San Francisco Bay Conservation and Development Commission
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September 13, 2023

TO: Engineering Criteria Review Board (ECRB) Members

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SUBJECT: **U.S. Army Corps of Engineers (USACE) Oakland Harbor Turning Basins Widening Project (OHTBW), Alameda County (BCDC Consistency Determination C2023.003.00)**
(For Board consideration on September 27, 2023)

Project Name

USACE Oakland Harbor Turning Basins Widening Project
(BCDC Consistency Determination C2023.003.00)

Project Representatives

Barney Wair, PE, GE, Chief, Geo-Sciences Section, USACE – San Francisco District
Ellie Covington, Environmental Planner, USACE – San Francisco District

Project Components Under Review

The US Army Corps of Engineers, San Francisco District, has requested the San Francisco Bay Conservation and Development Commission (BCDC) phased concurrence regarding the consistency of the Oakland Harbor Turning Basins Widening Project (project) with BCDC's federally-approved Amended Coastal Zone Management Program for the San Francisco Bay segment of the California Coastal Zone. The USACE is the federal sponsor and the Port of Oakland is the local project sponsor for this project, which includes widening the Oakland Federal Channel's two turning basins: one in the Outer Harbor and one in the Inner Harbor. The turning basins would be widened from 1,500 feet in diameter to 1,834 feet in diameter, improving both vessel transit efficiencies and navigational safety for larger ships. The following components of the project are under review:

1. Outer Harbor – widening the dredging area with new 3:1 slope on the Bay floor.
2. Inner Harbor
    a. New 1100-foot-long steel sheet pile bulkhead wall with batter piles and below-water rock slope protection (RSP) on private Alameda property (and removal of the existing bulkhead wall, wharf, piles, and materials on the Bay side of the new wall)
    b. New 800-foot long steel sheet pile bulkhead wall with batter piles and below-water RSP (same design as Alameda) at Howard Terminal, Port of Oakland property (and removal of the existing bulkhead wall, wharf, piles, and materials on the Bay side of the new wall)

c. New 400-foot-long submerged retaining structure with RSP in front of an existing bulkhead wall at Schnitzer Steel in Oakland

d. Widening the dredging area with new 3:1 slopes on the Bay floor

The project is currently in the feasibility phase, so only conceptual design and preliminary design criteria are being reviewed.

Purpose of this Meeting

The purpose of the meeting is to request the review and advice of the ECRB about the safety aspects of the project design to inform the Commission's review of the phased consistency determination. BCDC requests the assessment of the adequacy of the preliminary engineering criteria of the new dredging areas and bulkhead walls (the project) that are the focus of this review. It is anticipated that if deemed appropriate by the ECRB, that the applicant would return to the ECRB when the design is further advanced.

The authority to review and revise engineering criteria and any safety provisions is bestowed on the ECRB through the McAteer-Petris Act government section code 66605(e), which requires that all fill must be constructed "in accordance with sound safety standards which will afford reasonable protection to persons and property against the hazards of unstable geologic or soil conditions or of flood or storm waters." Additionally, the Bay Plan policies, especially policies Nos. 1 and 2 on the Safety of Fills, provide additional authority.

Project Description

In this project, USACE is proposing to install new shoreline protection systems, excavate fast land and portions of wharves, and dredge new areas to widen two turning basins along the Port of Oakland. The primary project components are listed above. Bulkhead walls are the primary shoreline protection, and as such they are designed to hold up the shoreline only; they are not designed to reduce current or future flood risk from sea-level rise. The expanded turning basins would be maintained by annual dredging, as are the current turning basins. The project location is shown in Figure 1 below and Figures 2 and 3 show the locations of the components of the Outer and Inner Harbor Turning Basins, respectively.

In this report, elevations are referenced to MLLW vertical datum. To convert MLLW elevations to NAVD88, add 0.1 feet.

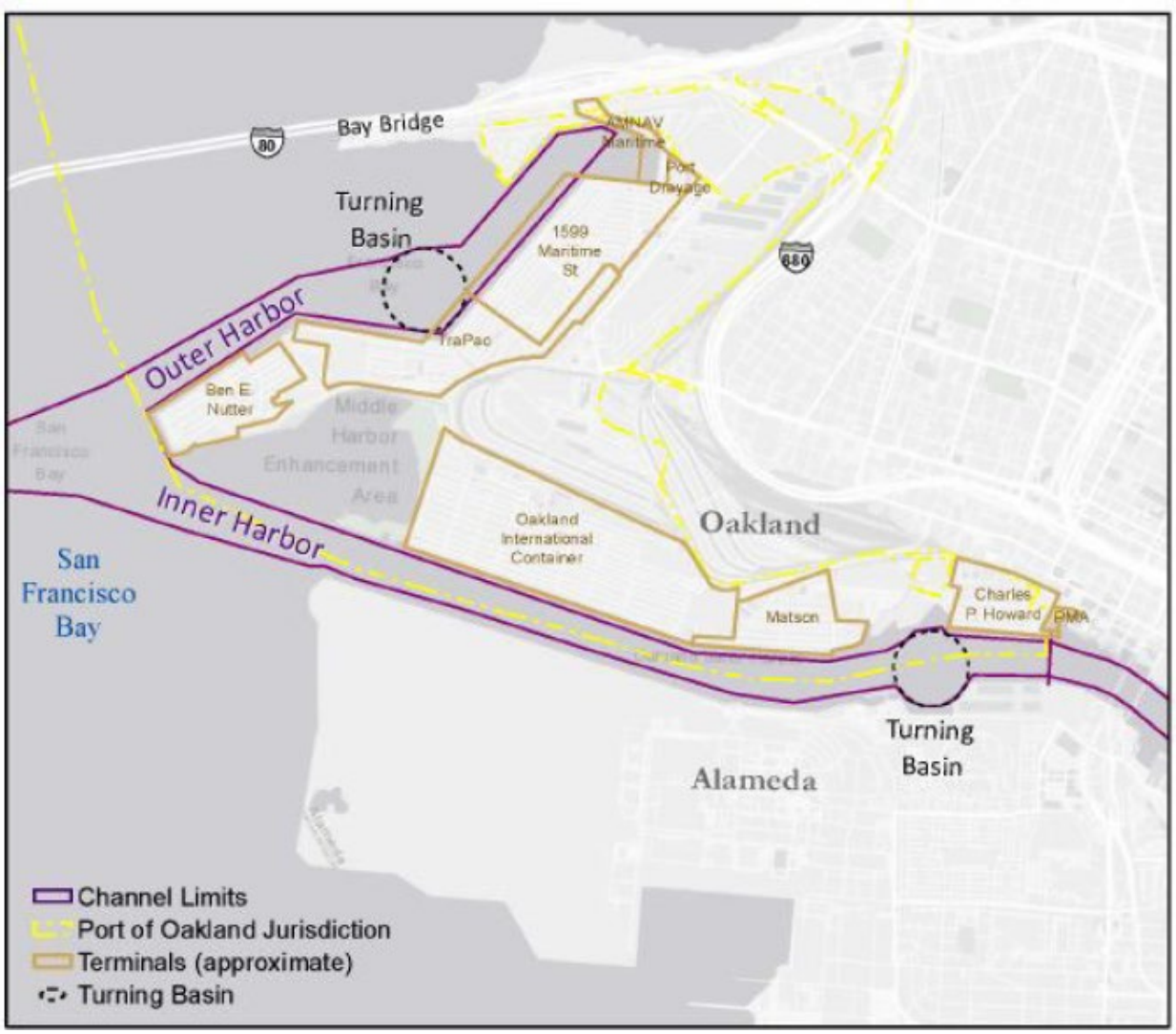

Figure 1. Location of the Two Turning Basins to be widened in the USACE Oakland Harbor Turning Basins Widening Project (from the Oakland Harbor Turing Basins Widening Revised Draft Integrated Feasibility Report and Environmental Assessment, Appendix B2: Geotechnical Engineering, Revised March 2023).

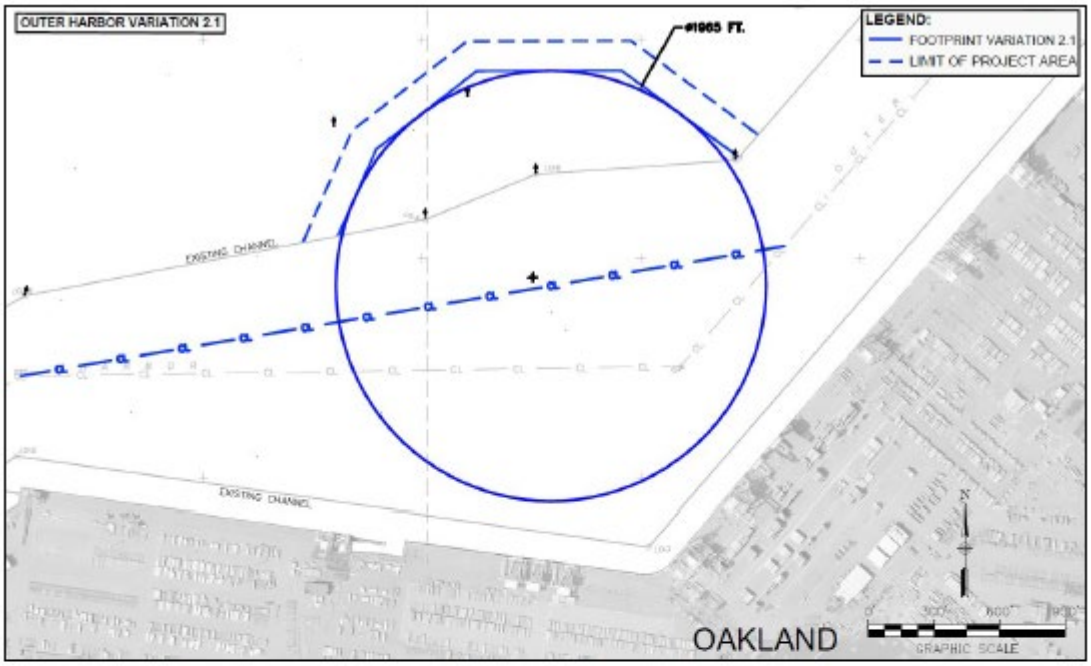

Figure 2: Outer Harbor Turning Basin Proposed Footprint

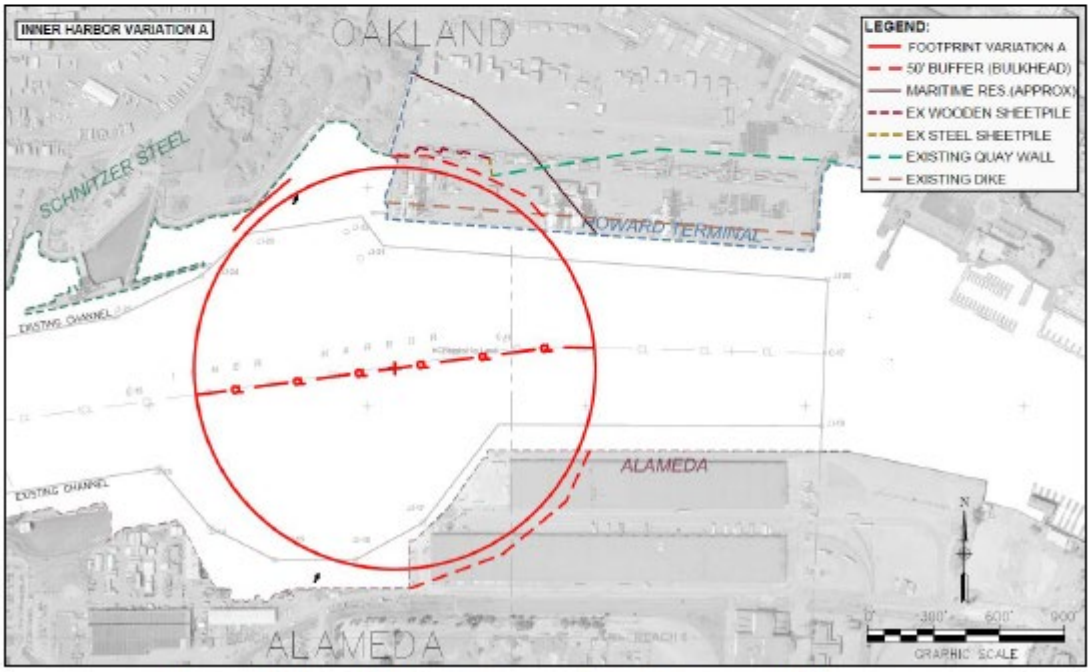

Figure 3: Inner Harbor Turning Basin Proposed Footprint

(Figures 2 and 3 from the Oakland Harbor Turning Basins Widening Revised Draft Integrated Feasibility Report and Environmental Assessment, Appendix B2: Geotechnical Engineering, Revised March 2023)

1. **Dredging Area Widening**: At both the Outer and Inner Harbor Turning Basins there are proposed areas of the Bay floor to be deepened by dredging, leaving 3:1 slopes (the same slope as at existing dredge limits). The Bay floor is at an elevation of about -5 feet MLLW and is being lowered to an elevation of -50 feet MLLW (the current base of the turning basins). These areas were analyzed by the USACE for slope stability.
2. **New Bulkhead Walls at Howard Terminal and Alameda**: At both locations, a sheet pile wall is proposed, supported by batter piles and possibly dead man anchors. The wall would support roughly 30 feet of fill that may require geotechnical improvement, between elevations of roughly 10 feet and -20 feet MLLW. In front of the wall is a submerged 1.5:1 slope covered with RSP roughly from an elevation of -20 to -50 feet MLLW. The portion of the existing bulkhead walls, pilings, soil, and other material in front of these walls would be removed. At Howard Terminal there is a portion of a wharf and a large rock dike below the wharf that also would be removed.
3. **New Submerged Wall Next to Schnitzer Steel**: This wall would be 300 to 400 feet long and conceptual designs include concrete secant wall, drilled stitch piers, driven piles or sheet piles. The wall would be offset 10 to 15 feet from the existing Schnitzer Steel wall. The top of the wall would be flush with the existing grade (mudline) at the base of the Schnitzer Steel wall and retain approximately 20-25 feet of soil (between elevations of roughly -20 and -40 feet MLLW). The Bay mud in front of the wall would be dredged out leaving a slope in front of the wall from roughly elevation -40 to -50 feet MLLW, which would be covered with RSP.

Project Design Considerations

Sediment in the areas of both harbors are Young Bay Mud over dense San Antonio Formation sands. Annually approximately 1-2 feet of new silty clay material naturally deposits in the turning basins requiring dredging.

The FEMA 100-year flood level in the Inner Harbor is elevation 10 NAVD88 (also MLLW). Sea level rise is beneficial to the project as the water level in the harbor would be deeper. Although it is not part or the project purpose, there are portions of the Alameda site predicted to flood in a 100-year (1% Annual Chance) flood event and portions of the Oakland site predicted to flood in a 500-year (0.2% Annual Chance) flood event, as shown in the FEMA National Flood Hazard Map in Figure 4.

Additional design-related studies would be performed when the project enters the planning, engineering and design phase.

The Board will review the following reports submitted by USACE:

1. USACE, Oakland Harbor Turning Basins Widening Navigation Study – Revised Draft Integrated Feasibility Report & Environmental Assessment (RDIFR&EA), April 2023. Appendix B1: Channel Design
2. USACE, RDIFR&EA Appendix B2: Geotechnical Engineering
3. USACE, RDIFR&EA Appendix B3: Structural Engineering and Attachments

4. USACE, RDIFR&EA Appendix B4: Coastal Engineering
5. USACE, Oakland Harbor Turning Basin Feasibility Study Drawing Set for BCDC Review (9 sheets), July 2023

The complete Oakland Harbor Turning Basins Widening Navigation Study – Revised Draft Integrated Feasibility Report & Environmental Assessment (DIFR&EA), April 2023 is available here if needed: https://www.spn.usace.army.mil/Missions/Projects-and-Programs/Current-Projects/Oakland-Harbor-Turning-Basins-Widening/

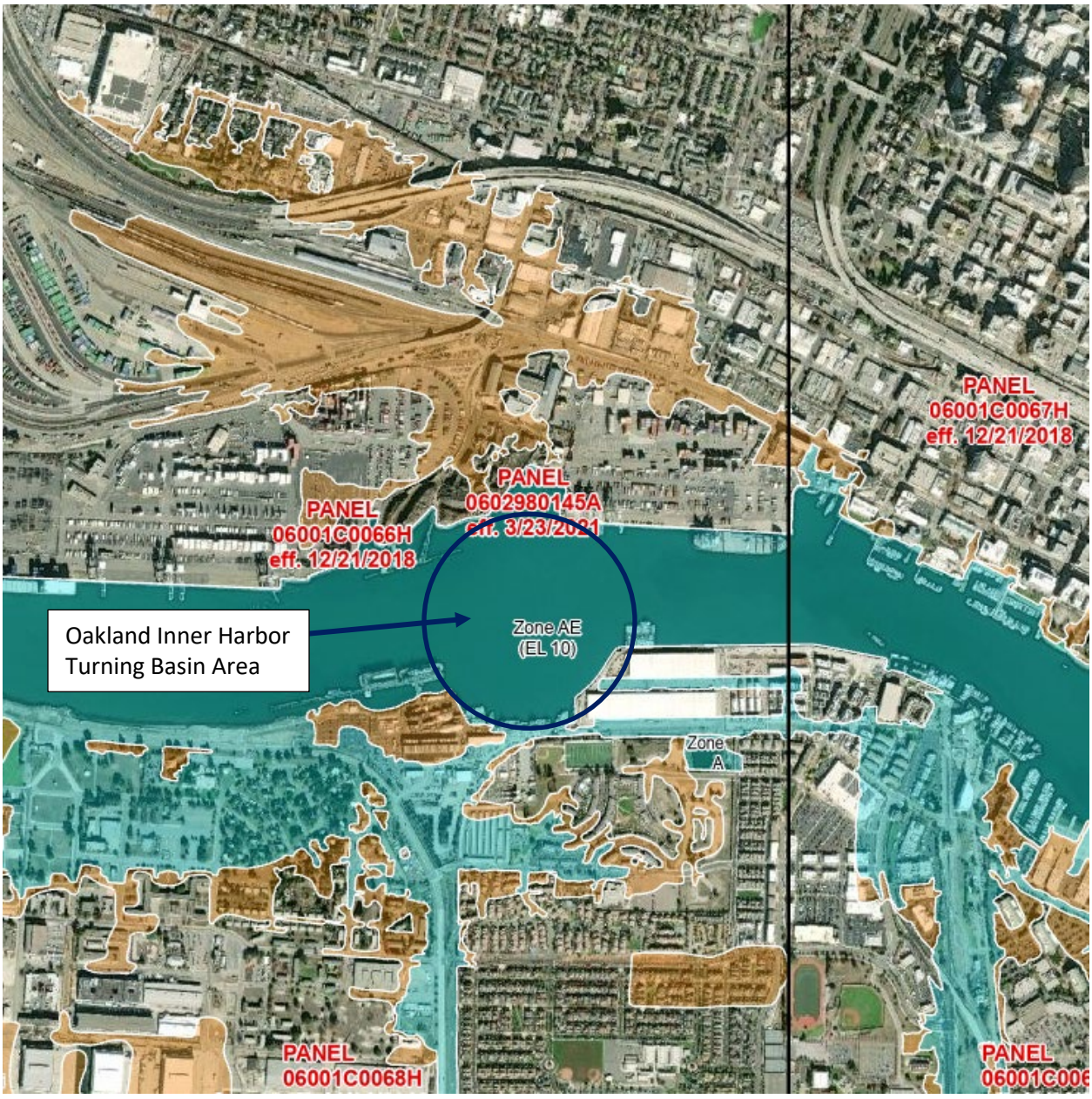

Figure 4. FEMA National Flood Hazard Layer Map for Oakland Inner Harbor Turning Basin Area. Blue shaded area = 1% (100-year) Annual Chance Flood Hazard and Brown shaded areas = 0.2% (500-year) Annual Chance Flood Hazard.

Staff Questions to the Board

BCDC staff requests that the Board review the content provided and advise on the following:

1. Are the scenarios and design criteria in the geotechnical stability analyses for the new 3:1 dredge slope appropriate for the site hazards, conditions and site criticality?
2. Are the structural engineering design criteria, including seismic criteria and design loads, for the three new bulkhead wall structures appropriate for the site hazards, conditions and site criticality?
3. Are current and future flooding concerns (i.e., from groundwater and coastal flooding) addressed adequately based on the site hazards and the nature of the project?
4. Are there any other design and physical concerns that have not been addressed?
5. Do you recommend a future ECRB meeting for this project?

Bay Plan Policies

The project raises issues related to Bay Plan policies including Safety of Fills, Shoreline Protection and Climate Change. The following policies are relevant for the Board's review:

Safety of Fills

The policies on the Safety of Fills seek to reduce risk of life and damage to property for projects that require construction on fill in San Francisco Bay. The following policies apply:

1. **Policy No. 1.** The Commission has appointed and empowered the ECRB to:
    a. Establish and revise safety criteria for Bay fills and structures thereon,
    b. Review projects for the adequacy of their specific safety provisions and make recommendations concerning these provisions, and
    c. Prescribe an inspection system to assure placement and maintenance of fill according to approved designs.
2. **Policy No. 2.** Even if fill may be permissible, no fill or building should be constructed if hazards cannot be overcome adequately for the intended use in accordance with the criteria prescribed by the ECRB.
3. **Policy No. 3** requires the installation of strong-motion seismographs on all future major landfills with the guidance of and recommendations by the California Geological Survey, for purposes of data comparison and evaluation.
4. **Policy No. 4**. Adequate measures should be provided to prevent damage from sea level rise and storm activity that may occur on fill or near the shoreline over the expected life of a project. The Commission may approve fill that is needed to provide flood protection for existing projects and uses. New projects on fill or near the shoreline should either:
    a. Be set back from the edge of the shore so that the project will not be subject to dynamic wave energy,

b. Be built so the bottom floor level of structures will be above a 100-year flood elevation that takes future sea level rise into account for the expected life of the project,

c. Be specifically designed to tolerate periodic flooding, ***or***

d. Employ other effective means of addressing the impacts of future sea level rise and storm activity.

Rights-of-way for levees or other structures protecting inland areas from tidal flooding should be sufficiently wide on the upland side to allow for future levee widening to support additional levee height so that no fill for levee widening is placed in the Bay.

Shoreline Protection Policies

The following policies of Shoreline Protection apply:

1. **Policy No. 1** New shoreline protection projects and the maintenance or reconstruction of existing projects and uses should be authorized if:

   (a) the project is necessary to provide flood or erosion protection for

   (i) existing development, use or infrastructure, or

   (ii) proposed development, use or infrastructure that is consistent with other Bay Plan policies;

   (b) the type of the protective structure is appropriate for the project site, the uses to be protected, and the causes and conditions of erosion and flooding at the site;

   (c) the project is properly engineered to provide erosion control and flood protection for the expected life of the project based on a 100-year flood event that takes future sea level rise into account;

   (d) the project is properly designed and constructed to prevent significant impediments to physical and visual public access;

   (e) the protection is integrated with current or planned adjacent shoreline protection measures; and

   (f) adverse impacts to adjacent or nearby areas, such as increased flooding or accelerated erosion, are avoided or minimized.

2. **Policy No. 4** Authorized protective projects should be regularly maintained according to a long-term maintenance program to assure that the shoreline will be protected from tidal erosion and flooding and that the effects of the shoreline protection project on natural resources during the life of the project will be the minimum necessary.

Dredging Policies

The Bay Plan Dredging policies apply to this project but are not related to project design safety and so are not repeated here.

Climate Change Policies

The Bay Plan Climate Change policies apply to the proposed project:

1. **Policy No. 2.** When planning shoreline areas or designing larger shoreline projects, a risk assessment should be prepared by a qualified engineer and should be based on the estimated 100-year flood elevation that takes into account the best estimates of future sea level rise and current flood protection and planned flood protection that will be funded and constructed when needed to provide protection for the proposed project or shoreline area. A range of sea level rise projections for mid-century and end of century based on the best scientific data available should be used in the risk assessment. Inundation maps used for the risk assessment should be prepared under the direction of a qualified engineer. The risk assessment should identify all types of potential flooding, degrees of uncertainty, consequences of defense failure, and risks to existing habitat from proposed flood protection devices.
2. **Policy No. 3.** To protect public safety and ecosystem services, within areas that a risk assessment determines are vulnerable to future shoreline flooding that threatens public safety, all projects—other than repairs of existing facilities, small projects that do not increase risks to public safety, interim projects and infill projects within existing urbanized areas—should be designed to be resilient to a mid-century sea level rise projection. If it is likely the project will remain in place longer than mid-century, an adaptive management plan should be developed to address the long-term impacts that will arise based on a risk assessment using the best available science-based projection for sea level rise at the end of the century.

Subtidal Areas Policies

The Bay Plan includes the following Subtidal Area policies relevant to the proposed project:

1. **Policy No. 1.** Any proposed filling or dredging project in the subtidal area should be thoroughly evaluated to determine the local and Bay-wide effects of the project on: (b) tidal hydrology and sediment movement; … and (e) the Bay's bathymetry. Projects in the subtidal areas should be designed to minimize and, if feasible, avoid harmful effects.

Port Policies

The Bay Plan Ports policies apply to the proposed project, including:

1. **Policy No. 1.** Port planning and development should be governed by the policies of the Seaport Plan and other applicable policies of the Bay Plan. The Seaport Plan provides for:
    a. Expansion and/or redevelopment of port facilities at Benicia, Oakland, Redwood City, Richmond, and San Francisco, and development of new port facilities at Selby;
    b. Further deepening of ship channels needed to accommodate expected growth in ship size and improved terminal productivity;
    c. The maintenance of up-to-date cargo forecasts and existing cargo handling capability estimates to guide the permitting of port terminals; and
    d. Development of port facilities with the least potential adverse environmental impacts while still providing for reasonable terminal development.