



# NEWS

Vol 6 Issue 3

# Port Innovations Promote Economic Growth

## Planning for Pacific Port, Feasibility through Design



Aguadulce Peninsula, Colombia

**W**HEN TERMINAL OPERATORS saw the need for a new facility to keep goods flowing through Colombia's Pacific port complex at Buenaventura, they turned to Moffatt & Nichol for comprehensive master planning and design for the country's premier Pacific port.

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# Planning for Pacific Port, Feasibility through Design

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**INITIALLY HIRED by Sociedad Puerto Industrial de Aguadulce S.A. (SPIA) to provide master planning and review existing environmental permits, the Moffatt & Nichol team is in the process of completing the final detailed design, construction drawings, technical specifications and bid documents for Phase I of the new container terminal. The Project includes extensive land reclamation, dredging of the berths and turning basin to the existing access channel, and 600 meters of new wharf for International Container Terminal Services, Inc., which acquired SPIA in 1997.**

“Moffatt & Nichol has been affiliated with this project since 2003, when the firm prepared a technical and economic feasibility study and preliminary design for a multi-purpose terminal, including deepening of the navigation channel for the site’s former owner,” explains Patricia McNeal, Moffatt & Nichol’s project manager. “We’re thrilled to continue the design of the new container terminal facility and look forward to the construction phase.”

Moffatt & Nichol, in association with local HMV Engineers in Colombia, will continue to work

with SPIA, a wholly-owned unit of International Container Terminals (ICTSI), as it develops and constructs a new state-of-the-art container terminal on the Aguadulce Peninsula in Colombia.

The contract also includes construction of a new, 21-kilometer access road, on site housing, administration buildings, a maintenance shop, a terminal fire station and an emergency power generation station. The new facility will have an opening throughput capacity of 450,000 TEUs with an ultimate capacity of 1.2 million TEUs, 900 meters

of quay with three berths, nine post-Panamax quay cranes, automated gate systems, ample inspection and screening areas, intelligent traffic control, and state-of-the-art management systems.

The new container terminal is expected to ease congestion at the existing SPRBUN Terminal in the Port of Buenaventura, just across the channel from the Aguadulce Peninsula, and assist with Colombia’s expanding trade. Completion is anticipated for 2010.



Port of Buenaventura

## YTTI Terminal for Blair-Hylebos Peninsula Redevelopment

**IN THE SUMMER OF 2007, the Port of Tacoma began planning the Blair-Hylebos Peninsula YTTI Terminal Redevelopment Project to accommodate their future client, Yusen Terminals Tacoma Inc., a wholly-owned subsidiary of NYK Line. This project not only allows NYK Line to grow, but it’s also an opportunity for the line to operate its own terminal.**

To complete the plans and specifications for the entire terminal development, the Port of Tacoma enlisted Moffatt & Nichol, who had prepared the Basis of Design (BOD) and Schematic Design Report. The BOD describes the primary requirements for a functional intermodal container terminal, and included a throughput capacity analysis, terminal planning summary, permitting considerations, conceptual design, construction cost, and anticipated development schedule. The BOD also included a preliminary description of the size, scope, and extent of the terminal facilities, with buildings, site structures, utilities, wharf, rail yard, and other related site improvements.

The proposed terminal will include a 2,400-foot-long apron for two 9,300 TEU (twenty-foot equivalent unit) ship berths and will accommodate eight super post-Panamax cranes. The terminal will also include a container yard, a 24-acre on-dock intermodal yard, entry and exit gates, and necessary on-terminal buildings. The terminal will be designed to handle between 1.4 million TEUs and 1.8 million TEUs a year. At opening, the terminal will accommodate a variety of terminal operating modes, anticipating future developments in the industry or in technology.

**When complete, it is estimated that this project will bring more than 5,000 new jobs to Washington and generate millions of dollars in tax revenues**



Port of Tacoma

In addition, Moffatt & Nichol is providing project management services and is leading the planning and design for the gate complex, the wharf structure, and terminal security. Environmental concerns play a key role in the design and operation of the facility and Moffatt & Nichol is assisting in the development of air emission mitigation strategies and is proceeding with plans to design and construct a LEED Silver certified terminal administration building.

NYK Line’s and the Port of Tacoma’s growth will be felt statewide. When complete, it is estimated that this project will bring more than 5,000 new jobs to Washington and generate millions of dollars in tax revenues. The terminal is scheduled to open in 2012.

# Craney Island Expansion Reduces Transport Costs

**B**RINGING the Craney Island Eastward Expansion closer to launch, the Virginia Port Authority (VPA) has contracted with the Moffatt & Nichol-led Craney Island Partners, LLC to serve as the design team for \$2.4 billion in site improvements that will reduce regional inland transportation costs and see the Port of Virginia's dredged material management plan well into this century.

An earlier economic analysis of cargo moving through the proposed Craney Island Marine Terminal (CIMT) expansion demonstrated a transportation cost savings to users and consumers of more than \$6 billion, a savings that proved to be a cornerstone for project approval.

"Consideration of the total transportation cost, including the land side cost to the point of origin or destination, was what made the project's economic justification so clear," observes Mike Crist, P.E., a senior

project manager with Moffatt & Nichol and team leader for the Craney Island project.

In addition, by partnering with the U.S. Army Corps of Engineers (which has oversight of many dredge projects affecting the nation's waterways), the VPA will be able to extend the life of Craney Island as a dredged material management area and provides land for the construction of a new marine terminal on new dredge material cells.

The expansion, coupled with the new terminal, will allow the VPA to capitalize on the cargo

growth generated by larger, Post-Panamax ships coming through the Panama Canal's new wider, deeper locks and channels, which are anticipated to be fully operational by 2015.

To expedite throughput—more than half of the terminal's cargo is destined for out-of-state delivery, primarily to the Midwest—the CIMT's on-dock rail yard will be capable of moving 50 percent of the terminal's cargo by train. Connected to the Heartland Corridor's eastern terminus in Virginia, the new route will cut the trip to Chicago

by 233 miles, providing faster and less costly transit to inland destinations.

Construction of the main dike is planned to start in 2009, with dredge fill to follow in 2011. The terminal is anticipated to be operational by 2017, and full build-out by 2032 will result in a 522-acre terminal with 8,400 feet of wharf, seven berths, and 50-foot-deep channels.

Moffatt & Nichol has worked with the VPA and the USACE since 1999, through all phases of the eastward expansion, from the feasibility study to the Environmental Impact Study.



Craney Island (Image Courtesy of the Virginia Port Authority)

# Supermodel Brings Cost Savings to Port

**S**TAYING COMPETITIVE is a priority for the Caribbean Port of Barranquilla, which lies on the Magdalena River Delta, providing passage to Colombia's most important inland waterway. Key to the port's ongoing success is maintaining a 40-foot-deep access channel, seen as essential for handling Handymax vessels (bulk carriers up to 60,000 metric tons of deadweight tonnage) without restriction.

As the port moved toward a long-term strategy to reach that goal, Moffatt & Nichol was brought in to develop models and alternative solutions based on initial studies by Colombia's Instituto Nacional de Vías (Invías). A surprising outcome of the firm's

work with ongoing modeling during construction would result in cost savings to the port.

Invías had developed a plan to permanently improve navigation conditions through the use of "river-training" structures that would direct river water flow and create an ongoing dredging process powered by nature. A series of seven rock jetties perpendicular to the flow of the river was proposed to confine the river to a single channel and increase the flow velocity while scouring the river bottom to the desired depth.

Moffatt & Nichol then defined and tested possible alternatives, calculated wave conditions affecting the structures, and validated the final channel configuration with a design vessel. An innovative design was developed for the proposed dike structures using a scour protection system that can adjust to scour and follow any bed erosion downwards.

To analyze each jetty's effect on river flow and channel depths, morphological models were used throughout construction, allowing for adaptive management in determining the final project design. Based on these models and observations, it was found that the goal depth of 40 feet had been achieved and an additional jetty once thought necessary was no longer needed—a cost savings of \$4.2 million for Invías.

"There is stability in the channel which will continue into the future," said Invías Atlantic Regional Director, Luigi Pugliese. "It is good that we now have a 40-foot-deep channel, which will further increase foreign trade through this region."

Construction of the jetties began in 2006. To date, four of the structures are complete and two are underway.



Port of Barranquilla, Espolón 1

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- Invías Atlantic Regional Director, Luigi Pugliese



Port of Barranquilla, Espolón 6



Deltaport, Vancouver

## Facilitating Trade Growth through Expansion at Port Metro Vancouver

in container volumes anticipated over the next 20 years, and on a grander scale, facilitate the growth of Asia-Pacific trade through Canada's west coast.

In the mid 1990's Moffatt & Nichol provided master planning for the original 100-acre, two-berth terminal including an innovative rail mounted gantry on-dock intermodal rail facility, truck gate layout, and architectural programming of buildings. Master planning continued in 2001 with a new plan to expand the then 160-acre terminal to a 220-acre facility that would include a new third berth and 50 acres of land reclamation.

As part of a two-firm team, Moffatt & Nichol was subsequently retained to provide detailed design, tendering and construction administration services for all dredging, containment dike, land reclamation and wildlife habitat compensation works. This includes more than 50 acres of land reclamation and approximately 2 million cubic meters of dredging. The project is the largest land reclamation project in British Columbia since the expansion of the Roberts Bank Superport in 1983. Since the terminal expansion is proposed for an area deemed critical for fish and bird habitat, the required compensation is

expected to be the most extensive in British Columbia's history and will include cobble and rock reefs, perched benches, fish refugia, salt marsh creation, transplant beds and artificial islands for riparian vegetation. In addition, Moffatt & Nichol is responsible for a new tug harbor, a 12,000 TEU container ship berthing and mooring analysis, wind, wave and current modeling, barge loading facility, underwater dive inspections, and wharf paving.

Moffatt & Nichol's Project Manager, Harold Westerman, sees the success of this project as an excellent example of the firm's versatility to successfully undertake virtually any port, maritime, or freight transportation assignment worldwide. "Moffatt & Nichol had the right combination of expertise in container terminal design plus extensive experience in dredging, land reclamation, and habitat compensation works to see this project through from conceptual analysis and feasibility study to planning, design, and construction". Construction on the Deltaport Third Berth project commenced in January 2007, with the firm providing resident engineering services, and is expected to be fully operational in the fall of 2009.

**M**OFFATT & NICHOL has earned a reputation for delivering innovative solutions to the port and maritime industry—from the advent of containerization to today's complex goods movement trends and environmental regulations. The firm's involvement with Vancouver's Deltaport Third Berth Expansion exemplifies this breadth of expertise.

The project is part of a larger Vancouver Fraser Port Authority initiative, known as the Pacific Gateway Program, to expand container terminal capacity at the Port to capture the considerable increases

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