Clean Water Act Section 404(b)(1) Alternatives Analysis

Treasure Island / Yerba Buena Island Redevelopment Project: Ferry Terminal and Stormwater Discharge Outfalls

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1. INTRODUCTION

Treasure Island (TI) and Yerba Buena Island (YBI) are in San Francisco Bay, about halfway between the San Francisco mainland and Oakland (see Figure 1). The Islands are the site of the former Naval Station Treasure Island ("NSTI"), which is owned by the U.S. Navy. NSTI was closed on September 30, 1997, as part of the Base Realignment and Closure Program. The Islands also include a U.S. Coast Guard Station and Sector Facility, a U.S. Department of Labor Job Corps campus, and Federal Highway Administration ("FHWA") land occupied by the San Francisco-Oakland Bay Bridge ("Bay Bridge") and tunnel structures.

The Treasure Island Development Authority ("TIDA") is proposing to redevelop the portions of NSTI still owned by the Navy. The Development Plan will be carried out by Treasure Island Community Development, LLC ("TICD").

Currently, the former military base consists primarily of low-density residential uses, along with vacant and underutilized non-residential structures, existing and former non-residential uses, parking and roadways, open space, a wastewater treatment facility, and other infrastructure. The Development Plan Area will be redeveloped with a new, high-density, mixed-use community with a variety of housing types, a retail core, open space and recreation opportunities, on-site infrastructure, and public and community facilities and services. In all, there will be up to 8,000 residential units, 450,000 square feet (sq. ft.) of new commercial and retail space; up to 500 hotel rooms and a cultural center; a new ferry terminal and transit program; approximately 300 acres of parks and open space; an approximately three-mile long shoreline trail on Treasure Island and Yerba Buena Island; and new and/or upgraded public services and utilities, including a new or upgraded wastewater treatment plant and a new recycled water plant.

Implementation of the Development Plan will be phased over a 10-15 year period. TIDA and TICD are jointly applying for an Individual Permit (IP) from the Army Corps of Engineers and a Water Quality Certification from the Regional Water Quality Control Board for the discharge of fill and dredging in waters of the U.S. associated with construction of the ferry terminal and renovation of the existing storm drain outfall system. TIDA and TICD will also apply for a major permit from the San Francisco Bay Conservation and Development Commission (BCDC) for those same activities as well as improvements to the shoreline revetment on TI and trails within BCDC jurisdiction on TI and YBI.

1.1 Proposed Federal and State Actions

The management of dredging and dredged material disposal in the San Francisco Bay Region is regulated by agencies under the umbrella of the Long Term Management Strategy (LTMS). These agencies include: the U.S. Army Corps of Engineers (Corps); the U.S. Environmental Protection Agency (EPA); the San Francisco Bay Regional Water Quality Control Board (RWQCB); the San Francisco Bay Conservation and Development Commission (BCDC); the California State Lands Commission (SLC); the U.S. Fish and Wildlife Service (FWS), the California Department of Fish and Wildlife (DFW); and NOAA's National Marine Fisheries Service (NMFS). Federal and state regulations require

an analysis of alternatives with respect to the disposal of dredged material prior to the authorization of a dredging and disposal project. The purpose of this document is to provide the necessary analysis to obtain authorization for disposal or reuse of dredged material.

The proposed federal and state actions for which this analysis is being prepared are the issuance of a permit under the Clean Water Act Section 404 and Section 10 of the Rivers and Harbor Act by the Corps, Clean Water Act Section 401 water quality certification and Porter-Cologne Act review by the RWQCB, and a major permit under the McAteer-Petris Act by BCDC for the discharge of fill material in waters of the U.S. and state and shoreline band, dredging, and the disposal of dredged material from a redevelopment project on Treasure Island. This Alternatives Analysis is prepared in support of applications for permits from the agencies noted above, and does not authorize the discharge of dredged or fill material without their approval.

1.2 Relationship to the Clean Water Act

The Corps, EPA and RWQCB regulate disposal of dredged material in San Francisco Bay pursuant to the Clean Water Act (CWA). Section 404(b)(1) of the CWA establishes procedures for the evaluation of permits for the discharge of dredged or fill material into waters of the United States. The 1980 EPA Guidelines (40 CFR Part 230) were promulgated specifically pursuant to Section 404(b)(1) of the Act. This 404(b) (1) Guideline governs, in part, the issuance of permits by the Corps. The Corps 1986 Regulations state, at 33CFR 320.4(a)(1), "For activities involving 404 discharges, a permit will be denied if the discharge that would be authorized by such permit would not comply with the Environmental Protection Agency's 404(b)(1) Guidelines". The Regional Water Quality Control Board under the authority of the Porter-Cologne Water Quality Control Act may issue discharge requirements for the disposal of dredged materials.

Subpart B of the 404(b) (1) Guidelines (40 CFR 230.10). Compliance with the Guidelines, establishes the alternatives analysis requirements which must be met. In particular, 40 CFR 230.10(a) states in relevant part that:

> *"No discharge of dredged or fill material shall be permitted if there is a practicable alterative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.*
>
> a. For the purpose of this requirement, practicable alternatives include, but are not limited to:
>
> (i) Activities which do not involve a discharge of dredged or fill material into the waters of the United States or ocean waters;
>
> (ii) Discharges of dredged or fill material at other locations in waters of the United States or ocean waters.
>
> b. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes…"

In addition, Section 40CFR 230.10(a)(5) of the Guidelines specifically provides for incorporating relevant planning-based evaluations to help streamline alternatives analyses for covered activities:

> *"To the extent that practicable alternatives have been identified and evaluated under a Coastal Zone Management program, a Section 208 program, or other planning process, such evaluation shall be considered by the permitting authority as part of the consideration of alternatives under the Guidelines. Where such evaluation is less complete than that contemplated under this subsection, it must be supplemented accordingly."*

This alternatives analysis was prepared in accordance with the 404(b) (1) Guidelines provisions, as follows.

a. Basic Project Purpose: The basic purpose of this analysis is redevelopment of the former Naval Station Treasure Island with a mix of urban uses and associated infrastructure, including transportation improvements.

b. Overall Project Purpose: The overall purpose of the project is to convert approximately 367 acres on Treasure Island and approximately 94 acres on Yerba Buena Island from a former military base to a dense, mixed-use development with residential, commercial, cultural, hotel, recreational, and retail uses centered around an intermodal Transit Hub.

c. Section 404 Jurisdiction: San Francisco Bay, its tributary rivers and streams and adjacent wetlands, and the ocean out to the three-mile limit are "waters of the United States" within Section 404 jurisdiction. Designated multi-user disposal sites in the region are not located in "special aquatic sites", but some alternatives (including some beneficial re-use sites) are. The Guidelines at 40 CFR 230.10(a)(3) establish a presumption that alternatives exist which are both practicable and less damaging, if a discharge whose basic purpose is not "water dependent" is proposed for a "special aquatic site". Dredged material disposal is not a "water dependent activity"; however the multi-user unconfined aquatic disposal sites in the San Francisco Bay region are not located in "special aquatic sites". Therefore the built-in presumption of a less damaging practicable alternative does not apply to typical in-Bay disposal options.

d. Plan-Based Evaluation: The LTMS EIS/EIR and Management Plan, discussed further below, constitute a regional "plan" under NEPA, CEQA, and the CWA, consistent with the Guidelines at section 40 CFR 230.10(a)(5). Application of the 404(b)(1) Guidelines by EPA and the Corps allows for consideration of the reasonableness of the cost of an alternative, relative to the nature of the project, the project proponent, and the "market" within which the project exists. The market for different kinds of projects, and therefore the range of alternatives and reasonable costs of doing business within that market varies widely. For dredging in the San Francisco Bay region, the "market area" is decidedly local. Therefore, the range of disposal options is limited to those that are relatively nearby to the project, technically feasible and cost effective.

1.3 Level of Analysis

The 404 Guidelines do not contemplate that the same intensity of analysis will be required for all types of projects, but instead envision a correlation between the scope of the evaluation and the potential extent of adverse impacts on the aquatic environment. Similar guidance with respect to the appropriate level of analysis is also provided in the Corps' Regulatory Guidance Letter No. 93-2 (August 23, 1993). The Guidelines and Regulatory Guidance Letter 93-2 afford flexibility to adjust the stringency of the alternative review for projects or classes of projects that would have only minor impacts. Minor impacts are associated with activities that generally would have little potential to degrade the aquatic resources of limited natural function; they are small in size and cause little direct impact; they have little potential for secondary or cumulative impacts; and/or they cause only temporary impacts.

2. PROJECT PURPOSE

2.1 Basic Project Purpose

The basic purpose of the proposed project is the redevelopment of former Naval Station Treasure Island, including parts of Treasure Island and Yerba Buena Island, with urban uses that serve the San Francisco Bay Area, and specifically the City and County of San Francisco.

2.2 Overall Project Purpose

Treasure Island Development Authority (TIDA), a single-purpose public agency responsible for the Project Area, and Treasure Island Community Development, LLC, (TICD), a private entity competitively selected as the master developer, are joint sponsors of the Proposed Project. The Proposed Project's overall purpose is to convert approximately 367 acres on Treasure Island and approximately 94 acres on Yerba Buena Island from a former military base to a dense, mixed-use development with residential, commercial, cultural, hotel, recreational, and retail uses centered around an intermodal Transit Hub. Supporting infrastructure, public services and utilities, and a substantial amount of open space would also be provided, consistent with the following list of objectives.

2.3 Project Objectives

The TIDA and TICD share a number of land use, housing, sustainability, transportation, and infrastructure objectives in the redevelopment of the Naval Station Treasure Island site. Particularly relevant to this Permit Application are the following objectives:

Land Use

- Implement a land use program with high-density, compact residential and commercial development located within walking distance of an intermodal Transit Hub to maximize walking, bicycling, and use of public transportation and to minimize the use and impacts of private automobiles.

Transportation

- Create a circulation and transportation system that emphasizes transit-oriented development, discourages automobile use, and supports and promotes the use of public transportation and car-sharing, through a comprehensive transportation demand management program.

- Provide a range of public transit choices as part of the transportation system.

Sustainability

- Create a development that is financially feasible; that allows for the delivery of infrastructure, public benefits, and affordable housing subsidies; and that is able to fund the Proposed Project's capital costs and ongoing operation and maintenance costs relating to the redevelopment and long-term operation of the project site.

Housing

- Provide high-density, mixed-income housing with a variety of housing types, consistent with transit-oriented development, that include both ownership and rental opportunities, to attract a diversity of household types, especially families.

- Include enough residential density to create a sustainable community that supports neighborhood-serving retail, community facilities, and transit infrastructure and service.

A principal objective of the Proposed Project is the provision of high-density residential uses in conjunction with supporting retail and other commercial services that allow the establishment of a sustainable community reliant upon public transit, including bus and ferry services, as well as other alternate modes of transportation such as well as bicycle and pedestrian paths. The connection of the Islands with the new eastern span of the Bay Bridge in combination with the Proposed Project's internal circulation design will support and promote the latter modes of transportation.

3. PROJECT DESCRIPTION

3.1 Overview

Treasure Island and Yerba Buena Island (collectively, "the Islands") are in San Francisco Bay, about halfway between the San Francisco mainland and Oakland. (See Figure 1: Regional Location.) The Islands are the site of the former Naval Station Treasure Island ("NSTI"), which is owned by the U.S. Navy. NSTI was closed on September 30, 1997, as part of the Base Realignment and Closure Program. The Islands also include a U.S. Coast Guard Station and Sector Facility, a U.S. Department of Labor Job Corps campus, and Federal Highway Administration ("FHWA") land occupied by the San Francisco-Oakland Bay Bridge ("Bay Bridge") and tunnel structures.

The Treasure Island Development Authority ("TIDA") is proposing to redevelop the portions of NSTI still owned by the Navy, once they are transferred to TIDA. The Development Plan would be carried out by Treasure Island Community Development, LLC ("TICD"), a private entity competitively selected as the master developer, subject to the executed Disposition and Development Agreement and related conveyance agreements governing redevelopment of NSTI. One or more Infrastructure Financing districts ("IFDs") would be used to help finance public facilities and infrastructure improvements.

Currently, the former military base consists primarily of low-density residential uses, along with vacant and underutilized non-residential structures. There are about 1,005 total dwelling units1 on Treasure Island and Yerba Buena Island (of which about 805 are available for occupancy), about 100 buildings with existing and former non-residential uses, parking and roadways, open space, a wastewater treatment facility, and other infrastructure.

The Development Plan Area would be redeveloped with a new, high-density, mixed-use community with a variety of housing types, a retail core, open space and recreation opportunities, on-site infrastructure, and public and community facilities and services. In all, there would be up to approximately 8,000 residential units; up to approximately 140,000 square feet (sq. ft.) of new commercial and retail space; approximately 100,000 sq. ft. of new office space; up to 500 hotel rooms; approximately 300 acres of parks and open space with possible cultural uses such as a museum; bicycle, transit, and pedestrian facilities; a Ferry Terminal and intermodal Transit Hub; and new and/or upgraded public services and utilities, including a new or upgraded wastewater treatment plant and a new recycled water plant.

Three historic buildings on Treasure Island would be adapted to house up to 311,000 sq. ft. of commercial space. Nine historic buildings and four garages on Yerba Buena Island would be adaptively reused for various commercial activities such as a hotel/wellness center and possibly a restaurant.

The Navy would remediate sites containing hazardous materials to standards consistent with applicable Federal laws governing base closure prior to transfer. Any remaining site remediation, to the extent that such remediation was not required of, or performed by the Navy, but is necessary to meet the requirements of applicable regulatory agencies for the

proposed uses of the Treasure Island / Yerba Buena Island Area Plan ("Area Plan") and Treasure Island / Yerba Buena Island Special Use District ("SUD"), would be carried out by TIDA as part of the implementation of the Area Plan/SUD.

Finally, geotechnical improvements would be made to stabilize Treasure Island and the causeway that connects it to Yerba Buena Island. Buildout would be implemented in four phases, anticipated to occur from approximately 2015 through 2034, depending on market conditions.

3.2 Development Plan Characteristics

The Development Plan includes:

- Geotechnical stabilization of Treasure Island and the causeway connecting it to Yerba Buena Island, and addition of fill to raise the surface elevation on Treasure Island to address flood protection and potential future sea level rise;
- Up to approximately 8,000 residential units;
- Up to approximately 140,000 sq. ft. of new commercial and retail space;
- Up to approximately 100,000 sq. ft. of new office space;
- Adaptive reuse of Buildings 1, 2, and 3 with up to 311,000 sq. ft. of commercial/flex space (the adaptive reuse would include approximately 67,000 square feet of additional retail, which, when combined with the 140,000 square feet of new retail, yields a total of 207,000 square feet of retail space proposed on the Islands);
- Rehabilitation of the historic buildings on Yerba Buena Island;
- Retention and continued use of the existing chapel in its existing location for general assembly and non-denominational religious activities;
- Up to approximately 500 hotel rooms;
- New and/or upgraded public facilities, including a joint police/fire station, a school, and other community facilities;
- New and/or upgraded public utilities, including the water distribution system, wastewater collection and treatment, recycled water system, and stormwater collection and treatment;
- Approximately 300 acres of parks and public open space, including cultural uses such as a museum;
- New and/or upgraded streets and public ways;
- Bicycle, transit, and pedestrian facilities;
- Landside and waterside facilities for the Treasure Island Sailing Center;
- Landside services for the marina; and
- A Ferry Terminal and intermodal Transit Hub.

The Development Plan includes two project elements that would affect waters of the U.S.

and these are discussed below.

3.3 Project Components in Waters of U.S.

The two project components requiring dredging or the discharge of fill material into waters of the U.S. are: a) construction and operation of a new ferry terminal; and b) improvements to existing drainage structures and outfalls. A description of each of these project elements is provided below. Construction methods, materials, equipment, timeline, project phase in which construction will occur and impacts on open water and shoreline habitat, as well as fish and wildlife are described. A phasing plan and schedule for construction are provided in Figures 2 and 3.

The residential, open space, commercial, community and public facilities elements of the project do not entail any work in waters of the U.S.

3.3.1 Ferry Terminal

Located at the southwest corner of TI, a new ferry quay and terminal will be constructed to provide service to downtown San Francisco. Once a ferry operator has been selected and the terminal has been constructed, the ferry service will be operated, with initial runs at approximately 60-minute intervals. The goal will be to provide service to downtown San Francisco at 15-minute intervals at peak periods from 5am to 9pm at full build-out of the Project.

The ferry terminal will include two side-loading ferry slips (where ferry boat loads passengers) that will have capacity to accommodate demand increases in the future. The land access to the ferry slip includes an access pier, an ADA- compliant gangway, a steel or concrete float that would be anchored by six guide piles and mooring dolphins to protect the ferry from bumping against the float and other structures. The float will have mooring fittings and access platforms on each side to allow two ferries to moor at the float at the same time, providing two slips.

To protect the ferry slips and allow ferry service to continue in the exposed wave climate of SF Bay, the Project includes an approximately 200- to 300- foot-wide west-facing basin with angled breakwaters.

The ferries themselves will be able to hold approximately 149 to 399 passengers, and will be approximately 140 feet long and 55 feet wide with a draft of up to eight feet. Up to two vessels could overnight at the ferry terminal, and routine operations, such as sewage pump-out, filling potable water storage containers, and light maintenance will occur at the terminal.

Construction of the ferry quay and terminal entail construction of the following elements in waters of the U.S.:

- Breakwaters
- Rock slope linkage of shoreline to the breakwater
- Pier with foundation piles, gangway and float (including guide and fender piles)
- Dredging

The Project includes approximately 0.15 acres (6,460 square feet) of fill for the ferry terminal facilities, and 0.12 acres (5,200 square feet) of floating fill. In order to create a navigable basin, the project proponents are proposing to dredge up to 6,000 cubic yards to a depth of about -14 feet (plus 2 feet of over-depth allowance, totaling to -16 feet). Table 1 summarizes bay fill and dredging associated with the ferry terminal. Figure 4 provides an overview of the ferry terminal facilities.

Breakwaters: Two breakwaters made of precast 12 inch thick concrete sheet piles will be constructed to create the west-facing basin. An approximately 760-foot-long breakwater to the north, and an approximately 350-foot-long breakwater to the south will be constructed. The concrete sheet pile breakwater will terminate on the east side (shore) at the toe of the slope of the existing rock revetment on TI that will leave a gap between the sheets and the existing rock slope. This gap will be closed with a rock slope placed on top of the existing rock slope and perpendicular to it. Both breakwaters will have navigation lights to mark the harbor entrance, but will otherwise not be lighted. Due to high waves overtopping the breakwaters, no public access along the breakwaters is proposed.

The breakwaters will be installed with an impact hammer with approximately 100,000 ft-lb energy output operated from barge-mounted cranes. Concrete batter piles (24-inch octagonal at 15-foot centers) will be installed along the basin-interior side of the breakwaters. Between 50 and 60 concrete batter piles will support the north breakwater, and 20 to 30 batter piles will support the south breakwater (see Figure 5).

The north breakwater will be installed between June and November (in water work window) as the first in-water element of ferry terminal construction. The exact year of this construction is dependent upon the date of construction of the first homes and it is estimated that it will be no earlier than 2018 nor later than 2020. The duration of the in water portion of the breakwater work in the first year of construction is estimated to be 3-5 months to drive the concrete sheets and to place the rock closure slope at the shore, described in the following section. No dewatering will be required for this work nor will any excavation to place the breakwaters be required. Since the existing shore line is fully protected from wave exposure, no slope protection will be needed during construction. The dredging for the basin will occur during this same period or the following year. The south breakwater may be installed in a second phase or in the same year. The south breakwater location may be adjusted due to an existing underwater cable located in the "exclusion zone" as depicted in Figure 4. Alternatively, the underwater cable may be relocated and the south breakwater constructed as shown in Figure 4.

During construction of the breakwaters best management practices will include no fueling of equipment allowed on site for over water work, use of equipment that minimizes turbidity in

the water, and require protective netting or equivalent devised to ensure no debris can fall into the water during the work.

Rock Slope Closure (Linkage between Breakwater and Shoreline): Two rock slope connections will be constructed on each side of the ferry terminal at the shore end of the breakwaters (see Figure 5).

The rock closure will consist of rip rap rock similar to the size (1-2 ton rock) and graduation of the existing rock slope and will be placed on top of the existing rock. The rock slope closures are needed to anchor and provide continuous wave protection of the breakwaters' connections at the shoreline. Each rock slope will be approximately 600 SF (0.014 ac) in size as measured at MHW, or 2,400 SF (0.06 ac) at bay bottom (each rock slope). The rock will be constructed following construction of each breakwater with the use of an excavator positioned on the landward side of the shoreline revetment, as well as with the use of an excavator operated from a barge. No dewatering will be performed for this work. This work will be performed during the first year of construction during the installation of the concrete sheets.

Pier (Abutment), Gangway and Float: The land access to the ferry slip includes:

- Pier: 13-feet-wide, 145-foot-long, with railing that may also have a canopy;
- Gangway: approximately 13-feet-wide, 90-feet-long, ADA- compliant, connects the pier and float;
- Float: approximately 45-feet-wide, 115-feet-long, steel or concrete, anchored by six guide and fender piles. Mooring dolphins and/or fender walls will be included to protect the ferry from bumping against the float and other structures.

These features are shown in Figure 6. The float will have mooring fittings and access platforms on each side to allow two ferries to moor at the float at the same time.

Four 42-inch diameter steel fender and guide piles will be installed on the west side of the float, and two 42-inch diameter steel guide piles will be installed on the east side of the float. The steel piles will be installed with the use of a vibratory hammer with an energy output of 6,000 ft-lb and a variable frequency between 0 to 1,400 vibrations per minute operated from a barge -mounted crane. The piles will be installed to a depth of embedment of 50-90 feet below the bay bottom, estimated, to be confirmed by geotechnical investigations currently in progress. The pier will be supported by 16 24-inch concrete pier foundation piles that will be installed with the use of a diesel powered impact hammer with approximately 100,000 ft-lb energy output operated from a barge-mounted crane to a depth of embedment of 50-90 feet below the bay bottom, estimated, to be confirmed by geotechnical investigations currently in progress.

The installation of the pier, gangway and float for the ferry slip will occur in the second year of the construction of the ferry terminal. This work will occur during the same in water work window from June to November. The pier deck will be installed atop the piles described above either formed of in-place concrete or coated steel. The work would be performed from barge-mounted cranes or from scaffolding clamped to the installed piles. The float will be

fabricated offsite and transported to the site with the use of a tug or similar tow vessel. The gangway would be fabricated off site and brought to the site on a barge. The gangway would then be placed on the pier and float by a barge mounted crane. The concrete sheet piles, batter, guide, fender and pier foundation piles will be manufactured off site and transported to the site on a barge that will stage delivery of materials within and just west of the ferry terminal location. Upon completion of this work, the ferry slip will be operational.

3.3.2 Outfall Improvements and Stormwater Management

Stormwater runoff from streets and paved areas on TI and YBI is currently discharged untreated directly to the Bay through 31 outfalls around the perimeter of TI and 32 outfalls from YBI. The existing stormwater system will be replaced with a new collection system, which will include gravity pipelines, force mains, lift stations, pump stations and the reconstruction of existing outfalls. Pre-discharge treatment will be provided by street planters and bioretention treatment planters. The stormwater management plan will be designed and constructed consistent with San Francisco Public Utility Commission (SFPUC) standards and regulations. Existing outfalls will be replaced, renovated or abandoned in place (see Figures 7, 8 and 9) during each of the four phases of construction. A total of 14 outfalls will be replaced or renovated from existing outfalls on TI and YBI. The disturbance area surrounding each outfall will be isolated and dewatered with the installation of a coffer dam prior to earthwork. Each outfall will be constructed by temporarily excavating an approximately 850 sq. ft. area and removing approximately 50 CY of existing rock slope protection to allow installation of a precast or cast-in-place concrete headwall. After the headwall has been placed, the work area will be backfilled with the previously excavated rock riprap to conform to the existing slope. Approximately 30 CY of rock will be returned, 6 CY of concrete will be placed as the headwall, resulting in a net loss of fill of about 14 CY per outfall. Because final design of the stormwater treatment system and outfalls has not been completed, the maximum area of impact (discharge of fill material and excavation) for the outfalls is described in Table 1 (permanent fill) and Table 2 (temporary fill), to ensure that permits issued for the project are adequate to cover potential impact to waters of the U.S.

Existing rock shoreline protection at the outfalls to be replaced or renovated will be excavated with the use of an excavator positioned on the shoreward side of the revetment. Excavated materials will be stockpiled in adjacent uplands for re-use or offsite disposal. The work areas surrounding the outfalls will be dewatered prior to construction with the use of sandbags, steel sheetpiles or water filled bladder-type cofferdams. The exact type of cofferdam would be determined by the contractor's means and methods as to which is most constructible given the thick rock embankment and slope. Water would be removed with pumps on site returning the water to the bay.

3.4 Proposed Dredging

Construction of the ferry basin will require dredging approximately 6,000 CY of primarily sandy substrate to a depth of -14 feet (plus 2 feet of over-depth allowance, to a total elevation of -16 feet) in an area of approximately 0.55 acres (see Figure 6). Maintenance dredging may be required once the terminal is operational. The frequency and volume of dredging cannot

be accurately predicted. The west shore of TI is not a high depositional environment and it is estimated that future dredging would be less than 2,000 CY performed at infrequent (over 2 years) intervals. Permit applications for maintenance dredging will be submitted following construction of the ferry terminal.

Dredging will be conducted by a clamshell bucket operated from a barge-mounted crane. Dredged material will be placed onto an adjacent scow. Pending completion of sediment sampling, three locations for the disposal of dredged materials are under consideration, with selection to be determined upon completion of sediment sampling: beneficial re-use to raise surface elevations on Treasure Island; beneficial re-use at Montezuma Wetlands; or beneficial reuse at Winter Island.

Table 1: Treasure Island Ferry Terminal and Storm Drain Outfalls Bay Fill and Dredging

Table 1: Treasure Island Ferry Terminal and Storm Drain Outfalls Bay Fill and Dredging						
	Bay Fill at MHW (SF)			Bay Bottom Footprint (Horiz. Projection below MHW) (SF)	Volume (CY)	
Ferry Component	**Solid**	**Shaded**	**Floating**		**Total Structure**	**Below MHW**
Breakwaters & Batter Piles	1,400	9,000		1,400	2,340	1,190
Rock Slopes	1,200			4,800	950	840
Pier & Foundation Piles	160	1,700		160	5,300	70
Gangway		1,200			90	
Float & Guide and Fender Piles	100		5,200	100	2,100	50
Dredging					-6,000	
Total Ferry Component	**2,860**	**11,900**	**5,200**	**6,460**	**10,780***	**2,150***
Outfalls permanent 14 total	+250 -700			3,800	+90 -280**	+50 -220
Total Ferry & Outfalls Gross (net)	**3,110 (2,410)**	**11,900**	**5,200**	**10,260**	**10,870* (10,590*)**	**2,200* (1,980*)**
	Bay Fill at MHW (Acres)			**Bay Bottom Footprint (Horiz. Projection below MHW (Acres)**		
Breakwaters & Batter Piles	0.03	0.21		0.03		
Rock Slopes	0.03			0.11		
Pier & Foundation Piles	0.00	0.04		0.00		
Gangway		0.03				
Float & Guide and Fender Piles	0.00		0.12	0.00		
Outfalls Gross (net)	0.01 (-0.02)			0.09		
Total Gross (net)	**0.07 (0.06)**	**0.27**	**0.12**	**0.24**		

* Dredging not included.

**90 CY of concrete for the outfall headwalls (total structure) will be permanently placed. 280 CY of rock will be permanently removed, resulting in a loss of 190 CY of bay fill.

Note: Some apparent errors due to rounding.

4. PROJECT ALTERNATIVES ANALYSIS

Five alternatives to the proposed project are examined below, including: No Ferry Service, Ferry Terminal in Clipper Cove, and Ferry Terminal Variants B1, B2 and B3. With the exception of the Ferry Terminal in Clipper Cove alternative, these alternatives were explored in further depth in the FEIR prepared for the project. The Clipper Cove Ferry Terminal alternative was included in response to a request by RWQCB staff.

4.1 No Ferry Service Alternative

Unlike the Proposed Project, the No Ferry Service, would not include the proposed Ferry Terminal and ferry service would not be provided. If no ferry service is provided, residents, visitors, and employees would travel to and from the Island by private vehicle or bus transit. This alternative assumes that funding would be available to provide the level of bus service to San Francisco and the East Bay. Thus, the level of bus service to the San Francisco mainland in this alternative would be greater than that for the Proposed Project. The No Ferry Service Alternative would provide fewer residential units and less neighborhood-serving retail space than in the Proposed Project, unless it were subsidized; these reductions were estimated based on the estimated amount of transit service that would be available, and assuming that Muni service goals would be met (buses operating at an average of 85 percent of seated and standing capacity).

Based on these factors, the number of residential units in the No Ferry Service Alternative would be reduced to amounts that would generate peak commute travel that could be accommodated by bus transit alone, without increasing peak-hour automobile travel. Therefore, this alternative would include up to 5,100 residential units, about 2,900 fewer units than with the Proposed Project. Residential parking would be reduced by the same amount, resulting in a total of about 8,255 parking spaces that would include the same number of on-street parking spaces as in the Proposed Project. The No Ferry Service Alternative was considered in response to comments on the NOP and to evaluate if and to what extent development of fewer residential units on Treasure Island would avoid or substantially lessen traffic and traffic-related air quality and noise impacts, as well as air quality impacts related to ferry operations. This alternative was also considered to evaluate to what extent it would avoid or lessen impacts on scenic views, noise, and historic resources. Table VII.16 summarizes the major differences in land uses.

Table 2: Key Land Use Differences - Proposed Project and No Ferry Service Alternative

Land Use	Proposed Project	No Ferry Service Alternative
Residential	8,000 units	5,100 units
Parking	10,675 spaces	8,255 spaces
Parks and Open Space	300 acres	306 acres

Source: FEIR for Treasure Island / Yerba Buena Island Redevelopment Project. April 21, 2011

Most other land uses would be the same as with the Proposed Project: 100,000 sq. ft. of office space; 500 hotel rooms, including 50 on Yerba Buena Island; adaptive reuse of about 311,000 sq. ft. of Buildings 1, 2, and 3 with retail, light industrial/food production, and entertainment uses; landside facilities to support the expanded marina at Clipper Cove; new Sailing Center landside support and waterside launch facilities; and reuse or reconstruction of the existing Treasure Island elementary school at its current location.

The No Ferry Service Alternative could feasibly meet most of the key objectives of the project sponsors, presented in Section 2, Project Sponsors' Objectives. However, without ferry service, this alternative would provide 2,900 fewer residential units and fewer transit options for residents of the Islands than the Proposed Project. It would provide less encouragement for nonresidents to visit the Islands, such that the Islands could be less attractive as a residential community and regional destination than the Proposed Project. In addition, fewer residential units under this alternative could reduce some of the economic efficiencies that higher density residential could provide in achieving key project objectives (e.g., providing public amenities and infrastructure and transit improvements; providing affordable housing; and creating a community of sufficient size to support neighborhood-serving retail, community facilities, and transit).

The No Ferry Service Alternative would hinder the attainment of the land use and transportation objectives identified for the redevelopment of the Naval Station Treasure Island site, including diminished supply of affordable housing and reduced options for the use of alternate transportation modes. The No Ferry Service Alternative would not implement a land use program with high-density, compact residential and commercial development located within walking distance of an intermodal Transit Hub that maximizes walking, bicycling, and use of public transportation and to minimize the use and impacts of private automobiles. The No Ferry Service Alternative limits a circulation and transportation system that emphasizes transit-oriented development, discourages automobile use, and supports and promotes the use of public transportation and car-sharing, through a comprehensive transportation demand management program. The No Ferry Service Alternative constrains the range of public transit choices comprising the transportation system, allowing only land-based public transit as an option for this mode of site access.

In addition to the limitations in options for public transit, the loss of the ferry service would represent a loss in alternative emergency access to, and egress from, Treasure Island in the event of a major earthquake, fire or other emergency. As such, the limited emergency access to and egress from the Islands in the event of a major earthquake, fire or other emergency, as identified for the Proposed Project would be increased in magnitude under the No Ferry Service Alternative. Although alternate water access and egress would continue to be available at Pier 1, on the east side of the Treasure Island, the absence of the proposed Ferry Terminal facilities would constrain emergency access and prolong the period of time required for evacuation from Treasure Island / Yerba Buena Island.

For the above reasons, the No Ferry Service Alternative was not considered to be a Practicable Alternative to the Proposed Project.

4.2 Ferry Terminal in Clipper Cove Alternative

Another alternative to the Proposed Project considered for evaluation entailed the installation of the Ferry Terminal in Clipper Cove. Presently, Clipper Cove contains a marina with 100 slips and the Treasure Island Sailing Center. The current marina facilities are planned for expansion to 400 slips as part of the redevelopment project, but the marina expansion is not included in the present permit applications.

The potential location of the Ferry Terminal facilities in Clipper Cove would replace all or a part of the proposed marina expansion, reducing this particular element of the redevelopment plan. The development of the new Ferry Terminal facilities in Clipper Cove would require extensive dredging (significantly more than for the Proposed Project) to accommodate ferries that are larger than the private recreational vessels currently using the marina.

In addition to the expanded dredging requirements for this alternative, ferry service to the Treasure Island /Yerba Buena Island would be required to use longer routes that circumnavigate the islands to reach the Terminal in Clipper Cove. The use of this alternate location for a ferry terminal would extend travel distances and times beyond those occurring for the Proposed Project. Extended travel distances would have associated fuel costs for equipment operation and would result in additional environmental effects for air quality, noise, and transportation. The potential separation of the Ferry Terminal from the proposed Transit Hub would also incur additional travel requirements (transfers) between the Clipper Cove Ferry Terminal and the Transit Hub facilities.

The project plans for the Transit Hub involve the location of this public transit facility in close proximity to residential high-rise towers to encourage the use of alternate transportation modes. Relocation of the Transit Hub to Clipper Cove would result in a disincentive to the use of public transit. Additionally, the Clipper Cove Transit Hub would require extended travel distances and times for public bus services, further discouraging the use of public transit by future residents. Maximizing the use of alternate travel modes for site access is a primary objective of the Proposed Project.

For the above reasons, the Clipper Cove Ferry Terminal Alternative was not considered to be a Practicable Alternative to the Proposed Project.

4.3 Ferry Terminal Breakwater Variants

Three variants for the breakwaters described above in Section 3.3.1 are considered below. Breakwater Variant B1 would provide for symmetrical angled breakwaters, each extending the same distance from the land connection. Breakwater Variant B2 would include two symmetrical angled breakwaters extending from the land connection plus a third, detached breakwater on the north side of the Ferry Terminal extending further into the Bay at an oblique angle. Breakwater Variant B3 would have the same configuration as in the Proposed Project, but would be constructed with the use of rock riprap, rather than concrete sheet piles. These variants also include more extensive shoreline improvements than the Proposed Project, including the construction of public access shoreline moles that link the breakwaters to the shoreline.

4.4 Ferry Terminal Variant B1 – Symmetrical Breakwaters

Variants B1 and B2 were evaluated because they provide alternative harbor configurations that could create slightly different wave conditions within the harbor. These variants, as well as the Proposed Project, were developed through a study conducted by the Water Emergency Transit Authority ("WETA"). The preliminary results of WETA's analysis are that the Proposed Project configuration would be the best from an operational perspective.

Breakwater Variant B1 would have two angled breakwaters extending about 600 feet from the shore, providing a 200-foot-wide harbor opening. Both breakwaters would be approximately 810-feet in length. The harbor opening would be directly west of the shoreline and the ferry berths. This alternative would require a greater area of fill and dredging than the proposed project. Figure 10 presents the configuration of Variant B1.

4.5 Ferry Terminal Variant B2 – Symmetrical Breakwaters with Separate Detached Breakwater

Breakwater Variant B2 would have two shorter angled breakwaters extending about 500 feet from the shore, with a harbor opening of about 300 feet, plus a third, detached breakwater. The third structure would be about 100 feet from the northern angled breakwater and would extend about 520 feet to the southwest, resulting a distance of about 400 feet from the end of the southern angled breakwater. The harbor opening would face south rather than west as a result of the third structure. The north and south breakwaters would be approximately 500-feet long, while the detached breakwater would be approximately 520 feet long. In both variants the breakwaters would be constructed of the same materials as for the Proposed Project, using the same construction methods. This alternative would require a greater area of fill and dredging than the proposed project. Figure 11 presents the configuration of Variant B1.

4.6 Ferry Terminal Variant B3 – Project Design with Rock Fill

Breakwater Variant B3 would construct the breakwaters for the Ferry Terminal in two phases as in the Proposed Project, but the breakwaters would be constructed with rock riprap. The breakwaters would be angled and the harbor configuration would similar to the one described in the Proposed Project. The northern breakwater would be about 800 feet long, and the southern breakwater would be about 450 feet long. Figure 12 presents the configuration of Variant B1.

The use of rock riprap in this alternative would require a greater area of dredging and significantly more fill in waters of the U.S. than the Proposed Project. Rock riprap would also provide habitat for non-native predatory species of fish, increasing the effects of the project on special-status fish.

4.7 Analysis of Ferry Terminal Variants B1, B2, and B3

The Ferry Terminal Variants to the Proposed Project involve extensive construction activities within the waters of the U.S. The main in-water construction activities are dredging, breakwater construction, construction of the ferry terminal support piles, and shoreline treatment. Table 3 shows construction quantities of fill that would be dredged for these various activities.

As can be noted in Table 3, the amount of fill discharges and volume of dredged material from Ferry Terminal Variants B1, B2, and B3 are substantially greater than those determined for the Proposed Project, as shown in Table 1 of Section 3.4. The more extensive discharge of fill and dredging activities for these Variant Alternatives would result in significant biological effects beyond those anticipated for the Proposed Project. In addition, the Variants Alternatives would require the disposal of these substantial dredged materials at one or more dredge materials disposal sites.

Table 3: Construction Quantities and Durations Variants B1-B3

Construction Activity	Volume of Fill (CY)			Impacted Area (ac)			Duration
	B1	B2	B3	B1	B2	B3	
Dredging	32,000	32,000	32,000	4.2	4.9	4.9	1-2 mo
Breakwater	7,800	7,900	100,000	0.6	0.7	3.8	3-5 mo
Ferry Docking Facility Piles (400 piles)	1,000	1,000	1,000	0.02	0.02	0.02	1-2 mo
Edge Treatment	8,700	8,700	8,700	0.48	0.48	0.48	4-6 wks
Slope Treatment	9,500	9,500	9,500	0.64	0.64	0.64	5-7 wks
Gangway Abutment & Building (100 piles	250	250	250	0.01	0.01	0.01	4 wks

Source: Treasure Island Ferry Terminal Project Coastal Engineering Assessment (Skidmore, Owings & Merrill, LLP/Moffatt & Nichol, September 14, 2009)

The Variant Alternatives are considered to be Practicable Alternatives to the Proposed Project. However, for the above reasons, none of these Variant Alternatives would be identified as the Least Environmentally Damaging Practicable Alternative to the Proposed Project.

5. DREDGED MATERIALS DISPOSAL ALTERNATIVES ANALYSIS

Pursuant to Section 404(b) (1) of the Clean Water Act, the following sub-paragraphs present an analysis of three alternative disposal options: (1) Upland Disposal at Treasure Island; (2) Upland Disposal at Winter Island; and (3) Upland Disposal at Montezuma Wetlands.

5.1 Upland/Wetland Reuse Sites

Detailed studies of potential upland disposal sites have been conducted by various agencies in past years. These studies have been consolidated and updated by past LTMS studies. As part of the LTMS goals, placement of dredged material at upland or beneficial reuse sites has been expanded in the recent years. Several upland disposal sites and beneficial reuse sites

have come on-line in the past couple years. As part of the disposal alternatives analysis, three sites have been identified as potential upland/wetland/reuse sites for dredged material from this project.

5.1.1 Treasure Island

Treasure Island was largely created through the placement of fill over a natural sand shoal or sand spit. Sand was dredged from various areas in San Francisco Bay and hydraulically placed within a series of rock dikes. The rock dikes were originally placed on top of the dredged sand in most areas of Treasure Island, or on top of the sand shoal in the southwest corner of the island. In the northern corner of Treasure Island, the dredged sand was placed directly on top of soft estuarine deposits known as Young Bay Mud.

Because Treasure Island was created by imported fill materials, there are no native surface soils on the island. Surface soils consist of imported dredged materials, primarily sands with some small gravels, silt, and clay. Surface soils on Yerba Buena Island include sand and rock fragment mixtures from local sources or dredge spoils. Dredge spoils and possible excavated materials from the Bay Bridge tunnel are found along the Bay margins, and sand and rock fragment mixtures are typically found in upland areas under building pads and roadways. Other surface soils include sandy colluvium and wind-blown sands.

Dredged materials from the Ferry Terminal site would be analyzed and screened for appropriate disposal. If suitable for use in the redevelopment process of the Proposed Project, dredged materials would be used as fill material to raise surface elevations and for general construction purposes on Treasure Island.

5.1.2 Winter Island

Winter Island is a privately owned and operated site located at the confluence of the Sacramento and San Joaquin Rivers, and Suisun Bay in Contra Costa County. Dredged material is imported onto the site to re-nourish the island and maintain five miles of perimeter levees.

Material is off-loaded from barges via clamshell directly onto the levees. The site can accept some pumped material into a contained area. Barges of less than 1,000 CY capacity are desirable since they can go around the island and directly access the levees. The maximum depth of barges that can access the site is 14 feet. Silt and clay material is the most desirable for levee maintenance, but the site also has the ability to accept as a lower priority, a limited amount of sandy material. Clean dredged material is accepted at this site. The site charges a standard tipping fee of $1 per CY. The importer is responsible for all unloading costs.

Due to a levee failure a few years ago, concerns of levee stability have caused the previously issued 10-year levee rehabilitation permits for the site to be revoked. Use of the site is currently permitted on a case-by-case basis.

5.1.3 Montezuma Wetlands

Montezuma is a privately owned and operated site that began accepting material in July 2003. The site is located adjacent to Montezuma Slough in Solano County. The imported material is being used to create wetlands and the site will be accepting material for many years. The site has all required permits, and may accept both "cover" and "non-cover" quality material (i.e., material not normally suitable for unconfined aquatic disposal). The site has deep-water access, as well as a docking area, however off-loading equipment is currently off-site. The off-loading equipment is designed for large barges and may be unsuitable for small shallow draft barges. The tipping fee varies with the size of the project and ranges from $8 per CY to $12 per CY for cover quality sediment, which includes the unloading and subsequent sediment management costs. Costs for non-cover quality sediment would be higher.

5.2 Practicable Alternative Analysis for Dredged Materials Disposal

The environmental impacts of dredging and disposal in the San Francisco region were assessed in the Final LTMS EIS/EIR on a relative basis. As stated in the EIS/EIR, …"the degree of actual adverse impacts to the Estuary resources that is associated with current volumes of in-Bay dredged material is impossible to accurately quantify with existing scientific information". The EIS/EIR therefore evaluated impacts on a relative basis using such terminology as "negligible", "low", "moderate" and "high" to describe impacts and relative risk of adverse impacts occurring.

5.2.1 Analysis

Treasure Island

Due to the geographical relationship to the project site, the Treasure Island disposal site represents the closest disposal opportunity of the three sites analyzed as well as the lowest air emissions. Furthermore, the impact on logistics and air quality related to the use of this site is considered low. Suitability of the dredged materials for beneficial reuse on Treasure Island will be determined with analysis of sediment sampling conducted consistent with the *Sediment Characterization Sampling and Analysis Plan for Dredging of Sediment from the Treasure Island Ferry Terminal Project* (Pacific EcoRisk 2014). Sampling is presently underway.

Winter Island

The use of this site requires the dredger to provide the equipment necessary to facilitate offloading of the material and placement within the disposal site. Equipment would include a diesel-powered clamshell dredge to place material on the levees or hydraulic pumps, a pump-out platform/barge, a discharge pipeline, and earth moving equipment to place material at the inland confined facility. The dredging contractors may have to retrofit their bottom-

dump barges to allow hydraulic offloading. Furthermore, access to the site is restricted due to shallow draft adjacent to the island. Consequently, impact on logistics is considered high due to the specialized equipment and possible retrofit requirements. Due to significant distance from the project site and the requirements for offloading and shore-side equipment, the impact on air quality is considered higher than beneficially reusing material on Treasure Island.

Montezuma Wetlands

The use of this site requires the dredger to coordinate and accommodate the offloading process within its expected dredging cycle. This has the effect of increasing the cycle time on individual scow trips. When coupled with the significant distance from the project site, the impacts on logistics and air quality are considered higher compared to beneficial reuse of material on Treasure Island. There is uncertainty that the unloader may be present, further compounding the complexity to logistics, such that this site cannot be confidently assumed as available when needed for this small of volume. Since no disposal occurs within the bay, the impact on the aquatic environments is considered negligible.

6. CONCLUSIONS

When taking into consideration impacts on logistics, aquatic environment, air quality, and cost for dredging to accommodate the proposed Ferry Terminal, beneficial reuse of dredged materials on Treasure Island is preferred. If the results of sediment testing indicate that the dredged materials are suitable for reuse on Treasure Island, this would be the best practicable disposal alternative for material suitable for upland disposal. Although Winter Island and Montezuma are beneficial reuse sites which present higher impacts to logistics, air quality, and potentially cost, the reliability is uncertain at this time. Therefore, should beneficial reuse on Treasure Island prove infeasible, these sites should be investigated for their availability. Although use of more than one of these disposal locations may be possible, the small volume of material anticipated for dredging will reduce the cost feasibility of multiple disposal locations.

Additionally, a combination of the sites noted above may be used for the disposal of dredged materials. These sites were preliminarily screened for site availability, capacity limitations and material suitability requirements. Given the small quantity of dredged material (up to 6,000 CY), a cost estimate range of $120 to $160/CY is appropriate for these disposal options. Although disposal at Montezuma Wetlands and/or Winter Island requires longer transport distances, disposal on Treasure Island will require a dewatering and trucking component that would add cost. At this stage in the project, these alternative disposal options could be considered relatively cost competitive.

Although Winter Island and Montezuma are beneficial reuse sites that present higher impacts to logistics, air quality, and potentially cost, the reliability is uncertain at this time. Therefore, should beneficial reuse on Treasure Island prove infeasible, these sites should be investigated for their availability during the Project schedule. While the use of more than one of these

disposal locations may be possible, the small volume of material anticipated for dredging will reduce the cost feasibility of multiple disposal locations.

6.1 Least Environmentally Damaging Practicable Alternative

A close examination of the selected Practicable Alternatives to the Proposed Project and for Dredged Materials Disposal was conducted to determine whether there is one Practicable Alternative that could be selected as the Least Environmentally Damaging Practicable Alternative. After evaluating all of these Alternatives it was determined that the No Ferry Service Alternative did not meet the Overall or Basic Purpose of the Proposed Project. Further, the Ferry Terminal in Clipper Cove Alternative and the Ferry Terminal Variants B1, B2, and B3 Alternatives had more significant environmental effects than the Proposed Project for reasons discussed above. Consequently, the Proposed Project was determined to be the Least Environmentally Damaging.

Figure 1. Vicinity and Location Maps

Source: Sediment Characterization Sampling and Analysis Plan for Dredging of Sediment from the Treasure Island Ferry Terminal Project (Pacific EcoRisk 2014)

Figure 2. Phasing Plan

Source: Disposition and Development Agreement, Exhibit II, Phasing Plan, June 28, 2011.

6/28/2011

Major Phase	Sub-Phase	Block	Parks & Open Space [1/]	Application Outside Date [2/]	Commencement Outside Date [2/]	Completion Outside Date [2/]
1				**2012**	**2014**	**2025**
	1-Y-A	1Y-2Y-3Y		2012	2014	2016
			YBI Hilltop Park 1		2017	2018
			YBI Hilltop Park 2		2020	2021
			YBI Open Space / HMP 1		2017	2019
	1-A	B2-B3		2012	2014	2016
			Eastside Commons 1		2017	2018
			Clipper Cove Promenade 2		2017	2018
	1-B	B1-M1		2013	2015	2017
			Building 1 Plaza		2018	2019
			Marina Plaza		2018	2019
			Clipper Cove Promenade 1		2018	2019
	1-C	C1-C2		2014	2016	2018
			Cityside Waterfront Park 1		2019	2020
			Cultural Park		2019	2020
	1-D	IC1-IC4		2015	2017	2019
			Eastside Commons 2		2020	2021
	1-E	C3		2016	2018	2020
			Cityside Waterfront Park 2		2021	2022
	1-F	E1-E2		2017	2019	2021
			Urban Farm 1		2023	2024
			Eastside Park 1		2022	2023
			Eastside Commons 3		2022	2023
	1-Y-B	4Y		2018	2020	2022
			YBI Beach Park		2023	2024
			YBI Open Space / HMP 2		2023	2025
2				**2018**	**2020**	**2027**
	2-A	E3-E4		2018	2020	2022
			Sailing Center Pad		2022	2022
			Eastside Park 2		2023	2024
			Eastside Commons 4		2023	2024
			Eastern Shoreline Park 1		2023	2024
			Clipper Cove Promenade 3		2023	2024
	2-B	C4		2019	2021	2023
			Cityside Waterfront Park 3		2024	2025
	2-C	E5-E6		2020	2022	2024
			Eastside Park 3		2025	2026
			Eastside Commons 5		2025	2026
			Eastern Shoreline Park 2		2025	2026
			Pier 1		2026	2027
3				**2021**	**2023**	**2030**
	3-A	E7-E8		2021	2023	2025
			Eastside Park 4		2026	2027
			Eastside Commons 6		2026	2027
			Eastern Shoreline Park 3		2026	2027
	3-B	C12-C13		2022	2024	2026
			Urban Farm 2		2028	2029
	3-C	IC1-IC4		2023	2025	2030
4				**2024**	**2026**	**2034**
	4-A	C5		2024	2026	2028
			Cityside Waterfront Park 4		2029	2030
			Sports Park		2030	2031
	4-B	C10-C11		2025	2027	2029
			Urban Farm 3		2031	2032
	4-C	C6		2026	2028	2030
			Cityside Waterfront Park 5		2031	2032
			Urban Farm 4		2032	2033
	4-D	C7-C8-C9		2027	2029	2031
			Cityside Waterfront Park 6		2032	2033
			Northern Shoreline Park / The Wilds / Environmental Center Pad		2033	2034

Figure 3. Phasing Schedule (Page 1 of 3)

Source: Disposition and Development Agreement, Exhibit JJ, Schedule of Performance

6/28/2011

Community Facility	Obligation	Building Permit / Trigger [3/]	Application Outside Date [4/]	Commencement Outside Date [4/]	Completion Outside Date [4/]
		A	B	C	D
Waterfront Plaza / Ferry Terminal Phase 1	Facility	100 du	+6mo	+12mo	+36mo
Retail - Interim Grocery Store (5,000 sf)	Facility	1,000 du	+6mo	+12mo	+36mo
Police / Fire Station	Facility	2,500 du	+6mo	+12mo	+24mo
Retail - Final Grocery Store (15,000sf)	Facility	5,000 du	+6mo	+12mo	+24mo
Ferry Terminal Phase 2	Facility	As mutually agreed by WETA, Developer, and TIDA, after engaging in a meet and confer process described in the MOU between TIDA and WETA.			
WWTP / Recycled Water Plant / PUC 4-6 acres	Developable Pad	See PUC / TIDA WWTP MOA for timing of pad delivery.			
Sailing Center Pad	Developable Pad	Developer shall use commercially reasonable efforts to provide the Sailing Center Pad earlier if the Authority requests it and if the Treasure Island Sailing Center provides reasonable evidence that it will be ready to proceed with construction of the Sailing Center building at that earlier date.			
Environmental Center Pad	Developable Pad	Developer shall deliver the Environmental Center Pad commensurate with improvements for The Northern Shoreline Park and The Wilds			
Pier 1 / Eastern Shoreline Park 2	Improvements	Construction of these improvements may be deferred if the area is still needed for barging operations related to importing material for the site. In no case will the Completion Outside Date for these improvements be later than the Completion Outside Date of the last Sub-Phase.			
Buses for East Bay Service	Rolling Stock	Nine (9) Buses for East Bay Bus Service. First five (5) buses at inception of service, remaining four busses no earlier than the occupancy of the 5,000th residential unit.			
On -Island Shuttle Buses	Rolling Stock	Four (4) Shuttle Buses. Up to two (2) buses will be provided when the service initially begins, but no earlier than the occupancy of the three thousandth (3000th) unit, subject to the meet and confer process described in Exhibit N, Transportation Plan Obligations. The remaining two (2) buses will be provided as needed based on service schedules.			
Bicycle Lending Library	Rolling Stock	Purchase of bicycles and equipment to establish the bicycle lending library up to a maximum expediture of $110,000. Must be completed no later that the occupancy of the 1,000 residential unit.			

Financial Obligation	Obligation	Mechanism
Open Space Annual O&M Subsidy	$14.3 MM (NPV)	Max $1.5mil first 5 yrs, $3 mil per yr from Yr 6, subject to need per annual operating budget. See Financing Plan for amounts and schedule.
Transportation Annual Operating Subsidy	$30 MM (NPV)	Max $4 mil per year, subject to need per annual operating budget. See DDA for amounts and schedule.
Additional Transportation Subsity	$5 MM max	Five annual consecutive installments (max $1 mil per year) after the first certificate of occupancy (whether temp or final) has been issued for the 4,000th dwelling unit on the Project Site, payable within 90 days after request of SFCTA if transit report shows residential transit mode share is 50% or less.
Transportation Capital Contributions	$1.8 MM (NPV)	Used to purchase up to six (6) busses. Per-bus subsidy: the lesser of 20% of the cost of a Muni bus, or $300,000.
Community Center Space(s) Subsidy	$9.5 MM (NPV)	Space or susidy determination made at Major Phase Approval. Max $2.375 mil each Major Phase - subject to approved budget and program description.
Childcare Facility Subsidy	$2.5M (NPV)	Space or funding no later than the first approved Sub-Phase within Major Phase Three or 18 months before the existing facility is no longer operational due to development activity, whichever comes first.
Affordable Housing Subsidy	$98 MM max; $73.5 MM baseline	$17,500 per market rate unit at each lot sale. Trueups at 50% of TI land acreage make-up to 2,100 units and at 4,200 units land sales, credit for any payment made at 2,100 unit true-up. See Housing Plan for amounts and schedule
School Improvement Payment	$5 MM (NPV)	Payment due at the start of refurbishment work on the school grounds for purposes of opening a K-8 school. See DDA for amounts and schedule.
Ramps / Viaduct SFCTA Soft Cost Reimbursement	$10 MM (NPV)	Annual schedule of payments. See TIDA / SFCTA MOA 3rd Amendment for amounts and schedule.
Import Fill	$1 MM	Payment due upon removal from stockpile at rate of $3.50 per CY or for any remaining in stockpile after 12/31/2015 in 3 equal annual installments. See TIDA / D.A. McCosker Agreement.

[1/] Horizontal obligations only, no vertical improvement or rehabilitation except as defined in Open Space Plan

[2/] All dates are subject to navy's environmental remediation efforts provided in the Navy MOA and land transfers from Navy and TIDA

Figure 3. Phasing Schedule (Page 2 of 3)

Source: Disposition and Development Agreement, Exhibit JJ, Schedule of Performance

SCHEDULE OF PERFORMANCE

6/28/2011

[3/] Community Facility obligation is triggered by number of total building permits issued for residential dwelling units (shown in table above)
[4/] Timeframes are additive: Completion Outside Date = Date of Trigger (A) + (B) + (C) + (D)

Figure 3. Phasing Schedule (Page 3 of 3)

Source: Disposition and Development Agreement, Exhibit JJ, Schedule of Performance

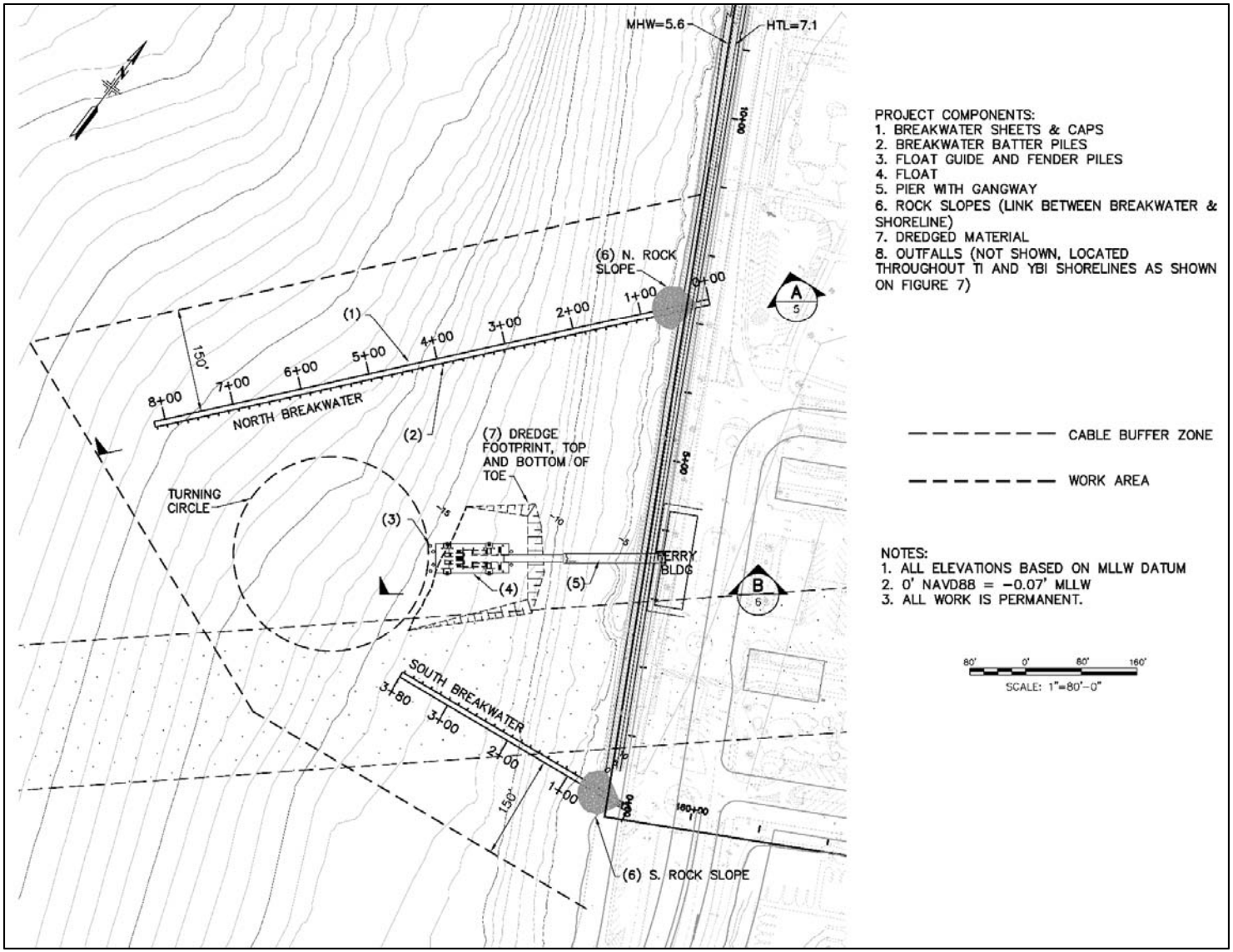


Figure 4. Ferry Dock Site Plan

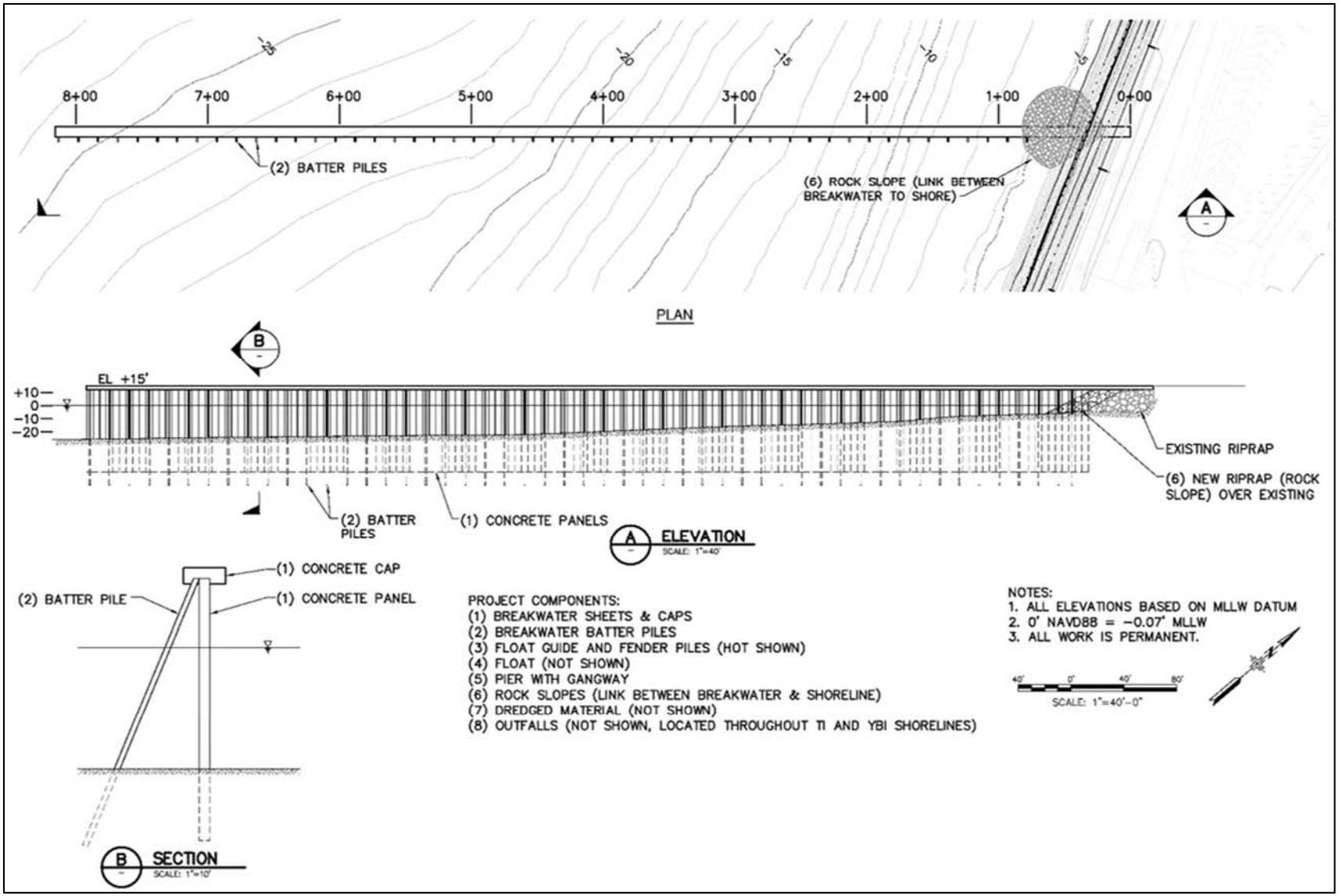


Figure 5. Breakwater Plan

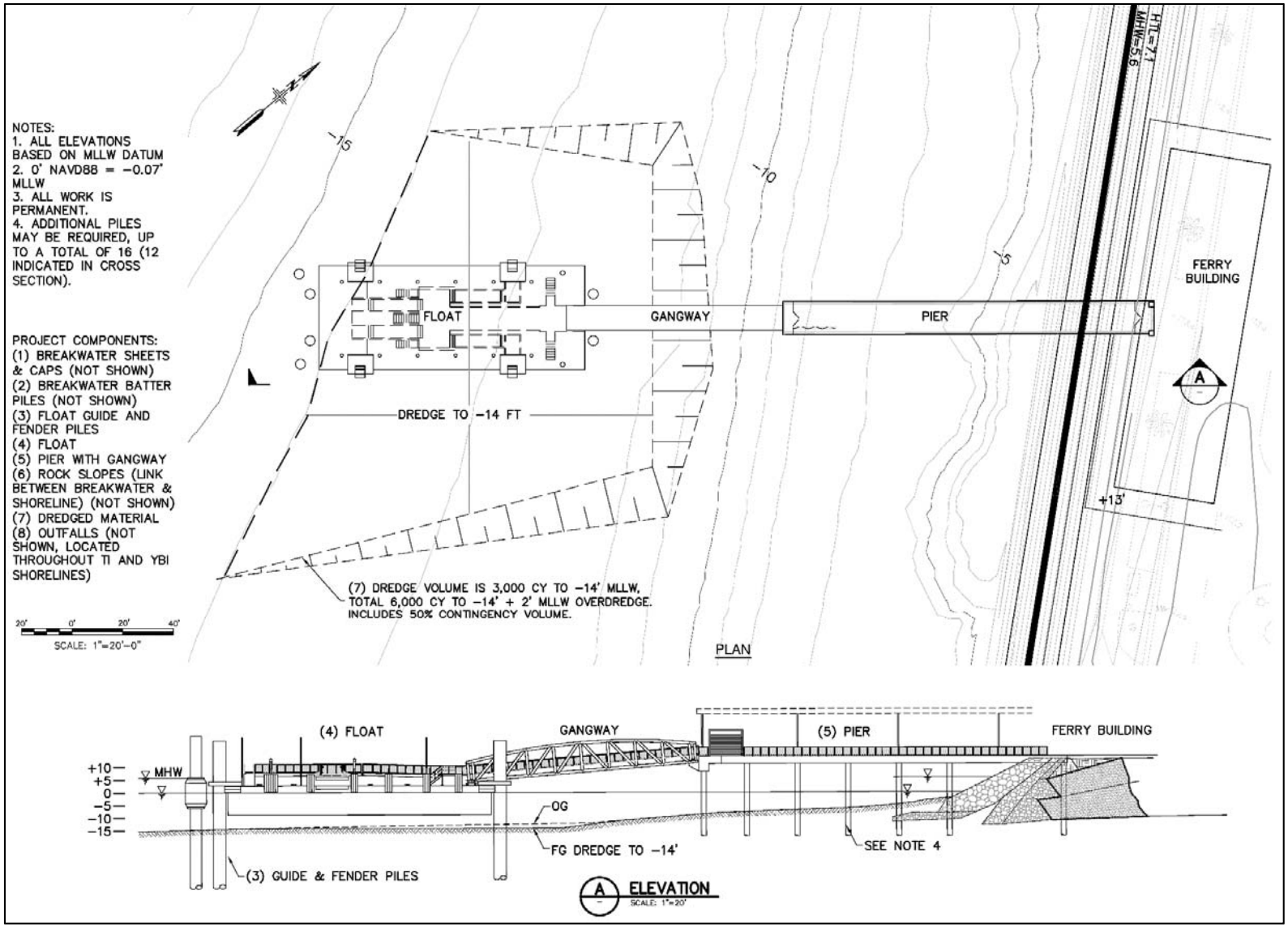


Figure 6. Dredging Plan

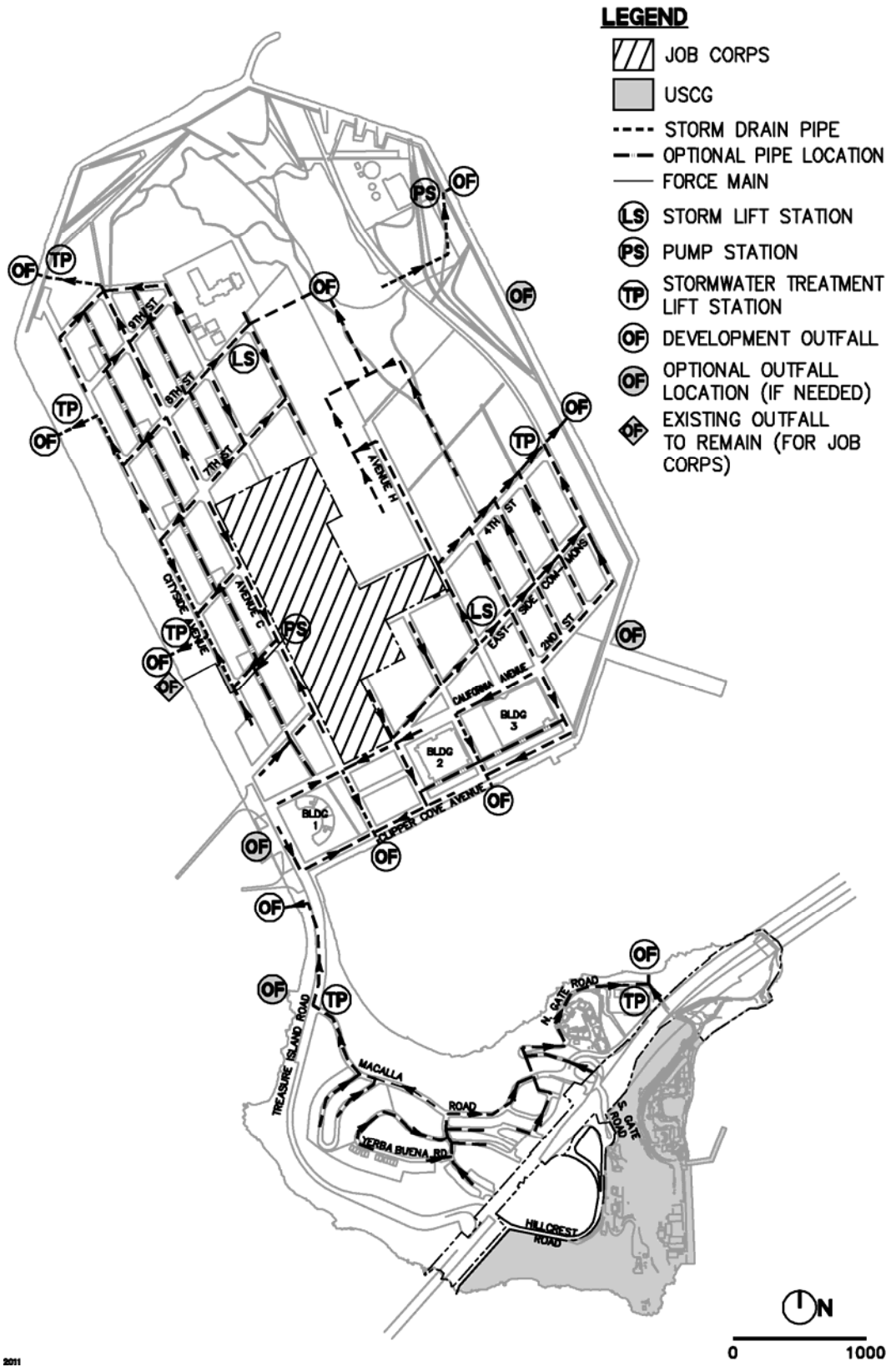
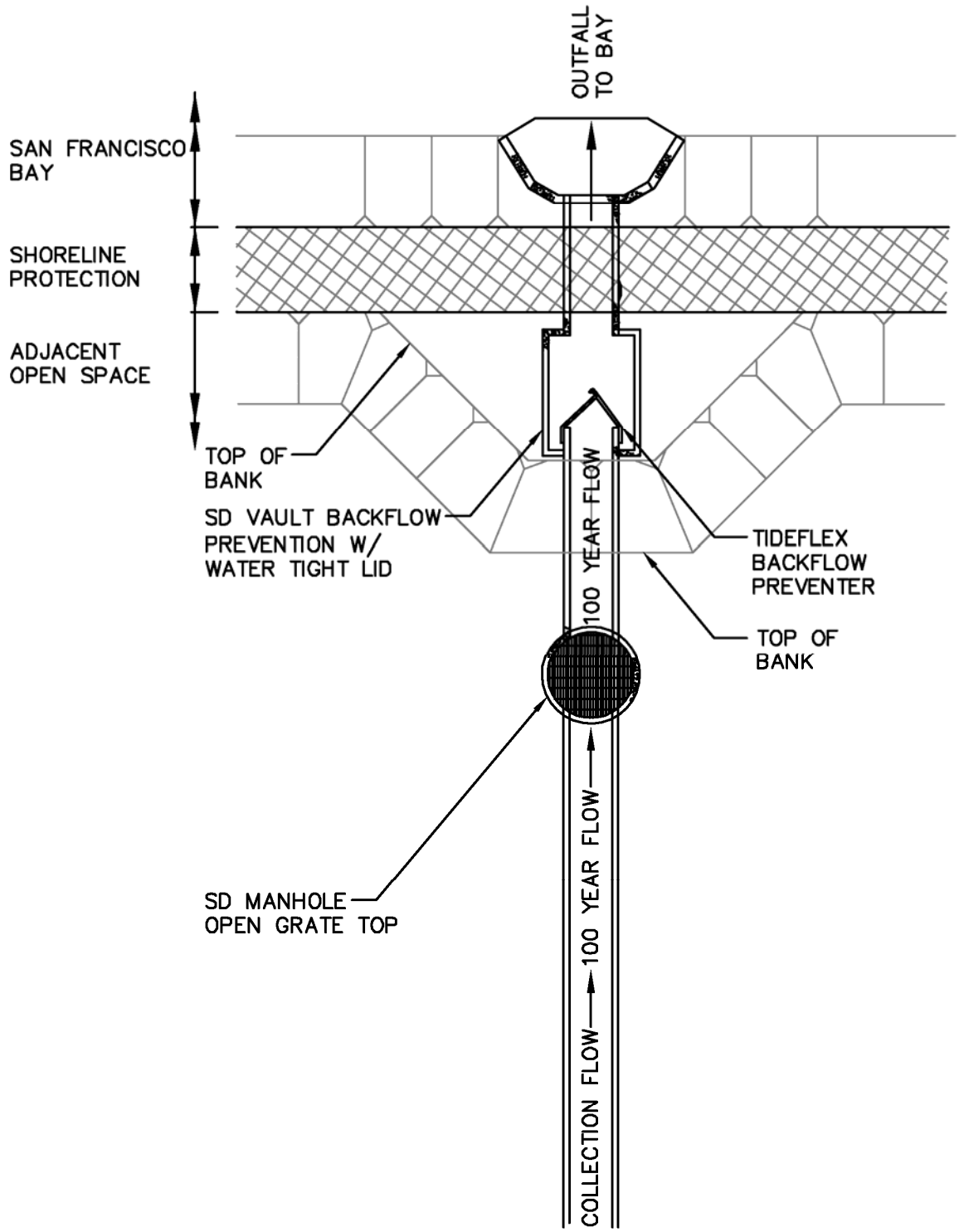


Figure 7. Proposed Stormwater Collection System Plan

Source: Treasure Island Infrastructure Plan, Figure 12.1

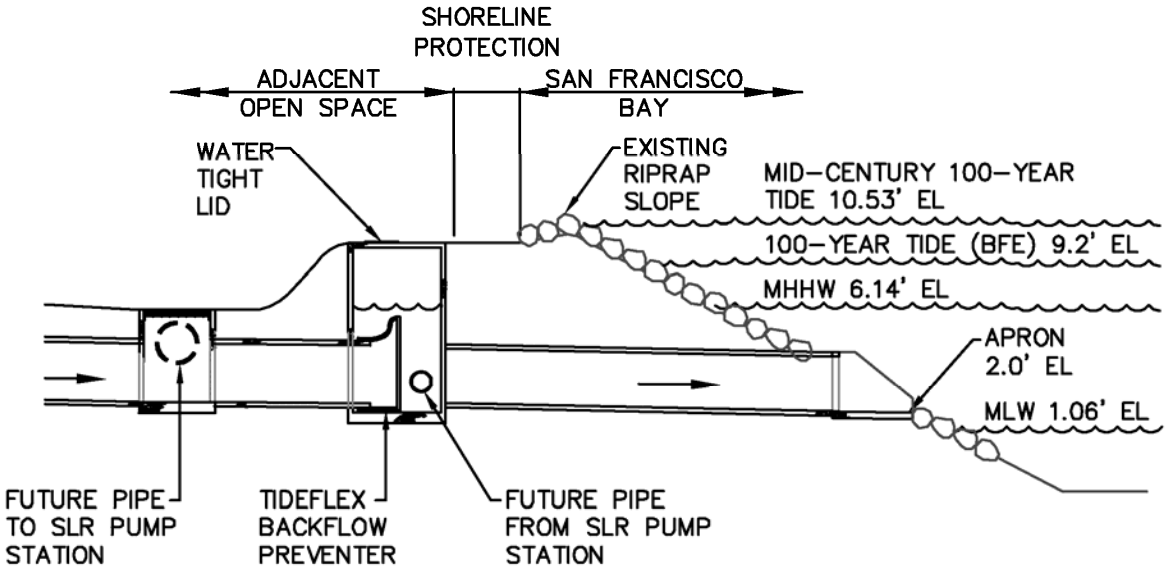


STORM DRAIN OUTFALL AT CONSTRUCTION

NOT TO SCALE

Figure 8. Stormwater Outfall Plan

Source: Treasure Island Infrastructure Plan, Figure 12.3.1



STORM DRAIN OUTFALL - SECTION

NOT TO SCALE

PROJECTED TIDE ELEVATIONS WITH SEA LEVEL RISE

TIDE BENCHMARK	SLR	100-YR	MLW	MHHW
CURRENT	–	9.20'	1.06'	6.14'
MID-CENTURY (~2050)	16"	10.53'	2.39'	7.47'
3/4 CENTURY (~2075)	36"	12.20'	4.06'	9.14'
END CENTURY (~2100)	55"	13.78'	5.64'	10.72'

Figure 9. Stormwater Outfall Section

Source: Treasure Island Infrastructure Plan, Figure 12.3.2

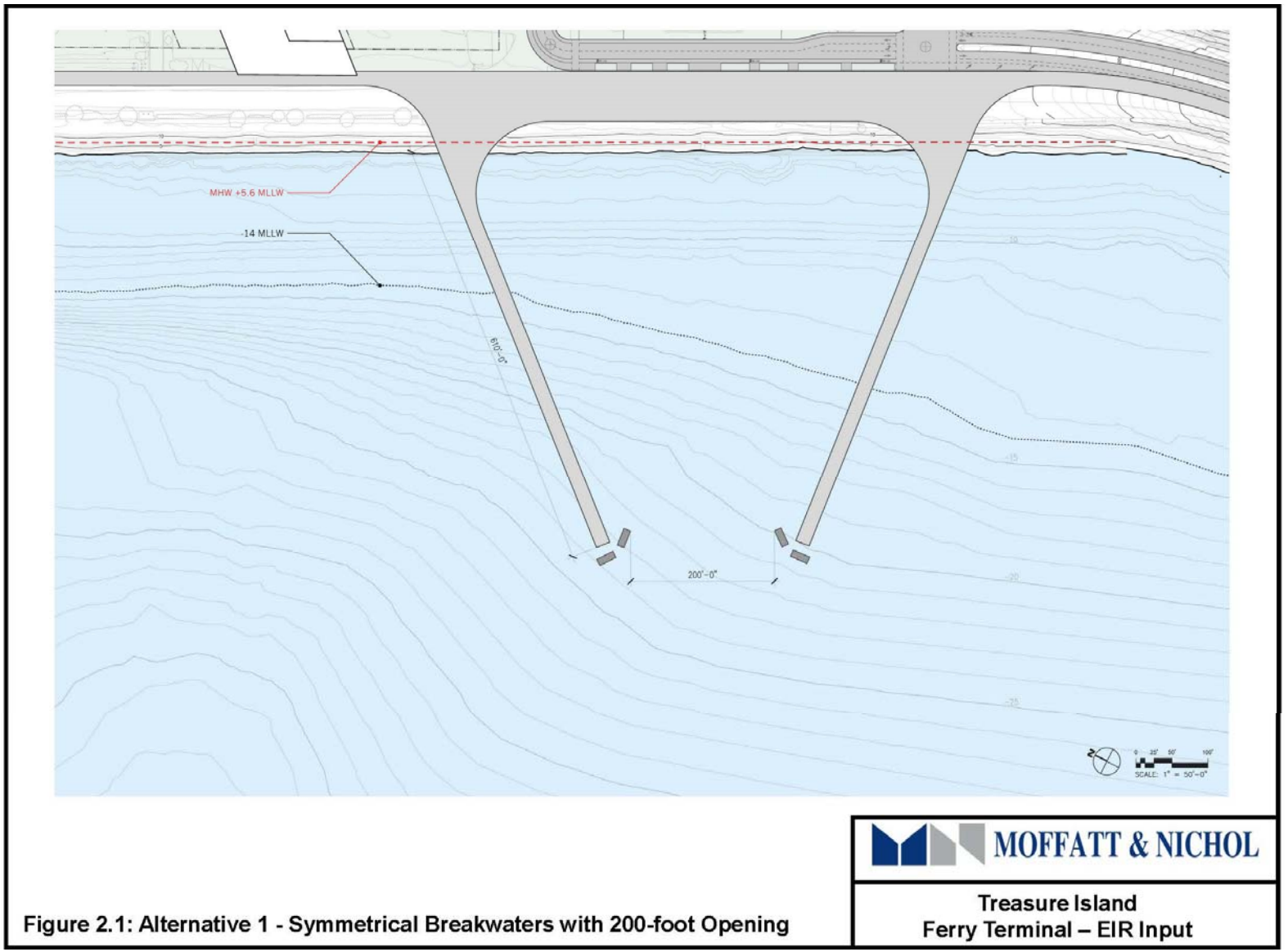


Figure 10: Variant B1 (*Source: Treasure Island Ferry Terminal Project Coastal Engineering Assessment* (SOM, LLP/Moffatt & Nichol, 9/14/09)

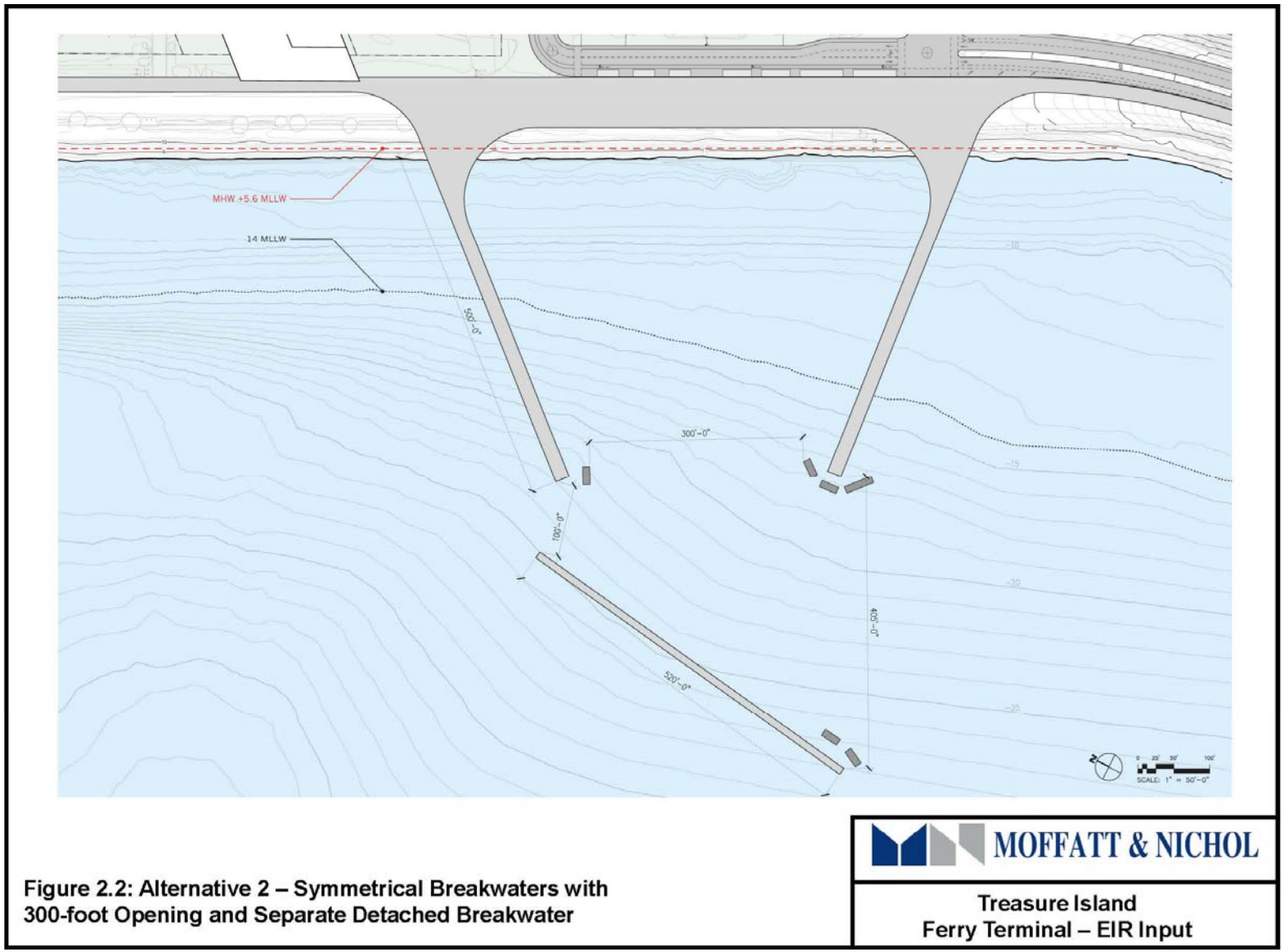


Figure 2.2: Alternative 2 – Symmetrical Breakwaters with 300-foot Opening and Separate Detached Breakwater

Figure 11: Variant B2 (*Source: Treasure Island Ferry Terminal Project Coastal Engineering Assessment* (SOM, LLP/Moffatt & Nichol, 9/14/09)

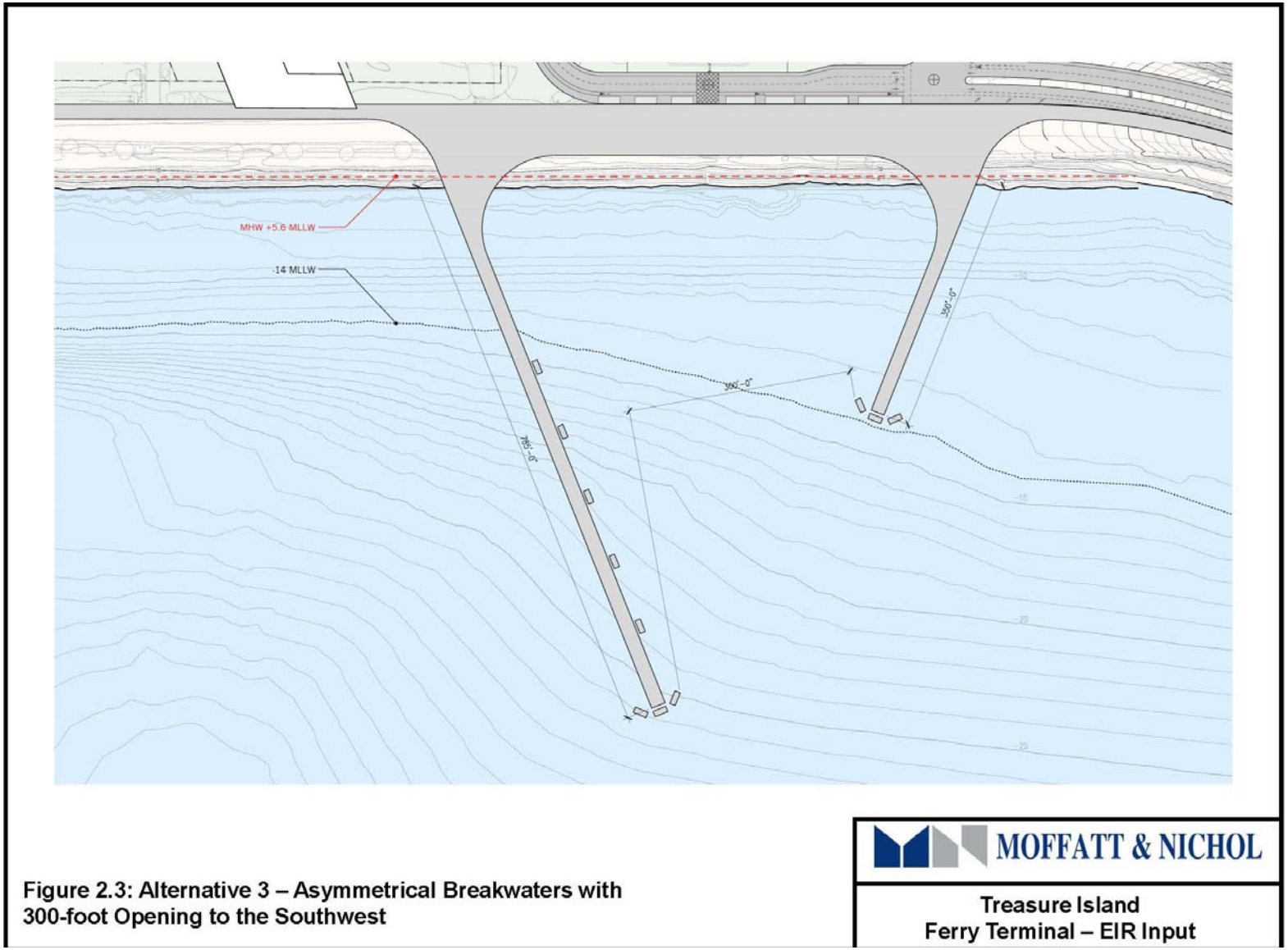


Figure 12: Variant B3 (*Source: Treasure Island Ferry Terminal Project Coastal Engineering Assessment* (SOM, LLP/Moffatt & Nichol, 9/14/09)