# THE NEW YORK AND NEW JERSEY HARBOR: ACHIEVING THE VISION OF A WORLD CLASS HARBOR ESTUARY

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#### **ABSTRACT**

Work is underway by the U.S. Army Corps of Engineers and The Port Authority of New York & New Jersey on a \$2.2 billion project to deepen the channels in the Port of New York and New Jersey to depths to 15.2 meters (50 feet) below mean low water. The deepened channels will accommodate the new fleet of post Panamax container ships, and will result in significant transportation cost savings. The project Benefit to Cost ratio is greater than 3 to 1. As the largest Port on the East Coast of the United States, the Port of New York and New Jersey is a key economic engine and contributes more than 230,000 jobs, \$10 billion in wages and \$22 billion in sales to the regional economy. The project presents some significant dredging, navigation, and logistical challenges, with multiple dredging contracts needing to co-exist with a very active and busy port. The channel bottom is also highly variable and includes significant amounts of hard bedrock that requires drilling and blasting, as well as softer rock, glacial tills and hard clays that can be dug with large excavators. There are also contaminated sediments that have strict environmental compliance and treatment requirements.

A key component of the project has been the development of a common vision of a "World Class Harbor Estuary" among the various port interest groups and stakeholders. In addition to the channel improvements, this vision includes a commitment by the Port interests to utilize sound environmental planning and to develop a Comprehensive Port Improvement Plan that looks at the potential infrastructure needs through the year 2030 with the deepening project in place. The vision also includes the commitment to beneficially utilize all of the materials dredged, and to actively promote habitat restoration and enhancement throughout the Harbor Estuary. The challenge is to develop consensus among the many stakeholders during times of tight budgets and constrained funding.

**Keywords:** Corps, dredging, federal, sponsor, ecosystem restoration, port infrastructure

### INTRODUCTION

The New York and New Jersey Harbor Estuary has changed dramatically since Henry Hudson first sailed into it in 1609. For almost 400 years, the estuary and its watershed have been transformed by industrialization and commercialization resulting in unfavorable impacts on both the waters of the estuary and its surrounding land. The Port of New York and New Jersey has become the largest port on the east coast of the United States and is a key economic engine for the region. It serves more than 20 million people locally and nearly 37 million people within a 400 km (250 mile) radius. It also supports more than 230,000 direct and indirect jobs, generates \$9.4 billion in personal income, and contributes \$22 billion in economic activity to the states of New York and New Jersey. It is also the largest petroleum port in the nation.

The U.S. Army Corps of Engineers, and its cost sharing partner, The Port Authority of New York & New Jersey, are currently deepening key shipping channels to ensure safe and efficient transportation for the larger class of vessels calling at the port. Surrounding the port, and encompassing the highly urbanized area, is the 42,000 square mile Hudson-Raritan Estuary, one of the largest estuaries on the east coast. In the Hudson-Raritan Estuary, fresh water is supplied by its major tributaries: the Hudson, Hackensack, Passaic and Raritan rivers, which drain the watersheds of New York and New Jersey.

During the Feasibility study for the Harbor Deepening project, a partnership was formed that included economic, shipping, and environmental interests, both government and non-government. What developed was a common vision of a "World Class Harbor Estuary" to reconcile the need for continued port improvements, while also protecting and even restoring the natural estuary.

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# COMPONENTS OF A WORLD CLASS NEW YORK AND NEW JERSEY HARBOR ESTUARY

The "World Class Harbor Estuary" consists of three equal components, which are represented by three interlocking rings (Figure 1.). The components include deepening and maintaining the federal navigation channels, port infrastructure improvements, and protection and restoration of the Harbor estuary environment.

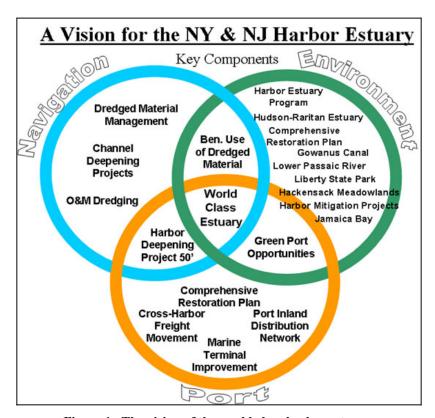


Figure 1. The vision of the world class harbor estuary.

The interlocking rings reflect the complementary goals of building a thriving port to support economic development while achieving environmental restoration. The vision does not view port development and environmental restoration as conflicting efforts.

#### NAVIGATION COMPONENT

The New York District of the U.S. Army Corps of Engineers has been constructing major improvements to federal navigations channels in the Port of New York and New Jersey since 1987 (Figure 2).

The New York District is performing this work through four authorized projects: the Kill Van Kull and Newark Bay Channels, NY and NJ Project (13.6 m (45 feet)); the Arthur Kill Channel, NY and NJ Project (12.42 m (41 feet)/12.12 m (40 feet)); the New York Harbor and Adjacent Channels, Port Jersey, NJ Project (12.42 m (41 feet)); and the New York and New Jersey Harbor Deepening Project (15.15 m (50 feet)). The Port Authority of New York & New Jersey is the required cooperating sponsor for all of these projects except for the Port Jersey deepening project, which the State of New Jersey is sponsoring. The three interim deepening projects provide access for Panamax class ships (maximum sized container ship that can currently pass through the Panama Canal) to the container terminals located in Port Newark/Port Elizabeth, Staten Island and Jersey City, respectively.

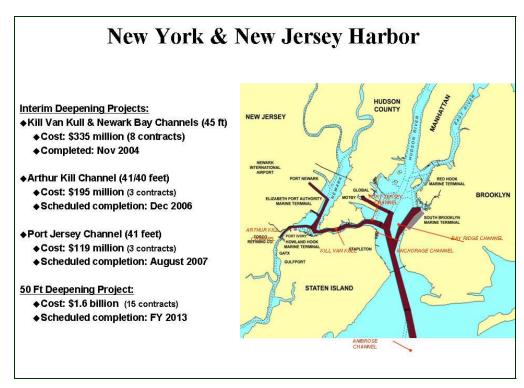


Figure 2. Channel deepening projects for the Port of NY and NJ.

The project benefits are derived from the very significant transportation cost savings due to the significantly greater number of individual containers that can shipped on the larger vessels (Figure 3). For example, deepening the channels from the existing 10.64 m (35 feet) in the Arthur Kill and Port Jersey channels to 12.42 m (41 feet), will allow the Panamax class ships to come in with loads of up to 4,000 TEU (Twenty-foot Equivalent Units), as compared to the existing 10.64 m (35 feet) channel. Post Panamax vessels with loads up to 6,000 TEUs are currently being unloaded at terminals in Port Newark/Port Elizabeth. Also underway is the 15.15 m (50 foot) Harbor Deepening Project, which when completed in 2013, will allow ships with loads of up to 8,000 TEU's to dock at the existing container terminals in Port Newark/Port Elizabeth, Staten Island, Jersey City and also Brooklyn. It is expected that maintenance dredging of about 1,528,000 cubic meters (2 million cubic yards) per year will continue to be needed both during and after construction of the 15.15 m (50 foot) project.

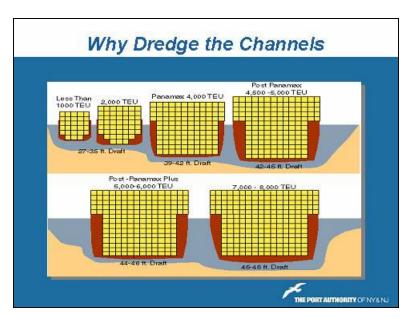


Figure 3. Relationship between channel depth and number of containers that can be transported.

## **Dredged Material Management**

The goal of the Dredged Material Management Plan (DMMP) for the Port of New York is to utilize all of the material dredged in environmentally beneficial ways. The DMMP estimated that a total volume of about 50.4 million cubic meters (66 million cubic yards) will be dredged within the Port of NY and New Jersey between 2005 and 2104 (Figure 4).

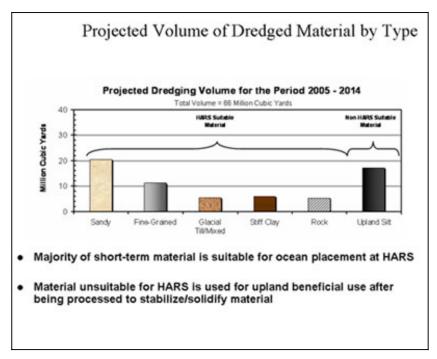


Figure 4. Volume of material projected to be dredged from the Port of NY and NJ over next 10 years.

About 75 percent of that material is considered to be clean or HARS-suitable, with most of the clean material associated with the Harbor Deepening project, including adjacent berthing areas. HARS refers to the Historic Area Remediation Site in the Atlantic Ocean, for which clean dredged material is being used to remediate the former "Mud Dump", which was used to dispose of dredged material from channels and berthing areas within the Port of New York and New Jersey between approximately 1910 and 1996. Other uses of the HARS-suitable material include:

- Offshore fishing reefs Rock removed from the project area has been placed offshore of Manasquan, N.J. and the south shore of Long Island to create artificial linear reefs that have become prime fishing locations.
- Construction aggregate/fill Current contracts include options to place material upland and are utilized by state and local authorities for redevelopment projects, such as the Peninsula in Bayonne, N.J.
- Wetlands and sub-aquatic habitat creation Currently utilizing dredged material to create wetlands in Jamaica Bay, N.Y.

Material unsuitable for the HARS is generally processed with Portland cement, either in-barge or in a pug mill (Figure 5) that renders the material non-toxic and also stabilizes the dredged material into a soil-like material, which can be used to cap and remediate landfills, brownfields, and even abandoned coal mines.



Figure 5. Top. In-barge treatment and stabilization of dredged material with Portland cement. Bottom.

Using a pug mill to treat and stabilize dredged material with Portland cement.

#### **ENVIRONMENT COMPONENT**

#### Hudson-Raritan Estuary Restoration Study

In 1999 Congress directed the Corps to conduct an estuary-wide environmental restoration study throughout the Hudson-Raritan Estuary, known as the Hudson-Raritan Estuary Ecosystem Restoration Study, or the HRE Study (Figure 6). Its purpose is to restore degraded, deteriorated lands and contaminated waterways in New York and New Jersey and to create wetland and other habitats consistent with other programs, such as the Harbor estuary program which is managed by the U.S. Environmental Protection Agency (EPA), and also the Hudson River Estuary Program that is managed by the New York State Department of Environmental Conservation (NYSDEC). Currently being prepared, in conjunction with both government and non-government stakeholders, is an overall Comprehensive Restoration Plan (CRP). One of the first deliverables under the CRP is identifying and reaching consensus among the stakeholders regarding specific ecosystem targets and performance measures, thereby helping to define what the "world class estuary" for New York and New Jersey Harbor would look like. Working with the stakeholders the CRP will serve as the basis of a master plan for the overall restoration of the Harbor estuary.

# Individual Restoration projects Underway under HRE authority.

<u>Liberty State Park, N.J.</u> – Liberty State Park is located on the western side of the Hudson River, in Jersey City, N.J., with views of the Statue of Liberty and Ellis Island. Formerly a rail yard that was largely built by filling tidal wetlands and shallow water, the Park is now the most visited state park in New Jersey with more than 5 million visitors a year. A feasibility study under the HRE authority has been completed that recommends a restoration plan for about 40 percent of the park, which will include excavating the fill material and creating 18.6 ha (46 acres) of tidal wetland and 10.5 ha (26 acres) of freshwater wetlands. In addition, the excavated material along with clean dredged material will be utilized to create about 63.8 ha (158 acres) of mixed upland vegetation and communities. The estimated project cost is \$32 million, of which 65 percent would be paid, if authorized, by the Federal government and 35 percent by the State of New Jersey.

<u>Lower Passaic River, N...J</u> – The lower Passaic River, a 27.2 km (17 mile) tidal stretch above its confluence with Newark Bay, has a long history of industrialization, which has resulted in degraded water quality, loss of wetlands, and highly contaminated sediments. The lower Passaic has also been designated an Operable Unit of the Diamond Alkali Superfund Site. Because of the coincidental study areas, the Corps of Engineers, along with the project sponsor, Office of Maritime Resources, New Jersey Department of Transportation (NJDOT)have combined the EPA Superfund RI/FS and the Corps Feasibility Study into one comprehensive cooperative study. This study is also a pilot project to coordinate remediation and restoration of degraded urban rivers in the United States under the Urban

River Restoration Initiative (URRI). The study will include a cost-benefit analysis of potential remediation and restoration opportunities, as required by various Water Resources Development Acts and also an analysis of the risk posed by the existing condition of contamination as required by CERCLA. Remediation alternatives being evaluated include sediment removal, placement of caps, sediment decontamination in-situ or ex-situ, and controls on combined sewer outfalls, while complimentary restoration goals may include benthic habitat restoration, tidal wetland restoration, vegetative buffer creation, shoreline stabilization and aquatic habitat improvement. The estimated cost of the study is \$19 million, with study completion in 2012.

<u>Hackensack Meadowlands, N.J.</u> – The Hackensack Meadowlands are located in Bergen and Hudson Counties, New Jersey and are within the Newark Bay watershed. The remaining 3,413.8 ha (8,450 acres) of wetlands in the Meadowlands comprise the largest remaining brackish complex in the estuary. Much of these wetlands are degraded due to physical disturbances, such as filling and alterations to natural hydrologic connections, and the prevalence of Phragmites. The Feasibility study will be developing a Comprehensive Restoration Plan for the entire Meadowlands complex. More specifically, it will evaluate opportunities for sustainable habitat restoration, with particular focus on the removal of undesirable fill and *Phragmites* and restoration of tidal flow to enhance fish and wildlife habitat. The estimated cost of the study is \$5.2 million, with study completion in 2008.

Gowanus Creek Canal and Bay, Brooklyn, N.Y. - The Gowanus Creek Canal, completed in 1881, was constructed to accommodate industrial users and commercial shippers on the Brooklyn waterfront. The historic industrial uses in and around the canal have resulted in significant contamination of the sediments in the canal and very poor water quality. The ongoing feasibility study will assess potential restoration measures in the canal, including dredging contaminated sediments, contaminant reduction measures, and improving water quality. This study is also a pilot project to coordinate remediation and restoration of degraded urban rivers in the United States under the URRI. The estimated cost of the study is \$5 million, with study completion in 2008.

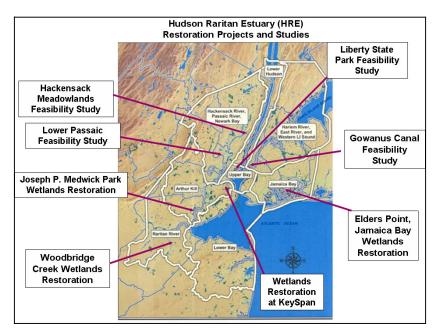


Figure 6. Hudson-Raritan Estuary restoration studies and projects.

## Ecosystem restoration projects being undertaken as mitigation under the Harbor Deepening Projects

Currently underway are four restoration projects to mitigate potential and unavoidable shallow water habitat impacts from the harbor deepening projects. The projects are undertaken in conjunction with partners such as the New York State Department of State (NYSDS), NYSDEC, New York City Department of Environmental Protection (NYCDEP), National Parks Service (Gateway), Natural Resources Conservation Service (NRCS), NOAA Fisheries, U.S. Fish and Wildlife Service (USFWS), New Jersey Department of Environmental Protection, the Township of Woodbridge, N.J., New Jersey Turnpike Authority (NJTPA) and Middlesex County, N.J. Department of Parks and Recreation. The four projects are as follows:

- Joseph P. Medwick Park Restoration in Carteret, N.J.;
- Salt Marsh Mitigation Project at Key Span Corporation in Staten Island, N.Y;
- Woodbridge Creek Ecosystem Restoration Project in Woodbridge, N.J.;
- Elders Point (East) Island Restoration in Jamaica Bay, N.Y.

Cumulatively, these four projects will preserve and restore more than 57.8 ha (143 acres) of tidal wetlands at a cost of nearly \$27 million.

#### PORT INFRASTRUCTURE COMPONENT

## **Comprehensive Port Improvement Plan**

In January 2000 a study was initiated to evaluate the transportation and marine infrastructure needs to handle anticipated cargo in the Port of New York and New Jersey which was forecasted to quadruple up to 14.4 million container units by 2040. Of particular concerns was that the increased cargo could result in the need for additional landfill that might impact wetlands and other critical habitats within the Harbor estuary. The Comprehensive Port Improvement Plan (CPIP), which was funded by a consortium that included the Port Authority of NY & NJ, the States of NY and NJ, and the City of New York, was completed in September 2005, had the following conclusions:

- There is sufficient land acreage available to handle forecast demand, but cargo terminal improvements needed to optimize.
- No major aquatic filling is likely to be needed
- The regional highway network is adequate to handle the increase in Port-related trucks traffic.
- Improvements are needed in the rail infrastructure in handle the expected growth in cargo. 23,000 additional jobs are expected to be generated as a result of the expected cargo growth

## **Port Inland Distribution Network**

The Port Inland Distribution Network (PIDN) (Figure 7) is a planned system for distributing containers that are moving through the Port of New York and New Jersey by barge and by rail, a system that is in addition to the more common conveyance by trucks. This hub-and-spoke system is designed to move containers by barge to water-accessible ports in the northeast such as Bridgeport, C.T.; Camden, N.J.; Providence, R.I.; and Boston, M.A. and would supplement existing and proposed rail service in the region. The inland terminals for the network are located at or near centers of marine customer service and distribution activities, i.e., cluster points in 13 states. Eighty-two percent of the container market within this 13-state area is found within an 80 km (50-mile) radius of these inland terminals.

The PIDN program aims to: lower distribution costs; reduce truck trips (vehicle miles traveled); improve air quality; save energy through reduced truck fuel use; increase port throughput capacity and spur economic development at feeder ports and hinterlands by providing new port platforms for value-added warehousing and distribution opportunities.

The PIDN requires a public/private partnership to ensure full development. Essential partners include The Port Authority of New York & New Jersey, prospective feeder port operators and state and local government's agencies that support PIDN development. Other stakeholders include ocean carriers and shippers who would use the system, the barge operators and local truckers, who will provide service support, and regional consumers and residents. Federal programs, such as the Congestion Mitigation Air Quality Improvement Program (CMAQ) and the Transportation Infrastructure Finance and Innovation Act (TIFIA) are potential federal sources for capital and operating funding.

# Portfields initiative

The Portfields Initiative is a project of The Port Authority of New York & New Jersey and the New Jersey Economic Development Authority (EDA) to help private developers, communities and others transform underutilized and brownfield sites into productive properties to support emerging market opportunities that include ocean-related warehousing and distribution operations. The Portfields Initiative seeks to create new development sites and economic opportunities in the Port District – defined as an area within an approximate 40 km (25-mile) radius around the Statue of Liberty – that will help meet the fast growing commercial cargo needs of the New York /



Figure 7. The rail and barge routes of the Port Inland distribution.

New Jersey region. The regions' port facilities, as well as the air freight facilities must have a modern warehousing/distribution network if the Port is to continue operating efficiently and competitively in a rapidly changing international cargo marketplace. The Portfields Initiative will have private sector developers and, in some cases, will have private/public sector partnerships that are sponsoring projects. The Port Authority and the EDA are working together to help developers who want to build projects on currently identified Portfields Initiative sites and for additional Portfield sites to be identified in the future.

#### **Marine Terminal Improvements**

The Port Authority, in conjunction with its marine terminal operator partners, is in the midst of a significant improvement program at the Port of New York and New Jersey. Current projects include: reconfiguring existing container terminals to increase capacity and productivity; improving inland access, particularly through the expansion of on-dock rail capabilities; and deepening channels and berths for better ocean access. When the terminal reconfiguration projects are completed, the Port of New York and New Jersey will have the capacity to meet the projected rise in demand for international cargo to the region. The program includes the following:

ExpressRail System. To help move cargo swiftly beyond terminals, the Port of New York and New Jersey is building ExpressRail, (Figure 8) a fully integrated intermodal transportation system. When fully operational in 2008, this system will provide the major terminal operators with on-dock rail facilities that connect them directly to a nationwide rail grid. At the Elizabeth-Port Authority Marine Terminal, ExpressRail has been moved from its original 12.2 ha (30-acre) site to a 28.3 ha (70-acre) facility that straddles APM and Maher terminals. Phase I, which include the installation of eight operating tracks and five crossovers with power-operated switches, was recently completed. Lead tracks have been redirected to avoid rail and vehicular traffic. At Port Newark, a permanent ExpressRail facility will replace the extremely successful Port Newark Container Terminal (PNCT) interim facility. Like the interim rail, it will sit adjacent to PNCT. At New York Container Terminal in Staten Island, the Port Authority is building a new ship-to-rail transfer terminal that will include a fully integrated, 9.7 ha (24-acre) on-dock intermodal facility, provided by CSX. Construction began in January 2003 and completion is expected in 2006.

**APM Terminal.** Located at Elizabeth-Port Authority Marine Terminal, APM's current terminal is 107.5 ha (266 acres), has eleven cranes, and includes over 1,368 m (4,500 feet) of wharf space. The redevelopment project will add 34 ha (84 acres) of container terminal space, making the terminal a total of 141.4 ha (350 acres). The expanded terminal will feature an improved gate system, eight 15.2 m (50-foot) deep berths and three new post-Panamax cranes. APM's expansion will be completed by December 2006.

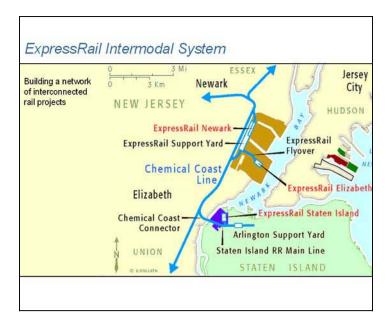


Figure 8. Components of ExpressRail System for the Port of NY and NJ.

*Maher Terminal.* Under the port redevelopment program, Maher's two terminals have been consolidated into a single 179.8 ha (445-acre) terminal. The consolidated terminal offers direct access to the expanded ExpressRail terminal. Maher also has developed the largest container crane fleet at the port and the largest and youngest fully automated straddle carrier fleet in North America. Other improvements include strengthening and deepening berths to accommodate post-Panamax vessels, extending gate hours, and adding new cranes, new pavement and a gate complex.

**Port Newark Container Terminal.** Port Newark Container Terminal is nearing completion of its 71.1 ha (176-acre) terminal improvement project. Six of the terminal's berths have been deepened to 15.2 m (50 feet), allowing entry of the world's most modern container ships. Five new post-Panamax cranes are in operation and two more are expected to come online shortly. Expanded wharf space, new energy-efficient cranes and a new truck gate entry system provide increased efficiency and security. Other improvements include a complete reconfiguration of the container yard, extended gate hours, new cargo handling machinery and new pavement

New York Container Terminal. At the former Howland Hook Marine Terminal, the south wharf has already been extended 60.8 m (200 feet) and the north wharf has been extended 91.2 m (300 feet), bringing total available wharfage to 912 m (3,000 feet). The expanded wharf is allowing customers of New York Container Terminal to benefit from the installation of four new post-Panamax cranes. The terminal operator can now accommodate three vessels simultaneously.

#### **Cross Harbor Freight Movement**

The New York Cross Harbor Railroad (NYCH) was formed over 20 years ago from two predecessor railroads. It is the last vestige of a once-extensive rail network across New York Harbor. The NYCH operates two terminals: One at the Greenville yards in Jersey City, New Jersey on property leased from Conrail and the other in South Brooklyn at 50<sup>th</sup> Street on property leased from the City of New York. The New York City Economic Development Corporation administers the latter agreement. NYCH's main business is rolling railroad cars on or off special-purpose "carfloats" (barges equipped with railroad tracks) in Jersey City and Brooklyn. These are primarily conventional boxcars, tank cars, etc. carrying domestic freight. Railroad cars are transferred between land and water via movable "float bridges" connected to the shore at one end and adjusted to the height of the carfloat at the other end. A tugboat moves the carfloats across the harbor between the two float bridge terminals. At each terminal, NYCH interchanges rail cars with other carriers. At Greenville, connections are made with Conrail and the North American rail network. On the Brooklyn side, some cars are delivered to local customers directly by NYCH and others are interchanged with the New York & Atlantic Railroad, which serves customers in Brooklyn, Queens and Long Island under an arrangement with the Metropolitan Transportation Authority's Long Island Rail Road. One unique variation to the regular routine involves loading cocoa at the Red Hook Container Terminal in Brooklyn. In this operation, a number of empty railroad cars are placed on a carfloat at Greenville. The carfloat, with the empty

cars in place, is moved across the harbor and docked at the Red Hook Container Terminal adjacent to a warehouse where imported cocoa beans have been stored. The beans (in bulk or in bags, depending on the customer) are loaded directly from the pier into the rail cars, after which the carfloat is returned to Greenville where the loaded cars are rolled off and moved to inland customers using the normal rail network.

NYCH forms a short cut for rail shipments between, for example, the Southeast United States and New York City and Long Island. The only rail alternative is to use the sole rail freight bridge over the Hudson River at Albany NY, then down the east side of the river to New York City.

# Portway International Intermodal Corridor

Under consideration by the Transportation NJDOT, Portway is a billion dollar, decade-long program that includes the phased development of various projects designed to improve truck access and road safety. Phase I of the project aims to relieve highway congestion near and around marine terminals and other intermodal service centers within a 27.2 km (17-mile) corridor that runs from Union and Essex counties north to Hudson and Bergen counties. Construction is underway on bridge and roadway improvements at the north end of the port. Other planned improvements include construction of a new, dedicated truck roadway to relieve a highly congested portion of the Corridor's route. NJDOT has also begun concept development for potential improvements such as the extension of the Portway corridor and terminal advancements to the former Military Ocean Terminal in Bayonne.

## Off-site and Regional Transportation Improvements

Since the port's competitiveness and ability to handle growing cargo volumes efficiently are dependent on the overall state of transportation in the region, many projects currently are being evaluated to alleviate container congestion at the terminals. These include:

- Improved rail connections in Bayonne, N.J. and the vicinity of the Port Jersey Channel.
- Improvements to access ramps that link the marine facilities in South Brooklyn to the Gowanus Expressway.

# **SUMMARY AND CONCLUSIONS**

While there has been strong consensus among the stakeholders regarding the collective "Vision of a World Class Harbor Estuary," there has been concern and recognition among the stakeholders that the funding for the Environmental component of the "Vision" has lagged behind that of the Navigation and Port Infrastructure Components. As one of the nation's "priority" civil works projects, the New York and New Jersey Harbor Project, as well as its predecessor interim project, has already received over \$800 million in federal and non-federal funds and continued funding for the balance is expected to keep the project on schedule for a 2014 completion. In addition, over \$1.1 billion has been committed for Port infrastructure projects, such as, improvements to the Marine Terminals, the Cross Harbor Freight system, and the Port Inland Distribution Network, which are needed for the Port to handle the increased cargo and to remain competitive in the future.

To address the funding disparity and to ensure that the Environment component of the "Vision" remains a co-equal component, an Environmental Roundtable, representing port, shipping, as well as environmental interests, was convened in 2004 to ensure that there would be continued advocacy for the environmental agenda for the Harbor Estuary. Among the agencies and groups participating and in support of the goals of the Roundtable include: the Environmental Defense Fund, the Hudson River Foundation, the National Parks Foundation, the Baykeeper, NY Shippers Association, Metropolitan Waterfront Alliance, The Port Authority of NY & NJ, NYC Parks, NJ Department of Environmental Protection, the NJ Department of Transportation, the NY State Department of Environmental Conservation, EPA, and others.

The Roundtable members have and will continue to lobby in support of increased funding and needed authorizations in support of the Environmental agenda. They also continue to be involved in public outreach and in further clarifying and refining the environmental agenda.

# ACKNOWLEDGEMENT

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