



MOFFATT & NICHOL

NEWS

Vol 6 Issue 4



Projects that Serve Delivering Federal Works

Modernizing the Oldest Continuously Operating Shipyard in the U.S.

THE U.S. NAVY recently selected the Moffatt & Nichol-MMM Design Group (MN3M) joint venture to provide engineering and design services for the replacement of Pier 5 at the Norfolk Naval Shipyard (NNSY) in Virginia.

This \$250-million project will maximize the configuration of the ship repair basin, while upgrading critical infrastructure.

Continued on Page 2

Rapid Response Saves Shoreline

THREE DAYS after Christmas 2006, the Tongue Point Bulkhead, at the U.S. Coast Guard facility in Astoria, Oregon failed. With a repair project already under regulatory review, Moffatt & Nichol was called in for an emergency inspection.

The team found the concrete slab adjacent to the sheet pile bulkhead had caved in due to extensive loss of soil backfill. The backfill eroded through holes in the wall, some 30 inches wide. The structure failure prohibited any vehicular traffic on the slab.

Five years earlier, the 75-year-old sheet pile bulkhead showed signs of advanced corrosion that eventually resulted in substantial loss of backfill through holes in the sheets. A preliminary study performed by another firm recommended buttressing the wall with stone to the height of the sheet pile.



Tongue Point Bulkhead, west seawall (Image Courtesy of U.S. Coast Guard)

However, in 2004, Moffatt & Nichol provided an alternative solution to the initial study that, among other things, minimized over-water construction impacts. The design involved cutting and removing a portion of the defective wall and integrating a rock revetment that sloped upward to the concrete deck for most of the west and all of the north facing walls. The design also significantly reduced the rock-fill in the water and lessened the impacts to the habitat of endangered salmon species. Moffatt & Nichol's alternative eased permitting hurdles and provided significant cost-savings to the U.S. Coast Guard.

After the inspection, Moffatt & Nichol prepared drawings and specifications for immediate emergency repairs to restore vehicular access. The holes in the sheet pile were then filled with concrete to stop the backfill erosion exacerbated by the tide, until the permanent revetment could be constructed. Due to the emergency situation, Moffatt & Nichol altered the existing design and the U.S. Coast Guard moved forward with the repair project.

In 2007, the design was finalized and construction began that summer. The project was completed in mid-2008. The Tongue Point Sheet Pile Bulkhead Repair project was among 27 tasks awarded to Moffatt & Nichol under a 5-year Indefinite Delivery Indefinite Quantity contract with the U.S. Coast Guard.



Hull technician welds ship stanchion (Image Courtesy of U.S. Navy)

Modernizing the Oldest Continuously Operating Shipyard in the U.S.

...Continued from Page 1

ORIGINALLY FOUNDED IN 1767 as a naval and merchant facility for the British Crown, NNSY is the U.S. Navy's oldest continuously operating and largest industrial facility.

During more than 240 years of its existence, the shipyard has been burned twice and seen the nation through nine major wars.

At present, two 1940s-era wooden piers (Piers 4 and 5) that serve the main ship repair basin are deteriorated and laid out in such a way that only one aircraft carrier may be berthed at each pier at a time. When replacement is complete, Pier 5 will accommodate two Nimitz class—as well as the navy's future class of aircraft carriers currently in development—berthed simultaneously at the pier for maintenance and repair.

This project requires demolishing the two aging piers and building a new modern aircraft carrier pier in their place.

In addition to the structural design of the new pier, the MN3M team will develop a meticulous demolition and construction sequence to avoid impacts to shipyard operations and maintenance schedules. Other project challenges include a complex utility system relocation and upgrade, as well as a disposal strategy for sediment from the existing piers.

The MN3M team plans to complete the design for this project in less than 12 months so that the

construction contract can be advertised when funds become available. After the project is awarded, it will take three to four years to complete.

"This project provides a tremendous opportunity to use the entire team's broad-ranging expertise to solve numerous complex challenges while delivering a high quality, cost effective engineering solution for the Navy," said Project Manager Mike Rieger.



Nuclear-powered aircraft carrier and support ship underway (Image Courtesy of U.S. Navy)

Protecting Rough-Weather

AT THE NORTHWESTERN most point of the continental United States, Fuca in Washington, the USCG Station Neah Bay faces one of the most on the U.S. coastline—weather conditions that, without proper protection, deterioration of unprotected vessels and equipment, and adversely impact

USCG Moorings

near the mouth of the Strait of Juan de challenging weather environments found disrupt boat maintenance, accelerate crew morale.



Neah Bay Bulkhead during construction

In recognition of Moffatt & Nichol's expertise with small craft moorings and coastal protection, the firm was tasked with completing a planning study to develop alternatives that would provide weather protection for the station's vessels.

The station's primary mission is heavy weather search and rescue in challenging sea conditions. Wind-generated waves can be as high as 12 feet while swells inside the strait can reach 22 feet. In addition, this location is regularly exposed to heavy rainfall—the station is located northwest of the only rainforest in the continental United States which has an annual average precipitation of 101.5 inches. On

average, severe weather requires the vessels to be moved to protective shelter at a nearby marina for about 70 days out of the year.

During its review of the study's four alternatives, the USCG split its preferred alternative in two separate pieces, a breakwater and covered moorings, to accommodate funding and facilitate construction.

Moffatt & Nichol provided final design for a 280-foot-long breakwater, now under construction, at an estimated cost of \$3.8 million. (Moffatt & Nichol is providing construction services.)

In September, Moffatt & Nichol completed a preliminary design for the project's second piece—

covered moorings to protect the station's two motor life boats. The covered moorings will provide a pile-supported foundation, roof, three walls, and weather screen adequate to protect boat crews from rain and wind at an estimated cost of \$5 million. Construction is scheduled to be completed in 2011.

"It's been a challenging project not only because of the adverse weather conditions, but also because of the site's remoteness. It takes almost three hours to truck in a load of concrete," says Moffatt & Nichol Project Manager, Mike Hemphill.

Kilo Wharf Upgrades to Meet Future Demand

WHEN WHEN THE NAVAL Facilities Engineering Command (NAVFAC), Pacific announced its decision to extend Kilo Wharf at Apra Harbor Naval Complex, Guam, Mariana Islands, Moffatt & Nichol was the firm chosen to provide Architect-Engineer services. The selection was based on Moffatt & Nichol's record of excellent service on past projects for NAVFAC Pacific, as well as its expert knowledge of Guam's waterfront—including its high seismicity, corrosive environment, and remote location.

Moffatt & Nichol provided concept development, preliminary and final design for the wharf extension and upgrades for the 400-foot westward extension, which will accommodate the new T-AKE class of ammunition vessels, meet current seismic

standards, provide utility upgrades to meet long-term transient berthing requirements for the T-AKE vessel, and support containerized cargo operations through the installation of new crane rails.

Among key project challenges was the wharf's proximity to the high wave energy entrance to Apra Harbor, which exposed the wharf to higher than normal wave activity for an ammunition loading wharf. Moffatt & Nichol explored solutions to project challenges by providing wave and wind

hindcasting to obtain deepwater wave statistics, wave transformation modeling from deepwater to the project site utilizing a fully nonlinear Boussinesq wave model, and prototype measurements of incident prototype waves outside of the harbor and at the project site to validate the numerical modeling results.

Unique to most Navy structures, caissons were used for the 400-foot-long wharf extension. Using state-of-the-art design methodologies, the design team was able to reduce caisson volume and the associated dredging considerably as compared to the original caisson design. A further innovation was Moffatt & Nichol's performance of the first application of service life modeling for the performance-based design of marine concrete on a Navy project, a beta-test innovation that targets service life for the wharf extension for at least 75 years.

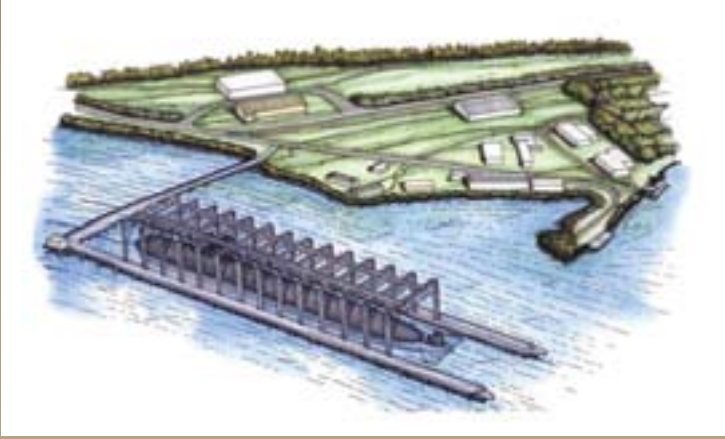
Today, Kilo Wharf continues to be a critical facility for the berthing of ordnance supply ships in the western Pacific Region in support of the 5th and 7th Fleets as well as Air Force requirements.



Kilo Wharf rendering

Class Act Facility to Protect New Class of Submarines

MOFFATT & NICHOL has worked in partnership with Naval Facilities Engineering Command (NAVFAC) Pacific for more than 50 years and has been on the cutting edge of technology necessary to design and execute efficient, safe, and cost saving facilities for the U.S. Navy.



Beckoning Point rendering

As part of a joint venture, Moffatt & Nichol was commissioned to provide planning, preliminary and final design, construction documents, and post-construction award services for NAVFAC Pacific. Under this contract, Moffatt & Nichol recently completed the design of the newest Magnetic Silencing Facility (MSF) at Beckoning Point, Pearl Harbor, Hawaii. It had become necessary to replace dated technology not applicable to the newest classes of modern U.S. Navy submarine (SSN-21 & SSN-774) and improve the facility which was undersized for these and other newer classes of submarine.

These facilities are crucial to the safety of naval vessels and those who operate them. Any mass of

iron stressed in the earth's magnetic field becomes a magnet. Riveting and other construction activities magnetize a ship, as do some operational activities. MSFs provide deperming and degaussing, which reduces the ship's electromagnetic signature therefore making it less of a moving target. The MSF at Beckoning Point will be the only magnetic silencing facility in the Pacific capable of treating all Navy submarines.

This particular MSF was designed with efficiency in mind. Special appurtenances were developed to assist in vessel berthing. Included in the design is a 700-foot-long non-magnetic concrete slip. The MSF was constructed with materials with a low mag-

netic permeability property necessary because the demagnetizing operation produces high-intensity magnetic fields.

One project challenge was the import of construction materials such as concrete aggregate, as local aggregate was not acceptable with regard to magnetic permeability. This restriction also affected concrete rebar, fenders, mooring, cleats, cable supports, and all steel hardware.

Work is being performed in Pearl Harbor, Hawaii and is expected to be complete by October 2010.

Corporate office: 3780 Kilroy Airport Way, Suite 750 Long Beach, CA 90806 P (562) 590-6500 F (562) 590-6512 www.moffattnichol.com Copyright 2008



To learn more about Moffatt & Nichol and its unique and exciting areas of practice please visit our website at : www.moffattnichol.com



On the Cover...

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE
PAID
Los Angeles, CA
Permit No. 33

Corporate Office
3780 Kilroy Airport Way, Suite 750
Long Beach, CA 90806

