



Ferry Building Restoration



James P. Heugas

Pile Driving



James P. Heugas, Treadwell & Rollo

ON THE WATERFRONT

Human beings are drawn to the places where land and water meet. Throughout history, entire cultures and civilizations have flourished because of their proximity to the many bounties offered by rivers, lakes, bays, and oceans. And, all over the world, humans have tried, with notable successes and more than a few spectacular failures, to understand and control the forces impacting our shorelines.

Purposeful human intervention in coastal and shoreline systems requires a variety of skills, knowledge, expertise, and theory. Such work involves the practice of civil engineering, as well as the sciences of oceanography and coastal geology. This is done to control erosion; to design, construct, and monitor coastal structures; to nourish beaches and shoreline wetlands; and to design and maintain ports, harbors, and related navigational facilities. Beyond engineering skills, there is a great deal of other scientific and related technical and professional knowledge necessary for the proper and sustainable management, protection, and use of coastal and ocean resources.

The senior professionals of Treadwell & Rollo, in addition to their shoreline and waterfront efforts closer to home, have contributed substantially to coastal and

shoreline projects in locations such as Greece, Portugal, Guatemala, the Caribbean, Guam, Saipan, Alaska, Hawaii, and Indonesia. These contributions have primarily been in the areas of geotechnical and earthquake engineering, environmental sciences and engineering, and assessment of other design parameters such as sediment deposition rates, and the loads imposed by waves and currents.

In the Bay Area and throughout California, Treadwell & Rollo continues to provide geotechnical, environmental, earthquake, and other consulting services for challenging projects along the shorelines of our rivers, estuaries, and bays as well as on the dynamic coastline of the Pacific Ocean. In this issue of our Newsletter, we are proud to highlight some of these projects.

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Alameda Inner Harbor Shoreline

Treadwell & Rollo is providing consulting services to Catellus Development Corporation for the Fleet Industrial Supply Center (FISC) and East Housing sites in Alameda. These sites, originally filled over wetlands in the early 1900s, were made available for redevelopment as part of the closure of the famed Alameda Naval Air Station, which operated from the late 1930s through 1997.

Approximately 215 acres of land along the Inner Harbor will be developed, with 92 acres devoted to residential use and 77 acres slated for technology-oriented offices and research and development space. The remainder of the site will include retail space, a high school, public open space, and new infrastructure systems. Structures up to six stories high may be built along the Inner Harbor shoreline.

The subsurface conditions across the site are highly variable and include 1 to 20 feet of fill overlying 5 to 95 feet of Bay Mud. The Bay

Mud is underlain by stiff alluvium. The fill materials include sand, some of which is potentially liquefiable, and dredged Bay Mud. Our services have included gathering and evaluating existing subsurface data and performing a preliminary geotechnical engineering investigation that included borings, cone penetrometer tests, and geotechnical laboratory testing.

We then prepared contour maps of the thickness of the fill and Bay Mud, evaluated liquefaction potential of the fill, evaluated static and seismic slope stability including potential for lateral spreading along the Inner Harbor channel, and estimated consolidation settlement under existing and new fill loads, and foundation loads. We also provided preliminary foundation recommendations for two-story residences, one- to two-story, concrete tilt-up buildings, and mid-rise, steel-framed buildings. The staff involved on the FISC and East Housing projects include Craig S. Shields, Craig A. Hall, Frank L. Rollo, Linda H. Liang and Elizabeth K. Gouchon.

San Francisco Ferry Terminal

With Treadwell & Rollo as the geotechnical and earthquake consultant, work on the first phase of the San Francisco Ferry Terminal project began in February 2000. The project entails constructing new and improved ferry terminal facilities and public access areas in the vicinity of the historic Ferry Building (located at the foot of Market Street).

The project's public access improvements include a new promenade on the north, and eventually east, side of the Ferry Building, and new terminals to be constructed at the south and north ends of the Ferry Building (for increased commuter ferry service capacity to the north, east, and eventually south bay regions). The public access improvements were designed to work in concert with the recent Embarcadero Roadway and San Francisco MUNI improvements.

In March 2000, work commenced to create a terminal in the area just north of the Ferry Building (the north terminal). Once completed, this change will create a separate float area for ferry service entering and exiting the north bay, improving passenger service and ferry operations overall. Work also began in March 2000 on the south terminal area of the Ferry Building (adjacent to Sinbad's restaurant). Project activities in this area include replacement of an existing bridge, pile and deck installation, and repair of the underside of the existing deck. Construction of the breakwater for the south terminal basin began in October 2000.

An important design element of the Ferry Terminal project will be the continuous public access area planned along the waterside between the north and south terminals and on top of the breakwater area of the Ferry Building. The new terminals will be ready for service with new portals, covered gangways and floats by this summer, as will the new breakwater. Pier 1/2 ferry service will continue uninterrupted until the new terminals are completed. At that point in the project, services to the north bay will be shifted to the new north terminal and east bay services will shift to the new south terminal area.

All of the new terminals have been designed to remain functional in the event of a major earthquake. The existing Ferry Building float at Pier 1/2 will be refurbished and will be available for use as needed as a temporary emergency terminal. The historic Ferry Building is currently undergoing a major renovation and will be developed for retail and restaurant space to serve ferry commuters.

The future phases of the project may include additional terminals and concessions areas to meet the anticipated demands of increased numbers of ferry passengers. The Treadwell & Rollo geotechnical investigation, design, and construction observation work for the Ferry Terminal projects is being done by Frank J. Rollo, Kelly E. Candra, James P. Heugas, Christopher A. Ridley, Eric P. Banaag, and Richard D. Rodgers.



California Maritime Academy

The California Maritime Academy is a four-year state university specializing in business, engineering, technology, and marine transportation. Since 1943, the Academy has been located in Vallejo at the Morrow Cove site, which had previously been a ferry terminal operated by the Southern Pacific Railroad. The eastern shoreline along Morrow Cove was historically a shallow estuary.

Treadwell & Rollo was the geotechnical and earthquake consultant for the recent seismic retrofit program at the Academy. Our investigations and studies indicated that portions of the filled shoreline could liquefy during a major earthquake, resulting in as much as three feet of lateral movement toward the water. Several methods to improve the stability of the shoreline were evaluated and it was concluded that stone columns were the most appropriate solution. Stone columns reduce the liquefaction potential through densification and also provide drainage for excess pore water pressure after a seismic event.

Stone columns were installed by advancing a vibratory probe into the ground to densify the surrounding soil. The void created through the densification of the surrounding soil was backfilled with gravel or crushed rock, which was also densified by the probe during withdrawal. A total of 519 stone columns were installed along 1,200 feet of the shoreline. The stone columns were installed between 25 and 35 feet deep, in four to five rows, on a 10-foot spacing.

In recognition of excellence in engineering, design, and construction, Treadwell & Rollo and the California Maritime Academy were joint recipients of the Distinguished Project Award from the Western Council of Construction Consumers. Christian J. Divis, Hadi J. Yap, and Frank L. Rollo were staff on the Academy shoreline project. The stone column contractor was Hayward Baker and the structural engineer was Hrach Kouyoumdjian & Associates.

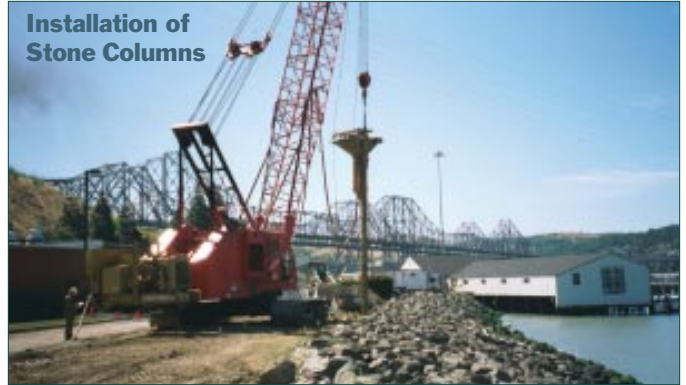
Carquinez Bridge

Crossing the Carquinez Strait between Vallejo and Crockett on Interstate 80 are parallel bridges that link the San Francisco Bay Area and the Sacramento Valley. Known jointly as the Carquinez Bridge, they carry average daily traffic of more than 104,000 vehicles. The original, now the three-lane southbound bridge, was built by private interests at a cost of \$4.6 million and opened in 1927. The State purchased it in 1940 and, after all construction bonds were redeemed, the tolls were eliminated in 1945. In 1958, the \$44 million parallel, now four-lane, northbound bridge was opened and tolls reinstated.

By 2003, at a cost of about \$200 million, the original (western) span will be replaced by a suspension bridge requiring only two main piers. The new span will include a pedestrian/bicycle lane along with vista points on both banks of the Strait. The superstructure and towers of the original span will be demolished and removed.

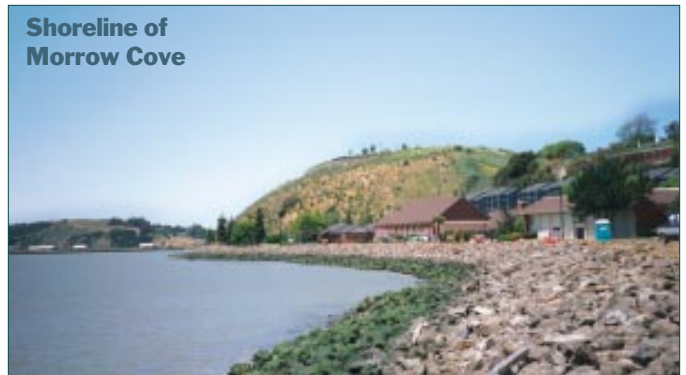
For Caltrans, Treadwell & Rollo provided geological and geotechnical services associated with the new suspension bridge. Our work has included the evaluation of pilings to be installed to support a temporary trestle, geotechnical test borings for a supplemental investigation, and the evaluation of pier ruins and pilings to be removed from an existing pier location.

Frank J. Rollo, Richard D. Rodgers, and Christopher A. Ridley were the Treadwell & Rollo staff on the Carquinez Bridge project.



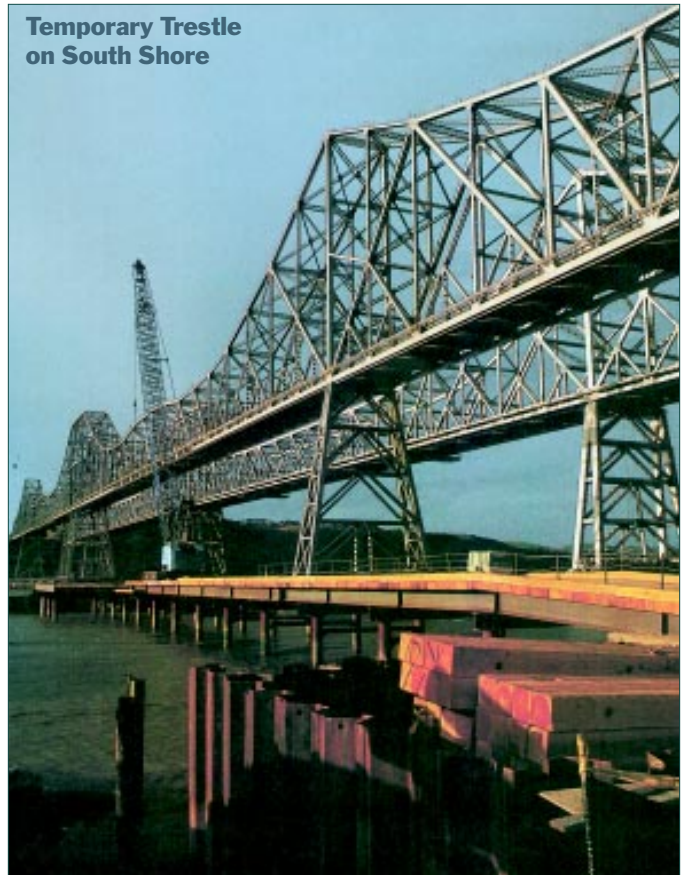
Installation of Stone Columns

Christian J. Divis



Shoreline of Morrow Cove

Christian J. Divis, Treadwell & Rollo



Temporary Trestle on South Shore

Civil Engineering, July 2000

PORT OF REDWOOD CITY

Treadwell & Rollo is providing environmental consultation to the Port of Redwood City for their waste disposal, site closure, and dredging projects. The Port is a commercial facility and has been in operation since 1937.

The Port is closing a 9-acre liquid bulk terminal with 9 steel aboveground tanks containing 10 million gallons of hazardous waste. Among their responsibilities are treating and disposing of the liquids and sludge in the tanks (left by previous tenants) and completing the estimated \$14.5 million closure under the auspices of the Department of Toxic Substance Control.

Our work includes litigation support, National Contingency Plan (NCP) compliance tasks, regulatory agency interaction, and cost recovery services. We also provided dredge sampling and characterization consultation and support to the Port for their dredging project in San Francisco Bay. We characterized and arranged for the disposal of a portion of the 30,000 cubic yards of dredged material at significant cost savings. The dredged material was used as fill at a permitted Treadwell & Rollo shoreline site in South San Francisco.

The Treadwell & Rollo project team for the Port of Redwood City includes Philip T. Tringale, Ellis A. Wallenberg, Timothy P. Becker, Sigrida Reinis, David G. Dixon, Dorinda S. Himes, Brian K. Moore, and Patrick B. Hubbard.

WEB SITES

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| American Society of Civil Engineers | www.asce.org |
| Association of Bay Area Governments | www.abag.org |
| Association of Coastal Engineers | www.coastalengineers.org |
| Audubon Society | www.audubonsfbay.org |
| Bay Conservation and Development Commission | www.bcdc.ca.gov |
| Bay Planning Coalition | www.bayplanningcoalition.org |
| California Academy of Sciences | www.calacademy.org |
| California Coastal Coalition | www.calcoast.org |
| California Coastal Commission | www.coastal.ca.gov/web |
| California Department of Fish and Game | www.dfg.ca.gov |
| California States Lands Commissions | www.slc.ca.gov |
| Coastal States Organization | www.sso.org/cso |
| Corps of Engineers | www.spn.usace.army.mil |
| Federal Emergency Management Agency | www.fema.gov |
| National Oceanic and Atmospheric Administration | www.noaa.gov |
| Nature Conservancy | www.nature.org |
| Oceanic Society | www.oceanic-society.org |
| Pacific Maritime Association | www.pmanet.org |
| Port of Oakland | www.portofoakland.com |
| Port of Redwood City | www.redwoodcityport.com |
| Port of San Francisco | www.sfport.com |
| Save San Francisco Bay Association | www.savesfbay.org |
| State Coastal Conservancy | www.coastalconservancy.ca.gov |
| State Floodplain Managers | www.floods.org |
| State Water Resources Control Board | www.swrcb.ca.gov |
| Surfrider Foundation | www.sfsurfrider.org |

SAN JOSE SHORELINE

Treadwell & Rollo is providing geotechnical and environmental consultation to Legacy Partners for the commercial development of a former landfill site in San Jose. The 70-acre shoreline parcel, known as Legacy Terrace, is located to the north of the intersection of Highway 237 and Great America Parkway. The former Class III non-hazardous landfill is in the midst of final closure design and construction activities.

Development plans consist of a number of five-story commercial buildings, a hotel, and a large parking structure. The buildings will be supported on deep piles that derive their capacity through skin friction in competent soil below the landfill. We are currently assisting the owners in developing a final closure plan that meets state and local regulations for commercial development on the landfill. Methane mitigation systems will be required for each building.

Our services include document review, geotechnical and environmental investigations, consultation on foundation type and earthwork, coordination with regulatory agencies, and the design of the landfill cap system. We are also providing all earth-related construction observation and testing.

Dean H. Iwasa, Jeffrey F. Ludlow, Andrew S. Kositsky, Eric P. Banaag, Loren M. Bedolla, and Marcos F. Pinheiro are among the staff contributing to the Legacy Terrace project.

Managing Editor: Andrea M. Oman
Graphics & Layout: F. Anthony Cerny
Technical Reviewer: Donald D. Treadwell

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amoman@treadwellrollo.com

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Treadwell & Rollo
Environmental and Geotechnical Consultants

501 14th Street
Third Floor
Oakland, CA 94612
(510) 874-4500
(510) 874-4507 Fax

555 Montgomery Street
Suite 1300
San Francisco, CA 94111
(415) 955-9040
(415) 955-9041 Fax

2 Theatre Square
Suite 216
Orinda, CA 94563
(925) 253-4980
(925) 253-4985 Fax