REPORT

OPPORTUNITIES AND CONSTRAINTS FOR EDEN LANDING POND COMPLEX

SOUTH BAY SALT PONDS RESTORATION, PHASE II

Prepared for

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October 18, 2012

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Acronyms

ACFCC	Alameda Creek Flood Control Channel
ACFCD	Alameda County Flood Control District
AMP	Adaptive Management Plan
BA	Biological Assessment
BCDC	(San Francisco) Bay Conservation and Development Commission
BO	Biological Opinion
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
Conservancy	California State Coastal Conservancy
EBRPD	East Bay Regional Parks District
EFH	Essential Fish Habitat
EIS/EIR	Environmental Impact Statement
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
HMMP	Habitat Mitigation and Monitoring Plan
LEDPA	Least Environmentally Damaging Practicable Alternative
ISP	Initial Stewardship Plan
MHHW	mean higher high water
msl	mean sea level
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service

NOI/NOP	Notice of Intent/Notice of Preparation
PMT	Project Management Team
project	South Bay Salt Ponds Restoration Project
PWA	Philip Williams and Associates
reserve	Eden Landing Ecological Reserve
ROD	Record of Decision
SBSP	South Bay Salt Ponds (Restoration Project)
Shoreline Study	South San Francisco Bay Shoreline Feasibility Study
SLR	sea level rise
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

The South Bay Salt Pond Restoration Project (project) encompasses approximately 15,100 acres of former salt ponds occurring along the southern edge of San Francisco Bay, including the 5,500-acre Eden Landing Pond Complex (Figure 1), which is part of the California Department of Fish and Game's (CDFG) Eden Landing Ecological Reserve (reserve). The project also includes the Alviso Pond Complex and the Ravenswood Pond Complex, which are part of the U.S. Fish and Wildlife Service's (USFWS) Don Edwards National Wildlife Refuge.

The purpose of this memorandum is to:

- Develop an initial set of possible Phase II project actions for the Eden Landing Pond Complex.
- Evaluate the ability of those actions to achieve project goals and objectives.
- Make an initial assessment of the opportunities and constraints of those actions.
- Outline a strategy for environmental clearance and permitting.

This memorandum was written for the California State Coastal Conservancy (Conservancy) and the Project Management Team (PMT) of key stakeholder representatives. As such, it assumes that the reader is familiar with the overall project, the setting, and the actions undertaken under the Initial Stewardship Plan (ISP) and Phase I.

The project has three main goals: habitat restoration, flood management, and improved public access. Each of these is briefly described below.

1.1 HABITAT RESTORATION

The primary goal of the project is to restore some ponds to tidal marsh wetland habitat and others to ponds that are managed for particular wildlife species. The actual configuration of each Eden Landing Pond Complex Phase II restoration activity will be guided by the Adaptive Management Plan (AMP; FEIS/R App. D 2007) – a strategy that is continuously adjusted based on each site's response to previous restoration activities observed through strategic monitoring and data evaluation – and furthered by this initial analysis of opportunities and constraints. The habitat restoration goals are linked to numerous species – including those listed under the Federal or California Endangered Species Acts (ESA), California species of special concern, migratory birds, and others – that depend upon these habitats for all or part of their life cycles.

Restored habitat should be of sufficient size, function, and appropriate structure to promote restoration of special status species, support current migratory bird species that utilize existing salt ponds and associated structures, and increase abundance and diversity of native species in various South San Francisco Bay aquatic and terrestrial ecosystem components (EDAW et al. 2007).

1.2 FLOOD MANAGEMENT

In order to address sea level rise, public safety, and protection of property, one of the project's main purposes is flood management. The specific objective listed in the EIR is to maintain or improve existing levels of flood protection in the South Bay Area (EDAW et al. 2007). Flooding in the project area can be caused by high tides, storm surge, El Niño effects, sea level rise, and fluvial flood hazards (rainwater runoff). In order to adequately address these concerns, the

project must be designed with flood management objectives in mind. Flood control can be compatible with the environmental goals of the pond complex restorations.

1.3 PUBLIC ACCESS

A key component of the pond complex design goals is to provide wildlife-compatible public access and recreational opportunities. Public access activities may include hiking, hunting, fishing, wildlife viewing, and other recreational activities. Facilities for public access may include walkways and trails, as well as interpretive signage and elevated viewing platforms. These public access and recreation features will be integrated with the Bay Trail and other existing regional and local plans for trails. Evaluating and addressing possible conflicts between recreation and restoration goals will be a key part of this project.

1.4 RESTORATION APPROACH

The basic restoration approach is to restore tidal marsh and managed pond habitat with an ultimate ratio for the entire SBSP project area somewhere between 50/50 and 90/10 for tidal marsh/managed pond. Initially, restoration design will aim to meet the 50/50 level goal, and will later aim to increase the percentage of tidal marsh restoration to as much as 90 percent. The actual configuration of each restoration activity will be guided by the AMP. Regular monitoring and evaluation of the data is a vital component of a successfully administered AMP. The PMT will direct URS to maintain or improve upon what has been a successful AMP. This approach is a valuable and necessary strategy for projects with a complex set of interrelated variables. In addition, the precise impacts of climate change and associated sea-level rise or changes in amounts or intensity of rainfall are unknown. Yet, they are likely to affect flood control management and tidal marsh restoration and must also be actively managed.

This section provides a summary list of reports and other documents reviewed as part of the background research on this project.

Ackerman, Josh, USGS; Mark Marvin-DiPasquale, USGS; Darrell Slotton, UC Davis; Collin Eagles-Smith, USGS. 2010. Memo to Laura Valoppi (USGS), Ann Buell, State Coastal Conservancy, Meghan Hertel, Resources Legacy Fund; Quarterly Report for RLF Grant #2009-0421. The Effects of Wetland Restoration on Mercury Bioaccumulation in the South Bay Salt Pond Restoration Project: Using the Biosentinel Toolbox to Monitor Changes across Multiple Habitats and Spatial Scales. April.

Fulfrost, Brian, Brian Fulfrost Associates. 2011. *Annual Report (Year Two) on the Habitat Evolution Mapping Project for the South Bay Salt Pond Restoration Project*. July 6.

Brown and Caldwell in association with PWA, EDAW, Harvey and Assoc. 2008. South Bay Salt Pond Restoration Project, Attachment to the Application for 401 Water Quality Certification Operations and Maintenance and Phase I Actions. May.

Foxgrover, Amy; David Finlayson, Bruce Jaffe. 2011. 2010 Bathymetry and Digital Elevation Model of Coyote Creek and Alviso Slough, San Francisco Bay, California; USGS Survey Open File Report 2011-1315.

Harvey and Assoc. 2008. *South Bay Salt Pond Restoration Project, Phase I Monitoring Plan*. October.

Philip Williams and Associates (PWA). 1995. Design Guidelines for Tidal Channels in Coastal Wetlands.

PWA, EDAW, Harvey and Assoc., Brown and Caldwell. 2006. *South Bay Salt Pond Restoration Project, Final Alternatives Report (FAR)*. January.

PWA, EDAW, Harvey and Assoc., Brown and Caldwell, and Geomatrix. 2007. *South Bay Salt Pond Restoration Project, Final EIS/R*. December.

Santa Clara Valley Water District. Not Dated. *Relationship between Groundwater Elevations and Local Subsidence in Santa Clara County*.

Stacey, Mark. 2010. *The Interactions of Island Pond Restoration and Coyote Creek Final Report to Legacy Fund*, Grant #2009-0105; UC Berkeley; 6/2011. South Bay Salt Pond Restoration Project; Annual Report, 2011; 2/2012. South Bay Salt Pond Restoration Project, Project Status Report, 8/2009. South Bay Salt Pond Restoration Project, Table of Key Uncertainties and Phase I Studies. August.

SBSP (South Bay Salt Pond) Project Management Team. 2010. South Bay Salt Pond Restoration Project, Phase II: Preliminary Options for Future Actions. September.

SBSP (South Bay Salt Pond) Project Management Team. 2009. *South Bay Salt Pond Restoration Project Status Report*. August.

Takekawa, J., Arriana Brand, Isa Woo, Stacy Moskal. 2011. Effects of regional wetland restoration on the Alviso Shoals of the South San Francisco Bay: migratory bird ecology, food webs, and sediment supply. February.

United States Fish and Wildlife Service (USFWS) and United States Geological Survey (USGS). 2012. *South Bay Salt Pond Restoration Project, 2011 Annual Self-Monitoring Report*. March.

United States Fish and Wildlife Service (USFWS). 2007. Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (*Charadrius alexandrinus nivosus*). In 2 volumes. Sacramento, California. xiv + 751 pages.

This section provides an overview of the habitat restoration, flood control, and recreation opportunities and constraints for the ponds in the Eden Landing Pond Complex being considered as part of Phase II of the South Bay Salt Pond Restoration Project. The physical characteristics of the ponds are summarized in Table 1. The potential opportunities and constraints for different clusters of ponds are summarized in Table 2. Opportunities represent alternatives for achieving the project goals. Constraints are technical, legal, financial, temporal, or political/social barriers to successful implementation. They are included to assist the PMT in considering cost and ease of permitting, or to avoid development of alternatives that are inconsistent with any of the three goals of habitat restoration, flood control, and public access/recreation.

The Eden Landing Phase II restoration includes Ponds E1-E7 (south of Old Alameda Creek channel) and most of the so-called "C-ponds", E1C, E2C, E4C, and E5C. (Pond E3C still belongs to the Cargill company, and it is not part of the project.) In Phase II, these ponds would be converted to tidal marsh. For the purposes of this memorandum, adjacent ponds with similar opportunities and constraints are clustered for discussion. The reason for defining potential restoration clusters is to provide the opportunity to restore the site in pieces as funds become available. Although it may be more cost effective to restore the entire site as a single unit, the reality of funding availability makes it likely that the site will be restored in pieces over many years. The clusters discussed below can be restored to a fully functioning tidal wetland without restoration of the other clusters. However, restoration actions do not need to be defined by these clusters. Figure 2 illustrates the pond clusters and possible locations of some conceptual design elements.

The clusters are:

- All ponds.
- Bay Ponds: Ponds located near the bay: E1, E2, E4, and E7.
- Inland Ponds: Ponds located inland from the bay: E5, E6, and E6C.
- Southern Ponds: E1C, E2C, E5C, and E4C.

They were clustered together in this analysis because the levee needed to separate the Bay Ponds from the Inland Ponds is shortest when constructed between Old Alameda Creek and the ACFCC roughly along the berm presently separating Ponds E6 and E5 from Ponds E4 and E7 (Figure 2). Other clusters are possible (for example, separating E1 and E2 from the other ponds), but conceptually the opportunities and constraints in other approaches to clustering would be similar to the clusters proposed here.

The proposed Phase II activities at Eden Landing provide opportunities to increase public access and recreation though the creation of new trails that would connect to the proposed Bay Trail. The Bay Trail spine itself would eventually pass along the eastern edge of the pond complex. Additional trails and interpretive displays around or near several of the smaller ponds (particularly the Southern Pond cluster) become feasible if easements or property is obtained. These possibilities are discussed in the sections that follow.

One additional flood control concept must be defined here, because it shapes much of what is possible for restoration and recreation at Eden Landing. The Alameda Creek Flood Control Channel [ACFCC]) has proposed that a "landmass" be constructed along the Bay-front edge of ponds E1 and E2 as shown on Figure 2.

The purposes of the landmass are: (1) protect the wetlands and urbanized areas landward of the landmass from flooding even in the absence of a certified levee; (2) force all tidal flows that could potentially flood urbanized areas to travel up Old Alameda Creek and the ACFCC and through the wetlands to dampen tidal surges and therefore lower the water surface elevation near the urbanized areas. The ACFCD expects the landmass to negate the need for a FEMA-certified or engineered levee along the landside boundary of the wetlands (adjacent to Ponds E6 and E5). The landmass would be at a minimum 100 feet wide with a top surface elevation several feet above the design water surface elevation (e.g., 100-year flood event) to account for freeboard and projected levels of sea level rise (SLR). If the landmass is not built, then some other form of flood control structure (e.g. a Federal Emergency Management Agency (FEMA)-certified engineered levee) would need to be installed on the landward side of the Eden Landing Pond Complex before restoration could proceed at the Bay Ponds

3.1 LEVEE BREACH DESIGN CONSIDERATIONS

There are several concepts that apply to any tidal restoration alternative that may be considered in the Eden Landing Pond Complex. The Eden Landing ponds are presently protected from tidal action by levees or berms (in this memo levees are considered engineered structures designed for flood control; berms are similar to levees but not necessarily engineered and may not have the size and strength of a levee. The only levees designed for flood control are those along the ACFCC.) One of the most important issues associated with tidal restoration of any of the Eden Landing ponds is the location and size of breaches.

The pre-development Eden Landing area had multiple locations for tidal access either directly along the Bay or from tidal sloughs (the largest located at the present site of the ACFCC). The location and size of breaches is not proposed at this time; these will be determined during future design steps. In the historic (pre-development) condition, there was a connection to a large slough or the Bay for approximately every 100-150 acres of wetland. To mimic this condition the restoration could include new pilot channels (likely at the locations of historic sloughs) and smaller channels connecting the wetlands to these sloughs as necessary. The sloughs/channels could be constructed as starter or pilot channels constructed to encourage channels to form naturally.

Breaching the levees or berms brings tidal waters to the interior of the ponds. Constructing tidal channels in the ponds provides drainage of the wetland. In general, it is easier to flood a tidal wetland than it is to drain it. When selecting the number, size and location of the breaches and other drainage features such as secondary channels, the size and location of the breaches determines the speed of restoration. An inadequate drainage network can result in a wetland that does not drain completely resulting in standing water over all or parts of the wetland. This will generally inhibit the growth of vegetation. However, once the surrounding levees/berms are breached, a drainage network will eventually form in the wetland. For cases where levee/berm breaches are unarmored and material is erodible, breaches that are too small will self-correct over time, and the restoration should be successful, though the time frame for complete success may vary. For breaches that are to be armored or where material is non-erodable, it is more critical that drainage features be adequate from the beginning.

The opportunities and constraints for each of these clusters are discussed below.

3.2 BAY PONDS (PONDS E1, E2, E4, AND E7)

3.2.1 Summary Information and Restoration Approach

The Bay Ponds are 4 large ponds that together are approximately 1,375 acres and thus constitute about 75% of the total southern Eden Landing complex. To restore tidal action to this area, breaches could be made in the levee/berms on the south side of E2 and E4 (north of the ACFCC) and/or on the north side of E1 and E7 (at Old Alameda Creek). During the conceptual design, the number and size of these breaches will be further evaluated. Since the area to be restored is large several relatively smaller breaches or fewer relatively larger breaches could be installed. Depending upon the number of breaches, the breaches would vary in size from less than 100 feet wide to over 200 feet wide. Depths (invert elevations) could be from about 10 feet deep to almost 20 feet deep (measured below mean higher high water [MHHW]) (PWA, 1995). Table 2 summarizes estimates of potential breach characteristics and the associated opportunities and constraints.

Due to the distance of these ponds from parking areas and sensitive habitat in the area the potential for developing recreational trails and interpretative centers in the area are limited. Bridges could be provided over armored levee breaches. Water trails (i.e., accessible by kayak) could be established, though none are currently planned.

Breaching the Bay Ponds would provide over 1,300 acres of tidal wetland habitat, in accordance with the Phase II goals. Given that the pond bottom elevations are already above mean sea level (msl), once the levees/berms are breached, vegetation growth is expected to be successful as long as adequate drainage is provided.

The Programmatic Environmental Impact Statement/Environmental Impact Report (EIS/EIR) conceptually showed three breaches at the approximate location of historic tidal sloughs (PWA et al. 2007). However, the ACFCD has proposed a flood control measure (the landmass, described earlier in Section 3) that could impact the type of restoration that can occur on the site. Based on this, two potential opportunities for providing flood protection are discussed below: bayside flood protection and landside flood protection. Within these two scenarios there are multiple alternatives, opportunities, and constraints for flood protection, recreation, and restoration.

3.2.2 Bayside Flood Protection

As noted, the ACFCD has proposed that a landmass be constructed along the Bay-front edge of ponds E1 and E2 for flood protection and tidal restoration. The following discussion assumes that this landmass is successfully installed there.

Opportunities

The construction of the landmass for flood control purposes provides an opportunity to construct a large area of ecotone and provide for a zone of upland transitional habitat. Figure 3 provides a cross-section of a conceptual design of the landmass. Although there are not yet any designs for the landmass, conceptually, it would consist of two retaining berms and the space between them filled with dredged disposal material. The inboard slope of the berm could be made shallow to provide transition habitat. Figure 3 shows two options a 10:1 (horizontal:vertical) slope and a

50:1 slope as well as the no transitional slope of 3:1. Initially, the berm would provide intertidal, wetland fringe and upland habitat. As SLR progresses, the wetland habitat would migrate up the slope decreasing the amount of upland habitat.

In addition, the landmass may also be able to provide habitat for terns or resident ducks or geese. Less likely, the landmass could provide western snowy plover (*Charadrius alexandrinus nivosus*) habitat if it were configured as a form of barrier beach. Maintenance of the landmass – in whatever habitat use it may be designed to provide – may be difficult and/or costly because of access issues.

The availability of dredged material may also provide the opportunity to create nesting islands in the ponds themselves, assuming the landmass does not require all of the available material to be used to build it. Upland transition and high tide refugia would be focus for intertidal areas.

The conceptual plan in the Programmatic EIS/EIR is to breach the E2 levee at the location of an historic slough and breach the ACFCC levee just opposite the E2 breach. This would allow the ACFCC to be the main supply of water to the wetland forming in E2. The EIS/EIR also shows a breach into E4 at the location of an historic slough. This would require an additional breach of the ACFCC levee just west of Pond E1C. The act of breaching the E2 and E4 levees, even if the ACFCC levee is breached, exposes the existing 700-foot wide tidal wetland ("levee wetland") wetland between the E2/E4 berms and the ACFCC levees to erosion. As an alternative to breaching the ACFCC levee, the existing channel in the levee wetland could be enlarged to provide a pathway from the Bay to the E2 and E4 breaches. The northern levee with E1 could also be breached to connect with the Old Alameda Creek channel.

Constraints

If the landmass is constructed, breaches into E2 could not be located on the bay-facing side of this pond; they would have to be located on the levee to the south. However, it is unlikely even without the landmass that the bay front levee would be breached as part of wetland restoration.

Connecting the E2 and E4 ponds to the Bay by a channel in the levee wetland or through a breach in the ACFCC levee will cause erosion in the levee wetland. To the extent existing wetlands are affected, there could be a constraint on permitting. However, the new wetlands formed in E2 and E4 (and others) would be several orders of magnitude greater in size than those that would be lost. In this sense, the restoration project could be considered self-mitigating with regard to wetlands.

Breaching E1, E2, E4 and E7 will allow water into the Eden Landing ponds. This could reduce the ability of the ponds to attenuate storm surges and provide flood protection to the urbanized areas inland of the ponds. Modeling and analysis will be required to determine how sensitive the storm surge attenuation is to breach size. If the attenuation is sensitive to breach size in the range that is expected to occur due to the restoration the ACFCD may want to harden the breaches into E1, E2, E4 and E7 to preserve the flood control capacity of the wetland. If the breaches expected to occur due to the restoration are small relative to the size breaches that effectively reduce the attenuation of storm surge, then no hardening may be needed.

For example, if modeling and analyses show that breaches in the levees or berms after restoration are expected to be on the order of 150 feet wide if left unconstrained, and the analyses show that breaches larger than 100 feet wide reduce the ability of the wetland to attenuate storm surges, then the breaches may need to be hardened to prevent them from enlarging beyond 100 feet

wide. On the other hand, if the modeling and analyses show that the wetland sufficiently attenuates storm surges even with breaches up to 300 feet wide then the breaches would not need to be hardened.

While the restoration of a formally non-tidal area (e.g., salt pond) to tidal action generally involves levee breaching, it may also involve constructing drainage channels. The drainage channels could consist of large main channels (essentially replacing the tidal slough that would have existed pre-development) and possibly smaller drainage channels to facilitate drainage in portions of the ponds that are particularly deep or far from the breaches to tidal flows. As the marsh develops, a channel system will develop where new channels will form. Constructed channels will respond to the new tidal prism (if undersized when constructed), and equilibrium conditions will develop. Without hardening, as discussed above, the restoration design can self-correct. That is, undersized channels and breaches can enlarge over time if they were undersized when constructed, or if they are responding to SLR.

Conversely, if the breaches or channels are hardened, they could not increase in size and therefore could not self-correct or adapt to future SLR. This would result in more of a necessity to construct full size breaches and main channels to ensure a successful restoration. Also, hardened breaches can lead to less complex channel development, which makes habitat less desirable to particular species, or it can lead to mosquito problems when areas are poorly drained.

The previous (2008-2010) restoration actions at Eden Landing north of Old Alameda Creek lowered some of the levees/berms in addition to breaching them. This option may be limited when designing for flood control. The purpose of the landmass concept is to use the wetland to dampen storm surges and thereby limit the risk of flooding to development landward of the wetland. This dampening is required for large storm events (e.g., 100-year event) but not for smaller events. Lowering a levee/berm has the greatest affect during large events since that is when the remaining levee/berm is overtopped by the greatest amount. Modeling will need to be conducted to determine the possibility of lowering levees/berms.

One uncertainty that could become a constraint is the capacity of Old Alameda Creek and the ACFCC to carry the additional tidal prism for the proposed restored ponds. This should be further analyzed before implementation.

The levees along the north side of ACFCC are federal flood control levees. Section 408 of the Clean Water Act (Title 33 of U.S. Code) requires approval of the U.S. Army Corps of Engineers (USACE) before making any major modifications of federal levees. Therefore coordination of with the USACE will be necessary if these levees are to be breached as part of the restoration.

3.2.3 Landside Flood Protection

Although not designed or constructed for flood control purposes, the Cargill salt ponds incidentally provided flood control for the urbanized areas inland of the ponds. Restoring Eden Landing's ponds to tidal marsh without the addition of improved flood protection has the potential to reduce the level of flood protection currently being provided by the ponds. For the restoration to proceed, flood control will need to be maintained for the inland areas. This alternative assumes that necessary flood control would be provided at the inboard side of Ponds

E6, E5 and E6C. Presently, however, a land-side levee (or landmass) is not being considered by the ACFCD. This is a topic for further development and consideration during design.

Opportunities

Breaches could be installed at multiple locations. Large tidal sloughs could be constructed or allowed to form to maximize the tidal exchange throughout the wetlands. Also, levees/berms could be lowered to increase wetland exchange during large events to provide more diversity of habitat that would arise from increased diversity in topography. Until they erode way the levee remnants would provide habitat that has a different hydroperiod and depth of flooding than the majority of the wetland. Channels formed in breached levees could be either excavated or allowed to erode to an elevation that would provide fish passage connectivity during all parts of the tide cycle.

Constraints

Flood protection is required before restoration can proceed. If the landmass is not built, then some other form of flood control structure (e.g. a Federal Emergency Management Agency (FEMA)-certified engineered levee) would need to be installed on the landward side of the Eden Landing Pond Complex before restoration could proceed at the Bay Ponds. This is not presently being considered by ACFCD.

3.2.4 Add/Improve Recreation Trails and Public Access

Adding and enhancing recreation and public access at the southern Eden Landing ponds is a central part of the Phase II planning. New or improved trails and public access opportunities will be provided regardless of whether the bayside flood protection (landmass) or the landside flood protection (FEMA-certified levee) option is chosen and what the sequence of tidal marsh restoration of pond cluster is. Therefore, this section stands alone to highlight the recreation and access components of the Phase II actions.

Opportunities

There are several recreation and public access opportunities in the Bay Ponds:

- Interpretative signage could be provided at the former Alvarado Salt Works site (Figure 2).
- The completion of the Bay Trail spine is a top priority. Completion of the Bay Trail spine could proceed faster with the completion of a bayside landmass, which would provide added flood protection.
- California Environmental Quality Act (CEQA) work for the Bay Trail has already been completed by East Bay Regional Parks District (EBRPD) allowing completion of this trail to occur more quickly.
- With bridges over breaches (e.g., over Old Alameda Creek and Alameda Flood Control Channel as shown on Figure 2), spur trails from the Bay Trail could be along added to Old Alameda Creek and maintained along ACFCC levees. Alternatively, if the J-Ponds or levee wetlands are used to supply water to the restored ponds then the northern levee on the ACFCC could be used for hiking without the need for bridges.

- Turk Island and Cal Hill (both owned by Cargill), as well as the Turk Island Landfill (under private ownership by the Turk Island Company) are highpoints that provide opportunities for viewing areas, if easements or ownership of the properties can be obtained.
- Restoration is compatible with the "water trail" kayak/canoe route along the west edge of E2. Adding haul-outs or other interpretive features is an option.
- Recreation on the landmass itself – in the form of water trail haul-outs and/or a hiking trail – would be possible if the landmass were connected by bridges to other parts of the trail system.

Constraints

Bridges would be required over breaches. Increasing the number of breaches could increase tidal exchange but could limit recreation opportunities unless all the breaches are bridged. These bridges would provide possible predator access or movement corridors. Increasing public access through trails (on the landmass or elsewhere) may impact use of the area by wildlife species that are sensitive to disturbance. Also, if there are locations where levees/berms were lowered, public access would be limited beyond those points. For all recreation, except the Bay Trail spine, funding for long-term operation and maintenance is a constraint.

3.3 INLAND PONDS (E5, E6, E6C)

The Inland Ponds lie to the east of the Bay Ponds. Restoration of these ponds necessitates increased flood protection. The development of a landmass at the bay side of E1 and E2 is currently proposed by the ACFCD to provide this flood protection.

To restore these ponds before the Bay Ponds, a temporary levee would need to be constructed between Ponds E4/E7 and Ponds E5/E6. This would isolate these ponds from the urbanized area, allowing them to be restored before the landmass is constructed or before alternative flood control measures are considered. Waiting until after restoration of the Bay Ponds is complete would reduce the need for this temporary levee, but would still require the landmass, as noted above.

3.3.1 Summary Information and Restoration Approach

If the Bay Ponds are to be restored before flood protection is provided to the urbanized areas east of Ponds E5 and E6, a temporary levee will need to be constructed separating the two clusters as described under Bay Pond restoration.

This cluster of ponds, comprising the eastern portion of the unit to be restored, is approximately 445 acres. To restore tidal action to this area, breaches could be made north of E6 along Old Alameda Creek, south of E6C through an unnamed channel, or by breaching the interior berms at the western edge with E7 and E4 (this approach assumes these have already been restored). During the conceptual design, the number and size of these breaches will be further evaluated. Depending upon the number of breaches, the breaches would vary in size from about 50 to over 100 feet wide and 8-15 feet deep (measured below MHHW) if the Inland Ponds are isolated from the Bay Ponds. Table 2 summarizes possible estimates of the breach characteristics.

The Phase II goals specify that these ponds be converted to tidal marsh. Given that the pond bottom elevations are already well above msl, once the levees/berms are breached, vegetation growth is expected to be successful as long as adequate drainage is provided.

Detailed designs for Phase II projects have not yet been developed, but conceptual planning is underway now. The Programmatic EIS/EIR conceptually showed a single breach and new slough feeding these ponds off of Old Alameda Creek. There is also an assumed connection with the Bay Ponds that would provide tidal waters to these ponds. If the Inland Ponds are restored separately from the Bay Ponds then there would be no connection with the Bay Ponds and either a larger breach on Old Alameda Creek or several breaches would need to be constructed. These larger breaches may conflict with the flood control goals of the ACFCD.

These ponds are adjacent to developed areas of Union City and Hayward to the east and could provide opportunities for both recreation and creation of an upland habitat transition zone.

The Union Sanitary District (District) wastewater treatment plant is located adjacent to the corner of Pond E6 and Old Alameda Creek. The District presently has an overflow discharge into Old Alameda Creek at this location. The District is willing to move its discharge or have an additional discharge into the Eden Landing ponds if that option is mutually beneficial. The discharge could be high on the shoreline to create a transition zone from the discharge point to the pond or could discharge directly into a pond creating a brackish environment. The initial concept from the District is to discharge only during extreme events. In this case, there is little environmental benefit since the discharge would be too sporadic for a compatible habitat to develop. However, the District is also open to an option for a more regular discharge which would provide an opportunity to create more diverse habitat.

3.3.2 Breaching Ponds E5, E6 and E6C

Opportunities

Breaches could be installed at one or more locations. Large tidal sloughs may be constructed or allowed to form to maximize the tidal exchange throughout the wetland. Also, internal berms between the ponds could be lowered or breached to increase wetland exchange and to provide more diversity of habitat.

The Inland Ponds are currently slated to be restored to tidal marsh. However, if the Inland Ponds were separated from the Bay Ponds by a levee, they could continue to be managed as ponds (providing open water habitat for diving or dabbling birds) even if the Bay Ponds were restored to tidal action. In this case, these ponds would need to have new water control structures so that CDFG will still be able to manage water flow into and through them. Further, these ponds could be modified and managed for snowy plover habitat either as seasonal ponds or with the addition of islands within the ponds. However, since the only water control structures are in Ponds E1 and E2, new water control structures would need to be installed in E6.

The Union Sanitary District discharge can provide a freshwater source and opportunity to create a more diverse habitat with the addition of freshwater to the saline or brackish system that will exist without the discharge. The effect of the freshwater source depends on the ambient salinity, which continuously changes. The largest potential benefit would be if the discharge were to occur in combination with a landmass that was constructed on the east side of Pond E6, instead of on the Bay Ponds as is generally planned. If the discharge were placed high on the slope (for

example, at the location of the highest observed water level) this would provide for the creation of the most complex habitat varying from mostly fresh with occasional saline high on the slope to brackish with swings between fresh and saline lower on the slope.

If a large transition zone is not feasible, the opportunities for developing a large complex ecotone are limited since the internal slopes of the levee are too steep to develop a large transition area. In this case, the freshwater discharge can be used to develop an "estuarine"-like environment in a portion of one of the ponds (the size would be dependent upon the discharge rate and frequency from the District). This would provide an opportunity to develop a habitat that differs from what will exist in the other ponds in the Eden Landing Complex. If multiple breaches were made along a single levee/berm, this would provide isolated refugia that would be relatively free from predators.

Constraints

Restoration of these ponds would require flood control improvements. To restore the area to full tidal action the size of the breaches needs to be analyzed with regard to flood control concerns. Breaches may need to be undersized relative to optimal restoration needs to reduce flood risk to adjacent urban areas; they may also need to be hardened to prevent them from responding to SLR. The need for constraining the breach sizes will be determined as part of the restoration/flood control analysis conducted as part of design.

Flood-control concerns may be lessened if the tides are dampened by not being directly connected to Old Alameda Creek, but instead receive tidal waters through the Bay Ponds and/or through a cluster of small ponds north and west of the Southern Ponds, known as the J-Ponds. The J-Ponds are not part of the reserve because they are owned by Alameda County. If landside flood protection (as discussed in Section 3.2.3) is provided, there would be fewer constraints on restoration.

Maintenance, e.g. removal of invasive species, of the landmass may be difficult and/or costly, partly because of access issues, but also because the landmass is not intended to support vehicles.

The discharge of treated wastewater into one of the Eden Landing ponds, which will not be considered as treatment wetlands, is an innovative concept that may require additional and more rigorous regulatory review. It could also result in additional permit conditions. In addition, additional pond-management activities, such as pepperweed or *Spartina* control, disease response, ongoing maintenance and operational needs, may be required if these ponds are to serve as a pond for treated wastewater. These additional management needs will be further explored during the evaluation of alternatives for the 10% design.

3.3.3 Add/Improve Recreation Trails and Public Access

Opportunities

There are several recreation and public access opportunities in the Inland Ponds:

- Completion of the Bay Trail spine would also be feasible under this option because flood protection would be provided. Completion of CEQA by EBRPD reduces the time that would be needed to provide the trail.

- Trail along E6 to Alvarado Salt Works could be added; interpretative signage and an interpretive platform would be a further improvement to such a trail.
- Bridge over Old Alameda Creek and breaches to allow small loop trail.
- Provide trail down east side of ponds, expanding into proposed upland habitat transition zone.
- Provide trails on interior berms to provide larger loop trails (e.g., between E7 and E5).
- Trail along Old Alameda Creek would provide access to the waters of the Bay.

Constraints

Bridges would be required over breaches. Increasing the number of breaches could increase tidal exchange but could limit recreation opportunities and/or increase trail construction and maintenance costs.

The possible trail along north edge of E6 was identified as being of particular concern to permitting agencies for potential to disruptions to habitat.

Increasing public access through trails may impact use of the area by wildlife species that are sensitive to disturbance. Trails may also increase predator access.

For all recreation, except the Bay Trail spine, funding for long-term operation and maintenance is a constraint.

Future sea level rise may necessitate modifications to trails or other public access features.

3.3.4 Upland Habitat Transition Zone

An upland habitat transition zone has been proposed along the northern and eastern sides of the Inland Pond cluster. This transition area was originally part of levee improvements that were expected to occur. If the bayside landmass concept is carried forward and the inboard levees are not improved or only minimally improved then the upland transition zone becomes less viable. However, even if the levees are not improved for flood control, a transition area could be constructed as part of the restoration program. If the landmass were constructed on the land side of Ponds E5 and E6, a large transition zone could be constructed.

Opportunities

- Provides transitional habitat for wildlife refugia during high tide and makes system more resilient to sea level rise.
- This area is part of the Bay Trail, and construction of a transition zone would provide an opportunity for recreational users to view a wider variety of habitat types and an opportunity to provide educational signage on the value of transitional ecotones in the Bay.

Constraints

This action would require a large volume of dredged or upland fill material. Access to the site is difficult given the amount of material required. Access from the land side would have significant

impacts to the urban environment due to the large amount of truck traffic. Access from the water side would require pumping slurry over 3 miles which might be prohibitively expensive.

Further, it may be difficult to permit, due to impacts to existing habitat, though the gain in habitat diversity may make the project self-mitigating.

3.4 SOUTHERN PONDS (E1C, E2C, E4C, E5C)

3.4.1 Summary Information and Restoration Approach

This cluster of ponds is often referred to as "the C Ponds" but here is called the Southern Ponds. It includes Ponds E1C, E2C, E4C, and E5C located at the southeastern end of the Eden Landing Complex and encompasses approximately 695 acres.

These ponds are adjacent to the developed area of Union City to the east and could provide opportunities for both recreation and creation of an upland habitat transition zone. The proposed landmass at E2 would have limited influence over water levels and flood protection at the Southern Ponds since the proposed water source is the ACFCC rather than the Bay or Inland Ponds. Therefore, some flood protection, likely along the south and east edge of E2C, E4C, and E5C, would be needed.

3.4.2 Breaching Ponds E1C, E2C, E4C, E5C

The Phase II goals specify that these ponds be converted to full tidal action. Given that the pond bottom elevations are already well above msl, vegetation growth is expected be successful once the levees/berms are breached as long as adequate drainage is provided.

Opportunities

To restore tidal action to this area, breaches could be made north of E4C, E5C and E1C or south of E2C or E1C from ACFCC. During the conceptual design, the number and size of these breaches will be further evaluated. Depending upon the number of breaches, the breaches would vary in size from about 80 to over 100 feet wide and 10-15 feet deep (measured below MHHW). Table 2 summarizes estimates of the breach characteristics.

The Programmatic EIS/EIR conceptually showed a single breach and slough feeding these ponds off of ACFCC. These ponds are already isolated from the Bay and Inland Ponds and so can be restored independently. However, Cargill still owns property within the pond cluster (e.g., Turk Island) so the restoration needs to be coordinated with Cargill before developing design plans.

Constraints

Breaching of these ponds may require improved flood control in order to maintain flood protection at the current level. Levees along the external borders of E3C and E4C may need to be improved to FEMA standards. Full tidal action will likely require breaching the ACFCC levee. As was noted in Section 3.2.2, modifying a federal flood control levee requires approval from the USACE under Section 408 of the Clean Water Act.

If breaching of the levee becomes problematic, there are few other options for tidal restoration. The J-Ponds could be used as a source of tidal water for the Southern Ponds if permitted by Alameda County but may result in a dampened tidal system.

3.4.3 Add/Improve Recreation Trails and Public Access

The Southern Ponds probably provide the best recreational opportunities of all the Eden Landing ponds being considered for restoration. They are easily accessible from the well-established and used ACFCC trail; they are immediately adjacent to residential areas; they provide a variety of land uses and landforms (e.g., Turk Island, upland areas, farms, existing wetlands); and they are adjacent to Coyote Hills Regional Park. With construction of a bridge across the ACFCC, they could be directly connected to the park. However, the upland areas are owned by Cargill (including Turk Island and the hills along Alameda Creek trail (e.g. Cal Hill), and an agreement or easement would be necessary to provide access through these areas. As importantly, they could provide a non-urban, north-south Bay Trail connection.

This portion of Eden Landing has existing recreational uses, and – because the Southern Ponds are small, allowing for easy public access and potentially less valuable to wildlife, and somewhat isolated from the rest of the Eden Landing ponds – restoration of this area would provide a good opportunity for public access to tidal wetlands. The existing internal berms could be used for construction of a trail system.

Concentrating trails and recreation in this area would leave the larger Bay Pond and Inland Pond complexes relatively undisturbed. Sensitive or shy species would have the Bay Pond and Inland Pond clusters for habitat that would have minimal public access under any restoration scenario. Further, there are numerous areas where viewing platforms could be constructed that would allow viewing of most of the wetland. With interpretive signage and docent-led walks, these ponds would provide a good location for public education of tidal wetland function. Additionally, given the close proximity to the larger ponds in the Eden Landing complex, the use of this area for heavier recreation use would provide a good laboratory to study the effects of human activity on wetland use by wetland species.

Opportunities

- A segment of the Bay Trail spine could be constructed along the eastern edge of E4C. The development of the Bay Trail Spine could occur more quickly with the provision of the landmass to provide flood protection.
- The Southern Pond cluster is the only group directly accessible from an existing maintained trail, the EBRPD's Alameda Creek Trail; ponds in this cluster could also be accessed via the road at the end of the J-Pond storage area if this road were designated for public access.
- This cluster contains Turk Island which provides a unique recreational opportunity. Cargill still owns the island and dos not allow public access as a corporate policy, so any incorporation of the island into the restoration would require purchase from Cargill.
- The existing trail along the south side of the ACFCC could be connected via a bridge over the ACFCC and/or connected to other proposed trails along the Eden Landing Pond levees.

- There is sufficient upland area near this cluster of ponds to construct a wildlife viewing platform that is easily accessible to the public.
- This section of Eden Landing is the only opportunity to provide a Bay Trail connection between Old Alameda Creek and the ACFCC that does not require trail users to use urban sidewalks or road. Whether the trail is on the eastern edge or on the existing or a re-configured levee/berm network, this area provides a superior recreational trail opportunity than outside the project area.

Constraints

- Pond E2C is presently connected to the ACFCC by a culvert. For full tidal action, the culvert would need to be replaced with large box culverts or a full breach with a bridge.
- The trail along the south edge of the Southern Pond cluster was identified as being of particular concern to permitting agencies for potential to disrupt habitat.
- Future trail planning needs to be coordinated with Cargill due to their ownership of some of the adjacent lands.
- Any bridge crossing over ACFCC would need to be coordinated with ACFCD.
- Increasing public access through trails may impact use of the area by wildlife species which are sensitive to disturbance; however, they could still use the Bay Ponds or Inland Ponds which will likely have less public access.

4.1 NEPA/CEQA STRATEGY

A Programmatic EIS/EIR for the entire SBSP Restoration Project was completed and signed in 2007 (PWA et al. 2007). That document also served as a project-level EIS/EIR for the Phase I actions that were to be undertaken at all 3 complexes. Under the current scope, the preparation of an EIS/EIR for Phase II projects at the Alviso and Ravenswood Pond Complexes will be tiered off of the Programmatic EIS/EIR and will use as much of the existing Phase I project material as possible.

Because a similar EIS/EIR for the Eden Landing Pond Complex will be produced as part of a subsequent project task with the Conservancy, the plans for compliance with the NEPA/CEQA at the Alviso and Ravenswood complexes are described here. After the conceptual (10%) design alternatives have been developed, the impacts of at least three alternatives will be compared, including the 'no project' alternative. Alternatives may be in the form of the number/sequence of restoration actions (as done for the Phase I EIS/EIR) or could be different design alternatives for each restoration action proposed. The likely case will be a mixture of both of these interpretations of "alternatives."

Project descriptions will be written for each of the alternatives and summarized in the NOI/NOP. After the NOI/NOP is released, a public scoping meeting will be held to inform the public and agencies of the project alternatives and their potential impacts and to solicit their input regarding the environmental analysis. The EIS/EIR will then be drafted. The following sections are expected to be included in the EIS/EIR, which will largely follow the format of the Programmatic EIS/EIR (PWA et al. 2007):

- Hydrology, Flood Management, and Infrastructure (to include Sea-level Rise)
- Surface Water, Sediment, and Groundwater Quality
- Wetlands and Waters of the United States
- Geology, Soils, and Seismicity
- Biological Resources
- Recreation/Public Access Resources
- Cultural Resources
- Land Use
- Public Health and Vector Management
- Socioeconomics and Environmental Justice
- Traffic
- Noise
- Air Quality/Greenhouse Gas Emissions
- Public Services
- Utilities

- Visual Resources
- Cumulative Impacts

Additional field and technical studies are needed to complete the wetlands and other waters, biological resources, cultural resources, and recreation/public access sections. These studies will be conducted early during the development of the EIS/EIR and used to further inform future permitting tasks.

The Draft EIS/EIR will be released for public review. Interested parties and adjacent property owners will be notified directly. In addition, a public hearing will be conducted to receive public comments on the draft document. A Final EIS/EIR will be produced based on the public comments and a record of decision (ROD) and findings statement will be published and filed.

4.2 PERMITTING STRATEGY

Permitting for Eden Landing would occur under a new task or contract following the 10% conceptual design. The permits will utilize the framework of the Phase I permit applications and the project description prepared for the 10% design memo. Similarly, the Phase I permit conditions and/or those proposed in the Phase I applications will be used as source material for the Phase II applications.

The following permit documents are expected to be needed for this complex:

- Jurisdictional Wetland Delineation Report for the USACE
- Biological Assessment for the U.S. Fish and Wildlife Service (USFWS) (through USACE)
- Biological Assessment for the National Marine Fisheries Service (NMFS) (through USACE)
- Clean Water Act Section 404 permit application for U.S. Army Corps of Engineers (USACE)
- Clean Water Act Section 401 water quality certification application for the Regional Water Quality Control Board
- Clean Water Act Section 404(b)(1) Alternatives Analysis for the Environmental Protection Agency
- Consistency Determination request or Incidental Take Permit application for California Department of Fish and Game (CDFG)
- National Historic Preservation Act (NHPA) Section106 Technical Report for the State Historic Preservation Officer (through USACE)
- Native American consultation letters for NHPA compliance for USACE archaeologist
- Habitat Mitigation and Monitoring Plan for the USACE
- San Francisco Bay Conservation and Development Commission (BCDC) major permit application

Many regulatory agencies will be involved in the permitting process. To streamline the various application processes, prior to preparation of applications, an interagency permit scoping meeting(s) will be held to introduce the project and obtain feedback. Communication with agency staff will be on-going through the application development process to ensure that

applications adequately cover all of the topics of interest. Additional strategies related to each permit application or document are provided below.

4.2.1 Jurisdictional Delineation of Waters of the United States

A delineation of jurisdictional wetlands and other waters of the U.S. will be conducted in order to quantify those wetlands and other waters that would be impacted by the restoration actions. To the extent possible, the delineation will rely on existing LiDAR data and aerial imagery to define wetland and other waters extents. These extents will be verified and/or modified in the field. A previous delineation of wetlands was done for those ponds included in the Phase I actions, but it does not cover the area impacted under the Phase II actions. The wetland delineation will be conducted as early as possible, to serve as background data for the preparation of the NEPA/CEQA document, but more importantly, will be timed to occur with the blooming period of the wetland-indicator plant species.

As early as possible, the jurisdictional delineation report will be submitted to the USACE for its review and approval or modification of the jurisdictional boundaries. This is a critical step to take in the early parts of the project because several subsequent project applications and steps depend on a verified delineation from the USACE.

4.2.2 Biological Assessments for USFWS and NMFS

The Biological Assessment (BA) documents will be prepared concurrently with the 404/401 applications and will address federally-listed species with potential to occur in the Eden Landing Pond Complex and potentially impacted by the project. These BAs will be based on those prepared for Phase I and the issued Programmatic Biological Opinion (BO) and the BO for Phase I. The species expected to be covered under the BA for USFWS are: western snowy plover, least tern, tadpole shrimp, salt marsh harvest mouse, and California clapper rail. The species expected to be covered under the BA for NMFS are Central California Coast steelhead and green sturgeon.

As part of the biological assessment, conflicts among the recovery plans will need to be identified. Restoration actions beneficial to one listed species may be detrimental to another listed species. BAs will rely primarily on desktop data to map habitats and determine the potential presence of species, but some field work to assess species occurrence may be necessary.

4.2.3 Clean Water Act 404/401 applications

The 404 and 401 applications will be developed concurrently by staff that is familiar with the requirements of both USACE and RWQCB. Much of the information in these documents is the same, so figures and text will be shared between the two documents to the extent possible.

4.2.4 404(b)(1) Alternatives Analysis

This document describes alternatives to the project and identifies the Least Environmentally Damaging Practicable Alternative (LEDPA). The Alternatives Analysis will use the alternatives and project goals as defined the EIS/EIR prepared for the Phase II actions. It will analyze

impacts to wetlands and other waters as defined by the wetland delineation, and therefore, must be developed after the wetland delineation is complete and has been verified by the USACE.

4.2.5 Consistency Determination/Incidental Take Permit

Of the species potentially affected and covered under the USFWS Biological Opinion, the California clapper rail, California least tern, and salt marsh harvest mouse are also state listed. In addition, the California black rail is state listed, but not federally listed. All of these species are also fully protected species, meaning that no take permits can be issued for them except for research or as associated with recovery actions. For any state listed species that may occur in the site that is not fully protected, there are two avenues for obtaining take permission from CDFG for these species: a consistency determination or an Incidental Take Permit.

A consistency determination is appropriate only for species listed under both the Federal and California Endangered Species Acts. It is a letter from CDFG indicating that it agrees with the provisions of the Biological Opinion and that the measures therein are adequate to avoid jeopardy for the species; it also allows some level of take. It is the simplest and least costly way to obtain permission to take a California ESA-listed species. CDFG will be approached about Consistency Determinations for those species covered under the BO(s) issued by USFWS and/or NMFS. But in recent years, CDFG has not been as willing to issue them as it had been previously. Early consultation with CDFG will be initiated to determine whether Incidental Take Permit applications will be necessary for dually listed species.

For species listed only under the California ESA, Incidental Take Permits from CDFG would certainly be necessary. There are several species listed in the 2007 EIS/EIR that are state-listed, but not federally listed. If these species are to be impacted, an Incidental Take Permit would be required as these species would not be covered under the Biological Opinion. These state-listed species include American peregrine falcon, California black rail, and bank swallow. None of these species are expected to be nesting in the vicinity of the Eden Landing complex. It is assumed that they would not be impacted by the Phase II project activities, and would not trigger the need for an Incidental Take Permit.

4.2.6 Consultation in Accordance with the National Historic Preservation Act

Eden Landing qualifies as National Register of Historic Places-eligible as a cultural landscape. The impacts to an eligible cultural landscape would require some sort of mitigation, potentially Historic American Buildings Survey/Historic American Engineering Record documentation. To address cultural resources at Eden Landing, a desktop survey and field assessment for cultural resources would be conducted as part of the evaluation for the CEQA/NEPA document. The results of these surveys would be provided in a Technical Report to be submitted to the State Historic Preservation Officer. For example, the remaining structures at the location of the former Alvarado Salt Works will need to be addressed. These eligible cultural resources are identified for mitigation, such as recordation and interpretive development, may be needed. In addition to the preparation of the technical report, consultation would include preparation and submittal of letters to relevant local Native American tribes associated with the landscape.

4.2.7 Habitat Mitigation and Monitoring Plan (HMMP)

This is a document required to be submitted with the 404 and 401 applications. It discusses project mitigation and post-construction monitoring and success criteria. The HMMP will comply with the AMP, will incorporate the results of the ongoing Applied Science Studies, and will be based on the approaches and measures used in the Phase I projects and the permits and other documents associated with it. It will include post-construction mitigation measures for fill in wetlands and other waters of the United States. The mitigation approach will be to suggest that the project is self-mitigating, and that on-site restoration activities account for any wetland and other waters lost as part of the project. No off-site mitigation is expected to be necessary or proposed as part of the project. The HMMP structure will follow the USACE outline for wetlands and other waters mitigation. In addition, mitigation requirements to enhance wildlife habitat or protect water quality that might be required under the biological opinions or other permits may also be included. This would allow a single document to be used to describe all post-construction monitoring and maintenance requirements.

4.2.8 San Francisco Bay Conservation and Development Commission Major Permit

In previous discussions the Conservancy has had with BCDC, the latter has indicated that its preference would be to amend an existing permit rather than apply for a new permit. A single permit amendment application would be prepared for Eden Landing's Phase II actions. Prior to acceptance of the amendment request, two hearings, one with the Design Review Board and a second with the Commission, are anticipated.

Though many regulatory agencies prefer to be the last one to issue a permit – so that they can review the others before issuing their own – BCDC generally insists on it. Therefore, this application is planned to be the last one applied for.

4.3 CONCEPTUAL DESIGN, EIS/EIR AND PERMITTING SEQUENCE

The attached Gantt chart (Figure 4) depicts a proposed conceptual design sequence. While the dates may change, the sequence and relationship between different design steps is expected to stay the same. The conceptual design and project alternatives would be developed first, followed by development of the EIS/EIR document.

Permit application preparation would follow the completion of these two documents, though the field work, pre-application meetings with agencies, development of the strategies behind the individual permits, and even the drafting of portions of the text (e.g., the project descriptions) will likely begin during development of the conceptual designs but before the EIS/EIR documents are complete.

The planned schedule for the applications will contain time for responding to agencies' requests for additional information. The maximum agency review period will be assumed to be required. We also anticipate that all regulatory agency application processing fees will be required.

4.4 POTENTIAL PERMITTING CHALLENGES

Challenges to permitting the project come from the four points summarized below.

Cultural resources: Identification of unexpected cultural resources during survey may delay permitting process by adding additional mitigation in the form of recordation and interpretation.

Stakeholder cooperation: Disagreement between different stakeholders in the project, including resource agencies, recreational users, and flood control agencies provide challenges for designing a project that recognizes the co-equal goals of restoration, recreation and flood control. Dissension among these groups could delay the project. This challenge will be minimized by having frequent and early stakeholder involvement.

Threatened and endangered species habitat: Due to differing species habitat requirements, it is impossible to create habitat that will be compatible or suitable for all species. For example, tidal marsh habitat that is suitable for salt marsh harvest mouse will be unsuitable for western snowy plover. In order to obtain permits from state and federal wildlife agencies, the project as a whole must include a diversity of habitats that can accommodate multiple species. Early consultation with state and federal agencies during the design process will ease obtaining permits. Input from the project's Applied Studies will be considered in assessing how to balance between competing habitat needs. Communication should involve both state and federal agencies, where appropriate.

Tidal marsh versus managed ponds: In addition to threatened and endangered species, wildlife species that do not have state or federal designations also use the managed pond habitats. Many of these species are waterfowl that are popular among bird watchers and other recreational users. Input from the project's Applied Studies will be considered in the decision on whether to restore to tidal marsh or managed ponds.

Each of these topics should be considered and addressed early in the design processes in order to minimize delays in the permitting process and limit comments on the EIS/EIR.

Existing, available data in combination with the results and reports of ongoing studies is believed to be mostly sufficient for preparing the 10% conceptual designs and NEPA/CEQA document. However, the information listed below may be useful.

- Hydraulic calculations and modeling to evaluate breach locations and sizes. The County is currently modeling water elevations under different breach and management scenarios. Integration of these modeling efforts with the restoration goals is important to ensure that both are met.
- Quantities or estimates of tidal and storm surge-delivered sediment to inform understanding of likely accretion rates in breached ponds.
- Information on available dredged material and upland material for reuse.
- Evaluation of sea level rise study results. Although the design will not be driven by SLR concerns, a discussion of how the design may respond under future SLR conditions should be included.
- Results from ongoing or new SBSP-sponsored priority studies that may be available or become available.
- Bird use data would be helpful in determining if some of the Southern Ponds are critical for any shorebird species and should thus be retained as managed ponds.
- Jurisdictional wetland delineation report and eventual verification by the USACE (to be done as part of this project).
- Cultural resources desktop records review and field surveys for artifacts that may need mitigation.
- Reconnaissance site visits to confirm or update the most recent externally developed data on biological resources such as habitats for listed species (to be done as part of this project).
- The existing LiDAR/topography data (with 1-ft or less accuracy) needs to be reviewed and incorporated.
- Geotechnical studies may be needed as the design progresses.
- Quality (and quantity available) of sediment to be imported.
- Specific preferences for trail corridor and interpretive center locations.
- Public and Science Team feedback on proposed restoration design options.

Table 1. Characteristics of Existing Ponds

Pond Number	Physical Characteristics			
	Area (acres)	Average Pond Bottom Elevation (feet, NAVD88)	Estimated Diurnal Tidal Prism (acre-ft)	Existing Condition and Use
E1	290	5 -6 (lowest ~4, highest ~6)	640.9	muted tidal flow, inlet on Old Alameda Creek, possible outlet to E2 and E7
E2	680	mostly 5-6	1502.8	muted tidal flow, outlet to Bay, inlets from E4 and E1
E4	190	mostly 6-7	229.9	muted tidal flow, inlet from E5, outlet to E2
E5	165	mostly 5.5 to 6.5	282.2	Inlet from E6, outlet to E4
E6	200	mostly 5.5 to 6.5 , higher along north side	342.0	tidal flow; connected to E5 through 2 culverts
E7	215	about half 5-6, SE corner 6-7, low spots 4-5	475.2	muted tidal flow
E1C	150	6 to 6.5	219.0	indirectly managed flow through gates in pond E2C to the ACFCC
E2C	30	6 to 6.5	43.8	managed flow through gates in pond E2C
E4C	175	mostly 5.5 to 6	343.0	indirectly managed flow through gates in pond E2C through E3C
E5C	95	6 to 6.5	138.7	indirectly managed flow through gates in pond E2C through E3C and E4C
E6C	80	mostly 6 to 7	96.8	muted tidal flow through connection to E5

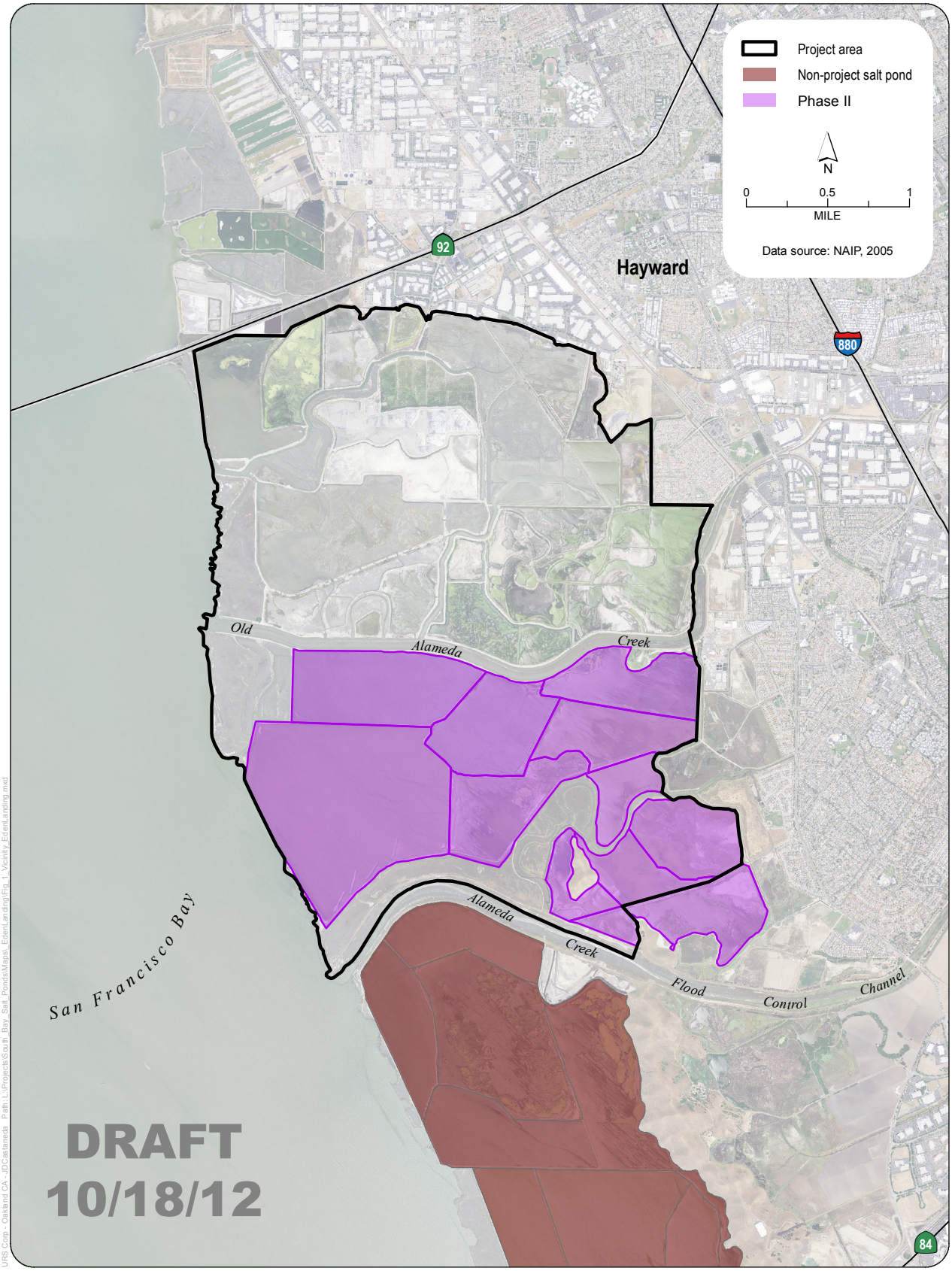
Table 2. Opportunities and Constraints Matrix

Pond Cluster(s)	No. of Breaches	Acres per Breach	Estimated Diurnal Tidal Prism/breach (acre-ft)	Effect of action on achieving goal (3 = strong effect; 2 = moderate effect; 1 = weak effect; 0 = no effect or the goal is N/A; -1 = may have negative effect)			Average Breach Width (ft)*	Average Channel Cross-Sectional Area (ft^2)*	Average Channel Depth (ft)*
				Habitat	Flood Mgmt	Recreation / Access			
Restore All but C-Ponds	1	1740	3473	2	3	3	230	2841	19
	5	348	695	3	2	2	133	1159	13
	10	174	347	3	-1	1	105	788	11
Restore Bay Ponds (E1, E2, E4, E7)	1	1375	2849	2	3	3	215.3	2544.1	17.7
	5	275	570	3	3	2	124.5	1038.0	12.5
	10	138	285	3	3	1	98.4	705.6	10.8
Restore Inland Ponds (E5, E6, E6C)	1	445	721	1	1	3	134.9	1183.5	13.2
	3	148	240	3	-1	2	92.9	641.8	10.4
	4	111	180	3	-1	2	84.2	546.8	9.7
Restore Southern Ponds (E1C, E2C, E3C, E4C, E5C)	1	139	168	1	0	3	142.2	1289.7	13.6
	2	348	421	2	-1	3	112.3	876.6	11.7
	5	695	841	2	-1	3	82.3	526.2	9.6

* Coats, R.N., Williams, P.B., Cuffe, C.K., Zedler, J.B., Reed, D., Waltry, S.M., and Noller, J.S.. 1995. Design Guidelines for Tidal Channels in Coastal Wetlands. Prepared for U.S. Army Corps of Engineers - Waterways Experiment Station. January.

Table 2. Opportunities and Constraints Matri

Pond Cluster(s)	Opportunities	Constraints
Restore All but C-Ponds	Breaches could be installed at multiple locations. Large tidal sloughs could be constructed or allowed to form to maximize the tidal exchange throughout the wetlands. Also, levees could be lowered to increase wetland exchange during large events to provide more diversity of habitat.	Flood protection is required before restoration can proceed. If wetland goals are to be the primary driver for the restoration project, a FEMA-certified levee or landmass would likely need to be constructed inland of the pond complex. This is not presently being considered by ACFCD. Also, the restoration could not proceed until flood control is implemented.
Restore Bay Ponds (E1, E2, E4, E7)	Breaches could be installed at multiple locations. They would not need to be hardened. Large tidal sloughs could be constructed or allowed to form to maximize the tidal exchange throughout the wetlands. Also, levees could be lowered to increase wetland exchange during large events to provide more diversity of habitat.	Flood protection may be required before restoration can proceed depending upon levees use to separate Bay Ponds from Inland Ponds. The use of the landmass concept on the Bay front requires that flood control and wetland restoration be permanently linked together, i.e. flood control requires certain characteristics of the wetland to be maintained.
Restore Inland Ponds (E5, E6, E6C)	Breaches could be installed at one or more locations. Internal levees could be lowered to increase wetland exchange and provide more diversity of habitat. If isolated from the Bay Ponds, they could to be restored before the landmass is constructed or could continue to be managed as open water habitat ponds even if the Bay Ponds were restored to tidal action. Trail along E6 to interpretative sign could be provided at Alvarado Salt Works. Loop trails could be provided if bridge over Old Alameda Creek and breaches are constructed and/or trails on interior levees are constructed (e.g., between E7 and E5). If upland habitat transition zones are constructed, trails could be placed there - possibly to link to Bay Trail. If the landmass concept is used, and the inboard levees are not improved or only minimally improved, then the upland transition zone becomes less viable. If the landmass was constructed on the landward side of ponds E5 and E6 the wetland restoration and flood control would be delinked, i.e., the wetland restoration could occur independently of the flood control once the landmass was constructed. In this case the landmass could provide transitional habitat benefits to pond E5 and E6. The Union Sanitary District is willing to move its emergency overflow discharge into the Eden Landing ponds. This could be used to create a transition zone from the discharge point to the pond or could discharge directly into a pond creating a brackish environment. Combined with a landmass on the landward side of the ponds would provide the greatest wetland benefits.	Would require flood control. If the Inland Ponds are isolated from the Bay Ponds and are restored to tidal action, improvements to flood control may be required to the existing landside levees. If the area is isolated from the Bay Ponds, full tidal action would require breaches of 80 to 100 feet wide, which could in turn affect flood control options. Breaches may need to be undersized or hardened to reduce flood risk to adjacent urban areas. Increasing the number of breaches could increase tidal exchange but could limit recreation opportunities and/or increase trail construction and maintenance costs. Bridges would be required over breaches. If a large transition zone is not feasible (for instance if the landmass is constructed along the bay) the opportunities for developing a large complex ecotone are limited since the existing slopes are too steep to develop a large transition area
Restore Southern Ponds (E1C, E2C, E3C, E4C, E5C)	Best recreational opportunities at Eden Landing. Easily accessible from the EBRPD trail. Immediately adjacent to residential areas. Provide a variety of land uses and landforms (e.g., Turk Island, upland areas, farms, existing wetlands). Adjacent to Coyote Hills Regional Park, and with construction of a bridge across the ACFCC, they could be directly connected to the park. Existing internal levees could be used for construction of a trail system. Sensitive wildlife species would have the Bay Pond and Inland Pond clusters for habitat with minimal public access. Viewing platforms would allow views of most of the wetland. With interpretive signage and docent-led walks, these ponds would provide a good location for public education of tidal wetland function. Bay Trail spine could be constructed along the eastern edge of E4C.	Would require improved flood control. Levees along E3C and E4C may need to be improved to FEMA standards. Full tidal action would likely require breaching the ACFCC levee. The J-Ponds (not part of the CDFG's Eden Landing Wildlife Reserve, and are owned by Alameda County) could be used for access to the Southern Ponds but may result in a dampened tidal system. Future trail planning and restoration needs to be coordinated with Cargill due to their ownership of some of the adjacent lands.



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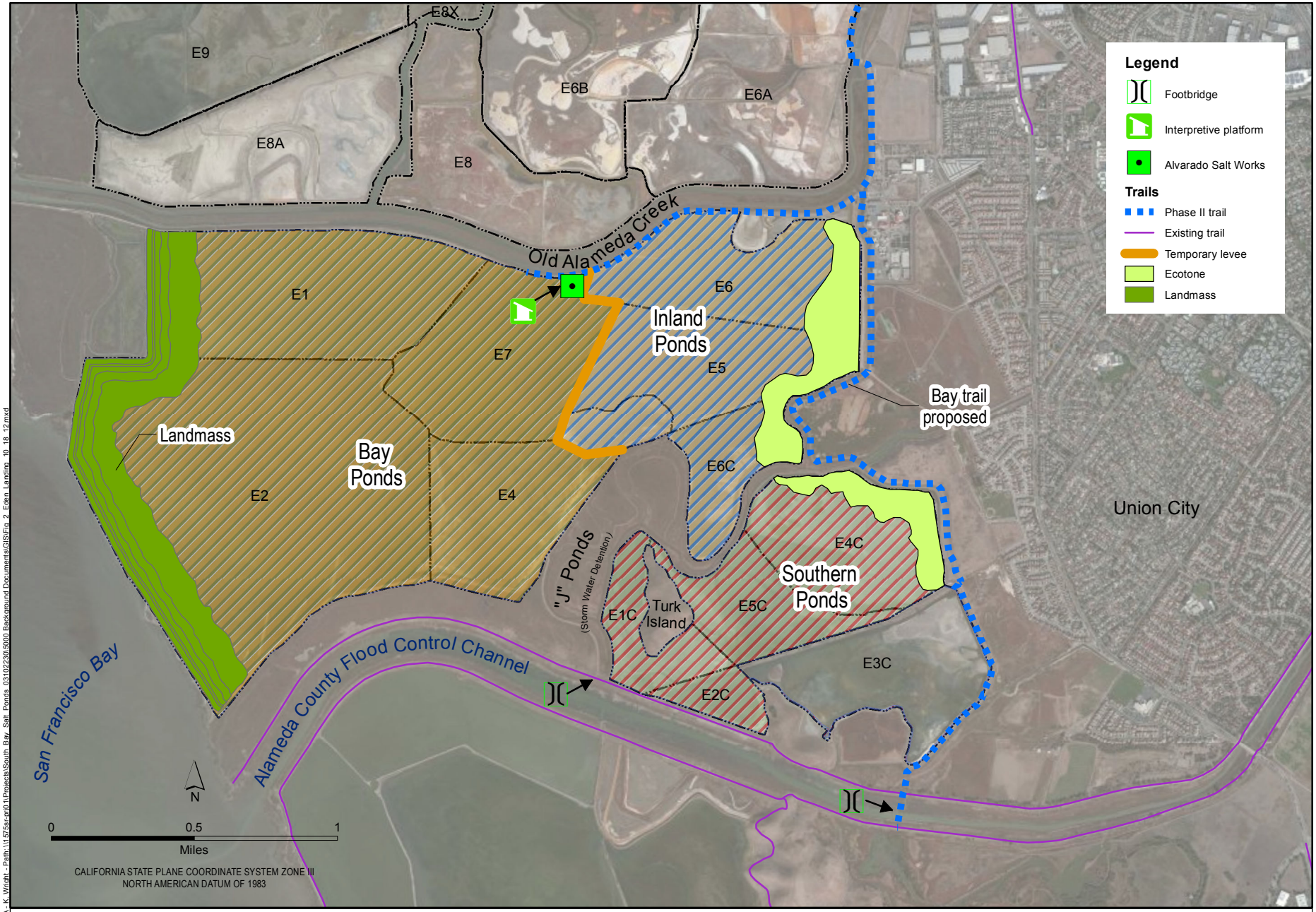
State Coastal Conservancy
South Bay Salt Ponds Project, Phase 2

Figure 1
Vicinity map - Eden Landing



URS Oakland CA, K. Wright - Path: \\r-675sv-pr01\Projects\South_Bay_Salt_Ponds_03102230\5000 Background Documents\GIS\Fig. 2 Eden Landing 10_18_12.mxd

URS

SOUTH BAY SALT PONDS
EDEN LANDING
ALAMEDA COUNTY, CA

DATE OF PREPARATION: 10/18/2012
DRAFT, FOR INTERNAL USE ONLY
URS PROJECT NO. 26818346

ALTERNATIVE DESIGN CONCEPTS
EDEN LANDING POND COMPLEX

EDEN LANDING PROTECTIVE LANDMASS

LANDMASS DIMENSIONS:

LENGTH	10,770	FEET
MAX HEIGHT	15	FEET
3 SLOPE OPTIONS		
1:3		
1:10		
1:50		

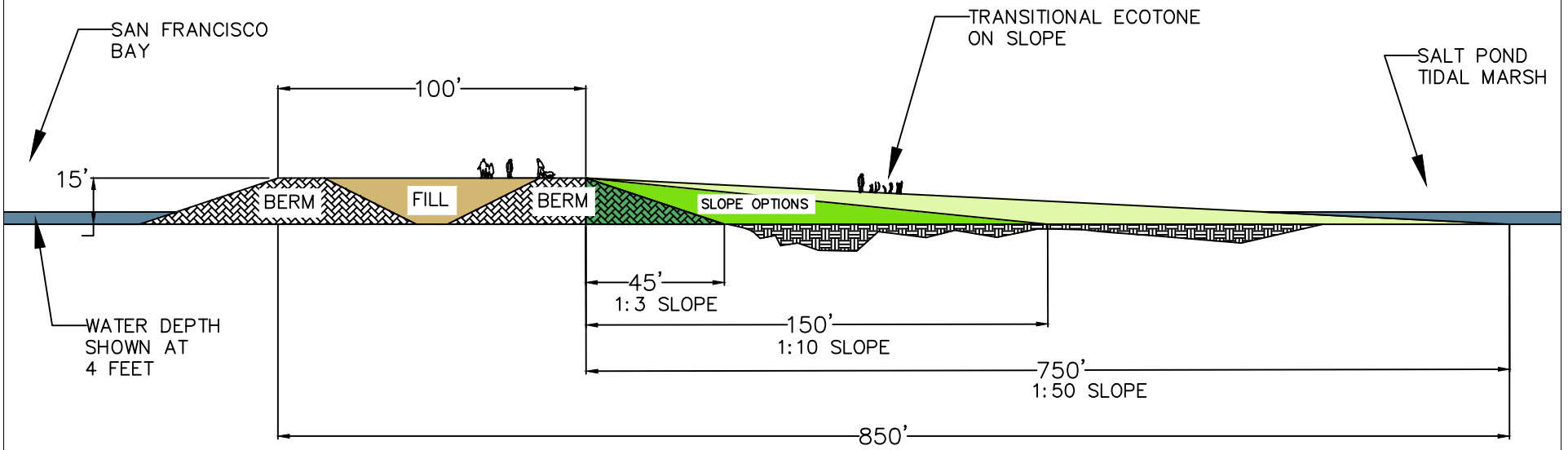


FIGURE 3,
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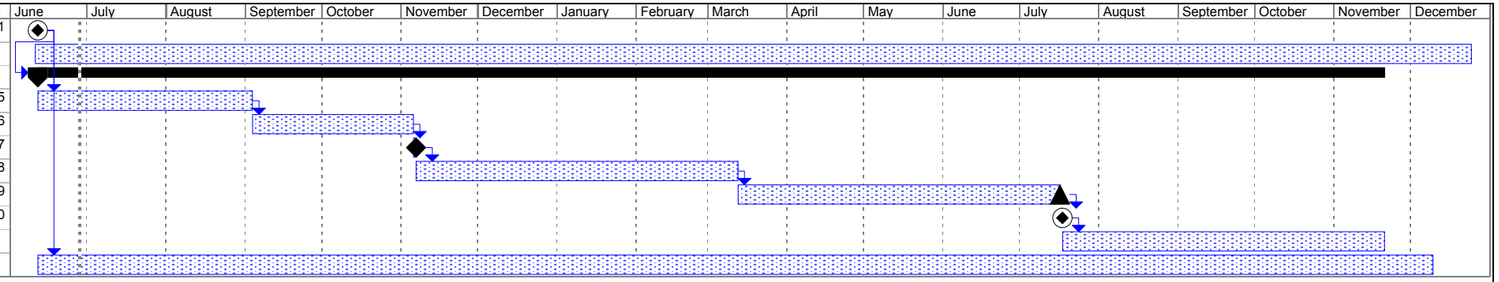
6/26/2012
NOT TO SCALE

ID	Task Name	Duration	Start	Finish	Predecesso	Successors
1	Notice to Proceed	1 day	Mon 6/11/12	Mon 6/11/12		4,3,11
2	Project Management	402 days	Mon 6/11/12	Tue 12/24/13		
3	**Alternatives Development and Conceptual Design**	**377 days**	**Tue 6/12/12**	**Wed 11/20/13**	**1**	
4	Review Phase II projects, AMP and Phase I Applied Stu	60 days	Tue 6/12/12	Mon 9/3/12	1	5
5	Rank Project Features	45 days	Tue 9/4/12	Mon 11/5/12	4	6
6	PMT Meeting	1 day	Tue 11/6/12	Tue 11/6/12	5	7
7	Revise Preliminary Design concepts	90 days	Wed 11/7/12	Tue 3/12/13	6	8
8	Develop Alternatives Draft 10% Design memo	90 days	Wed 3/13/13	Tue 7/16/13	7	9
9	Constructability Review Workshop	1 day	Wed 7/17/13	Wed 7/17/13	8	10
10	Refine and Deliver Alternative Design Memo	90 days	Thu 7/18/13	Wed 11/20/13	9	
11	**GIS Support**	390 days	Tue 6/12/12	Mon 12/9/13	1	



Project:South Bay Salt Ponds Restora

Task
Split
Milestone
Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Progress
Deadline