

San Francisco Bay Conservation and Development Commission

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TO: Engineering Criteria Review Board (ECRB) Members

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SUBJECT: Brooklyn Basin Project, City of Oakland, Alameda County
(For Board consideration on August 13, 2020)

Project Summary

Project Name

Brooklyn Basin, City of Oakland

Project Representative

Patrick Vanness, Signature Development Group

Project Components under Review

Clinton Basin East Promenade and Bulkhead Wall

Project Geotechnical Engineer

ENGEO

Project Marine Structural Engineer

Simpson Gumpertz & Heger (SGH) Inc.

Project Description

The Brooklyn Basin Development Project consists of approximately 60 acres of waterfront property development. Phase 1 of the project focused on the Shoreline Park at the 9th Avenue Wharf and was constructed earlier this year. Phase 2 of the project centers around Clinton Basin which is located at the intersection of Embarcadero and Brooklyn Basin Way and between Shoreline Park and South Park. The primary shoreline infrastructures feature the new arch bulkhead system, and the new Promenade Wharves.

Project Site and Existing Conditions

The Clinton Basin East Promenade and Bulkhead Wall are both within Clinton Basin, which is an artificial basin along the shoreline that is generally rectangular in shape and oriented southwest to northeast. The soil conditions surrounding Clinton Basin generally comprise fill over Young Bay Mud (ranging in thickness from 20 to 30 feet) over interlayered Old Bay Clay and Alluvium. Bedrock is approximately 500 to 700 feet deep. The geotechnical aspects of the project were discussed on August 11, 2105 with ECRB and approval of the project was provided conditioned on an approved instrumentation plan and additional non-circular analyses of the Clinton Basin Bulkhead. Geotechnical explorations are provided in ENGEO's "Clinton Basin Updated Recommendations," dated July 2, 2015.



Existing BCDC Approvals

On January 20, 2011, the San Francisco Bay Conservation and Development Commission issued Permit No. 2006.007.00 to the Port of Oakland, the City of Oakland and Zarsion-OHP I, LLC to construct the Brooklyn Basin Development Project, located between the Oakland Estuary and Embarcadero roadway, southeast of Jack London Square, in the City of Oakland, Alameda County. The project consists of five phases of development at the site.

Phase I was reviewed by the ECRB on June 11, 2007 and three additional times in 2015, on February 26, August 11 and October 22. The Phase I review involved the review of the retrofit of the 9th Avenue Terminal Wharf, a conceptual boardwalk wharf at Clinton Basin and a gravity wall at the site of the current semi-circular bulkhead wall.

Permit Authorization and Condition Requirements

In January 2011, BCDC Permit No. 2006.007.00 authorized 41,800 square feet (0.97 acres) of permanent, pile-supported fill to create an approximately 30-foot-wide concrete public promenade along 1,340 feet of shoreline, and 74,000 square feet (1.7 acres) of permanent, solid fill to create a portion of new public park, known as Gateway Park.

Special Condition II.A.1.a requires that preliminary engineering plans and engineering criteria shall be reviewed by or on behalf of the Engineering Criteria Review Board (ECRB) prior to submittal to the staff for final approval. Such materials shall demonstrate to the satisfaction of the ECRB that the permittees have adopted design criteria appropriate to the nature of the project and use of any structures constructed in connection therewith. Such criteria shall take into account the soil and foundation conditions at the site and potential earthquake-induced forces.

Proposed Project Bulkhead Wall

The Clinton Basin Bulkhead is a semi-circular retaining structure with a radius of approximately 120 ft. and located in the Clinton Basin Channel in Oakland, California. The existing channel deposits located directly behind the proposed arched retaining wall will be replaced with gravel to improve the stability of the wall. Additional granular fill will be placed behind the wall to raise the existing mudline to the final grade at approximately EL. +8' (City of Oakland Datum, COD,) which, according to the applicants, is above the flood protection elevation plus sea level rise (SLR). The engineering drawings show that the conversion from NAVD88 to COD is +5.77'. The arched bulkhead consists of prestressed concrete sheet piles with grouted joints and a curved reinforced concrete pile cap. At both ends of the arched wall, a wing wall system provides lateral support for the arch with a planar wall, a reinforced concrete deck, and a combination of vertical and batter steel pipe piles.

East Promenade

The promenade wharf consists of an 18-inch thick cast-in-place, reinforced concrete design supported on 24-inch square, prestressed precast concrete piles. The top of the deck is at EL. +6.78' (COD,) which, according to the applicants, is above the flood protection elevation plus SLR. The approximately 551-foot long wharf is divided into three sections with expansion joints between sections. The three segments have the following layouts:

- Segment 1 – 71'-8" X 89' deck, seven piles per bent, with bents arranged at 22'-9" on center
- Segment 2 – 159'-9" X 49'-6" deck, four piles with bents arranged at 17'-9" on center
- Segment 3 – 319' X 33' deck, three piles with bents spaced at 18'-9" on center

Phasing and Construction Timeline

The public access will follow the redevelopment stages and be built in five phases. The first phase is complete and will be open to the public following approval from the City of Oakland. The second phase, which includes the promenade and curved wall that is the subject of this ECRB review, will begin construction in the third quarter of 2020 and is anticipated to be complete by the end of 2021 and open to the public in early 2022. The third and fourth phases are anticipated to begin in mid-2022 and completed and open to the public in mid-2024. The fifth phase, known as Estuary Park, will be designed and built by the City of Oakland. That design effort has been delayed due to the global pandemic staffing constraints. The anticipated restart of this design process is the first quarter of 2021.

Engineering Criteria

According to project proponent, the engineering criteria for the Phase 2 project at Clinton Basin is consistent with the criteria that was presented to and approved by ECRB and BCDC in 2015. The essential criteria are summarized below:

- The engineering design complies with the life safety requirements in 2013 California Building Code (CBC) and updated to 2016 CBC
- Seismic analysis and design using Design Earthquake (DE per 2013 CBC) based on site-specific ground response analysis
- Deformation-based analysis using pseudo-static analysis with NCHRP 611 method and displacement 6 inches
- Seismic design of pile-supported wharf is based upon nonlinear static pushover analysis per "Refined Method" in CBC 31F
- Static and seismic design of the arched bulkhead retaining structure is based upon linear elastic analysis method with system reduction factor of 1.0
- Design for SLR following "Projected" trends to year 2100, i.e., 36-inch SLR
- Wave climate in the Clinton Basin is assessed in accordance with the methodology in Army Corps of Engineers' Shore Protection Manual. The shoreline protection in the Clinton Basin is designed in accordance with Caltrans' California Bank and Shore Rock Slope Protection Design with consideration of SLR
- The wharf and the bulkhead wall are designed for occupancy rating/ risk category II
- Both the wharf and bulkhead are designed for emergency vehicle access (truck loading)

Seismic Instrumentation Plan

On August 11 and October 22, 2015, the ECRB reviewed a concept of an instrumentation plan for the 9th Avenue Wharf (Phase 1) and for a previous design of the promenade wharf that is the subject of this review. At the time, the instrumentation plan did not include the curved wall. The Board made suggestions about instrument locations at the 9th Avenue Wharf, but ultimately it made a strong recommendation to seek the advice from the California Geological Survey's (CGS) on this effort.

On February 19, 2020, ENGEO presented a seismic instrumentation plan to the CGS for the semi-circular wall. No instrumentation plan proposal was included for the current East Promenade Wharf. On April 14, 2020, the staff of the CGS California Strong Motion Instrumentation Program (CSMIP) responded that, based on the February 20, 2020 proposal, CSMIP need not participate in the project. However, the staff opined that “[f]or a more meaningful understanding of the dynamics of the Bulkhead behavior, as a minimum, an additional free field instrument would be needed at a location nearby which represents the original landside soil profile (i.e., not founded in the new fill). For an even greater understanding, it would be desirable to have a downhole array of accelerographs to record the ground motions within the Young Bay Mud and the Old Bay Mud/Alluvium.”

On July 23, 2020, BCDC reached out to CGS seeking confirmation of its non-involvement. CSMIP staff stated that CSMIP is not interested in the proposed instrumentation because, according to its advisory committee, CSMIP would not learn much from “such a minimum instrumentation.” CSMIP stated that if the project included additional free field instrument and a downhole array, then it will have enough justification to be involved. See details in the references.

Soil Improvements Proposal

According to the project proponent, the retaining walls are designed for static and earthquake loading based on the GLE method presented in the 2015 meeting with ECRB. No ground improvement will be performed, though select backfill will be implemented for the walls as described in the ENGEO report.

NOTE to ECRB: *There are existing earth retaining structures (soldier pile (East) retaining walls) along the landside edge of the proposed promenade wharf that are not part of this review. Information about these is provided for reference only.*

Sea Level Rise

According to Moffatt & Nichol's February 11, 2015 Memo regarding the project, which was presented at the February 26, 2015 ECRB meeting (a copy is included in the references), the project flood adaptation strategy consists of two flood protection components: a perimeter protection component along the shoreline and the interior grades. The memo also indicates that since it is not practical to build high walls for future conditions, the shoreline edge is proposed to be three feet above the current 100-year water level, which, according to M&N, would address the SLR effects beyond mid-century levels. The document states that BFE is 9.27' NAVD88 and represents Still Water conditions.

For the interior grades, the development plan proposes a minimum Finish Flood elevation of 12.3' NAVD88 (three feet above the current 100-year water level) to account for SLR in the future. The proposed shoreline edge elevation would be 11.77' NAVD88. According to the project, such elevations would be high enough to prevent overtopping by extreme waves.

Commission Findings & Policies

Bay Plan Policies

The project raises issues related to Bay Plan policies on topics including Safety of Fills, Shoreline Protection, Public Access and Climate Change.

Note: Certain Bay Plan policies have been amended since the Brooklyn Basin development project was originally approved by the Commission. When considering the engineering criteria used for the East Promenade and the Bulkhead Wall, the ECRB should refer to the policies that were in effect at the time of the Commission approval. Those policies are noted below.

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 "establish and revise safety criteria for Bay fills and structures thereon."
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** (from the *San Francisco Bay Plan* in effect when the project was originally approved by BCDC) required that "[t]o prevent damage from flooding, structures on fill or near the shoreline should have adequate flood protection including consideration of future relative sea level rise as determined by competent engineers."

Policy No. 5 (from the *San Francisco Bay Plan* in effect when the project was originally approved by BCDC) stated, in part: "To minimize the potential hazard to Bay fill projects and bayside development from subsidence, all proposed developments should be sufficiently high above the highest estimated tide level for the expected life of the project...."

Shoreline Protection Policies (from the *San Francisco Bay Plan* in effect when the project was approved by BCDC)

1. **Policy No. 2** required that “[n]ew shoreline erosion control projects and the maintenance or reconstruction of existing erosion control facilities should be authorized if: (a) the project is necessary to protect the shoreline from erosion; (b) the type of the protective structure is appropriate for the project site and the erosion conditions at the site; and (c) the project is properly designed and constructed.”

Public Access Policies (from the *San Francisco Bay Plan* in effect when the project was approved by BCDC)

1. **Policy Nos. 1 and 6** stated that “a proposed fill project should increase public access to the Bay to the maximum extent feasible” and that the public access improvements “...should be designed and built to encourage diverse Bay-related activities and movement to and along the shoreline, should permit barrier free access for the physically handicapped to the maximum extent feasible, should include an ongoing maintenance program, and should be identified with appropriate signs.”
2. **Policy No. 7** stated that, “in some areas, a small amount of fill may be allowed if the fill is necessary and is the minimum absolutely required to develop the project in accordance with the Commission’s public access requirements.”

Staff Questions to the Board

The project proposal includes a relatively large, complex-geometry, semi-circular retaining wall, measuring 120 feet in radius with an unsupported height of up to 23’ at the apex. In addition, the project proposal includes a new 551-foot promenade wharf of varying width from 33’ to 89’. Both structures involved new fill for the purpose of public access. Therefore, BCDC requests the Board to review the engineering criteria and assist the Commission on evaluating the safety provisions that could impact the public and the Bay.

The authority to review and revise engineering criteria and any safety provisions is bestowed on the ECRB through the Bay Plan policies, especially policies Nos. 1 and 2 on the Safety of Fills, and the McAteer-Petris Act government section code 66605(e), which require 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.”

Specifically, BCDC request the Board to assess:

1. Whether the design criteria are appropriate and attainable for the existing site hazards and conditions.
2. Whether the project addresses flood hazards adequately, considering the 2010 Bay Plan policies (described above) that were in effect when this project was originally approved by the Commission.

3. Whether there are any design and physical concerns that have not been addressed.
4. Whether there may be any concerns with the designed loads, emergency vehicle access and level of occupancy for the public use of these facilities.

Material Enclosed with this Staff Report for August 13, 2020 ECRB Meeting¹

1. August 11 and October 22, 2015 ECRB meeting minutes.
2. SGH, 75% Clinton Basin Bulkhead Design Plans, June 16, 2020.
3. SGH, 75% Clinton Basin Bulkhead Design Report, June 23, 2020.
4. SGH, Clinton Basin East Promenade Wharf Structural Design Report, March 9, 2020.
5. SGH Clinton Basin East Promenade Wharf Plan Set, March 9, 2020.
6. SGH East Retaining Wall Structural Design Report Update, July 21, 2020.
7. SGH East Retaining Wall Structural Design Report, December 16, 2019.
8. SGH East Retaining Wall at Clinton Basin Full Set, December 9, 2019.
9. SGH, Soldier Pile Retaining Wall Structural Design Report, November 7, 2019.
10. ENGEO, Report on Clinton Basin Bulkhead and Block J Soldier Pile Walls, May 17, 2019, revised on July 22, 2020.
11. Einwillerkuehl, Gateway Park at Clinton Basin Conceptual Set, August 22, 2017.
12. Brooklyn Basin Phase 2 Open Space Permit Set by Einwillerkuehl, February 2020.
13. ENGEO, Clinton Basin Updated Recommendations, July 2, 2015.
14. ENGEO, Clinton Basin Improvements Geotechnical Report Brooklyn Basin, Phase 2, January 19, 2015.
15. ENGEO, Instrumentation Plan for Fill along Clinton Basin, February 19, 2020
16. ENGEO, Supplemental Response to BCDC ECRB Comments and Response From the California Geological Survey, May 5 and April 14, 2020
17. Email from Hamid Haddadi of the California Geological Survey's Strong Motion Instrumentation Program to BCDC, July 23, 2020
18. Moffatt & Nichol, Memorandum to Patrick Van Ness of Signature Development re: Vulnerability to Sea Level Rise Brooklyn Basin Development, February 11, 2015.

¹ All reference materials can be made available upon request.