

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

50 California Street • Suite 2600 • San Francisco, California 94111 • (415) 352-3600 • Fax: (415) 352-3606 • www.bcdc.ca.gov

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TO: All Design Review Board Members

FROM: Will Travis, Executive Director [415/352-3653 travis@bcdc.ca.gov]
, Staff Engineer [415/352-3670 rafaelm@bcdc.ca.gov]

SUBJECT: Dumbarton Bridge Seismic Retrofit Project
(For Board consideration on June 8, 2009)

Project Summary

Permittee Applicant. California Department of Transportation (Caltrans)

Project Representatives. Brian Maroney, Deputy Toll Bridge Program Manager; Mo Pazooki, Project Manager.

Staff Note. Caltrans submitted a BCDC permit application for the project listed above on April 29, 2009. The Commission's Engineering Criteria Review Board (ECRB) reviewed the proposed project on February 5, 2009 on May 21, 2009, and concurred with the engineering and seismic criteria. Following the Design Review Board's consideration of this project, the commission is expected to consider the matter at its August 6, 2009 meeting.

Project Background. Following the 1989 Loma Pietra Earthquake, a Governor's Board of Inquiry emphasized that the transportation network throughout the San Francisco Bay Area must be maintained as a flexible and integrated system. As a result, the Dumbarton Bridge is recognized as "important" relative to other Bay Area and California bridges due to the connectivity that the bridge provides. The Dumbarton Bridge is unusually valuable to regional emergency response and the economic viability of the communities it serves. The primary purpose of the proposed project is to meet current Caltrans' design standards by providing a seismic upgrade of the Dumbarton Bridge on State Route 84. Caltrans' has strived to address the bridge's vulnerabilities, including obsolete design and construction methods. The Dumbarton and the Antioch bridges are the only two Bay Area toll bay bridges that have not yet been seismically retrofitted by Caltrans.

Prior Board Review. The Board reviewed this project in the 1970's as part of the original permit application.

1. **January 26, 1974 Design Review Board Meeting.** As a result of concerns raised at this meeting, an informal work session on the bridge design was held in the Offices of the Architect on February 14, 1974. Please see attached letter, dated February 15, 1974, for details.
2. **January 20, 1975 Design Review Board Meeting.** As indicated in the attached letter, dated November 8, 1977, the January 20, 1975 design review board meeting resulted in moving the location of the pedestrian/bicycle path from the north side to the south side of the bridge. The Board minutes of the January 20, 1975 meeting could not be found for more specific details.



Making San Francisco Bay Better

Site. The Dumbarton Bridge is the southernmost highway bridge spanning the San Francisco Bay. Its eastern terminus is in Fremont, and its western terminus is at the border of Menlo Park and East Palo Alto in San Mateo County. The existing bridge accommodates three lanes of traffic in each direction and has a bicycle path on the south side of the bridge. The bridge carries over 81,000 vehicles daily. Other uses in the vicinity of the bridge include such uses as recreation, commercial and industrial shipping traffic, wildlife refuges and major transportation corridors such as I-880 and Highway 101 at either end of the bridge. The Don Edwards San Francisco Bay National Wildlife Refuge, located on the Southeast boundary of the project limits, provides for a wide array of outdoor activities that include, hiking, fishing, biking, hunting, migratory bird watching and environmental and interpretive education opportunities. In 2009, construction will begin on the restoration of tidal salt pond SF-2. Pond SF-2 is located on the Southwest end of the Dumbarton Bridge adjacent to the Ravenswood Pier.

The bridge has five main sections: a main channel crossing at the center of the bridge, an approach section on each end of the main channel crossing, and a trestle structure landing on each side of the Bay. The retrofit actions include work on all five-bridge components.

Proposed Project

1. **Seismic Retrofit.** Seismic retrofit activities would take place entirely within the Caltrans right-of-way (ROW). Caltrans proposes to strengthen the existing bridge's substructure by adding concrete bolster along the pier footings, columns and bent caps of the main channel crossing and the two approach sections of the bridge. The project would also add four-foot diameter piles along the two trestle sections of the bridge to add lateral strength. In addition, Caltrans proposes to replace all 44 deck joints on the bridge. The project will require use of temporary trestles to accommodate construction vehicles. While the temporary trestles are in place, retrofit work would be conducted on the superstructure (roadway bed) and substructure (under-deck structure sections) of the various bridge sections, including: (1) retrofit of the bridge hinges located within the superstructure; (2) strengthening of the pile caps, columns, pedestals and bent caps; and (3) and other related work. The permittee states that none of the proposed work would affect habitat or generate large amounts of noise. Reinforcing the connection between the columns, pedestals, and pile caps would involve adding a reinforced concrete collar. The reinforcement would increase the size of the pedestals as they sit atop the pile caps. This work would be performed at most of the piers, including those without adjacent temporary trestles.

To accommodate the work described above, the Ravenswood Pier would be removed and replaced with a temporary trestle. Starting at the shoreline, work crews would remove a short section of the Ravenswood Pier and then either pull the existing reinforced-concrete piles or, if they break during removal, cut them off three feet below the mudline. Construction crews would then drive temporary piles, construct a section of temporary trestle, and then repeat the process step-wise further east. When work is completed, the temporary trestle would be removed from the easternmost end, working westward back toward the shoreline. The Ravenswood Pier would not be rebuilt.

Adding the concrete collars would require placing a cofferdam around each pier, dewatering the enclosure, and removing any mud deposits from the tops of the pile caps. Caltrans anticipates that the cofferdams would be constructed of sheet piles driven 15 feet into the Bay floor with a vibratory hammer and placed from six inches to a maximum of two feet from the edges of the existing pile caps. Dewatering would then lower the water level to expose the top and several feet of the sides of each pile cap. Up to 50,000 gallons of water would be removed

from each cofferdam, resulting in a total of 1,000,000 gallons of initial dewatering. Project design plans and field surveys indicate that a maximum total of 1,800 cubic yards of mud could sit atop the pile caps of the shallow water piers, including Piers 1 and 44, which are on land. The mud would be disposed of offsite in an upland location. Approximately 25,000 square feet of concrete would be placed in the Bay as part of these activities.

No construction staging would occur in the project area. Contractors would be required to procure environmentally cleared staging areas away from the immediate project vicinity. Use of currently graded and disturbed areas at each end of the bridge for short-term material laydown and vehicle access would be permitted. The parking areas on both sides would be reconfigured as needed to provide parking for construction workers while maintaining some of the public parking spaces for the Dumbarton Pier.

On the western end of the Dumbarton Bridge, all access roads are within Caltrans ROW. On the eastern end, the only suitable access road into the project area is Marshlands Road, which enters the Don Edwards National Wildlife Refuge (DENWR) from the Thornton Avenue - South exit from SR 84. This exit will provide vehicle access to the Dumbarton Pier parking lot where construction personnel parking and material laydown will occur.

2. **Tidal Barrier.** Another important component of the proposed project is the construction of a temporary barrier to keep Bay water from encroaching onto the northern frontage road at the western end of the bridge. At present, the highest tides in the Bay flow unchecked out of the Moseley Tract and onto the roadway, immediately north of the project area. The temporary barrier would be installed within Caltrans ROW on the edge of the paved shoulder. The barrier would retain the Bay water in the Moseley Tract and thus minimize potential damage or access problems during project activities, as well as insure public access and safety afterwards.

Stormwater landward of the barrier would be collected by a 36-inch pipe and a pump. The pipe and the pump would collect rain water and runoff from the frontage road and adjacent parking lot. The water would flow to a pumphouse at the eastern end of the barrier, adjacent to the western shore of San Francisco Bay where rainwater currently enters the Bay. No changes to local hydrology are expected.

The pumphouse would be up to 10 feet tall, have a maximum footprint of 12 feet by 15 feet, and would be partially buried in an excavated space. The volume of excavated material could reach 300 cubic yards. The pumps would push water through a 12- to 18-inch-diameter outflow pipe upwards and through the existing levee. At the end of the outflow pipe, approximately 500 square feet of rip-rap would be placed to disperse the outflow and reduce erosion. The barrier and the associated drain and pumping system would be the first activities to take place as part of the seismic retrofit project.

Existing Public Access. Bicycle and pedestrian access from the city of Newark in Alameda County to the city of Menlo Park in San Mateo County is provided by an eight-foot-wide bicycle/pedestrian path. The bicycle/pedestrian path is on the south side of the structure adjacent to the eastbound traffic. The path is separated from the eastbound traffic by a 33-inch high concrete barrier. The outside 22-inch high railing is mounted over a 33-inch high concrete barrier. Currently, two public fishing piers lie just south of the Dumbarton Bridge. The western pier is referred to as the Ravenswood Pier and has been closed to the public for many years because of safety issues. The eastern pier, which is currently open to the public, is referred to as the

Dumbarton Pier and is located inside the boundaries of the Don Edwards San Francisco Bay National Wildlife Refuge. The Ravenswood Pier would be removed as part of the western temporary trestle construction described above.

Existing Visual Access. The Dumbarton Bridge retrofit project consists of a number of concrete bolsters to be placed at the footing pedestals of Piers 5 to 15 and 32 to 40, 14 trestle piles at the approaches, and seismic bearing installation at the superstructure. The bridge will be raised six inches to accommodate the improvements. Upon completion of the project, the appearance of the Dumbarton bridge will not be significantly altered, nor will elements of the seismic retrofit obstruct views of the Bay. The views from surrounding Don Edwards San Francisco Bay National Wildlife Refuge and Ravenswood Open Space Preserve will not be impacted by the final bridge design. Furthermore, views of the Bay and the surrounding shoreline from the bridge deck will remain unobstructed upon project completion.

As described above, a temporary barrier will be placed in Caltrans right-of-way to the north of the west approach, along the edge of the pavement. The temporary barrier will remain in place following the completion of the bridge retrofit project. The height of the barrier will range from 39 to 56 inches above the existing road to accommodate the varied surface level of the roadway. A pump plant will be installed at the levee to the north of the west approach to draw water from the parking lot during flood events and return it to San Francisco Bay. In addition, the pump house at the end of the barrier will stand approximately 10 feet above ground, with the majority of the structure buried underground in excavated space, as to reduce visual impacts on the shoreline and to enhance public safety. The pump house and the barrier height would likely obstruct foreground views of the Mosely Tract to the north and distant views to the east from the parking lot.

Proposed Public Access. Caltrans proposes to replace the bridge railing to meet current safety regulations and standards. The proposed change is to place a 22-inch high railing on top of the existing concrete barrier between eastbound traffic and the bike/pedestrian path. The change to the outer railing is to remove the current 22-inch high railing and replace it with a 40-inch high railing on top of the existing 33-inch high concrete barrier. The proposed railing configuration is a duplicate of the railing currently installed on the existing Benicia Bridge as shown in the material.

The removal of Ravenswood Pier at the west approach would be offset by improving access to the shoreline at the site of the removed bridge. Details of the proposed shoreline improvements are not available at this time. However, seating, paving and landscaping improvements are expected to be constructed in a manner that takes advantage of the views. Interpretive signs will be developed to highlight environmental, cultural, and recreational resources near the site.

Schedule. The proposed project is expected to take approximately three (3) years to complete. Construction activities are set to start in August 2010. The entire project would be completed by August 2013.

Issues. The staff believes the proposed project raises issues relative to physical and visual access to the Bay. The Board's advice is sought on the following issues:

1. **Is the proposed project consistent with the scenic roadway designation of the Bay Plan?** The San Francisco Bay Plan Map No. 7 designates the Dumbarton Bridge as a scenic drive. In establishing this scenic roadway designation, the Commission found that this Bridge provides

regionally significant and panoramic views of the South Bay and that such views should be maintained and enhanced as a matter of policy.

The Board should advise the staff on whether the proposed project would adversely affect views to the Bay from the bridge.

2. **Is the proposed project designed consistent with the Bay Plan policies on appearance, design, and scenic views?** The Bay Plan policies on appearance, design and scenic views state in part, that “maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, the Bay itself, and from the opposite shore.... New or remodeled bridges across the Bay should be designed to permit maximum viewing of the Bay and its surroundings by both motorists and pedestrians. Guardrails and bridge supports should be designed with views in mind.... Access routes to Bay crossings should be designed so as to orient the traveler to the Bay. Guardrails, fences, landscaping and other structures related to such routes should be designed and located so as to maintain and to take advantage of Bay views.”

The Board should address the following issues when reviewing the proposed project:

- a. Whether the proposed bridge railings would provide adequate visual access to the Bay; and
 - b. Whether the retrofit project would provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, the bridge, the Bay itself, and from the adjacent shores.
3. **Do the public access improvements contribute to the enjoyment of the visitor of the Bay?** The McAteer-Petris Act and the San Francisco Bay Plan both require that maximum feasible public access, consistent with the project, be provided. The Bay Plan policies on appearance, design and scenic views further states that “[v]iews of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a “first view” of the Bay.”

The Board should address the following issues when reviewing the proposed project:

- a. Whether the location of the proposed overlook on the south side of the bridge would offset the loss of the existing overlook on the north side of the bridge and the removal of the Ravenswood Pier;
- b. How the proposed overlook could be designed so as to create a valuable public access area that takes advantage of the Bay setting, functions as vista point and provides a “first view” of the Bay; and
- c. Whether the proposed railings would enhance the visitor’s experience of the existing bicycle/pedestrian path.