3.2 Hydrology, Flood Management, and Infrastructure	
Phase 2 Impact 3.2-1: Increased risk of flooding that could cause injury, death, or substantial property loss**.**	LTS
Phase 2 Impact 3.2-2: Alter existing drainage patterns in a manner which would result in substantial erosion or siltation on- or off-site.	LTS
Phase 2 Impact 3.2-3: Create a safety hazard for people boating in the project area.	LTS
Phase 2 Impact 3.2-4: Potential effects from tsunami and/or seiche.	LTS
3.3 Water Quality and Sediment	
Phase 2 Impact 3.3-1: Degradation of water quality due to changes in algal abundance or composition.	LTS
Phase 2 Impact 3.3-2: Degradation of water quality due to low dissolved oxygen levels.	LTS
Phase 2 Impact 3.3-3: Degradation of water quality due to increased methylmercury production or mobilization of mercury-contaminated sediments.	LTS
Phase 2 Impact 3.3-4: Potential impacts to water quality from other contaminants.	LTS
Phase 2 Impact 3.3-5: Potential to cause seawater intrusion of regional groundwater sources.	LTS
3.4 Geology, Soils, and Seismicity	
Phase 2 Impact 3.4-1: Potential effects from settlement due to consolidation of Bay mud.	LTS
Phase 2 Impact 3.4-2: Potential effects from liquefaction of soils and lateral spreading.	LTS
Phase 2 Impact 3.4-3: Potential for ground and levee failure from fault rupture.	LTS
Phase 2 Impact 3.4-4: Potential effects from consolidation of Bay mud on existing subsurface utility crossings and surface rail crossings.	LTS
3.5 Biological Resources	
Phase 2 Impact 3.5-1: Potential reduction in numbers of small shorebirds using San Francisco Bay, resulting in substantial declines in flyway-level populations.	LTS/B
Phase 2 Impact 3.5-2: Loss of intertidal mudflats and reduction of habitat for mudflat-associated wildlife species.	LTS
Phase 2 Impact 3.5-3: Potential habitat conversion impacts to western snowy plovers.	LTS
Phase 2 Impact 3.5-4: Potential reduction in the numbers of breeding, pond-associated waterbirds (avocets, stilts, and terns) using the South Bay due to reduction in habitat, concentration effects, displacement by nesting California gulls, and other project-related effects.	LTS
Phase 2 Impact 3.5-5: Potential reduction in the numbers of non-breeding, salt-pond-associated birds (e.g., phalaropes, eared grebes, and Bonaparte's gulls) as a result of habitat loss.	LTS
Phase 2 Impact 3.5-6: Potential reduction in foraging habitat for diving ducks, resulting in declines in flyway-level populations.	LTS

Phase 2 Impact 3.5-7: Potential reduction in foraging habitat for ruddy ducks, resulting in declines in flyway-level populations.	LTS
Phase 2 Impact 3.5-8: Potential habitat conversion impacts on California least terns.	LTS
Phase 2 Impact 3.5-9: Potential loss of pickleweed-dominated tidal salt marsh habitat for the salt marsh harvest mouse and salt marsh wandering shrew, and further isolation of these species' populations due to breaching activities and scour.	LTS/B
Phase 2 Impact 3.5-10: Potential construction-related loss of or disturbance to special-status, marsh-associated wildlife.	LTS
Phase 2 Impact 3.5-11: Potential construction-related loss of or disturbance to nesting pond associated birds.	LTS
Phase 2 Impact 3.5-12: Potential disturbance to or loss of sensitive wildlife species due to ongoing monitoring, maintenance, and management activities.	LTS
Phase 2 Impact 3.5-13: Potential effects of habitat conversion and pond management on steelhead.	LTS/B
Phase 2 Impact 3.5-14: Potential impacts to estuarine fish.	LTS/B
Phase 2 Impact 3.5-15: Potential impacts to piscivorous birds.	LTS/B
Phase 2 Impact 3.5-16: Potential impacts to dabbling ducks.	LTS
Phase 2 Impact 3.5-17: Potential impacts to harbor seals.	LTS/B
Phase 2 Impact 3.5-18: Potential recreation-oriented impacts to sensitive species and their habitats.	LTS
Phase 2 Impact 3.5-19: Potential impacts to special-status plants.	LTS
Phase 2 Impact 3.5-20: Colonization of mudflats and marsh plain by non-native *Spartina* and its hybrids.	LTS
Phase 2 Impact 3.5-21: Colonization by non-native *Lepidium*.	LTS
Phase 2 Impact 3.5-22: Increase in exposure of wildlife to avian botulism and other diseases.	LTS
Phase 2 Impact 3.5-23: Potential impacts to bay shrimp populations.	LTS
Phase 2 Impact 3.5-24: Potential impacts to jurisdictional wetlands or waters.	LTS
Phase 2 Impact 3.5-25: Potential construction-related loss of, or disturbance to, nesting raptors (including burrowing owls).	LTS
3.6 Recreation Resources	
Phase 2 Impact 3.6-1: Provision of new public access and recreation facilities, including the opening of new areas for recreational purposes and completion of the Bay Trail spine.	PS
Phase 2 Impact 3.6-2: Permanent removal of existing recreational features (trails) in locations that visitors have been accustomed to using and that would not be replaced in the general vicinity of the removed feature.	NI
Phase 2 Impact 3.6-3: Increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated.	LTS

Phase 2 Impact 3.6-4: Result in substantial adverse physical impacts associated with the provision of new or physically altered park and recreational facilities, or result in the need for new or physically altered park and recreational facilities, the construction of which could cause significant environmental impacts.	LTS/B
Phase 2 Impact 3.6-5: Result in the temporary construction-related closure of adjacent public parks or other recreation facilities, making such facilities unavailable for public use.	SU
3.7 Cultural Resources	
Phase 2 Impact 3.7-1: Potential disturbance of known or unknown cultural resources.	LTS
Phase 2 Impact 3.7-2: Potential disturbance of the historic salt ponds and associated structures which may be considered a significant cultural landscape.	LTS
3.8 Land Use and Planning	
Phase 2 Impact 3.8-1: Land use compatibility impacts.	LTS
3.9 Public Health and Vector Management	
Phase 2 Impact 3.9-1: Potential increase in mosquito populations.	LTS
3.10 Socioeconomics and Environmental Justice	
Phase 2 Impact 3.10-1: Displace, relocate, or increase area businesses, particularly those associated with the expected increase in recreational users.	LTS/B
Phase 2 Impact 3.10-2: Change lifestyles and social interactions.	LTS/B
Phase 2 Impact 3.10-3: Effects disproportionately placed on densely populated minority and low-income communities or effects or racial composition in a community.	NDE
3.11 Traffic	
Phase 2 Impact 3.11-1: Potential short-term degradation of traffic operations at intersections and streets due to construction.	LTSM
Phase 2 Impact 3.11-2: Potential long-term degradation of traffic operations at intersections and streets during operation.	LTS
Phase 2 Impact 3.11-3: Potential increase in parking demand.	LTS
Phase 2 Impact 3.11-4: Potential increase in wear and tear on the designated haul routes during construction.	LTS
3.12 Noise	
Phase 2 Impact 3.12-1: Short-term construction noise effects.	LTS
Phase 2 Impact 3.12-2: Traffic-related noise impacts during construction.	LTS
Phase 2 Impact 3.12-3: Traffic-related noise effects during operation.	LTS
Phase 2 Impact 3.12-4: Potential operational noise effects from O&M activities.	LTS
Phase 2 Impact 3.12-5: Potential vibration effects during construction and/or operation.	LTS
3.13 Air Quality	
Phase 2 Impact 3.13-1: Short-term construction-generated air pollutant emissions.	LTS
Phase 2 Impact 3.13-2: Potential long-term operational air pollutant emissions.	LTS

Phase 2 Impact 3.13-3: Potential exposure of sensitive receptors to TAC emissions.	LTS
Phase 2 Impact 3.13-4: Potential odor emissions.	LTS
3.14 Public Services	
Phase 2 Impact 3.14-1: Increased demand for fire and police protection services.	LTS
3.15 Utilities	
Phase 2 Impact 3.15-1: Reduced ability to access PG&E towers, stations or electrical transmission lines.	LTS
Phase 2 Impact 3.15-2: Reduced clearance between waterways and PG&E electrical transmission lines.	LTS
Phase 2 Impact 3.15-3: Reduced structural integrity of PG&E towers.	LTS
Phase 2 Impact 3.15-4: Changes in water level, tidal flow and sedimentation near storm drain systems.	LTS
Phase 2 Impact 3.15-5: Changes in water level, tidal flow and sedimentation near pumping facilities.	LTS
Phase 2 Impact 3.15-6: Changes in water level, tidal flow and sedimentation near sewer force mains and outfalls.	NI
Phase 2 Impact 3.15-7: Disrupt Hetch Hetchy Aqueduct service so as to create a public health hazard or extended service disruption.	NI
Phase 2 Impact 3.15-8: Disruption of rail service due to construction of coastal flood levees and tidal habitat restoration.	NI
Phase 2 Impact 3.15-9: Reduced access to sewer force mains due to levee construction.	NI
3.16 Visual Resources	
Phase 2 Impact 3.16-1: Alter views of the SBSP Restoration Project Area.	LTS
3.17 Greenhouse Gas Emissions	
Phase 2 Impact 3.17-1: Construction-generated GHG emissions.	LTS
Phase 2 Impact 3.17-2: Operational GHG emissions.	LTS
Phase 2 Impact 3.17-3: Conflicts with applicable GHG emissions reduction plan, policy, or regulation.	LTS

Notes:

B = Beneficial; LTS = Less Than Significant; LTSM = Less Than Significant With Mitigation; NDE = No Disproportionate Effect; NI = No Impact; PS = Potentially Significant; SU = Significant and Unavoidable

The levels of significance for the impacts listed above assume that the program-level mitigation measures from the 2007 EIS/R and the elements of the Adaptive Management Plan are integral components of the Phase 2 project alternatives, and that management responses would be implemented based on ongoing monitoring and applied studies.

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(b) How the nature, location, and extent of the fill would minimize possible harmful conditions or effects to the Bay.

As noted in previous sections and the sections that follow, the actions required for the Phase 2 portion of the project have been designed to require the least fill placement within BCDC jurisdiction possible while still achieving the project goals for this phase. Any impacts (e.g., fill placement to create nesting islands) would create or enhance habitat for listed species, would

optimize restoration activities, or would provide sufficient improvements to the existing flood risk management to allow the restoration processes to proceed; environmental benefits would result from implementation of restoration.

In addition to the benefits stated in the project's Goals and Objectives, and the proposed BMPs, the Phase 2 project would include a review and approval process for imported fill to be used for the project (**Appendix E**). Chemical concentrations and associated sampling plans and activity of imported upland fill material or imported site soils planned for use on-site would be reviewed and approved according to the QAPP (**Appendix E**), developed specifically for the Phase 2 actions. That QAPP was accepted by the Regional Water Quality Control Board and approved by USFWS and NMFS. The data for imported upland fill material proposed for use in the project area would be provided to the agencies for review and approval, according to the terms of the QAPP (H.T. Harvey 2016). Fill material sourced on-site (i.e., from levee removals, breaches, pilot channels) is authorized by existing project permits for re-use in the ponds and are exempt from the QAPP review and approval process.

Table 33 Project Impacts versus Project Benefits

POND CLUSTER	POND	NOMINAL POND AREA (ACRES)[1]	CURRENT STATUS	EXISTING WETLANDS (ACRES)	IMPACTS IN BCDC JURISDICTION		RESTORATION OUTCOME(S)			RATIONALE	NET RESTORATION (ACRES)[2]	NET RESTORATION RATIO (X:1)	NET GAIN OF WETLANDS (ACRES)
					FILL (ACRES)	DREDGE (ACRES)	NEW TIDAL MARSH RESTORATION (ACRES)	ENHANCED TIDAL MARSH RESTORATION (ACRES)	ENHANCED MANAGED POND HABITAT (ACRES)				
Island Ponds	A19 and A20[3]	330	Open to tidal flows; transitioning to tidal marsh	115.5	7	2	0	321	0	Modification of a previous restoration effort to improve connectivity and complexity of marsh and aquatic habitat and to speed marsh formation.	312	36	206
A8 Ponds	A8 and A8S	570	Muted tidal-managed ponds	0	24	0	0	0	570	Modification of a previous restoration effort to enhance habitat complexity, protect against levee and landfill erosion, and prepare for future tidal marsh restoration.	546	24	0
Mountain View Ponds	A1 and A2W	710	Muted tidal ponds	12.2	46	1	662	0	0	Full tidal marsh restoration minus area of habitat islands and transition zones and levee improvements. Transition zones and islands have ecological benefits as well.	615	14	650
Ravenswood Ponds	R3	270	Seasonal pond/salt pannes	0.26	10	0	0	0	270	Retained as seasonal pond/salt pannes habitat but enhanced control over water levels and circulation for western snowy plover.	260	26	0
	R4	295			22	6	267	0	0	Full tidal marsh restoration minus area of habitat transition zones and levee improvements. The habitat transition zones have ecological benefits as well.	238	9	267
	R5 and S5	60			10	2	0	0	60	Managed ponds enhanced by three new water control structures to provide year-round control over water depths and quality for duck and shorebird habitat.	48	5	0
Totals		**2235**	**n/a**	**128.0**	**119**	**12**	**929**	**321**	**900**		**2019**	**16**	**1122**

Notes:

1. This table presents standard pond areas excerpted from the 2007 SBSP Final EIR/S. The measured areas of the ponds may vary seasonally, tidally, and by method of measurement.
2. Net restoration is calculated as the sum of the various restoration enhancements minus the sum of the impacts from fill and dredge.
3. The net gain of wetlands is calculated as the total area of wetlands newly restored or enhanced toward restoration minus the area of existing wetlands.
4. Pond A21 technically is part of the Island Ponds, but it would not be directly affected or benefitted by the proposed Phase 2 actions.

Additional fill volumes and areas from work associated with PG&E infrastructure improvements would be 124 cubic yards/0.18 acres in BCDC jurisdiction, in addition to that shown above. The distribution of these volumes and areas of fill would be 124 cubic yards/0.2 acres.

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Table 34 Areas of Habitat Effects from Project Activities on Federally Listed Species' Habitats by Species and Pond Cluster

SPECIES	POND CLUSTER	AREA OF HABITAT CHANGE (ACRES)				
		CREATED/ NEWLY OPENED	ENHANCED/ IMPROVED	NO CHANGE	DEGRADED/ CONVERTED	LOST
Salt Marsh Harvest Mouse	Island	0.0	324.8	374.0	0.0	0.4
	A8	4.2	20.4	37.2	0.0	0.0
	Mountain View	705.2	6.2	290.4	0.0	0.8
	Ravenswood	571.6	1.6	299.8	0.0	1.7
	Total[1]	**1281.0**	**353.1**	**1001.4**	**0.0**	**2.9**
California Ridgway's Rail	Island	0.0	324.8	374.0	0.0	0.4
	A8	4.2	20.4	37.2	0.0	0.0
	Mountain View	705.2	6.2	290.4	0.0	0.8
	Ravenswood	571.6	1.6	299.8	0.0	1.7
	Total[1]	**1281.0**	**353.1**	**1001.4**	**0.0**	**2.9**
Western Snowy Plover	Island	0.0	0.0	0.0	0.0	0.0
	A8	0.0	0.0	0.0	0.0	0.0
	Mountain View	0.0	0.0	38.4	0.0	0.0
	Ravenswood	0.0	290.0	2.2	19.3	379.6
	Total[1]	**0.0**	**290.0**	**40.6**	**19.3**	**379.6**
California Least Term	Island	0.0	0.6	685.1	5.2	2.5
	A8	0.0	157.6	16.4	21.1	0.0
	Mountain View	0.0	19.0	1011.1	25.4	0.0
	Ravenswood	340.3	4.6	76.0	27.1	0.0
	Total[1]	**340.3**	**181.8**	**1788.6**	**78.8**	**2.5**
Longfin Smelt	Island	3.1	329.6	371.6	1.9	0.0
	A8	0.0	20.4	180.4	0.0	4.2
	Mountain View	1.5	721.8	347.7	2.8	11.9
	Ravenswood	284.1	0.0	582.4	0.0	0.0
	Total[1]	**288.7**	**1071.7**	**1482.1**	**4.7**	**16.1**
Green Sturgeon and CCC Steelhead	Island	3.1	329.6	371.6	1.9	0.0
	A8	0.0	20.4	180.4	0.0	4.2
	Mountain View	1.5	721.8	347.7	2.8	11.9
	Ravenswood	284.1	0.0	582.4	0.0	0.0
	Total[1]	**288.7**	**1071.7**	**1482.1**	**4.7**	**16.1**

Note:
1. The habitat areas for these species are not mutually exclusive. For example, salt marsh harvest mouse and California Ridgway's Rail may use the same habitat areas.
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3.6 Box 3.g. 5. Subtidal Areas, Eelgrass Beds

The project activities are not proposed to occur in subtidal areas that have an abundance of fish, eelgrass beds, or sandy deep water.

3.7 Box 3.g.6. (a) Minimal Fill Necessary; (b) Upland Alternative for Fill

a) The actions required for the Phase 2 portion of the project have been designed to require the least fill placement within BCDC jurisdiction possible while still achieving project goals to the maximum extent feasible for this phase. Any impacts (e.g., fill placement to create nesting islands) would create or enhance habitat for listed species, would optimize restoration activities, or would provide sufficient improvements to the existing flood risk management to allow the restoration processes to proceed; environmental benefits would result from implementation of restoration. The increase in high quality tidal marsh wetlands and enhanced managed pond habitat, from the conversion of former industrial salt ponds, is proposed by this project as mitigation for the restoration impacts.

b) As restoration of former salt ponds to tidally influenced wetlands, open water and marsh wetland can occur only at existing salt ponds, no upland alternative exists that would avoid the need for fill in the Bay.

3.8 Box 3.g.7. Shoreline and Public Access Fill

Improvements to the shoreline appearance would include restoration of Refuge areas to enhanced habitat and the addition of new habitat or improvement to exiting public access features. Because restoration of tidal marsh habitat could occur only in the Bay, Shoreline Band, or Salt Ponds, no possible upland alternative exists to meet these project goals. Because the fill placed in the Bay and/or Salt Ponds for public access also would provide restoration and flood risk management benefits required to meet project goals. Public access on new fill in the Bay and Salt Ponds would be the maximum feasible without affecting the surrounding sensitive habitat that the project has committed to restoring, conserving, and enhancing. The project is proposing the maximum feasible public access within these restored habitats.

3.9 Box 3.g.8. Fill for Use in Stable and Permanent Shoreline

Levee improvements and maintenance at A8, Mountain View, and Ravenswood Ponds would provide stable and permanent shoreline. However, modifications to Shoreline Band areas would occur because of the project. Levee breaches and lowering would alter the existing Shoreline Band.

3.10 Box 3.g.9. Reasonable Protections to Persons and Property

Habitat transition zones, improved levees, and controlled ponds would provide water storage capacity to maintain or improve existing levels of flood risk management. Ponds A8 and A8S are configured and managed so that they also could be used as flood storage basins during high-rainfall events. In addition, the project area is adjacent to former landfills at the A8, Mountain View and Ravenswood Ponds. The project is designed to avoid these areas and would improve conditions protecting these landfills from intrusion or leaching of landfill material. South of the A8 Ponds, a

closed and capped landfill currently is in use as a business park. The Mountain View Ponds A1 and A2W southern borders abut the closed landfill that now forms Shoreline Park, and recreational trails and bicycle paths run along them. At Ravenswood Ponds, Bedwell Bayfront Park is on a capped landfill where public trails, vegetation, parking, and recreation features now cover it. The habitat transition zones proposed at each of these ponds would provide additional protection to the adjacent capped landfill.

Pond A8 contains an overflow weir. During flood events greater than a 10-year flood in the lower Guadalupe River and Alviso Slough, water could overflow into Pond A8 for initial flood storage.

At the Mountain View Ponds, the improvements proposed for the Coast Casey Forebay levee would extend beyond the border of Pond A1 and would provide a greater level of increased flood risk management than the improvements to the other levees. The levee breaches in Pond A1 would remove some of the de-facto flood protection currently provided by the outboard levees of Pond A1, but raising the western levee of Pond A1 would offset that loss and would maintain the existing levels of flood risk management in the communities and infrastructure southwest of Pond A1.

At Ravenswood Ponds, managed pond water control structures could be used to provide low levels of flood risk management during rain and flood events.

All locations where trails are proposed were designed in compliance with the Bay Trail Plan (Bay Trail 1989) and to meet ADA standards (DOJ 2010).

3.11 Box 3 g.10 Contact Information for Licensed Geologists, Engineers or Architects that Can Provide Technical Information and Certify the Safety of the Project

Seth Gentzler, PE, AECOM, 300 Lakeside Drive Suite 400, Oakland, Ca, 94612. (510) 874-3018.

For additional contact information, please contact John Bourgeois, SBSP Executive Manager at (408) 314-8859

3.12 Box 3 g. 11 Anticipated Impacts of Fill

The actions required for the Phase 2 portion of the project have been designed to require the least fill placement within BCDC jurisdiction possible while still achieving project goals for this phase. Any impacts (e.g., fill placement to create nesting islands) would create or enhance habitat for listed species, would optimize restoration activities, or would provide sufficient improvements to the existing flood risk management to allow the restoration processes to proceed; environmental benefits would result from implementation of restoration. The project would alter hydraulic connections to the Bay at Island, Mountain View, and Ravenswood Ponds to meet restoration goals. Potential impacts to tidal and subtidal areas are described in response to Box 2.v.3 (Section 2.8). The increase in high-quality tidal marsh wetlands and enhanced managed pond habitat, from the conversion of former industrial salt ponds, is proposed by the project as mitigation for the restoration impacts. Therefore, the Refuge believes that the project would be self-mitigating and has determined that no further off-site mitigation is required to account temporary and permanent project impacts.

3.13 Box 3.g.12 Marina Project Information

This is not a marina project.

3.14 Box 3.g.13. Long-Term Monitoring Goals; Success Criteria; and Monitoring Plans

Short-term and long-term goals, success criteria, monitoring programs, and corrective measures for the SBSP Restoration Project are included in the project's AMP (**Appendix D**) and are defined in the Project Purpose and Objectives section of the Project Description.

4 Box 4. Shoreline Band Information

4.1 Box 4.d. Total Shoreline Band Area

Table 35 Total Shoreline Band Area

POND CLUSTER	SHORELINE BAND AREA (SQUARE FEET)	SHORELINE BAND AREA (ACRES)
Island Ponds	0	0.0
A8 Ponds	1,195,500	27.4
Mountain View Ponds	2,895,800	66.5
Ravenswood Ponds	1,647,000	37.8
Total	**5,738,300**	**131.7**

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Examples of the existing conditions in the project's 100-foot Shoreline Band areas are shown in **Figure 9.**

4.2 Box 4.e. Information about Work in the Shoreline Band

BCDC Jurisdictions, including the 100-foot Shoreline Band, are shown in **Figure 8**. Proposed locations and details for public access features are discussed in response to Box 5 below and in the Project Description. Dimensions for public access features are presented in the Project Description, in **Table 12**,

Table 13,

Table 22, and **Table 23**. Public access features include viewing platforms and trails. Only some portions of the proposed public access features would occur in the Shoreline Band. The area of those feature that would occur in the Shoreline Band are shown in **Table 36**. Structures in the Shoreline Band would include water control structures and bridges. These features are summarized in **Table 37**.

Photos showing existing Shoreline Band conditions are shown in **Figure 9**.

Table 36 Public Access in the Shoreline Band

POND CLUSTER	FEATURE	AREA IN THE SHORELINE BAND (SQUARE FEET)
Mountain View	Pond A1 West Levee Trail	6,720
Mountain View	Pond A1 West Levee Viewing Area	830
Mountain View	Pond A2W East Trail	103,040
Mountain View	Pond A2w Viewing Area	1,900
Total		112,490

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Table 37 Structure Areas within the Shoreline Band

POND CLUSTER	FEATURE	AREA IN THE SHORELINE BAND (SQUARE FEET)
Mountain View	A2W East Levee Bridges (2)	2,600
Ravenswood	Water Control Structures	2,970

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5 Box 5. Public Access Information

5.1 5.a.1. Existing Public Access

Existing public access is described in response to Box 5.a.4 below. **Figure 9** shows examples of existing views at proposed viewing platforms. Except for the Island Ponds photos, nearly all the photos in **Figure 9** show views from publicly accessible areas.

5.2 Box 5.a.2. Project Impact on Public Access and Views

Figure 12 shows proposed public access features in the project area. **Figure 13** shows the existing public access and recreation features in or nearby the project area, these are detailed in the response to Box 5.a.4.

The proposed project activities are not anticipated to adversely affect present or future public access and views to the Bay. In addition, public access features are expected to improve access to views of the Bay. During construction activities, public access would be temporarily restricted in construction areas for safety. After construction activities are completed, public access would return to normal. The proposed project activities would provide an increase in trail access and new viewing platforms for public use. See the Project Description for further details on public access features.

5.3 Box 5.a.3. Existing Usage and Project Impacts

5.3.1 Trail Usage

The trail segments proposed for the SBSP Phase 2 project area would be recreational spur trails at the Mountain View Ponds and the Ravenswood Ponds. Although they would provide public access opportunities for pedestrians and bicyclists, the trails would not constitute a through-trail system (a spine trail) that would allow non-motorized commuter access from one neighborhood location to another. The existing Bay Trail segments within the project area would remain, although some segments may be temporarily closed, temporarily relocated, or rebuilt during project construction. No additional public access or modifications to existing public access are proposed at the Island Ponds or at the A8 Ponds.

Based on a trail user satisfaction survey that was completed for the project (Sokale and Trulio 2013), recreational trail users who would be expected to use these trails primarily would be locals (living within 5 to 10 miles from the trail), and may drive or bicycle to the trailhead parking from where they live. In addition, a small but significant percentage of the potential trail users work in the immediate area and use the trail system during work hours. Recreational trail users include those desiring to exercise (run or walk), to walk with friends and family, and to observe nature and wildlife. As would be expected, the trail user satisfaction survey found slightly higher trail use during weekends than during week days, and slightly higher trail use during the late spring, summer, and early fall months, when the weather is good, rather than during the late fall and winter months when the weather is more likely to be wet. The trail user survey also found that trail user priorities include keeping the trail clean and well maintained, with good signage and facilities (e.g., parking, restrooms, and benches). The 568 visitors who completed surveys were less interested in historical and natural history interpretive signs and panels, boardwalks, and overlooks.

Some trail use information for the general project area is reported in the trail user satisfaction survey, which allows for extrapolation and rough approximation of the number of new trail users to be expected because of the project. Between 750,000 and 900,000 people were estimated to have visited the Refuge annually between 2009 and 2011, and a majority of these visitors used the 30 miles of trails within the 30,000-acre Refuge, especially the trail system near the Visitor Center and Environmental Education Center (EEC) parking areas (Sokale and Trulio 2013). This equates to approximately 25 to 30 visitors annually per acre of Refuge, or about 25,000 to 30,000 visitors annually per mile of trail. This information does not consider that a disproportionate amount of trail use likely occurs in the 1 or 2 miles of trail immediately surrounding the main visitor center in Fremont and the EEC in Alviso, but provides a rough guide to overall trail use.

If (for discussion purposes) trail users were spread out equally each day throughout the year, this would be a daily use of about 68 to 82 people per mile of trail. Considering that trail use would be more concentrated during the better weather months of the year, with slightly more trail use on weekends, daily trail use likely would be in the range of 100 to 150 people per day per pond cluster during periods of highest use, with average daily use throughout the year at 50 to 60.

The total trail length of new additional trails proposed for Phase 2 is approximately 2 miles. Rough extrapolation of the annual trail use rates at the Refuge indicate probable increases in usage of approximately 100 to 150 users per pond complex or 200 to 300 cumulative users per day (73,000 to 110,000 cumulative annually).

Although they are located in an urban area, the SBSP Phase 2 trails are intended for recreational use and would not provide commuting opportunities, linking with a regional trail system. Based on this fact, the daily use estimate range of 100 to 150 daily users per pond are reasonable approximations.

Proposed additional public access would have no permanent or temporary impacts on the Island and A8 Ponds. At the Mountain View and Ravenswood Ponds, temporary impacts on public access would occur during construction, from temporary trail closures. However long-term beneficial impacts would occur from the establishment of new trails and public access features at these ponds.

5.3.2 Traffic and Parking

Existing traffic and parking conditions and potential impacts from the project are described for each pond cluster in the sections below.

5.3.2.1 Island Ponds

Interstate 880 is located approximately 1 mile to the east of the Island Ponds. According to the Caltrans Traffic Data Branch, traffic volumes in 2013 for I-880 between SR 262 and Dixon Landing Road were 15,600 peak hour trips (Caltrans 2014).

The northeastern tip of Pond A19 has very limited service access via a service road along the eastern edge of the levee on Pond A23, from Landing Road via Fremont Boulevard or Warren Avenue. Fremont Boulevard and Warren Avenue are accessed from I-880. No public access to the Island Ponds exists beyond this point, and no public transit connects to the Island Ponds. AC Transit bus route 215 travels along Fremont Boulevard, the closest roadway to the Island Ponds (AC Transit 2012). The Fremont BART station is approximately 6 miles to the northeast, and the UPRR crosses

the Island Ponds between Ponds A20 and A21 past the historic town of Drawbridge, but does not provide direct access to Refuge lands.

The closest airport to the Island Ponds is San Jose International Airport located approximately 6 miles to the southwest.

5.3.2.1.1 Temporary Construction Impacts

Construction activities would generate traffic associated with the transport of materials and equipment. No material would need to be moved on or off site for construction. Thus, vehicle trips would only be required for workers commuting on a daily basis (estimated three to five people). The transport of equipment at the beginning and end of construction seasons would occur by accessing the ponds on barges from the bay water side, either through Mud Slough or Coyote Creek. Therefore, temporary traffic increases associated with construction activities would be minimal.

The designated access routes for the construction truck trips at the Island Ponds would include Fremont Avenue, Warren Avenue, and Landing Road. Per the City of Fremont General Plan (Fremont 2011), Fremont Avenue and Warren Avenue are classified as minor arterial streets. Landing Road is classified as a local road; however, it is zoned for industrial/tech, not residential. As such, these roads were designed to withstand substantial truck traffic. Under the action alternatives for the Island Ponds, no hauling of material would occur into or out of these ponds. Passenger trucks would enter and exit daily, and seasonal delivery of large construction equipment would occur at the beginning and end of each construction season. Therefore, construction truck trips would not increase wear and tear on these roads.

5.3.2.1.2 Long-term Impacts

Aside from the monitoring and management activities of the AMP and continued maintenance of the existing railroad tracks, no other operation and maintenance activities would occur at the Island Ponds. Ongoing monitoring and studies to track the progress of these ponds toward restoration as tidal marsh habitat are a component of the continued implementation of the AMP. No recreational or flood control facilities would be constructed as part of either alternative.

Due to the periodic nature of the operations and maintenance traffic, the limited number of trips generated by workers visiting the ponds, and the lack of new recreation facilities, the implementation of Phase 2 operations would not result in a substantial increase in traffic volumes compared to the current traffic levels in the area.

5.3.2.1.3 Parking Impacts

Phase 2 operations anticipate a small staging area northeast of Pond A19 provided during construction for vehicles and equipment. Phase 2 operations at the Island Ponds would not generate demand for parking outside the boundary of the pond cluster.

No recreational facilities are at the Island Ponds. In addition, no new recreational facilities would be constructed as part of either action alternative. The implementation of either alternative would not result in an increase in visitors or parking demand. Therefore, there would be no impact

5.3.2.2 A8 Ponds

The A8 Ponds are west of the community of Alviso and north of Sunnyvale. SR 237 is approximately 0.5 mile south of Pond A8S. In 2013, traffic volumes for SR 237 between North First Street and Great America Parkway were 11,000 peak hour trips (Caltrans 2014).

Vehicle access to the western and southern perimeter of the A8 Ponds is available from an access road via Gold Street, although no public parking facilities or recreation-based amenities are found there. Gold Street is accessed from Great America Parkway from SR 237. No public vehicle access is allowed along the levees surrounding these ponds. Bicycle and pedestrian access to trails near the south perimeter of the A8 Ponds (including parts of the Bay Trail) is available from Sunnyvale Baylands Community Park via East Caribbean Drive.

Several VTA bus routes travel near the A8 Ponds. Routes 120, 122, 321, and 328 travel along East Caribbean Drive, and Route 58 travels to the town of Alviso. In addition, two VTA light rail stations—Crossman Station and Borregas Station—are less than 1.5 miles southwest of the ponds (VTA 2013).

5.3.2.2.1 Temporary Construction Impacts

The construction traffic associated with Phase 2 operations at A8 Ponds would be temporary in nature, lasting the duration of the construction phase. The construction traffic associated with work at A8 Ponds would be temporary in nature, lasting the duration of the construction phase. Construction activities would generate traffic associated with the transport of materials and equipment and the delivery of fill material. Access to the A8 Ponds would be from Gold Street or America Center Road near the southeast corner of Pond A8S and the levee crests along the perimeter levees. The ponds would be accessed by haul trucks using existing roadways and levee roads. No work would occur on the internal pond levees. Construction crews would typically consist of fewer than a dozen people. The existing levees are known to be capable of handling heavy construction equipment and trucks carrying dirt because the SCVWD uses these access roads to import material dredged from creek channels in Santa Clara County Truck trips would be required for the transport of equipment at the beginning and end of construction and for workers commuting on a daily basis. The trips resulting from the delivery of equipment and workers would not noticeably contribute to local traffic delays

In addition to the trips required for the transport of equipment at the beginning and end of construction and for the worker's daily commute, a maximum of 180 two-way truck trips per day for a minimum of 4 to 5 months will be required for the delivery of fill material needed to construct habitat transition zones. The primary fill delivery route includes the intersections of 237 WB off-ramp/Great America Parkway and SR 237 EB off-ramp/Great America Parkway in the city of Santa Clara. Intersections travelled through for A8 Ponds work would not be impacted by project traffic.

A staging area would be established for equipment and material stockpiling. The location would be within the hard-pack access and turnaround areas that exist within the construction area along the southern border of Pond A8S.

5.3.2.2.2 Long-term Impacts

The Refuge would continue to operate and maintain the ponds in accordance with the AMP and other ongoing management practices that have been in place since the implementation of Phase 1 actions. The SCVWD would also be involved in maintaining these pond levees. These ongoing management

practices would not change during or after the construction activities described above. The increase in traffic volumes associated with the routine maintenance and monitoring activities would be minimal. No new recreational facilities would be constructed as part of this alternative.

Due to the periodic nature of the operations and maintenance traffic, the limited number of trips generated by workers visiting the ponds, and the lack of new recreation facilities, the implementation of this alternative would not result in a substantial increase in traffic volumes compared to the current traffic levels in the area.

5.3.2.2.3 Parking Impacts

At the A8 Ponds, construction staging would be accommodated off of public roads or public areas on the landfill access road immediately adjacent to the pond cluster. As such, Phase 2 operations at A8 Ponds would not generate demand for parking outside the boundary of the pond cluster.

No new recreational facilities would be constructed at the A8 Ponds for Phase 2. The implementation of Phase 2 features would not result in an increase in visitors or parking demand.

5.3.2.3 Mountain View Ponds

U.S. 101 is approximately 0.5 miles southwest of the Mountain View Ponds. In 2013, traffic volumes for U.S. 101 between Embarcadero Road/Oregon Expressway and San Antonio Road were 16,600 peak hour trips (Caltrans 2014).

No public vehicle access exists at Ponds A1 and A2W. Levee roads at the perimeter of the ponds are accessible by Refuge service vehicles for operations and maintenance activities on the levees and by PG&E for its access to the power lines and towers in and around Pond A2W. Bicycle and pedestrian access to the southern perimeter of Ponds A1 and A2W is available from public trails (including the Bay Trail) at Mountain View Shoreline Park, accessed either from San Antonio Road or Shoreline Boulevard from U.S. 101.

No public transit connects directly to the Mountain View Ponds; however, VTA bus routes 40 and 120 travel along Charleston Road at the southernmost extent of Mountain View Shoreline Park (VTA 2013).

5.3.2.3.1 Temporary Construction Impacts

The construction traffic associated with this Phase 2 operation at Mountain View Ponds would be temporary in nature, lasting the duration of the construction phase. Construction activities would generate traffic associated with the transport of materials and equipment and the delivery of fill material. The SBSP Restoration Project would develop the final haul routes in consultation with the City of Mountain View's traffic engineers to minimize potential traffic impacts. Truck trips would be required for the transport of equipment at the beginning and end of construction and for workers commuting on a daily basis (estimated 5 to 10 people). The trips resulting from the delivery of equipment and workers would not noticeably contribute to local traffic delays.

In addition to the trips required for the transport of equipment at the beginning and end of construction and for the worker's daily commute, a maximum of 200 two-way truck trips per day for the duration of a minimum of approximately 6 months would be required for the delivery of fill material needed to construct habitat transition zones and islands. Primary access to the project site

would be from U.S. 101 via exits for major arterials. The first of those would be to the Pond A1 portion of the project using the North San Antonio Road exit, continuing north to Terminal Boulevard and then heading east onto the levee road between the Shoreline Park sailing lake and the Coast Casey Forebay. From there, the work areas along the Coast Casey Forebay, Charleston Slough, and Pond A1 would be accessible. A secondary route is available along the levee road that forms the western boundary of the Coast Casey Forebay. To reach the work areas at Pond A2W, the Rengstorff Avenue North exit would be used to leave U.S. 101 and head north, after which, Amphitheater Parkway, North Shoreline Boulevard, and Crittenden Lane would be used to reach the large levees and existing access roads around west of Stevens Creek and the northeastern corner of Shoreline Park.

The exact route(s) and timing used for material delivery are subject to modification due to City of Mountain View requirements for traffic control, Shoreline Park activities, and burrowing owl protection. The SBSP Restoration Project would develop the final haul routes in consultation with the City of Mountain View's traffic engineers to minimize potential traffic impacts.

Heavy vehicles would avoid crossing structures in the levees if the vehicle exceeds the weight-bearing capacity. If this is not possible, engineer-approved precautions would be taken to avoid damaging the structure.

Construction staging areas would be established within Mountain View Shoreline Park in coordination with City of Mountain View. The staging areas would be adjacent to the southern border of Pond A1 north of the sailing lake and east of the Coast Casey Forebay and adjacent to the southern border of Pond A2W west of Stevens Creek Marsh in upland areas alongside existing roads and trails, as shown in project plan sheets (**Appendix C**).

5.3.2.3.2 Long-term Impacts

Operation and maintenance activities for components of the pond cluster within the Refuge would continue to follow and be dictated by the 2009 USACE permit #2008-00103S, applicable County operations, and the AMP. These activities would include pond maintenance, levee maintenance, nesting island maintenance, habitat transition zone maintenance, and maintenance of public access and recreational features. In addition, PG&E would continue to operate and maintain its infrastructure, and the City of Mountain View would continue to operate and maintain its properties that are included and analyzed as part of the action alternatives at this pond cluster. The increase in traffic volumes associated with the routine maintenance and monitoring activities would be minimal.

Under Phase 2 operations at Mountain View Ponds, several new trails, viewing platforms, benches and interpretative platforms would be installed or replaced to improve recreation and public access at the pond cluster. Operation of the new recreational facilities is anticipated to result in minimal increases in visitors to the Mountain View Ponds. However, the increased number of visitors is not anticipated to result in a substantial increase in vehicle traffic relative to the traffic volumes of the local network.

Due to the periodic nature of the operations and maintenance traffic, the limited number of trips generated by workers visiting the ponds, and the minimal increase in recreation visitors, the implementation of Phase 2 features would not result in a substantial increase in traffic volumes compared to the current traffic levels in the area.

5.3.2.3.3 Parking Impacts

Construction staging may be established within the boundaries of Mountain View Shoreline Park, outside of the pond cluster. Construction vehicles and equipment may need to be staged in existing parking areas, and may therefore increase the parking demand. Under Phase 2 operations several new trails, viewing platforms, and interpretative platforms would be installed or replaced to improve recreation and public access at the pond cluster. Operation of the new recreational facilities is anticipated to result in an increase in visitors to the Mountain View Ponds. The increased number of visitors is anticipated to result in a corresponding increase in parking demand.

Mountain View Shoreline Park has 166 parking spaces, and approximately 200 parking spaces are available at the Shoreline Amphitheater Overflow Parking Lot. In addition, on-street parking is available along several nearby streets. These spaces are anticipated to provide sufficient capacity for the parking demand resulting from construction and the increase in visitors to the Mountain View Ponds. As a result, this impact is less than significant.

5.3.2.4 Ravenswood Ponds

At Ravenswood Ponds, a portion of SR 84 is along its southern border. U.S. 101 is approximately 0.5 miles southwest of the Ravenswood Ponds. In 2013, the traffic volume for SR 84 between University Avenue (SR 109) and Willow Road (SR 114) was 56,000 peak hour trips. The traffic volume for U.S. 101 between Willow Road (SR 114) and Marsh Road (SR 84 junction) was 15,600 peak hour trips (Caltrans 2014).

No public vehicle access exists at the Ravenswood Ponds, and no public trails are within the Refuge itself. However, bicycle and pedestrian access to the western perimeter of the Ravenswood Ponds is available from public trails at the adjacent Bedwell Bayfront Park, and to the southern perimeter from the Bay Trail. Both the Bay Trail and Bedwell Bayfront Park are accessible from U.S. 101 and SR 84 via Marsh Road. Levee roads around the ponds themselves are accessible only to service vehicles for operations and maintenance activities.

Limited public transit connects to the Ravenswood Ponds. The Caltrain Marsh Road shuttle travels from the Menlo Park Caltrain Station to the intersection of SR 84 and Marsh Road (Caltrain 2013). The Dumbarton Express, run by a consortium of transit agencies and administered by AC Transit, runs in both directions across the Dumbarton Bridge and passes just south of the Ravenswood Ponds on SR 84. The Menlo Park Caltrain Station is approximately 2 miles to the southwest.

5.3.2.4.1 Temporary Construction Impacts

The construction traffic associated with Phase 2 operations would be temporary in nature, lasting the duration of the construction phase. Construction activities would generate traffic associated with the transport of materials and equipment and the delivery of fill material. Truck trips would be required for the transport of equipment at the beginning and end of construction and for workers commuting on a daily basis (estimated 5 to 10 people). The trips resulting from the delivery of equipment and workers would not noticeably contribute to local traffic delays.

Because the only publicly accessible land vehicle access to the Ravenswood Ponds is through the entrance to Bedwell Bayfront Park, any construction activities in these ponds would have some effect on recreational use of the park. During the start and end of a construction season, heavy construction equipment would be brought in and out of the Refuge through the park, which could

lead to delays for park visitors. This could also occur during each day's commute as the work crews arrive. This daily commute would happen in smaller and faster passenger vehicles, and the work crews are typically small (approximately 10 people). Finally, the trucks that would deliver upland fill material to the ponds for use in levee raising or improvement or habitat transition zone construction would likely cause delays in the entry and exit from the park and parking lot by recreational park visitors. The Refuge managers have an easement with the City of Menlo Park for entry and exit of operations and maintenance vehicles through the entry gate of Bedwell Bayfront Park and its roads. To ensure that degradation of average delay at an intersection would not occur, the Refuge would coordinate with Caltrans and/or the City of Menlo Park to modify the intersection signal timing to reduce project-related delay to a level as needed that the City does not deem significant.

In addition to the trips required for the transport of equipment at the beginning and end of construction and for the worker's daily commute, a maximum of 150 two-way truck trips per day for a duration of a minimum of 1 month would be required for the delivery of fill material needed to construct the habitat transition zone.

Ravenswood Ponds would be primarily accessed from the Marsh Road exit on U.S. 101 via the entrance to the City of Menlo Park's Bedwell Bayfront Park. Alternate access to the southern edge of Pond R3 is possible from the paved bicycle path/hiking trail just north of SR 84. The details of this access would be developed in coordination with the City of Menlo Park.

The construction areas in and around the ponds themselves would be accessed via existing trails in Bedwell Bayfront Park and on the Refuge levee crests. Refuge staff drive on the levees for maintenance, cleanup, and other management purposes, and it is assumed that the existing levees are capable of handling heavy construction equipment. Ponds R4, R5, and S5 can be accessed via existing trails on the edge of Bayfront Park and the outboard perimeter levee in Ponds R3 and R4. The crests of the berms on either side of the AAC or the levee around the perimeter of Pond R4 would be used to access various construction areas in Ponds R3 and R4.

If conditions warrant, levee improvements, including the widening of the crest to provide adequate pathway for construction equipment, would be undertaken. Heavy vehicles would avoid crossing structures in the levees if the vehicle exceeds the weight-bearing capacity of a structure. If this is not possible, engineer-approved precautions would be taken to avoid damaging the structure. Phase 2 operations would likely result in an increase in delay greater than 0.8 seconds at the intersection of U.S. 101 SB off-ramp/Marsh Road (SR 84), project construction-related impacts would be potentially significant.

5.3.2.4.2 Long-term Impacts

Operation and maintenance activities for components of the pond cluster within the Refuge would continue to follow and be dictated by the 2009 USACE permit #2008-00103S, applicable County operations, and the AMP. These activities would include pond maintenance, levee maintenance, monitoring of water control structures, habitat transition zone maintenance, public access platform maintenance, and management of water levels. In addition, Redwood City would continue to operate and maintain its properties that are a part of the pond cluster. The increase in traffic volumes associated with the routine maintenance and monitoring activities would be minimal.

Phase 2 operations at Ravenswood would construct new trails along the levee tops and construct an interpretive platform or an educational exhibit to improve recreation and access. However, operation of the new recreational facilities is anticipated to result in minimal increases in visitors to the Ravenswood Ponds. The increased number of visitors is not anticipated to result in a substantial increase in vehicle traffic relative to the traffic volumes of the local network.

Due to the periodic nature of the operations and maintenance traffic, the limited number of trips generated by workers visiting the ponds, and the minimal increase in pond visitors, Phase 2 operations would not result in a substantial increase in traffic volumes compared to the current traffic levels in the area.

5.3.2.4.3 Parking Impacts

During construction, staging areas would be established for equipment and material storage within the Refuge boundaries. These areas may be on existing levees or in areas that would be filled as part of the Phase 2 actions later in the project. The Pond S5 forebay would be used for stockpiling before Pond S5 is hydraulically connected to Flood Slough. Material staging areas would not be located within the City of Menlo Park's Bedwell Bayfront Park. Therefore, no impacts to parking are anticipated during construction.

Operation of the new recreational facilities is anticipated to result in minimal increases in visitors to the Ravenswood Ponds. The increase in visitors is anticipated in result in a corresponding increase in parking demand.

Parking spaces are available at Bayfront Park, and 70 parking spaces are available on the northern and southern sides of the western approach to Dumbarton Bridge. In addition, on-street parking is available along several nearby streets. These spaces are anticipated to provide sufficient capacity for the parking demand resulting from construction and the increase in visitors to the Ravenswood Ponds.

5.4 Box 5.a.4. Public Use of Nearby Public Assets

Myriad recreation features are nearby or connected to the Phase 2 project area.

Table 38, **Table 39**, **Table 40**, and **Table 41** summarize existing public recreation uses for each pond cluster. During construction, reasonable restrictions such as temporary impacts on some public access or recreational features at Mountain View and Ravenswood Ponds are anticipated. These restrictions would be implemented as needed to protect the public during construction operations that occur within, or adjacent to existing public access features. At the Mountain View and Ravenswood ponds, the potential exists for temporary restrictions on portions of the Bay Trail during construction and staging operations. Notable impacts on public access would be when fill material is being delivered to stockpiling areas and placed in these ponds. At Mountain View Ponds near Pond A2W, the potential would exist for areas in Shoreline Park to be used for stockpiling material. Specific locations would be coordinated with the City of Mountain View, and potential impacts on public access are anticipated to be minimal because the park already has similar stockpiling areas that are used regularly. At Mountain View Ponds near Pond A1, the Means, Methods, and Equipment, Construction Access sections of the Project Description for each pond cluster describe construction activities, some of which would have the potential to cause temporary impacts on public access. In the long term, the project would provide improved aesthetic and experience at the Ravenswood and Mountain View Ponds that would connect with and/or complement many of the public access and recreation features nearby. Proposed public access features are detailed in the Proposed Action sections for Mountain View and Ravenswood Ponds, presented in the Project Description.

Table 38 Alviso Island Ponds–Existing Public Access and Recreation

RECREATIONAL FEATURES	NEARBY LOCATIONS
Trails	Bay Trail Spine The nearest segment of the Bay Trail is approximately 0.5 mile east of Pond A19, constructed as part of Bayside Business Park, or approximately 1 mile north at Auto Mall Parkway.
Boating	Bay and its tributaries Access is not restricted in waterways around the Phase 2 ponds, but boating on the ponds is restricted to hunting (see below).
Access Points and Staging Areas	Bayside Business Park Two trailheads are nearby, but no land access exists to the Alviso Island pond cluster (Island Ponds).
Waterfowl Hunting	Hunting by boat is allowed. Pond A19 is open for hunting 7 days a week during the fall and winter waterfowl hunting season. Access to Pond A19 is by boat only. Boats must access Pond A19 from the Bay, and hunting is allowed only from a boat on the pond. Shooting from levees is prohibited. Ponds A20 and 21 are not open for hunting.
Dog Use	Dogs are allowed in hunting areas during waterfowl hunting season, with a Special Use Permit.
Fishing	Fishing by boat is allowed in the Bay and sloughs only. Fishing is prohibited in all Refuge ponds and from levees.
Environmental Education Center at the Refuge	Docent-led tours and interpretive displays at the Environmental Education Center (EEC) at the Refuge provide an overview of the Island Ponds from trails at Ponds A16 and A17, south of Coyote Creek. No physical access to the area is allowed.

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Table 39 Alviso A8 Ponds–Existing Public Access and Recreation

RECREATIONAL FEATURES	NEARBY LOCATIONS
Trails	Access to levee roads currently is allowed for driving vehicles, walking, or bicycling associated with hunting. A 9-mile loop trail is accessible from the Alviso Marina County Park around Alviso pond complex Ponds A9 –A14. Bay Trail Spine The planned Bay Trail segment is to be located at the southeast corner of Pond A8S. The existing Bay Trail spine is located south of Pond A8S on the south side of Guadalupe Slough, adjacent to Sunnyvale Baylands Park.
	Guadalupe River Trail This trail, which is east of the project site, is planned to connect to the Bay Trail at Alviso Marina County Park.
Boating	The Bay and its Tributaries Access is not restricted in waterways around the Phase 2 ponds, but boating is not permitted on the ponds except during hunting season and with a permit.
	Alviso Marina County Park (Santa Clara County Parks) A boat launch, marina, and a Bay Area Water Trail access point are nearby.
Parks	Alviso Marina County Park (Santa Clara County Parks) Recreation activities include hiking, bicycling, bird watching, and picnicking. Dogs are allowed in the County Park's pathways and picnic areas, but are not allowed on the trails, levees, and boardwalks. A boat launch provides access to the San Francisco Bay for motorized and non-motorized watercraft. The site is a designated access point for the Bay Area Water Trail.
	Baylands Park (City of Sunnyvale) Active recreation resources include hiking, bicycling, amphitheater, picnicking, group facilities, and four playground areas. Pets are not allowed in the park.
Access Points and Staging Areas	Gold Street gate provides access to ponds and levees for waterfowl hunting only.
Viewing Platforms	Wildlife observation areas, platforms, boardwalks, and benches are located at the EEC, Alviso Marina County Park, and Baylands Park.
Waterfowl Hunting	Pond A8 is open to waterfowl hunting on Wednesdays, Saturdays, and Sundays during the fall and winter waterfowl hunting season. Access to ponds by hunters with permits is allowed from Gold Street in Alviso. Hunters must maintain a minimum distance of 300 feet from adjacent hunters when hunting on the levees. Hunting from boats is allowed. Motorized vehicles are not allowed on the levees.
Dog Use	Dogs are allowed in hunting areas during waterfowl hunting season, with a Special Use Permit.
Fishing	Fishing is allowed by boat, in the Bay and sloughs only. Fishing is prohibited in all Refuge ponds and from levees.
Environmental Education Center at the Refuge	Docent-led tours and interpretive displays are located at the EEC, approximately 0.5 mile east of Pond A8.

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Table 40 Alviso Mountain View Ponds–Existing Public Access and Recreation

RECREATIONAL FEATURES	NEARBY LOCATIONS
Trails	Bay Trail Spine The Bay Trail spine is in Mountain View's Shoreline Park, south of Pond A1 and Pond A2W, west and south of Charleston Slough.
	Adobe Creek Loop Trail (Bay Trail) The Bay Trail is located west of Charleston Slough, in the Palo Alto Baylands Nature Preserve.
	Stevens Creek Trail The trail is located between Ponds A2W and A2E, on the east levee of Stevens Creek.
	Mountain View Shoreline Park The park has 8 miles of paved trails.
Access Points and Staging Areas	Palo Alto Baylands Nature Preserve (west of the pond cluster)
	San Antonio Road/Terminal Boulevard (parking, restrooms, and trailhead)
	Shoreline Park, Mountain View (south of the pond cluster)
Boating	Bay and its tributaries Access is not restricted in waterways around the Phase 2 ponds, but boating is not permitted on the ponds.
	Palo Alto Baylands Nature Preserve Non-motorized, hand-launched watercraft are allowed. A Bay Area Water Trail access point is available.
	Mountain View Shoreline Park A 50-acre sailing lake is located within Shoreline Park, with non-motorized watercraft rental and lessons, windsurfing, and other facilities available.
Waterfowl Hunting	Per USFWS Hunting Regulations, Ponds A2E and AB1 east of the project area are open to waterfowl hunting on Wednesdays, Saturdays, and Sundays during the fall and winter waterfowl hunting season; a Refuge Special Use Permit is required. Ponds A1 and A2W are not open for hunting.
Dog Use	USFWS Refuge Lands Dogs are allowed in hunting areas during waterfowl hunting season, with a Special Use Permit.
	Palo Alto Baylands Nature Preserve Dogs are allowed on leash.
	Mountain View Shoreline Park Dogs not allowed in the park. An adjacent dog park is outside Shoreline Park's limits.
Fishing	Fishing is allowed only from boats in the Bay and sloughs. Fishing is prohibited in all Refuge ponds and from levees.
Palo Alto Baylands Park and Nature Preserve	The park offers docent-led tours, interpretive displays, environmental education field trips, hands-on activities, classroom presentations, and other outreach.
Mountain View Shoreline Park	The park offers docent-led tours focusing on the environment, interpretive displays, a Junior Ranger program, sailing, and watercraft activities. The park has an 18-hole golf course, a clubhouse, and banquet facilities. The historic Rengstorff House is located in the park, and areas for jogging, walking, bird watching, and kite

RECREATIONAL FEATURES	NEARBY LOCATIONS
	flying are available.
Viewing Platforms	Wildlife observation areas, platforms, and benches are located along the site perimeter at the south end of Charleston Slough, in Palo Alto Baylands Park and Nature Preserve, and Shoreline Park

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Table 41 Ravenswood Ponds–Existing Public Access and Recreation

RECREATIONAL FEATURES	NEARBY LOCATIONS
Trails	Bay Trail Spine The Bay Trail spine extends along State Route (SR) 84/Bayfront Expressway and the south borders of Ponds R3 and S5, and continues between Ponds R2 and SF2 and onto the Dumbarton Bridge.
	Ravenswood Trail Hiking is allowed on this unimproved trail around Ponds R1 and R2, east of the Phase 2 site.
	Phase 1 Bay Trail Spur This trail lies east of the Phase 2 site, along the eastern edge of Pond SF2.
	Bedwell Bayfront Park Trail A loop trail winds around the perimeter of the park, adjacent to Ponds R4, R5, and S5. Other trails are located in the park.
	Facebook Loop Trail This trail is a paved, public shoreline trail southeast of Pond R3.
Boating	No boating is allowed.
Access Points and Staging Areas	An access road and parking areas are located at the Marsh Road entrance to Bedwell Bayfront Park and further into the park on the western side, near the restrooms.
Waterfowl Hunting	At Greco Island (adjacent to Pond R4), waterfowl hunting from boats only is allowed 7 days a week. No land or tidal access is allowed. At Ponds R1 and R2, waterfowl hunting is allowed 7 days a week, only from the existing levees. Access to ponds is by foot or bicycle from either of two trailheads off SR 84. Hunting is prohibited within 300 feet of SR 84 and the Pacific Gas and Electric Company (PG&E) substation.
Dog Use	Bedwell Bayfront Park Dogs are allowed on leash.
	USFWS Refuge Lands Dogs are allowed in hunting areas during waterfowl hunting season, with a Special Use Permit.
Fishing	Fishing is allowed from boats in the Bay and sloughs only. Fishing is prohibited in all Refuge ponds and from levees.
Interpretive Exhibits and Viewing Platforms	Exhibits are located in the parking area at the entrance to Bedwell Bayfront Park on Marsh Road, at a viewing point at the top of the hill near the northeast corner of the park, and along the Pond SF2 Trail.

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5.5 Box 5.b. Additional Public Access Information

1. Public access features proposed for Phase 2 are presented in the Project Description (Section 2.6.8.3.3; Section 2.6.8.4.8; Section 2.6.9.3.11; Section 2.6.9.4.13 and **Table 12**; **Table 13**; **Table 22**; and **Table 23**), in project plan sheets, and are shown in **Figure 12**. Existing recreation and public access facilities in and near the project area, as well as facilities proposed by projects or general, master, or recreation plans other than the SBSP Restoration Project, are shown in **Figure 13** and in

Table 38, **Table 39**, **Table 40**, and **Table 41**. The information in these tables is not meant to be comprehensive or exhaustive of every public access opportunity or recreational resource, but is intended to give a sense of the existing conditions regarding recreation and public access in the vicinity of each of the pond clusters.

2. Public access areas were designed in compliance with the safety standards provided in the Bay Trail Plan (Bay Trail 1989) and ADA Standards for Accessible Design (DOJ 2010). Public access compliance with ABA and ADA are further described in the Project Description for each public access feature.

3. Connections from proposed Phase 2 public access features to existing public access features are described in the Project Description (see Sections referred to in item 1 above) and are shown in **Figure 12** and the project plan sheets (**Appendix C**).

4. Operations and maintenance for specific Phase 2 features are described in the Project Description under Section 2.6.11, in the SBSP Restoration Project's programmatic permits, and in the AMP (**Appendix D**).

5. A central theme to developing and implementing the overall SBSP project has been the concept of "Adaptive Management." Under an Adaptive Management approach, the outcomes of previous restoration efforts and ongoing management actions that have been implemented are analyzed, and the resulting information is used to modify management and develop new strategies, to lessen impacts and achieve better restoration results. This approach is particularly effective with regards to potential impacts of trail use on wildlife, especially threatened and endangered species. The public access and wildlife compatibility studies that have been conducted for the project have identified potential impacts from trail use in certain areas and on certain species, such as the endangered western snowy plover. Based on these studies, the Phase 2 operations would provide the maximum feasible public access without affecting protected wildlife in the Refuge. For details on the public access features and avoidance and minimization measures, see the Project Description.

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6 Box 6. Dredging and Mining Information

6.1 Box 6.c. Type of Activity

The project is not a dredging project specifically, but does propose to excavate material for beneficial re-use on site. This new dredging would include excavating material from above HTL/MHHW to breach levees, lower levees, or remove levees. Material would be excavated below MHHW/HTL for levee removal, levee lowering, levee breaching, and channel excavations. The following response to Box 6 describes locations, areas, and volumes within BCDC jurisdictions where these excavations, or cuts, would occur.

6.2 Box 6.e. Total Volume of Material to be Dredged

Dredged materials would be beneficially re-used on site for the creation of transitional habitat within the salt ponds. Total cut locations areas and volumes are summarized in the Project Description, in **Table 7**, **Table 11**, **Table 15**, **Table 18** and **Table 19**. The tables below show cut areas and volumes within BCDC jurisdictions.

Table 42 Island Ponds–Estimated Cut Volumes and Areas

CUT LOCATION	CUT PURPOSE	BCDC JURISDICTION IMPACT AREA		BCDC JURISDICTION IMPACT VOLUME	
		BAY (SQUARE FEET)	BAY/SALT POND (SQUARE FEET))	BAY CUT BELOW HTL (CUBIC YARDS)	BAY/SALT POND CUT BELOW HTL (CUBIC YARDS)
Pond A19	Northwest Levee Lowering	28,200	30,800	480	520
Pond A19	North Levee Lowering (Middle)	10,200	10,000	230	220
Pond A19	Northeast Levee Lowering	12,800	12,100	270	250
Pond A19	Southwest Levee Lowering	13,300	6,700	190	90
Pond A19	Southeast Levee Lowering	12,800	7,500	240	140
Subtotal	***Levee Lowering***	***77,300***	***67,100***	***1,410***	***1,220***
Pond A19	Southwest Levee Removal	7,800	8,500	220	250
Pond A19	Northwest Levee Removal	17,300	17,800	530	540
Pond A20	Northeast Levee Removal	13,300	5,200	340	130
Pond A20	Southeast Levee Removal	26,300	14,500	630	340
Subtotal	***Levee Removal***	***64,700***	***46,000***	***1,720***	***1,260***
Pond A19	Northwest Breach	7,100	2,500	590	210
Pond A19	Northeast Breach	3,800	2,500	140	90
Pond A19	South Breach Widening	5,800	4,300	320	240
Subtotal	***Levee Breaches***	***16,700***	***9,300***	***1,050***	***540***
Totals	**Fill Removed**	**158,700**	**122,400**	**4,180**	**3,020**

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Table 43 Mountain View Ponds–Estimated Cut Volumes and Areas

CUT LOCATION	CUT PURPOSE	BCDC JURISDICTION IMPACT AREA				BCDC JURISDICTION IMPACT VOLUME			
		100-FOOT SHORELINE BAND (SQUARE FEET)	SALT PONDS (SQUARE FEET)	BAY (SQUARE FEET)	NON-JURISDICTIONAL (SQUARE FEET)	100-FOOT SHORELINE BAND CUT BELOW HTL (CUBIC YARDS)	SALT PONDS CUT BELOW HTL (CUBIC YARDS)	BAY CUT BELOW HTL (CUBIC YARDS)	NON JURISDICTIONAL CUT BELOW HTL (CUBIC YARDS)
Pond A1	Northwest Breach	8,100	100	0	0	980	10	0	0
Pond A1	Southeast Breach	7,900	0	700	0	610	0	50	0
Pond A2W	Northwest Breach	8,100	2,000	4,500	0	370	90	200	0
Pond A2W	Southwest Breach	8,000	2,800	6,500	0	410	140	330	0
Pond A2W	Northeast Breach	5,400	0	0	0	330	0	0	0
Pond A2W	Southeast Breach	6,000	200	5,600	0	840	30	780	0
Subtotal	***Mountain View Pond Breaches***	***43,500***	***5,100***	***17,300***	***0***	***3,540***	***270***	***1,360***	***0***
Pond A1 (Coast Casey Forebay)	Shear Key Excavation	0	0	0	26,700	0	0	0	3,100
Totals		**43,500**	**5,100**	**17,300**	**26,700**	**3,540**	**270**	**1,360**	**3,100**

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Table 44 Ravenswood Ponds–Estimated Cut Areas and Volumes within BCDC Jurisdictions

CUT LOCATION	CUT PURPOSE	BCDC JURISDICTION IMPACT AREA			BCDC JURISDICTION IMPACT VOLUME		
		100-FOOT SHORELINE BAND (SQUARE FEET)	SALT PONDS (SQUARE FEET)	BAY (SQUARE FEET)	100-FOOT SHORELINE BAND CUT BELOW HTL (CUBIC YARDS)	SALT PONDS CUT BELOW HTL (CUBIC YARDS)	BAY CUT BELOW HTL (CUBIC YARDS)
Pond S5	Internal Levee Removal	300	23,700	0	10	990	0
Ponds R5/S5	North Internal Levee Removal	0	63,600	0	0	3,900	0
Ponds R5/S5	South Internal Levee Removal	0	51,600	0	0	2,800	0
Subtotal	***Levee Removal***	***300***	***138,900***	***0***	***10***	***7,690***	***0***
Pond R4	Northwest Levee lowering	33,000	0	4,300	0	0	0
Pond R4	Northeast Breach	22,700	1,100	68,700	4,100	130	6,370
Pond R4	Pilot Channel	0	176,500	0	0	16,000	0
Pond R3	Water Control Structure	1,200	0	5,700	170	0	830
Totals	**Total**	**57,200**	**316,500**	**78,700**	**4,280**	**23,820**	**7,200**

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Table 45 Net Cut Impact by BCDC Jurisdiction

BCDC JURISDICTION	CUT AREA (SQUARE FEET)	CUT AREA (ACRES)	CUT VOLUME (CUBIC YARDS)
100-Foot Shoreline Band	100,700	2.3	7,820
Bay	254,700	5.8	12,740
Salt Pond	321,600	7.4	24,090
Bay/Salt Pond	122,400	2.8	3,020
Total Fill Removed in BCDC Jurisdiction	***799,400***	***18.4***	***47,670***
Non-Jurisdictional	26,700	0.6	3,100
Total Fill Removal Impact	**826,100**	**19.0**	**50,770**

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Areas where dredged materials would be used are described in response to Box 3 and in the fill tables (**Table 8**, **Table 9**, **Table 10**, **Table 16**, **Table 20**, and **Table 21**) included in the Project Description.

6.3 Box 6.I. Additional Information

1. All dredged material would be beneficially re-used on site.

2. Dredged material would come from the pond bottom, or from pond levees made from material sourced directly adjacent to the levee (typically Bay mud). Beneficial re-use of excavated material would be conducted consistent with the project's existing BCDC permits (Permit 7-03 and CN 10-03).

3. The project has applied for a Section 401 Water Quality Certification. This authorization would be transmitted to BCDC after it is issued by the RWQCB.

4. Bay-wide impacts from the proposed excavations would not be expected because many excavations would occur above HTL or below HTL within the ponds at a time when they would have minimal hydraulic connection to the Bay. All excavated material would be re-used on site. Impacts from the project are discussed further in the Project Description and in response to Box 2.

5. No scarce subtidal areas or areas with a significant abundance and diversity of fish, other aquatic organisms or wildlife occur at the site

7 Box 8. Environmental Impact Documentation

The SBSP Restoration Project's Programmatic FEIR/S was completed in 2007, and is available online at http://www.southbayrestoration.org/EIR/.

The SBSP Restoration Project, Phase 2 FEIR/S was completed in 2016, and is available online at http://www.southbayrestoration.org/planning/phase2/FEISRdownload.html.

The Notice of Determination for the SBSP Restoration Project, Phase 2 FEIR/S was signed in May 2016, and is available online at http://www.southbayrestoration.org/planning/phase2/NOD%20signed.pdf.

Hard copies of these documents are available on request.

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8 Box 9. Public Notice Information

a. Lists of owners and residents located within 100 feet of the project area were provided by County Recorders Offices and are summarized in **Table 46**.

Table 46 Adjacent Landowners within 100 feet of SBSP Phase 2 Pond Clusters by APN

APN	OWNER	ADDRESS
Alviso Island Ponds		
519-760-3	USFWS	2800 Cottage Way, Unit W-2610 Sacramento, CA 95825
519-800-1-32	USFWS	2801 Cottage Way, Unit W-2610 Sacramento, CA 95825
537-801-6	CA	N/A
519-800-1-21	USA	N/A
519-780-1	Anna M. DeSilva	694 Malarin Avenue Santa Clara, CA 95050
531-155-3-1	CA	N/A
519-800-4	SP Co	872-1-124-3
519-820-1-4	CA	N/A
519-800-1-20	USA	N/A
519-800-1-17	CA	N/A
519-800-1-30	USFWS	2800 Cottage Way, Unit W-2610 Sacramento, CA 95825
519-820-1-3	State Lands Commission	100 Howe Avenue, Suite 100 South Sacramento, CA 95825
519-760-1	USFWS	2800 Cottage Way, Unit W-2610 Sacramento, CA 95825
519-760-2	Dowd V. Luce	2010 Evergreen Court Yakima, WA 98902
519-780-2	Anna M. DeSilva	694 Malarin Avenue Santa Clara, CA 95050
Alviso A8 Ponds		
01533022	USFWS	2800 Cottage Way, Unit W-2610 Sacramento, CA 95825
01535005	Santa Clara Valley Water District	5750 Almaden Expressway San Jose, CA 95118
01533011	State of California	N/A
01535014	Santa Clara Valley Water District	5750 Almaden Expressway San Jose, CA 95118
01501025	State of California	N/A
01535040	Santa Clara Valley Water District	5750 Almaden Expressway San Jose, CA 95118
01535048	Santa Clara Valley Water District	5751 Almaden Expressway San Jose, CA 95118

APN	OWNER	ADDRESS
01535047	Santa Clara Valley Water District	5752 Almaden Expressway San Jose, CA 95118
11005003	Santa Clara Valley Water District	5753 Almaden Expressway San Jose, CA 95118
01533055	USFWS	2800 Cottage Way, Unit W-2610 Sacramento, CA 95825
01535038	USFWS	2801 Cottage Way Unit W-2610 Sacramento, CA 95825
01545011	America Center Maintenance Association	PO Box 130639 Carlsbad, CA 92013
01545031	America Center Maintenance Association	PO Box 130639 Carlsbad, CA 92013
Alviso Mountain View Ponds		
11619001	Computer LLC	2700 Broderick Way Mountain View, CA 94043
01536022	USFWS	2800 Cottage Way, Unit W-2610 Sacramento, CA 95825
01536013	State of California	N/A
01536046	Pacific Gas Electric Lease/Possessory Interest	N/A
01536017	State of California	N/A
01536026	State of California	N/A
01536020	State of California	N/A
11603015	City of Mountain View	444 Castro Street Mountain View, CA 94043
01536044	City of Mountain View	445 Castro Street Mountain View, CA 94043
01536024	USFWS	2800 Cottage Way, Unit W-2610 Sacramento, CA 95825
01536039	City of Mountain View	443 Castro Street Mountain View, CA 94043
11619002	City of Mountain View	444 Castro Street Mountain View, CA 94043
01536012	Santa Clara Valley Water District	5750 Almaden Expressway San Jose, CA 95118
01536025	City of Mountain View	444 Castro Street Mountain View, CA 94043
11603027	Charleston Properties	3260 Ash Street Palo Alto, CA, 94306

APN	OWNER	ADDRESS
Ravenswood Ponds		
55400170	CA	State of California 303 Big Trees Park Road Felton, CA, 94560
55400480	USA	United States of America PO Box 364 Newark, CA, 94560
55400460	CA	State of California 303 Big Trees Park Road Felton, CA, 94560
55400490	City of Menlo Park	701 Laurel St. Menlo Park, CA, 94025
55170310	Menlo Park Sanitary District	West Bay Sanitary District 500 Laurel Street Menlo Park, CA, 94025
54310060	Cargill (formerly Leslie Salt Company)	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601
55400580	Cargill (formerly Leslie Salt Company)	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601
55400570	USA	United States of America c/o Land Department 2100 Willow Road Menlo Park, CA, 94025
54310160	Cargill Point LLC	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601
55400590	Cargill (formerly Leslie Salt Company)	Attention: Pat Mapelli Cargill Salt 7220 Central Ave Newark, CA, 945601

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In addition to the information above, a mailing list and e-mail list of interested parties and stakeholders is provided in **Appendix F**.

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9 References

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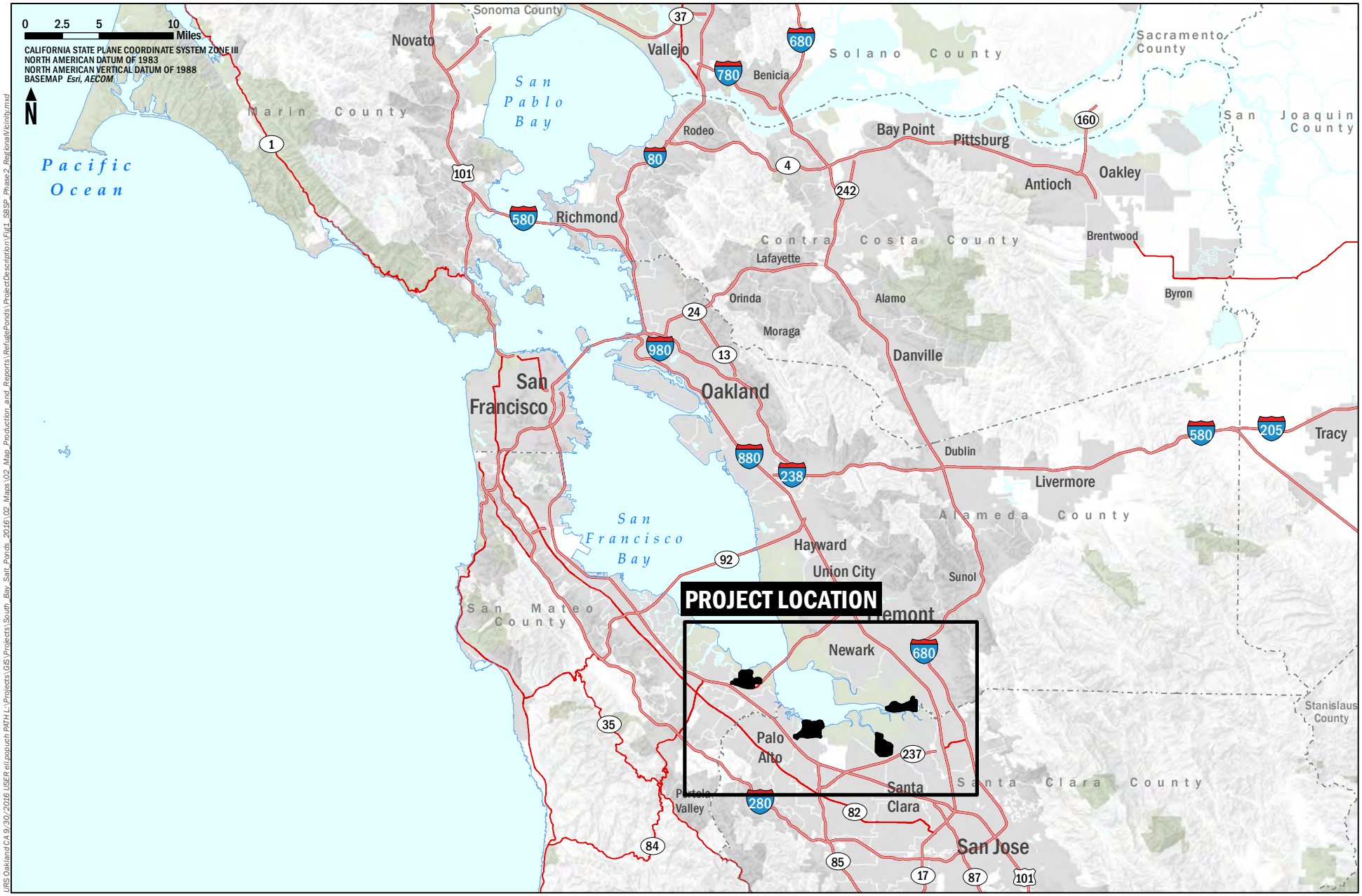
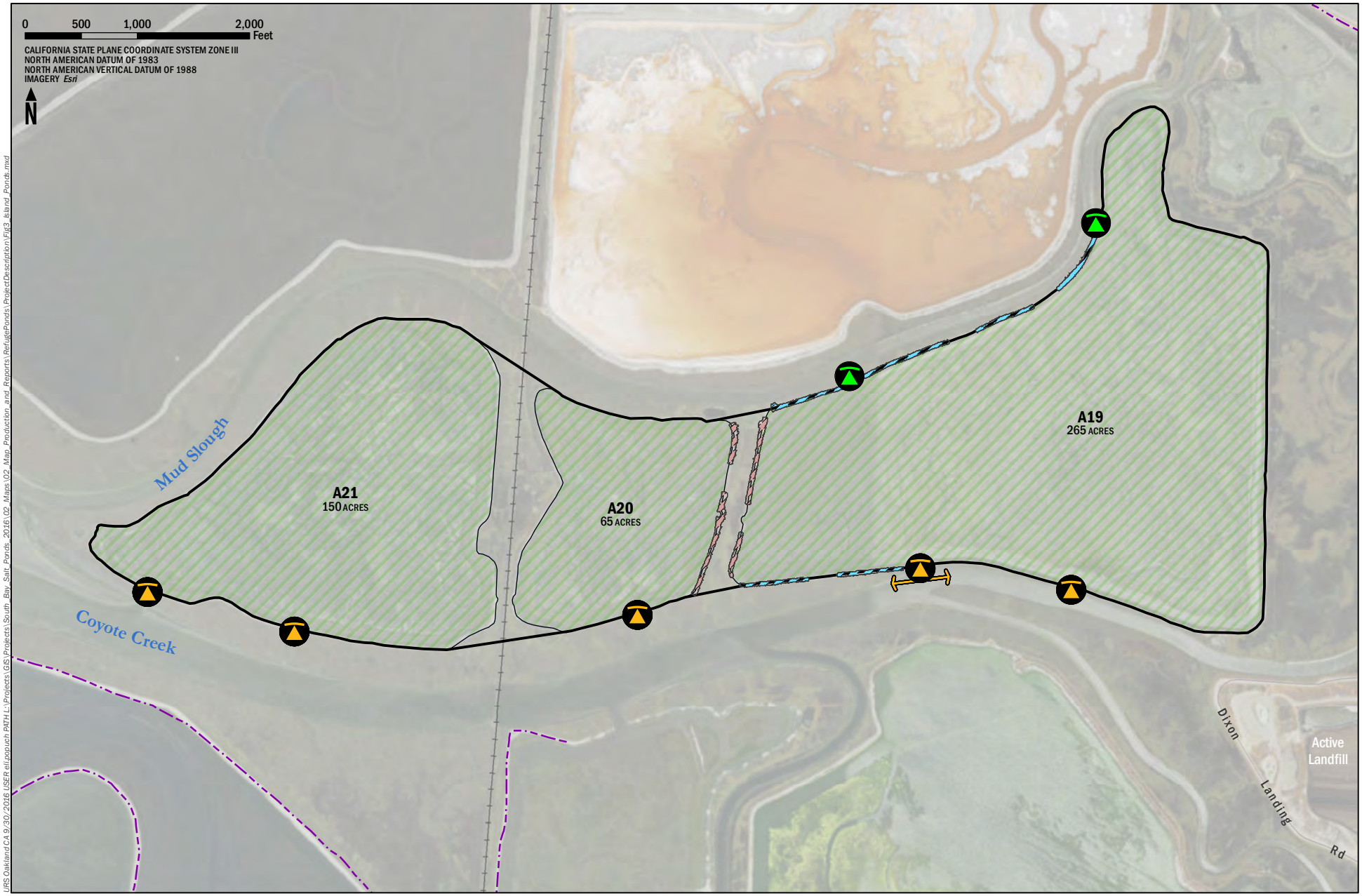
Figures



AECOM
South Bay Salt Pond Restoration Project

Figure 1
SBSP Phase 2 Regional Location

Figure 2
SBSP Phase 2 Project Sites



AECOM

South Bay Salt Pond Restoration Project

Figure 3

Alviso Island Ponds

LEGEND

Existing reversible armored notch

Railroad

Existing trail

Pond boundary

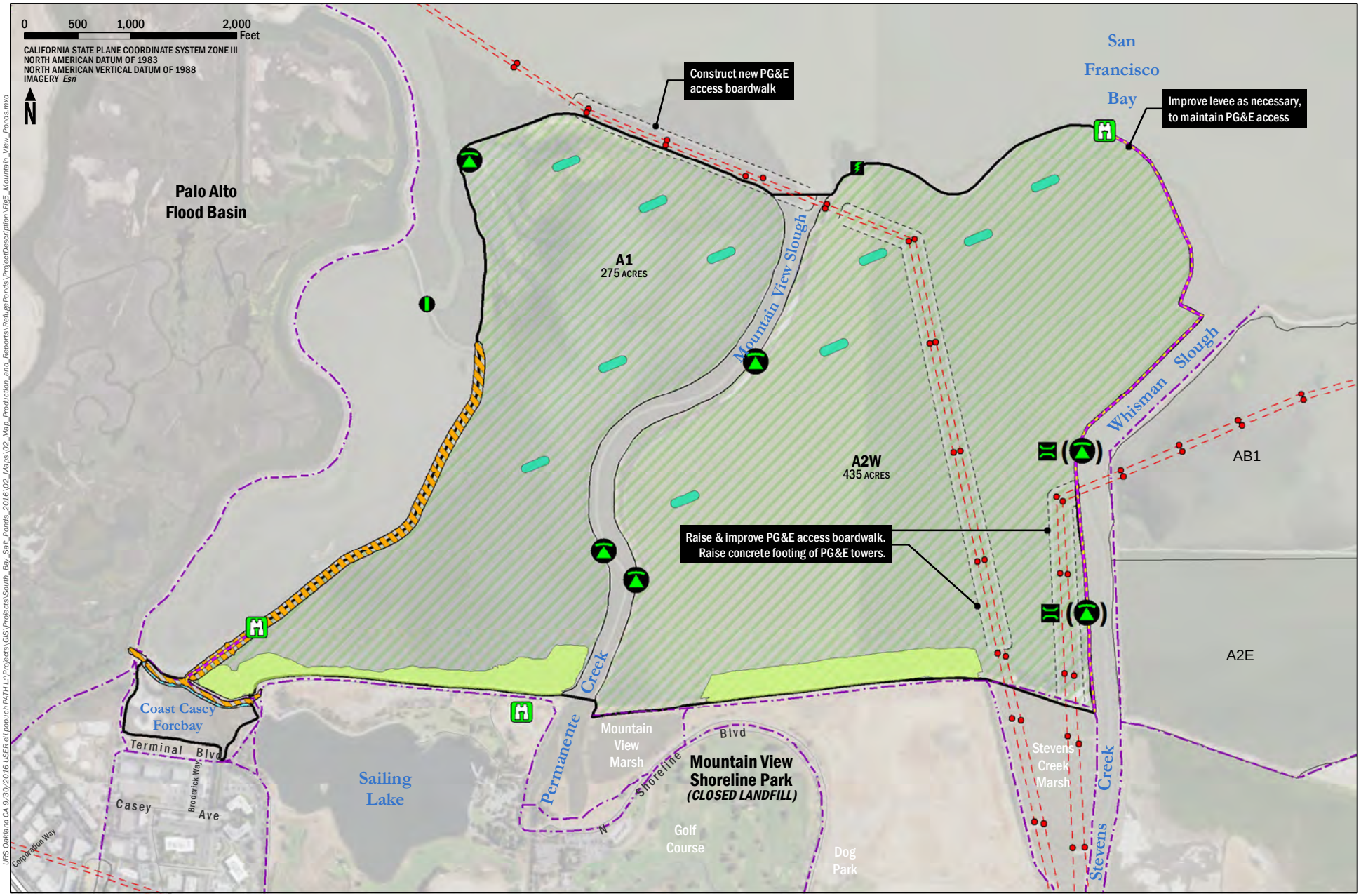
Habitat Transition Zone

AECOM

South Bay Salt Pond Restoration Project

Figure 4

Alviso A8 Ponds



LEGEND

- Existing control gate
- Proposed breach
- Proposed armored breach (two sides)
- Bridge
- PG&E turnaround
- Viewing platform
- PG&E tower
- PG&E power line
- Phase 2 trail
- Existing trail
- Tidal marsh
- Levee Improvement
- Levee Lowering
- Habitat Transition Zone
- Habitat Island
- Pond Boundary

AECOM

South Bay Salt Pond Restoration Project

Figure 5

Alviso-Mountain View Ponds

LEGEND

- Proposed breach
- Proposed water control structure
- Viewing platform
- Existing viewing platform
- Railroad
- Existing trail
- Phase 2 trail
- Cargill pipeline
- Fence
- Levee Improvement
- Levee Lowering
- Levee Removal
- Pilot Channel
- Habitat Transition Zone
- Habitat Island
- Ditchblock
- Tidal marsh
- Managed pond
- Pond boundary

*Pending property rights/easements

AECOM

South Bay Salt Pond Restoration Project

Figure 6

Ravenswood Ponds

LEGEND

Existing reversible armored notch

Culvert

Levee Cut

Siphon

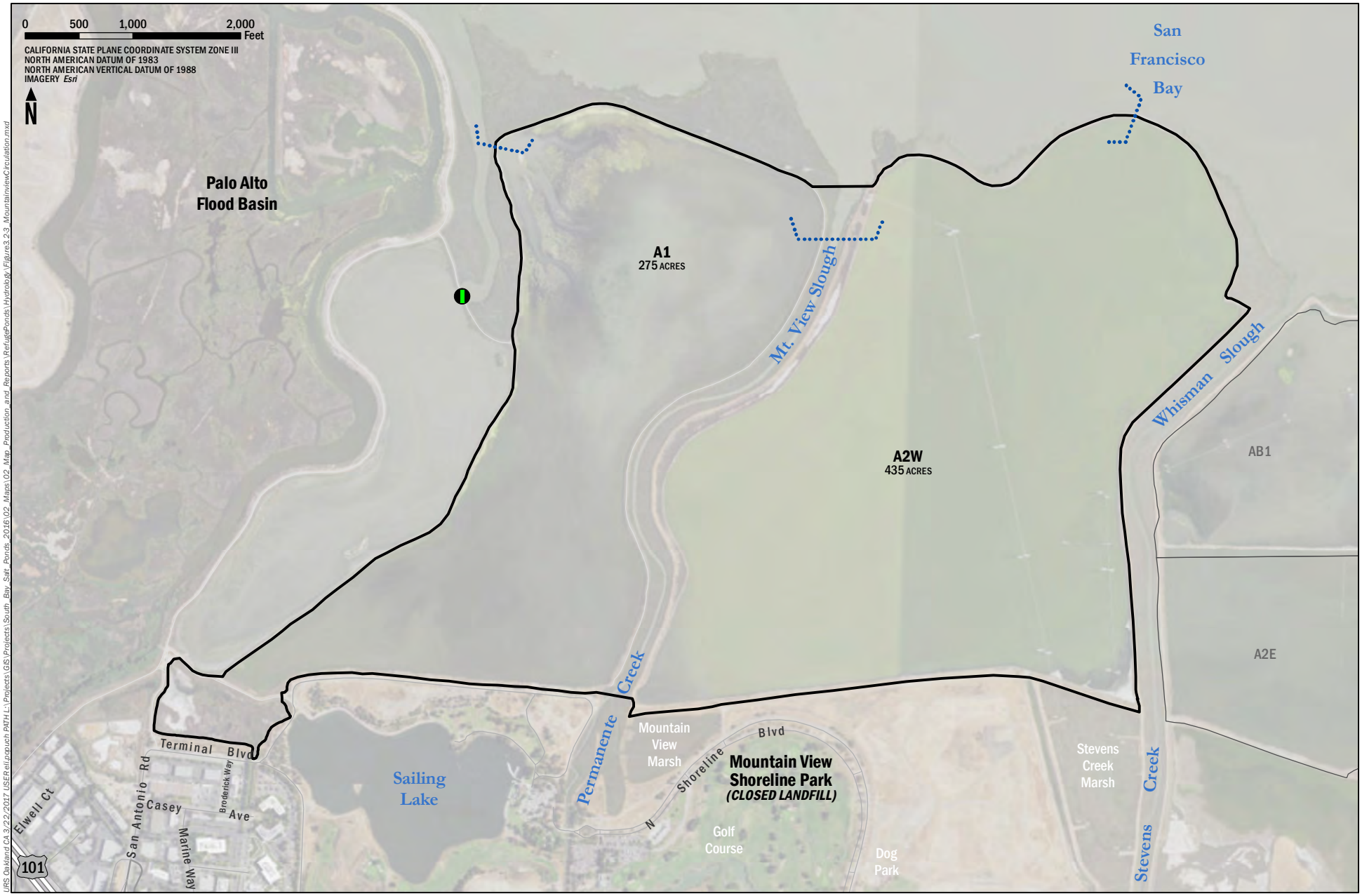
Pond boundary

AECOM

South Bay Salt Pond Restoration Project

Figure 7a

Existing Circulation in the A8 Ponds



LEGEND

- Existing control gate
- Siphon
- Pond boundary

AECOM

South Bay Salt Pond Restoration Project

Figure 7b

Existing Circulation in the Mountain View Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
IMAGERY *Esri*

N

Mud Slough

Coyote Creek

A21
150 ACRES

A20
65 ACRES

A19
265 ACRES

Dixon Landing Rd

Active Landfill

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LEGEND

BCDC Jurisdiction
- Bay
- Bay/Salt Ponds
- 100-ft Shoreline Band
- Study Area

Project Design Footprint
- Cut Impacts
- Fill Impacts

AECOM
South Bay Salt Pond Restoration Project

Figure 8a
BCDC Jurisdictional Areas
Alviso Island Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
IMAGERY *Esri*

N

A8
410 ACRES

A8S
160 ACRES

Spreckles Ave
Pacific St
Los Esteros Rd
State St
Wabash Ave
Essex St
Michigan Ave
Grand St
Blvd
Mills St
Elizabeth St
Hope St
Catherine St
Archer St
Gold St
Taylor St
Dorado St
El
Hoppe
Moffat St
Disk Dr
Wilson Way
Trinity Park Dr
Archangel Dr
N 1st St
School St
Nortech Pky
Sun Rise Dr
Guadalupe River
Guadalupe Slough
Mud Slough
Carl Ave
Rd
Borregas
E Caribbean Dr
Baylands Community Park
San Tomas Aquino Creek
Great America Pky
237
Pinefield Rd

LEGEND

BCDC Jurisdiction
- Bay
- Salt Ponds
- Non-jurisdictional

- 100-ft Shoreline Band
- Study Area

Project Design Footprint
- Cut Impacts
- Fill Impacts

AECOM
South Bay Salt Pond Restoration Project

Figure 8b
BCDC Jurisdictional Areas
Alviso A8 Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
IMAGERY *Esri*

N

Palo Alto Flood Basin

San Francisco Bay

A1
275 ACRES

A2W
435 ACRES

Mt View Slough

Whisman Slough

Permanente Creek

Coast Casey Forebay

Terminal Blvd

San Antonio Rd

Mountain View Marsh

N Shoreline Blvd

Mountain View

Stevens Creek

Sailing

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LEGEND

BCDC Jurisdiction
- Bay
- Salt Ponds
- Non-jurisdictional

- 100-ft Shoreline Band
- Study Area

Project Design Footprint
- Cut Impacts
- Fill Impacts

AECOM
South Bay Salt Pond Restoration Project

Figure 8c
BCDC Jurisdictional Areas
Alviso Mt. View Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
IMAGERY *Esri*

N

Greco Island

Flood Slough

Marsh Rd

Bedwell Bayfront Park
(CLOSED LANDFILL)

R4
295 ACRES

R5
30 ACRES

S5
30 ACRES

R3
270 ACRES

All-American Canal

Ravenswood Slough

To Dumbarton Bridge

Haven Ave

84

Independence Dr

Constitution Dr

Chrysler Dr

Jefferson Dr

Scott Dr

Campbell Ave

Bohannon Dr

Commonwealth Dr

Jefferson Ct

Chilco St

101

Network Cir

University Ave

114

LEGEND

BCDC Jurisdiction
- Bay
- Salt Ponds
- Non-jurisdictional

- 100-ft Shoreline Band
- Study Area

Project Design Footprint
- Cut Impacts
- Fill Impacts

AECOM
South Bay Salt Pond Restoration Project

Figure 8d
BCDC Jurisdictional Areas
Ravenswood Ponds

Island Ponds

Figure 9a. Pond A21, facing south into pond center (Bay/Salt Pond jurisdiction area). No work is proposed in Pond A21 for Phase 2.

Figure 9b. Mud Slough adjacent to Pond A21, facing southeast (Bay Jurisdiction area)

Figure 9c. Pond A21, facing north into pond center (Bay/Salt Pond jurisdiction area). No work is proposed in Pond A21 for Phase 2.

Figure 9d. Pond View facing south of Pond A20 (foreground) and Pond A21 (background left) (Bay/Salt Pond Jurisdiction)

Figure 9e. Pond A19, approximate center of pond (Bay/Salt Pond jurisdiction area)

A8 Ponds

Figure 9f. Pond A8 South Shore Facing Northwest at Southeast Corner Where Habitat Transition Zone Would be Installed (Salt Pond Jurisdiction area)

Figure 9g. Pond A8 Shoreline at Southeast Corner Where Habitat Transition Zone Would be Installed (Salt Pond Jurisdiction area)

Figure 9h. Pond A8 Shoreline at Southeast Corner Looking West Where Habitat Transition Zone Would be Installed (Salt Pond Jurisdiction area)

Mountain View Ponds

Figure 9i. Mountain View Pond A1 Shoreline as Viewed from the Bay Trail (Salt Pond Jurisdictional area)

Figure 9j. Mountain View Pond A1 Shoreline as Viewed from the Bay Trail (Salt Pond Jurisdictional area)

Figure 9k. Mountain View Pond A1 Shoreline as Viewed from the Bay Trail (Salt Pond Jurisdictional area)

Figure 9l. Pond A2W (Salt Pond Jurisdiction area)

Figure 9m. Pond A1 view from proposed shoreline viewing platform (Salt Pond Jurisdiction area)

Figure 9n. Levee between Pond A1 and Charleston Slough at approximate viewing platform location (Shoreline Band and Salt Pond Jurisdiction areas)

Figure 9o. Existing PG&E infrastructure (boardwalks and towers) in Pond A2W (Salt Pond Jurisdiction).

Figure 9p. Existing PG&E infrastructure (boardwalks and towers) in Pond A2W (Salt Pond Jurisdiction).

Figure 9q. Existing water control structure in Pond A2W, southeast corner (Salt Pond Jurisdiction).

Figure 9r. Shoreline of Pond A2W at the southeast corner (Shoreline Band and Salt Pond Jurisdiction)

Ravenswood Ponds

Figure 9s. Ravenswood Pond Levee Between R5 and R4 at the Southeast Corner of Bedwell-Bayfront Park Looking North (Salt Pond Jurisdiction area)

Figure 9t. Levee Between Westpoint Slough and Pond R4 (100-foot Shoreline Band Jurisdiction area)

Figure 9u. Maintenance Road Between Bedwell Bayfront Park and Pond R4 (Salt Pond Jurisdiction area)

Figure 9v. Ravenswood Pond Levee Between R5 and R4 at the Southeast Corner of Bedwell-Bayfront Park Looking North (Salt Pond Jurisdiction area)

Figure 9w. Ravenswood Pond R4 (right) as viewed from Bedwell Bayfront Park (Salt Pond and Shoreline Band Jurisdiction areas)

Figure 9x. Ravenswood Pond R4 as viewed from Bedwell Bayfront Park (Salt Pond Jurisdiction area)

Figure 9y. View of norther levee of the All American Canal between Ponds R3 and R4 looking to the east with existing water control structure to be removed in the foreground. Location is near proposed R3/R4 viewing platform location (Salt Pond Jurisdiction).

Figure 9z. Existing water control structure between ponds S5 and R5 to be removed (Salt Ponds Jurisdiction)

M:\Vogel_L\Projects\GIS\Projects\South_Bay_Salt_Ponds_archive\Maps\Parks_Recreation\Figure 3.6-1 Recreation and Public Access - New.mxd

LEGEND

Trails
- Existing
- Proposed

Bike path class
- 1 - Separated path for cyclists & pedestrians
- 2 - Painted lanes solely for cyclists
- 3 - Signed routes on shared roads

Regional Open Space
- CA Department of Fish & Wildlife
- City of East Palo Alto
- City of Menlo Park
- City of Mountain View
- City of Newark
- City of Palo Alto
- East Bay Regional Park District
- San Francisco Public Utilities Commission
- San Mateo County Parks & Recreation
- Santa Clara County Parks & Recreation
- U.S. Fish & Wildlife Service
- Parks & Open Space Outside Project Area
- Phase 2 Project Area

AECOM

South Bay Salt Pond Restoration Project

Figure 12

Recreation and Public Access

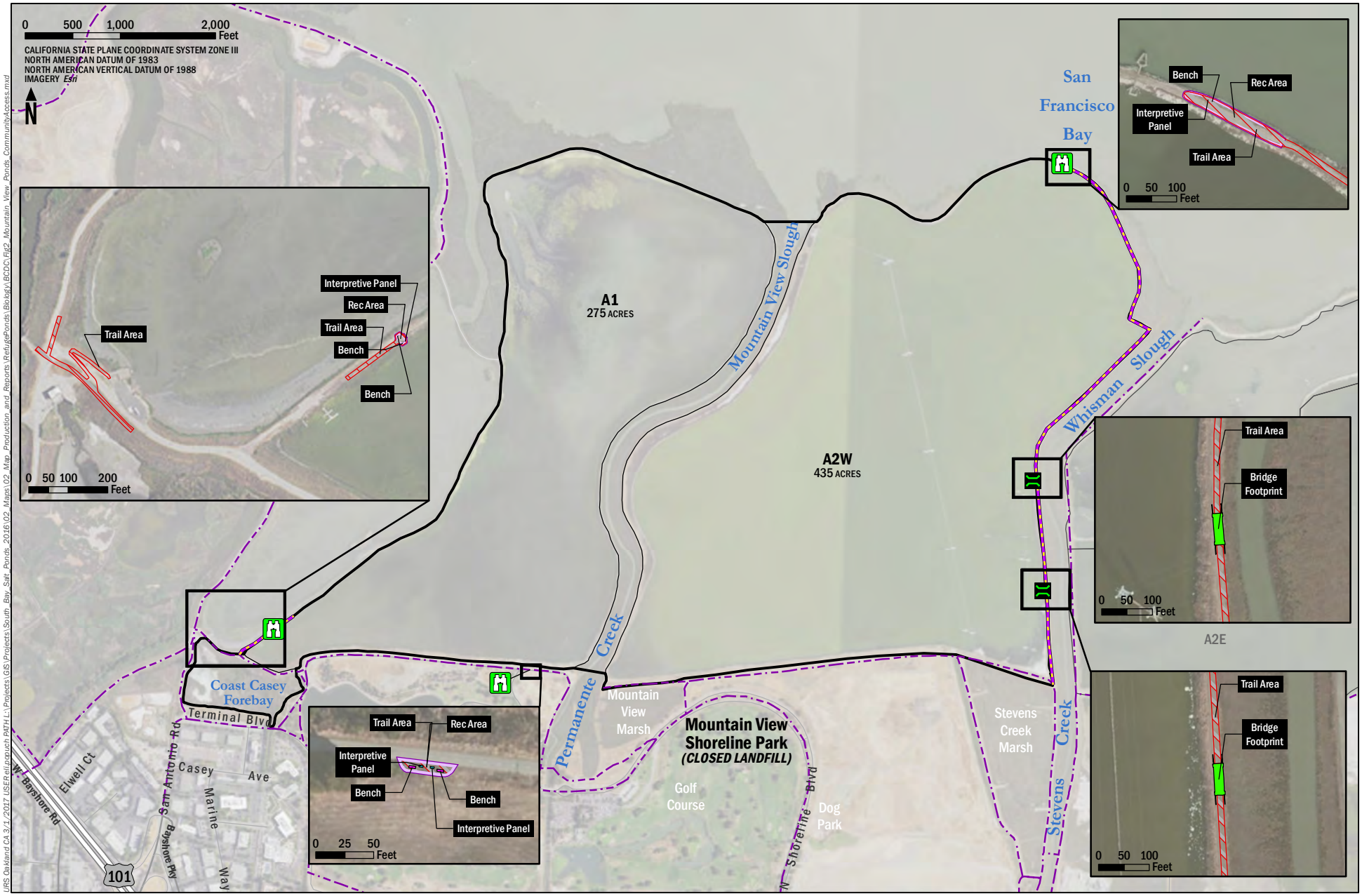
LEGEND

Trail (Existing)

Pond boundary

Figure 13a

Existing Community Access: Alviso A8 Ponds

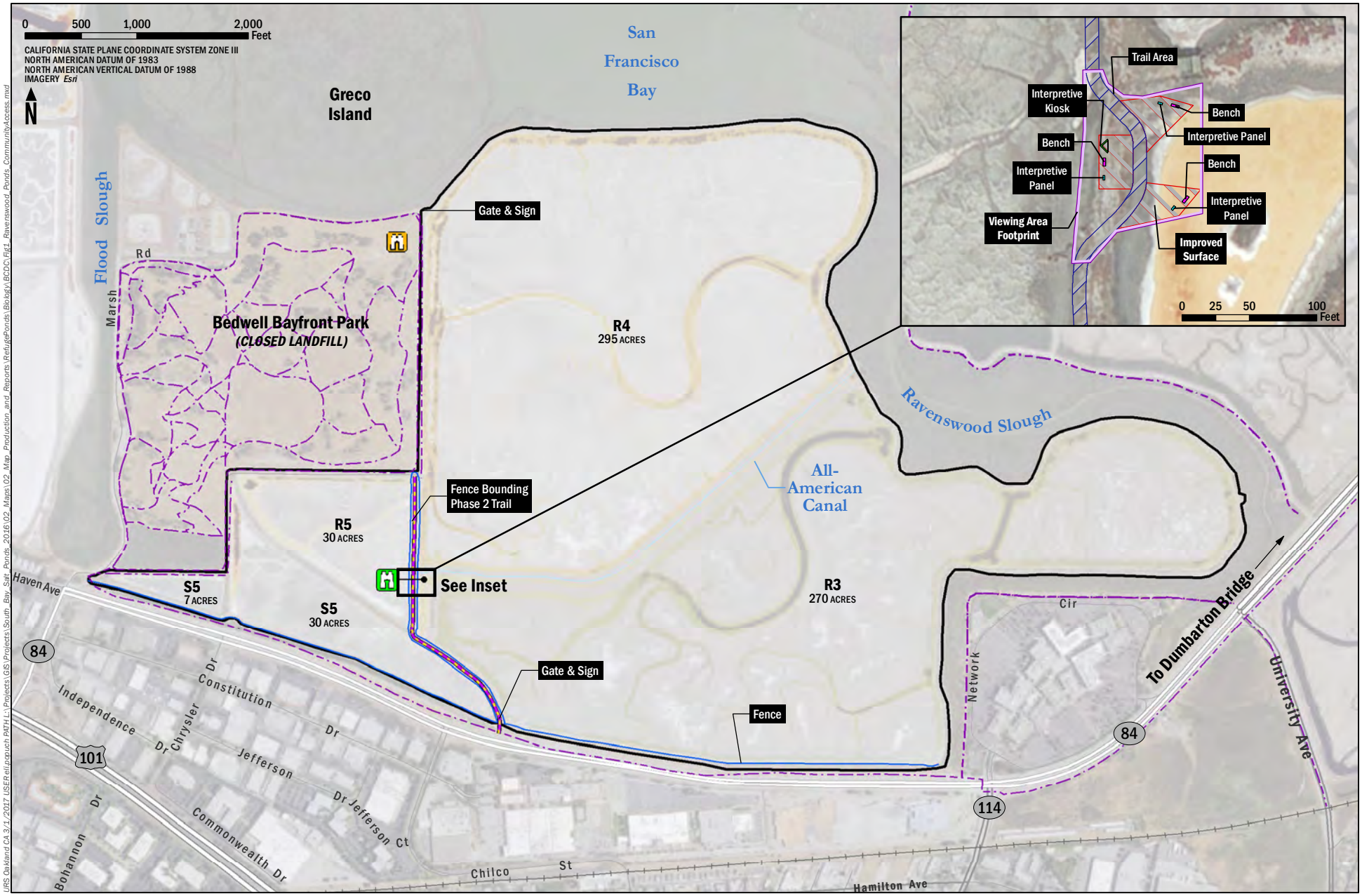


AECOM

South Bay Salt Pond Restoration Project

Figure 13b

Existing/Planned Community Access: Alviso-Mountain View Ponds



LEGEND

- Viewing Platform (Existing)
- Viewing Platform (Planned)
- Pond Boundary
- Trail (Existing)
- Trail (Planned)
- Fence (Planned)

*Pending property rights/easements

AECOM

South Bay Salt Pond Restoration Project

Figure 13c

Existing/Planned Community Access: Ravenswood Ponds

Appendix A.
SBSP Land Titles

Appendix B.
PG&E Infrastructure Improvements

Appendix C.
SBSP Restoration Project Phase 2 Project Plan Sheets

Appendix D.
SBSP Restoration Project Adaptive Management Plan

Appendix E.
SBSP Restoration Project Quality Assurance Project Plan for Fill Import to Operate and Maintain Levees at Ravenswood and Alviso Salt Pond Complexes

Appendix F.
Project Stakeholders and Interested Parties Contact Information

About AECOM

AECOM (NYSE: ACM) is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries.

As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges.

From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM companies had revenue of approximately US$19 billion during the 12 months ended June 30, 2015.

See how we deliver what others can only imagine at
aecom.com and @AECOM.

Appendix A:

April 2017 email from Chris Barr to BCDC

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Lennebacker, Dillon

From: Barr, Chris <chris_barr@fws.gov>
Sent: Thursday, April 27, 2017 1:20 PM
To: Goeden, Brenda@BCDC
Cc: Morkill, Anne; Lennebacker, Dillon; Bourgeois, John@SCC; Underwood, Jared; Collins, Megan; David Halsing; Buxton, Brenda@SCC
Subject: Re: BCDC: response needed from FWS
Attachments: C2003.010.007SBSP14DLtr20170417.pdf

Hi Brenda

Thank you for your letter dated April 17, 2017 regarding amendment No. seven to BCDC Consistency Determination C2033.010.00 (Attached). In your letter you requested no later than April 30, 2016 our concurrence to delay the start of the 60 day review until after you receive the 401 Certification and the BOs from NMFS and USFWS. We concur and are agreeable to the request for we fully understand how these additional items as well as the volume of materials submitted may require additional time for BCDC staff to complete a thorough analysis of the project and provided material. Please accept this email as our formal reply on the time extension and we will address your other comments from your initial review separately.

Thanks again for your initial review and we look forward to working with you and providing any relevant additional information helpful to you in consideration of the proposed restoration projects on the Don Edwards San Francisco Bay NWR.

Chris

Chris Barr
Deputy Complex Manager
San Francisco Bay National Wildlife Refuge Complex

Chris_Barr@fws.gov
510-792-0222 (office)
530-520-5614 (cell)

Appendix B:

SBSP Phase 2 Project Area APN Boundaries

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0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
PARCELS *Alameda County, San Mateo County, Santa Clara County, 2016*
IMAGERY *Esri*

N

See Figure 1e for Detailed Parcel Description

519-800-1-17

A21
150 ACRES
519-800-1-32

A20
65 ACRES
519-800-1-21

519-800-4

A19
265 ACRES
519-800-1-20

537-801-6

Dixon Landing Rd

LEGEND
Project Pond
APN (**Only parcels that fall within project ponds are labeled)

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AECOM
South Bay Salt Pond Restoration Project

Figure 1a
Parcels Within Project Ponds
Alviso Island Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
PARCELS *Alameda County, San Mateo County, Santa Clara County, 2016*
IMAGERY *Esri*

N

01533011
01535005
01533022
01533055
01501025
01535047
A8
410 ACRES
A8S
160 ACRES
01535038
01545031
01545011
01535014

Mills St
Hope St
Elizabeth St
Catherine St
Taylor St
Gold St
El Dorado St
Hoppe
Moffat St
Sun Rise Dr
Gold St
Sprockles Ave
Pacific St
State St
Wabash Ave
Essex St
Michigan Ave
Grand St
Archer Blvd
Disk Dr
Wilson Way
Trinity Park Dr
Archangel Dr
N 1st St
School St
Nortech Pky
Los Esteros Rd
Ave Carl Rd
Borregas Ave
E Caribbean Dr
Great America Pky
237
Pinefield Rd

LEGEND
Project Pond
APN (**Only parcels that fall within project ponds are labeled)

AECOM
South Bay Salt Pond Restoration Project

Figure 1b
Parcels Within Project Ponds
Alviso A8 Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
PARCELS *Alameda County, San Mateo County, Santa Clara County, 2016*
IMAGERY *Esri*

N

00805005
01536022
01536024
01536017
01536043
01536044
01536037
01536012
01536025
01536025

A1
275 ACRES

A2W
435 ACRES

Terminal Blvd
San Antonio Rd
N Shoreline Blvd

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LEGEND

Project Pond

APN (* *Only parcels that fall within project ponds are labeled)

AECOM
South Bay Salt Pond Restoration Project

Figure 1c

Parcels Within Project Ponds

Alviso Mt. View Ponds

0 500 1,000 2,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
PARCELS *Alameda County, San Mateo County, Santa Clara County, 2016*
IMAGERY *Esri*

N

R4
295 ACRES

R5
30 ACRES

S5
30 ACRES

R3
270 ACRES

055400490
055400480
055400570
055400580
055400570

Marsh Rd
Haven Ave
Independence Dr
Constitution Dr
Chrysler Dr
Jefferson Dr
Scott Dr
Campbell Ave
Bohannon Dr
Commonwealth Dr
Chilco St
Jefferson St
Network Cir
University Ave
84
101
114

LEGEND
Project Pond
APN (**Only parcels that fall within project ponds are labeled)

4/26/2017 User: elizpaulin | Map location: L:\Projects\GIS Projects\South Bay Salt Ponds\2016-03_Maps\02_Map Production and Reports\RefugePonds\Biology\BCDC\Figure1_BCDC_APNs.mxd

AECOM
South Bay Salt Pond Restoration Project

Figure 1d
Parcels Within Project Ponds
Ravenswood Ponds

0 250 500 1,000 Feet

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE III
NORTH AMERICAN DATUM OF 1983
NORTH AMERICAN VERTICAL DATUM OF 1988
PARCELS *Alameda County, San Mateo County, Santa Clara County, 2016*
IMAGERY *Esri*

N

519-760-5
519-760-13
519-760-6
519-760-8
519-760-9
519-760-10
519-760-11
519-760-12
519-770-6
519-770-7
519-770-8
519-770-9
519-770-10
519-770-11
519-770-12
519-770-14
519-770-15
519-770-16-2
519-800-1-17
519-800-4
519-770-5
519-770-17

A21
150 ACRES
519-800-1-32

A20
65 ACRES
519-800-1-21

A19
265 ACRES
519-800-1-20

4/26/2017 User: elopouh | Map location: L:\Projects\GIS Projects\South Bay Salt Ponds_2016\02 Maps\02 Map Production and Reports\Refuge Ponds Biology BCDC Figure1e_BCDC APNs_IslandPondInset.mxd

LEGEND
Project Pond
APN (**Only parcels that fall within project ponds are labeled)

AECOM
South Bay Salt Pond Restoration Project

Figure 1e
Parcels Within Project Ponds
Detail Map: Island Ponds

Appendix C:

Sea Level Rise Risk Assessment

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SEA LEVEL RISE ANALYSIS

Narrative in Response to BCDC's Comment about Sea Level Rise and Fill in the Bay and Salt Ponds

In response to an application submitted by the United States Fish and Wildlife Service (USFWS) to the San Francisco Bay Conservation and Development Commission (BCDC) for the South Bay Salt Pond (SBSP) Restoration Project's Phase 2 actions within the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge), the BCDC requested more information on expected risks from sea-level rise (SLR) in the South San Francisco Bay (South Bay). The text of the request made in the initial comment letter from BCDC was as follows:

"*As the proposed project would involve fill in former salt ponds, it will be necessary to submit a risk assessment prepared by a qualified engineer and based on the estimated 100-year flood elevation taking into account mid- and end-of-century science-based sea level rise ("SLR") projections. We did not find this analysis in the project description or application.*

We recommend that you use the state guidance for this analysis. The risk assessment should:

a. *Take into account current and planned flood protection at the project site;*

b. *Contain an inundation map of the project site depicting projected flooding scenarios and reflecting the proposed project;*

c. *Discuss degrees of uncertainty and consequences of defense failure; and*

d. *If relevant, identify risks to existing habitat from proposed flood protection devices.*"

To respond to that request for additional information and analysis, the SBSP Restoration Project has prepared this document.

The 2013 Update to the State of California's Sea-Level Rise Guidance Document[1] (Guidance Document) contains eight planning recommendations for projected changes in sea level elevations. The following discussion first lists each of the individual recommendations provided in the SLR Guidance Document and then gives a description of the Project's efforts to follow them. Following that, a summary of the individual features at the Phase 2 Project locations is provided which discusses how those features may or may not be adversely affected by SLR and how the project planned to avoid negative long-term outcomes there.

[1] Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT). 2013. State of California Sea-Level Rise Guidance Document – March 2013 Update. Additional science support provided by the Ocean Protection Council's Science Advisory Team and the California Ocean Science Trust.

1 RECOMMENDATIONS

1.1 1. Use the ranges of SLR presented in the June 2012 National Research Council (NRC) report on Sea-Level Rise for the Coasts of California, Oregon, and Washington as a starting place and select SLR values based on agency and context-specific considerations of risk tolerance and adaptive capacity.

For the South Bay, those projections of SLR are shown in the following bullets.

- 2000 – 2050: 12 to 61 cm (0.39 to 2.0 feet)
- 2000 – 2100: 42 to 167 cm (1.38 to 5.48 feet)

For comparison, the U.S. Army Corps of Engineers' (USACE) and the Santa Clara Valley Water District's (SCVWD) South Bay Shoreline Study Project (Shoreline Study) is planning for just over 2 feet of SLR by the year 2067[2]. This is very similar to the range used by the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT) team in the Guidance Document and the NRC in its 2012 report[3]. To determine the appropriate SLR to plan for, the USACE used an analysis that included three different sea level change scenarios for 14 areas in Santa Clara County and southern Alameda County. The estimated SLR values for the low, intermediate and high projections used in that study were 0.5 feet, 1.01 feet and 2.59 feet by the year 2067. The selection of the >2-foot SLR planning estimate is near the highest projections of assumed SLR. That estimate reflects an appropriately conservative degree of planned risk aversion for a project with a goal of providing 100-year protection from coastal flooding, which the Shoreline Study is.

As an additional comparison, the April 2017 San Mateo County Draft Sea-Level Rise Vulnerability Assessment[4] examined coastal flooding and erosion risk from three SLR scenarios and one scenario for coastal erosion data. The elevations used in those scenarios were derived from the Point Blue "Our Coast, Our Future" tool, which uses similar projects as the CO-CAT and thus produces similar results. A later section of that document references the 2012 NRC report projecting SLR along California's coast south of Cape Mendocino as shown in the following table.

[2] South San Francisco Bay Shoreline Study Website. 2017 U.S. Army Corps of Engineers, Santa Clara Valley Water District, and California State Coastal Conservancy. Available at URL < http://www.southbayshoreline.org/faq.html#3>.
[3] National Research Council (NRC), National Academy of Sciences, National Academy of Engineering, Institute of Medicine. 2012. Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future. http://dels.nas.edu/besr
[4] Draft Sea Level Rise Vulnerability Assessment. 2017. County of San Mateo – Office of Sustainability. Available at URL < http://seachangesmc.com/current-efforts/vulnerability-assessment/ >.

Table 1. SLR along California's coast south of Cape Mendocino

Year	Projection	Ranges
2030	6 +/- 2 inches	2 to 12 inches
2050	11 +/- 4 inches	5 to 24 inches
2100	36 +/- 10 inches	17 to 66 inches

In general, the SBSP Restoration Project has a timeline for program-level implementation over several decades (nominally 50 years), so the appropriate amount of SLR to plan for over that time frame is two to three feet of increase. The successful implementation of the SBSP Restoration Project would provide a largely self-sustaining set of actions and additional adaptive management-based modifications to any of the three project goals (i.e., habitat restoration, public access and recreation, and maintaining or improving current levels of flood protection). The SBSP Restoration Project itself would likely be deemed complete at that time, but the operations and maintenance (O&M) of project features, as well as any adaptive management actions necessary, would need to continue out to the 100-year planning horizon. O&M for the SBSP Restoration Project would be conducted by the landowners –USFWS at the Refuge and the California Department of Fish and Wildlife (CDFW) at the Eden Landing Ecological Reserve.

Over the course of the 50-year implementation period for the SBSP Restoration Project, the expected amount of SLR the project plans for is somewhat higher than the 2.0 feet projected for 2050 in the State Guidance Document. That is because the SBSP Restoration Project's Programmatic EIR/S was not published until 2007, and the initial project phase was not implemented until a few years later. The 2.67 feet of SLR by 2067 from the 'high-SLR' projection used in the USACE's Shoreline Study is an upper bound of what the project might expect at 60 years after project initiation. Between those two time frames, an approximate SLR of 2.25 feet is reasonable for the project to plan for. At 100 years, the high-end estimate of 66 inches (5.5 feet) is used.

In the Phase 2 EIS/R (2016) a Master Response to Comment was specific to the project's treatment of SLR. It first said that, "while there is considerable uncertainty to the rate of sea level rise, particularly after about 2050 due to uncertainties in global carbon emission rates, there is a general consensus among scientists that sea levels on the West Coast are predicted to increase by 2 to 12 inches by 2030, 5 – 24 inches by 2050, and 17 – 66 inches by 2100, relative to levels in 2000 (NRC 2012)[3]. This NRC research is the same source integrated into the CO-CAT projections that were used in the 2013 SLR Guidance Document.

To manage that uncertainty, the response went on to reference the original 2007 Program-level EIS/R, which said that the project would "use phased implementation, monitoring and adaptive management to plan for and accommodate a range of potential future sea level rise. Updated sea level rise estimates would be used as future phases were designed and implemented. Monitoring and adaptive management would provide updated assessments of future sea level rise, inform planning for future phases, and adjust previously implemented phases as needed." The Master Response went on to note

that specific actions that could be employed included monitoring SLR in the South Bay, modeling and monitoring sediment dynamics in the South Bay, and using the coupled hydrodynamic and sediment transport model of the South Bay to develop better plans for phasing future implementation actions. Other examples included adjusting the phasing to better match the sediment supply; maintaining levees along the bayfront to shelter restored tidal areas from wave energy and encourage marsh formation; removing levees along the bayfront edge to restore sustainable mudflats within the ponds; restoring natural shorelines such as shell breaches and wrack lines; using imported fill to raise pond beds to elevations conducive to vegetation establishment; and prioritizing restoration of less subsided ponds and/or ponds close to sediment supplies within the project area.

The specific SBSP Restoration Project Phase 2 components and their potential to be affected by SLR are discussed following the Guidance Document's recommendations. As a preface to that discussion please note that during both the 50-year and 100-year periods the different types of habitats restored (tidal marsh and enhanced managed ponds), the flood risk management components, and public access and recreation features all have different vulnerability to SLR. They also have different intended useful lives and require different levels of long-term maintenance. Tidal marsh restoration actions are intended to be self-sustaining in the face of SLR; they are to be permanent features of the landscape and to require little maintenance and no flood protection. The inclusion of habitat transition zones to allow vegetated tidal marsh areas to migrate upward along with tidal elevations facilitates this migration. Many of the former salt pond levees[5] around breached ponds that transition to tidal marsh are intended to degrade over time and will be allowed to do so.

Conversely, managed ponds do need ongoing maintenance and repair of their levees and water control structures throughout their useful lives. However, that intended useful lifespan may vary by pond. If ongoing monitoring and adaptive management conducted for the SBSP Restoration Project indicates that pond-dependent wildlife are adjusting to the gradual loss of former salt pond habitats, some of these managed ponds may be breached and tidal restoration may begin within them. Others will be maintained indefinitely by adding material to raise levee crest elevations.

Similarly, levees retained or improved for flood risk management as part of one of the project's implementation actions will also need maintenance. They can be repaired and improved as needed (by the flood protection agencies, landowners, and/or project partners) to keep pace with SLR or other sources of erosion. That maintenance can continue unless and until the flood protection agencies and the cities and counties develop other long-term plans and systems for coastal flood protection, most of which is beyond the purview or responsibility of the SBSP Restoration Project.

Public access features such as trails can occasionally be overtopped or inundated with little damage; such damage can also be easily repaired as it occurs. This highlights a distinction between brief inundations and longer-term or permanent inundations. Most human developments and infrastructure both suffer damage from either of those forms of flooding, but natural habitat systems (marshes, ponds,

[5] The SBSP Restoration Project refers to all former salt pond levees as "levees" even though they were not designed or constructed to perform as true flood protection levees. They are largely earthen berms intended to isolate water for salt production. In keeping with the project's established terminology, this document, as well as the previously submitted BCDC permit application and the NEPA/CEQA document, all use the term "levees" throughout. This should not imply that they are engineered levees, except where otherwise noted.

mudflats, habitat transition zones, and habitat islands) and the wildlife that use them are resilient to intermittent flooding of relatively short duration.

As noted above, the SBSP Restoration Project's three goals are habitat restoration, adding wildlife-compatible public access and recreation, and maintaining or improving current levels of flood protection. These goals are co-equal in terms of importance to the project's outcomes. However, the intended useful lifespan of the project components to achieve those goals may not be the same. That is because the project takes place within a National Wildlife Refuge, the primary concern of the landowner is to manage the landscape for wildlife. This implies that the changes in the natural environment should be allowed to proceed wherever doing so would benefit wildlife and would not threaten human life or property. For example, the public access features implemented in the project are not necessarily intended to be permanent with regard to SLR. Should public access areas be lost to natural processes, including SLR, they might not be replaced where they were originally built, or at all if replacement is inappropriate. This is in accord with one of the later points of the Guidance document about "considering coastal change". It is also in line with the State Coastal Conservancy's general approach to public access features for which it provides grant support, which often require a grantee project to have a "useful life" of 20-25 years.

1.2

1.3 2. Consider timeframes, adaptive capacity, and risk tolerance when selecting estimates of SLR.

As noted in Guidance Document, climate models generally agree about the amount of SLR that is likely to occur by 2050, after which, the projections become more uncertain. The narrative above on Recommendation #1 discussed the SBSP Restoration Project's plans for a 50-year implementation period ending sometime around 2060 and the SLR expected to that period and afterwards to 2100 as the project's elements are maintained.

Those SLR projections are appropriate because the SBSP Restoration Project has a generally high adaptive capacity and generally a medium level of adverse impacts from SLR. That is because its flood-related goals and requirements are largely to maintain the existing (current) levels of de facto flood protection provided by the former salt pond levees. At very few locations is the project attempting to replace or improve upon the existing degree of flood risk management. Rather, it is required to provide sufficiently enhanced levees and other areas of high ground to allow restoration to proceed in the former salt ponds.

In addition, the SBSP Restoration Project takes place on publicly owned land that is managed as a National Wildlife Refuge and a California Ecological Reserve. These areas are intended to be functionally restored to the natural environment (as opposed to the anthropocentric, built environment) and allowed to evolve along with their surroundings, including the Bay, sloughs, streams, and other waterways around them. In urban refuges/reserves such as these, there are inherent limits to the extent to which this evolution can be allowed to proceed. Unplanned levee breaches would expose human

communities and infrastructure to flooding and other related damages. Some actions to guard against these types of adverse outcomes are necessary, but minor changes related to natural dynamics such as wave action, high tides, erosion, and storms are expected and – to some extent – desirable.

This illustrates not only the adaptive capacity of the project area but also the relatively high level of tolerance to SLR risks. The project actions are specifically designed and implemented to be integrated with and responsive to changes in SLR; the proposed project does not intend to generate a highly engineered and inflexible interface with the tides. Rather, it includes very little built infrastructure that can be damaged by SLR. The State Guidance Document describes a case where a marsh restoration project could be rendered ineffective by underestimating SLR. This is certainly possible; however, the SBSP Restoration Project has considered this potential outcome in its design and taken steps to minimize that risk. For example, the pond selection process for Phase 2 at the Refuge specifically considered and chose ponds that were not so deeply subsided that they would not likely accrete sediment at a sufficiently rapid rate to allow marsh formation which would keep pace with SLR. The project has also been tracking and monitoring sediment accretion rates at other locations around the South Bay and used those rates as inputs into models that examine the relative rates of SLR and sediment marsh formation.

An analysis conducted for the SBSP Restoration Project in 2013[6] addressed the question of the response of the Mountain View Ponds A1 and A2W (the most subsided ponds at the Refuge considered for Phase 2 tidal restoration) to accrete sediment rapidly enough to keep pace with SLR. That analysis determined, based on observed sediment accretion rates in previous pond breaches elsewhere in the South Bay, that those ponds would just keep pace with the mid-level SLR projections from the Guidance document. Other researchers (Schile et al. 2014[7]; Takekawa et al. 2013[8]) have investigated the predicted response of tidal marshes to future rates of sea level rise in San Francisco Bay. A discussion of those studies and their methods and results is available in Appendix R of the SBSP Restoration Project's 2016 Final EIS/R for Phase 2. The results were generally encouraging for the sustainability of marshes in the South Bay relative to other areas of the San Francisco Bay. During future project phases that could involve more deeply subsided ponds, the project plans would need to include beneficial reuse of dredge material to raise pond bottoms to accelerate marsh formation in its designs and environmental clearance in light of SLR.

1.4 3. Consider storms and other extreme events.

As noted above, the project's designs are intended to be resilient to storms and other extreme events. The confluence of extreme events and SLR do expose coastal developments to more damage from overtopping, levee failure, storm surge, and other forms of inundation. However, in general, restoration

[6] Mineart, Phillip. 2013. Predicted Sedimentation in SBSP Restoration Phase II Ponds. Internal Technical Memorandum to John Bourgeois. November 5, 2013.
[7] Schile LM, Callaway JC, Morris JT, Stralberg D, Parker VT, et al. (2014) Modeling Tidal Marsh Distribution with Sea-Level Rise: Evaluating the Role of Vegetation, Sediment, and Upland Habitat in Marsh Resiliency. PLoS ONE 9(2): e88760. doi:10.1371/journal.pone.0088760
[8] Takekawa, J.Y., Thorne, K.M., Buffington, K.J., Spragens, K.A., Swanson, K.M., Drexler J.Z., Schoellhamer, D.H., Overton, C.T., Casazza M.L. 2013. Final report for sea-level rise response for San Francisco Bay estuary tidal marshes. U.S. Geological Survey Open File Report 2012-1081, 161 p.

projects that are creating or supporting natural systems are less vulnerable to these types of impacts. By using naturalistic designs, creating habitat transition zones, and planning for erosion, settlement, and other changes over time, the SBSP Restoration Project explicitly plans for storms and other extreme events. The proposed design elements and creation of marshlands also help buffer the built environment that exists landward of the Phase 2 ponds more so than the current landscape of former salt ponds does. In addition, the project is committed to raising and improving levees and other flood risk reduction infrastructures in places where the local conditions require that improvement in order to enable restoration efforts to proceed. Finally, as noted, trails and other public access features that use the kinds of minimalistic designs used in this project are less easily damaged and more easily repaired than other forms of development.

1.5 4. Coordinate with other state agencies when selecting values of SLR and, where appropriate and feasible, use the same projections of sea-level rise.

The SBSP Restoration Project is a multi-agency effort that includes a number of federal, state, county, and city agencies as landowners, lead agencies, permittees, and/or other project partners. The State agencies directly involved in the project's planning and implementation are the State Coastal Conservancy and the CDFW. The BCDC and the RWQCB are also frequent participants in project planning workshops and regulatory agency advisory groups wherein SLR itself and adaptation strategies to it are topics of discussion. Also, the project has made efforts to use the same projections for timing and amounts of SLR as those being used in related or neighboring projects in the South Bay. These include the USACE's Shoreline Study, the San Francisquito Creek Joint Powers Authority's SAFER Bay Project, the Alameda County Flood Control and Water Conservation District, the Santa Clara Valley Water District, the SLR-related components of capital improvement projects by the City of Mountain View, and others. Finally, as discussed above, the SBSP Restoration Project is planning for at least the amounts and timing of SLR that are recommended in the updated State of California guidelines on SLR. In places where project partners or neighboring cities request using a higher degree of protection (e.g., at the City of Mountain View's Coast Casey Forebay levee), the SBSP Restoration Project will include designs and plans for higher levels of SLR.

1.6 5. Future SLR projections should not be based on linear extrapolation of historic sea level observations.

As discussed elsewhere in this document, the SBSP Restoration Project is using the Guidance Document, which includes non-linear projections of changes in sea levels and tidal elevations extrapolated from historic sea-level observations.

1.7 6. Consider changing shorelines.

The SBSP Restoration Project has included considerations for a number of different types of changes to shorelines, slough channels, intertidal mudflats, and other aspects of environmental changes associated with SLR. For example, the project's science team has monitored and analyzed sediment fluxes and accretion/deposition patterns in the South Bay for over a decade. Similar efforts have been made to

track and understand changes in mudflat from erosion or deposition, levee erosion, marsh formation, and so on, both as a consequence of project actions and from external dynamics.

1.8 7. Consider predictions in tectonic activity.

The SBSP Restoration Project does not explicitly include many designs for effects of tectonic activity. First, the San Andreas Fault system and other faults (including Hayward, Calaveras, and others) in the South Bay are transform/slip-strike faults that do not cause large changes in elevations the way that converging or diverging systems do. The Humboldt Fault system in far northern California is subject to hazards from elevation changes in the Cascadia Subduction Zone that lies off of the coastline there; the South Bay is much less exposed. The South Bay is subject to earthquake-induced liquefaction that can lead to down-dropping from consolidation of sediments. Consequently, marsh formation could be slowed or hindered if this occurs. This is beyond the project's ability to control, but remedial actions afterwards could include the import and placement of dredge material or upland fill to re-raise pond bottoms and repair levees and water controls structures to maintain existing flood protection.

More importantly, however, the project proposes to build very few actual structures or features that would cause loss of life or property from a tectonic or seismic event. The project proposes to raise or improve some existing levees and will have a number of water control structures (including tide gates and culverts) and a few bridges. Any of these features could be damaged by shaking, earthquake-induced liquefaction, or other dynamics related to tectonic or seismic activity. However, the project does not propose to add buildings or roads or any other new infrastructure, the loss of or damage to which would lead to increased damage to properties or loss of life. Moreover, the existing landscape of earthen berms that were constructed for salt production is subject to these same risks, which would be reduced or kept constant (i.e., not increased) by the proposed project activities. The entire South Bay area is subject to similar hazards. In addition, where the project proposes actions to provide reductions of flood risk, those actions have been based on designs that include subsurface geotechnical information, analyses of stability and compaction potential, and other relevant factors. Any proposed project features damaged in an event could be repaired or replaced.

1.9 8. Consider trends in relative local mean sea level.

According to the National Oceanic and Atmospheric Administration (NOAA) 'Tides and Currents' web page, the recent sea level trend (1974-2016) at Redwood City (the only analysis presented within the South Bay itself) is 0.65 feet per century (1.99 mm/year). This is not much different than other estimates around the Central Bay, North Bay, and Central California Coast. The SBSP Restoration Project has noted this and used it in some of the early decisions to determine which groups of ponds (or pond clusters) to include in certain project-level actions within the overall Program. The project has also used recent observations of sea levels and tidal ranges to assess whether a restoration action in a particular location can be expected to see its sedimentation accretion rate keep pace with SLR.

2 SBSP RESTORATION PROJECT – PHASE 2 COMPONENTS AT THE NATIONAL WILDLIFE REFUGE PONDS

This section discusses the Phase 2 project features at the Refuge, grouped into the four clusters of ponds as they were discussed in the BCDC permit application. Per BCDC guidance, within each sub-section, the current and planned flood protection/flood risk management needs and proposed features are discussed. It also summarizes the risks of failure of these flood risk management efforts to either the built environment or natural habitats, as requested in the BCDC comment letter. Also following BCDC guidance, inundation maps are provided following the text of this section. It should be noted that all project elements were designed with proper hydrologic and engineering analysis by a qualified firm.

To provide a frame of reference for the text below, note that the current levee elevations (all in the NAVD88 datum) at the Phase 2 ponds range from 11-12 feet for external (Bay-facing) levees and from 7-11 feet for internal levees that only separate one pond from another). In reference to those elevations, the following table summarizes the elevations associated with the proposed levee improvements. All of the listed elevations are the designed final elevation after consolidation and settlement. They would all have an initial overbuild of 2-3 feet (depending on the subsurface conditions on which they would be built) to compensate for that long-term settlement. Many of these raised levees would also have trails or viewing platforms on them.

The table also presents a comparison of those features' elevations relative to the current normal high-tide line at roughly 9 feet elevation NAVD88 and from the projected 50-year SLR tides and 100-year SLR tides, which respectively include an added 2.25 feet and 5.5 feet of elevation gain.

Finally, note that the table only lists the Mountain View Ponds and the Ravenswood Ponds because no Phase 2 actions proposed for the Island Ponds or the A8 Ponds would have levee improvements or trail features. The habitat transition zones proposed at the A8 Ponds would have a top elevation of 9 feet, which is very close to the high-tide line

.

Table 2. Phase 2 SLR Analysis by Features at the Refuge

Pond Cluster	Proposed Phase 2 Feature	Elevation (feet) (NAVD88)	At or Above Current High-Tide Line (~ 9 to 9.25 feet)	At or Above 11 to11.25 feet (with projected 50-year SLR of 2.0 feet)	At or Above 14.5 to 14.75 feet (with projected 100-year SLR of 5.5 feet)
Alviso-Mountain View Ponds	Coast Casey Forebay Levee and Trail	14.7	Yes	Yes	Yes
	Pond A1 Charleston Slough Levee, Trail, and Viewing Platform	14.7	Yes	Yes	Yes
	Pond A1 West Levee	12	Yes	Yes	**No**
	Pond A2W East Levee and Trail	12	Yes	Yes	**No**

Pond Cluster	Proposed Phase 2 Feature	Elevation (feet) (NAVD88)	At or Above Current High-Tide Line (~ 9 to 9.25 feet)	At or Above 11 to11.25 feet (with projected 50-year SLR of 2.0 feet)	At or Above 14.5 to 14.75 feet (with projected 100-year SLR of 5.5 feet)
Ravenswood Ponds	All-American Canal Levees	12	Yes	Yes	**No**
	R5/S5 East Levee and Trail (internal levee)	11	Yes	**No**	**No**
	Viewing Platform between R3, R5, R5/S5	12	Yes	Yes	**No**
All	Habitat Transition Zones' Top Elevations	9	Yes	**No**	**No**

2.1 Alviso-Island Ponds

Proposed Phase 2 features and flood risk management needs.

The Phase 2 actions at the Alviso-Island Ponds (A19, A20, and A21) involve breaching, lowering, and removing sections of previously breached levees to improve habitat connectivity and complexity, the spatial distribution of sediment accretion, and speed marsh establishment.

Risks of flood management failure to the built environment (i.e. uncertainty and consequences).

Once implemented, little management or repairs to adapt to or resist SLR would be necessary here. That is because these ponds are islands, separated by Bay waters from land-based access, which provide neither flood protection nor public access opportunities. They are designed to become natural areas with primarily tidal marsh habitat that is expected to continue to keep pace with SLR. Therefore, there is no flood risk at the Island Ponds or in the human environments landward of them.

Risks of flood management failure to habitats or restoration outcomes.

If SLR is faster than projected, and marsh formation does not take place as intended, the intertidal lagoon habitat and high ground from portions of former levees within it that would remain would still have habitat value. Also, additional dredged sediment or upland fill material could be brought to the site as a way of "catching up" with SLR. This is not expected to be necessary at these ponds and is not proposed as part of the Phase 2 or O&M actions at this point.

2.2 Alviso-A8 Ponds

Proposed Phase 2 features and flood risk management needs.

The Phase 2 action at the Alviso-A8 Ponds (A8, A8S, A5, and A7) is simply to build habitat transition zones within the southern corners of Pond A8S to provide a number of benefits, including adding habitat complexity, preparing these muted tidal/managed ponds for future tidal marsh restoration actions, protecting the cap of a closed landfill behind the levee from scour, and reducing the scour and erosion of a different former salt pond that is also maintained by the Refuge.

Risks of flood management failure to the built environment (i.e. uncertainty and consequences).

In the long-run, the consequences of the existing levees around A8 Ponds being overtopped or failing are minimal because the intent is for these ponds to be restored to fully tidal flows and for marsh habitat to be established there as part of a future project phase. After that occurs, much like at the Island Ponds discussed above, there would be no need to maintain any of the levees, gates, or habitat transition zones for flood risk management purposes. Prior to that long-term restoration step – expected to take place within a decade or two – the Phase 2 habitat transition zones and the rest of the A8 Ponds' levees and water control structures would be maintained as they are currently. These levees are high enough to withstand the relatively small amount of SLR projected for the next decade or two as long as they are properly maintained. Finally, these ponds are not directly adjacent to any low-lying ground, as they are surrounded by the Bay on the north, sloughs on the east and west and much of the

south, and by the closed and capped landfill that is very high ground some tens of feet above the highest tides.

Risks of flood management failure to habitats or restoration outcomes.

A managed pond system such as the A8 Ponds can experience occasional inundation from coastal floods or freshwater from fluvial outflows with no ill effects. This is a dynamic estuarine system that has evolved to cope with wide ranges of salinity and water depths. There is little to no risk to habitats from levee failure here. The resilience to dynamic changes in the natural environment would be increased by the Phase 2 action and the subsequent phases' restoration actions.

2.3 Alviso-Mountain View Ponds

Proposed Phase 2 features and flood risk management needs.

The Phase 2 actions at the Alviso-Mountain View Ponds (A1 and A2W) include breaching those ponds in several places to allow tidal flows, raising the west levee of Pond A1 to isolate its waters from the adjacent Charleston Slough, raising the Coast Casey Forebay levee to provide flood protection, building habitat islands and habitat transition zones, installing bridges over two breaches to allow continued PG&E maintenance access and a trail, and building a number of other trails and viewing platforms on existing or improved levees.

Risks of flood management failure to the built environment (i.e. uncertainty and consequences).

Once the Phase 2 actions are implemented and the tidal marsh restoration begins, the protection from current flooding and that associated with future SLR will be provided by the very large, high-ground close landfill that sits across most of the southern extent of these ponds. To complement that, the Coast Casey Forebay levee – owned by the City of Mountain View – at the southwestern corner would be raised to an elevation of 14.7 feet NAVD88 to comport with the City's capital improvement plans for its levees. That particular elevation is derived from guidance associated with the USACE and SCVWD's Shoreline Study, discussed above) and is intended for long-term flood protection in light of SLR. The western Pond A1 levee will be raised so that the current level of flood risk management the unbreached levees currently provide will be retained following pond breaching. The eastern and northern levees of Pond A2W will be kept and maintained as currently with the addition of bridges over the breaches. The long-term maintenance of those levees or their improvements to adjust to future SLR is not part of the SBSP Restoration Project, as it is retained largely for PG&E access to its power lines and towers. The proposed bridges were conceptually designed to accommodate a vehicle load of 4,000 pounds (and would more than sufficiently accommodate typical and expected pedestrian usage at the trails), to an elevation that would minimize inundation during tidal flood events, maintain structural integrity during and after potential inundation events and be consistent with the useful life of the trails that they are part of. Final bridge designs for construction will be provided to BCDC in accord with standard plan review and approval process in the project's forthcoming BCDC authorization. Access would be restricted during flood and heavy storm events to avoid risks to the public. However, they provide no flood protection. Further, following the other improvements discussed above, the northern levee Pond A1 and the levees between A1 and A2W would become obsolete with regard to their flood protection, and they would be allowed to decay. The trails and viewing platforms on the improved levees are

intended to last anywhere from the State Coastal Conservancy's minimum goal of 20 years up to the 50 years planned for by the SBSP Restoration Project itself. After that, if the levees are no longer needed for flood risk management, the trail features may be removed and the levees allowed to degrade.

Risks of flood management failure to habitats or restoration outcomes.

The habitat islands built for pond-dependent bird species would be allowed to degrade over time as the breached ponds transition to tidal marsh. That is part of their intended ecological progression. The habitat transition zones would protect the upland areas, including the closed landfill, from erosion and reduce wave run-up and storm surge, while also providing initial habitat complexity; as SLR progresses. They would allow marsh formation to progress uphill and continue to provide their habitat, flood protection, and erosion-resistance benefits. If SLR occurs more rapidly than planned, more upland fill material could be added to the tops of the transition zones to allow them to continue to provide benefits. As at the Island Ponds and A8 Ponds, the accretion of sediment and formation of tidal marsh is expected to keep pace with the current projections of SLR, but if this expectation is incorrect, there are mechanisms for delivering upland fill material or dredge material to the ponds to raise their bottoms and "catch up" with SLR. Those actions would need environmental review and permitting at the time, and are not proposed as part of the Phase 2 actions or SBSP Restoration Project O&M actions at this time, but such future augmentations of previously implemented SBSP Restoration Project actions are included as part of the project's Adaptive Management Plan.

2.4 Ravenswood Ponds

Proposed Phase 2 features and flood risk management needs.

The Phase 2 actions at the Ravenswood Ponds (R3, R4, R5, and S5) include breaching Pond R4 to restore it to tidal marsh, raising and improving several levees to maintain the current levels of flood risk management, building two habitat transition zones, adding water control structures to enhance the habitat value of the other three ponds and allow direct control of water levels and quality in those managed ponds, and adding a trail and viewing platform.

Risks of flood management failure to the built environment (i.e. uncertainty and consequences).

The proposed levee improvements are expected to be sufficient to retain the necessary levels of flood protection for several decades, which is sufficient time for the San Francisquito Creek Joint Powers Authority to finish implementing the Strategy to Advance Flood protection, Ecosystems and Recreation along the Bay (SAFER Bay Project), which is intended to fulfill the long-term coastal flood protection requirements, including against SLR, for the San Mateo County cities of Menlo Park and East Palo Alto, which are the communities immediately landward of the Ravenswood Ponds. The two projects are in close collaboration to make sure the alignments of levee improvements and associated trails and habitat transition zones are leveraged to reduce adverse habitat impacts and provide greater protection at lower cost. If the SAFER Bay Project is delayed, the SBSP Restoration Project and/or the USFWS (as the manager of the Refuge) could work within its existing levee O&M permits to continue to raise levees as needed to keep pace with SLR. Nothing in the SBSP Restoration Project prevents or impairs that ability.

Risks of flood management failure to habitats or restoration outcomes.

The habitat transition zones would be installed to provide the same types of benefits to habitat complexity, tidal marsh formation, SLR adaptation, and landfill and levee scour protection, as described above. Also noted above, similar opportunities to raise the high end of the transition zones to keep pace with unexpectedly high levels of SLR are available. Finally, as at the other pond clusters, the accretion of sediment and formation of tidal marsh is expected to keep pace with the current projections of SLR, especially at Pond R4, which is very close to marsh plain elevation already. If these expectations are incorrect, similar corrective actions could be permitted and implemented through the project's Adaptive Management Plan, if needed.

3 INUNDATION MAPS

The following figures show inundation maps for the 50- year and 100-year SLR projections discussed above at each of the four clusters of ponds discussed in this document. Figures 1-4 are excerpted from existing douments, including the USACE Shoreline Study and the San Mateo County Vulnearability Assessment referenced above. In addition, this section also includes maps (Figures 5-16) developed using the Our Coast, Our Future (OCOF) mapping tool[9], produced by Point Blue and others. That system integrates several data sets and SLR models to generate site-specific projections of flooding under different scenarios, one of which is that developed by the CO-CAT team and the NRC and recommended for use in the State Guidance Document. Those maps presented below are generated using the 2013 CO-CAT/NRS projections described above. The OCOF maps below include the current (0 feet of SLR), 50-year (2.5 feet of SLR), and 100-year (5.7 feet of SLR) sea levels at each of the Phase 2 pond clusters.[10] These maps are set to show only normal tidal flooding due to SLR, waves and storm surge. They do not include king-tide scenarios or combinations of fluvial flows from heavy rainstorms.

Note that these OCOF maps describe the current and projected flood risk from the highest tides based on the existing topography, bathymetry, levee/berm alignments, and water control structures. The SBSP Restoration Project is committed to maintaining these current levels of protection. Therefore, the maps of the "post-project implementation" state of the world will look the same in terms of areas exposed to inundation. This is, however, a conservative estimate, because in reality the addition of habitat transition zones and establishment of tidal marshes would reduce wave run-up and storm surge and add a layer of protection greater than that based solely on the elevations of the levees. The exception to that is at the City of Mountain View's Coast Casey Forebay levee, which would be raised to a level to protect against the long-term SLR. The project strongly emphasizes that the 50- and 100-year SLR inundation maps for the Mountain View Ponds do not include this added level of protection and show an inundation greater than that which would occur.

It is also important to note that these inundation levels do not include several other flood protection projects that are either underway or are being planned for/expected and that are intended to prevent the kinds of inundation shown in these OCOF maps. Those projects include the SAFER Bay Project, which would protect Menlo Park and East Palo from the 100-year SLR tidal elevations and which is expected to also extend coverage to the southwestern corner of the Mountain View Ponds and avoid the overflows through the Palo Alto Flood Basin. That work would guard against the flooding in Palo Alto and Mountain View shown on the maps. Similarly, the City of Mountain View has a number of capital improvement projects slated for implementation. These would tie together various existing high ground (e.g., Shoreline Park) with an existing FEMA-certified levee along Stevens Creek, the SBSP Restoration Project-provided improvements to the Coast Casey Forebay levee, and others. That would further

[9] Ballard, G., Barnard, P.L., Erikson, L., Fitzgibbon, M., Moody, D., Higgason, K., Psaros, M., Veloz, S., Wood, J. 2016. Our Coast Our Future (OCOF). [web application]. Petaluma, California. www.ourcoastourfuture.org. (Accessed: May 2017).

[10] Note that the OCOF mapping tool does not give the user the ability to enter the exact number of feet of SLR to illustrate, so the maps were generated with the next elevation upward from those in the 2013 Updated SLR Guidance Document.

reduce flooding at Mountain View and Sunnyvale. Finally, these maps also do not illustrate the Shoreline Study's various flood protection levees, which – as noted above – are being planned with the 100-year SLR in mind. That project's initial phase would not protect the areas behind the A8 Ponds, but a future phase of that project would do so.

Preliminary Feasibility Study for South San Francisco Bay Shoreline
Coastal Storm Damage Risk Analysis February 2017

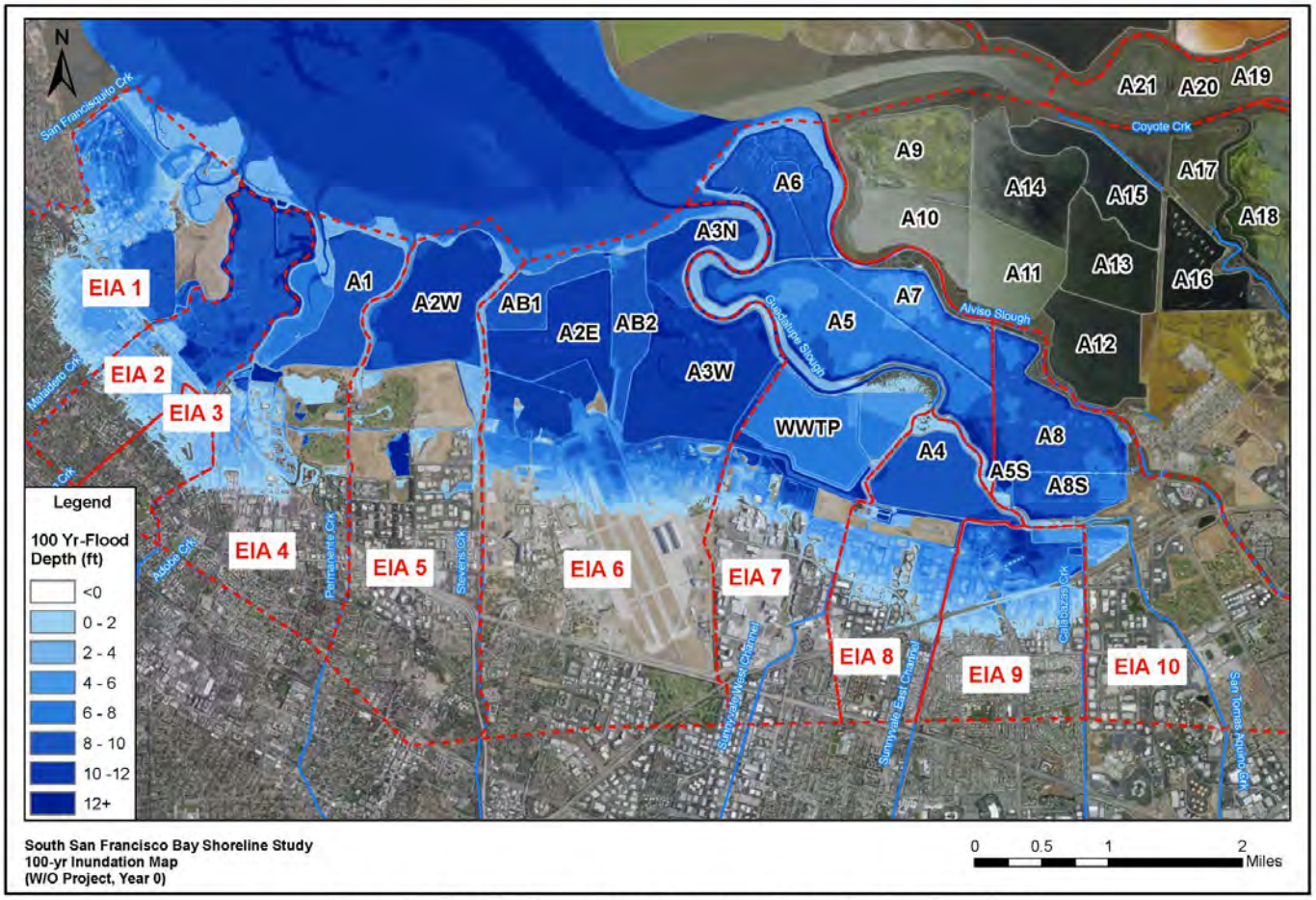

Figure 5. 1% ACE Event Flood Map, Year Zero (Existing Conditions)

Figure 1. USACE Shoreline Study's Existing Condition 1% Flood Map

Preliminary Feasibility Study for South San Francisco Bay Shoreline
Coastal Storm Damage Risk Analysis February 2017

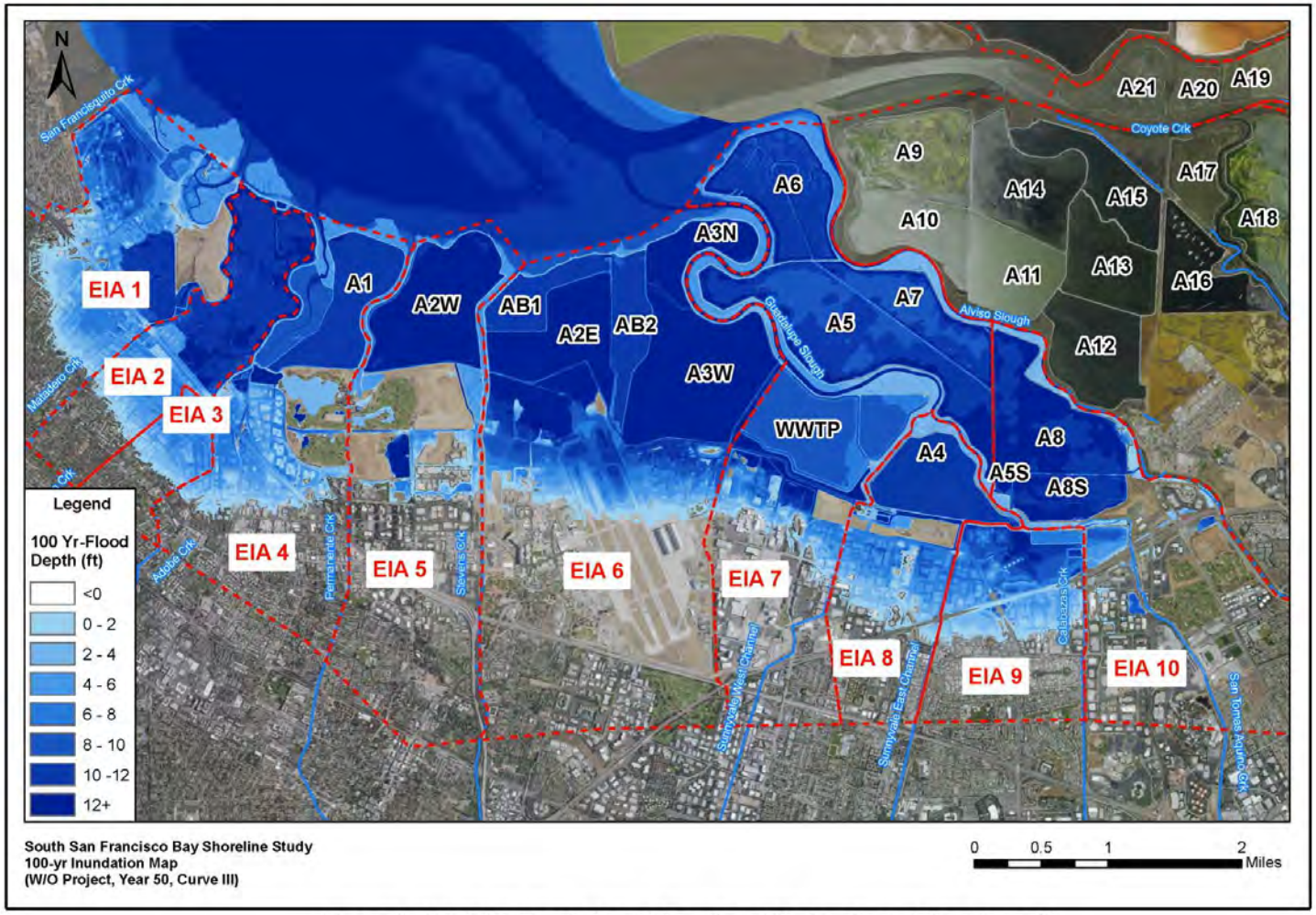

Figure 6. 1% ACE Event Flood Map, Year 50, Sea-Level Rise Curve III

Figure 2. USACE Shoreline Study's 50-yr 1% Flood Map with High SLR

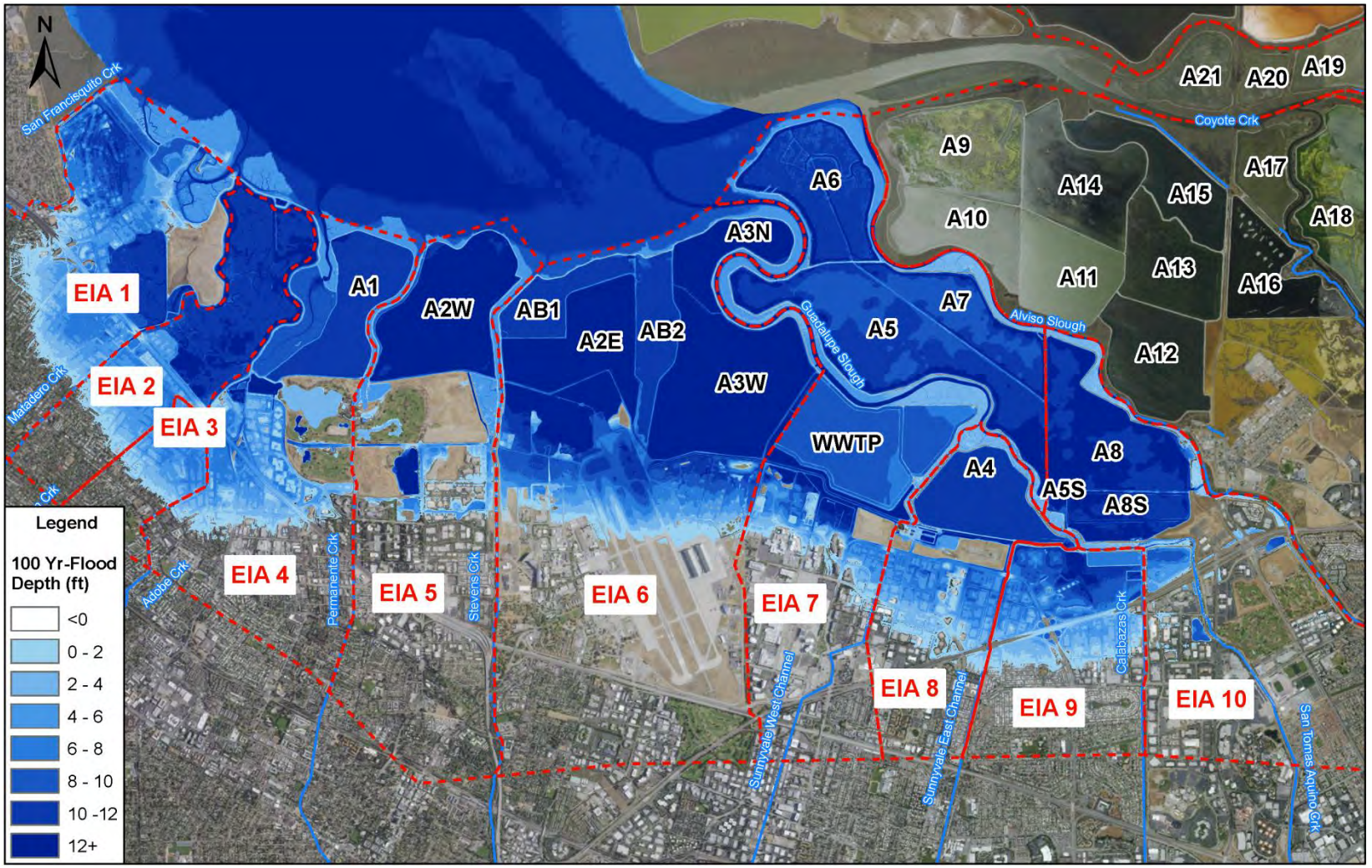

Figure 3. USACE Shoreline Study's 100-yr 1% Flood Map with High SLR

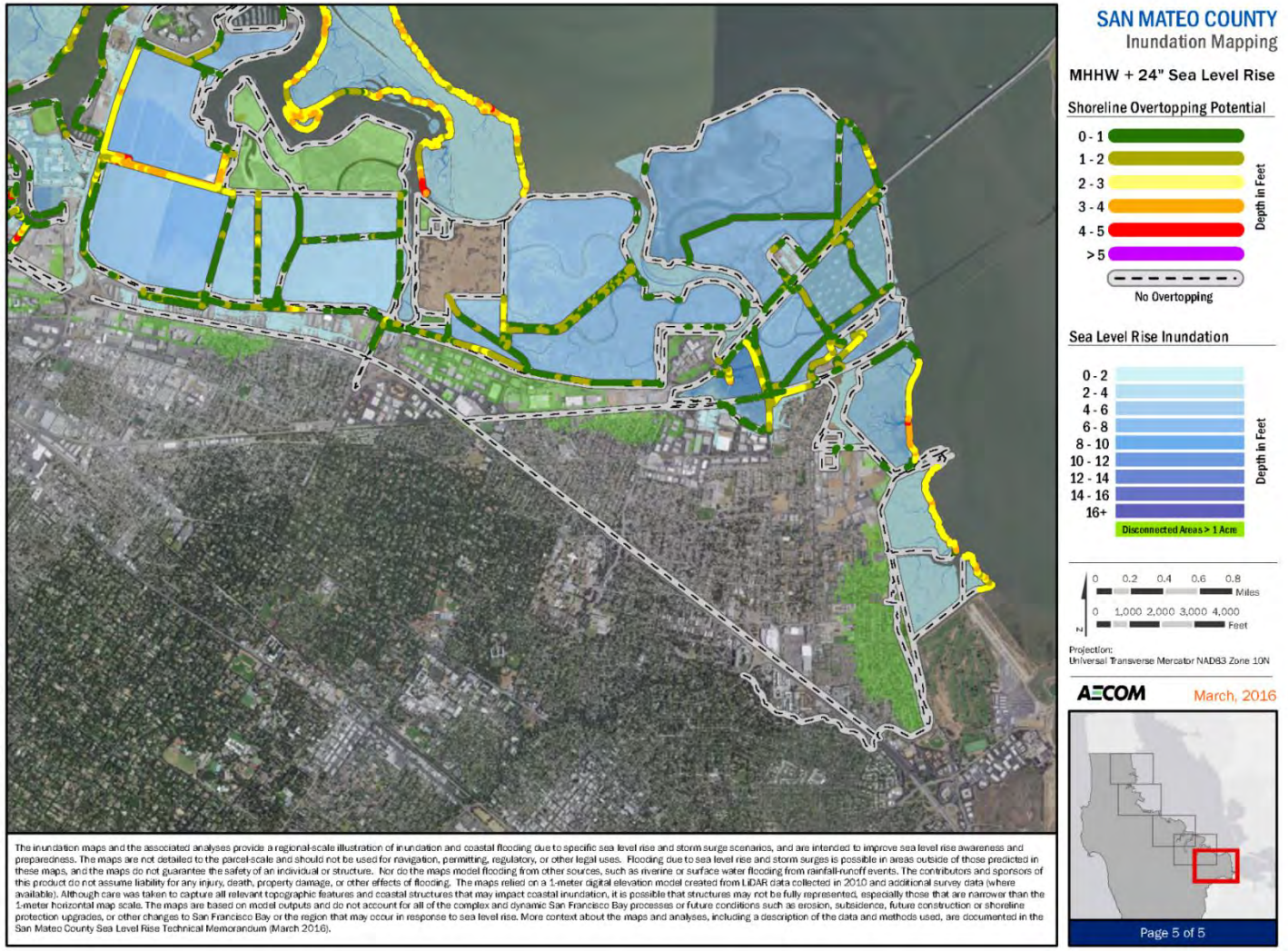

Figure 4. Inundation Mapping for San Mateo County near Ravenswood Ponds

Alviso-Island Ponds

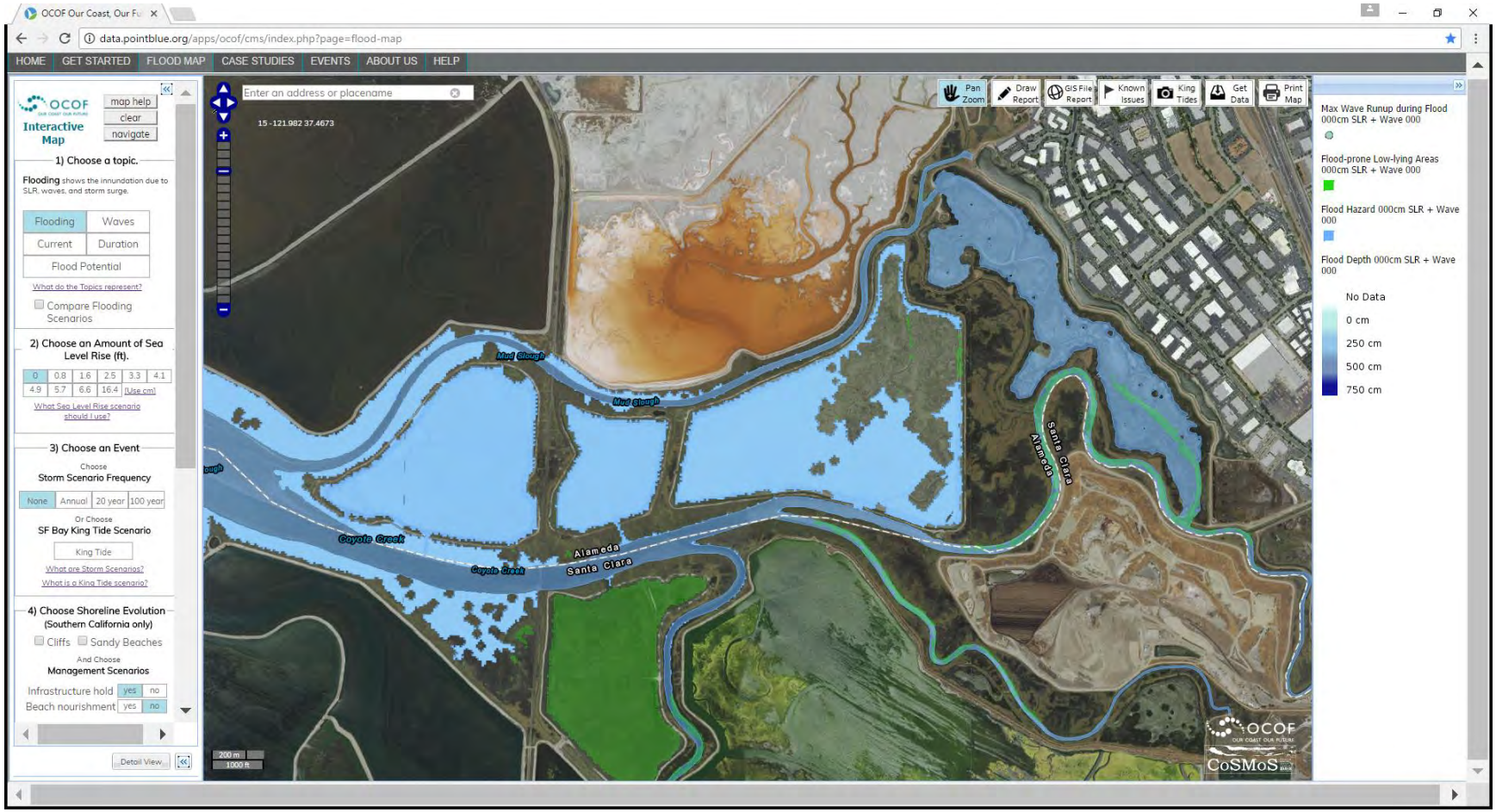

Figure 5. Present-Day Inundation at the Island Ponds

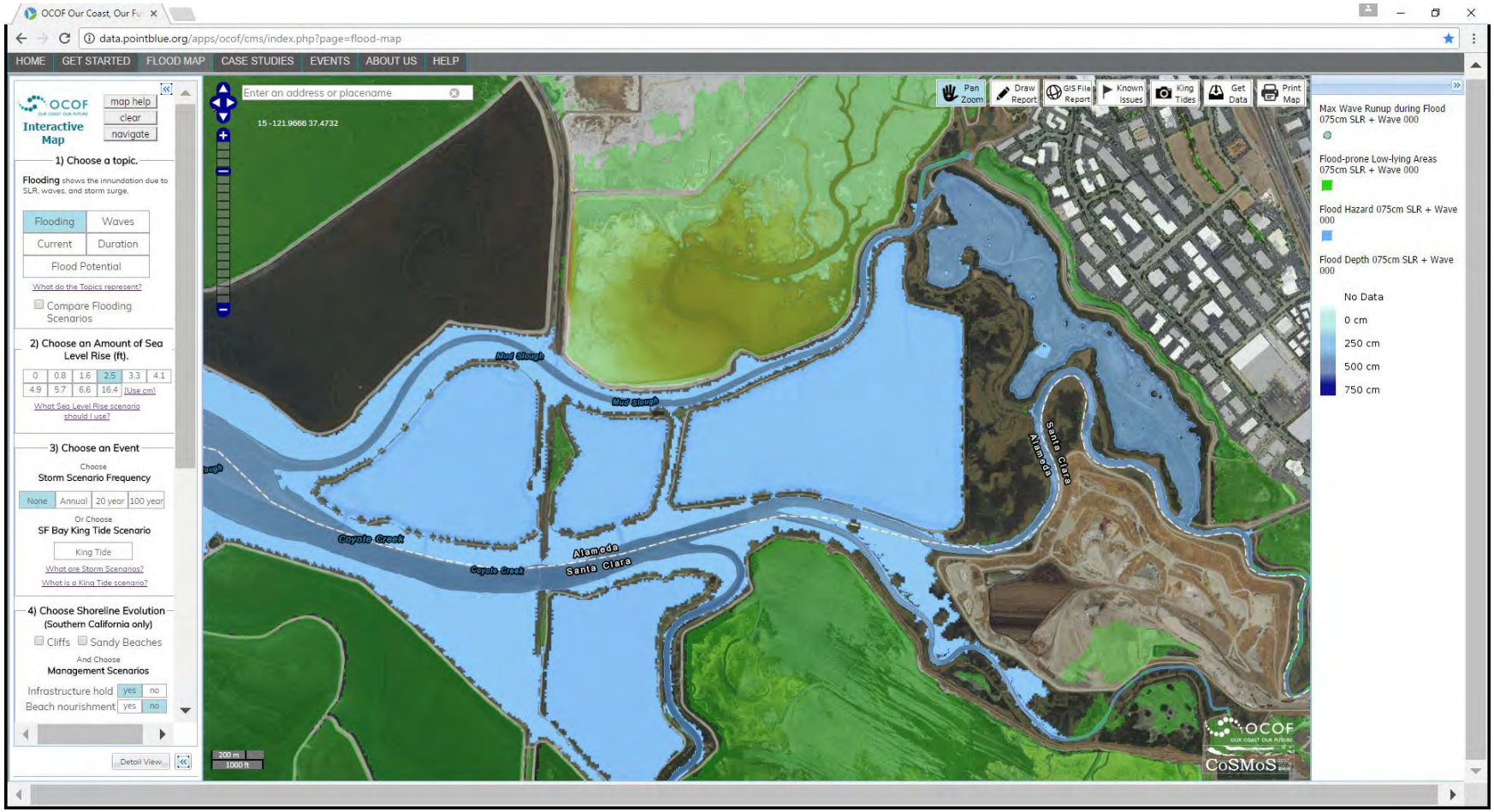

Figure 6. 50-Year SLR Inundation at the Island Ponds

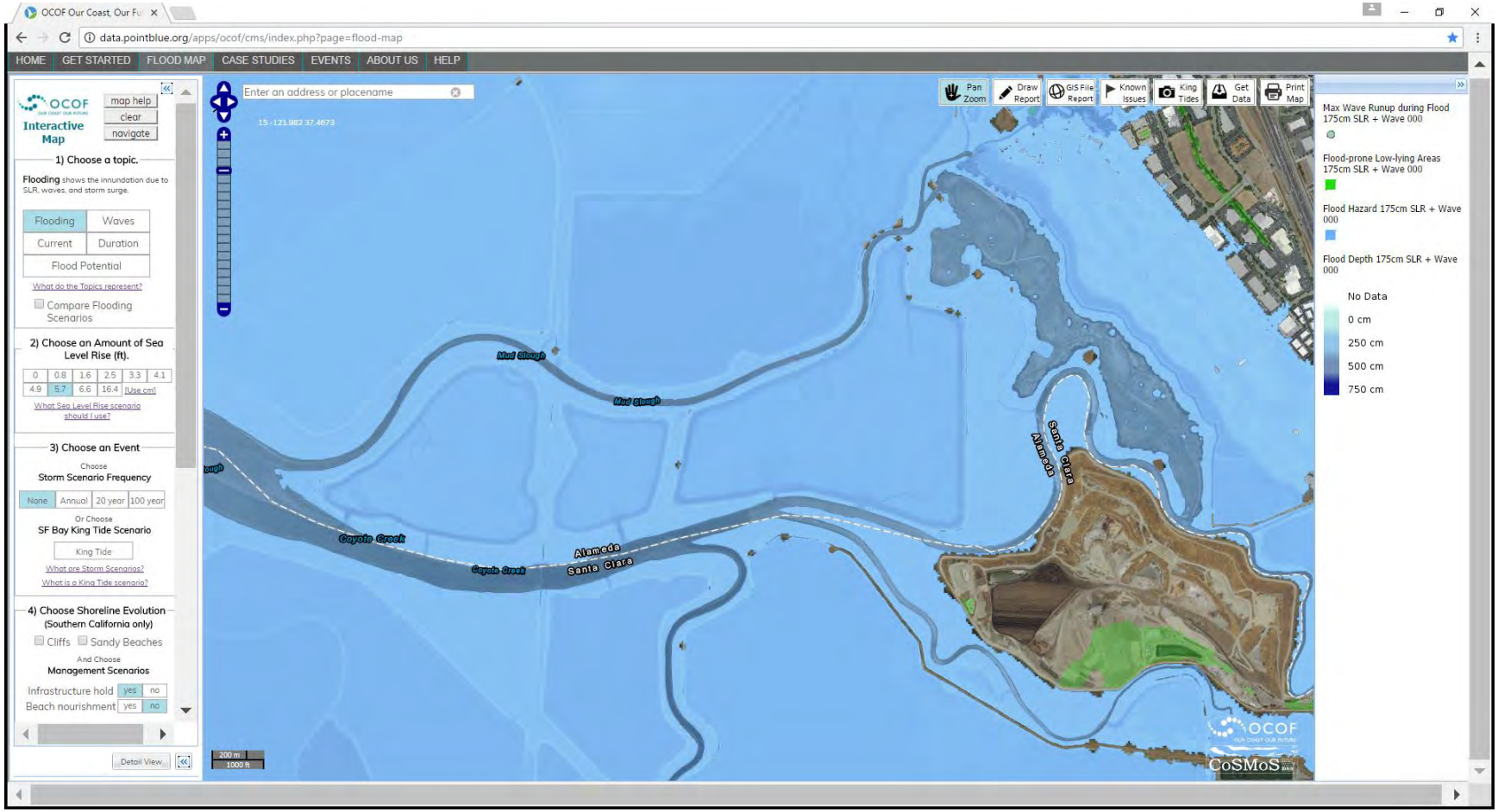

Figure 7. 100-Year SLR Inundation at the Island Ponds

Alviso-A8 Ponds

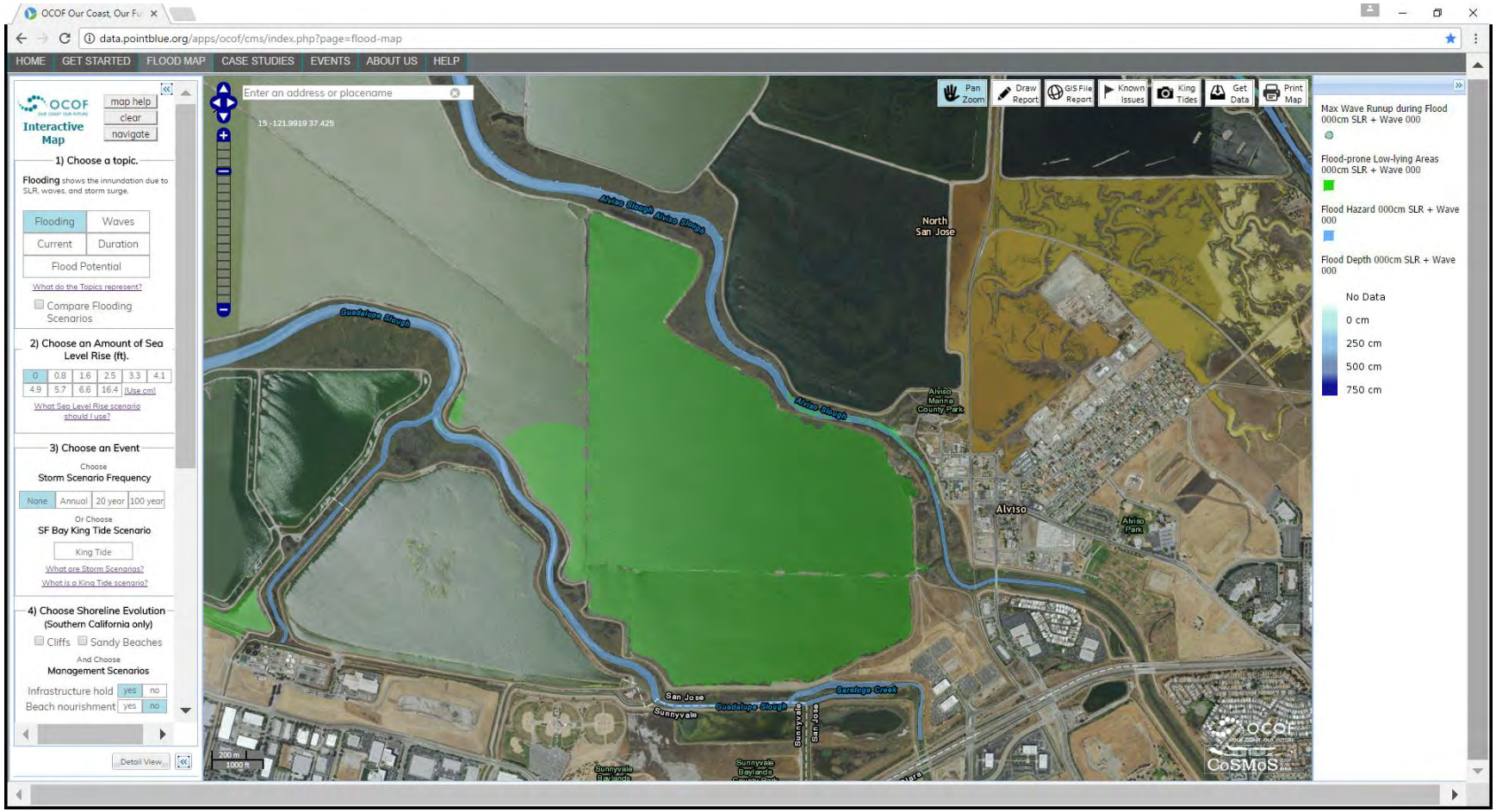

Figure 8. Present-Day Inundation at the A8 Ponds

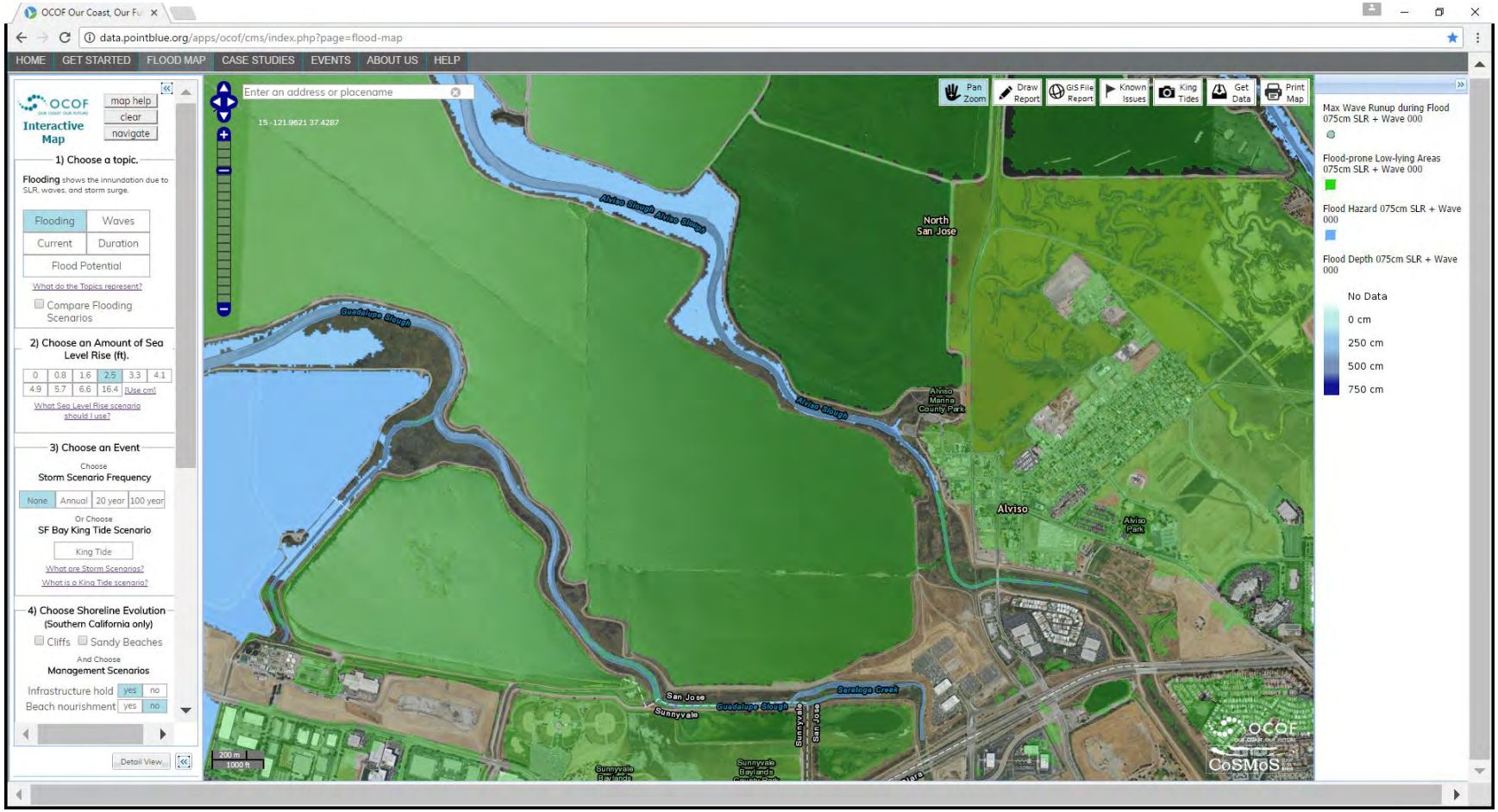

Figure 9. 50-Year SLR Inundation at the A8 Ponds

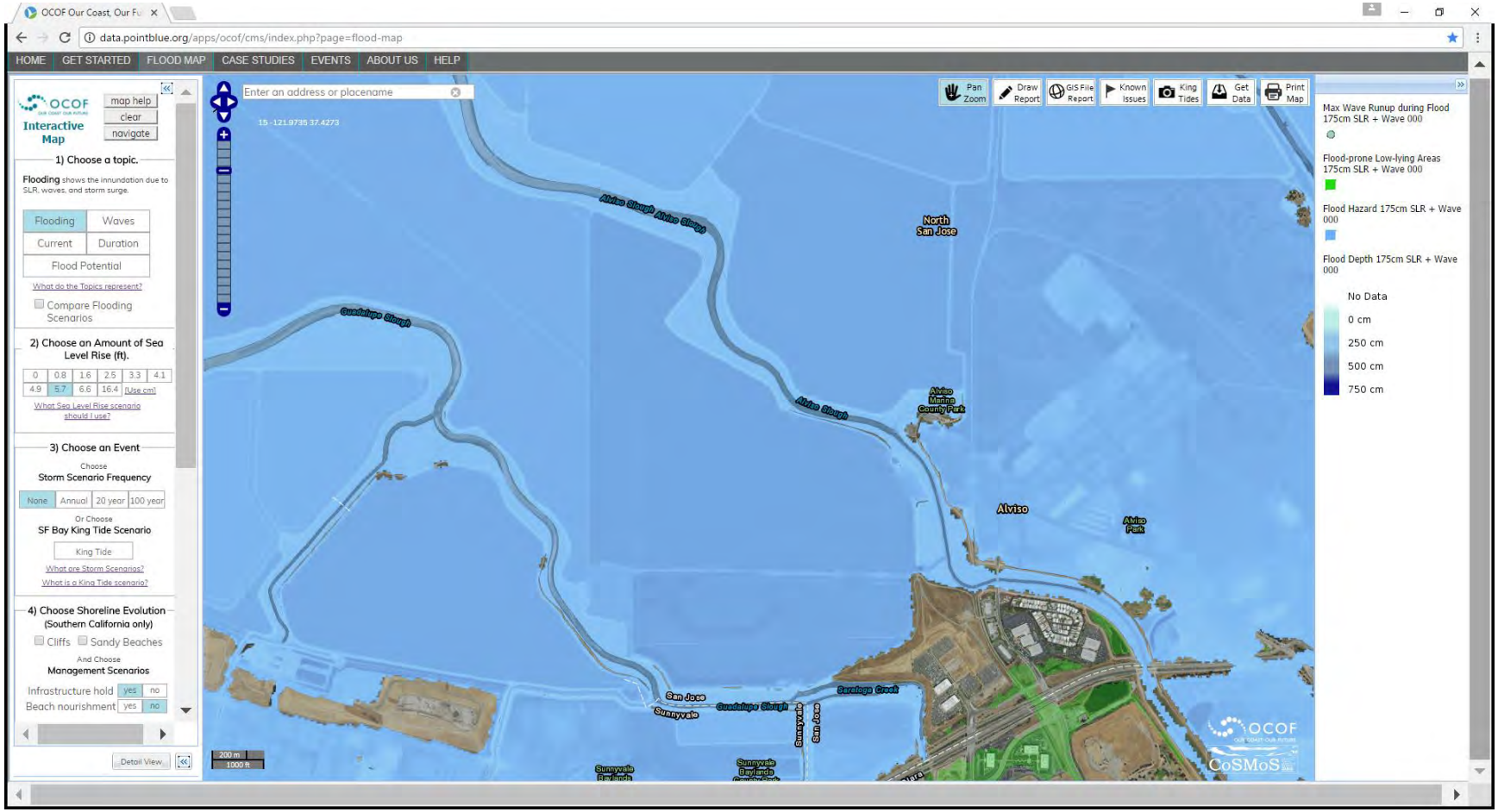

Figure 10. 100-Year SLR Inundation at the A8 Ponds

Alviso-Mountain View Ponds

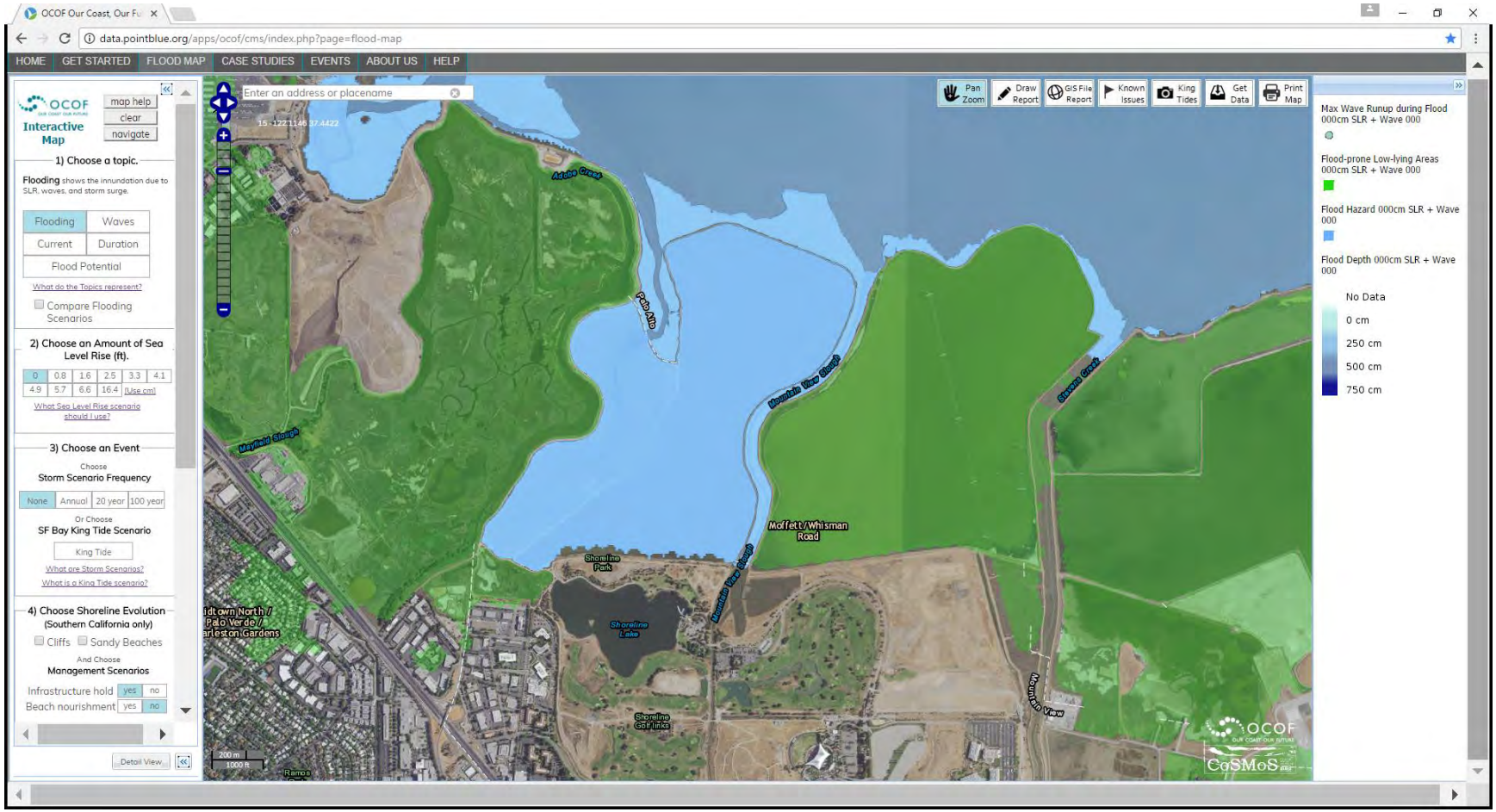

Figure 11. Present-Day Inundation at the Mountain View Ponds

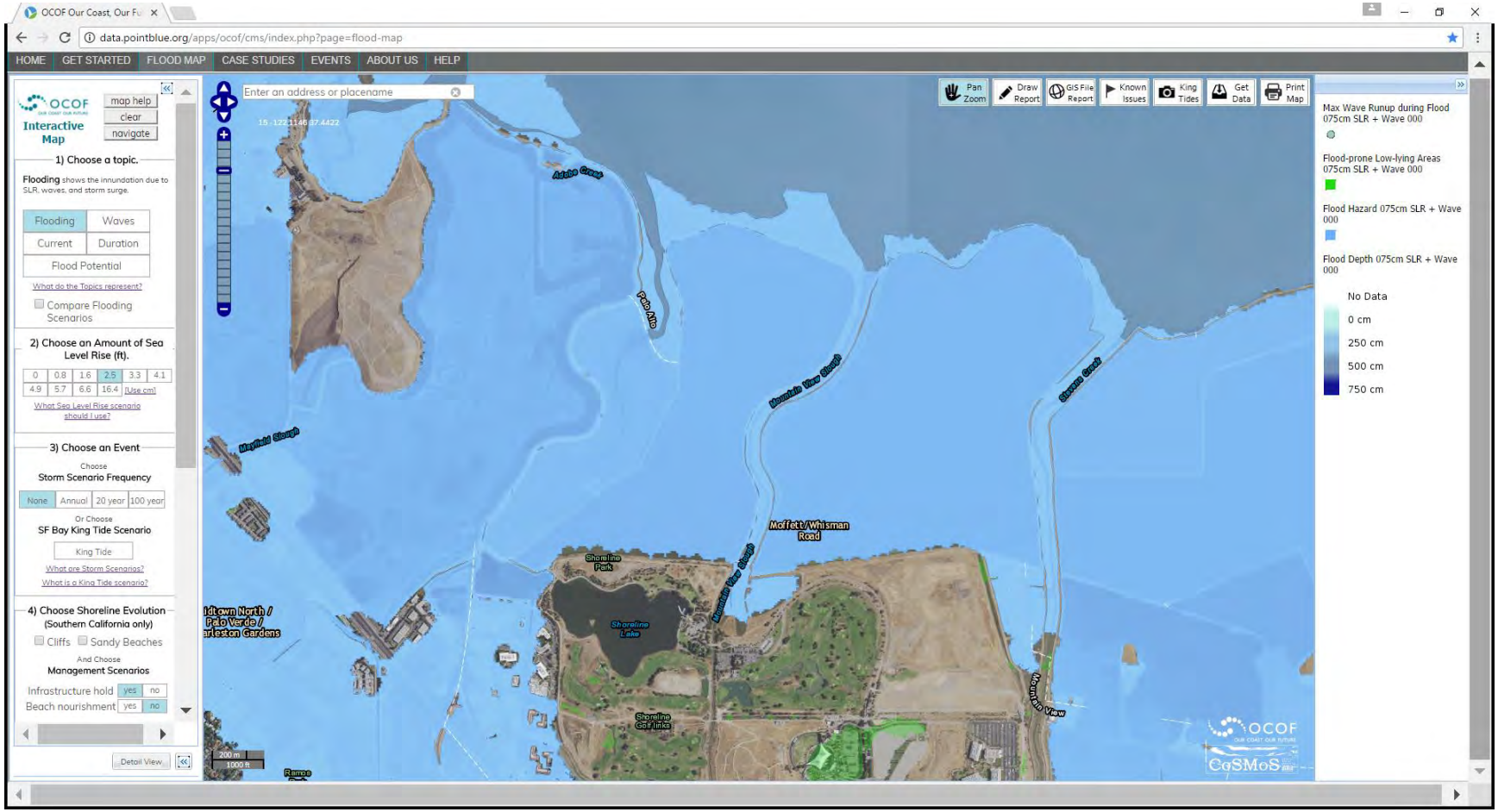

Figure 12. 50-Year SLR Inundation at the Mountain View Ponds

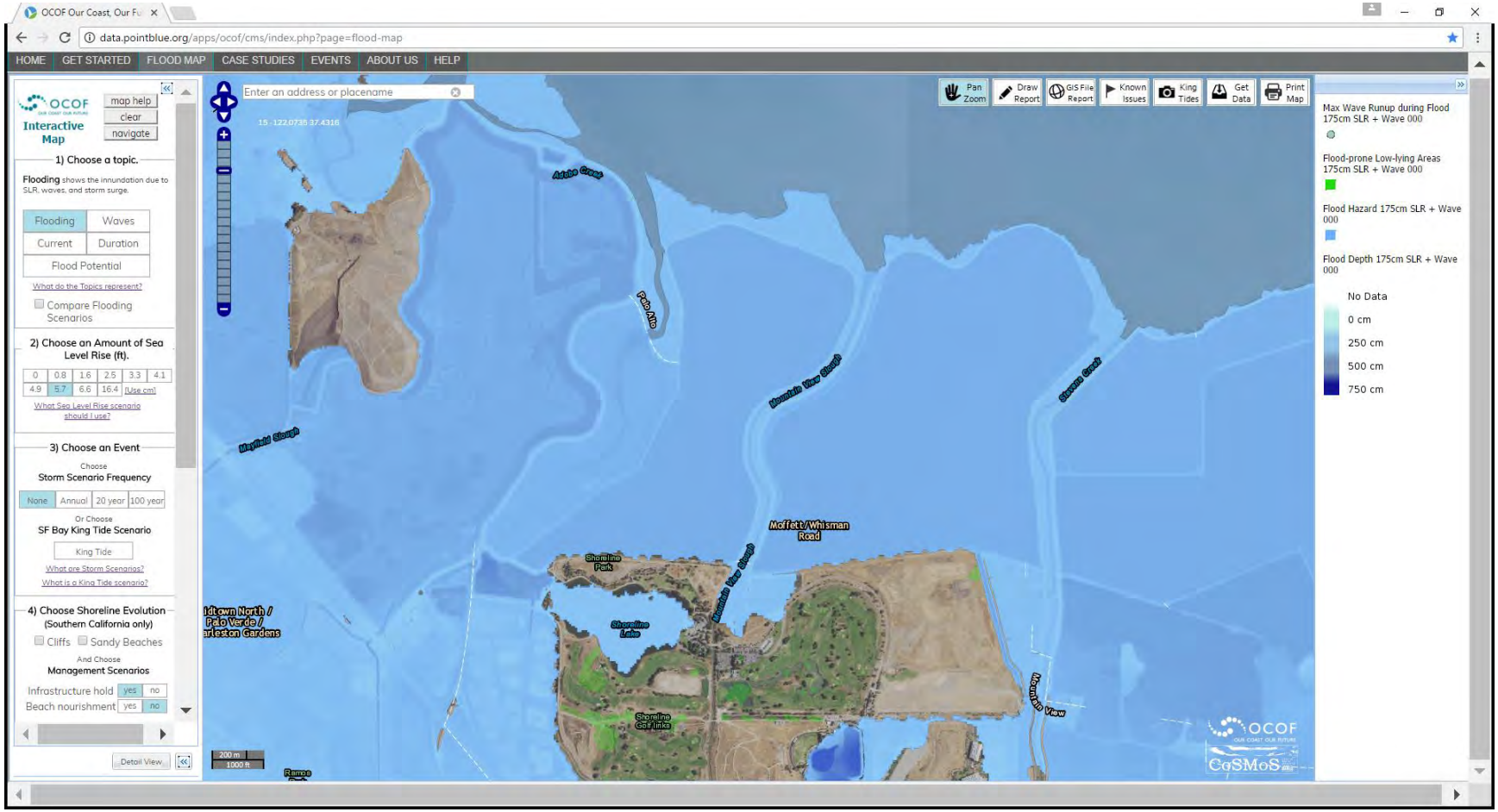

Figure 13. 100-Year SLR Inundation at the Mountain View Ponds

Ravenswood Ponds

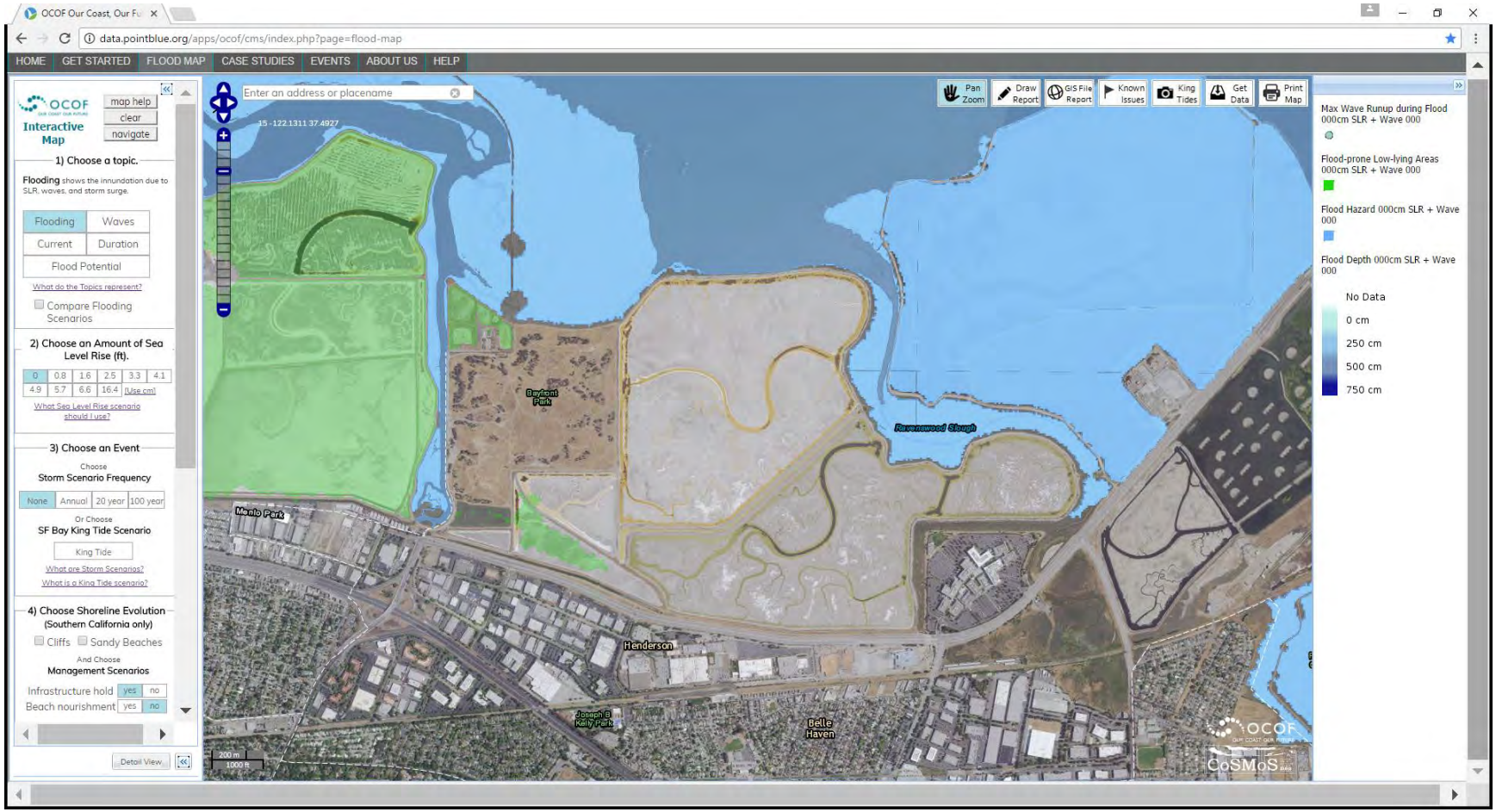

Figure 14. Present-Day Inundation at the Ravenswood Ponds

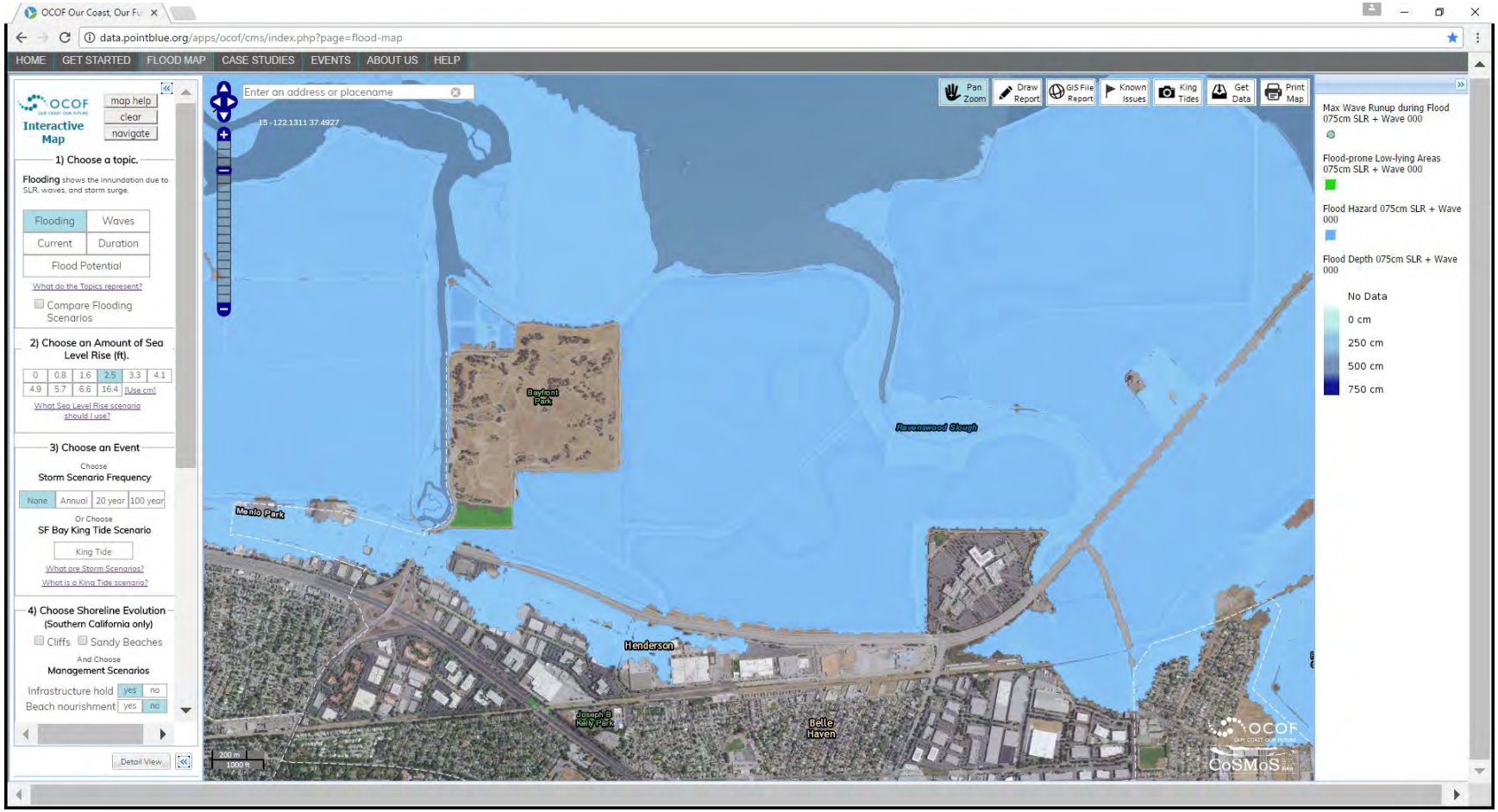

Figure 15. 50-Year SLR Inundation at the Ravenswood Ponds

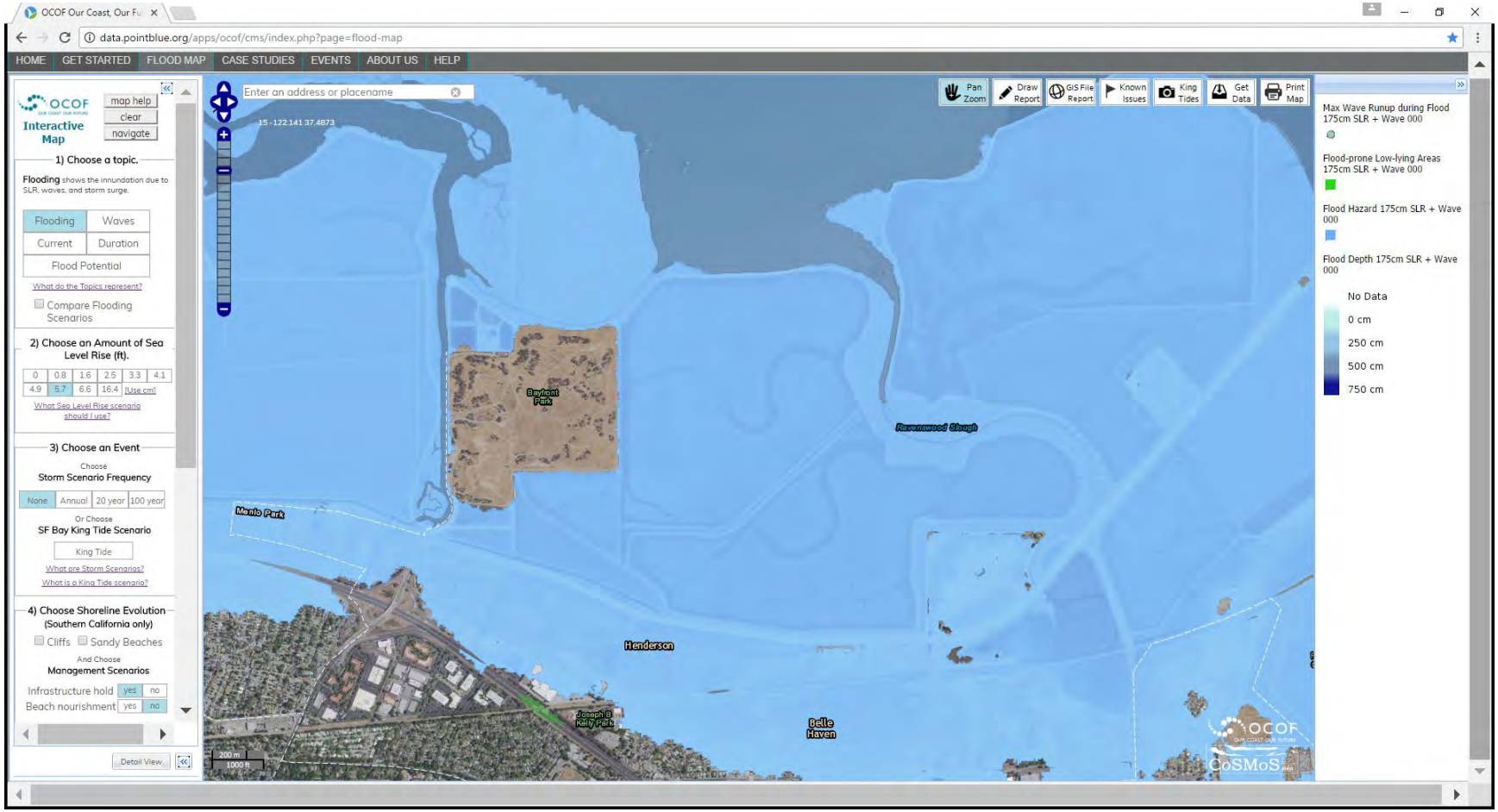

Figure 16. 100-Year SLR Inundation at the Ravenswood Ponds

Appendix D:

SBSP Phase 2 Underwater Noise Impact Memorandum

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M E M O R A N D U M

TO:	Members of the South Bay Salt Pond Restoration Project Management Team
FROM:	AECOM
DATE:	08/1/2016
RE:	**Underwater Noise Analysis for Phase 2 Construction**

1 Purpose

This memorandum provides an analysis of the potential for underwater noise resulting from the South Bay Salt Pond (SBSP) Restoration Project's Phase 2 actions to affect biological resources. This memorandum described potential underwater noise effects that will be needed for development of Endangered Species Act (ESA) consultation, and other regulatory agency permitting processes such as California Endangered Species Act (CESA), and a makes a recommendation on whether or not an Incidental Harassment Authorization (IHA) pursuant to the requirements of the Marine Mammal Protection Act (MMPA) should be requested for those actions.

2 Project Description

The SBSP Restoration Project is a multi-agency effort to restore tidal marsh habitat, reconfigure managed pond habitat, maintain or improve flood protection, and provide recreation opportunities and public access in 15,100 acres of former salt-evaporation ponds purchased from and donated by Cargill Incorporated (Cargill) in 2003. These former salt ponds are part of the U.S. Fish and Wildlife Service (USFWS) owned and managed Don Edwards San Francisco Bay National Wildlife Refuge (Refuge), and cover approximately 9,600 acres in the South San Francisco Bay (South Bay).

The selection of and planning for the Phase 2 projects started in 2010 and completed its Final EIS/R in April 2016. The project is currently developing more detailed designs sufficient to inform applications for permits and other regulatory agreements for work at four groups of ponds ("pond clusters") in the Ravenswood and Alviso pond complexes. The four Refuge ponds clusters in Phase 2 are collectively nearly 2,400 acres in size. One regulatory agreement that may be needed is an IHA under the MMPA.

The SBSP Restoration Project's proposed actions for Phase 2 provide a variety of habitat enhancements at all four Phase 2 pond clusters. It also includes maintained or increased flood protection and additional public access and recreation features at two of the pond clusters. Figure 1 and Figure 2 show the regional location and the vicinity of the Phase 2 pond clusters. Figures 3 through 7 illustrate the proposed construction as it would be implemented at each of the Phase 2 pond clusters. Generally speaking, Phase 2 activities include:

- Breaching, lowering, and removal of levees to provide tidal flows to pond interiors and to improve habitat connectivity
- Raising and improving certain levees for flood control
- Excavation of pilot channels to improve drainage and connect ponds to external waterways
- Construction of viewing areas and trails
- Installation of water control structures to enhance managed pond habitats
- Construction of habitat transition zones and habitat islands
- Building bridges over two new levee breaches, which would be armored to prevent scour
- Improvements to Pacific Gas and Electric (PG&E) transmission tower footings and associated access boardwalks

Of the above activities, only the construction of bridges and the installation of one particularly long water control structure are expected to require pile driving or other activities that would generate substantial under water noise. Only hand tools would be used for the improvements to PG&E transmission towers and the associated boardwalks. Hand tools would not generate substantial noise and thus are not considered in this analysis.

Pile driving would occur at three locations. Two of these locations (rail car bridges) are located along Whisman Slough/Stevens Creek, approximately 2,300 and 4,000 feet from its mouth with the bay, respectively. The third pile driving location (water control structure) is at the terminus of Flood Slough near the southeast corner of Bedwell Bayfront Park. This point is located approximately 3,500 feet from where Flood Slough meets others and flows around Greco Island before meeting the open Bay. Piles may be driven here to support a 100 foot-long (or longer) water control structure under the entrance road to Bedwell Bayfront Park.

Two rail car bridges would be installed to extend over the armored breaches on the eastern levee of Pond A2 and would provide access to existing PG&E utilities. These bridges would be approximately 60 feet long and 10 feet wide. The bridges would span the two proposed breaches along the Pond A2W east levee to provide all-weather PG&E access route to the utility's facilities near the northwest corner of Pond A2W. A public access trail for bicycle and foot traffic would also be built on this levee and would use these bridges.

The railcar bridge superstructure would rest on top of cast-in-place concrete abutments. The integrated concrete wing walls would be built with stem to contain the embankment. Because the bridge is not subject to busy traffic, a concrete approach slab is not required. The abutments would be supported with multiple 14-inch x14-inch precast pre-stressed concrete piles with an estimated total of eight piles at each abutment. The pile length is assumed to be 45 feet long. Armoring and bridging of breaches would be done in dry conditions. Therefore, installation of temporary cofferdams would be required at the breach and bridge locations to facilitate the construction of concrete abutments and wingwalls. This analysis assumes the abutment piles would be driven with an impact pile driver, which is the installation method typically used for concrete piles. It is also assumed that creation of these cofferdams would use vibratory driving of 24-inch steel sheet piles. Pumped water would be discharged

downstream of the construction area and possibly directed to Pond A2W or the lower end of Stevens Creek, shown on some maps as Whisman Slough.

The water control structure at Flood Slough would likely be supported by several 14-inch concrete piles. It is assumed that a temporary cofferdam, constructed of 24-inch steel sheet piles, would also be constructed at this location to temporarily dewater the site.

3 Site Conditions and Sensitive Resources Considered

Factors such as topography, bathymetry, and sediment type are important factors in considering how underwater noise propagates through the environment. This section also briefly describes the sensitive resources that are considered in this memorandum.

3.1 Site Topography, Bathymetry, and Sediment Profile

The portions of the project area that are above Mean Higher High Water (MHHW) are limited to levees and other areas of fill that parallel the sloughs and border the ponds of the project area. The levees and other areas of fill would greatly limit the movement of pile driving noise during construction, as the compacted fill of the levees is expected to reflect and absorb sound energy with very little transmission into the surrounding waters.

The project area is located in very shallow waters, ranging from approximately 0 feet Mean Lower Low Water (MLLW) in Flood Slough, -2 feet MLLW in Whisman Slough/Stevens Creek, and 4-5 feet MLLW within large areas of the ponds. The Ravenswood Ponds currently have no tidal connection to the Bay, and are dry unless rainwater collects in the ponds. The maximum tidal range there is approximately 9 feet, meaning that water depths would be, at most, 11 feet in the deepest parts of the project area.

Though the Phase 2 ponds vary in their own depth and hydrology, they all have bay mud as the dominant substrate type below their pond bottoms and in the areas surrounding them. The thickness of the bay mud depends on the location, with bay muds generally 10 to 20 feet thick in the Alviso complex and 20 to 60 feet deep in the Ravenswood complex (AECOM 2016). Underneath the bay mud are clays and alluvial deposits that may vary from sand to cobble. Due to the geology of the area, piles driven for the project are not expected to encounter bedrock.

3.2 Hydrologic Data

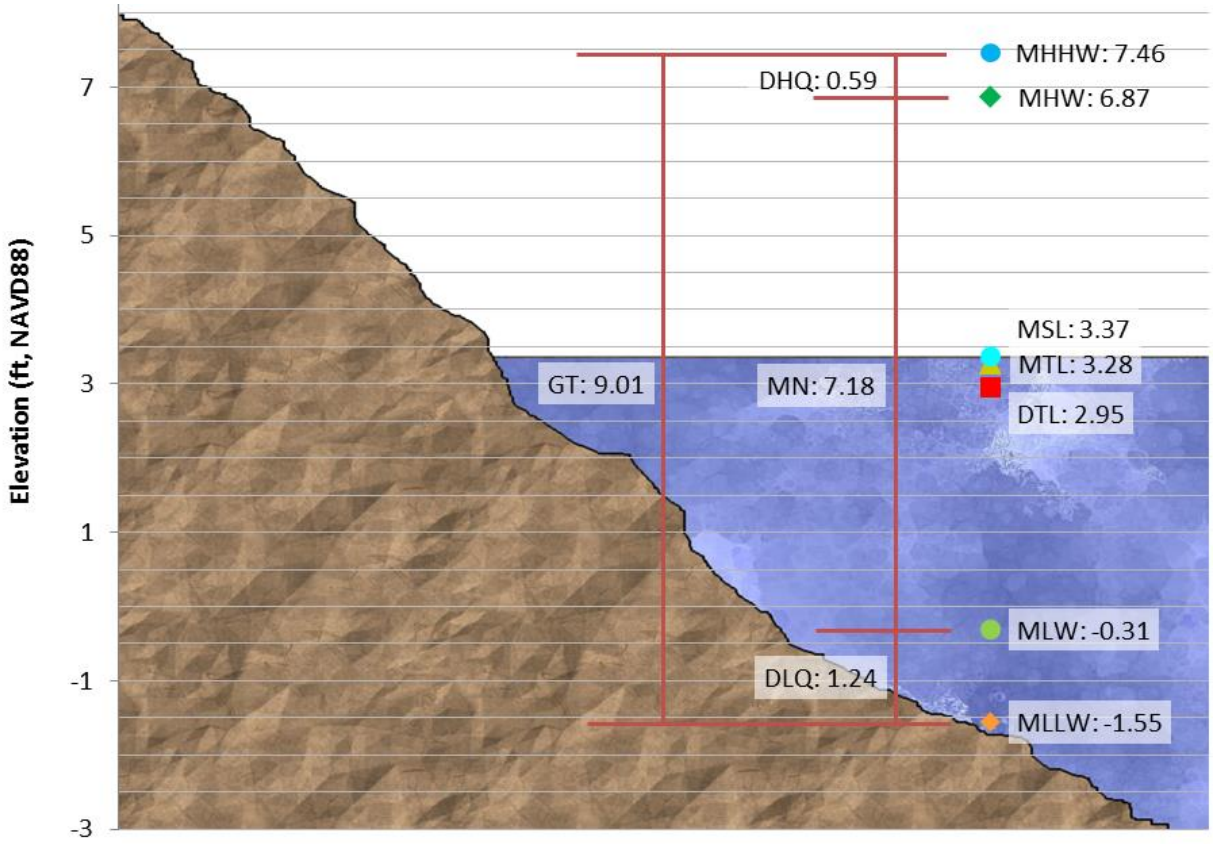
Water surface elevations representative of the project area were obtained from the Coyote Creek tide gauge near the mouth of Coyote Creek (NOAA gauge 9414575). Tide elevation at this gauge generally varies between -1.64 feet (-0.5 meters) and 7.9 feet (2.4 meters). **Figure 8** shows the average tide elevations for the Coyote Creek station.

3.3 Sensitive Receptors of Underwater Noise in the Action Area

Underwater noise generated by pile driving can have adverse effects on both fish and marine mammals. Many species of marine mammals can be found in San Francisco Bay (Bay), but only one species, Pacific harbor seal, is typically present in the southern portion of the Bay. The largest harbor seal haul-out site in the South Bay occurs along lower Mowry Slough, which located approximately 3.5 miles northeast of the pile driving locations. Other areas frequently used as haul-out sites in the South Bay are near Calaveras Point along Coyote Slough, at Dumbarton Point, on Greco and Bair Islands, and

along Corkscrew Slough (AECOM 2016). These lesser used sites are two miles or more from the proposed Phase 2 pile driving locations.

Two distinct population segments (DPS) of ESA listed fish may be present in the project area – Steelhead (Central California Coast DPS, or CCC) and Green Sturgeon (Southern DPS). Additionally, one CESA listed fish species may be present, the longfin smelt. These fish species may utilize tidal waters of the Bay (including the lower portions of Flood Slough, Stevens Creek and other waterways) for foraging areas. Stevens Creek supports an anadromous population of CCC steelhead and thus is a migratory pathway for that species. Stevens Creek, the Guadalupe River, and Coyote Creek are designated as critical habitat for the Central California Coast Distinct Population Segment for this species, and all portions of San Francisco Bay below MHHW are designated as critical habitat for Southern DPS green sturgeon.



Note: All elevations in feet, NAVD88
Source: NOAA 2013; SBSP 2013

Key: MHHW (mean higher high water), MHW (mean high water), MSL (mean sea level), MTL (mean tide level), DTL (mean diurnal tide level), MLW (mean low water), MLLW (mean lower low water), GT (great diurnal range), DHQ (mean diurnal high water inequality), MN (mean range of tide), DLQ (mean diurnal low water inequality)

Figure 8. Coyote Creek gauge tide elevations

4 Underwater Noise Analysis

The methods, results, and effects of the underwater noise analysis are discussed in the sections below.

4.1 Fundamentals of Underwater Noise

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of a sound, and is measured in the number of cycles per second, or hertz (Hz). Intensity describes the pressure per unit of area (i.e., loudness) of a sound, and is measured in decibels (dB). A dB is a unit of measurement describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. For underwater sounds, a reference pressure of 1 microPascal (µPa) is commonly used to describe sounds in terms of decibels, and is expressed as "dB re 1 µPa." Therefore, 0 dB on the decibel scale would be a measure of sound pressure of 1 µPa. As sound levels in dB are calculated on a logarithmic basis, an increase of 10 dB represents a tenfold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense, etc. For airborne sound pressure, the reference amplitude is usually 20 µPa, and is expressed as "dB re 20 µPa."

The method commonly used to quantify airborne sounds consists of evaluating all frequencies of a sound according to a weighting system that reflects the frequency range of human hearing. This method is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. The method is called A-weighting, and the dB level that is measured using this method is called the A-weighted sound level (dBA). Sounds levels measured underwater are not weighted, and include the entire frequency range of interest.

When a pile-driving hammer strikes a pile, a pulse is created that propagates through the pile and radiates sound into the water, substrate, and air. The sound pressure pulse is a function of time and is referred to as the waveform. The instantaneous peak sound pressure level (SPL_{peak}) is the highest absolute value of pressure over the measured waveform, and it can be a negative or positive pressure peak. Sound is frequently described as a root mean square (RMS) level, which is a statistical average of the sound wave amplitude. The RMS level is determined by analyzing the waveform and computing the average of the squared pressures over the time that constitutes the portion of the waveform containing 90 percent of the sound energy (Richardson et al., 1995).

Table 1 contains definitions of these terms. In this document, dB for underwater sound is referenced to 1 µPa, and dB for airborne noise is references to 20 µPa. The practical spreading model has been used to estimate underwater noise in this analysis.

In common use, noise refers to any unwanted sound. This meaning of noise will be used in the following discussion in reference to marine mammals and fish; that is—pile driving noise may harass marine mammals or affect fish.

Table 1. Definitions of Underwater Acoustical Terms

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference

	pressure for air is 20 µPa, and 1 µPa for underwater.
SPL_{peak} Sound Pressure Level (dB)	Peak sound-pressure level, based on the largest absolute value of the instantaneous sound pressure. This pressure is expressed in this report as a decibel (referenced to a pressure of 1 µPa), but can also be expressed in units of pressure, such as µPa or pounds per square inch (psi).
SEL, sound exposure level	SEL is the total noise energy produced from a single noise event and is the integration of all the acoustic energy contained within the event. SEL takes into account both the intensity and the duration of a noise event. SEL is stated in dB re 1 µPa2 · s for underwater sound.
RMS Level, (NMFS Criterion)	The average of the squared pressures over the time that comprise that portion of the waveform containing 90 percent of the sound energy for one pile-driving impulse.

Notes:
dB = decibel
µPa = microPascal
NMFS = National Marine Fisheries Service
psi = pounds per square inch
SPL_{peak} = sound pressure level
SEL = sound exposure level
RMS = root mean square

4.2 Applicable Criteria for Noise Effects

The National Marine Fisheries Service (NMFS), through coordination with other agencies, has established guidelines for the thresholds of underwater noise that may affect fish and underwater or airborne noise that may affect marine mammals. These criteria are summarized below.

4.2.1 Fish

On June 12, 2008, NMFS; USFWS; California, Oregon, and Washington Departments of Transportation; California Department of Fish and Wildlife; and the U.S. Federal Highway Administration agreed in principal to interim criteria to protect fish from pile driving activities. These criteria were established after extensive review of available analysis of the effect of underwater noise on fish. The agreed-upon threshold criteria for impulse-type noise to harm fish has been set at 206 dB SPL_{peak}, as well as 187 dB accumulated sound exposure level (SEL) for fish over 2 grams (0.07 ounces), and 183 dB accumulated SEL for fish less than 2 grams (FHWG, 2008). Any listed fish species that are present in the project area would be bigger than 2 grams, thus the 187 dB accumulated SEL threshold is used in this analysis.

The primary difference between the adopted criteria and previous recommendations is that the single strike SEL was replaced with a cumulative SEL over a day of pile driving. NMFS does not consider sound that produces an SEL per strike of less than 150 dB to accumulate and cause injury. The adopted criteria in the above paragraph are for pulse-type sounds (e.g., pile driving with an impact hammer) and do not address sound from vibratory driving of piles. As other guidance is lacking, the 206 dB SPL_{peak} and 187 dB accumulated SEL threshold has conservatively been applied to vibratory pile driving as well. NMFS also generally uses a 150 dB RMS threshold for potential behavioral effects to listed fish species, so this metric will also be utilized in this analysis.

4.2.2 Marine Mammals

Under the MMPA, NMFS has defined two levels of harassment for marine mammals (Cetaceans, Pinnipeds, Mustileds (sea otters), and Sirenians). Level A 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." Level B harassment is defined as "Any act of pursuit, torment, or annoyance which 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."

Current NMFS recommendations regarding exposure of marine mammals to underwater noise are as follows: Cetaceans and Pinnipeds exposed to impulse sounds of 180 and 190 dB RMS or greater, respectively, are considered to have been taken by Level A harassment (potential injury). Level B (behavioral harassment) is considered to have occurred when marine mammals are exposed to sounds 160dB RMS or greater for impulse sounds (e.g., impact pile driving) and 120 dB RMS for continuous noise (e.g., vibratory pile extraction and driving). The application of the 120 dB RMS threshold can sometimes be problematic because this threshold level can be either at or below the ambient noise level of certain locations.

The NMFS has also adopted thresholds for airborne noise that may cause harassment and injury to marine mammals. The appropriate airborne noise thresholds for behavioral disturbance for all Pinnipeds, except harbor seals, is 100 dB re 20 µPa RMS and for harbor seals is 90 dB re 20 µPa RMS. The underwater and airborne noise criteria for marine mammals are shown in Table 2. In-air noise generated during pile driving would likely exceed the 90 dB noise threshold (AECOM 2016). However, harbor seal haul-outs are two or more miles from the pile driving locations, and at that distance airborne noise would have attenuated to 50 dB or less, which is similar to typical ambient sound in a quiet natural environment (Dooling and Popper 2007). As a result, airborne noise will not be considered further.

Table 2. Regulatory Noise Criteria for Marine Mammals

Marine Mammal Type	Airborne Marine Construction Criteria (re 20 µPa)	Underwater Continuous Noise Criteria (e.g., vibratory pile extraction and driving) (re 1µPa)		Underwater Pulsed Noise Criteria (e.g., impact pile driving) (re 1 µPa)	
	Level B Threshold	Level A Threshold	Level B Threshold	Level A Threshold	Level B Threshold
Cetaceans (whales, porpoises)	N/A	180 dB RMS	120 dB RMS	180 dB RMS	160 dB RMS
Pinnipeds (sea lions)	100 dB RMS (unweighted)	190 dB RMS	120 dB RMS	190 dB RMS	160 dB RMS
Pinnipeds (harbor seals)	90 dB RMS (unweighted)	190 dB RMS	120 dB RMS	190 dB RMS	160 dB RMS

Notes:
dB = decibel
µPa = microPascal
RMS = root-mean-square pressure

4.3 Approximation of Project-related Noise

A review of underwater sound measurements for similar projects was undertaken to estimate the near-source sound levels for vibratory pile extraction and driving and impact pile driving. Pile driving sound levels from similar types and sizes of piles have been measured from other projects and can be used to estimate the noise levels that the proposed action would generate. This analysis utilizes the practical spreading loss model (Transmission loss = 15*log(R1/R0), the use of which NMFS and the USFWS have accepted to estimate the propagation of noise through water. The default transmission loss utilized by NMFS of 15log R represents a loss of 4.5 dB per doubling of distance unless data are available to support a different model. Transmission losses within the project area are expected to be greater due to the extremely shallow waters (average depths of a few feet during high tide and many areas would be dry during low tide) and extensive unconsolidated sediments that are a poor conductor of sound energy.

The primary sources of underwater noise produced during construction would be pile driving. This includes the installation of 14-inch square concrete piles and the installation and removal of temporary steel sheet piles for cofferdams at the bridge construction locations as described in **Section 2**.

4.3.1 14-Inch Square Concrete Piles

The 14-inch square concrete piles, which current project designs assume would measure approximately 45 feet long, would be installed using an impact hammer. It is estimated that each pile would require approximately 300 blows of a Delmag D46 or similar sized hammer for full installation and that up to four piles may be installed per day. The best fit acoustic data of pile driving comes from installation of 14-inch square concrete piles at the Noyo Harbor in Fort Bragg, CA (Caltrans 2015). The pile lengths, substrate type, and maximum water depths were all similar to the pile driving scenario for the proposed project. During installation of those piles, the maximum sound levels measured for unattenuated pile strikes were 183 dB peak, 166 dB RMS, and 154 dB for the single strike SEL. Using the practical spreading loss model described above, these values were used for approximating the distance over which underwater noise thresholds may be exceeded during installation of the 14-inch square concrete piles. These distances are provided in **Table 3** and **Table 4**.

4.3.2 Steel Sheet Piles

Temporary steel sheet piles would be installed with a vibratory driver in the event that dewatering is needed for construction of the railcar bridge footings. It is estimated that each pile would require, at most, 5 minutes of vibratory driving for installation and for removal and that up to 6 of these piles may be installed per day. The best fit acoustic data of pile driving comes from installation of a sheet pile cofferdam at Ten Mile River Bridge, Fort Bragg, CA (Caltrans 2015). The pile size, substrate type, and maximum water depths were all similar to the pile driving scenario for the proposed project. During installation of those piles, the maximum sound levels measured for vibratory pile driving were 174 dB peak, 142 dB RMS, and 142 dB for the one-second SEL. Using the practical spreading loss model described above, these values were used for approximating the distance over which underwater noise thresholds may be exceeded during installation of the 14-inch square concrete piles. These distances are provided in **Table 3** and **Table 4**.

Table 3. Distances of Exceeded Regulatory Thresholds for Pile Driving Noise – Fish

Pile Type	Source Levels at 10 meters (dB)				Distance of Threshold* (feet)		
	Peak Noise Level	SEL, Single Strike**	SEL, Accumulated	RMS	206 dB Peak	187 dB accumulated SEL	150 dB RMS
Impact Driving							
14-inch square concrete (4 per day)	183	154	185	166	NE	24 (assumed)	385
Vibratory Driving/Extraction							
24-inch sheet pile (6 per day)	174	142	175	142	NE	5	10

Notes:

dB decibels
NE threshold not exceeded
SEL sound exposure level

* The distance from the pile over which the effects threshold of 206 dB peak sound level and 187 dB accumulated SEL would be exceeded. These threshold values apply to fish over 2 grams in weight.

** For vibratory driving, the Single Strike SEL represents the SEL of one second of pile driving.

Table 4. Distances of Exceeded Regulatory Thresholds for Pile Driving Noise – Marine Mammals

Pile Type	Source Levels at 10 meters (dB)		Distance to Threshold (meters)		
	Peak Noise Level	RMS	190 dB RMS (Level A)**	180 dB RMS (Level A)**	160/142 dB RMS (Level B)*
Impact Driving					
14-inch square concrete (4 per day)	183	166	NE	NE	83
Vibratory Driving/Extraction					
24-inch sheet pile (6 per day)	174	142	NE	NE	966

Notes:

dB decibels
NE threshold not exceeded within 10m of the pile
RMS root mean square
* For underwater noise, the Level B harassment threshold is 160 dB for impulsive noise and 120 dB for continuous noise.
** For underwater noise, the Level A harassment threshold for cetaceans is 180 dB and 190 dB for pinnipeds.

4.4 Effects of Approximated Noise to Fish

The above modeling indicates that underwater noise produced during pile driving for the proposed project would not exceed the 206 dB peak or 187 dB accumulated SEL thresholds that NMFS has established for injury or temporary hearing threshold shifts. However, the underwater noise would

exceed the 150 dB RMS threshold used by NMFS for behavioral effects on fish. Potential behavioral effects of underwater noise include the temporary cessation of feeding, startle responses, or movements to other areas. Depending on the timing of work, these behavioral effects could disrupt migratory movements of steelhead. Following the cessation of pile driving, fish are expected to resume the use of the affected area. The estimated distance over which 150 dB RMS may be exceeded is 385 feet for impact driving of the concrete piles and 10 feet for vibratory driving of the sheet piles (**Table 3**). During low tide, the pile driving areas would be separated from the wetted channel by a distance of at least 30 feet. At these times, very little of the sound energy is expected to enter waters where fish may be present. During high tide, however, the pile driving noise could more readily radiate out into the channel and affect fish, such as green sturgeon or steelhead that may be present within the distances provided in **Table 3**.

In order to avoid impacts on nesting birds, pile driving activities may need to occur during the migration period. Steelhead and green sturgeon may be present in the project area year-round. As a result, complete seasonal avoidance of these special-status fish species is not possible, though there are months when these species are less abundant in the Bay. Pile driving could be scheduled to occur during low tide, during which there would minimize direct transmittal of noise into water in the work area and the presence of special-status fish would be unlikely in the nearby shallow waters that remain.

4.5 Effects of Approximated Noise to Marine Mammals

Pile driving noise could exceed the 160 dB RMS and 120 dB RMS thresholds established by NMFs for harassment of marine mammals over the distances specified in **Table 4**. The distance over which these thresholds may be exceeded (966 feet or less) does not extend into the open waters of the bay. Additionally, levees and other similar landforms present barriers to any sound emanating towards the open waters of the Bay. While harbor seals occasionally enter Stevens Creek slough, the likelihood that they may be present in the small area where underwater noise exceeds the aforementioned Level B harassment thresholds is very small. If pile driving is conducted during low tide periods, this likelihood shrinks to virtually non-existent as the water likely becomes too shallow to permit movement of harbor seal.

5 Recommendations

With regards to the potential effects of pile driving noise on fish, it is recommended that the results of the analysis be integrated into the biological assessment that is being prepared for NMFS. This will allow for proper consideration of the potential effects of pile driving noise on listed fish species.

With regards to marine mammals, the results of this analysis indicate that an IHA would not be needed for potential effects to marine mammals due to the remote chance of exposure. This chance becomes even more remote if pile driving is scheduled to occur only during periods of low tide.

Finally, it is recommended that restricting driving to low tide periods be considered to further reduce the potential for listed fish or harbor seal to be exposed to underwater noise in excess of the regulatory thresholds described above.

6 References

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Appendix E:

10-page Summary of SBSP Restoration Project Phase 2 FEIS/R

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CONDENSED SUMMARY OF PHASE 2 EIS/R

S.1 Introduction and Project History

The Final Environmental Impact Statement/Environmental Impact Report (EIS/R) was prepared by the United States Fish and Wildlife Service (USFWS) and the California State Coastal Conservancy, partnering with the California Department of Fish and Wildlife (CDFW), Santa Clara Valley Water District (SCVWD), the City of Mountain View, the City of Redwood City, and others to evaluate the potential environmental impacts of the proposed South Bay Salt Pond (SBSP) Restoration Project, Phase 2. The Phase 2 EIS/R was a tiered document that drew on the background information and analysis developed for the SBSP Restoration Project as a whole, as well as its programmatic mitigation measures and Adaptive Management Plan (AMP).

In that Phase 2 EIS/R for the lands under management of the USFWS, as part of the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge), potential project actions at four separate groups of ponds ("pond clusters") were described and analyzed regarding their potential to cause significant adverse effects on the environment. From those analyses and the inputs and comments received on the Public Draft EIS/R, a Preferred Alternative was developed. The Preferred Alternative included actions at each of the four pond clusters. This document presents a condensed discussion of the initially developed alternatives, the Preferred Alternative, and the significance determinations for each of the impacts included in the SBSP Restoration Project's program-level analysis. For brevity, maps and a table are used to convey these concepts. The Executive Summary of the Final EIS/R contains a complete summary.

The SBSP Restoration Project is a multi-agency effort to restore tidal marsh habitat, reconfigure managed pond habitat, maintain or improve flood protection, and provide recreation opportunities and public access in 15,100 acres of former salt-evaporation ponds purchased from and donated by Cargill, Inc. in 2003. This long-term planning effort, a 50-year programmatic level plan for restoration, flood protection, and public access that included a first phase of projects, is described in the 2007 EIR/S, which addressed the SBSP Restoration Project at both the program level and at the Phase 1 level. Phase 1 implementation began in 2008 and was completed in 2016. It included the construction of 3,040 acres of tidal or muted tidal wetlands, 710 acres of enhanced managed pond, construction of habitat islands and improved levees, 7 miles of new public access and recreation trails, and other public access features.

S.2 Initial Phase 2 Alternatives

The selection and planning for Phase 2 projects started in 2010, continued with the 2015 Draft EIS/R, and proceeds with this Final EIS/R. The Phase 2 project would be implemented at the Alviso-Island Ponds, the Alviso-Mountain View Ponds, the Alviso-A8 Ponds, and the Ravenswood Ponds. These pond clusters are located at the Don Edwards National Wildlife Refuge (Refuge) in Alameda, Santa Clara, and San Mateo Counties, California (See **Figure 1**, SBSP Phase 2 Regional Location, and **Figure 2**, SBSP Phase 2 Project Sites). Alternatives are proposed for each pond cluster, including a No Action Alternative.

S.2.1 Alviso-Island Ponds Cluster

The Alviso-Island Ponds cluster (also referred to as the Island Ponds) consists of Ponds A19, A20, and A21, which are located in the eastern portion of the Alviso pond complex between Mud Slough to the north and west and Coyote Creek to the south. These ponds were were breached on their southern sides in

March 2006 to bring tidal flows to these ponds and allow sediment to accrete until marsh plain elevation was reached. The action alternatives at the Island Ponds proposed activities to increase habitat complexity and improve the distribution of sedimentation and vegetation establishment of these ponds as they transition to tidal marsh. To increase complexity and connectivity of the Island Ponds and the waterways surrounding them, the activities proposed under these alternatives include breaches of the existing levees at various locations, removal or lowering of levees, and modification of existing breaches. Due to their geographic isolation, the SBSP Restoration Project does not include recreation or flood control goals for these ponds. Therefore, no flood management or flood control activities or recreation components are proposed at these ponds for Phase 2.

S.2.2 Alviso-Mountain View Pond Cluster

The Alviso-Mountain View pond cluster (the Mountain View Ponds) consists of Pond A1, Pond A2W, the levees surrounding each pond, some of the fringe marsh outside of the pond and slough levees, Permanente Creek, and Mountain View Slough. Charleston Slough, which is owned by the City of Mountain View and is not part of the Refuge, is part of the Mountain View ponds. These ponds are in the western portion of the Alviso pond complex, between the Palo Alto Flood Basin to the west, Mountain View Shoreline Park to the south, Stevens Creek to the east, and open bay water to the north.

The action alternatives proposed transitioning the ponds to tidal marsh while maintaining or improving existing flood protection along the pond cluster borders with the cities of Mountain View and Palo Alto. Several viewing platforms and trails would be established to improve recreation and public access. The SBSP Restoration Project goals for this pond cluster are a transition to tidal marsh, maintain or improve flood protection, and improve recreation and public access. The alternatives included levee breaches, constructing habitat islands and transition zone features, and making other levee alterations to provide flood protection. The main difference between the two action alternatives was the possible integration of Charleston Slough into the project as part of the City of Mountain View's tidal mahs restoration requirement for it. In addition, a number of ancillary levee improvement measures and other infrastructure improvements would have been needed for that integration.

S.2.3 Alviso-A8 Pond Cluster

The Alviso-A8 pond cluster (A8 Ponds) consists of Ponds A8 and A8S, which are located in the south-central portion of the Alviso pond complex, between Guadalupe Slough and Alviso Ponds A5 and A7 to the west, Sunnyvale Baylands County Park, Guadalupe Slough and San Tomas Aquino Creek to the south, Alviso Slough to the east and northeast, and San Francisco Bay to the north. A capped landfill lies to the southeast. Ponds A8 and A8S were physically connected in the Phase 1 actions and were made reversibly muted tidal habitat by removing parts of the levees between them and between Pond A8 and the adjacent Ponds A5/A7 to the west. An armored notch (that can be closed seasonally) was made in the eastern levee of Pond A8 to allow some muted tidal exchange and to allow the USFWS to vary the size of the notched opening. The only Phase 2 action alternative at these ponds would involve the placement of upland fill material to form habitat transition zones in the southwestern and southeastern corners of Pond A8S. These would provide some flood protection, add transitional habitat for future use by marsh species, and protect the adjacent landfill. There are no recreation or public access features proposed for Phase 2.

S.2.4 Ravenswood Pond Cluster

The Phase 2 Ravenswood pond cluster consists of Ponds R3, R4, R5, and S5. The pond cluster is bordered by Menlo Park's Bedwell Bayfront Park to the west, State Route 84 and the city of Menlo Park to the south, and open bay water to the north. These ponds are all seasonally wet ponds that collect rainfall and gradually dry out but that have no hydraulic connection to the surrounding waters. The Phase 2 action alternatives proposed activities that would initiate the transition of Pond R4 from a seasonal pond to tidal marsh while maintaining or improving the existing flood protection and the conversion of Ponds R5 and S5 from seasonal ponds to a variety of enhanced managed pond habitat types. Upland fill material would also be placed in ponds to construct habitat transition zones in these ponds and enhance levees around them. In Pond R3, the existing western snowy plover habitat would be improved by adding a water control structure to improve water circulation within the pond. Viewing platforms and trails to improve recreation and public access were considered as part of Phase 2

S.3 Identification of the Phase 2 Preferred Alternative

As noted, the Final EIS/R identified the Preferred Alternative as it would be implemented at each of the four pond clusters evaluated for Phase 2 at the Refuge. The federal and state lead agencies (the USFWS and the State Coastal Conservancy, respectively) along with the Project Management Team and other partners did not specify a Preferred Alternative in the Draft EIS/R for Phase 2. Instead, by waiting until the Final EIS/R, they were able to incorporate input received from the public, regulatory agencies, and other stakeholders on the Draft EIS/R's alternatives and impact analyses. Those comments informed and shaped the selection of the Preferred Alternative from individual components from the various action and no-action alternatives presented in the Draft EIS/R, as well as minor adjustments and some recombination of them into a complete Preferred Alternative. Finally, the selection of project components to include in the Phase 2 Preferred Alternative was shaped by a sense of how the SBSP Restoration Project's goals and objectives could be met while minimizing the environmental impacts associated with various parts of the project implementation. Many of these potential impacts resulted from the volumes of fill that would need to be imported and placed into the ponds. Although these impacts were found to be less than significant in the Draft EIS/R, the realization that the purpose and need of the project could be met while further reducing associated impacts drove the decision process. Feasibility, constructability, and regulatory constraints were also carefully considered.

The Phase 2 Preferred Alternative provides a variety of restoration enhancements at all four pond clusters, as well as maintained or increased flood protection and additional public access and recreation features at two of the Phase 2 pond clusters (Mountain View Ponds and Ravenswood Ponds). The Preferred Alternative, including all elements and refinements planned at each pond cluster, is made up entirely of project components that were presented and analyzed in the Draft EIS/R and then included again in the Final EIS/R along with additional text, figures, and tables explaining how combinations of individual project components would be fit together to form that Preferred Alternative. **Figure 3** through **Figure 6** illustrate the four locations at which the Preferred Alternative would be implemented and shows where these different restoration, flood protection, and public access actions would be located.

S.4 Summary of Impacts and Mitigation Measures

This section summarizes the impacts and the resulting significance determinations made for each of them, as well as any mitigation measures that were developed to reduce the amounts and types of adverse impacts from the various project alternatives. Note that the program-level mitigation measures developed

for the SBSP Restoration Project as a whole were incorporated into the Phase 2 alternatives as part of the project itself. Thus, they are no longer mitigation measures, but simply part of the project designs. The full list of program-level mitigation measures is presented in Chapter 2 of the main text.

S.4.1 Impacts Resulting from Phase 2 Alternatives

Table 1 summarizes the results of the impacts analysis that were presented in the Final EIS/R. For each no action alternative (Alternative A) and each action alternative (Alternative B, Alternative C and – at Ravenswood only – Alternative D) at each pond cluster, the table presents the significance determination for each enumerated impact within each environmental resource category. The table also includes a column showing the significance determinations by impact for the Phase 2 Preferred Alternative.

Potentially Significant Impacts and Mitigation Measures

The impact analysis and significance determination conducted for the Final EIS/R identified the two potentially significant impacts listed below. These are those impacts that could not be reduced to a less-than-significant level, even after implementation of project-specific mitigation measures or because no appropriate project-level mitigation measures exist that would that have that effect.

- Phase 2 Impact 3.6-1: Provision of new public access and recreation facilities, including the opening of new areas for recreational purposes and completion of the Bay Trail spine. One of the thresholds of significance for this impact included not providing "maximum feasible public access, consistent with the proposed project." While the Phase 2 actions would add a several new public access and recreation features at two pond clusters, others had to be removed from implementation under Phase 2 because of concerns over recreation-based impact on sensitive wildlife species.
- Phase 2 Impact 3.6-5: Result in the temporary construction-related closure of adjacent public parks or other recreation facilities, making such facilities unavailable for public use. These impacts are Significant and Unavoidable because existing parking areas, park access, and some trails would necessarily be temporarily closed during portions of the construction work.

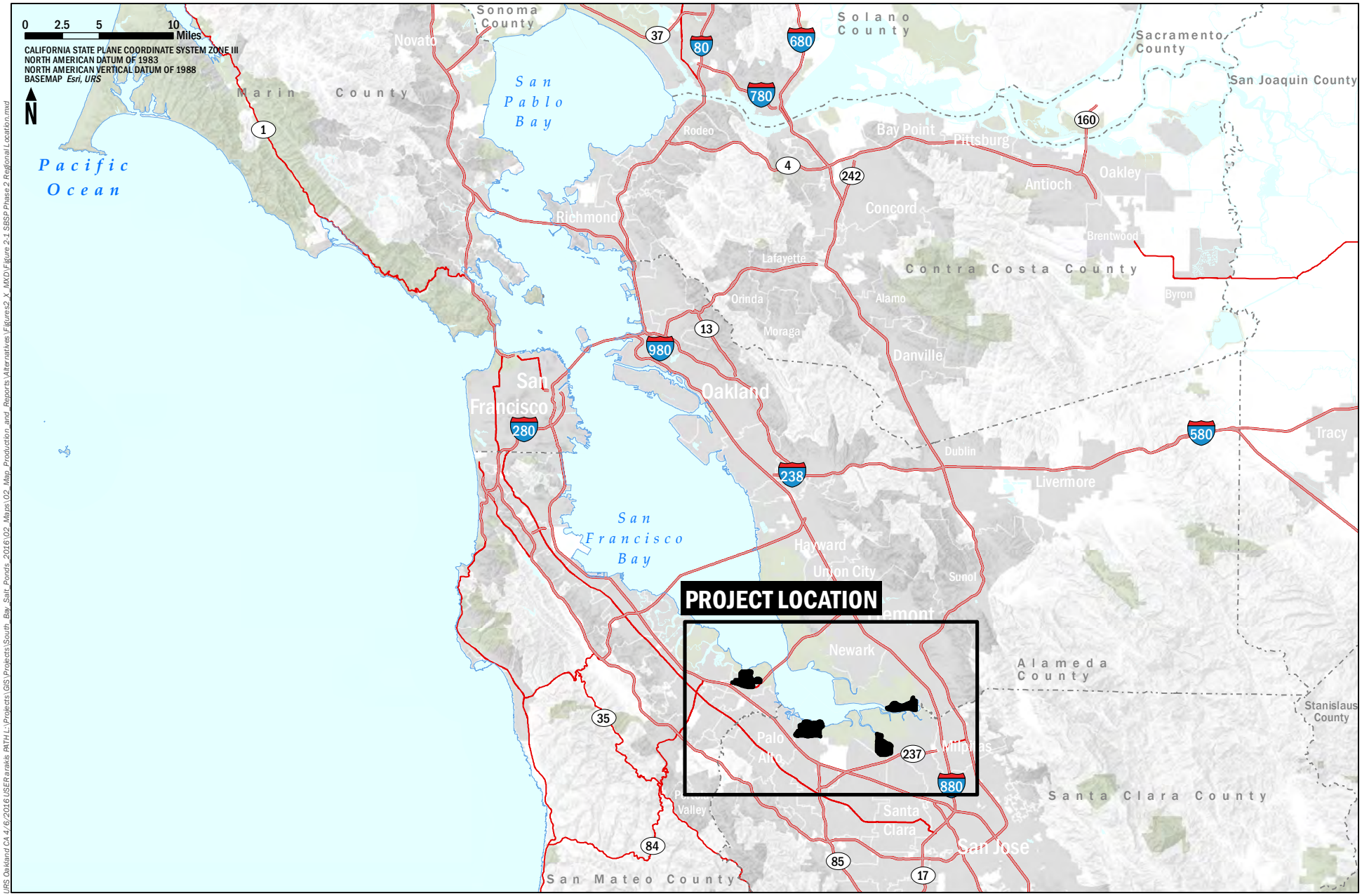
Only one project-level mitigation measures developed for the Phase 2 alternatives: Phase 2 Mitigation Measure 3.11-1: Modify Signal Timing. That mitigation measure says that the landowner (USFWS) shall coordinate with Caltrans and/or the City of Menlo Park to modify the intersection signal timing in the a.m. to reduce project-related delay to a level that the City does not deem significant.

The Final EIS/R also evaluated cumulative impacts from the proposed project when considered together with other projects. The multi-step analytical approach of cumulative impacts and results are described in Chapter 4 of the Final EIS/R. If a Phase 2 project impact were to have a considerable contribution to a cumulative impact, then mitigation from the project impact analysis would be recommended to reduce the project's contribution to cumulative impacts to a level that is less than considerable. However, no considerable contributions to a cumulative impact were found.

S.5 Environmentally Preferred Alternative and Environmentally Superior Alternative

NEPA and CEQA processes include the identification of an Environmentally Preferred Alternative (NEPA) and an Environmentally Superior Alternative (CEQA). The Environmentally Preferred

Alternative is ordinarily the alternative that causes the least damage to the biological and physical environment, but it also means the alternative that best protects, preserves, and enhances historical, cultural, and natural resources. The SBSP Restoration Project would provide benefits such as increased and improved tidal marshes and other habitats, additional public access and recreation opportunities, reduced risk of unplanned levee failure, and added potential for carbon sequestration. The USFWS has made a preliminary identification of the Environmentally Preferred Alternative. The Phase 2 Preferred Alternative is also the Environmentally Preferred Alternative. The SCC has made a preliminary identification that the Phase 2 Preferred Alternative is also the Environmentally Superior Alternative under CEQA. Implementing the Preferred Alternative would most effectively and efficiently meet the project goals while minimizing impacts on the natural environment, the built environment, and human communities, and also comply with environmental regulatory requirements. The only potentially significant and unavoidable impacts remaining pertain to recreation and public access resources, as described above. These significant and unavoidable impacts would be realized under any of the action alternatives, and one of them (failure to provide maximum possible new public access features) would be realized and of greater magnitude even under the No Action Alternative. All other potential impacts were either non-existent or less than significant.



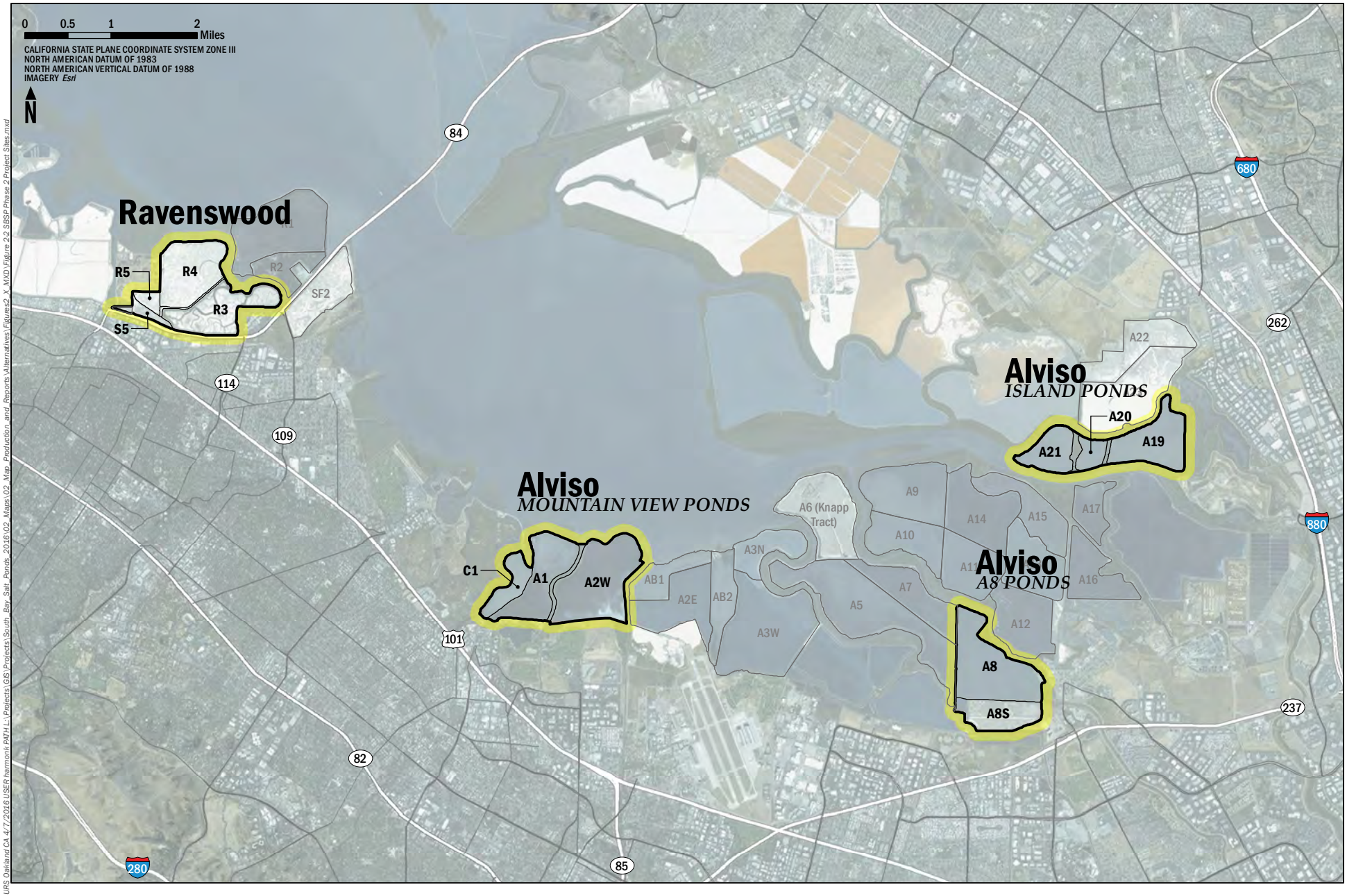
URS Oakland CA 4/6/2016 USER araiks PATH L:\Projects\GIS Projects\South Bay Salt Ponds_2016\02 Maps\02 Map Production and Reports\Alternatives Figures\2 X MXD\Figure 2-1 SBSP Phase 2 Regional Location.mxd

AECOM

South Bay Salt Pond Restoration Project

Figure 1

SBSP Phase 2 Regional Location



URS Oakland CA 4/7/2016 USER harmonk PATH L:\Projects\GIS Projects\South Bay Salt Ponds 2016\02 Maps\02 Map Production and Reports\Alternatives\Figures2_X.MXD Figure 2-2 SBSP Phase 2 Project Sites.mxd

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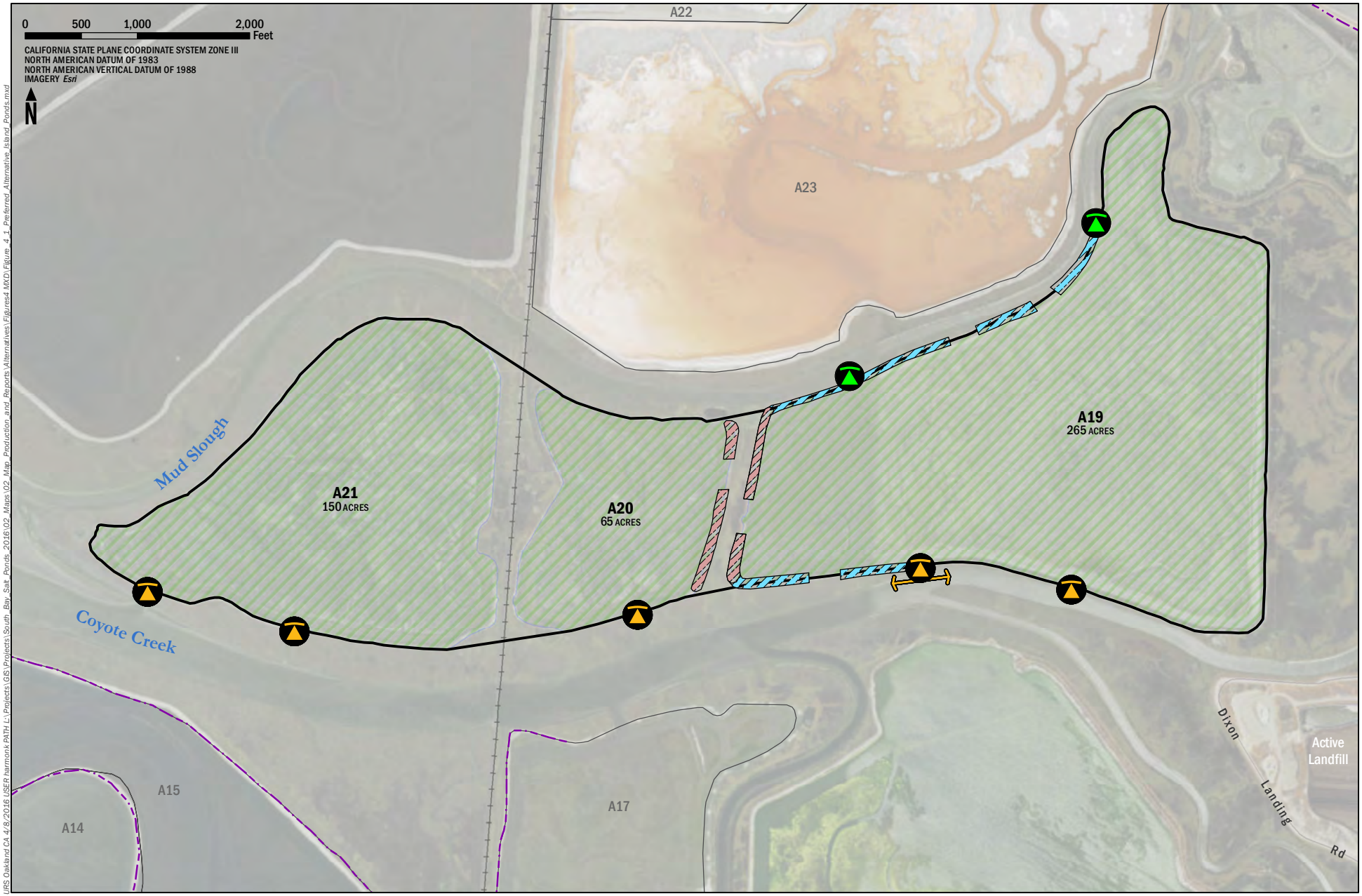
South Bay Salt Pond Restoration Project

Figure 2

SBSP Phase 2 Project Sites



LEGEND

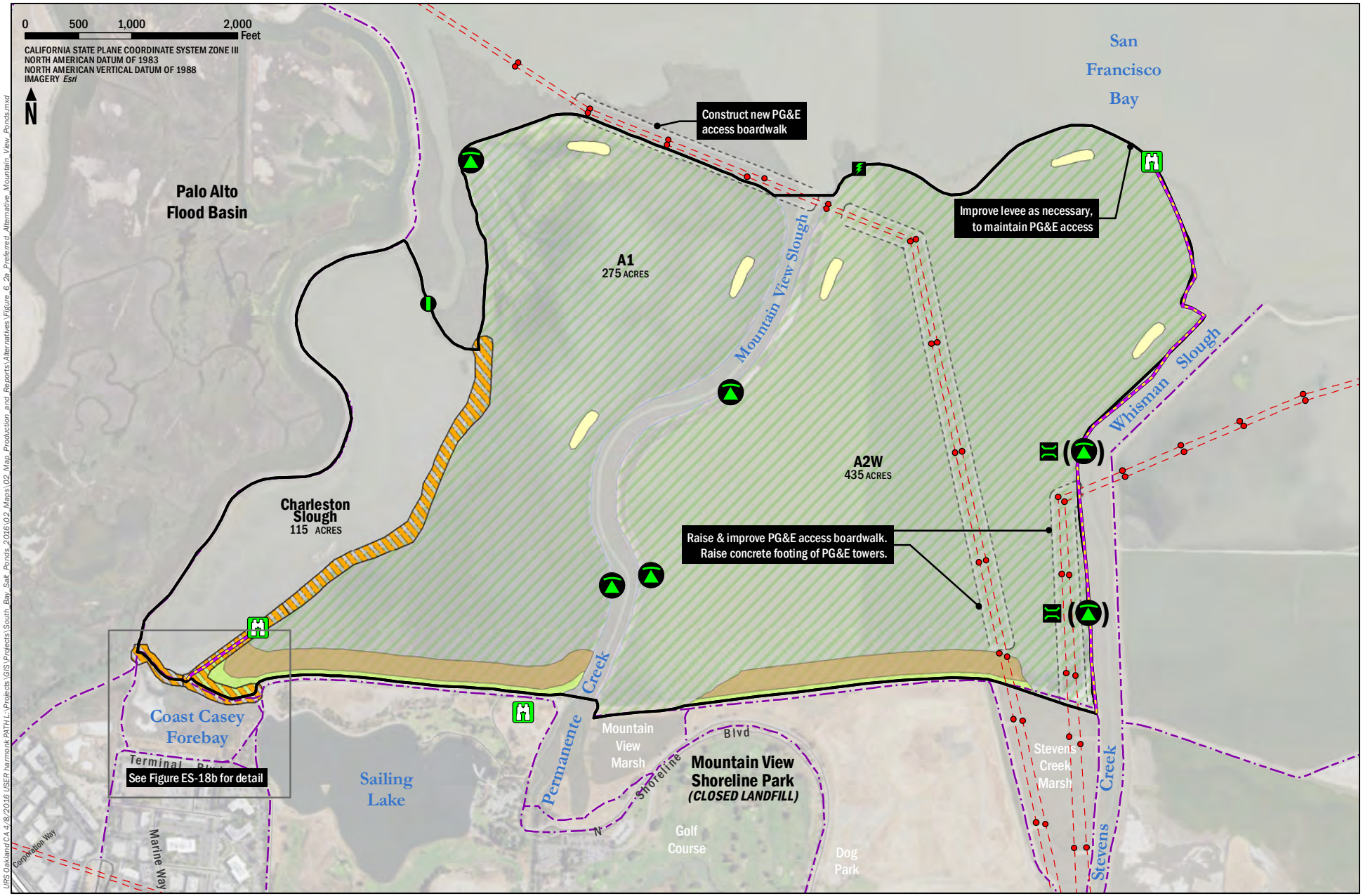
Proposed breach
Existing breach
Expand existing breach
Railroad
Existing trail
Removed levee
Lowered levee
Tidal marsh
Pond boundary

AECOM

South Bay Salt Pond Restoration Project

Figure 3

Preferred Alternative Island Ponds



LEGEND

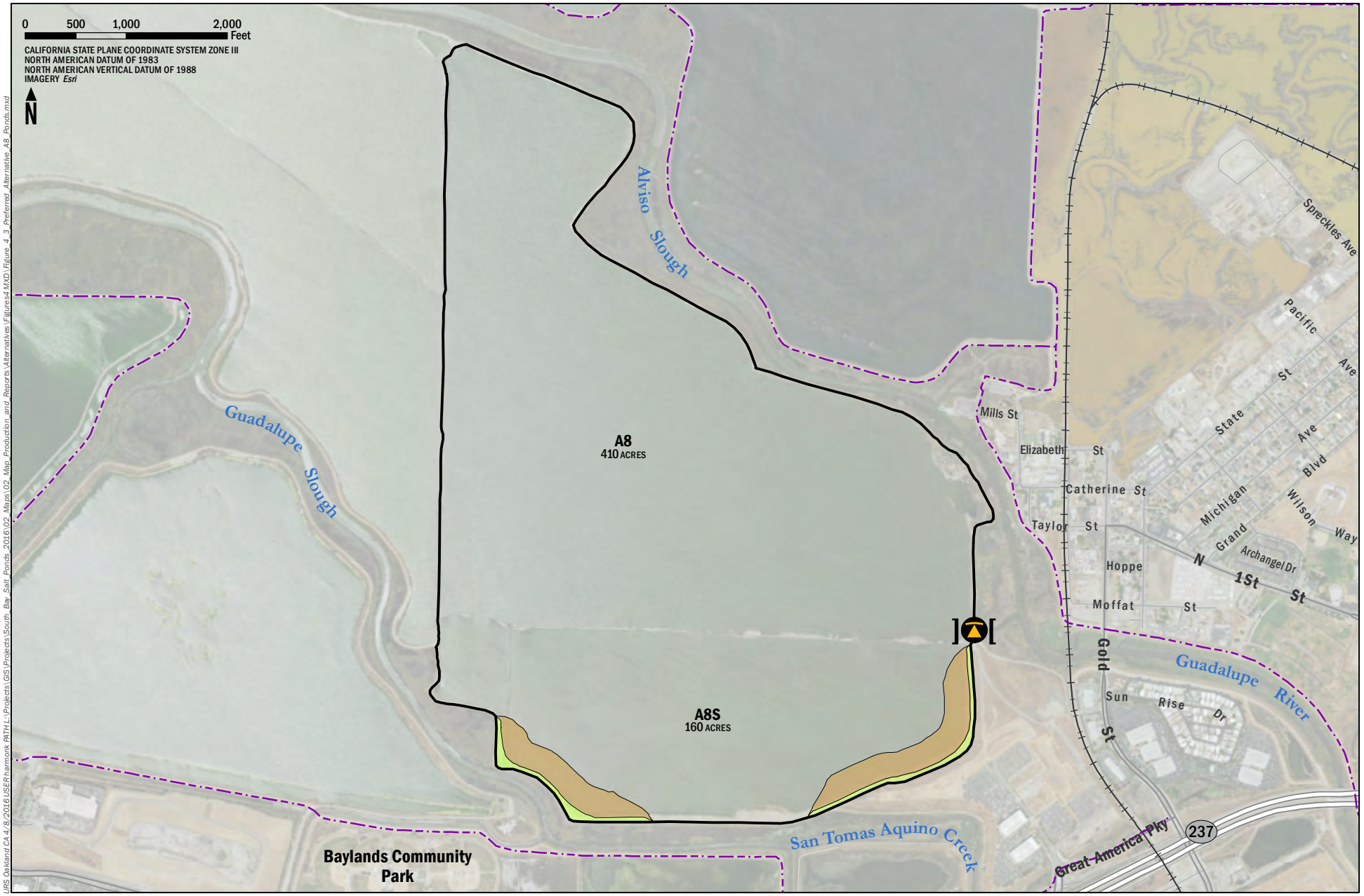
- Existing control gate
- Proposed breach
- Proposed armored breach (two sides)
- Bridge
- PG&E turnaround
- Viewing platform
- PG&E tower
- PG&E power line
- Phase 2 trail
- Existing trail
- Raised levee
- Habitat island
- Tidal marsh
- Pond boundary
- Pond boundary
- Transition Zone Habitat
- High marsh habitat
- Intertidal habitat

AECOM

South Bay Salt Pond Restoration Project

Figure 4

Preferred Alternative Mountain View Ponds



AECOM

South Bay Salt Pond Restoration Project

Figure 5

Preferred Alternative A8 Ponds

LEGEND

- Proposed breach
- Proposed water control structure
- Viewing platform
- Existing viewing platform
- Railroad
- Existing trail
- Phase 2 trail
- Cargill pipeline
- Fence
- Lowered levee
- Improved levee
- Removed levee
- Pilot_channel
- Tidal marsh
- Managed pond
- Pond boundary

Transition Zone Habitat
- High marsh habitat
- Intertidal habitat

*Pending property rights/easements

AECOM

South Bay Salt Pond Restoration Project

Figure 6

Preferred Alternative Ravenswood Ponds

Table 1. SBSP Restoration Project Phase 2 EIS/R Summary of Impacts

IMPACT	ALTERNATIVES												
	ISLAND			MOUNTAIN VIEW			A8		RAVENSWOOD				PREF ALT
	A	B	C	A	B	C	A	B	A	B	C	D	
3.2 Hydrology, Flood Management, and Infrastructure													
Phase 2 Impact 3.2-1: Increased risk of flooding that could cause injury, death, or substantial property loss**.**	LTS	LTS	LTS	LTS	LTS	LTS/B	LTS	LTS	LTS	LTS	LTS	LTS/B	LTS
Phase 2 Impact 3.2-2: Alter existing drainage patterns in a manner which would result in substantial erosion or siltation on- or off-site.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.2-3: Create a safety hazard for people boating in the project area.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.2-4: Potential effects from tsunami and/or seiche.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
3.3 Water Quality and Sediment													
Phase 2 Impact 3.3-1: Degradation of water quality due to changes in algal abundance or composition.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.3-2: Degradation of water quality due to low dissolved oxygen levels.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.3-3: Degradation of water quality due to increased methylmercury production or mobilization of mercury-contaminated sediments.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.3-4: Potential impacts to water quality from other contaminants.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.3-5: Potential to cause seawater intrusion of regional groundwater sources.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
3.4 Geology, Soils, and Seismicity													
Phase 2 Impact 3.4-1: Potential effects from settlement due to consolidation of Bay mud.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.4-2: Potential effects from liquefaction of soils and lateral spreading.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.4-3: Potential for ground and levee failure from fault rupture.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.4-4: Potential effects from consolidation of Bay mud on existing subsurface utility crossings and surface rail crossings.	LTS	LTS	LTS	NI	NI	NI	NI	LTS	NI	NI	NI	LTS	LTS
3.5 Biological Resources													
Phase 2 Impact 3.5-1: Potential reduction in numbers of small shorebirds using San Francisco Bay, resulting in substantial declines in flyway-level populations.	LTS	LTS	LTS	NI	LTS/B	LTS	NI	LTS/B	NI	LTS	LTS/B	LTS	LTS
Phase 2 Impact 3.5-2: Loss of intertidal mudflats and reduction of habitat for mudflat-associated wildlife species.	LTS	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS/B	LTS	LTS
Phase 2 Impact 3.5-3: Potential habitat conversion impacts to western snowy plovers.	NI	NI	NI	NI	LTS	LTS	NI	NI	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.5-4: Potential reduction in the numbers of breeding, pond-associated waterbirds (avocets, stilts, and terns) using the South Bay due to reduction in habitat, concentration effects, displacement by nesting California gulls, and other Project-related effects.	LTS	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS/B	LTS/B	LTS/B	LTS
Phase 2 Impact 3.5-5: Potential reduction in the numbers of non-breeding, salt-pond-associated birds (e.g., phalaropes, eared grebes, and Bonaparte's gulls) as a result of habitat loss.	NI	NI	NI	NI	LTS	LTS	NI	NI	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.5-6: Potential reduction in foraging habitat for diving ducks, resulting in declines in flyway-level populations.	LTS	LTS	LTS	NI	LTS	LTS	LTS	LTS	NI	LTS/B	LTS	LTS/B	LTS
Phase 2 Impact 3.5-7: Potential reduction in foraging habitat for ruddy ducks, resulting in declines in flyway-level populations.	LTS	LTS	LTS	NI	LTS	LTS	LTS	LTS	NI	LTS/B	LTS	LTS/B	LTS
Phase 2 Impact 3.5-8: Potential habitat conversion impacts on California least terns.	NI	NI	NI	NI	LTS	LTS	LTS	LTS	NI	LTS/B	LTS/B	LTS/B	LTS
Phase 2 Impact 3.5-9: Potential loss of pickleweed-dominated tidal salt marsh habitat for the salt marsh harvest mouse and salt marsh wandering shrew, and further isolation of these species' populations due to breaching activities and scour.	LTS/B	LTS/B	LTS/B	NI	LTS/B	LTS/B	NI	LTS/B	NI	LTS/B	LTS/B	LTS/B	LTS/B
Phase 2 Impact 3.5-10: Potential construction-related loss of or disturbance to special-status, marsh-associated wildlife.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.5-11: Potential construction-related loss of or disturbance to nesting pond associated birds.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS

Table 1. SBSP Restoration Project Phase 2 EIS/R Summary of Impacts

IMPACT	ALTERNATIVES												
	ISLAND			MOUNTAIN VIEW			A8		RAVENSWOOD				PREF ALT
	A	B	C	A	B	C	A	B	A	B	C	D	
Phase 2 Impact 3.5-12: Potential disturbance to or loss of sensitive wildlife species due to ongoing monitoring, maintenance, and management activities.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.5-13: Potential effects of habitat conversion and pond management on steelhead.	LTS/B	LTS/B	LTS/B	NI	LTS/B	LTS	NI	LTS	NI	NI	NI	NI	LTS/B
Phase 2 Impact 3.5-14: Potential impacts to estuarine fish.	LTS/B	LTS/B	LTS/B	NI	LTS/B	LTS	NI	NI	NI	LTS/B	LTS	LTS/B	LTS/B
Phase 2 Impact 3.5-15: Potential impacts to piscivorous birds.	LTS/B	LTS/B	LTS/B	NI	LTS	LTS	NI	LTS	NI	LTS/B	LTS/B	LTS/B	LTS/B
Phase 2 Impact 3.5-16: Potential impacts to dabbling ducks.	LTS/B	LTS/B	LTS/B	NI	LTS	LTS	NI	LTS	NI	LTS/B	LTS/B	LTS/B	LTS
Phase 2 Impact 3.5-17: Potential impacts to harbor seals.	LTS/B	LTS/B	LTS/B	NI	LTS/B	LTS/B	NI	NI	NI	NI	NI	NI	LTS/B
Phase 2 Impact 3.5-18: Potential recreation-oriented impacts to sensitive species and their habitats.	LTS	LTS	LTS	NI	LTS	LTS	NI	NI	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.5-19: Potential impacts to special-status plants.	NI	LTS	LTS	NI	NI	NI	NI	NI	NI	NI	NI	NI	LTS
Phase 2 Impact 3.5-20: Colonization of mudflats and marsh plain by non-native *Spartina* and its hybrids.	LTS	LTS	LTS	LTS	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.5-21: Colonization by non-native *Lepidium*.	LTS	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.5-22: Increase in exposure of wildlife to avian botulism and other diseases.	NI	NI	NI	NI	NI	NI	NI	NI	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.5-23: Potential impacts to bay shrimp populations.	LTS/B	LTS/B	LTS/B	NI	LTS/B	LTS/B	NI	LTS	NI	LTS/B	LTS/B	LTS/B	LTS
Phase 2 Impact 3.5-24: Potential impacts to jurisdictional wetlands or waters.	LTS	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS/B	LTS/B	LTS/B	LTS
Phase 2 Impact 3.5-25: Potential construction-related loss of, or disturbance to, nesting raptors (including burrowing owls).	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
3.6 Recreation Resources													
Phase 2 Impact 3.6-1: Provision of new public access and recreation facilities, including the opening of new areas for recreational purposes and completion of the Bay Trail spine.	NI	LTS	LTS	PS	PS	LTS/B	NI	NI	PS	PS	LTS/B	LTS/B	PS
Phase 2 Impact 3.6-2: Permanent removal of existing recreational features (trails) in locations that visitors have been accustomed to using and that would not be replaced in the general vicinity of the removed feature.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Phase 2 Impact 3.6-3: Increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated.	NI	NI	NI	NI	LTS	LTS	NI	NI	NI	NI	LTS	LTS	LTS
Phase 2 Impact 3.6-4: Result in substantial adverse physical impacts associated with the provision of new or physically altered park and recreational facilities, or result in the need for new or physically altered park and recreational facilities, the construction of which could cause significant environmental impacts.	NI	NI	NI	NI	LTS/B	LTS/B	NI	NI	NI	LTS	LTS/B	LTS/B	LTS/B
Phase 2 Impact 3.6-5: Result in the temporary construction-related closure of adjacent public parks or other recreation facilities, making such facilities unavailable for public use.	NI	NI	NI	NI	SU	SU	NI	NI	NI	SU	SU	SU	SU
3.7 Cultural Resources													
Phase 2 Impact 3.7-1: Potential disturbance of known or unknown cultural resources.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.7-2: Potential disturbance of the historic salt ponds and associated structures which may be considered a significant cultural landscape.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
3.8 Land Use and Planning													
Phase 2 Impact 3.8-1: Land use compatibility impacts.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Table 1. SBSP Restoration Project Phase 2 EIS/R Summary of Impacts

IMPACT	ALTERNATIVES												
	ISLAND			MOUNTAIN VIEW			A8		RAVENSWOOD				PREF ALT
	A	B	C	A	B	C	A	B	A	B	C	D	
3.9 Public Health and Vector Management													
Phase 2 Impact 3.9-1: Potential increase in mosquito populations.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
3.10 Socioeconomics and Environmental Justice													
Phase 2 Impact 3.10-1: Displace, relocate, or increase area businesses, particularly those associated with the expected increase in recreational users.	NI	LTS/B	LTS/B	NI	LTS/B	LTS/B	NI	LTS/B	NI	LTS/B	LTS/B	LTS/B	LTS/B
Phase 2 Impact 3.10-2: Change lifestyles and social interactions.	NI	LTS/B	LTS/B	NI	LTS/B	LTS/B	NI	LTS/B	NI	LTS/B	LTS/B	LTS/B	LTS/B
Phase 2 Impact 3.10-3: Effects disproportionately placed on densely populated minority and low-income communities or effects or racial composition in a community.	NDE	NDE	NDE	NDE	NDE	NDE	NDE	NDE	NDE	NDE	NDE	NDE	NDE
3.11 Traffic													
Phase 2 Impact 3.11-1: Potential short-term degradation of traffic operations at intersections and streets due to construction.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTSM	LTSM	LTSM	LTS
Phase 2 Impact 3.11-2: Potential long-term degradation of traffic operations at intersections and streets during operation.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.11-3: Potential increase in parking demand.	NI	NI	NI	NI	LTS	LTS	NI	NI	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.11-4: Potential increase in wear and tear on the designated haul routes during construction.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
3.12 Noise													
Phase 2 Impact 3.12-1: Short-term construction noise effects.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.12-2: Traffic-related noise impacts during construction.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.12-3: Traffic-related noise effects during operation.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.12-4: Potential operational noise effects from O&M activities.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.12-5: Potential vibration effects during construction and/or operation.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
3.13 Air Quality													
Phase 2 Impact 3.13-1: Short-term construction-generated air pollutant emissions.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.13-2: Potential long-term operational air pollutant emissions.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.13-3: Potential exposure of sensitive receptors to TAC emissions.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.13-4: Potential odor emissions.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
3.14 Public Services													
Phase 2 Impact 3.14-1: Increased demand for fire and police protection services.	NI	NI	NI	NI	LTS	LTS	NI	NI	NI	LTS	LTS	LTS	LTS
3.15 Utilities													
Phase 2 Impact 3.15-1: Reduced ability to access PG&E towers, stations or electrical transmission lines.	NI	NI	NI	LTS	LTS	LTS	NI	NI	NI	NI	NI	NI	LTS
Phase 2 Impact 3.15-2: Reduced clearance between waterways and PG&E electrical transmission lines.	NI	NI	NI	NI	LTS	LTS	NI	NI	NI	NI	NI	NI	LTS
Phase 2 Impact 3.15-3: Reduced structural integrity of PG&E towers.	NI	NI	NI	LTS	LTS	LTS	NI	NI	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.15-4: Changes in water level, tidal flow and sedimentation near storm drain systems.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.15-5: Changes in water level, tidal flow and sedimentation near pumping facilities.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Table 1. SBSP Restoration Project Phase 2 EIS/R Summary of Impacts

IMPACT	ALTERNATIVES												
	ISLAND			MOUNTAIN VIEW			A8		RAVENSWOOD				PREF ALT
	A	B	C	A	B	C	A	B	A	B	C	D	
Phase 2 Impact 3.15-6: Changes in water level, tidal flow and sedimentation near sewer force mains and outfalls.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Phase 2 Impact 3.15-7: Disrupt Hetch Hetchy Aqueduct service so as to create a public health hazard or extended service disruption.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Phase 2 Impact 3.15-8: Disruption of rail service due to construction of coastal flood levees and tidal habitat restoration.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Phase 2 Impact 3.15-9: Reduced access to sewer force mains due to levee construction.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
3.16 Visual Resources													
Phase 2 Impact 3.16-1: Alter views of the SBSP Restoration Project Area.	LTS	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS/B	LTS/B	LTS/B	LTS
3.17 Greenhouse Gas Emissions													
Phase 2 Impact 3.17-1: Construction-generated GHG emissions.	NI	LTS	LTS	NI	LTS	LTS	NI	LTS	NI	LTS	LTS	LTS	LTS
Phase 2 Impact 3.17-2: Operational GHG emissions.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS
Phase 2 Impact 3.17-3: Conflicts with applicable GHG emissions reduction plan, policy, or regulation.	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS	LTS

Notes:

Alternative A at each pond cluster is the No Action/No Project Alternative.

B = Beneficial; LTS = Less Than Significant; LTSM = Less Than Significant With Mitigation; NDE = No Disproportionate Effect; NI = No Impact; PS = Potentially Significant; SU = Significant and Unavoidable

The levels of significance for the impacts listed above assume that the program-level mitigation measures from the 2007 EIS/R and the elements of the Adaptive Management Plan are integral components of the Phase 2 project alternatives, and that management responses would be implemented based on ongoing monitoring and applied studies.

Appendix F:

Draft Addendum to SBSP Restoration Project AMP

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ADDENDUM TO THE ADAPTIVE MANAGEMENT PLAN

This Addendum to the Adaptive Management Plan (AMP) for the South Bay Salt Pond (SBSP) Restoration Project is intended to incorporate a new type of habitat restoration and enhancement feature to the previously adopted AMP. It defines and explains those features and sets for a system for how the AMP's principles and feedback mechanisms would be applied to the new features and what sorts of monitoring and adaptive management actions may be applied to them.

The SBSP Restoration Project is proposing the creation of habitat transition zones as part of Phase 2 actions. Habitat transition zones involve the beneficial reuse of material to create transitional habitats from the pond or marsh bottom to the adjacent upland habitat or levees along portions of the upland edge. These "habitat transition zones", are sometimes referred to elsewhere as "upland transition zones," "transition zone habitats," "ecotones," or "horizontal levees". Transition zones are specifically called out in documents such as the U.S. Fish and Wildlife Service's Tidal Marsh Recovery Plan and the recent Science Update to the Baylands Ecosystem Habitat Goals Project Report. A gradual transition from submerged Baylands, ponds, or open waters to uplands is largely missing in the current landscape of the South Bay, where there is often an abrupt boundary between the bay or ponds and the built environment. The SBSP Restoration Project's intention in including habitat transition zones in the Phase 2 alternatives is to restore this missing habitat feature. Doing so would:

1. Establish areas in which terrestrial marsh species can take refuge during high tides and storm events, thereby reducing their vulnerability.

2. Expand habitat for a variety of special status plant species that occupy this specific elevation zone.

3. Provide space for marshes to migrate upslope over time as sea-level rise occurs.

Before proposing these features, the SBSP Restoration Project examined the landscape to see if there are any areas adjacent to the project site where this could occur naturally. In general, the best locations for building these features would be located adjacent to open space or park land where the project can provide an even greater extent of transition into upland habitats.

However, at the edge of the Bay, these open space areas are largely former (now closed and capped) landfills which present a variety of challenges for creating the missing upland habitat. First, the existing elevation gradient between the restored marsh and the edge of the landfill is usually too steep to provide a gradual transition. Secondly, these landfills would otherwise pose a water quality risk from erosion if tidal action were introduced immediately adjacent to the protective clay liner or un-engineered rip rap slopes. In these instances, it is necessary that the project place material inside the former salt ponds to create the desired slope (15:1 to 30:1). At other locations, the actual elevations landward of the project sites are too low to create an uphill slope with the desired habitat functions. Therefore, once levees are raised or improved, such as at the All-American Canal levees, the only area remaining to build the transition zones is into the salt ponds. Finally, most of the adjacent property is not within the SBSP Restoration Project's ability to acquire, whether or not it has the desired elevation profile, because it is currently developed. In addition to being very expensive to acquire these areas, it would be infeasible to relocate all of the residences and businesses that have been built adjacent to the salt ponds. For these reasons, the project plans to use fill from upland excavation projects to create habitat transition zones inside the former salt

ponds. The transition zones would provide habitat complexity and connectivity as marsh is restored. This would help improve habitat quality, particularly for endangered and threatened species, and improve resiliency of the shoreline over time as sea levels rise.

The SBSP Restoration Project notes in this Addendum that there are other new actions associated with the ongoing and more basic actions of maintaining the habitat transition zones that are more like routine maintenance of any part of the National Wildlife Refuge than they are adaptive in nature. Those activities would include the same kinds of actions performed under various regulatory permits, guidance documents, and other agreed-upon protocols. For example, commonplace Refuge practices like trash removal, fencing repairs, biological monitoring of bird populations, trail upkeep, removing invasive plant species and controlling or removing nuisance wildlife species, and other actions would proceed as normal and would therefore be implemented as needed on the habitat transition zones.

More broadly, the SBSP Restoration Project would continue to cooperate with the Santa Clara County, Alameda County, and San Mateo County Mosquito Abatement Districts to provide access by these districts to control mosquito populations. The Project would also work with the Invasive Spartina Project to remove or control populations of the non-native forms of that plant species. Similar coordination efforts to coordinate with adjacent or nearby city or county parks to control and manage use of the public access trails near transition zones by humans (and their pets, if/where allowed) would proceed as normal. None of these actions is what is typically meant by "adaptive management".

Therefore, the table below is limited to the two more adaptive aspects of habitat transition zones: (1) the successful establishment and spread of elevationally-varying vegetation communities and habitat types, and (2) the transition zones' ability to help maintain or improve existing levels of flood protection in the areas landward of where they are constructed. This effect is largely indirect, as habitat transition zones do not directly provide flood protection but do help protect existing levees or uplands from scour or wave run-up.

Proposed New Rows for Adaptive Management Plan Summary Table

Category / Project Objective	Restoration Target	Monitoring Parameter (Method)	Spatial Scale for Monitoring Results	Expected Time Frame for Decision-Making	Management Trigger	Applied Studies	Potential Management Action
Habitat Transition Zones Project Objective 1A. Create, restore, or enhance habitats of sufficient size, function, and appropriate structure to promote restoration of native special-status plants and animals that depend on South San Francisco Bay habitat for all or part of their life cycles.	The range and mosaic/composition of various vegetation communities and associated wildlife species habitat on the transition zones is at or on a trajectory resembling that of a natural (i.e., predevelopment) gradient between intertidal mudflats, low tidal marsh, high tidal marsh, and upland vegetation. This includes characteristics such as vegetation acreage and density per unit of transitional habitat, species composition, and other observable aspects of existing natural or successful marsh restoration sites in South San Francisco Bay.	- Monitoring of planted vegetation to evaluate success of establishment and spread - Acreages of each type of sub-, inter-, and -supratidal habitat (collected via remote imagery with limited ground-truthing) as a percent of the total restoration area; plant species composition, including abundance of nonnatives such as those listed elsewhere in the AMP (qualitative assessments for invasive species will occur annually, quadrant or transect sampling once habitat transition zone has 20% vegetation cover); being on habitat trajectory toward a reference marsh and other restoration sites - Habitat qualities of those different elevationally varying habitat rated as high, medium, or low based on suitability or potential usefulness to Ridgway's rail and salt marsh harvest mouse, determined every 2-3 years using aerial photos, ground-truthing, and/or other methods to evaluate these characteristics - Habitat mapping will take place every 5-8 years, beginning 5 years after the different sections of the constructed transition zone have established vegetation communities. Once 40% vegetation cover has been achieved, species composition (including native vs non-native) will be collected in a variety of zones (low marsh, high marsh, upland) on each transition zone.	Each of the proposed Phase 2 transition zones would be monitored. There are six in total. Two in Pond R4, two in Pond A8S, and one each in Pond A1 and Pond A2W.	- Establishment of different vegetation communities on the lower slopes of habitat transition zones depends on tidal flux, the depth of each pond (i.e., pond bottom elevations relative to tidal elevations). Yet natural vegetation colonization is anticipated to be detectable within 5 years (or less) of reaching appropriate elevations, while habitat development trajectory anticipated to be detectable within 15 years (and possibly less) of the onset of vegetation colonization. - In the areas where planting would take place (the higher portions of the zones), the successful establishment and spread of the planted vegetation is expected to be detectable in 5 years. - Invasive species establishment is expected to be detectable within the first year of its occurrence.	- Failure of habitat transition zones to develop native vegetation communities in elevations where those are expected to develop. - Vegetation deviates significantly (30–50%) from projected trajectory after colonization elevations are achieved. - Failure of the zones to hold or retain actively seeded or planted vegetation communities in elevations where that takes place. - Non-native Spartina, Pepperweed or Phragmites present in large numbers on site. - A level of invasive plant establishment and resistance to active control and management efforts that undermines the ecological values of the native communities and habitats intended for the transition zones to provide. - Inability to control and prevent outbreaks of vector (mosquitoes) on the slopes of the habitat transition zones using the methods and techniques discussed in the Vector Control Project Objectives.	**Applied Study Question #2017-1. Will habitat transition zones become established with naturalistic, native vegetation communities across a range of elevations and thereby provide a gradient of habitats for marsh plants and special-status species, including the California Ridgway's rail and the salt marsh harvest mouse?** Project Objective 1A states that the South Bay Salt Pond Restoration Project will create, restore, or enhance habitats of sufficient size, function, and appropriate structure to promote restoration of native special-status plants and animals that depend on South San Francisco Bay habitat for all or part of their life cycles. Most ecotone and transitional habitat between the waters of San Francisco Bay and the adjacent uplands have been lost as a consequence of historical land use and development. The Phase 2 actions to construct habitat features to replace this lost natural gradient is an important part of meeting Project Objective 1A.	- Study causes of slow vegetation establishment - Active revegetation - Increased non-native invasive plant species control - If invasive species cannot be controlled, study biotic response to non-native vegetation - Continue to re-evaluate what is meant by "control" of invasive species and adjust monitoring and management triggers based on the latest scientific consensus

Category / Project Objective	Restoration Target	Monitoring Parameter (Method)	Spatial Scale for Monitoring Results	Expected Time Frame for Decision-Making	Management Trigger	Applied Studies	Potential Management Action
Habitat Transition Zones. Project Objective 2. Maintain or improve existing levels of flood protection in the South Bay area.	- No increase in tidal flood risk at any levee or adjacent uplands associated with a habitat transition zone.	- Collect high water mark elevations on the existing levees and adjacent uplands prior to construction and then periodically after construction, especially following large storm or flood events. - Inspect for levee erosion initially monthly, then annually, and after major rainfall and/or tidal events	Each of the proposed Phase 2 transition zones would be monitored. There are six in total. Two in Pond R4, two in Pond A8S, and one each in Pond A1 and Pond A2W.	- Slope failure or erosion/scour is expected to be detectable within 5 years of normal weather, but heavy storm years may cause it to occur earlier or sooner. -If after 10 years, no substantial failure or erosion beyond minor, localized failures, it would be unlikely to occur, as the vegetation communities and natural sediment dynamics should have become established.	- Significant erosion observed - Elevated (higher) water surface elevations projected by modeling effort and/or observed in the field - Field data collection and/or observation indicates that flood risk is greater than that predicted by models	**Are habitat transition zones effective in slowing the amount of erosion or scour due to tides, storm surges, wind waves, or other erosional forces and thereby reducing the risk of levee failure or other aspects of flood risk to surrounding communities and infrastructure?** Habitat transition zones also address Project Objective 2 (Maintain or improve existing levels of flood protection in the South Bay area) because they slow wave run up, buffer storm surges, and provide a broader range of roughly horizontal surfaces on which sediment can accrete and vegetation can form. They thereby provide a foundation for naturalistic future sea-level rise adaptation by providing substrate on which tidally varying habitats can migrate upslope.	- Reconstruct failing portions of the habitat transition zones with material of higher quality. - Construct transition zones with a higher level of soil compaction.