EXECUTIVE ORDER NO. 215
ENVIRONMENTAL IMPACT STATEMENT

For the

SOUTH JERSEY PORT CORPORATION

PAULSBORO MARINE TERMINAL PROJECT

Borough of Paulsboro, Gloucester County, New Jersey

MAY 2009

Submitted by

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Executive Order No. 215
Environmental Impact Statement
Paulsboro Marine Terminal Project

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List of Acronyms

ACO	Administrative Consent Order
AOC	Area of Concern
APE	Area of Potential Effect
AQI	Air Quality Index
As	Arsenic
AS	Air Sparging
ATR	Automatic Traffic Recorder
BACT	Best Available Technology
BEE	Baseline Ecological Evaluation
BMPs	Best Management Practices
BP	British Petroleum
CAAA	Clean Air Act Amendment
CAFRA	Coastal Area Facility Review Act
CBP	Customs Border Control
CCTV	Closed Circuit Television
CEA	Classification Exception Area
CEQ	Council on Environmental Quality
Cfm	Cubic Feet per Minute
CFR	Code of Federal Regulations
CO	Carbon Monoxide
COC	Chemical of Concern
CY	Cubic Yards
CZMCD	Coastal Zone Management Consistency Determination
dB	Decibels
dBA	A-Weighted Scale for Sound Levels
dBA L_{eq}	Steady Level of Noise Over a Specific Time
DEIS	Draft Environmental Impact Statement
DN	Deed Notice
DO	Dissolved Oxygen
DOC	Diesel Oxidation Catalysts
DOT	Department of Transportation
DPF	Diesel Particulate Filter
DRBC	Delaware River Basin Commission
DRPA	Delaware River Port Authority
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMS	Emergency Medical Service
EO 215	Executive Order No. 215
EOP	Emergency Operations Plan
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
Ft^2	Square Feet
GCIA	Gloucester County Improvement Authority
GCSCD	Gloucester County Soil Conservation District
GCUA	Gloucester County Utilities Authority
GDP	Gross Domestic Product
GIS	Geographic Information System
GPM	Gallons per Minute
GPS	Global Positioning System
HASP	Health and Safety Plan
HHS	Health and Human Services
HP	Horsepower
IRMs	Interim Remedial Measures
ISRA	NJ Industrial Site Recovery Act
JD	Jurisdictional Determination
L_{10}	Noise Level Exceeded 10 Percent of the Time
LNG	Liquefied Natural Gas
LNAPL	Light Non-Aqueous Phase Liquids
LOA	Length of Overall Vessel
LOI	Letter of Interpretation
LO-LO	Lift-On / Lift-Off
LURP	Land Use Regulation Program
MARAD	U.S. Maritime Administration
Mgd	Million Gallons per Day
Mg/Kg	Milligrams per Kilogram
Mg/l	Milligrams per Liter
MHW	Mean High Water
MHHW	Mean Highest High Water
MIBP	Marine Industrial Business Park
MLW	Mean Low Water
MLLW	Mean Lowest Low Water
MTL	Mean Tide Level
MOA	Memorandum of Agreement
MPT	Maintenance and Protection of Traffic
MSAT	Mobil Source Air Toxics
MSL	Mean Sea Level
MTS	Marine Transportation System
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAVD	North American Vertical Datum
NGVD	National Geodetic Vertical Datum
NHP	Natural Heritage Program
NHPA	National Historic Preservation Act
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJGS	New Jersey Geologic Survey
NJPDES	New Jersey Pollutant Discharge Elimination System
N.J.S.A.	New Jersey Statutes Annotated
NJSDRP	New Jersey State Development and Redevelopment Plan
NJSHPO	New Jersey State Historic Preservation Office
NJSM	New Jersey State Museum
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NR	National Register
NRHP	National Register of Historic Places
NOx	Nitrous Oxides
NO_2	Nitrogen Dioxide
O_3	Ozone
ODST	NJDEP Office of Dredging and Sediment Technology
OPRA	Open Public Records Act
OSHA	Occupational Safety and Health Administration
PAH	Polyaromatic Hydrocarbons
PAR	Preliminary Action Report

Pb	Lead
PCBs	Polychlorinated Biphenyls
Pc/l	Picocuries per liter
PIDN	New Jersey's Port Inland Distribution Network
PM_{10}	Coarse Particulate Matter
Ppb	Parts per Billion
Ppm	Parts per Million
Ppt	Parts per Thousand
PRM	Potomac-Raritan-Magothy aquifer
Prma	Potomac-Raritan-Magothy aquifer
PCWS	Public Community Water Supply
RA	Remedial Agreement
RASR	Remedial Action Selection Report
RI	Remedial Investigation
RIR	Remedial Investigation Report
RM	River Mile
RMU	Remedial Management Unit
RO-RO	Roll-On / Roll-Off
ROSI	Recreation and Open Space Inventory
RTG	Rubber Tired Gantry Cranes
SAMP	Special Area Management Plan
SAP	Sediment Sampling and Characterization Plan
SCD	Soil Conservation District
SESC	Soil Erosion and Sediment Control
SESCP	Soil Erosion and Sediment Control Plan
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SJPC	South Jersey Port Corporation
SNJWMP	Southern New Jersey Waterfront Master Plan
S.R.	State Road
SSA	Sole Source Aquifer
SWAP	Safe Water Protection Program
SWM	Stormwater Management
SO_2	Sulfur Dioxide
SRP	Site Remediation Program
SSA	Sole Source Aquifer
SSURGO	United States Soil Survey Geographic Database Program
SVE	Soil Vapor Extraction and Treatment System
SVOC	Semi-Volatile Organic Compound
TES	Technical Environmental Study
TEU	Tons Per Loaded 20-Foot Equivalent Unit, Which Equates To About 10 tons
TIP	Transportation Implementation Plan
TPH	Total Petroleum Hydrocarbons
TRSR	Technical Requirements for Site Remediation
TSA	Transportation Security Administration
TU	Toxic Unit
TWIC	Transportation Worker Identification Card
µg/l	Microgram per Liter
$\mu g/m^3$	Microgram per Cubic Meter
UddcB	Udorthents Soil Classification Type
US	United States
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTEs	Heavy Load Trucks
VI	Vapor Intrusion
VMT	Vehicle Miles Travelled
VOC	Volatile Organic Compound
VPP	Value Protection Plan
WHPA	Well Head Protection Area
WDP	Waterfront Development Permit
WMA	Watershed Management Area
WQC	Water Quality Certification
WQM	Water Quality Management
WR	Waterfront Recreation
WRA	Well Restriction Area

1.0 INTRODUCTION

The South Jersey Port Corporation (SJPC), in conjunction with the Gloucester County Improvement Authority (GCIA), proposes to redevelop the former BP Oil Terminal and the former Essex Industrial Chemicals, Inc. (Essex) properties located in the Borough of Paulsboro into a new, deep-water marine terminal with associated processing, distribution, and intermodal operations.

This Environmental Impact Statement (EIS) examines the potential effects of the proposed SJPC Paulsboro Marine Terminal (project) on the natural and built environments. This EIS was prepared according to the Executive Order No. 215 (EO 215) of 1989 and the "Attachment to Executive Order No. 215 of 1989: *Guidelines for the Preparation of an Environmental Impact Statement/Environmental Assessment*" (Revised and Updated – April 23, 2002). On September 11, 1989, EO 215 was signed by New Jersey Governor Thomas H. Kean. EO 215 requires departments, agencies, and authorities of the State to prepare and submit to the NJDEP an environmental assessment (EA) or EIS in support of major construction projects. The objective of EO 215 is to reduce or eliminate potential adverse environmental impacts of projects initiated or funded by the State. Projects with both construction costs in excess of $5 million and land disturbance in excess of five acres shall be subject to the preparation of an EIS. Therefore, since the proposed Paulsboro Marine Terminal exceeds both these criteria, an EIS is required to be completed.

A new access road and overpass are proposed to serve the Paulsboro Marine Terminal. The potential effects and impacts of the proposed access road and overpass are detailed in the T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, prepared for the GCIA.

Six key elements make up this Paulsboro Marine Terminal EIS: Section 1.0 defines the proposed project; Section 2.0 details its purpose and need; Section 3.0 provides an analysis of the project alternatives; Section 4.0 describes the existing conditions related to the social, economic, and environmental parameters at the site; Section 5.0 evaluates the anticipated impacts to the natural and built environment of the proposed project; and Section 6.0 identifies measures to mitigate potential adverse impacts.

1.1 Project Setting

The project site is located along the Delaware River at River Mile 105 in the Borough of Paulsboro, Gloucester County, New Jersey, directly across the river from the Philadelphia International Airport. The site is bordered by the Delaware River to the north and by Mantua Creek to the east. The site is bounded by residential neighborhoods to the west and by wetlands in the south (Figure 1.1).

Figure 1.1 Project Location Map
Source: New Jersey Office of Information Technology 2007-08 High Resolutions Ortho-Photography

1.2 Site Description

The project site consists primarily of two parcels: a 130-acre parcel that is owned by BP Oil Company (BP) and an adjacent 60-acre parcel identified as the former Essex property (Figure 1.2). The BP parcel comprises approximately the western two thirds of the project site and formerly housed the BP Oil Terminal containing fuel handling and storage facilities including a wharf along the river's edge. The former Essex property comprises approximately the eastern third of the project site.

Additional land parcels or property rights that are within the footprint of the project site include the Colonial Oil Company (Conoco) Pipeline property (formerly operated by Tosco), which is approximately a quarter acre in size and is located between the BP and Essex parcels near the center of the project site, and a Conoco Pipeline easement that crosses the southwest corner of the BP property. Smaller properties currently owned by the Borough of Paulsboro and Universal Avenue in the south are also included in the footprint of the project.

Figure 1.2 Project Map – Current Conditions
Source: New Jersey Office of Information Technology 2007-08 High Resolutions Ortho-Photography

Within the two primary parcels comprising the project site are two land areas that are not part of the project. These "out-parcels" include BP's current groundwater remediation treatment system facility and the current solar array located on Essex's former gypsum landfill (Figure 1.2). BP's groundwater remediation treatment facility is an active component of the on-going remediation of BP's former Oil Terminal property on the project site. Essex's former gypsum landfill property

contains a solar array that, in part, generates electricity for BP's groundwater remediation treatment facility. More detail about these facilities is provided in Sections 4.12.2 and 4.12.3.

In early 2005, the Borough of Paulsboro signed a 90-year lease with BP that would effectively transfer the BP Oil Terminal property to the Borough, once BP completes the remediation program as approved by NJDEP. In addition, the Borough acquired the 60-acre former Essex property on July 17, 2007 via a declaration-of-taking. Therefore, the Borough of Paulsboro has acquired the rights to redevelop the entire 190-acre parcel. In a redevelopment agreement, the Borough would provide the land and an entity such as the SJPC would operate the complex. Integrated into the redevelopment agreement, the Borough of Paulsboro and Gloucester County have agreed to allow the County (i.e., the GCIA) to lead the redevelopment efforts for the project.

1.3 Design Elements and Criteria

The following design standards and manuals were used in designing this project:

- AASHTO – A Policy on Geometric Design of Highways and Streets, 5th Edition, 2004.
- AASHTO - LRFD Bridge Design Specifications for Highway Bridges, 3rd Edition, 2004.
- AASHTO – Standard Specifications for Highway Bridges, 17th Edition, 2002.
- ACI 318-05 – Building Code Requirements for Structural Concrete.
- AISC – American Institute of Steel Construction – Manual of Steel Construction, Allowable Stress Design (ASD).
- ASCE 7-02 Minimum Design Loads for Building and Other Structures.
- AWS – American Welding Society – Welding Code – Steel (AWS D1.1) and Welding Code – Concrete Reinforcement (AWS D1.4).
- BS 6349 – Maritime Structures, Part 4: Code of Practice for Design of Fendering and Mooring Systems.
- Highway Capacity Manual (HCM), 2000.
- MUTCD - Manual on Uniform Traffic Control Devices, 2003.
- NJDOT Roadway Design Manual (English Unit), 2002 (with current Baseline Document Changes).
- UFC 4-152-01 – Department of Defense Unified Facilities Criteria, Design: Piers and Wharves.
- United States Army Corp of Engineers, Coastal Engineering Manual.

1.4 Required Environmental Permits/Approvals

The following permits/approvals would be required for implementation of the proposed Paulsboro Marine Terminal project. Pre-application meetings with the respective regulatory agencies and stakeholders were held in January 2004, October 2007, March 2007, June 2008, October 2008, and March 2009 to address application contents and schedules. Meeting minutes are included in Appendix A.

Federal

- United States Army Corps of Engineers (USACE) Jurisdictional Determination (JD). The USACE requires a JD to determine the types, amounts, and locations of open water and wetlands that could be impacted by the project. The USACE definitions and requirements are further detailed in Section 4.4.1.

- USACE Section 10/404 Permit. This permit is required for structures and/or work in or affecting navigable waters of the United States, and is required for placement of dredge and fill material and/or mechanized land clearing, ditching, draining, channelization, or other excavation activities into the waters of the United States, including wetlands adjacent to those waters. As the proposed project would require disturbance and fill in the Delaware River, the Mantua Creek, and/or the adjacent wetlands, a USACE Section 10/404 permit is required.

State

- NJDEP Freshwater Wetlands Letter of Interpretation (LOI). A Letter of Interpretation provides the NJDEP's official determination of the presence of freshwater wetlands, wetland transition areas, and/or State open waters on a project site, as well as verification of the boundaries of these resources. Once issued, an LOI is valid for a period of five years.

- NJDEP Waterfront Development Permit (WDP). This permit is required for all development at or below the mean high water line in tidal waters of the State. A permit is required prior to the development of waterfront upon any tidal or navigable waterways, including most development within 500 feet from the mean high water line in New Jersey's coastal zone. Waterfront activities include but are not limited to the construction of bulkheads, piers, bridges, pipelines, and removal or deposition of fill material. The proposed project is situated within 500 feet of the mean high water line of the Delaware River and Mantua Creek and therefore, a WDP is required.

- NJDEP Stormwater Management Approval. Projects that are considered major development must comply with the NJDEP Stormwater Management Regulations (N.J.A.C. 7:8 *et seq.*), including implementation of the design and performance standards for stormwater management measures to minimize adverse impacts of stormwater runoff on water quality, water quantity in receiving waterbodies, and minimize the loss of groundwater recharge.

- NJDEP Water Quality Certification (WQC). NJDEP cannot issue a permit or approval for a project or activity that is inconsistent with the Statewide or Area-wide Water Quality Management (WQM) Plan. A consistency determination is the review conducted by the NJDEP to determine whether or not a particular project or activity conflicts with the Statewide or Area-wide WQM plans. WQC review is conducted concurrently with the Waterfront Development Permit application and these approvals are issued simultaneously. As the proposed project would require a WDP, a WQC would be required.

- NJDEP Freshwater Wetlands and Coastal Wetlands Permit. A Letter of Interpretation (LOI) would be required to delineate wetlands at the site. Upon the NJDEP's approval of the LOI, an application for an Individual Wetlands Permit would be submitted. Freshwater wetlands in New Jersey are regulated by the NJDEP Freshwater Wetlands Protection Act (NJAC 7:7A *et seq.*). Tidal wetlands in New Jersey are regulated by the Tidal Wetlands Act of 1970. Coastal wetlands are defined under the *Wetlands Act of 1970* as "any bank, marsh, swamp, meadow, flat, or other low land subject to tidal action in the State of New Jersey along the Delaware Bay and Delaware River...or any inlet, estuary or tributary waterway, including those areas now or formerly connected to tidal waters whose surface is at or below an elevation of 1 foot above local extreme high water, and upon which may grow or is capable of growing some, but not necessarily all the species listed in the *Wetlands Act of 1970*. The NJDEP requirements are further detailed in Section 4.4.1.

- NJDEP Tidelands Conveyance. Tidelands grants, leases, and/or licenses are required for the use of State-owned riparian lands. Tidelands or riparian lands are lands which are now, or were formerly covered by the mean high tide. These lands are owned by the State unless the State conveys its ownership through a riparian grant. According to the NJDEP Tidelands Maps, the areas along the Delaware River and Mantua Creek are flowed by tide or formerly flowed by tide within the site which has not been conveyed. Therefore, a Tidelands Conveyance is required for the proposed project.

- NJDEP Coastal Zone Management Consistency Determination (CZMCD). The filling or dredging of, or placement or construction of structures, pilings or other obstructions in any tidal waterway, or in certain upland areas adjacent to tidal waterways outside the *Coastal Area Facility Review Act* (CAFRA) zone are regulated under the Federal *Coastal Zone Management Act* and implemented and reviewed by the NJDEP under its Coastal Permit Program. A CZMCD approval shall be required for the construction, reconstruction, alteration, expansion or enlargement of any structure, or for the excavation or filling of any area, any portion of which is in the Delaware River coastal zone waterfront area. A CZMCD is required for the proposed project and a Coastal Zone Consistency Determination is issued by the NJDEP Division of Land Use (DLUR).

- NJDEP Office of Dredging and Sediment Technology (ODST). Permit reviews are coordinated by the NJDEP Office of Dredging and Sediment Technology. Pre-application discussions with the ODST are required prior to the actual submittal of a permit application to discuss the proposed project, required permits, sampling and testing protocol, and other permit information. The NJDEP's authority to regulate proposed dredging activities are inclusive of the Waterfront Development Law, Riparian Interests, *NJ Water Pollution Control Act*, *Federal Water Pollution Control Act*, and the *Federal Coastal Zone Management Act*. Additional regulations pertain to the placement of upland confined disposal facilities.

- NJDEP Site Remediation Program (SRP). The NJDEP's SRP regulates contaminated materials investigations and the associated remediation within the State of New Jersey. The NJDEP maintains regulatory oversight of projects via several mechanisms such as statues, directives, agreements, and consent orders. In 1979, the NJDEP issued a directive letter to BP for the Oil Terminal site. In 1982, the NJDEP issued an Administrative Consent Order (ACO) to BP, which in 1991 was amended. In 1994, a

Memorandum of Agreement (MOA) was completed between the NJDEP and BP. In 1996, a Remedial Agreement was executed between the NJDEP and BP, which was subsequently amended in 2002 and in 2006. The NJDEP will continue to monitor BP's activities with regard to the past releases and the related remediation activities.

Project sponsors may be required to enter into an agreement with the NJDEP, such as an MOA, to investigate and remediate the remaining portions of the project site and/or which have not been completed by BP, or which are currently under investigation by BP.

- NJDEP – New Jersey Pollutant Discharge Elimination System (NJPDES) General Permit for Stormwater Discharge Associated with Construction Activity. A stormwater construction general permit is required under the NJDEP NJPDES program but is obtained through the local Soil Conservation District office. This authorization applies to point source stormwater discharges from construction activities (e.g., clearing, grading, excavating) that disturb 1 acre or more. Because the proposed project would disturb more than 1 acre of surface area of land, a construction stormwater discharge authorization would be required from the Gloucester County Soil Conservation District.

County

- Gloucester County Soil Conservation District (GCSCD) - Soil Erosion and Sediment Control Plan Certification. Approval of development projects by municipalities and all other public agencies is conditioned upon approval of a plan for soil erosion and sediment control (SESC). Certification is required for projects that disturb more than 5,000 square feet (ft^2) of surface area of land. Certification is also required for demolition of structures, construction of parking lots, public facilities, operation of mining or quarrying activities, and for clearing or grading of land for other than agricultural or horticultural purposes. Public facility means any building, pipeline, highway, electricity, telephone or other transmission line; or any other structure to be constructed by a public utility, municipality, County or State, or any agency or instrumentality thereof. Because the proposed project would disturb greater than 5,000 ft^2 of surface area of land, SESCP Certification is required from the GCSCD.

Other

- Delaware River Basin Commission (DRBC) Approval. The DRBC develops and effectuates plans, policies and projects relating to the water resources of the Delaware River Basin. The DRBC adopts and promotes uniform and coordinated policies for water conservation, control, use and management in the Basin. The DRBC encourages the planning, development, and financing of water resource projects according to such plans and policies. According to the DRBC requirements, no project having a substantial effect on the water resources of the Basin shall be undertaken by any person, corporation or governmental authority unless it has first been submitted to and approved by the DRBC. The DRBC shall approve a project whenever it finds and determines that such a project would not substantially impair or conflict with the comprehensive plan and may modify and approve as modified, or may disapprove any such project whenever it finds and determines that the project would substantially impair or conflict with such plan.

Additional permits may be required dependent upon the features included at the proposed Marine Terminal (e.g., underground storage tanks, treatment works approvals, etc.). Municipal or other local permits or variances not listed may also be required (e.g., demolition, fire protection, construction permits, noise variances, etc.).

2.0 PROJECT PURPOSE AND NEED

This chapter identifies the purpose of the proposed Paulsboro Marine Terminal project (Terminal or project), describes the elements of need for the project, and specifies the goals and objectives inherent in pursuing the project.

2.1 Project Purpose

The purpose of the project is to construct and operate an integrated, cost-efficient bulk and break-bulk, multi-user, deep-water marine terminal on the Delaware River in southern New Jersey that is capable of servicing multiple ships concurrently with associated processing, distribution and intermodal operations.

A marine terminal is a waterfront facility that features one or more ship berths[1] and enables the loading and unloading of cargo between ships and land. Typically, a marine terminal is a place where cargo is received, stored and/or loaded for transport to sites outside the terminal. At a bulk and break-bulk terminal, loose (bulk) cargo arrives by ship in either loose or packaged[2] form. Packaged cargo may require unpacking or re-packaging (break-bulk activity) prior to delivery to its final destination. The project would provide facilities at the Terminal site to unpack, re-package, handle (i.e., process), and store bulk and/or break-bulk cargo.

The Terminal would be integrated which means that the ship-to-shore loading and unloading operations and the on-site processing operations would function as a single system. The Terminal would be a multi-user facility such that more than one tenant operator would be co-located at the terminal, using a common wharf[3] and intermodal infrastructure. A deep-water berth is proposed to handle ocean-going ships with a draft that can be accommodated in the Delaware River channel.[4] The Terminal would operate as the juncture of multiple transportation modes, such as deep-water marine vessels, ocean-going barges, truck, and freight rail, thereby providing intermodal connectivity for cargo movements.

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[1] A berth is a location used specifically for mooring vessels while loading or unloading cargo.

[2] Packaging may include roll-on/roll-off (RO-RO) type wheeled containers; cargo may also be containerized, such as fruit.

[3] A wharf is a waterside structure adjacent to the ship berths. The wharf supports equipment and personnel handling cargo as it is unloaded from a ship and transferred to the landside for storage, processing, and/or distribution.

[4] The existing Delaware River navigation channel is approximately 40 feet deep. The water depth limits the size of ships that can call on Delaware River ports and terminals to those with a draft less than the channel depth.

In recognition of the North Atlantic market trend toward larger vessels, there is a proposal by the USACE to have the Delaware River and Bay navigation channel deepened to 45 feet to accommodate larger vessels and increase the competitiveness of Delaware River ports and terminals. Dredging would enable larger vessels with larger cargo loads and corresponding deeper drafts to call on Delaware River ports and terminals. Issues surrounding the proposed deepening of the channel in the southern portion of the river are yet to be resolved. Because implementation of channel deepening is uncertain, the Paulsboro Marine Terminal has been planned based upon the current conditions.

2.2 Project Need

The Paulsboro Marine Terminal is proposed to address identified areas of need with respect to water-oriented transport of and markets for goods in southern New Jersey and the Delaware River region. These needs were organized into three groups to enable appropriate evaluation of the performance of each alternative: overall needs, location needs and design needs. Overall needs focus on the land use and economic planning aspects of the project purpose; the performance of all of the alternatives was measured using overall needs. Location needs focus on the capabilities and constraints of specific properties considered; the performance of the location alternatives was measured using location needs. Design needs focus on the safety and operational capabilities and constraints of specific facility designs and correlate those performance characteristics to cost efficiency and return on public investment. The performance of the design alternatives was measured using the design needs.

Overall needs include:

- Expand marine terminal capacity in southern New Jersey;
- Respond to unmet existing and foreseeable demand for deep-water marine terminal berthing space in southern New Jersey by providing additional berth space in proportion to the adjacent available land area;
- Enable southern New Jersey to capture a greater market share of local as well as regional discretionary bulk and break-bulk commodity movements;
- Complement existing marine terminal operations in southern New Jersey by building upon specialized strengths in handling bulk and break-bulk commodities;
- Accommodate on-site, associated processing and distribution facilities;
- Respond to the State of New Jersey's freight and logistics development strategy that focuses on integrating supply chain corridors and maximizing return on investment of public funds;
- Respond to the federally recognized need to enhance the intermodal transportation infrastructure; and,
- Be consistent with local and regional plans.

Location needs include:

- Develop deep-water marine terminal berths proximate to the existing deep-water shipping channel; and,
- Develop an intermodal marine terminal with landside access to existing road and rail systems.
- Develop a marine terminal facility that limits impacts to the natural and human environments.

Design needs include:

- Provide for safe and secure operations;
- Avoid interfering with navigation and docking at existing terminals;
- Achieve minimum operating efficiency thresholds;
- Achieve minimum operating cost efficiency thresholds; and,
- Return on public investment – Achieve a competitive marine terminal compared to industry standards.

Each project need is described in more detail in the following sections.

2.2.1 Expand Marine Terminal Capacity in Southern New Jersey

Existing Conditions

Delaware River ports and terminal facilities in New Jersey, Pennsylvania, and Delaware handle approximately 100 to 120 million tons of domestic and international cargo annually with trade partners in South America, Southeast Asia, Europe, Africa, and Australia. Excluding petroleum and related products, the Delaware River ports and terminals handle approximately 23.5 million tons per year. Of that total, 19.5 million tons are imported upriver while 4.0 million tons are exported downriver.

Approximately 22 existing Delaware River ports and terminals handle bulk and break-bulk cargo, with 11 in Pennsylvania, 9 in New Jersey and 2 in Delaware. Prior to the economic recessionary impacts of 2008, collectively, the SJPC ports and terminals were operating at approximately 95 percent of capacity, which means that they were operating at or near capacity. In southern New Jersey, 2006 marked the fourth consecutive year of record cargo tonnage throughput at the SJPC ports and terminals. The 2007 total tonnage was the third highest total in SJPC history.

Despite the number of port and terminal facilities located along the Delaware River, ships had to be turned away in 2006 and 2007 due to a lack of available berth space to handle the additional ships and cargo. This at-capacity condition represents a significant missed opportunity for economic benefit to southern New Jersey and the Delaware River region. Deep-water marine port and terminal activities contribute to the local, regional, and national economies by providing employment and income to individuals, tax revenues to local and State governments, customs fees to the Federal government, and revenue to businesses engaged in handling, shipping and receiving cargo.

Using fruit as an example, 508,000 tons of break-bulk fruit was imported through the SJPC terminals in 2001, creating 443 direct jobs.[5] The majority of direct jobs were in terminal operations (241 jobs) and trucking firms (160 jobs). On top of these direct jobs are indirect jobs that are directly dependent on port activities, such as maintenance and repair services, communications, and fuel suppliers. Additionally, related jobs were created such as local and regional manufacturers that are users of imported cargo, and retailers selling commodities and manufactured products.

Continuing the fruit import example, the revenue generated by fruit imports in 2001 at SJPC terminals was $38.8 million or approximately 24 percent of the total commodity revenue that year. Fruit was the highest single revenue generator of all commodities handled at the SJPC ports in 2001.

The average annual personal income (direct jobs at ports and terminals) in 2001 was $39,828, which compares favorably with the Gloucester County and Paulsboro income data described in Section 4.15.1 of this EIS. Per capita income levels as of the 2000 U.S. Census were $16,368 in Paulsboro, $22,708 in Gloucester County and $27,006 in New Jersey.

[5] These and the remaining economic statistics in this section were reported in Martin Associates, 2002, *The Local and Regional Economic Impacts of the South Jersey Port Corporation*. Prepared for the Delaware River Port Authority.

These data demonstrate the significant economic value that is derived from goods movement through marine ports and terminals. The benefits to individuals, the local community, the southern New Jersey region and the State as a whole are dramatic. Being able to sustain and grow marine terminal capacity in order to accommodate existing and foreseeable future demand is essential to long-term economic health. Given that southern New Jersey ports and terminals have been operating at or near capacity during the last several years, continued growth cannot be accommodated and future economic benefits cannot be realized. For this reason, there is a compelling need to expand marine terminal capacity in southern New Jersey.

Future Demand

Industry forecasts indicate that cargo volumes entering and leaving the United States will continue to grow throughout the foreseeable future. Since 2000, the total value of international trade with the United States has risen by over 40 percent and is a growing part of our national economy. This growth in international trade was the result of both the combination of sustained consumer spending in tandem with a continuous drive for cost-effectiveness. This has resulted in the outsourcing of United States manufacturing to other countries, specifically China and Southeast Asia, the retention of low product inventories, and changes in the supply chain, notably large retailers taking control of products earlier in the process.

Forecasts for future cargo volumes to be handled at ports and terminal facilities located along the Delaware River were developed by the Delaware River Port Authority (DRPA) based upon Low, Medium, and High forecasts (Figure 2.1). Moderate growth between 1993 and 2002 resulted in an actual Compound Annual Growth Rate of just 2.2%.[6] As detailed by Figure 2.1, the bulk/break-bulk volume in 2003 was 19,000,000 tons. However, the forecasted bulk/break-bulk volume in 2024 is 44,000,000 tons. This volume represents a 2 to 2-1/2 fold increase over 20 years.

[6] Compound Annual Growth Rate (CAGR) is the annualized mean growth rate of an investment over a specified period of time.

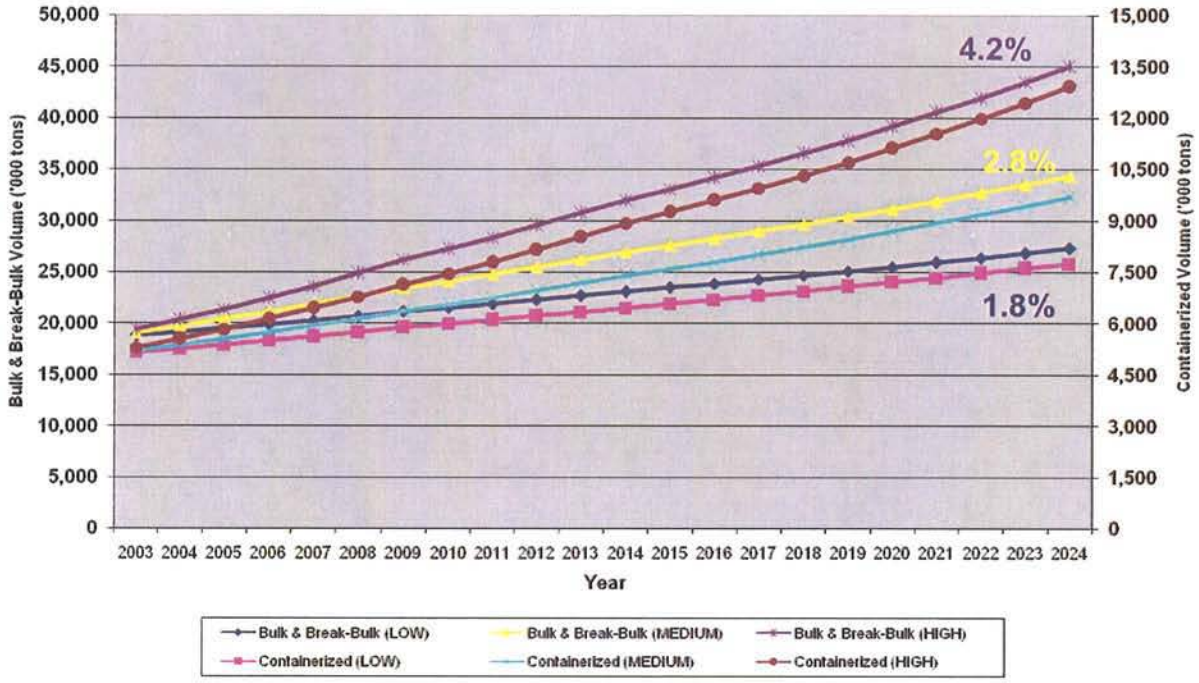

Figure 2.1 – Historic and Future Southern New Jersey Cargo Volume Trends
Source: Delaware River Port Authority, 2006. Southern New Jersey Waterfront Master Plan, November 9, 2006 Public Outreach Slideshow.

The current economic downturn has resulted in some slowing in cargo movements. However, the bulk and break-bulk commodity market in the United States has been only mildly affected. At SJPC facilities, growth in total annual tonnage peaked in 2006 at 3.8 million tons of bulk and break-bulk cargo. In 2008, total annual tonnage handled at the SJPC facilities was 2.5 million tons or 70 percent of 2006 total annual tonnage. Examination of total annual tonnage history at SJPC facilities indicates that year 2008 total tonnage was the sixth highest volume year and was higher than all years prior to 2003 when total annual tonnage grew from a low of 500,000 tons in 1969 to 2.0 – 2.5 million tons per year in the late 1980's and 1990's. As a way of presenting the data between 2002 and 2008 including the two down years of 2007 and 2008, the annual growth rate remained in excess of 3.3 percent which correlates between the Medium and High growth rates shown on Figure 2.1.

The softening of the global trade market is echoed nationally; however, bulk and break-bulk ships continue to be full or nearly full of cargo.[7] The reason for relative stability in the local market is that many commodities transported in bulk or break-bulk form to southern New Jersey ports and terminals are necessities, such as food (particularly fresh produce) or agricultural items. By contrast, consumer-oriented markets involving commodities such as televisions and clothing, which are typically transported by container rather than bulk/break-bulk shippers, have experienced a considerably sharper decrease due to the current economic downswing.

[7] Journal of Commerce E-Newsletter, Winter 2008.

The current economic condition is temporary and is viewed by the SJPC and other port and terminal operators as an opportunity both for operators and for investors. Commitments to and investments in port and terminal operations are always made with a long-term view because of the time it takes to construct a facility and begin operations. Many ports around the world are actively preparing for the recovery of world trade that will follow the current downturn.[8] For example, United States port authorities on the east and Gulf coasts are gearing up to be competitive when the widened Panama Canal opens in 2014. Over the long-term, operators understand the keen competition in the industry for market share and are implementing plans now in order to be in the best position possible when the economy recovers.[9]

Looking ahead, the effect of the United States economy on the local bulk/break-bulk market is anticipated to result in the Low to Moderate commodity volume growth scenario in the near term for southern New Jersey. As shown in Figure 2.1, the Low growth scenario forecasts a 1.8 percent increase in bulk and break-bulk cargo volume and a Moderate 2.8 percent increase for southern New Jersey.

Over the long-term, economic recovery is anticipated to follow the Moderate 2.8 percent to High 4.2 percent growth scenarios as the demand for building materials and other commodities increases once again. Considering the recent condition of southern New Jersey ports and terminals, the lack of excess capacity experienced at the existing ports and terminals, and the fact that the facilities could not accommodate market demand, indicates a lack of readiness to handle the forecasted growth in commodity demand in the foreseeable future.

2.2.2 Respond to Unmet Existing and Foreseeable Needs for Deep-Water Marine Terminal Berthing Space in Southern New Jersey

Terminal capacity can be measured in part by the available berthing space, the size of the ships that can be accommodated in a berth, the capacity of the ships that call on the terminal or port, the amount of cargo handled per vessel call, berth occupancy, vessel call patterns, and the available land area adjacent to the berth location. A balanced terminal operation takes the berth and landside operations into account to avoid overall terminal capacity limitations.

Foreseeable Berth Needs

Forecast future growth in cargo demand, as described in Section 2.2.1, was translated into berth requirements to determine the need for additional berthing space at southern New Jersey terminals and ports. In order to handle forecast bulk and break-bulk cargoes, analyses in the DRPA's *Southern New Jersey Waterfront Master Plan* indicate that by 2024 there is likely to be a need for 19 additional berths at facilities located along the Delaware River, including facilities in southern New Jersey, the Commonwealth of Pennsylvania, and the State of Delaware (Table 2.1).

[8] Dr. Satoshi Inoue, Secretary General, The International Association of Ports and Harbors. In Ports & Harbors, January 2009, p. 3.

[9] David Sanborn, Senior Vice President and Managing Director of the Americas Region of Marine Terminals, DP World. In Ports & Harbors, January 2009, p. 5.

TABLE 2.1 DELAWARE RIVER DEEP-WATER BERTH REQUIREMENTS TO ACCOMMODATE GROWTH FORECAST (2003)

Location	Existing Berths	Projected Berth Requirements			
		2009	2014	2019	2024
Camden / Gloucester Counties, NJ	13	15 (+2)	18 (+3)	21 (+3)	22 (+1)
Other Delaware River Ports, NJ, PA and DE	35	37 (+2)	39 (+2)	41 (+2)	45 (+4)
BERTH TOTALS	**48**	**52 (+4)**	**57 (+5)**	**62 (+5)**	**67 (+5)**

Source: Delaware River Port Authority, 2006. *Southern New Jersey Waterfront Master Plan*, November 9, 2006 Public Outreach Slideshow.

Additional Berth Space

On the basis of the DRPA's forecast, which is adjusted by a review of SJPC cargo handling volume trends through calendar year 2008, a new terminal with multiple berths would address a portion of the need for additional berths in southern New Jersey.

The actual number of berths that can potentially be provided at a site depends on the length of the available waterfront, the size of the ships that handle the target cargo, the size of the adjacent available land area, and the types of operations desired. Existing and foreseeable bulk shipper operations in the Delaware River and North Atlantic use primarily Handymax[10] class vessels. The length of berth required for a Handymax vessel is determined by adding the overall length of the vessel to the required mooring space, which is equal to the vessel width. Thus, the typical berth length for a Handymax vessel is approximately 750 feet.

Ideally berth operations should be paired to provide maximum flexibility. A new marine terminal operation should focus on one or both of the following two activities: 1) general bulk and break-bulk movements[11] and 2) specialized recycled metal/bulk and heavy lift cargo movements. The length of available waterfront will largely dictate whether one or both types of operations can be accommodated. The minimum operating configuration for a general bulk and break-bulk operation is two ship berths. Two berths allow for continuous terminal operations. In the event that one berth is occupied or shut down for repairs, ships could still call at the terminal.

Specialized recycled metal and heavy lift cargo movements are typically served by one ship berth and one barge berth. The barge berth handles incoming heavy lift or oversized cargo, such as recycled metal, construction equipment, storage tanks, generators, silos, compressors and machine equipment. The ship berth handles outgoing recycled metal. This operation is

[10] Handymax is a commonly occurring, general purpose bulk, ocean-going cargo ship at southern New Jersey ports. Typical Handymax ships are 650 feet long and 95 feet wide.

[11] In general operations, a bulk/break-bulk terminal should have the capability to service roll-on roll-off vessels (RO-RO), reefers (refrigerated), and general cargo ships.

dedicated to providing service only for recycled metal, heavy lift and oversized cargo. The separation of general bulk and break-bulk operations from scrap and heavy lift operations is required because the nature of the latter activity involves the use of specialized, heavy weight handling equipment including cranes and trucks as well as reinforced weight-bearing structural components in the wharf and backlands design. The specialized equipment can only be used in areas that have been appropriately designed to accommodate it. Likewise, the heavy lift areas are not equipped with general cargo handling equipment.

Multiple berths and commodity types increase the total throughput and potential diversity of cargo at the facility which, in turn, requires a greater number of employees and generates higher business revenue. Based on current and foreseeable bulk shipper operations in the Delaware River and North Atlantic, the barge berth should be approximately 500 feet long to accommodate a 400-foot long by 100-foot wide barge plus 100 feet of mooring area.

Using these dimensions, a suitable site for a new marine terminal handling both general and specialized heavy cargo should have sufficient frontage on the Delaware River to accommodate, at minimum, 2,750 feet of berthing area to simultaneously service three Handymax ships and one barge.

Landside activities (i.e., handling, storage, processing and distribution) complement wharfside activities (i.e., loading and unloading of cargo from ships) in a marine terminal operation. In other words, adequate landside or backlands[12] area is required to accommodate the expected cargo generated at the wharf. This so-called matching of berth to backlands capacity determines minimum required parcel size and the number of berths.

Each Handymax berth requires approximately 40 to 50 acres of backlands to safely handle cargo and maneuver cargo-handling equipment. In addition to backlands acreage, approximately 20 to 40 acres is required per berth for processing and distribution facilities. Therefore, the total acreage per berth needed at a site is between 60 and 90 acres. Thus, in searching for a suitable new terminal site, the number of potential berths (based on available waterfront space) has to be matched with potential backlands capacity and processing/distribution requirements (based on the available land acreage).

2.2.3 Enable Southern New Jersey to Capture a Greater Market Share of Local and Regional Discretionary Bulk /Break-Bulk Commodity Movements

Market Share

Recent marine terminal capacity constraints have limited the ability of southern New Jersey to grow its market share of bulk and break-bulk movements. The market share of every marine terminal fluctuates over time based on many factors, such as changes in the capacity for throughput at each terminal, terminal competition for shipping line contracts, shipper costs, investment in terminal facility upgrades, and North Atlantic trade variations. Due to near-capacity conditions in the southern New Jersey, port business is being lost that cannot be recaptured in the region. The documented inability of the southern New Jersey terminals to accept cargo in recent years because of capacity constraints (Section 2.2.1), and the inability to accommodate future growth represents a competitive and economic loss for southern New Jersey. Cargo that cannot use ports in southern New Jersey will travel to other facilities in the North Atlantic. Thus, there is a compelling need to protect and grow port facilities in order to

[12] A backlands is a landside support area providing storage, processing and/or distribution facilities for cargo.

keep pace with current and future demand and to increase southern New Jersey's market share.

In addition to accessibility and cost-efficiency, which are discussed in Sections 2.2.5, 2.2.6 and 2.2.8, a key characteristic needed for a terminal to successfully compete for a greater market share is flexibility in the types of cargo it can potentially handle. Opportunities have been identified in local regional consumption, and in commodity volume and diversification.

Local and Regional Consumption

Incoming commodities to southern New Jersey ports and terminals are destined primarily for either the local market (i.e., consumption in southern New Jersey counties) or the regional market which comprises the Delaware Valley area. Today, only a small portion of local and regional commodities comes in through southern New Jersey's ports and terminals. The vast majority of commodities arrive by truck and railroad from major ports outside the region such as the Port of New York and New Jersey and the Port of Baltimore.

The USDOT Maritime Administration (MARAD) recognizes the need for and benefits of increasing the volume of local and regional discretionary commodity movements through the southern New Jersey ports and terminals: less cost, fewer truck movements between the region and major ports, fewer truck emissions, reduced fuel use, job opportunities, and business revenue for local handling, processing and distribution of goods.

Commodities

In the last ten years, the principal commodities handled through SJPC facilities were:

- Fruit, cement and cocoa – via dedicated on-port facilities; and
- Wood, steel and recycled metal – via general cargo on-port facilities

Terminals that handle fruit, cement and cocoa have dedicated on-port facilities to store, process and distribute the cargo, such as refrigeration and break-bulk processing. General cargo facilities require less investment and have more flexibility as to the type of cargo handled. Because these commodities are already captured by SJPC facilities, expanding market share by handling a greater volume of these commodities is the primary opportunity.

However, to allow for the greatest degree of flexibility, pursuit of greater market share should not be limited to the existing principal commodities. Terminal site selection and design should consider and allow for the potential to capture other growing bulk commodities markets, such as grains or components of products that can be assembled at New Jersey processing facilities. As described in Sections 2.2.7 and 2.2.8, there is a recognized, growing opportunity in New Jersey for value-added activities including final assembly, product customization, and product preparation for the sales floor or production lines. All of these activities are employment and business revenue generators.

Unless a marine terminal site is very small and limited to handling only one commodity, multiple types of cargo should be targeted to maximize flexibility and revenue generation. Logistically, it makes sense where multiple cargoes are concerned to provide separate berths for cargo requiring different off-loading and handling equipment and landside processes. For example, separate berths for vessels transporting grain, lumber, and finished steel products (such as coiled wire) are preferred as their handling methods and equipment typically differ. Thus, as

described in Section 2.2.2, care needs to be taken in site selection to match the number of desired berths to potential backlands capacity based on the available waterfront and land acreage.

Co-located general and dedicated facilities, plus value-added processing and distribution facilities, would be a highly economical use of available land area. Moreover, a multi-user facility handling multiple types of cargo would provide the benefits of diversity and stability during inevitable commodity market fluctuations.

2.2.4 Complement Existing Marine Terminal Operations in Southern New Jersey

The southern New Jersey and Delaware River region is a well known and long-standing commodities bulk and break-bulk marine terminal and port operations. To date, the southern New Jersey portion of the market has been relatively small; however, as previously described, the market has steadily grown over the years and is forecast to continue growing. In the marketplace, the quantity of commodities such as fruit, wood, cement and cocoa, which are already handled at southern New Jersey ports and terminals, is expected to increase.

In addition, commodities not currently handled or handled minimally at southern New Jersey ports and terminals are also available. Under-used resources include the region's agricultural, food production, seafood, as well as sand and silica mining industries. The NJDOT's *Southern New Jersey Freight and Logistics Industry Context and Economic Growth Visioning Plan*[13] (Visioning Plan) identifies enhancing these export opportunities as a unique regional strength. An importing opportunity that could also be pursued by southern New Jersey ports is components and assembling/distributing the finished or near-finished products. As described in Section 2.2.8 below, the cargo market trend is increasingly toward the integration of freight movement and goods production.

Thus, in general, there is a high potential to complement rather than cause unacceptable competition among existing marine terminal operations in southern New Jersey. Nevertheless, bulk and break-bulk operations require highly specialized, dedicated equipment and facilities. For example, paper and wood must be stored under cover, fresh fruits require refrigeration, and metals may require specially designed cranes. For this reason and because of contracts with shippers, a new terminal should be planned with the flexibility to handle commodities in a manner that complements the operations of the existing terminals in the region.

2.2.5 Accommodate On-Site, Associated Processing and Distribution Facilities

Processing and distribution facilities are key components of freight movement as they provide one or more of the following operations between the place of goods origin and the final destination: goods receipt, temporary storage, possible modification or customization, and distribution. An important concept is the value-added activity that occurs at processing and distribution facilities. Examples of value-added activities include final assembly, product customization, and preparation for the sales floor (i.e., packaging and tagging). Value-added

[13] New Jersey Department of Transportation, September 2008. Southern New Jersey Freight and Logistics Industry Context and Economic Growth Visioning Plan.

activity has taken on significance in the goods movement industry, and is a growing source of economic benefit in terms of local employment and tax revenue.

Today, southern New Jersey's share of processing and distribution facilities is small relative to other areas of the State, such as Middlesex County in central New Jersey. However, given growth projections for the freight movement industry, the proximity of major limited access highways, the Delaware River, and a strong industrial and manufacturing history in the region, southern New Jersey is ripe for increasing its share of processing and distribution facilities. Moreover, as described in Section 2.2.4, the integration of freight movements with goods production is an element of NJDOT's Visioning Plan.

As discussed in Section 2.2.8 below, the most efficient scenario for freight movement is integrating processing and distribution facilities into a terminal development plan. The ability for a terminal to have the available land area to accommodate processing and distribution facilities associated with the cargo it handles at the wharf is ideal because co-location eliminates the need to transport cargo to another location for that purpose. Reducing or eliminating the need for cargo transport saves transport costs, time and fuel emissions. Providing on-site processing and distribution facilities to a terminal site adds a ratable locally and creates a higher concentration of jobs than a terminal site without such facilities.

2.2.6 Respond to the State of New Jersey's Freight Plan, and Freight and Logistics Development Strategy

NJDOT's 2007 *Comprehensive Statewide Freight Plan* (Freight Plan) states plainly, "Freight means goods in motion, and, more fundamentally, the economy (of New Jersey) in motion....Goods moving into, out of and across New Jersey are valued at more than $850 billion annually. New Jersey's freight system is a key generator of jobs within the State, with some 500,000 people working to move goods to local, regional, national, and international destinations. In many respects, the jobs generated by New Jersey's warehouses and distribution centers represent the "new manufacturing" workers in the State – workers who are undertaking the final stages of the production process to ensure goods are ready for consumption by the end users."

The Freight Plan defines ports, marine terminals and processing/distribution facilities as nodes or focal points (freight generators) in the freight supply chain. The corridors connecting these nodes are the transportation links: highways, roadways, rail routes, and major waterway channels. The Freight Plan identifies the following trends and needs for integrating supply chain corridors to enhance freight movement in New Jersey:

- Freight traffic is growing locally, nationally and internationally, resulting in an increasing need for greater efficiencies and/or capacities of the nodes: ports, terminals and intermodal facilities;
- Tighter supply chains are focusing on "just-in-time" deliveries, which increase stress on transportation and warehouse distribution systems;
- A growing reliance on multimodal cargo movements (especially integrated alliances such as FedEx and UPS, and railroad/trucking firm partnerships) means being competitive in the freight market will increasingly depend on efficient intermodal connectivity; and,

- Today, freight movement is more integrated in the production and retail sales processes (via technology's role in goods tracking and timed deliveries, for example). This trend signals growth opportunities in warehousing, processing, and distribution employment. There is a competitive advantage to adding processing/distribution to a port operation. The challenge is to find sufficient land proximate to ports and terminals.

Put simply, a return on an investment is the amount of money earned from an investment compared to the amount of money invested. The recommendations in NJDOT's Freight Plan for enhancing goods movement in New Jersey were selected, in part, for their ability to support economic development and provide a lasting return on public investment. A high level of project responsiveness to the NJDOT's Freight Plan will demonstrate a commitment to maximizing return on the investment of public funds.

The NJDOT's Visioning Plan takes the elements of the Freight Plan and sets out a vision for advancing cargo movements and goods production in southern New Jersey. It identifies the unique strengths of the region and its growing function as a supply chain corridor with available land and labor, unique industries that lend themselves to commodity export, and maritime facility assets. The proposed Paulsboro Marine Terminal and its connecting roadway are cited as strategic components of the Visioning Plan. As such, the principles that guided the development of the Visioning Plan should also be among the guiding principles of the proposed project:

- Build on the strengths of the southern New Jersey region: the unique commodities, the availability of land and labor, and the connections to freight transportation facilities;
- Create economic growth as well as economic value and quality of life;
- Invest prudently to maximize return on public investment; and
- Build sustainably and with consideration of community goals and concerns.

2.2.7 Respond to the Federally Recognized Need to Enhance the Intermodal Transportation Infrastructure

America's "intermodal transportation system" combines numerous public and private transportation elements, all of which are essential to the nation's economy and defense. The principal components of our intermodal freight transportation infrastructure are:

- The Marine Transportation System (MTS), consisting of the inter-related components of the national transportation system, such as shipping, ports, inland waterways, and their connection to rail and highway transportation modes, and system users;
- Roads/Highways;
- Railroads, in the North Atlantic region, on-dock rail handling facilities were cited as a particular need; and
- Pipelines.

In its 2005 *Report to Congress on the Performance of Ports and the Intermodal System*, the MARAD concluded:

> "The...greatest challenge to our intermodal transportation system is the projected growth in our international trade, and the ability of the marine, highway and rail systems to accommodate the increased volumes of freight shipments so vital to our nation's

> continued economic growth...(In 2005,) DOT project(ed) that total freight volumes will increase by more than 50 percent in...20 years. Nowhere will this pressure be felt more than at U.S. ports. As trade volumes increase, the capacity of America's total intermodal transportation system must increase in order to maintain and expand the nation's economy."[14]

As the Government Accountability Office, formerly the General Accounting Office recognized: "Because more than 95 percent of our nation's overseas trade tonnage moves by water,...(ports) are key gateways for our nation's imports and exports and, therefore, play a particularly critical role in moving goods into and across the country." [15]

In 2004, MARAD specifically named rail and road access to ports, on-dock railroad access, increased terminal capacity, and increased water depth at major ports as 5 of the nation's 10 most pressing national MTS priorities.[16]

2.2.8 Be Consistent With Local and Regional Plans

Planning at the municipal level guides the types and locations of land use. The intent of local planning is to assure the suitability of activities for a particular location and the compatibility of those activities with adjacent land uses. Regional planning examines the relationship of land uses and transportation activities over a geographic area encompassing multiple towns and/or counties. There is a need for the proposed marine terminal to be located in a place where the industrial and transportation activities associated with its operation are consistent with local and regional land use planning.

2.2.9 Develop Deep-Water Marine Terminal Berths Proximate to the Existing Shipping Channel

Among the key factors in selecting a suitable location for a terminal facility is proximity to a deep-water shipping channel. When possible, berths should be located close to the shipping channel to optimize ship access. The less distance a ship has to travel and maneuver to access a terminal berth, the greater the time and fuel savings. In addition, less dredging is required, thereby limiting environmental impacts to the sediments and open water. Placing new berths in a previously dredged area would also limit new dredging and environmental impacts.

2.2.10 Develop an Intermodal Marine Terminal with Landside Access to Existing Road and Rail Systems

Cargo throughout New Jersey is transported on land via trucks on roadways and freight railroads. A suitable marine terminal site should have access to at least one mode on land. Ideally, a roadway connection between a terminal facility and major, limited access highways should be as short and direct as possible to maximize efficient cargo transport time. In addition,

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[14] USDOT Maritime Administration (MARAD), 2005. *Report to Congress on the Performance of Ports and the Intermodal System.*

[15] Government Accountability Office, formerly the General Accounting Office (GAO), *Freight Transportation: Strategies Needed to Address Planning and Financing Limitations*, GAO-04-165 (Washington, DC, December 2003), p. 1.

[16] MARAD, 2004. *Marine Transportation System National Infrastructure Needs Assessment: Vol. I – Final Report.*

the roadway system should be located in an area of compatible land use such as adjacent to industrial or commercially zoned land so as to avoid or minimize potential problems such as truck traffic noise, conflicting traffic, and safety issues. An active freight rail connection is also ideal as cargo can be off-loaded directly to rail cars and moved cost-effectively along an existing, dedicated corridor. A terminal site that provides access to both roadway and freight rail systems provides the highest degree of flexibility and capacity in landside transport choice.

2.2.11 Provide for Safe and Secure Operations

A focal point in marine terminal design is to promote safe and secure operations. Safety relates primarily to traffic maneuvering, traffic control issues, and emergency access. A terminal is a busy place with mobile cranes and other equipment, trucks moving to and from the wharf and backlands, and train movements. The safest and most efficient terminal designs provide dedicated, separate travel corridors for each mode with ample turning radii and no intersections with other modes. The safest designs have taken into consideration train dwell times and routine maintenance activities which cause equipment to be parked at one location for an extended period of time. Safe designs accommodate traffic movements during these events in a manner that also maintains operational efficiency. To provide a competitive facility and a high return on public investment, there is a need to develop a terminal that has a high level of safety built into its design.

Terminal security is also a high priority. Security means protection of the facility from unauthorized access or deliberate attack. Security depends on two factors. One is the design elements such as fences, fendering, lighting, monitoring devices and procedures. These mechanical systems provide a first line of facility security. The second line is worker vigilance. Employee presence on the wharf and in the backlands areas provides vital and continuous human monitoring. A person regularly on the job is highly likely to recognize something that is out of the ordinary and call attention to it. For this reason, there is a need in terminal design to incorporate mechanical security as well as provide continuity between human activity areas to achieve the highest level of vigilance.

2.2.12 Avoid Interfering with Navigation and Docking at Existing Terminals

Selecting a location and design for a marine terminal requires consideration of existing ship and barge travel patterns between the shipping channel and existing terminals. Ship and barge maneuvering and docking and undocking activities are affected by winds, tides and currents in the river and tributary waterways. Sufficient distance between new operations and existing operations is required to avoid interfering with navigation and potentially causing a safety hazard. It is also vital that new structures do not obstruct views of existing navigation lights and signage.

2.2.13 Achieve Minimum Operating Efficiency Thresholds

Operating efficiency is the measure of how well a terminal facility can load or offload cargo per ship call. The most efficient terminals exhibit a combination of factors that speed operations, including an absence of traffic and equipment circulation conflicts (Section 2.2.11 above) and short cargo-handling travel distance between the wharf and the backlands. The SJPC has established benchmark travel distance and travel time thresholds based on operations at its existing facilities. These "industry" thresholds represent "minimum operating efficiency" targets

by which cost efficiency, return on public investment and terminal competitiveness can be measured. Prospective shippers or users of the port will look for terminals that have higher minimum operating efficiencies. Thus, there is a need to strive for as good as or better than minimum operating efficiency thresholds in the design of the proposed terminal.

2.2.14 Achieve Minimum Operating Cost Efficiency Thresholds

Operating cost efficiency is the measure of terminal operating cost in proportion to terminal operating efficiency. As stated in Section 2.2.13 above, cost efficiency is determined by the extent to which terminal operations meet SJPC-established benchmarks for minimum operating efficiency. The higher the operating cost efficiency, the higher the return on public investment and overall terminal competitiveness. Thus, there is a need to strive for as good as or better than minimum operating cost efficiency thresholds in the design of the proposed terminal.

2.2.15 Return on Public Investment – Achieve a Competitive Terminal Compared to Industry Thresholds

Return on public investment is measured as the sum of a design's responsiveness to the project needs. How well a design performs in each area of the project need will factor into how well a design can be expected to achieve a competitive terminal. As described in Sections 2.2.13 and 2.2.14, the SJPC has established benchmarks based on operations at its existing facilities. These "industry" thresholds represent "minimum operating efficiency" targets by which return on public investment and terminal competitiveness can be measured. Thus, there is a need to strive for as good as or better than minimum operating and cost efficiencies in the design of the proposed terminal to achieve a high return on public investment.

2.3 Goals and Objectives

Goals and objectives have been developed to guide the development of the proposed Paulsboro Marine Terminal project so as to carefully balance transportation needs with desired outcomes regarding environmental and community resources protection. Project goals and objectives include:

- Contribute to local and regional economic development through the provision of transportation and value-added services;
- Create new local employment opportunities;
- Re-use former industrial site(s) and/or a property designated as in need of redevelopment;
- Avoid or minimize new impacts on the natural and human environments; and,
- Respond to the DRPA's Green Ports Initiative.[17]

[17] In 2008, the Delaware River Port Authority, the SJPC, and the Philadelphia Regional Port Authority signed a Memorandum of Understanding to launch a Green Ports Initiative by which they would cooperatively develop environmental programs and projects aimed at reducing or neutralizing the impact of port operations on the environment and the community.

3.0 ALTERNATIVES AND DETAILED PROJECT DESCRIPTION

In response to the project Purpose and Need, a "No Action" alternative, the project location, and the design alternatives for a marine terminal and distribution center were evaluated. This chapter details the alternatives considered, assesses the performance of each in addressing the project purpose and need as well as project goals and objectives, and presents the benefits and drawbacks of each. The Preferred Alternative is identified and the rationale for its selection is provided. The last section in this chapter provides a description of the conceptual layout of the landside elements of the Preferred Alternative.

3.1 No Action Alternative

The No Action alternative is a "do nothing" alternative in which the SJPC would take no action to develop a new marine terminal. A No Action alternative is required in an EIS and is used as a benchmark alternative against which the action alternatives may be compared. The No Action alternative would not address any element of the project Purpose and Need. In particular, the No Action alternative would not expand terminal capacity in southern New Jersey; would not respond to unmet existing and foreseeable needs for deep water marine terminal space in southern New Jersey; would not complement existing terminal operations; would not develop deep-water berths near the shipping channel or on-site processing and distribution facilities; would not respond to New Jersey's freight strategy; would not respond to the federally recognized need to enhance the intermodal transportation infrastructure; would not respond to regional or local plans; and would not take advantage of existing road and rail systems.

The No Action alternative would continue to have commodities brought into the region by truck or train from outside the market area, resulting in further burden to the local infrastructure and increasing demand on the local roadways and air quality emissions.

The No Action alternative would not capture commodities along the Delaware River and the East Coast and would not enable southern New Jersey to increase its volume of import or export goods to and from the local area and the region. In the foreseeable future, marine terminal capacity constraints in southern New Jersey will result in turning away an increasing volume of shipping traffic to other ports along the Delaware River (i.e., Pennsylvania or Delaware) or to other ports along the East Coast. The corresponding loss of economic benefit to southern New Jersey in terms of potential revenue, tax benefits, and employment opportunities, would increase over time. Thus, the No Action alternative would not respond favorably to project goals and objectives concerning local economic development or new local employment opportunities. The No Action alternative would meet the goal of having no new impacts on the natural and human environments.

3.2 Local Location Alternatives

Alternative locations for the proposed marine terminal were identified along the New Jersey portion of the Delaware River and assessed as part of the alternatives analysis. The geographic range of location alternatives analysis coincided with the extent of the existing 40-foot authorized shipping channel between the open ocean at Cape May and SJPC's existing facilities in Camden. The purpose of examining alternative locations was to determine the most suitable location in regard to meeting the project Purpose and Need (overall needs and location

needs), as well as the project goals and objectives. Local location alternatives were evaluated from sites detailed in the DRPA's *Southern New Jersey Waterfront Master Plan*[18] (SNJWMP) and as detailed in the NJDOT's Freight Plan. Additional location alternatives were examined based upon potential access to local roadways and the proximity to the main channel of the Delaware River. The location alternatives evaluated included the DuPont property in Carney's Point, Salem County, the Ferro industrial site in Logan Township, Gloucester County, the Repauno industrial site in Greenwich Township, Gloucester County, the Former BP Oil Terminal/Former Essex site in Paulsboro, Gloucester County and the existing SJPC facilities in Camden, New Jersey. Figure 3.1 shows the locations of the sites.

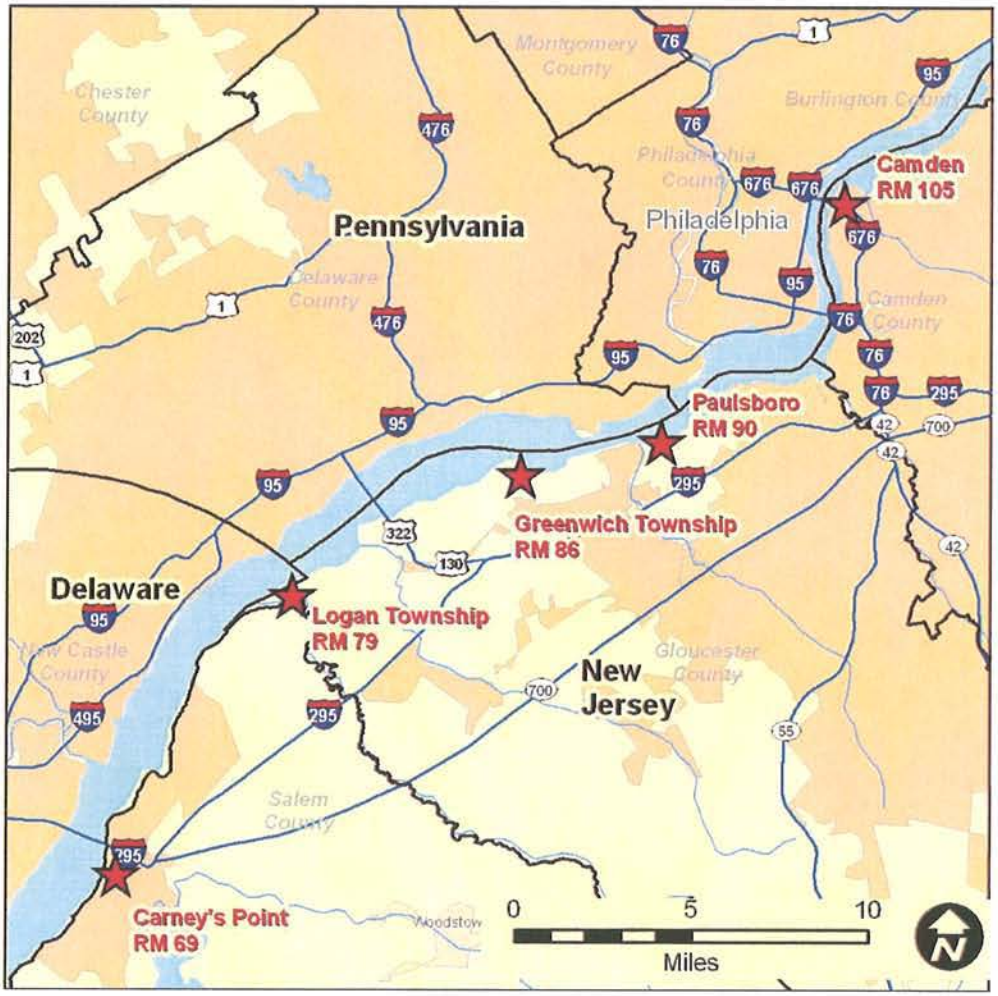


Figure 3.1 Site Selection Locations with River Mile (RM)
Source: DVRPC 2009.

The capabilities and constraints of each location alternative are described in the following five subsections, focusing on issues relevant to the project need, goals and objectives. Subsection 3.2.6 provides a comparative discussion of the performance of the location alternatives in regard to the project Purpose and Need, as well as project goals and objectives. Subsection 3.2.7 identifies the preferred location and the selection rationale.

[18] Delaware River Port Authority, 2006. Southern New Jersey Waterfront Master Plan.

3.2.1 Carney's Point, Salem County, NJ

The E.I. DuPont's Chambers Works Industrial Facility is located in Carney's Point, Salem County, New Jersey just north of the base of the Delaware Memorial Bridge at Interchange 1 of the New Jersey Turnpike.

The Chamber's Works Industrial Facility has an existing timber pier structure that was used previously to load and unload product and materials destined to and from the facility. The pier structure is no longer used due to changes at the facility as well as the pier's deteriorated condition. The waterfront structures within this portion of the river are within the State of Delaware's Coastal Zone Management jurisdiction.

The Borough of Carney's Point created a redevelopment plan that designates industrial reuse for various parcels on the site including the potential for the development of a commercial port facility. The redevelopment plan identified three redevelopment zones: Sub-Area 1, Sub-Area 2, and Sub-Area 3. Sub-Area 1 is located closest to the Delaware River whereas Sub-Area 3 is the farthest away but is situated between Interstate 295 (I-295) and the New Jersey Turnpike.

Sub-Area 1 is part of DuPont's Chambers Works Industrial Facility that was decommissioned in the late 1970s. Sub-Area 1 was previously used as a weapons factory. Due to possible relict ordnance remaining at the site, this area is not identified for residential or mixed use development. Alternatively, reuse options such as a marine terminal, industrial park, or warehouse / distribution facility could be viable considerations. Sub-Area 2 and Sub-Area 3 are identified in the redevelopment plan as available for other mixed use alternatives such as residential, light industrial, warehousing, etc.

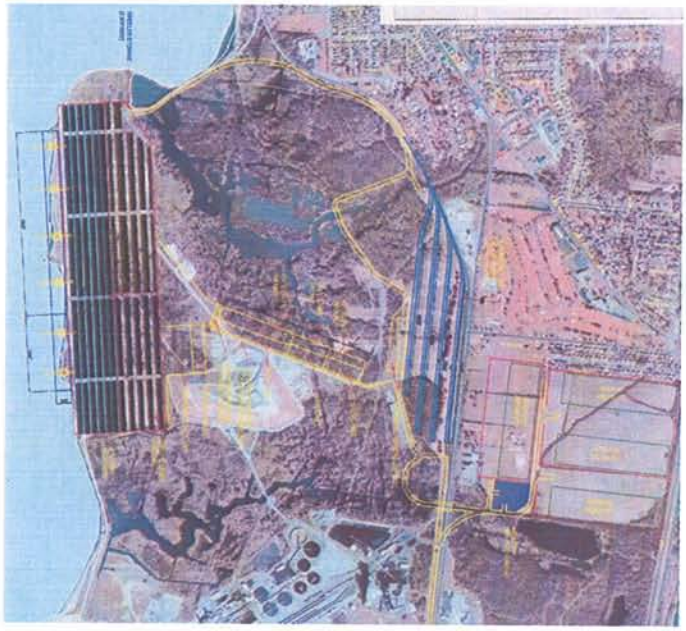


Figure 3.2 Potential Marine Terminal Layout: DuPont Chambers Works Industrial Facility, Carney's Point
Source: DRPA's SNJWMP. 2006.

A marine terminal in Carney's Point could be configured to accommodate bulk, break-bulk, automobile, and/or containerized cargoes (Figure 3.2). The marine terminal use would be consistent with the previous industrial use of the site and the Borough's redevelopment plan. As the site is located directly across the Delaware River from the Port of Wilmington (Delaware), it would have the strategic benefits of a southern waterfront location, immediate access to interstate highways and adjacent acreage for value-added warehouse, distribution and/or processing facilities.

In concept, the Carney's Point site would address most elements of the project need. In particular, the Carney's Point site would enable expansion of terminal capacity in southern New Jersey; would respond to unmet existing and foreseeable needs for deep water marine terminal

space in southern New Jersey; would complement existing terminal operations; would take advantage of multimodal landside access; would have adequate land area to develop processing and distribution facilities; would respond to New Jersey's freight strategy; and would respond to the federally recognized need to enhance the intermodal transportation infrastructure.

However, a number of redevelopment obstacles at the Carney's Point site ultimately make the site undesirable for this project. The former munitions factory in Sub-Area 1, and the approximately 4.5 acres of wetlands present at Sub-Areas 1, 2, and 3 pose regulatory and development challenges as described below. Compared to other local location alternatives with less potential wetlands impact area and no potential ordnance issues, the Carney's Point site is a weak performer in response to the project goal to avoid or minimize environmental impacts.

As with the Logan Township site, the development at Carney's Point would be subject to the State of Delaware Coastal Zone Management's jurisdiction which could restrict marine facility development in such close proximity to the Port of Wilmington. The additional regulations and multi-state jurisdictions required to develop a marine terminal at this location substantially restrict the Carney's Point site from further consideration as a local location alternative.

Also, similar to the Logan Township site (see Section 3.2.2), the shipping channel of the Delaware River is located approximately 4,000 feet from the proposed site. Dredging to accommodate the berths and access to the shipping channel would require 3,000,000 CY of sediment to be removed. Compared to other local location alternatives, the Carney's Point site is a weak performer in response to the project need to develop deep-water berths near the shipping channel.

In light of the large area of potential wetlands impacts on the site, the long distance to the shipping channel and related extensive dredging required needed to construct viable ship berths, and the availability of other alternative locations under consideration without the encumbrances of the State of Delaware, the Carney's Point site is rejected from further consideration as a practicable site for this project..

3.2.2 Logan Township, Gloucester County, NJ

The Logan Township site would occupy approximately 80 acres of the mostly undeveloped Ferro industrial property (Figure 3.3). The site is located along the Delaware River between Oldmans Creek and the Logan Generating Station. Although partly zoned for industrial use, the site is predominantly agricultural land and includes approximately 1 acre of wetland. U.S. Route 130 borders the southern boundary of the site and provides access to the site via the existing road to the Logan Generating Station. This roadway passes through the local community before intersecting with I-295. An existing rail spur extends onto the site.

This location was previously evaluated for BP's Crown Landing Liquefied Natural Gas (LNG) Project. The Delaware Valley Regional Planning Commission's (DVRPC) in cooperation with the Open Space Committee of Logan Township completed the August 2004 *Logan Township Open Space and Recreation Plan*. Their plan assesses the southern area of the potential site as farmlands and includes Oldmans Creek, its associated wetlands and the areas immediately surrounding the creek to be used as a greenway. The plan further defines the southern portion of the site as being environmentally sensitive, encompassing all of the existing farmlands.

Figure 3.3 Logan Township, Gloucester County, NJ Potential Site Location
Source: NJDEP i-MapNJ, 2009.

The Ferro facility currently contains a single berth measuring 700 feet in length. This pier is situated offshore to be near the shipping channel and to facilitate the loading and offloading of butane, jet fuel, and gasoline. This configuration, although appropriate for petroleum or other liquid bulk products, would not meet the requirements of a dry bulk and break-bulk cargo facility where the pier and wharf system is better suited to be near shore and/or attached to the landside activities. To accommodate a bulk/break-bulk facility, approximately 2,000,000 CY of material would have to be dredged to create the required near shore berths as well as approximately 4,200 feet of access to the shipping channel of the Delaware River. Compared to other local location alternatives, the Logan Township site is a weak performer in response to the project need to develop deep-water berths adjacent to an industrial site near the shipping channel.

The most significant constraint involving the Logan Township site, however, is the proximity of the State of Delaware open water in the Delaware River (Figure 3.3). As with BP's previously proposed Crown Landing LNG Project, much of the operations of a proposed marine terminal at the Logan Township location would require development within the jurisdiction of the State of Delaware Coastal Zone Management. The additional regulations and multi-state jurisdictions required to develop a marine terminal at this location substantially restrict the Logan Township site from further consideration as a local location alternative. Since there are other alternative locations under consideration that are not encumbered by the State of Delaware, and that have fewer potential environmental impacts, the Logan Township site is rejected from further consideration.

3.2.3 Greenwich Township, Gloucester County, NJ

Greenwich Township is centrally located in Gloucester County along the eastern shore of the Delaware River, north of the Commodore Barry Bridge. The subject site contains a former E.I. DuPont industrial facility on nearly 1,700 acres of which roughly 300 acres were used by the Repauno Company for industrial purposes throughout much of the 20th Century.

DuPont and the Repauno Company's operations no longer exist at the site. The manufacturing businesses have been sold and contaminated soil and groundwater remediation activities are currently ongoing. According to the SNJWMP, two tenants utilize select portions of the site. One tenant, US Salt, has a 99-year lease for approximately 35 acres to produce sodium nitrate. A second tenant, Cardox, uses roughly 5 acres and produces dry ice.

Waterfront infrastructure currently exists at the site but is unused (e.g., breasting dolphins, trestles, an access pier, and bulkheads). The previous berth length at the facility is recorded as 540 feet with a draft (or depth) of 35 feet.

Greenwich Township created a redevelopment plan that calls for: remediating the existing industrial site, redeveloping designated portions of the site, facilitating public waterfront access that does not conflict with industrial reuse, and preserving environmentally sensitive areas. The redevelopment area is designated for marine terminal use, a waterfront park promenade, and a recreation facility.

The marine terminal component could be situated and configured to correspond with the footprint of the previous industrial complex. A marine terminal use would be compatible with the previous industrial use of the site and Greenwich Township planning for the site as described below. Based on a potential concept design, a three-ship deep water berth could be provided with sufficient backlands area as well as land for processing and distribution facilities. Dedicated rail and roadway access could be developed and connected to nearby existing infrastructure.

Although the site is closer to the shipping channel than the Carney's Point or Logan Township sites, the distance to the shipping channel at Greenwich Township is 1,500 feet which would require 2,000,000 CY of dredging to develop access to the berths. Compared to other local location alternatives, the Carney's Point site is a somewhat weak performer in response to the project need to develop deep-water berths near the shipping channel.

The frontage of the site on the river would provide adequate space for a 3-berth wharf. The master plan layout of the site scatters industrial operations around a centrally located wetlands/open space area as shown in Figure 3.4. From an operations standpoint, avoiding the most sensitive wetlands by creating a centrally located open space inhibits the effectiveness and productivity of a marine terminal. The warehousing operation would be remote and not contiguous to the main terminal operations, necessitating additional handling and movement of cargo that would not be required if the two activities were adjacent. Additional handling and movement of cargo adds to overall costs, and requires more time and fuel usage. The narrow linear bent design of the terminal also poses challenges for providing safe internal circulation patterns. Whereas this site may perform better for another terminal use, the Greenwich site is not ideal at this time for bulk and break-bulk operations.

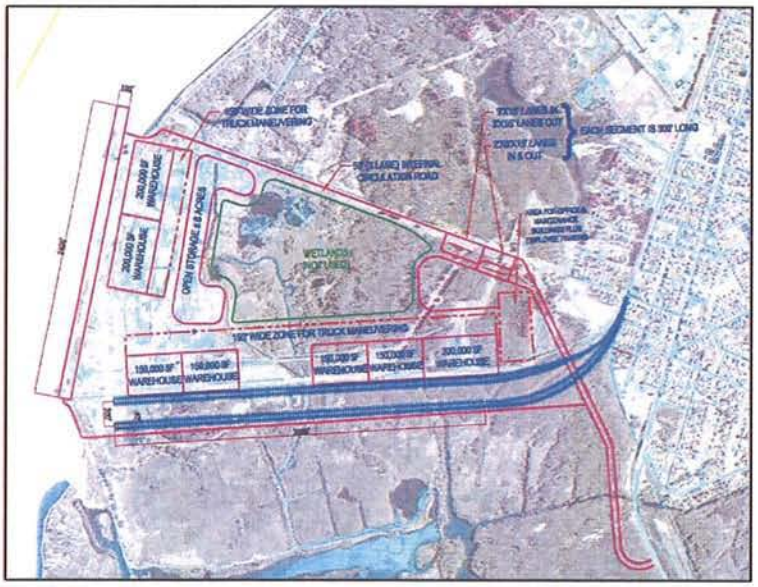


Figure 3.4 Potential Bulk / Break-Bulk Marine Terminal Layout: Repauno Industrial Facility, Greenwich Twp., NJ
Source: DRPA's SNJWMP. 2006.

As with Carney's Point, the Greenwich Township site would redevelop a former and contaminated industrial site and transform the property into a viable economically producing property. However, unlike the Paulsboro location where remediation, capping, and closure activities are well advanced, the remedial investigations for certain locations within the Greenwich Township site are in the early stages with much of the remediation techniques and alternatives still being developed. Thus, considerable remedial work would be required prior to the entire site being considered ready for initiating a redevelopment project.

In light of the combined challenges of atypical site shape and unresolved remediation, and the availability of other alternative locations under consideration with fewer challenges, the Greenwich Township site is rejected from further consideration as a practicable site for this project.

3.2.4 Borough of Paulsboro, Gloucester County, NJ

The Borough of Paulsboro is centrally located in Gloucester County, along the eastern shore of the Delaware River, immediately east of the Philadelphia International Airport. The former BP Oil Terminal and the former Essex Industrial Chemical, Inc. properties comprise an approximately 190 acre site that has been targeted for redevelopment by the Borough into a marine terminal and industrial / processing / distribution center.

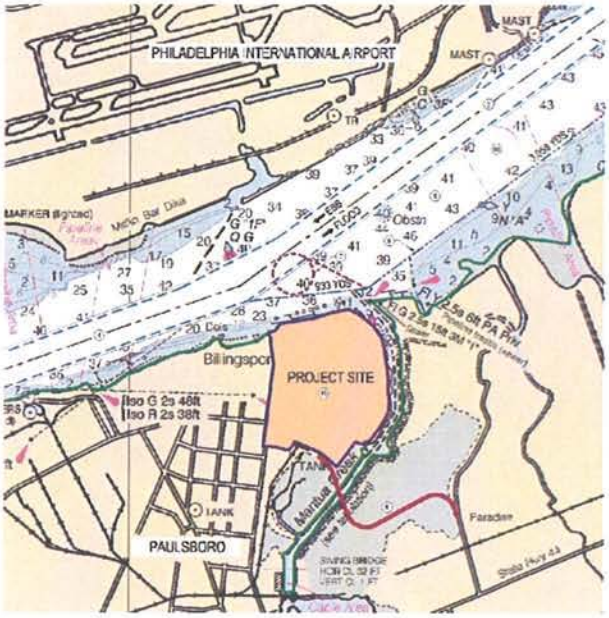


Figure 3.5 Paulsboro Proximity to the Delaware River Main Shipping Channel. (Source:SNJWMP. 2006)

In 1996, British Petroleum (BP) terminated operations at its 130-acre Paulsboro Oil Terminal and commenced the process of conducting soil and groundwater remediation in accordance with NJDEP regulations. In addition, BP has removed all of the bulk oil storage tanks and over 20 miles of associated piping.

The adjoining 60-acre parcel formerly owned by the Essex Industrial Chemical, Inc. (a wholly-owned subsidiary of DOW Chemical) also ceased operations in the later 1980's and completed demolition and remediation activities. No facilities remain at the site. Essex's remediation efforts resulted in a conditional No Further Action determination by the NJDEP. In addition, the former Essex property also contains an approximate 17-acre former dredge spoil area located in the northeast portion of the property. This dredge spoil area dates back to at least 1930 and was in part used by the USACE for historic dredging of the Delaware River and the Mantua Creek. The dredge spoil area is no longer in active use.

In early 2005, the Borough of Paulsboro signed a 90-year lease with BP that would effectively transfer the BP Oil Terminal property to the Borough, once BP completes the remediation program as approved by NJDEP. In addition, the Borough acquired the 60-acre former Essex property on July 17, 2007 via a declaration-of-taking. Therefore, the Borough of Paulsboro has

acquired the rights to redevelop the entire 190-acre parcel. In a development arrangement, the Borough would provide the land and an entity such as the SJPC would develop and operate the complex.

On behalf of BP, URS completed a 2002 Phase II Study for the Paulsboro site to examine the highest and best use of the property. URS' study assumed that, because of its waterfront access, adjacent land area, and previous industrial use, the site would be best suited for industrial redevelopment requiring river access such as a marine terminal. URS examined the capabilities of the site to support different types and sizes of marine terminals, such as container, and/or bulk and break-bulk, and concluded that a new generation major port was unlikely at the current time as river depths would not meet new ship sizes and draft requirements. A large container port was considered but ultimately viewed as not likely due to the size of the site, handling inefficiencies and costs, and the fact that the trucking and landside transportation infrastructure/access would be easier from Pennsylvania or New York. In its consideration of bulk and break-bulk operations, URS found that the site would have a high potential given its size, configuration, the shallower draft vessels typically used, and the pre-existing and ready market for bulk and break-bulk commodities in southern New Jersey.

The Paulsboro site has the advantage of being situated only 800 feet from the shipping channel of the Delaware River. To develop deep-water berths, approximately +/- 500,000 CY of dredging would be required. Paulsboro is the closest site to the shipping channel of any location alternative considered (Figure 3.5), and has the least dredging requirement. The extant wharf and historic maintenance dredging from BP's previous operations at the site are evidence of previous water-dependent use of the site; thus, less new dredging may be required due to previous dredging activities.

The length of site frontage on the river is longer than most of the location alternatives (+/- 2,750 feet), and would provide sufficient area for three Handymax vessel berths and one barge berth. The size of the backlands is considerable and balances favorably with the available waterfront frontage for bulk and break-bulk operations. This means that sufficient backlands area is available to support three berths and a barge berth with land to spare for processing and distribution facilities.

The configuration of the landside area contains no irregularities of shape that would challenge a logical and efficient layout of backlands operations. Thus, a highly efficient and safe marine terminal layout can be developed. A dedicated roadway and rail access could be developed with connections to existing, nearby transportation infrastructure. In particular, a Conrail rail yard and I-295 are located nearby.

The site contains small areas of freshwater wetlands totaling approximately 1.0 acre. Compared to the other location alternatives, the Paulsboro site has the least potentially impacted wetlands. The inactive USACE dredge disposal site is available for redevelopment.

The site has a well-developed remediation program. BP Oil Company has investigated and identified the contamination at the site and is in the process of obtaining NJDEP-approved Remedial Action Work Plans (RAWPs) to clean up the site. Implementing a new marine terminal operation is practicable without impacting BP's remedial efforts at the site.

Unlike other locations considered, the Paulsboro site is proximate to other industrial facilities and is within the community of Paulsboro. The Valero Refinery (formerly Mobil) continues to operate within Paulsboro. Historically, BP, Essex, and other industrial operations at and near the Paulsboro site were convenient and highly valued industrial and waterfront employment centers for the Paulsboro community. In redeveloping the Paulsboro site, the local community could once again serve as an important source of employment for the community. Recognizing the historic and on-going importance of the property as a marine-oriented industrial site, and long-time community support of the site for such use, the Borough adopted zoning for a Marine Industrial Business Park for the site in 1999. For these reasons, the Paulsboro site merits consideration.

3.2.5 Existing SJPC Facilities; Port of Camden and Port of Salem

For over 73 years, SJPC's facilities at the Port of Camden, have served the southern New Jersey and local Delaware Valley regions. Situated on the Delaware River with direct access to the Atlantic Ocean, the Port of Camden specializes in handling break-bulk and bulk cargo, receiving hundreds of ships moving international and domestic cargo through the Port's facilities every year.

The SJPC provides short- and long-term covered and open storage opportunities, inventory control services, and logistic services at up to four marine terminals, primarily focused in Camden, New Jersey. The SJPC can handle cargo from the ship to the final destination. The SJPC also has opportunities for businesses to lease property within the Port District. Currently, with over 35 tenants, the Port of Camden offers an advantage to businesses involved with water-borne cargo and the maritime industry.

Three terminals comprise the SJPC Port of Camden: the Beckett Street Terminal, the Broadway Terminal, and the Broadway Produce Terminal (Figure 3.6). The following details the specifics of each. However, for the purposes of the alternatives evaluation, the SJPC's Port of Camden will be evaluated in the context of a single port location. Economic information and commodity throughput data for the SJPC is included in Section 2.0, the Purpose and Need.

Figure 3.6 SJPC Existing Port of Camden Terminals
From Left to Right: Beckett Street Terminal, Broadway Terminal, and Broadway Produce Terminal
Source: SJPC Website http://www.southjerseyport.com/

Beckett Street Terminal

SJPC's Beckett Street Terminal provides a "one-stop service" bulk and break-bulk facility that, on a regular basis, handles steel, project cargo, wood products, cocoa beans and other bulk cargoes. Port specifications include:

Specialized Cargos:	Wood product, steel products, cocoa beans, containers, iron ore, furnace slag, scrap metal.
Other Cargos:	Project and dry bulk cargos
Terminal Area:	125 Acres
Number/Size of Berths:	3 berths: 2,000 linear feet
Depth at MLW:	Berth 2: 30 feet; Berth 3: 35 feet; Berth 4: 40 feet (Berth 1 not operational)
Heavy lift:	2 multipurpose bulk/container cranes-95 tons
Other Features:	Food grade warehousing; all storage warehouse and shed served by rail; innovative direct discharge for bulk cargoes; custom cargo carriers for direct discharge to storage; all-weather-controlled warehouse.

Broadway Terminal

SJPC's Broadway Terminal handles all types of break-bulk and bulk cargoes. In addition, the Broadway Terminal is also an industrial park with over 25 maritime business related tenants. Port specifications include:

Specialized Cargos:	Petroleum coke, furnace slag, dolomite, other dry bulks, steel products, wood products, minerals, cocoa beans, and fresh fruit
Terminal Area:	180 Acres
Number/Size of Berths:	Pier 1: 735 linear feet; Pier 1A: 750 feet; Pier 5: 1,050 linear feet
Depth at MLW:	35 feet
Reefer Plugs:	130 reefer plugs available on terminal
Other Features:	Full service facility for all break-bulk and bulk cargoes; 30 acre open lay down space; bulk cargo storage area with direct rail service; 2,000 feet of rail siding for intermodal transfer.

Broadway Produce Terminal

SJPC's Broadway Produce Terminal handles fruit and other fresh produce. Primary to the port is the Del Monte facility, which is their largest fruit port and distribution center in the world.

Specialized Cargoes:	Bananas, pineapples, other perishables
Terminal Area:	26 acres
Number/Size of Berths:	1 berth, 1,050 linear feet
Depth at MLW:	35 feet

The SJPC's Port of Camden, includes a total of 30 dry warehouses totaling more than 1.2 million square feet and 2 temperature-controlled warehouses totaling 135,000 square feet. Each terminal provides for direct access to and from truck, rail and vessel, with rail connections to CSX, Norfolk Southern and the CP Rail System.

Truck access to the Port of Camden is controlled by the main security gate at Beckett Street and provides for 6 other internal gates to the storage areas at the facility. Interstates I-676, I-76, I-295 and State Route 130 are all located in close proximity to allow trucks to quickly travel to Philadelphia, the New Jersey Turnpike, and destinations beyond. However, the current direct access from the nearby Interstates to the Port of Camden is via Atlantic Avenue and/or Morgan Boulevard. Transit on these designated truck routes requires the port-related truck traffic to comingle with the local traffic through the Waterfront South community of the City of Camden.

Unlike the other sites evaluated, the SJPC's Port of Camden is an operating marine terminal. The facility already is included in the City of Camden's Master Plan. A reliable and trained workforce is available and nearby given the site's urban location and its proximity to the densely populated areas of Camden County. However, expansion of the facility is not currently possible. The SJPC's Port of Camden is at its current development limits, and directly abuts the City of Camden's Waterfront South residential neighborhood. Expansion of the Port in this area would be in conflict with the local Waterfront South's *Proposed Strategic Investment Plan* (2006).

The SJPC's Port of Camden is not a viable solution to additional berths or terminal operations given its current "landlocked" nature, and therefore would not address the project Purpose and Need. Efficiencies can be developed and the port operations can be refined to be more congruent with the neighboring community. However, the Port of Camden at this time cannot be expanded beyond its current limits.

Also of note to the Port of Camden, the SJPC oversees the Port of Salem Terminal in Salem County, New Jersey. Operations at the terminal are leased to Salem Terminals Limited which specializes in apparel, fishing apparel, motor vehicles, food products, and other consumer goods. A port of entry since 1682, the Port of Salem is one of the oldest ports on the East Coast. The Port of Salem includes 22 acres, berthside truck access, with a berthing space of 350 feet with 65 feet of beam. Covered storage at the Port of Salem includes 80,000 square feet of shed and warehouses.

However the Port of Salem was not included in this alternatives analysis for a larger scale bulk/break-bulk cargo facility due to:

- The Salem River has only 16 feet of water which prohibits use by Handymax class ships unless significant and intensive dredging was undertaken,
- The limited available terminal space, berthing space and resulting capacity at the Port of Salem, and
- The limited rail and direct truck access at the Port of Salem to Interstate highways.

Due to the above reasons, the SJPC's existing facilities are not considered a viable alternative.

3.2.6 Comparative Discussion of Location Alternatives

This section provides a comparative discussion of the performance of the location alternatives in regard to the project Purpose and Need, as well as project goals and objectives. A comparative summary of the location alternatives is provided in Table 3.1. In the table, the performance of the location alternatives is compared using the relevant elements of the project need as well as the goals and objectives. A scoring system is provided to the left of each alternative column by which the relative performance of each alternative has been quantified. Each alternative was

scored based on its performance compared to that of the other alternatives. The following scoring system was used: 0 = no impact/not available/not applicable; 1 = high impact or least responsive; 2 = moderate impact or moderately responsive; and 3 = least impact or most responsive. Scores were totaled for each alternative along the bottom of the table. The highest scores indicate the location alternatives that perform best in terms of meeting the project need and responding to the project goals and objectives.

The Greenwich Township site contains a large area of freshwater wetlands at the center of the site. Use of the site would require an L-shaped layout of the wharf, backlands and processing distribution operations to avoid impacting the wetlands as shown in Figure 3.4. While the site would provide sufficient size for a terminal operation, the layout would be awkward, requiring the movement and maneuvering of cargo over longer distances than would occur in a more typical rectangular site configuration. Greater travel distances would increase handling time and costs. Additional equipment running time would use more fuel and cause more emissions than in a typical configuration. For these reasons, and as other locations would allow for a more desirable configuration of the backlands, the Greenwich Township site was rejected at this time from further consideration.

Other major factors primarily determining location suitability were the relative location of the proposed wharf in relationship to the shipping channel of the Delaware River and the amount of dredging required providing access to the berths. Distance to the shipping channel typically decreases northward up the river at each location alternative. The best performing location alternative from the perspective of minimizing distance to the shipping channel is the Paulsboro site. All other location alternative sites are considerably farther away from the shipping channel. The least amount of required dredging at Paulsboro would result in the fewest impacts to the open and shallow water environments of the Delaware River.

The Logan Township site is only partly zoned for industrial use and no local master planning efforts have been undertaken for potential bulk/break-bulk marine terminal use. Rezoning from farmland and open space would be required at the Logan Township site. In contrast, development of the Paulsboro site would not require re-zoning or open space impacts and would require impacting the least wetlands of any of the locations considered.

The State of Delaware Coastal Zone Management's jurisdiction at Carney's Point and Logan Township also greatly inhibits the potential for developing a marine terminal in southern New Jersey at these locations. The multi-state jurisdictional, commerce, and environmental regulations which in part hampered BP's Crown Landing LNG Project could have similar impact on a proposed bulk/break-bulk facility at these locations.

Consideration was also given to the potential location of the project relative to existing roadway, rail and utility infrastructure. Carney's Point, Logan Township, Greenwich Township, and Paulsboro provide opportunities for facilities in close proximity to State or Interstate highways. New, dedicated access roads could be constructed at Greenwich and Paulsboro to eliminate the potential burden on the local infrastructure and bypass the respective local communities. In addition, Paulsboro is located in closer proximity to the urban areas of Philadelphia and Camden which would provide for reduced travel times for cargo destined to these regional areas. A limitation of the existing roadway in Logan is that it traverses the community between the site and I-295.

Existing rail access is available at or proximate to the Carney's Point, Logan Township, Greenwich Township, and Paulsboro sites, although upgrades such as storage or loading tracks would be required at each location to accommodate the increased rail freight projected for a marine terminal facility.

Another factor contributing to location selection was the potential for contamination. Currently, investigations and remediation are ongoing at the Carney's Point, Greenwich Township, and Paulsboro locations. Of them, Carney's Point contains the potential to encounter former munitions which would require extensive and the potential long-term removal of the ordnance. While investigations are underway at the Greenwich Township site, considerable work remains before the entire site is available for redevelopment. The remediation process is much further along at the Paulsboro site where the NJDEP is currently reviewing the remedial action plans for the BP Oil Terminal and has granted the former Essex site with a conditional No Further Action determination.

The SJPC's Port of Camden is an existing marine terminal facility that is located in an urban, heavily populated area in the City of Camden, Camden County. Much of the infrastructure needed to operate a marine terminal already exists at the site. However, the Port of Camden is currently at its development limits and directly abuts Camden's Waterfront South neighborhood community. Truck traffic, as it currently exists, is required to travel on local roadways designated as Truck Routes to access the Port. This requires the port traffic to mix with the local traffic through the Waterfront South community. Additional port-related, landside traffic would only exacerbate this current condition. Rail access is present at the Port but no additional storage track space is currently available.

No land or additional wharf space is available to expand beyond the current borders of the Port of Camden. As seen by Table 3.1, the Port of Camden rated well for responding to planning and avoiding environmental impacts mainly due to its existing infrastructure. However, the project need element to provide expanded capacity cannot be achieved due to the current "landlocked," at-capacity nature of the terminal. Therefore, the Port of Camden is not considered a viable alternative for terminal expansion at this time.

3.2.7 Location Selection Rationale

The location alternatives analysis determined that the Paulsboro site responded best to the elements of the project need as well as the goals and objectives. In the overall scoring, the Paulsboro site performs at a significantly higher level than the other locations. The Paulsboro site is ready for development. It is zoned and included in the local master plan for a new marine terminal facility. It has sufficient waterfront and backlands acreage to support multiple berths and a barge berth with a balanced land area for terminal backlands, processing and distribution facilities. A safe and efficient bulk and break-bulk operation can be designed for the site. Multimodal access is available, and a new, dedicated roadway would eliminate truck traffic from local streets. The site is local to the Paulsboro community which has historically benefited from the employment and economic opportunities of an active industrial facility at the site. Paulsboro is close to the shipping channel; implementing a marine terminal at the site would require the least amount of new dredging and incur the least environmental impacts. For these reasons, the Paulsboro site was selected as the preferred location alternative for the proposed project.

TABLE 3.1 PROPOSED MARINE TERMINAL: LOCATION ALTERNATIVES ANALYSIS

Criteria	No Action Alternative		Carney's Point Site		Logan Township Site		Greenwich Township Site		Paulsboro Site		SJPC Port of Camden Site	
River Mile		N/A		69		79		86		90		105
County		N/A		Salem		Gloucester		Gloucester		Gloucester		Camden
PURPOSE AND NEED												
Expand Marine Terminal Capacity												
Suitable site size	0	N/A	2	Yes (90 ac)	2	Yes (80 ac)	3	Yes (250 ac)	3	Yes (167 ac)	0	None Available
Suitable site configuration for bulk and break-bulk operation	0	No	3	Yes	3	Yes	2	Yes	3	Yes	0	Not Available
Provide Deep-Water Berths												
Number of potential vessel berths	0	0	3	3 Handymax, 1 barge	3	3 Handymax, 1 barge	2	2 Handymax	3	3 Handymax, 1 barge	0	None Available
berth and backlands areas balance	0	No	3	Yes	3	Yes	3	Yes	3	Yes	0	None Available
Capture a Greater Market Share of Bulk and Break-Bulk Commodities												
Overall new terminal feasibility	0	No	3	Yes	3	Yes	2	Yes	3	Yes	0	No
Complement Existing Marine Terminal Operations												
Absence of conflicts with existing terminal markets	0	N/A	3	Yes	3	Yes	3	Yes	3	Yes	0	No
Accommodate On-Site Processing and Distribution Facilities												
Location has sufficient area for processing and distribution facilities	0	No	3	Yes	3	Yes	2	Yes (Less Efficient)	3	Yes	0	No
Respond to Federal, State, Regional and Local Planning												
Location is consistent with federal need to enhance intermodal transportation infrastructure	0	No	3	Yes	3	Yes	3	Yes	3	Yes	0	No
Location is consistent with NJ Freight Plan and Visioning Plan	0	No	3	Yes	3	Yes	2	Yes (Less Efficient)	3	Yes	0	No
Site is zoned for industrial use	0	No	3	Yes	2	Partly	3	Yes	3	Yes	3	Yes
Site has a terminal or industrial Master Plan	0	No	3	Yes	2	Yes (Partly)	3	Yes	3	Yes	3	Yes
Compatibility with existing or former land use	0	No	3	Industrial	2	Assessed Industrial and Farmlands	3	Former Industrial	3	Former Industrial	3	Marine Terminal
Marine terminal use is compatible with adjacent land uses	0	No	3	Yes	1	No	3	Yes	3	Yes	2	(Truck Access via local roadways)
Outside State of Delaware Coastal Zone Management Jurisdiction	0	N/A	0	No	0	No	3	Yes	3	Yes	3	Yes
Proximity to Deep-Water Shipping Channel												
Minimize distance of wharf to channel (ft)	0	No	2	No - 4,000 ft	2	No - 4,200 ft	3	No - 1,500 ft	3	Yes- 800 ft	3	At Bulkhead
Existing access channel to berth	0	No	1	No	2	Yes (Off-Shore)	3	Yes	3	Yes	3	Yes
Existing berth facility	0	No	1	No	2	700 lf	2	500 lf	3	1,200 lf	3	4,405 ft
Potential new dredging volume (CY)	0	No	1	No - 3,000,000 CY	1	No - 2,000,000 CY	1	No - 2,000,000 CY	3	Yes - 587,000 CY	3	Yes
Proximity to Existing Road and Rail Systems												
Location has existing road/rail access	0	No	3	Yes	2	Yes (Indirect highway connection)	3	Yes	3	Yes	2	Yes (Limited Local Roadway Access)
GOALS AND OBJECTIVES												
Contribute to Local Economic Development												
Provide new industrial use and business revenue source	0	No	3	Yes	3	Yes	2	Yes	3	Yes	0	No

Criteria	No Action Alternative		Carney's Point Site		Logan Township Site		Greenwich Township Site		Paulsboro Site		SJPC Port of Camden Site	
River Mile		N/A		69		79		86		90		105
County		N/A		Salem		Gloucester		Gloucester		Gloucester		Camden
GOALS AND OBJECTIVES (*continued*)												
Create New Local Employment Opportunities												
Population within 2 miles (i.e., potential workforce and economic Impact)	0	No	2	Yes (4,400)	1	Yes (200)	2	Yes (3,783)	3	Yes (10,354)	3	Yes (>75,000)
Re-use Former Industrial Site and/or Property Designated for Redevelopment												
Site is a former industrial site (maximizing land use)	0	N/A	3	Yes	2	Yes (Partly)	3	Yes	3	Yes	3	Yes
Remediation activities are sufficiently complete to enable redevelopment	0	N/A	1	Unknown (Potential munitions)	1	Unknown	1	No (Preliminary Site Investigations only)	3	Yes (Remedial Plans)	1	Unknown
Avoid or Minimize New Natural and Human Environment Impacts												
Least tidal wetlands impacts	3	Yes - None	2	No - Approx 45 ac	2	No - Approx 50 ac	2	No - Approx 20 ac	3	Yes – Approx 6.2 ac	3	None Known
Least freshwater wetlands impacts	3	Yes - None	2	Yes - Approx 5 ac	3	Yes - Approx 1 ac	2	Yes - Approx 3 ac	3	Yes – Approx 1.05 ac	3	None Known
Essential fish habitat	0	N/A	1	Yes	1	Yes	2	No	2	No	2	No
Bald eagle foraging area	0	N/A	2	No	1	Yes	1	Yes	1	Yes	3	No
Least forested areas impacts	3	None	3	None	3	None	3	None	2	Minimal	3	None
TOTAL SCORES:	**9**		**65**		**59**		**67**		**80**		**49**	

Rating System
0 = No Impact / Not Available / Not Applicable; **1** = High Impact / Least Responsive; **2** = Moderate Impact / Moderately Responsive; **3** = Least Impact / Most Responsive

3.3 Marine Terminal Design Alternatives

The Paulsboro Marine Terminal is planned to provide two berths (Berths 1 and 2) for general cargo and RO-RO movements and one ship berth and one barge berth (Berth 3 and the barge berth) for recycled metal/dry bulk and heavy lift cargo movements. Each design alternative would provide the same number and relationship of vessel and barge berths. Berths 1 and 2 are planned for materials such as lumber, forest and metal products; banana/fruit wheeled containerized cargo operations would use these berths as well. Berth 3 and the barge berth would be dedicated to handling recycled metal/dry bulk and oversized and/or heavy bulk cargo movements.

Berths 1, 2, and 3 would each accommodate Handymax class cargo vessels, which are 650 feet long and 95 feet wide. The length of a berth is determined by the length overall of the vessel plus mooring space equal to the width of the vessel. Therefore, the minimum required ship berth length is approximately 750 feet. The minimum barge berth is 500 feet to accommodate a typical 400-foot long by 100-foot wide barge. A minimum wharf dimension of 2,750 feet long [(750 feet x3) + 500 feet] by 150 feet wide, therefore, was used as a basis for terminal design. This typical dimension allows space for securing the vessel's mooring lines, personnel access, crane operations, cargo lay down areas, truck and equipment drive aisles, safety areas, rail operations, and truck circulation routes.

The terminal layout for each design alternative would feature similar functional elements. The backlands for Berths 1 and 2 would be located behind the berths to the west of the central spine road (Figures 3.8, 3.10, 3.12 and 3.14). The backlands for Berth 3 and the barge berth would be located behind the berths to the east of the spine road. Separate roadway and rail circulation networks would serve each berth pair, connecting the berths and the backlands area. Between 60 and 90 acres of associated backlands is required to service each berth. Conceptual evaluation of the Paulsboro site indicates that adequate backlands acreage is available to accommodate and support the three vessel berths and one barge berth.

Using these typical dimensions and operational relationships, several design alternatives were developed and evaluated. Each design alternative is described in the following four subsections. The design alternatives focused on the location and configuration of berths. Key issues with locating berths included accommodating multiple berths and a barge berth, and ship maneuverability when berths are occupied. The differences between the design alternatives that are described below involve the location and configuration of the waterfront structures themselves (i.e., wharf and berths). The landside area and infrastructure components of the terminal are relatively consistent across the alternatives.

Subsection 3.3.5 provides a comparative evaluation of the design alternatives in terms of the project need as well as goals and objectives. The subsection concludes with an identification of the Preferred Alternative.

A new, dedicated terminal access road and overpass would be required for any Build Alternative at Paulsboro. The roadway would connect the Paulsboro Marine Terminal with the regional roadway network, and allow traffic from the terminal to bypass the urban center of Paulsboro. Effects and impacts as a result of the proposed access road and overpass are detailed in the

T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, prepared for the GCIA.

3.3.1 Alternative 1 – Continuous Bulkheaded Wharf Face at the Existing Berth Line with Filling Behind

Alternative 1 would provide three deep-water ship berths in an angled configuration essentially following the contour of the shallow water shelf waterward of the shoreline. A barge berth would be provided alongside the mouth of Mantua Creek (Figures 3.8 and 3.9). A continuous wharf structure would be provided essentially at the former BP Oil Terminal's existing wharf line adjacent to the shoreline. The wharf would be placed on fill with a bulkhead along the river side. Contiguous landside area would be created behind the wharf by filling open water of the Delaware River.

3.3.2 Alternative 2 – Continuous Bulkheaded Wharf Face 365 Feet Landward from Existing Berth Line with Cutting and Filling Behind

Alternative 2 would provide three deep-water berths in a straight alignment approximately 365 feet in-shore of the former BP Oil Terminal's existing wharf line (Figures 3.10 and 3.11). A continuous wharf would be constructed partly over the existing shoreline. A barge berth would be provided by angling the wharf along Mantua Creek. The area behind (shoreward of) the bulkhead would be filled to meet the finished grade of the wharf.

3.3.3 Alternative 3 – Continuous Pile Supported Wharf at the Existing Berth Line with Bent Alignment

Alternative 3 would provide three deep-water berths in an angled configuration similar to Alternative 1 along the Delaware River and a dedicated barge berth facility on Mantua Creek (Figure 3.12 and 3.13). The continuous wharf would be an open, pile-supported structure allowing the ebb and flow of the river beneath it. The shallow water area behind the wharf would be retained. Surrounding land area would be filled to meet the finished grade of the wharf.

3.3.4 Alternative 4 – Discontinuous Pile Supported Wharf at the Existing Berth Line with Straight Alignment and Trestle Access

Alternative 4 would provide three deep-water berths in a straight configuration essentially following the contour of the shallow water shelf. A barge berth would be provided alongside the mouth of Mantua Creek. However, unlike the continuous wharf in Alternative 3, two separate wharves would be provided, one wharf measuring 2,350 feet in length would serve the three vessel berths and the second shorter wharf would serve the barge berth (Figure 3.14 and 3.15). A trestle approximately one-third the width of the wharves would connect the two wharves. The shallow water area behind the wharves would be retained. Surrounding land area would be filled to meet the finished grade of the wharves.

3.3.5 Comparative Evaluation of Design Alternatives

This section provides a comparative evaluation of the design alternatives in regard to the project need (overall and design needs), as well as the project goals and objectives. The design alternatives present variations in operations and safety that affect cost efficiency, and, ultimately, return on public investment. For this reason, a two-step, iterative evaluation process

was undertaken to consider and compare the performance of the No Action and design alternatives. In Step 1, the alternatives are assessed for performance in regard to the elements of the project need. As described in Chapter 2, the elements of need focus on selecting a competitive marine terminal design that performs at a high level with regard to operational efficiency, safety, security, and cost. In the Step 1 evaluation, an alternative that was found to be responsive to the project need was determined to meet the purpose and intent of the project and, therefore, merits consideration. An alternative that was found to not address the project need does not merit consideration.

In Step 2, the surviving alternatives from Step 1 are assessed for performance in regard to the project goals and objectives. The goals and objectives are desired economic, land use, and environmental outcomes for which the design alternatives meeting the project need must also be screened. In the Step 2 evaluation, an alternative that was found to be responsive to most or all goals and objectives was determined to merit consideration. An alternative that was not highly responsive to the project goals and objectives was determined to not merit consideration.

This section summarizes the results of the two-step design alternatives evaluation process. The relative performance of each alternative is described and compared with that of the other design alternatives. Determinations as to the merit of each alternative for further consideration are stated.

Step 1 – Project Need Performance

In Step 1, the performance of design alternatives was evaluated in regard to the elements of project need that pertain to design (overall needs and design needs):

Need No.	Description
N1.	Expand marine terminal capacity; develop deep-water marine terminal berths; increase market share; complement existing facilities;
N2.	Accommodate on-site processing and distribution facilities;
N3.	Respond to Federal, State, regional and local plans;
N4.	Provide for safe and secure operations;
N5.	Avoid interfering with navigation and docking at existing terminals;
N6.	Achieve minimum operating efficiency thresholds;
N7.	Achieve minimum operating cost efficiency thresholds; and,
N8.	Return on public investment – achieve a competitive marine terminal.

Collectively, these elements of need measure the potential return on public investment (item N8, above). An alternative that performs at a high level according to the first seven criteria is one that is competitive compared to benchmarks established by SJPC at their bulk and break-bulk facilities in southern New Jersey (known herein as "industry" thresholds). As a competitive facility, the potential return on public investment is also high. A facility that is less responsive to the elements of need is less competitive and likely to yield a lower return on public investment. At the conclusion of this Step 1 evaluation, responsive design alternatives were deemed practicable and carried into the Step 2 evaluation process. Design alternatives that were found to respond poorly to the elements of project need were deemed impracticable and rejected from further consideration. This section describes the performance of the design alternatives in regard to the elements of need. Table 3.2 provides an at-a-glance summary of the Step 1 findings.

No Action Alternative
The No Action alternative was determined to not respond to the elements of project need as no action would be taken to develop additional marine terminal capacity. However, the No Action alternative was retained during the alternatives evaluation as a baseline for comparison.

Design Alternatives
The performance of the design alternatives is described for each element of need:

N1. Expand marine terminal capacity; develop deep-water marine terminal berths; increase market share; complement existing facilities – Each of the design alternatives would provide the same added marine terminal capacity by providing three new ship berths and one barge berth. In each case, sufficient backlands area would be provided to balance berth capacity. Each design alternative would provide the potential to increase southern New Jersey's market share of the bulk and break-bulk commodity market. Each design alternative would complement existing facilities within that market.

N2. Accommodate on-site processing and distribution facilities – Each of the design alternatives would provide adequate land area to accommodate facilities for on-site processing and distribution activities.

N3. Respond to Federal, State, regional and local plans – Each of the design alternatives would respond to the facility, economic and transportation elements of the federally recognized need to enhance intermodal transportation infrastructure as well as the NJ Freight Plan and Visioning Plan which call for expanding economic opportunities and cargo transportation facilities in New Jersey. For the same reasons, each design alternative would be responsive to the Borough's redevelopment plan for the Paulsboro site and the regional Transportation Implementation Plan (TIP).

N4. Provide for safe and secure operations – Each of the design alternatives was examined for internal access and circulation capabilities for daily operations, emergency access, and access during routine maintenance and repair activities. The continuous wharf design in Alternatives 1, 2 and 3 would allow for dedicated travel lanes for trucks and the rail system. Circulation between Berths 1 and 2 and the backlands would occur on a travel network that is independent of and separate from the travel network serving Berth 3 and the barge berth.

However, because of the physical constraints of the wharf and trestle configuration in Alternative 4, there would be a physical overlap between the two circulation networks in the vicinity of Berth 3. At that location, the rail network for Berths 1 and 2 would cross the roadway network of Berth 3 and the barge berth to access the trestle connecting to the backlands. This location is a significant operational safety concern as it presents undesirable problems of sight distance limitations, traffic maneuvering and traffic control issues. During normal operations, blockage of circulation by a train or truck queue at that location could consistently adversely impact operating efficiency by increasing wharf to backlands travel times and causing down-time for cargo loading and unloading. In this condition, free transfer of cargo to trains and trucks via crane would be stalled, potentially resulting in the hazardous condition of heavy cargo being suspended over the work area until the blockage is cleared. Moreover, during an emergency or during routine maintenance or repair activities, blockage of circulation by a train could pose a significant, time consuming obstacle to access between the wharf and the backlands area as well as longer vessel dwell time for cargo moving.

From a security perspective, each of the design alternatives would be equipped and operated in a manner that would meet Department of Homeland Security requirements, current industry standards for security, including provisions for such mechanical systems as fences, fendering, lighting and monitoring devices and procedures. As described in Section 2.2.11, these mechanical systems provide a first line of facility defense. The second line is worker vigilance. Alternatives 1, 2, and 3 provide a continuous wharf and work area such that no part of the waterfront would be unmanned. The regular employee presence on the wharf and in the backlands areas would provide a high level of human monitoring. Alternative 4 would provide a trestle between Berth 3 and the barge berth. This transportation corridor would have no stationary worker activities on it. As an essentially unmanned facility, the trestle would function as a vigilance gap along the waterfront, adding a measure of vulnerability to the facility, which could result for potential unseen and unabated access under or behind the trestle. Thus, Alternative 4 would provide the potential for less secure operations than Alternatives 1, 2, and 3.

N5. Avoid interfering with navigation and docking at existing terminals – The United States Coast Guard mandates that no activity be undertaken that has the potential to interfere with authorized shipping channels or ship navigation. Alternatives 1, 2 and 3 would be configured so as not to create navigation interference with the adjacent existing terminal operated by Nu-Star. Nu-Star has indicated that outflowing currents from Mantua Creek can make maneuvering and docking barges at their Mantua Creek wharf challenging depending on weather and river conditions. The Nu-Star barge berth is located upstream from the proposed Paulsboro Terminal barge berth. The wharf in Alternatives 1, 2, and 3 would bend and align with the western edge of the creek, thereby not interfering with the natural currents of the creek or the creek navigation channel. The wharf configuration would not obstruct lines of sight up and down the creek, and would not obstruct views of navigation markers. Consequently, Alternatives 1, 2, and 3 would avoid navigational interference with the Nu-Star barge operations and other marine craft using the creek.

The wharf in Alternative 4 would terminate at the mouth of the creek, potentially affecting creek currents and introducing a structure in the vicinity of the creek's navigation channel. The wharf structure itself would interfere with navigation by obstructing lines of sight at the point where marine craft enter and leave the creek, and by obstructing views of navigation markers. This condition would necessitate additional maneuvering of Nu-Star barges and other marine craft entering and leaving the creek, essentially forcing them to navigate around the new structure and associated shipping activity at the terminal. Shifting the wharf to the south is impracticable as it would place the western end of the wharf off-shore from the Paulsboro community, potentially increasing air quality and noise impacts, and impacting community views of the river and the Borough's redevelopment plan for that portion of the waterfront. Thus, Alternative 4 would introduce navigational concerns for the adjacent barge movements and recurring recreational craft that use Mantua Creek.

N6. Achieve minimum operating efficiency thresholds – In terminal operations, operating efficiency depends in large part on a facility design that provides separate and dedicated activity areas for cargo transporting equipment: cranes, trucks and trains. The freer of operational impediments this equipment is, the less time it takes for cargo to be moved from ship to shore and vice versa, and the less time a ship spends in port. Operating

efficiency directly relates to return on public investment and competitiveness, which are described in more detail in element 7 below. In this context, the SJPC's minimum operating efficiency benchmark (the relevant industry threshold) is the ability to avoid most or all operational impediments in order to achieve a high return on public investment and a competitive terminal.

Alternatives 1, 2, and 3 would provide a continuous wharf structure along all berths. The continuous wharf structure would provide the highest operating efficiency and flexibility in terms of the use and positioning of cranes at the berths and internal truck and rail circulation. Alternatives 1, 2, and 3 would achieve a high level of operating efficiency by avoiding conflicts between truck and rail networks, and between crane and truck movements. The circulation network for Berths 1 and 2 would be physically separate from that of Berth 3 and the barge berth, and no circulation conflicts would occur during simultaneous operations at Berth 3 and the barge berth.

Alternative 4 would provide a trestle between Berth 3 and the barge berth. Although Alternative 4 would also provide separate internal circulation networks, these networks would physically overlap causing significant impediments to operational efficiency and safety concerns described in element 4 above.

Because the trestle would be approximately one third the width of the wharf, rail and truck lanes would converge where the trestle meets each wharf. Where the trestle would meet the wharf at Berth 3, for example, the truck and rail lanes would cross one another in both directions of travel. The short distance between this bottleneck and the berth makes it likely that either a truck queue or a train could be stopped at that location, effectively blocking access through the bottleneck.

Near that location would be the eastern terminus of the crane rail. A crane stationed, or broken down, at that eastern end of the wharf would obstruct truck and rail passage at that location making the wharf inaccessible. As shown in Figure 3.7, a crane is a very large structure that constrains operating space on the wharf. A crane is immovable when it is inoperable.

Routine maintenance and repair on the trestle, particularly of a train, would block the rail lane as well as one of the truck lanes for the duration of the activity, thereby severely reducing circulation on the trestle.

Figure 3.7: Wharf Crane and Rail Cars; SJPC Port of Camden (Source: SJPC. 2008)

Another benchmark of operating efficiency that was examined in the design alternatives evaluation was truck travel time between the wharf and the backlands area. The movement of cargo to and from the backlands is a component of the overall time a ship spends at a terminal. Ultimately, the shipper pays for that time in fees (see element 7 below). Thus, a terminal with the highest operating efficiency has the lowest shipper fees and, therefore, is the most competitive in attracting ships and their cargo. Competitive

bulk and break-bulk facilities operated by the SJPC target 4 minute or better truck trips (up to 1,800 feet of travel). Thus, the design of Alternatives 1, 2, and 3 would be as good as or better than the industry threshold of 4 minutes per truck trip.

The straight wharf and trestle configuration in Alternative 4, in contrast, would add 500 feet of truck travel time per trip to cargo moving activities between the wharf and backlands. Although this distance may seem short, it adds over a minute of truck travel time per trip, 43 hours of truck operations per ship call and 22,000 vehicle miles per year. Cumulatively, the extra distance and time does not meet the established industry benchmark and would have a significant adverse effect on operational efficiency compared with the other design alternatives. These conditions would also add to the time a ship is at the wharf, thereby adversely affecting ship schedules. Ship delays typically incur additional fees payable to the ship owner of $25,000 or more per ship depending on type and class. As described in elements 7 and 8 below, these adverse effects add to operating costs and, ultimately, negatively impact facility competitiveness.

N7. Achieve minimum operating cost efficiency thresholds – Cost efficiency directly correlates with operating efficiency. Higher operating efficiency yields higher cost efficiency. The SJPC's minimum operating cost efficiency threshold is the ability to avoid most or all additive operational costs in order to achieve a high return on public investment and a competitive terminal. As indicated in element 6 above, Alternatives 1, 2 and 3 would perform at a high level of operational efficiency. Thus, it can be expected that a high level of cost efficiency can be achieved.

Alternative 4 would perform at a lower level of operational efficiency compared to the industry threshold and the other design alternatives due to the additional truck travel distance between Berth 3 and the backlands. The additional distance would translate to additional annual costs to operate and maintain the equipment, fuel costs, truck and cargo travel time, and longer ship dwell time. The annual cost to the shipper is estimated to be $400,000 in 2009 dollars above the SJPC benchmark for their competitive bulk and break-bulk facilities. Aside from other concerns such as extra fuel use, more emissions and greater vehicular wear and tear, this additional cost to the shipper is expected to adversely impact the ability of the SJPC to attract shippers to the terminal.

N8. Return on Public Investment – Return on public investment was measured by considering construction cost and duration in the context of the performance of each design alternative with regard to the elements of need. An alternative that performs consistently at a high level according to need without incurring disproportionate construction cost is one that is the most competitive compared to industry thresholds. As a competitive facility, the potential return on public investment is also high. An alternative that is less responsive to the elements of need is less competitive and likely to yield a lower return on public investment.

In regard to construction cost and duration, Alternative 3 would have a slightly higher cost than Alternatives 2 and 4 due in part to the pile-supported wharf design, but it would have a relatively short construction duration. However, the difference in cost is minor at approximately 2 percent. Alternative 1 would have the least cost, but the construction duration would be 25 percent longer than Alternative 3 due partly to earthmoving requirements.

In terms of operations and as summarized in Table 3.2, all design alternatives would provide new deep-water berths and backlands balance, thereby expanding marine terminal capacity in southern New Jersey. All alternatives would provide on-site processing and distribution facilities. Alternatives 1, 2, and 3 would perform at a high level with regard to safe and secure operations, absence of navigation interference, efficiency of operations (as good as or better than industry thresholds) and cost efficiency. Thus, Alternatives 1, 2, and 3 are responsive to all elements of the project need.

In considering overall return on investment, the construction cost was factored in. As described above, the cost estimates for Alternatives 2 and 3 are similar while the cost for Alternative 1 is somewhat lower. None of the construction cost estimates is considered disproportionately high or low such that the returns on investment of the alternatives would be dissimilarly affected. Design Alternatives 1, 2 and 3 would provide a high return on public investment and would achieve a competitive marine terminal in southern New Jersey. On the basis of these findings, Alternatives 1, 2, and 3 were determined to be practicable and taken through Step 2 evaluation.

Alternative 4 has design constraints stemming from the discontinuous wharf and trestle configuration that yield less than desirable conditions regarding safety, security, and navigation. These issues, in combination with poorer than industry threshold performance in the areas of operational efficiency and operational cost, yield a considerably lower return on public investment and a noncompetitive marine terminal in southern New Jersey. On the basis of these findings, Alternative 4 was determined to be impracticable. In light of there being other alternatives that achieve the project design-related need, Alternative 4 was rejected from further consideration.

Step 2 – Goals and Objectives Performance

Step 2 in the alternatives evaluation process involved assessing the performance of the surviving alternatives from Step 1 (the No Action alternative and Alternatives 1, 2 and 3) in terms of the project goals and objectives. The following goals and objectives represent desired outcomes for implementing the proposed terminal:

Goal No.	Description
G1.	Contribute to local and regional economic development through the provision of transportation and value-added services;
G3.	Create new local employment opportunities;
G3.	Re-use former industrial site(s) and/or a property designated as in need of redevelopment;
G4.	Avoid or minimize new impacts on the natural and human environments; and,
G5.	Respond to the DRPA's Green Ports Initiative.

A design alternative that was found to be responsive to most or all goals and objectives was determined to merit consideration. An alternative that was not highly responsive to the project goals and objectives was determined to not merit consideration. This section describes the performance of the design alternatives in regard to the project goals and objectives. Table 3.3 provides an at-a-glance summary of the Step 2 findings.

No Action Alternative

The No Action alternative would not respond to four of the five goals and objectives as no action would be taken to develop additional marine terminal capacity. Specifically, the No Action alternative would not contribute to local or regional economic development; would not create new employment opportunities; would not re-use a former industrial site and/or a property designated as in need of development; and would not respond to the DRPA's Green Ports Initiative.

The No Action alternative would perform at a high level with regard to the goal and objective of avoiding or minimizing new impacts on the natural and human environments. As the No Action alternative would take no new development action, potential adverse impacts such as open water fill, shading, subtidal and intertidal impacts, wetlands impacts, and dredging would not occur.

As previously stated in Step 1, the No Action alternative was found to not support any of the elements of the Project Need. As a consequence, the No Action alternative was determined to be not viable. However, it was retained during the alternatives evaluation as a baseline for comparison.

Design Alternatives

The performance of the design alternatives is described for each goal and objective:

G1. Contribute to local and regional economic development through the provision of transportation and value-added services – Alternatives 1, 2, and 3 would support this goal at an equivalent high level as each would provide a new industrial use and business revenue source.

G2. Create new employment opportunities - Alternatives 1, 2, and 3 would support this goal at the same high level. Each would provide a new, permanent industrial use in close proximity to the local workforce population in Paulsboro. It is expected that a range of skill sets will be required to staff and operate the wharf, backlands and processing and distribution functions of the terminal.

G3. Re-use former industrial site(s) and/or a property designated as in need of redevelopment - Alternatives 1, 2, and 3 would support this goal at the same high level. Each would provide a new industrial use on a former industrial property comprising the Paulsboro site. The Paulsboro site was designated by the Borough for redevelopment as a marine terminal.

G4. Avoid or minimize new impacts on the natural and human environments – Alternatives 1, 2, and 3 would provide an equivalent landscape buffer with structure along the western boundary of the site to minimize impacts on the nearby community. As well, each would provide an equivalent, dedicated access road that is distinct from the community street system. This roadway would accommodate facility-related truck traffic, thereby relieving local streets of the burden.

With regard to natural environment impacts, each of the design alternatives would perform differently due to the design and location of the proposed wharf and backlands area. Alternative 1 would provide a new wharf structure on fill adjacent to the existing shoreline. The backlands area would be filled to meet the finished grade of the wharf. Alternative 1 would require a large amount of open water fill (15 acres) to develop the

wharf and backlands. Because the wharf would be offshore, less dredging would be required compared to the other design alternatives (495,000 CY), but total intertidal and subtidal impacts, 11.3 acres and 14.9 acres respectively, would be high.

Alternative 2 would provide a new wharf structure on fill partly over the existing shoreline. The backlands area would be filled to meet the finished grade of the wharf. Alternative 2 would require a smaller amount of open water fill (5 acres) compared to Alternative 1 because of the location of the wharf along the shoreline. However, because of the shoreward position of the wharf, a very large amount of dredging would be required compared to the other design alternatives (1,601,000 CY). Unlike Alternatives 1 and 3, Alternative 2 would require the landside excavation and removal of known contaminated material as part of dredging. The subtidal and intertidal impacts of Alternative 2 would be the highest of any of the design alternatives, 13.6 acres and 17.5 acres respectively.

Alternative 3 would provide a new wharf structure on piles adjacent to the existing shoreline. A portion of the backlands would be filled to meet the finished wharf elevation. However, unlike Alternatives 1 and 2, Alternative 3 would retain a portion of the existing shallow water area behind the wharf. Alternative 3 would require no open water fill (0 acres) due to the pile-supported structure design. The amount of dredging required to implement Alternative 3 would be slightly more than Alternative 1 (587,000 CY), but significantly less than Alternative 2. Subtidal and intertidal impacts would be considerably less than that of either Alternatives 1 or 2, at 6.2 acres and 6.7 acres respectively.

G5. Respond to the DRPA's Green Ports Initiative – The SJPC is a co-signer of the DRPA's Green Ports Initiative, an agreement among the DRPA, the SJPC and the Philadelphia Area Port Authority, to promote energy conservation and sustainable practices at their facilities. Due to their similar components, functions and capabilities, Alternatives 1, 2, and 3 would provide equally extensive opportunities for the SJPC to implement energy and cost savings initiatives that are consistent with the Green Ports Initiative.

The findings of Step 2 of the evaluation process indicate that the best performing design alternative in regard to the project goals and objectives is Alternative 3. While each of the design alternatives would perform equivalently in four of five areas, Alternative 3 would perform at the highest level in regard to avoiding or minimizing new impacts to the natural and human environments. Alternative 3 would incur no open water fill due to the pile-supported structure design and retention of the shallow water area behind the wharf. Alternative 3 would have the least impacts on subtidal and intertidal shallows, less than half the impacts of Alternatives 1 and 2. Although slightly more dredging would be required for Alternative 3 than Alternative 1, the amount of dredging required for Alternative 3 is 63% less that that required to implement Alternative 2.

Preferred Alternative Considered in this EIS

The Step 1 and Step 2 design alternatives evaluation process determined that Alternatives 1, 2, and 3 would meet all the elements of the project need at a high level. However, the evaluation of these alternatives in regard to the project goals and objectives determined that Alternative 3 would be the most responsive. Alternative 3 would have the least new natural and built environment impacts while responding at a high level to each of the other goals and objectives. Thus, this EIS considers Alternative 3 as the preferred design alternative.

TABLE 3.2 PAULSBORO MARINE TERMINAL – DESIGN ALTERNATIVES EVALUATION STEP 1: PURPOSE AND NEED

	Need Description	No Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
1. Expand Marine Terminal Capacity/Develop Deep-Water Marine Terminal Berths/Increase Market Share/Complement Existing Facilities						
	Number of New Berths (Deep-water/Barge)	0/0	3/1	3/1	3/1	3/1
	Deep Water and Barge Berth Length (lf)	N/A	3,200 lf	3,550 lf	3,000 lf	2,950 lf
	Total Available Site Area (ac) **	167 ac	182 ac	168 ac	167 ac	167 ac
	Equal Backlands Balance	N/A	Yes	Yes	Yes	Yes
	Potential to Capture Greater Market Share	No	Yes	Yes	Yes	Yes
	Complement Existing Facilities	No	Yes	Yes	Yes	Yes
2. Accommodate On-Site Processing and Distribution Facilities						
	Site Can Accommodate On-Site Processing and Distribution Facilities Separate From Backlands Operations Area	N/A	Yes	Yes	Yes	Yes
3. Respond to Federal, State, Regional and Local Plans						
	Design is Consistent with Federal Need to Enhance Intermodal Transportation Infrastructure	N/A	Yes	Yes	Yes	Yes
	Design is Consistent with NJ Freight Plan and Visioning Plan	N/A	Yes	Yes	Yes	Yes
	Design is Consistent with Regional Transportation Improvement Plan (TIP)	N/A	Yes	Yes	Yes	Yes
	Design is Consistent with Borough Redevelopment Plan	N/A	Yes	Yes	Yes	Yes
4. Provide for Safe and Secure Operations						
	Absence of Sight Distance Limitations	N/A	Yes	Yes	Yes	No
	Absence of Traffic Maneuvering and Control Issues	N/A	Yes	Yes	Yes	No
	Absence of Emergency Access Constraints	N/A	Yes	Yes	Yes	No
	Absence of Access Constraints During Routine Maintenance and Repair	N/A	Yes	Yes	Yes	No
	Absence of Security Constraints	N/A	Yes	Yes	Yes	No

	Need Description	No Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
5. Avoid Interfering with Navigation and Docking at Existing Terminals						
	Absence of Potential Navigation Interference with Adjacent Existing Terminal and Mantua Creek Channel	N/A	Yes	Yes	Yes	No
	Absence of Potential to Obstruct Navigation Lights at Mantua Creek	N/A	Yes	Yes	Yes	No
6. Achieve Minimum Operating Efficiency Thresholds						
	Continuous Wharf Structure	N/A	Yes	Yes	Yes	No
	Absence of Truck/Rail Circulation Conflicts	N/A	Yes	Yes	Yes	No
	Absence of Crane/Truck Circulation Conflicts	N/A	Yes	Yes	Yes	No
	Absence of Circulation Conflicts at Berth 3 and Barge Berth	N/A	Yes	Yes	Yes	No
	No Conflicts Between Berths 1and 2 Circulation Pattern with the Berth 3 and Barge Berth Circulation Pattern	N/A	Yes	Yes	Yes	No
	Wharf to Backlands Travel Distance is = or > Industry Threshold (1,800 ft per roundtrip distance; additional VMT)	N/A	Yes (1,450 ft: -13,200 less VMT)	Yes (1,100 ft; -28,600 less VMT)	Yes (1,750 ft; 0 additional VMT)	No (2,250 ft; 22,000 additional VMT)
	Wharf to Backlands Travel Time is = or > Industry Threshold (4 minutes per trip)	N/A	Yes (3.3 minutes)	Yes (3 minutes)	Yes (4 minutes)	No (5 minutes)
	Working Hours Per Vessel Call is as = or > Industry Threshold (150 hours per call)	N/A	Yes (124 hours)	Yes (94 hours)	Yes (150 hours)	No (193 hours)
7. Achieve Minimum Operating Cost Efficiency Thresholds						
	Wharf to Backlands Cost Per Vessel Call is = or > Industry Threshold ($1.2 million annual cost to shipper)	N/A	Yes ($959,000)	Yes ($713,000)	Yes ($1.2 million)	No ($1.6 million)
8. Return on Public Investment - Achieve a Competitive Marine Terminal Compared to Industry Thresholds Scoring System						
	Estimated Construction Cost ($ million)	N/A	$220 million	$252 million	$257 million	$254 million
	Estimated Construction Duration (months)	N/A	30 months	35 months	24 months	24 months
	New Deep-Water Berths and Backlands Balance	N/A	Yes = 1	Yes = 1	Yes = 1	Yes = 1
	On-site Processing and Distribution Facilities	N/A	Yes = 1	Yes = 1	Yes = 1	Yes = 1

	Need Description	No Action Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Respond to Local and Regional Planning	N/A	Yes = 1	Yes = 1	Yes = 1	Yes = 1
	Safe and Secure Operations	N/A	Yes = 1	Yes = 1	Yes = 1	No = 0
	Absence of Navigational Interference	N/A	Yes = 1	Yes = 1	Yes = 1	No = 0
	Efficiency and Speed of Operations	N/A	Yes = 1	Yes = 1	Yes = 1	No = 0
	Cost to Shipper is = or > the Industry Threshold (annual additional cost)	N/A	Yes = 1 (-$261,000)	Yes= 1 (-$507,000)	Yes= 1 ($0)	No = 0 (+$400,000)
Total Item 8 Purpose and Need Performance Scores:		**0**	**7**	**7**	**7**	**3**

TABLE 3.3 PAULSBORO MARINE TERMINAL – DESIGN ALTERNATIVES EVALUATION STEP 2: GOALS AND OBJECTIVES

	Goal and Objective Description	No Action Alternative	Alternative 1	Alternative 2	Alternative 3
1. Contribute to Local Economic Development					
	Provide New Industrial Use and Business Revenue Source	No	Yes	Yes	Yes
2. Create New Local Employment Opportunities					
	Provide a New, Permanent Industrial Use In Close Proximity to a Local Workforce Population	No	Yes	Yes	Yes
3. Re-Use Former Industrial Site and/or Property Designated for Redevelopment					
	Alternative Meets Criteria	No	Yes	Yes	Yes
4. Avoid or Minimize New Impacts on the Natural and Human Environments					
	Wharf Design	N/A	Structure on fill with bulkhead	Structure on fill with bulkhead	Structure on piles
	Wharf Location (Distance of Berth Face from Shoreline†)	N/A	Adjacent to shoreline (520 ft)	Partly over the shoreline (155 ft)	Adjacent to shoreline (520 ft)
	Backlands Design	N/A	Fill to match wharf elevation	Fill to match wharf elevation	Portion filled to match wharf elevation; portion of shallows retained
	Open Water Coverage: On–Pile Structures (ac)	0.0 ac	0.0 ac	0.0 ac	10.6 ac
	Area of Piles / Cells (ac)	0.0 ac	0.0 ac	0.0 ac	0.2 ac
	Land Creation: Open Water - Fill (ac)	0.0 ac	15 ac	5 ac	0.0 ac
	Shoreline Revetment Area (ac)	0.0 ac	2 ac	3 ac	9 ac
	Upland Removal (ac) ††	0.0 ac	0.0 ac	4 ac	0.0 ac
	Dredging and Removal of Landside Contaminated Soil	No	No	Yes	No
	Subtidal Impacts (ac)	0.0 ac	11.3 ac	13.6 ac	6.2 ac
	Freshwater Wetlands Impacts (ac)	0.0 ac	1.05 ac	1.05 ac	1.05 ac
	Total Area of Open Water Fill Requiring Mitigation (ac)	0.0 ac	10.6 ac	4.6 ac	0.0 ac
	Dredging Volume (CY) †††	0.0 ac	495,000 CY	1,601,000CY	587,000 CY
	Total Area of Dredging Requiring Mitigation (ac)	0.0 ac	4.3 ac	12.9 ac	6.7 ac

	Goal and Objective Description	No Action Alternative	Alternative 1	Alternative 2	Alternative 3
	Intertidal Impacts - Dredging and/or Filling (ac)	0.0 ac	14.9 ac	17.5 ac	6.7 ac
	Potential to Increase Sedimentation in River From Mantua Creek	None	Low	Low	Low
	Tidelands Impact Area	0.0 ac	High	Low	Moderate
	Landscape Buffer Provided Along Western Boundary	N/A	Yes	Yes	Yes
	Dedicated Access Road that is Distinct from Community Street System	N/A	Yes	Yes	Yes
	Overall Performance on Goal and Objective 4:	**High**	**Low**	**Low**	**Moderate**
5. Respond to the DRPA's Green Ports Initiative					
	Opportunities for Energy and Cost Savings Consistent with the Green Ports Initiative	N/A	Yes	Yes	Yes

Notes:
† Dimension measured from the face of wharf to the NAVD88 El. 0.0 level at Wharf Station 25+00 in all alternatives.
†† Upland areas currently in dry condition.
††† Dredging is considered to be all volume on the riverside of the bulkhead wharf face.

3.5 Conceptual Operation of the Preferred Alternative

The following narrative describes the conceptual layout of landside operation elements of the Preferred Alternative. Further design refinement is likely as the project matures and the market driven terminal demands are identified. The conceptual layout contains five distinct areas of operation, which are detailed below and are, in part, shown in Figure 3.12.

Processing Facility: A 35-acre processing facility is designed to be located on the northeastern portion of the site adjacent to the proposed barge wharf. The site elements generally consist of an open storage yard, activity area, 15-car rail loading tracks with mobile harbor crane, 28-car rail storage yard, scale house/administration building and a water collection/treatment system for dust suppression. The processing facility is designed to have a dedicated secondary access gate to provide direct access for the employees and trucks. The processing facility is designed to be separated from the remainder of the terminal by a security fence. This facility may be used for the export of recycled metal products or for the importation of a food-grade bulk commodity. Using recycled metal products as an example, recycled metals would arrive at the site by way of barge, rail, and trucks for transfer to deep sea vessels. The collected materials would be sorted, stockpiled and processed onsite.

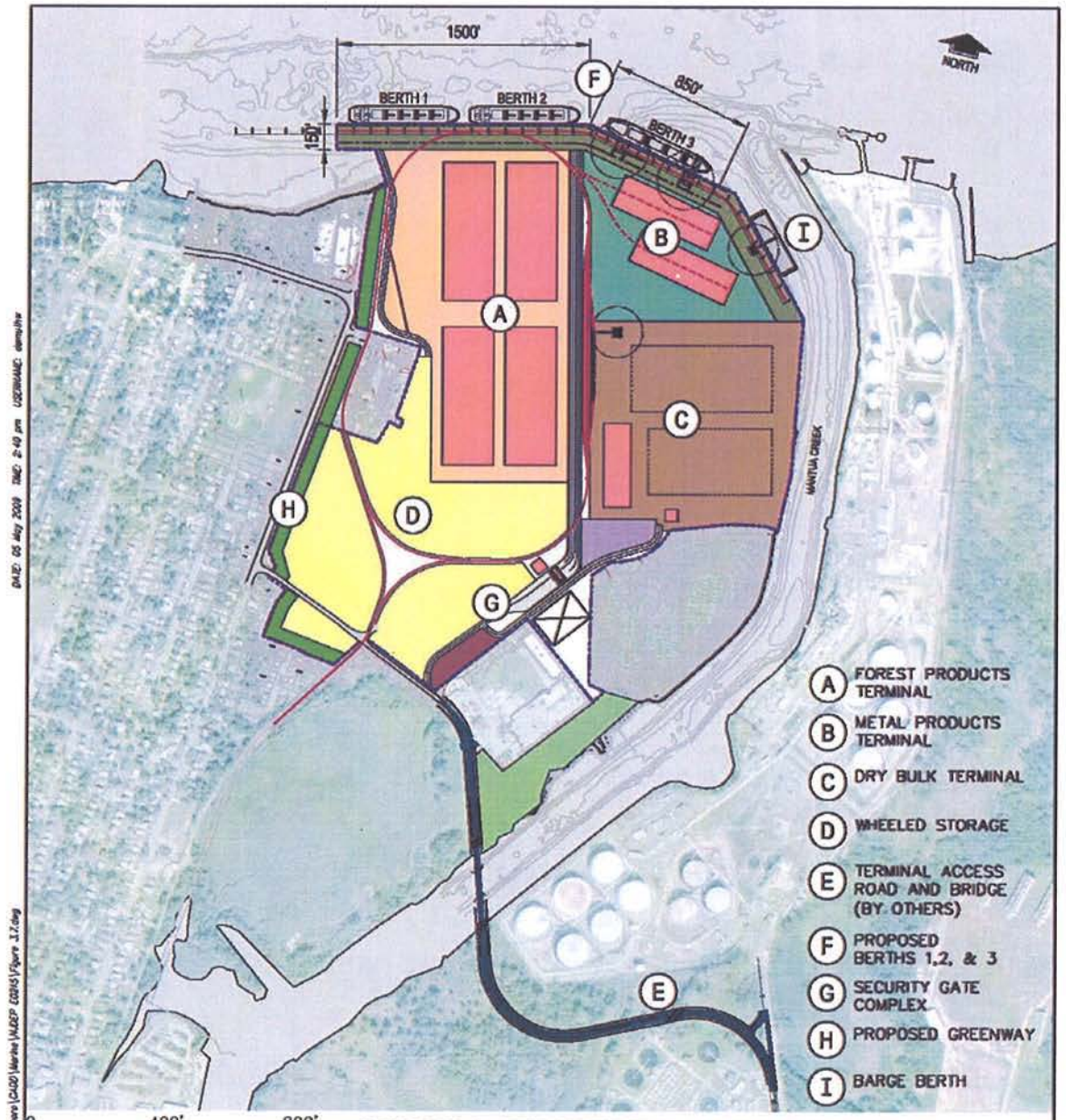
Break-Bulk Finished Products: A 17-acre finished products terminal is designed to be located in the western portion of the site adjacent to the westernmost berths. Site elements could consist of two transit sheds totaling 250,000 square feet, approximately 11 acres of outdoor storage area and future plans to provide direct rail access to warehouses. This terminal may be used for the import of finished steel products, such as structural steel products, pipe, rebar, coiled steel, slab steel, and other metal products. These products can be shipped from the facility palletized, bundled, loose, or as bulky individual items.

Break-Bulk Products: A 44-acre products terminal is designed for the central area of the site. The general project elements include approximately six transit sheds totaling approximately 1.0 million square feet of indoor storage, and two rail spurs providing 2,200 linear feet of storage track. This facility may be used for the import of forest products: lumber, plywood, paper and other products. These products usually are shipped palletized or bundled.

Wheeled Containerized Cargo Yard: An 18-acre wheeled containerized cargo yard is designed at the southern portion of the project site. At this time, it is anticipated that this operation could be used for a small RO-RO export operation. This operation may use wheeled flatbed trucks for conveyance from/to the ship. Cargo is also anticipated to be stored using box-on-a-chassis system (wheeled storage). This yard represents approximately 12 percent of the proposed terminal area and would use some of the spare berthing capacity at the wharf. This area may also be available for outdoor cargo storage overflow to serve the break-bulk products terminals along with potential oversized/overweight cargo.

Administrative/Security Complex and Ancillary Facilities: The administration/security gate complex and the ancillary facilities combined, encompass more than 20 acres of the proposed Paulsboro Marine Terminal. The proposed elements include a centralized security gate complex for all marine terminals, a secondary access road to the processing facility, employee/vendor parking areas, a multi-story administration/tenant office building, a centralized maintenance yard, a utility yard for the power substation and sewer lift stations, an auxiliary

multi-use area for the gate, rail storage tracks within a centralized transportation corridor and the 80 foot-wide "greenway" along the western perimeter of the project site to separate the terminal from the neighboring community. A four-lane terminal spine road would extend from the gate to the wharf, channeling vehicular traffic efficiently to the internal warehouse facilities and storage yards.



WHARF ALTERNATIVE 1 - SITE PLAN

FOR PERMIT USE ONLY
NOT FOR CONSTRUCTION

BULKHEAD WHARF FACE, FILL BEHIND, BENT ALIGNMENT ALONG EXISTING BERTH LINE

PURPOSE: TO CONSTRUCT MARINE TERMINAL AND ASSOCIATED IMPROVEMENT

DATUM: NAVD 88

AGENT: SJPC/GCIA

PREPARED BY: AECOM USA, Inc.

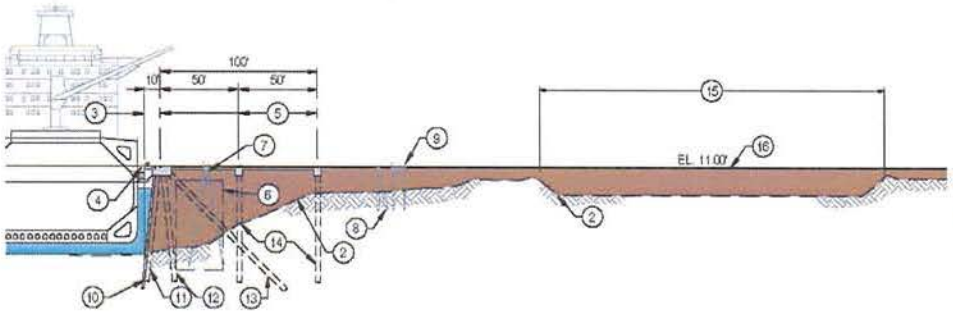
PROPOSED
PAULSBORO MARINE TERMINAL
BOROUGH OF PAULSBORO

GLOUCESTER COUNTY
STATE OF NEW JERSEY

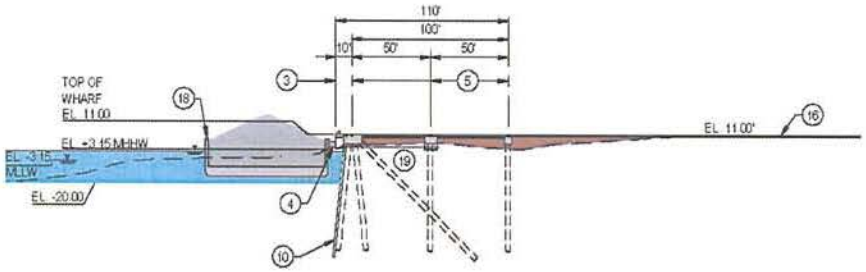
APPLICATION BY: SOUTH JERSEY PORT CORPORATION

DATE: 02-24-09

FIGURE 3.8

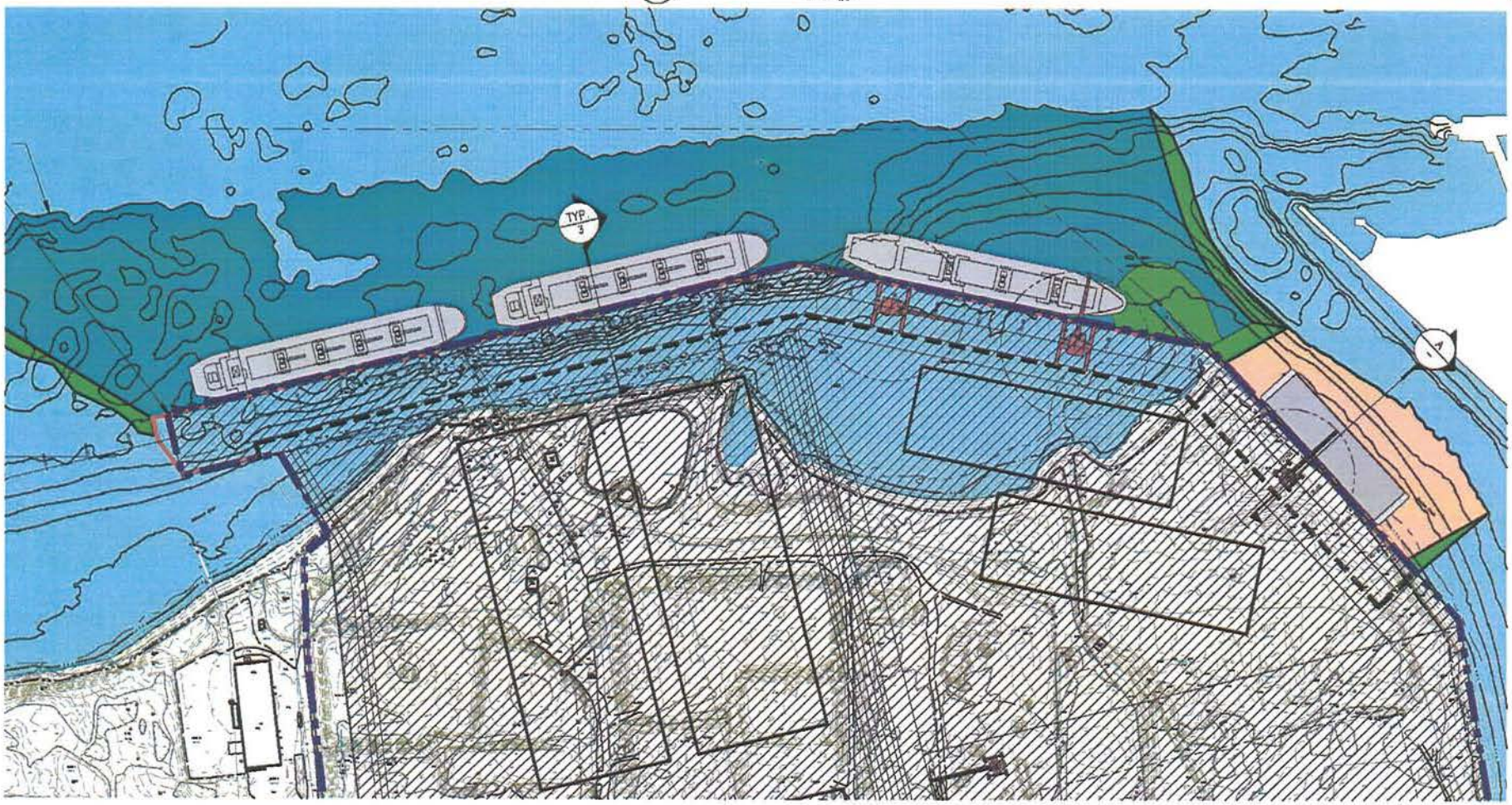


AL SECTION - WHARF ALTERNATIVE NO. 1



TYPICAL SECTION - BARGE BERTH

1" = 50'



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17. PILE SUPPORTE
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Paulsboro Ma	
No.	Name
1	Open Water Fill
2	Bulkhead Berths &
4	Dredging
5	Revetment

N

0'
SCALE:

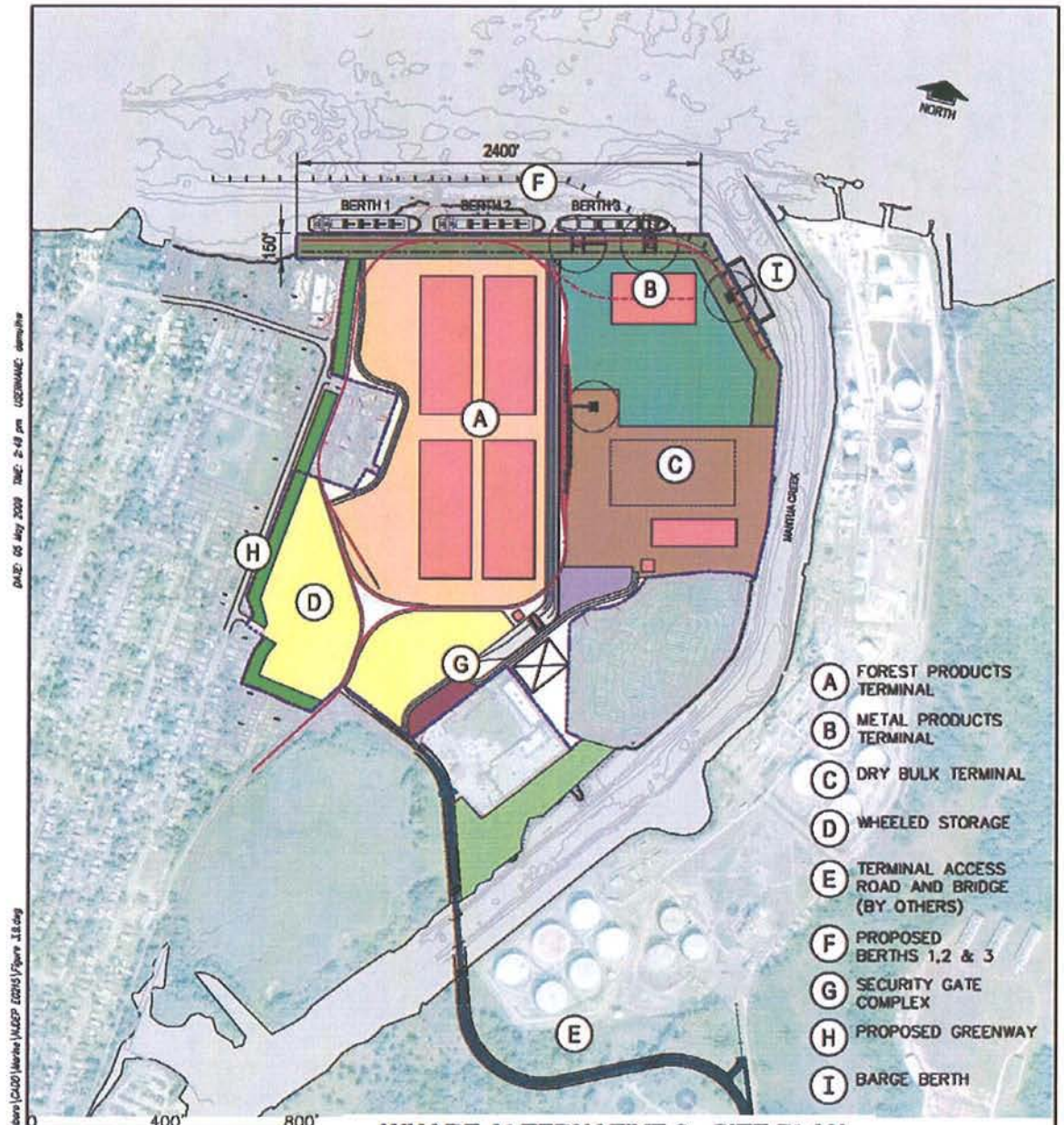
WHARF ALTERNATIVE NO. 1

1" = 150'

WHARF ALT NO. 1:
BULKHEAD WHARF FACE,
BENT ALIGNMENT ALONG EXISTING B

PURPOSE: TO CONSTRUCT MARINE TERMINAL AND ASSOCIATED

PAULSBOR



WHARF ALTERNATIVE 2 - SITE PLAN

FOR PERMIT USE ONLY
NOT FOR CONSTRUCTION

BULKHEAD WHARF FACE, FILL BEHIND, STRAIGHT ALIGNMENT,
365 LF IN-SHORE OF EXISTING BERTH LINE

PURPOSE: TO CONSTRUCT MARINE TERMINAL AND ASSOCIATED IMPROVEMENT

DATUM: NAVD 88

AGENT: SJPC/GCIA

PREPARED BY: AECOM USA, Inc.

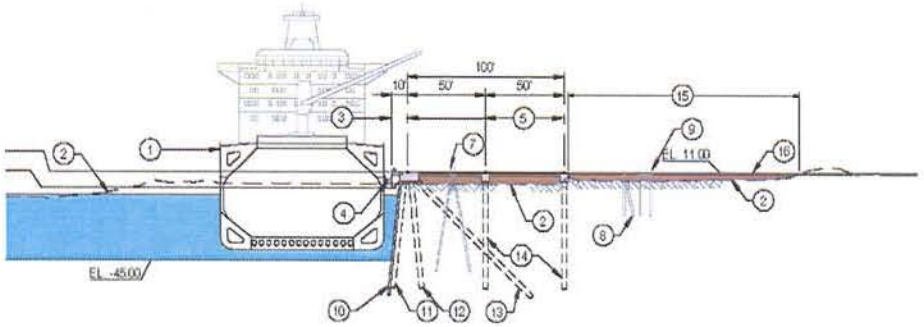
PROPOSED
PAULSBORO MARINE TERMINAL
BOROUGH OF PAULSBORO

GLOUCESTER COUNTY
STATE OF NEW JERSEY

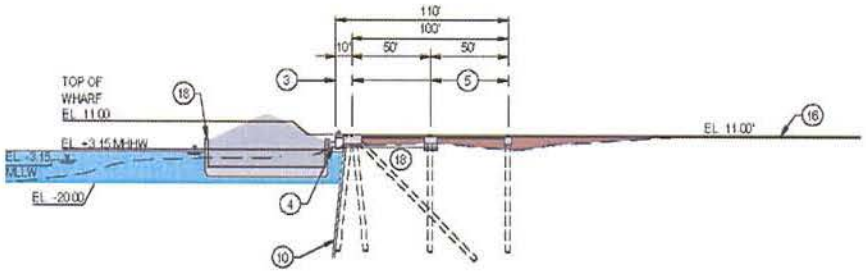
APPLICATION BY: SOUTH JERSEY PORT CORPORATION

DATE: 02-24-09

FIGURE 3.10

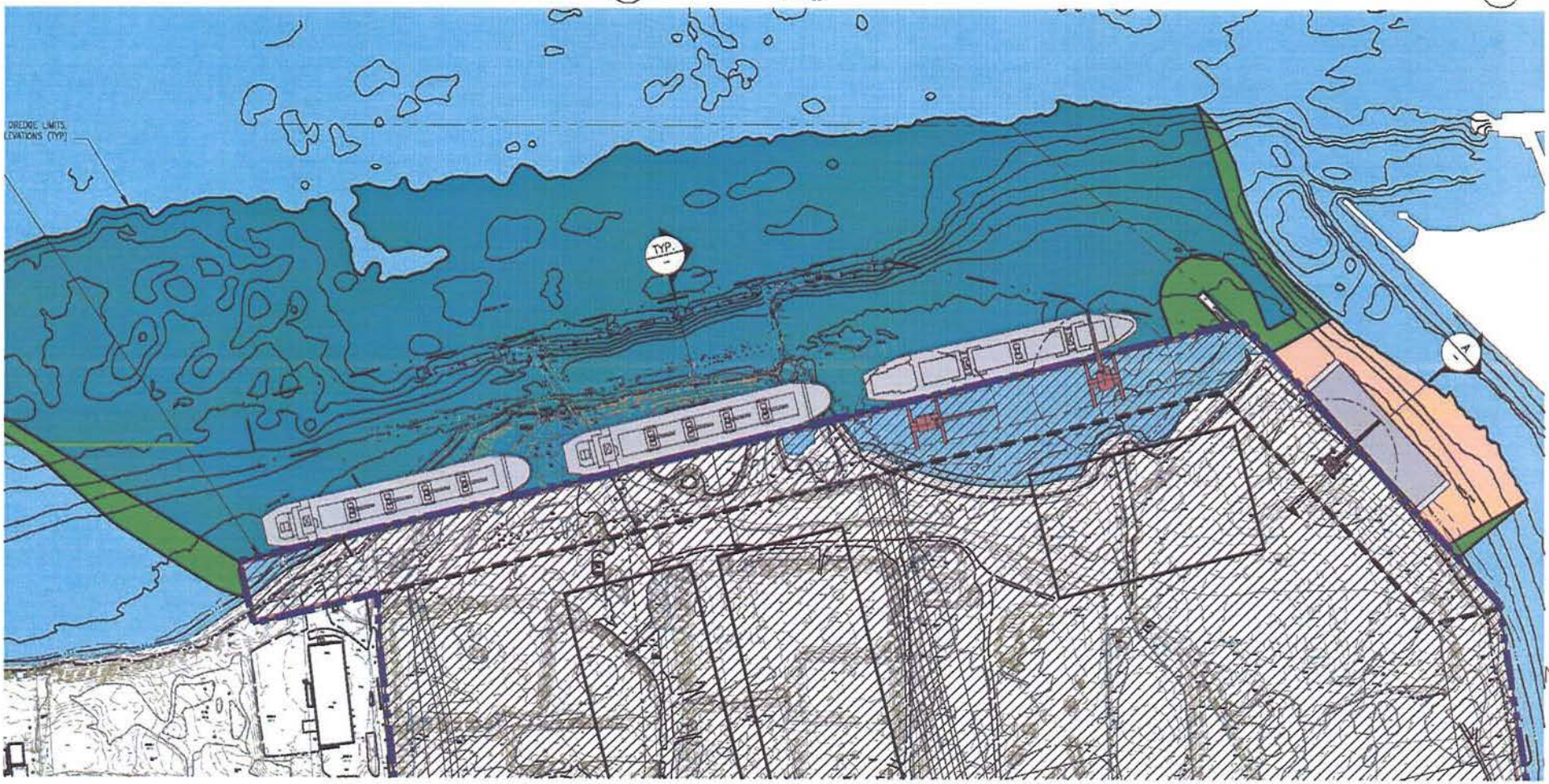


. SECTION - WHARF ALTERNATIVE NO. 2



TYPICAL SECTION - BARGE BERTH

1" = 50'



1. BULK CARRIER
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12. BATTER PILES
13. TIE BACK ANCH
14. PLUMB PILES U
15. EXISTING STOR BASIN FILLED
16. CONCRETE PAV
17. PILE SUPPORTE
18. BARGE
18. DEADMAN TIEB

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BULKH

1. ELEVATIONS SHO
2. HYDROGRAPHIC ASSOC

No.	Pau
1	Open W
2	Dry Land
3	Bulkhead
4	Dredging
5	Revetme

N

0'
SCALE:

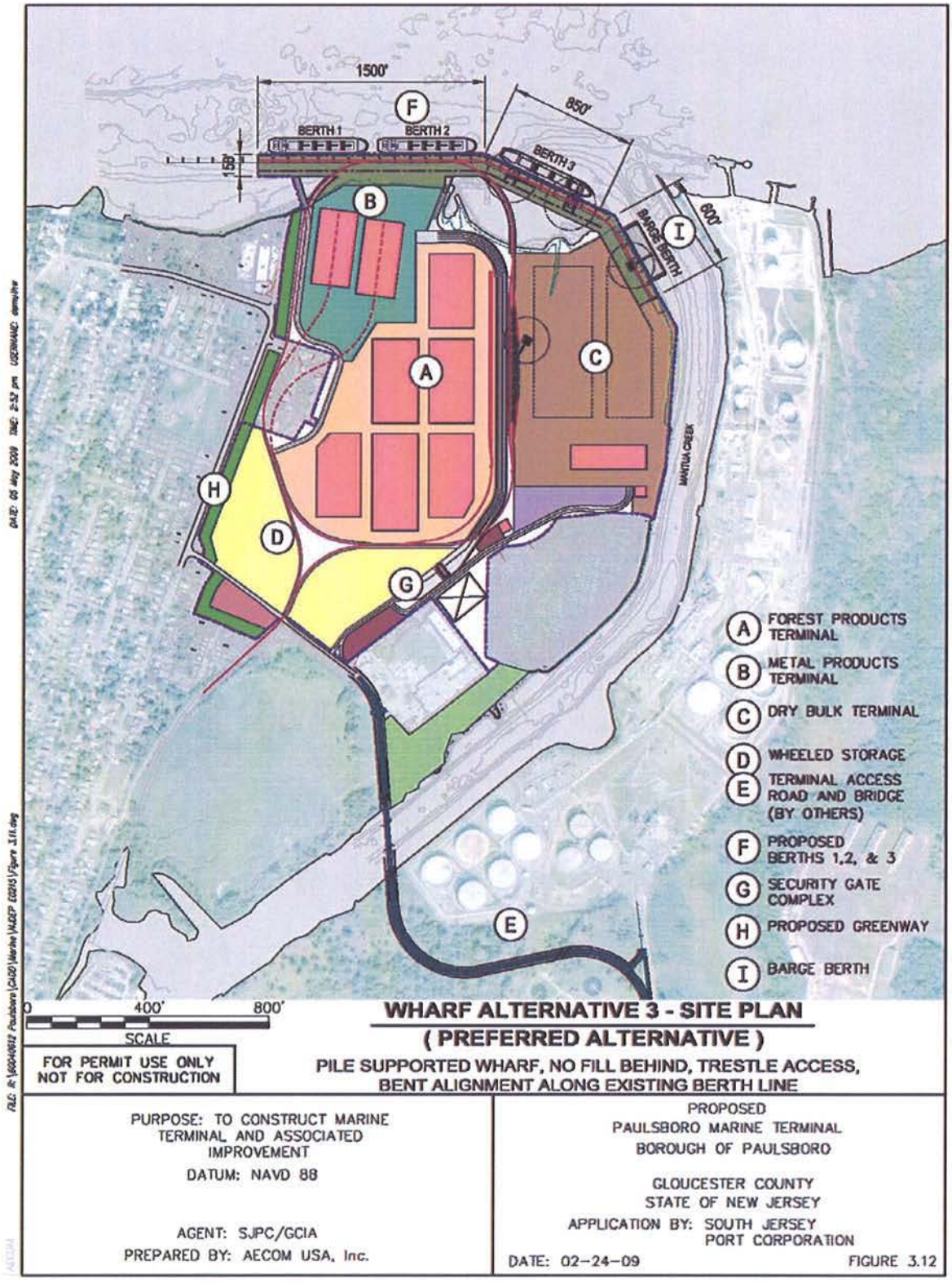
WHARF ALTERNATIVE NO. 2

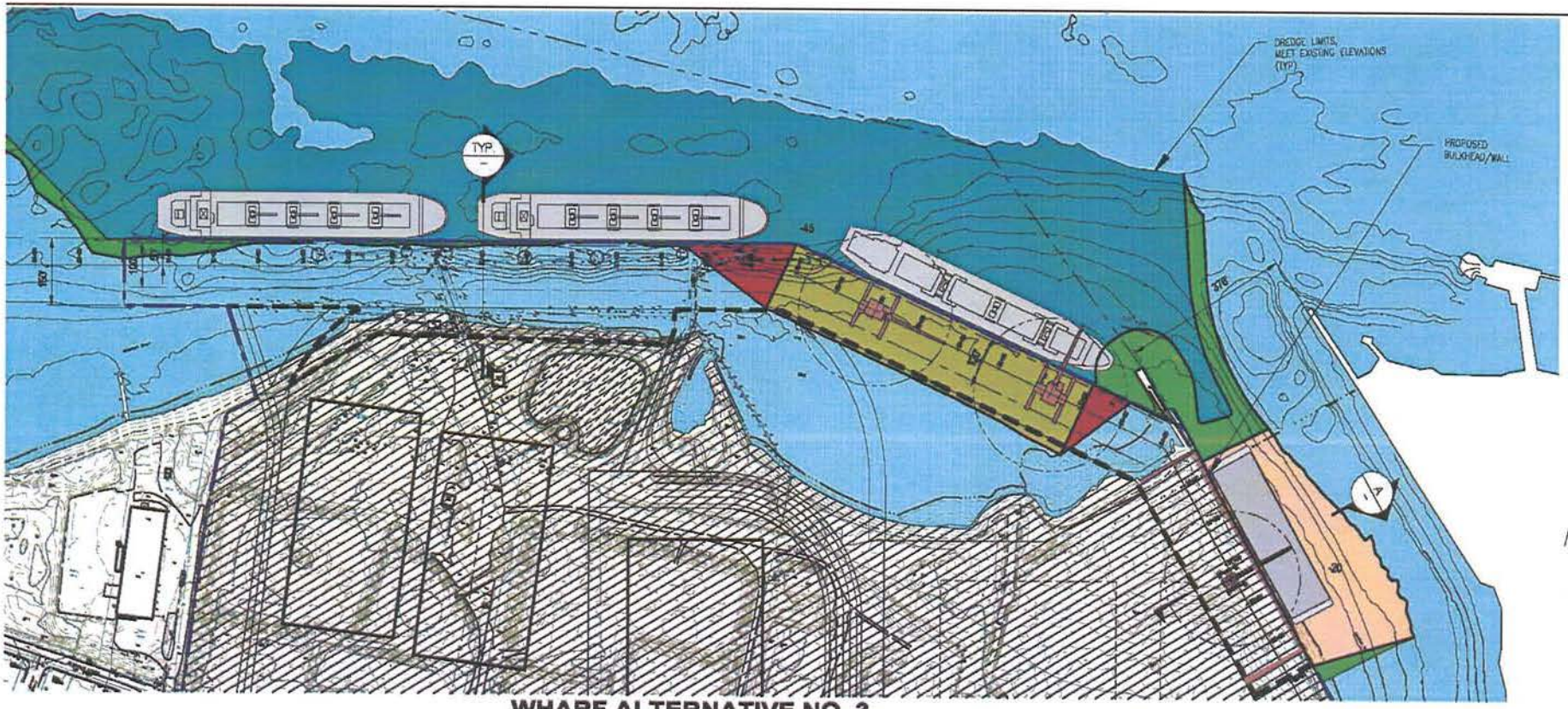
1" = 150'

WHARF ALT NO. 2:
BULKHEAD WHARF FACE, MINIMAL FILL BE
ALIGNMENT, 365 LF IN-SHORE OF EXISTI

PURPOSE: TO CONSTRUCT MARINE TERMINAL AND ASSOCIATED

PAULSBOR


1500'
850'
800'
BERTH 1
BERTH 2
BERTH 3
BARGE BERTH
MANTUA CREEK
A FOREST PRODUCTS TERMINAL
B METAL PRODUCTS TERMINAL
C DRY BULK TERMINAL
D WHEELED STORAGE
E TERMINAL ACCESS ROAD AND BRIDGE (BY OTHERS)
F PROPOSED BERTHS 1,2, & 3
G SECURITY GATE COMPLEX
H PROPOSED GREENWAY
I BARGE BERTH
0 400' 800'
SCALE
FOR PERMIT USE ONLY
NOT FOR CONSTRUCTION
WHARF ALTERNATIVE 3 - SITE PLAN
(PREFERRED ALTERNATIVE)
PILE SUPPORTED WHARF, NO FILL BEHIND, TRESTLE ACCESS,
BENT ALIGNMENT ALONG EXISTING BERTH LINE
PURPOSE: TO CONSTRUCT MARINE TERMINAL AND ASSOCIATED IMPROVEMENT
DATUM: NAVD 88
AGENT: SJPC/GCIA
PREPARED BY: AECOM USA, Inc.
PROPOSED
PAULSBORO MARINE TERMINAL
BOROUGH OF PAULSBORO
GLOUCESTER COUNTY
STATE OF NEW JERSEY
APPLICATION BY: SOUTH JERSEY PORT CORPORATION
DATE: 02-24-09
FIGURE 3.12



WHARF ALTERNATIVE NO. 3

1" = 150'

1 BULK CARRIER
2 EXISTING CONTC
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4 ARMOR STONE S
5 FACE OF WHARF
6 FENDERING SYS
7 PILE SUPPORTE
8 CENTERLINE OF
9 EXISTING CELL T WHARF STRUCTU
10 EXISTING WALKV
11 EXISTING PROTE
12 EXISTING WALKW
13 RETAINING WALL
14 SECURITY FENCE
17 PILE SUPPORTE
18 CL OF RAIL
19 AREA FOR WHEE
20 ROAD STRUCTUF
21 OPEN WATER
22 VEHICLE LANE
23 PER BP'S PROPC TECHNOLOGIES FILLED AND CAPI

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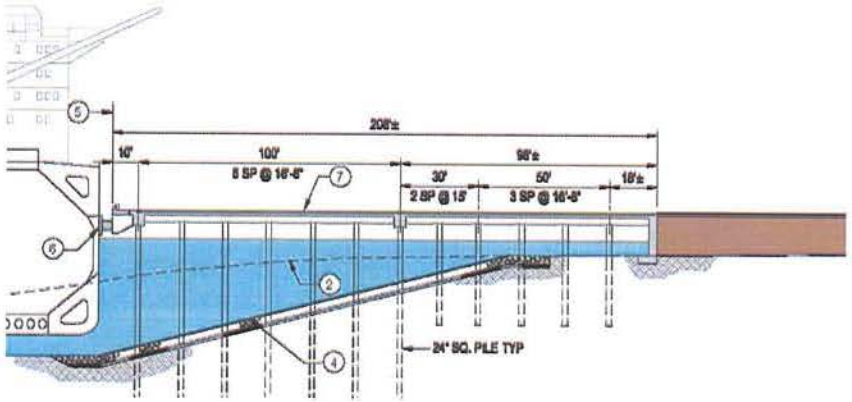
DREDG
SLOPE
SLOPE
AREA C SLOPE
DREDG
LAND C
EXISTIN
WHARF
BULKHE

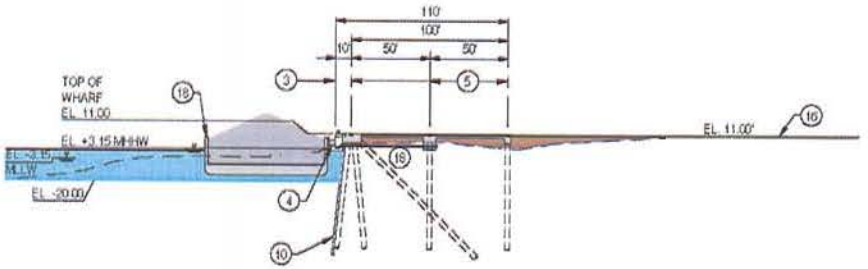
1. ELEVATIONS SHC
2. HYDROGRAPHIC ASSOC

No.	Name
1	Bulkhead (Barge B
2	Coverage Over Ope
3	Dredging
4	Revetment



AL SECTION - WHARF ALTERNATIVE NO. 3

TYP.



TYPICAL SECTION - BARGE BERTH

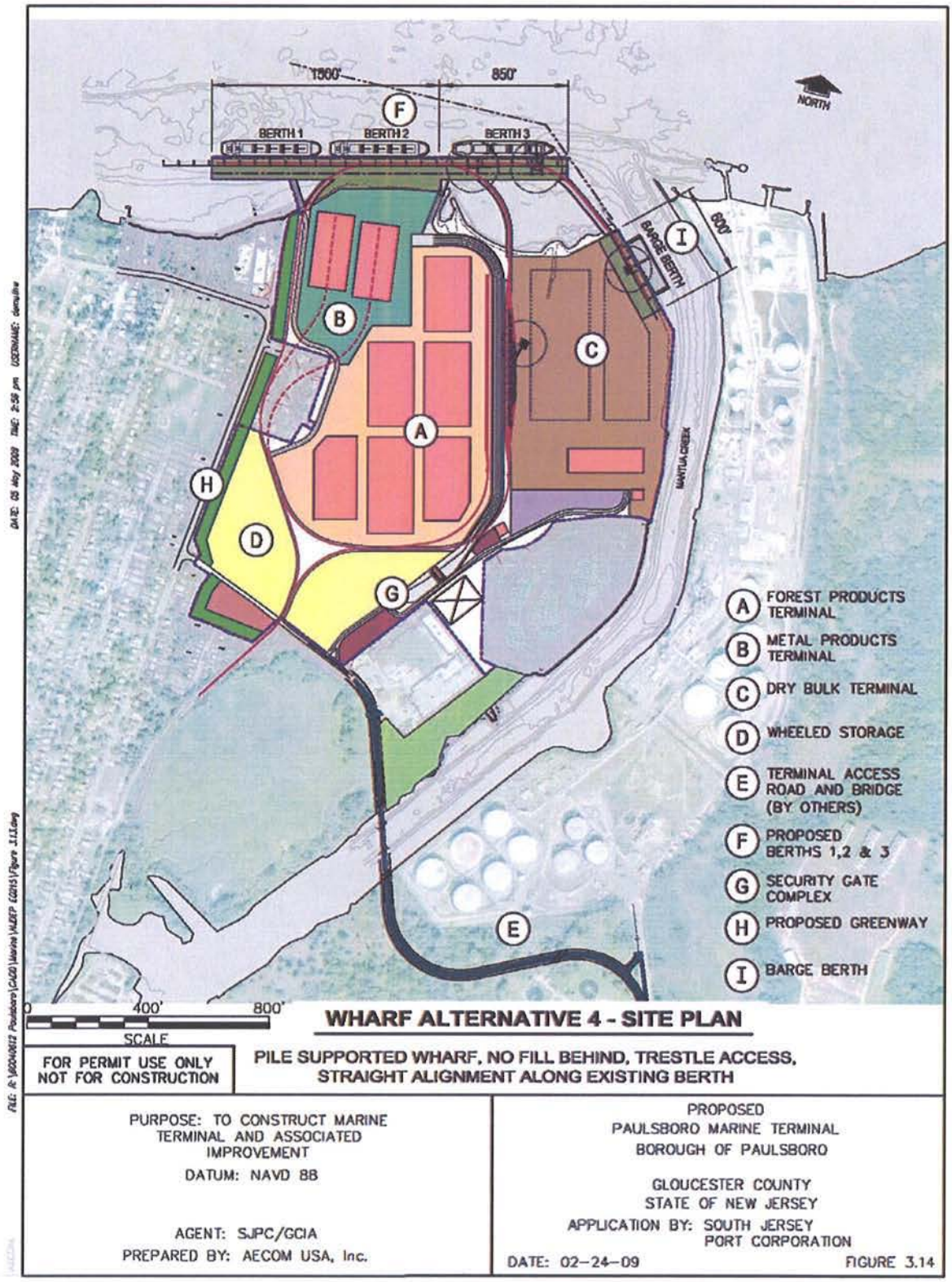
1" = 50'

A

WHARF ALT NO. 3: PREFERRED ALTI PILE SUPPORTED WHARF, NO FILL TRESTLE ACCESS

PURPOSE: TO CONSTRUCT MARINE TERMINAL AND ASSOCIATED

PAULSBOR


1300'
850'
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BERTH 1
BERTH 2
BERTH 3
NORTH
I
600'
BARGE BERTH
B
C
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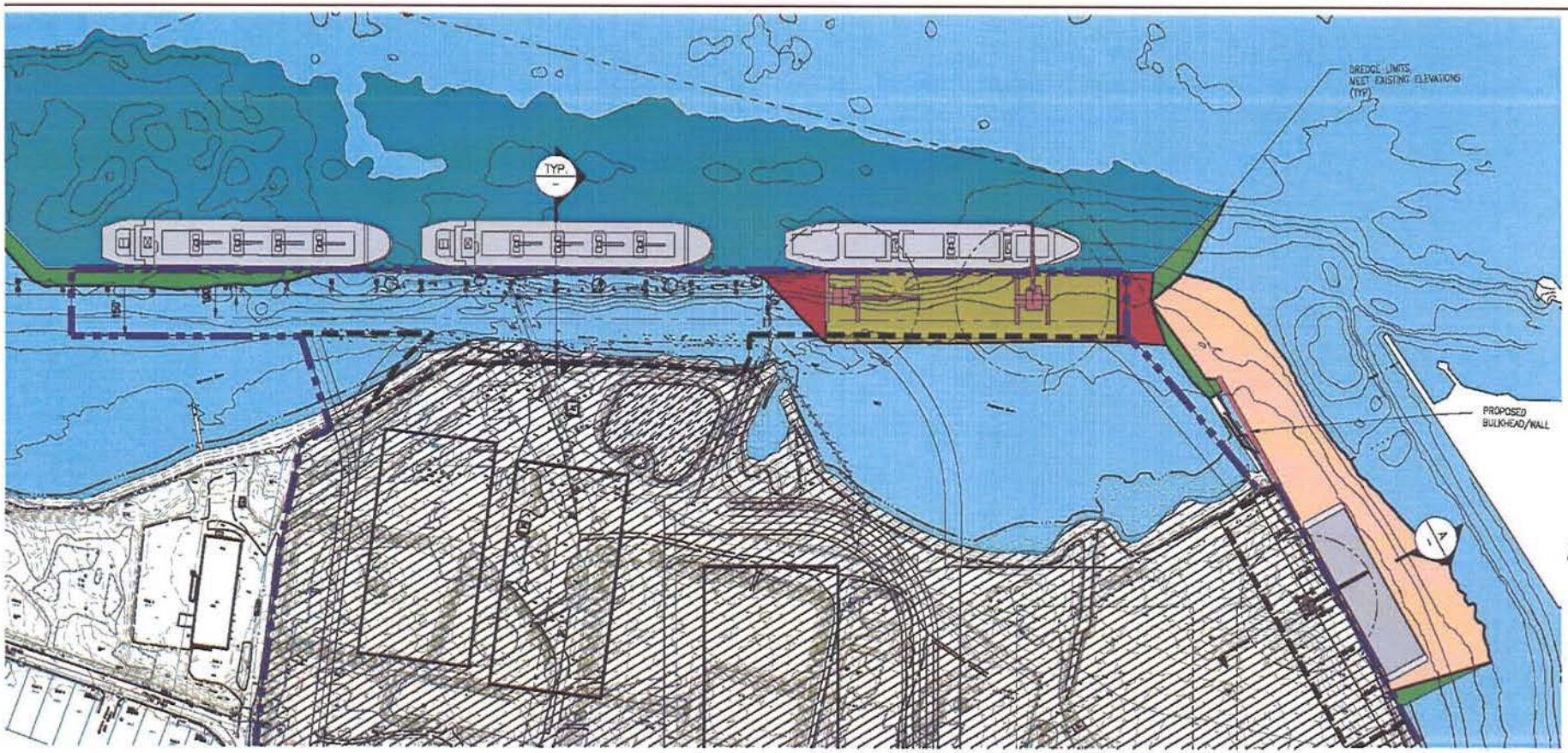
D
G
MANTUA CREEK
E
A FOREST PRODUCTS TERMINAL
B METAL PRODUCTS TERMINAL
C DRY BULK TERMINAL
D WHEELED STORAGE
E TERMINAL ACCESS ROAD AND BRIDGE (BY OTHERS)
F PROPOSED BERTHS 1,2 & 3
G SECURITY GATE COMPLEX
H PROPOSED GREENWAY
I BARGE BERTH
0
400'
800'
SCALE
WHARF ALTERNATIVE 4 - SITE PLAN
FOR PERMIT USE ONLY
NOT FOR CONSTRUCTION
PILE SUPPORTED WHARF, NO FILL BEHIND, TRESTLE ACCESS, STRAIGHT ALIGNMENT ALONG EXISTING BERTH
PURPOSE: TO CONSTRUCT MARINE TERMINAL AND ASSOCIATED IMPROVEMENT
DATUM: NAVD 88
AGENT: SJPC/GCIA
PREPARED BY: AECOM USA, Inc.
PROPOSED
PAULSBORO MARINE TERMINAL
BOROUGH OF PAULSBORO
GLOUCESTER COUNTY
STATE OF NEW JERSEY
APPLICATION BY: SOUTH JERSEY PORT CORPORATION
DATE: 02-24-09
FIGURE 3.14



WHARF ALTERNATIVE NO. 4

1" = 150'

1 BULK CARRIER
2 EXISTING CONTO
3 PROPOSED DREI
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5 FACE OF WHARF
6 FENDERING SYS
7 PILE SUPPORTEI
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9 EXISTING CELL T WHARF STRUCTU
10 EXISTING WALKV
11 EXISTING PROTE
12 EXISTING WALKV
13 RETAINING WALL
14 SECURITY FENCE
15 ENGINEERED FIL
16 CONCRETE PAVE
17 PILE SUPPORTEI
18 CL OF RAIL
19 AREA FOR WHEE
20 ROAD STRUCTUI
21 OPEN WATER
22 VEHICLE LANE
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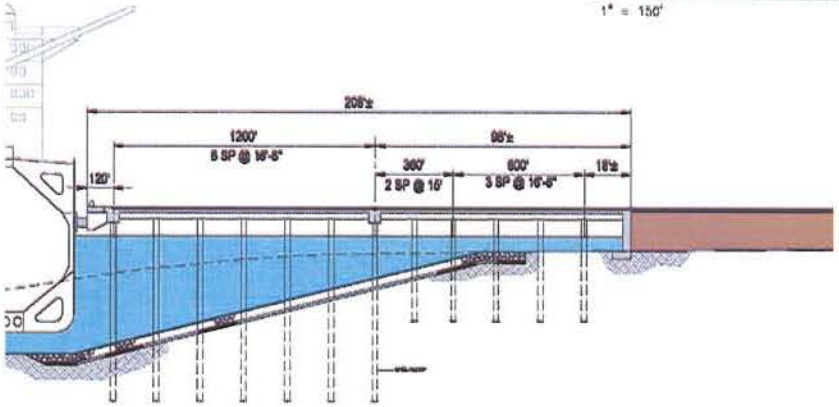
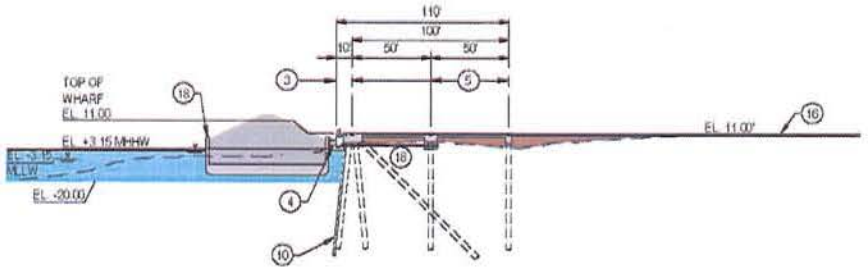


ECTION - WHARF ALTERNATIVE NO. 4



TYPICAL SECTION - BARGE BERTH

1" = 50'

Paulsboro Ma	
No.	Name
1	Bulkhead (Barge B
2	Coverage Over Ope
3	Dredging
4	Revetment

0'
SCALE:

WHARF ALT NO. 4
PILE SUPPORTED WHARF, NO FILL BEHIND, T
STRAIGHT ALIGNMENT ALONG EXISTING

PURPOSE: TO CONSTRUCT MARINE TERMINAL AND ASSOCIATED

PAULSBOR

4.0 EXISTING ENVIRONMENTAL CONDITIONS

This section describes existing environmental conditions within and proximate to the site.

4.1 Surface Features and Landforms

4.1.1 Topography

Topography within the site is predominantly flat (Figure 4.1). Elevations range between approximately 2 and 16 feet above mean sea level (MSL). The highest elevations are associated with the former secondary containment berms that surrounded each of the former above ground petroleum storage tanks. The tanks have been removed but remnants of the berms remain. The lowest elevations can be found along the Delaware River and Mantua Creek.

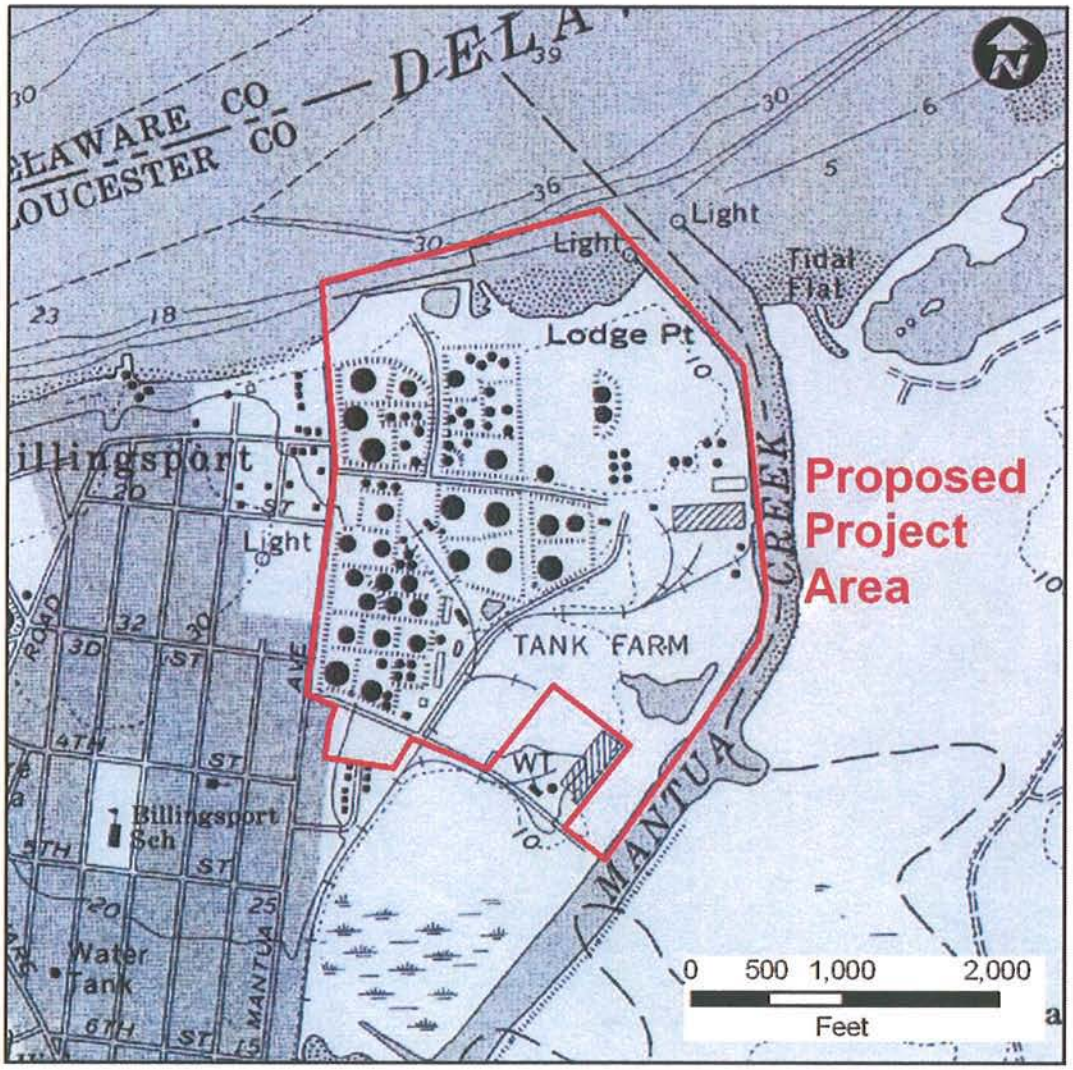


Figure 4.1 USGS Topographic Map
Source: USGS Woodbury NJ/PA Quadrangle

4.1.2 Geology

New Jersey is divided into the Valley and Ridge, Highlands, Piedmont, and Coastal Plain Physiographic Provinces. Each province defines a region in which relief, landform, and geology are significantly different from that of the adjoining nearby regions. The boundary between each province is determined by a major change in topography and geology and this data delineates the boundary lines between them.

The site is situated within the Coastal Plain Physiographic Province. The Coastal Plain Province topographically is generally flat to very gently undulating. This province is characterized by southeastward sloping beds of sediment, which are comprised of sand, silts, and clays. These sediments overlap the bedrock of the Piedmont province in the west and thicken towards the east and the continental shelf. These layers of sediment outcrop in irregular bands trending northeast to southwest. Wide areas of the Coastal Plain are covered by a thin veneer of Late Tertiary and Quaternary sand and gravel deposited by rivers.

The sand formations of the Coastal Plain are productive aquifers and important ground water reservoirs for southern New Jersey.

Figure 4.2 Geologic Formations
Source: New Jersey Office of Information Technology 2007-08 High Resolutions Ortho-Photography

The Coastal Plain formations identified at the site include the Potomac and Magothy Formations (Figure 4.2). The Potomac Formation (Kp) outcrops along the shoreline of the Delaware River and is characterized by fine- to coarse-grain sand, inter-bedded with white, red, or yellow clay. The Magothy Formation (Kmg) comprises the majority of the project area and is characterized by fine- to coarse-grained quartz sand, interbedded with thin-bedded clay or clay-silt.

4.1.3 Soils

Soil information was obtained using the NJDEP *i-MapNJ* Geographic Information Systems (GIS) Interactive Mapping website (www.state.nj.us/dep/gis/newmapping.htm). This website details the soils from the original soil maps created by the U.S. Department of Agriculture (USDA) with added layers showing the most recent information available. The USDA has been re-mapping the County soil maps throughout the United States under the Soil Survey Geographic Database

program (SSURGO). The intent of the program is to create new digital soils maps for each County, which are spatially accurate and fully attributed.

The soils in the site are mapped as Udorthents (UddcB), which are characterized as dredged-coarse materials having 0 to 8 % slopes (Figure 4.3). Udorthents can be further segregated into at least two subcategories as detailed below:

Udorthents, organic substratum – This soil type is found in low areas of marine and estuarine deposits. Areas of this unit have been filled and smoothed to a depth of 3 feet or more. The original soil can no longer be identified. This fill material generally consists of a mixture of stones, boulders, rubble, and soil material. In most areas, the original soils are presumed to have been deep, very poorly drained, organic or mineral soils that were subject to daily tidal flooding.

Udorthents, organic substratum – Urban land complex – This soil type is in low areas of marine and estuarine deposits and in the uplands. The Udorthents and Urban land occur as areas so intricately mixed or so small that it is not practical to map them separately. These soils are about 50% Udorthents, organic substratum; 35% Urban land; and 15% included areas.

Figure 4.3 Soil Survey Geographic Database Program
Source: New Jersey Office of Information Technology 2007-08 High Resolutions Ortho-Photography

4.1.4 Bathymetry

A bathymetric and water sounding survey was conducted at the site in accordance with Corps of Engineers Hydrographic Survey Manual EM 1110-2-1003. This included locating and plotting all items that can be surveyed within the project area. The results of the bathymetric survey were used to develop the proposed dredging plans and permits, and aid in the preliminary designs.

4.2 Surface Water Resources

The site is situated within the Lower Delaware Tributaries New Jersey Watershed Management Area 18 (WMA 18) of the Lower Delaware Water Region. WMA 18 extends southward along the Delaware River from Swede's Run in Delran and Moorestown townships in Burlington County to Oldmans Creek in Oldmans Township, Salem County. WMA 18 includes ten watersheds and encompasses all or part of 65 municipalities. Specifically, the site is contained within the Mantua Creek Watershed. The Mantua Creek drains an area of 50.9 square miles of land. From its headwater in Glassboro, Mantua Creek flows 18.6 miles northwest to the Delaware River at Paulsboro (Figure 4.4).

Figure 4.4 Watershed Management Area 18
Source: NJDEP Division of Watershed Management

The Delaware River and the Mantua Creek are located immediately north and east of the site, respectively. These surface waterbodies are tidal in nature with the Mantua Creek discharging into the Delaware River at this location. Each of these waterbodies is further described in the following sections.

4.2.1 Delaware River

The Delaware River is classified as Interstate Waters for which classifications are administered by the Delaware River Basin Commission (DRBC). According to the DRBC, the Delaware River in proximity of the site is classified as Zone 4, which includes River Mile 95.0 to the Pennsylvania-Delaware State line at River Mile 78.8.

As detailed in the "*New Jersey 2006 Integrated Water Quality Monitoring and Assessment Report*" (Integrated Report NJDEP, 2006), the Delaware River, in particular in the Philadelphia area region, has an industrial history that can still impact the river, with much of the present pollutant runoff attributed to past industry. Chlorinated organic compounds, such as polychlorinated biphenyls (PCBs), chlordane, and DDT, have been found in the tissues of fish and shellfish in the Delaware Estuary, which has resulted in fish consumption advisories being issued for the entire estuary. In addition to the human health risks from consuming contaminated fish, PCBs also represent a direct ecological risk to wildlife and aquatic biota in the estuary. Elevated levels of PCBs, DDT and its metabolites, and chlordane have been detected in Peregrine Falcon eggs from the estuary.

Table 4.1 provides the criteria for human health stream quality objectives to protect the taste and odor of ingested water and fish in all zones of the Delaware River. Results are presented in micrograms per liter (µg/l) unless otherwise noted.

TABLE 4.1 CRITERIA FOR HUMAN HEALTH STREAM QUALITY OBJECTIVES TO PROTECT THE TASTE AND ODOR OF INGESTED WATER AND FISH IN ALL ZONES OF THE DELAWARE RIVER

Parameter	Stream Quality Objective (µg/l)
Phenol	300
2-Chlorophenol	0.1
2,4-Dicholorophenol	0.3
2,4-Dimethylphenol	400
4 – Chloro – 3 – metholphenol	3.0 mg/l
Pentachlorophenol	30
Acenaphthene	20
Chlorobenzene	20
Hexachlorocyclopentadiene	1.0
Nitrobenzene	30

Source: DRBC's Delaware River Basin Commission (DRBC), *Administrative Manual – Part III, Water Quality Regulations*, Revised to Include Amendments Through September 27, 2006

As detailed by the DRBC's Delaware River Basin Commission (DRBC), *Administrative Manual – Part III, Water Quality Regulations*, Revised to Include Amendments Through September 27, 2006, the stream quality objectives for Zone 4 waters are indicated in Table 4.2.

TABLE 4.2 SUMMARY OF STREAM QUALITY OBJECTIVES FOR ZONE 4 WATERS OF THE DRBC

Parameter	Description
Dissolved Oxygen (DO)	1. 24-hour average concentration shall not be less than 3.5 mg/l 2. During the periods from April 1 to June 15, and September 16 to December 31, the DO shall not have a seasonal average less than 6.5 mg/l
Temperature	Shall not exceed: 1. 5°F (2.8°C) above the average 24-hour temperature gradient displayed during the 1961-66 period or, 2. A maximum of 86°F (30.0°C), whichever is less.
pH	Between 6.5 and 8.5
Phenols	Maximum 0.02 mg/l unless exceeded due to natural conditions
Threshold Odor Number	Not to exceed 24 at 60°F
Synthetic Detergents	Maximum 30-day average 1.0 mg/l
Radioactivity	1. alpha emitters – maximum 3 pc/l (picocuries per liter) 2. beta emitters – maximum 1,000 pc/l
Bacteria	1. Fecal coliform a. Above RM 81.8 maximum geometric average 770 per 100 milliliters b. Below RM 81.8 maximum geometric average 200 per 100 milliliters 2. Enterococcus a. Above RM 81.8 maximum geometric average 88 per 100 milliliters b. Below RM 81.8 maximum geometric average 33 per 100 milliliters
Total Dissolved Solids	Not to exceed 133 percent of background
Turbidity	1. maximum 30-day average 40 units 2. maximum 150 units
Alkalinity	Between 20 and 120 mg/l
Toxic Pollutants	1. Applicable criteria to protect the taste and odor of ingested water and fish are presented below in Table 4.2. 2. Applicable freshwater stream quality objectives for the protection of aquatic life are presented in Table 4.3. 3. Applicable freshwater stream quality objectives for the protection of human health are presented in Table 4.4.
Effluent Quality Requirements	1. All discharges shall meet the effluent quality requirements in Section 3.10 of the DRBC *Administrative Manual – Part III, Water Quality Regulations*. 2. The carbonaceous oxygen demand from all outfalls in the zone (exclusive of stormwater bypass) shall not exceed that assigned by DRBC regulations.

Source: DRBC's Delaware River Basin Commission (DRBC), *Administrative Manual – Part III, Water Quality Regulations*, Revised to Include Amendments Through September 27, 2006

Table 4.3 provides the stream quality objectives for toxic pollutants for the protection of aquatic life in the Delaware River Estuary.

TABLE 4.3 STREAM QUALITY OBJECTIVES FOR TOXIC POLLUTANTS FOR THE PROTECTION OF AQUATIC LIFE IN THE DELAWARE RIVER ESTUARY

Parameter	Freshwater Objectives (µg/l)		Marine Objectives (µg/l)	
	Acute	Chronic	Acute	Chronic
Aluminum	750	87	---	---
Arsenic (Trivalent)	360	190	69	36
Cadmium	$e^{(1.128*LN(Hardness)-3.828)}$	$e^{(0.7852*LN(Hardness)-3.49)}$	43	9.3
Chromium (Trivalent)	$e^{(0.8190*LN(Hardness)+3.688)}$	$e^{(0.8190*LN(Hardness)+1.561)}$	---	---
Chromium (Hexavalent)	16	11	1,100	50
Copper	$e^{(0.9422*LN(Hardness)-1.464)}$	$e^{(0.8545*LN(Hardness)-1.465)}$	5.3	3.4
Cyanide (Total)	22	5.2	1.0	---
Lead	48	16	220	8.5
Mercury	2.4	0.012	2.1	0.025
Nickel	$e^{(0.846*LN(Hardness)+3.3612)}$	$e^{(0.846*LN(Hardness)+1.645)}$	75	8.3
Selenium	20	5.0	300	71
Silver	$e^{(1.72*LN(Hardness)-6.52)}$	---	2.3	---
Zinc	$e^{(0.8473*LN(Hardness)+.08604)}$	$e^{(0.8473*LN(Hardness)+0.7614)}$	95	86
Aldrin	1.5	---	0.65	---
Gamma –BHC (Lindane)	1.0	0.08	0.08	---
Chlordane	1.2	0.0043	0.045	0.004
Chlorpyrifos (Dursban)	0.083	0.041	0.011	0.0056
DDT & metabolites (DDE & DDD)	0.55	0.001	0.065	0.001
Dieldrin	1.25	0.0019	0.355	0.0019
Endosulfan	0.11	0.056	0.017	0.0087
Endrin	0.09	0.0023	0.019	0.0023
Heptachlor	0.26	0.0038	0.027	0.0036
PCBs (Total)	1.0	0.014	5.0	0.03
Parathion	0.065	0.013	---	---
Toxaphene	0.73	0.0002	0.21	0.0002
Pentaclorophenol	$e^{(1.005*PH-4.83)}$	$e^{(1.005*PH-5.29)}$	13	7.9
Whole Effluent Toxicity	0.3 TUs acute	1.0 TUs chronic	0.3 TUs acute	1.0 TUs chronic

Note: Metals (Values indicated are total recoverable)
Source: DRBC's Delaware River Basin Commission (DRBC), *Administrative Manual – Part III, Water Quality Regulations*, Revised to Include Amendments Through September 27, 2006

Table 4.4 provides the stream quality objectives for the estuary.

TABLE 4.4 DELAWARE RIVER ESTUARY STREAM QUALITY OBJECTIVES; CARCINOGENS

Parameter	Freshwater Objectives (µg/l)		Marine Objectives (µg/l)
	Fish and Water Ingestion	Fish Ingestion Only	Fish Ingestion Only
Beryllium	0.00767	0.132	0.0232
Aldrin	0.00189	0.00226	0.00397
alpha – BHC	0.00139	0.0132	0.00231
Chlordane	0.000575	0.000588	0.000104
DDT	0.000588	0.000591	0.000104
DDE	0.00554	0.00585	0.00103
DDD	0.00423	0.00436	0.000765
Dieldrin	0.000135	0.000144	0.0000253
Heptachlor	0.000208	0.000214	0.0000375
Heptachlor expoxide	0.00019	0.000208	0.000366
PCBs (Total)	0.0000444	0.0000448	0.0000079
Toxaphene	0.000730	0.000747	0.000131
Acrolonitrile	0.0591	0.665	0.117
Benzene	1.19	71.3	12.5
Bromoform	4.31	164.0	28.9
Bromodichloromethane	0.559	55.7	9.78
Carbon tetrachloride	0.254	4.42	0.776
Chlorodibromomethane	0.411	27.8	4.88
Chloroform	5.67	471.0	82.7
1,2 – Dichloroethane	0.383	98.6	17.3
1,1 – Dichloroethene	0.0573	3.20	0.562
1,3 – Dichloropropene	87.0	14.1	2.48
Methylene chloride	4.65	1,580	277
Tetrachloroethene	0.80	8.85	1.55
1,1,1,2-Tetrchlorethane	1.29	29.3	5.15
1,1,2,2-Tetrachloroethane	0.172	10.8	1.89
1,1,2-Trichloroethane	0.605	41.6	7.31
Trichloroethene	2.70	80.7	14.2
Vinyl chloride	2.00	525.0	92.9

Source: DRBC's Delaware River Basin Commission (DRBC), *Administrative Manual – Part III, Water Quality Regulations*, Revised to Include Amendments Through September 27, 2006

The DRBC's *2006 Integrated Water Quality Monitoring and Assessment Report* details the parameters tested and the resultant designations. Those parameters meeting the testing criteria within Zone 4 included: Dissolved Oxygen, Temperature, pH, Fecal Coliform, Enterococcus, Alkalinity, and Toxicity. Only Toxic Parameters did not meet the current water criterion. As a result, the Delaware River in Zone 4 was given the following support level assessments for each of the designated uses;

- Aquatic Life - Supported
- Recreation - Supported
- Drinking Water - Not Applicable (no supply intakes are present in Zone 4)
- Fish Consumption - Not Supported

Tidal and flood elevations for the Delaware River were obtained from the National Oceanic and Atmospheric Administration (NOAA) Tides and Currents website and using the FEMA Flood Insurance Study report. Information was collected using measured data from the NOAA Tidal Station No. 8545240, located at the Philadelphia United States Coast Guard Station, published April 21, 2003. Table 4.5 details the findings.

TABLE 4.5 DELAWARE RIVER TIDAL AND FLOODWATER ELEVATIONS

Water Elevation Description	Referred to MLLW Elevation (ft)	Referred to NAVD 88 Elevation (ft)
100-year Flood*	+ 11.83	+ 8.68
50-year Flood*	+ 10.93	+ 7.78
Highest Observed Water Level (11/25/1950)**	+ 10.49	+ 7.34
10-year Flood*	+ 9.63	+ 6.48
Highest Tide Level – 2008 (HTL-08) (05/12/08)***	+ 8.88	+ 5.73
Mean Higher High Water (MHHW)	+ 6.18	+ 3.03
Mean High Water (MHW)	+ 5.78	+ 2.63
Mean Sea Level (MSL)	+ 3.44	+ 0.29
Mean Tide Level (MTL)	+ 2.99	- 0.16
North American Vertical Datum - 1988 (NAVD)****	+ 3.15	0.00
Mean Low Water (MLW)	+ 0.20	- 2.95
Mean Lower Low Water (MLLW)	0.00	- 3.15
Lowest Tide Level – 2008 (LTL-08) (12/22/08)*****	- 2.11	- 5.26
Lowest Observed Water Level (12/31/1962)**	- 6.80	- 9.95

Notes:
* The flood elevations are based on FEMA Flood Insurance Study report.
** The measured data from NOAA Tidal Station 8545240 (Philadelphia USCG Station, Delaware River, PA) are used for highest observed water level and lowest observed water level. The site is located approximately 10 miles downstream from this Tidal Station.
*** Highest tide level recorded for the year 2008 at Philadelphia Tidal Station.
**** The approximate relationship between NAVD88 and MLLW is used in the vertical conversion.
***** Lowest tide level recorded for the year 2008 at Philadelphia Tidal Station.

Also, as shown by the following figure (Figure 4.5), according to the NOAA Tides and Currents website, the mean sea level trend is rising 2.75 millimeters/year (0.90 feet/century) at the Philadelphia Gauging Station with a standard error of 0.12 mm/yr based on monthly mean sea level data from 1900 to 1999.

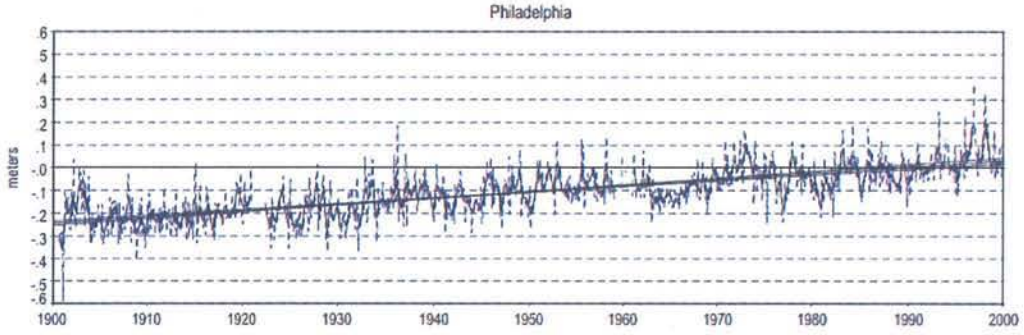


*Figure 4.5 Mean Sea Level Trend – **Delaware River, Philadelphia Station***
Source: NOAA Tides and Currents, 2008.

4.2.2 Mantua Creek

Mantua Creek and its two major tributaries, Edwards Run and Chestnut Branch, drain over 50 square miles of Gloucester County. From its headwaters near Glassboro, Mantua Creek flows northwest for 18.6 miles to the Delaware River in Paulsboro. The downstream end of the creek flows through a relatively broad, flat valley which is part of the creek's floodplain. It finally flows through low, tidal marshland from the New Jersey Turnpike in the east to the Delaware River in the west.

Development has been most concentrated near Pitman and downstream where Mantua Creek passes through the developed areas of Deptford, West Deptford, and Mantua Townships. Further downstream, development of the floodplain increases in Paulsboro, where residential, commercial, and industrial development can be found on or near floodplains. This area is adjacent to low, tidal wetlands that are susceptible to flooding from high water flowing down Mantua Creek.

The NJDEP-Division of Water Resources establishes water quality standards for the State's waterways. These standards classify surface water according to water quality and provide the basis for determining which uses are appropriate for those waters. Under this classification system, waters are first classified as Freshwater, Saline/Estuarine, Saline/Coastal or Pinelands Water. The designations are followed by the number 1, 2, or 3, which indicates the relative quality of the water. The 1 designation represents the highest quality and the 3 designation represents the poorest quality.

The Mantua Creek (the entire length) is classified as Freshwater 2 Non-trout / Saline/Estuarine 2 (FW2-NT/SE2) in accordance with Table 2 of the NJDEP *Surface Water Quality Standards* (N.J.A.C. 7:9B-1.15, 2006). Freshwater 2 means the general surface water classification applied to those freshwaters that are not designated as Freshwater 1 or Pinelands Waters. Non-trout waters are those designated not suitable for trout production or trout maintenance due to their physical, chemical, or biological characteristics. Although not suitable to trout, these waters are generally suitable for a diversity of other fish species. Saline/Estuarine means the general surface water classification applied to saline waters of estuaries that contain brackish conditions with salinities greater than 3.5 parts per thousand (ppt) at mean high tide.

In accordance with the 2006 *Surface Water Quality Standards*, the designated uses for all Freshwater 2 waters (FW2) include the following:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary and secondary contact recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and
5. Any other reasonable uses.

In accordance with the 2006 *Surface Water Quality Standards*, the designated uses for all Saline/Estuarine 2 waters (SE2) include the following:

1. Maintenance, migration and propagation of the natural and established biota;
2. Migration of diadromous fish;
3. Maintenance of wildlife;
4. Secondary contact recreation; and
5. Any other reasonable uses.

As further detailed in Appendix B of the NJDEP's 2006 *Integrated Report*, the Mantua Creek in areas is designated as impaired. The areas of impairment and the parameters listed are included in Table 4.6 below.

TABLE 4.6 NJDEP'S INTEGRATED REPORT IMPAIRMENT DESIGNATIONS; MANTUA CREEK

Assessment Area Name	Parameter of Impairment	NJDEP Priority Ranking
Main Ditch / Little Mantua Creek	PCBs, Dioxins	Medium
Mantua Creek (Above Route 47)	Pollutant Unknown	Low
Mantua Creek (Edwards Run to Sewell)	Dioxin, PCBs, Phosphorus	Medium
Mantua Creek (Below Edwards Run)	Dioxin, PCBs	Medium

Source: New Jersey's 303(d) List of Impaired Waters with Priority Ranking, December 2006.

4.2.3 On-Site Stormwater Management Basins

Five existing stormwater management (SWM) basins are located on the former BP Oil Terminal property. The group of four basins located in the southern portion of the site was originally interconnected. Basins No. 1 and No. 3 drained to No. 2 which in turn drained into No. 4. SWM Basin 5 is located in the northern portion of the site and is not connected to the other basins. The basins were reconfigured in the 1990's to meet the revised New Jersey Pollution Discharge Elimination System (NJPDES) regulations. Water in the basins is either discharged to groundwater or is discharged to surface waters via NJPDES permitted outfalls.

BP, as part of their responsibilities at the site, is required by the NJDEP to remediate, backfill, and/or cap these basins. As of this date, the basins are scheduled to be remediated by BP during the calendar year 2009. As a result, these surface water features are not anticipated to exist at the time of the construction of the proposed Paulsboro Marine Terminal. Field investigations and coordination with BP would be completed prior to construction to confirm that the remediation of the basins was completed. The following discussion and table details the specifics of each existing SWM Basin.

SWM Basin No. 1
SWM Basin No. 1 is located in the south-central portion of the site. SWM Basin No. 1 is a previously gravel-lined basin and received stormwater runoff from the southern portion of the site including BP's former petroleum truck loading rack area and rail loading rack area.

SWM Basin No. 2
SWM Basin No. 2 is located in the south-central portion of the site. SWM Basin No. 2 is a previously gravel-lined and received stormwater runoff from the southern portion of the site including BP's former petroleum truck loading rack area and rail loading rack area.

SWM Basin No. 3
SWM Basin No. 3 is located in the south-central portion of the site. SWM Basin No. 3 received condensate/rinsate effluents from BP's former garage and boiler house and was lined circa 1996 using an impermeable synthetic membrane (which replaced a liner reportedly installed in the 1970's).

SWM Basin No. 4
SWM Basin No. 4 is located in the south-central portion of the site. SWM Basin No. 4 is a previously gravel-lined basin and received stormwater runoff from the southern portion of the site including BP's former petroleum truck loading rack area and rail loading rack area.

SWM Basin No. 5
SWM Basin No. 5 is located in the north-central portion of the site near the Delaware River. SWM Basin No. 5 has a containment sub-basin, was gravel-lined, and receives stormwater runoff from the northern portion of the site including BP's former marine terminal area. A NJPDES permitted outfall, identified as DSN 002, is located in a tidal cove of the Delaware River immediately east of the basin. This outfall is equipped with a flood gate to prevent flooding during periods of excessive high tides.

4.3 Floodplains

A floodplain is defined as any land area susceptible to being inundated by floodwaters from any source, whereas the 100-year floodplain is the area of land inundated by a flood event that has a 1% chance of being equaled or exceeded in any given year. The 100-year flood event is typically used as a benchmark in engineering design for projects located in a floodplain.

As delineated by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), the northern and eastern portions of the site are located within the 100-year floodplain. These areas are located proximal to the Delaware River and Mantua Creek.

Flood hazard areas identified on the FEMA FIRM are defined as the area that will be inundated by the flood event having a one percent chance of being equaled or exceeded in any given year. The one percent annual chance flood is also referred to as the base flood or 100-year flood. Floodplains mapped on the FIRM for the site include Zone A4. Moderate flood hazard areas, including Zone B are also mapped for the project site on the FIRM, as well as the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the mapped floodplains and higher than the elevation of the 0.2-percent annual chance flood, are labeled Zone C.

As shown on Figure 4.6, a large portion of the project site along the Delaware River and Mantua Creek is situated within Zone A4 (EL +10 feet as referenced to MLLW). These areas are at high risk for flooding and consist of one percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. In most instances, base flood elevations derived from detailed analyses are shown at selected intervals within these zones. Base flood elevations shown within these zones at the project site are at elevation +10 feet (MLLW).

The interior portions of the site are shown in Zone B, which is moderate to low risk of flooding. These areas are either outside the one percent annual chance floodplain, are areas of one percent annual chance sheet flow flooding where average depths are less than one foot, areas of one percent annual chance of stream flooding where the contributing drainage area is less

than one square mile, or areas protected from the one percent annual chance flood by levees. No Base Flood Elevations are shown within this zone.

The remainder of the project site along Mantua Avenue and Universal Road are situated within Zone C. Zone C has the same description as Zone B, above, and is also moderate to low risk for flooding.

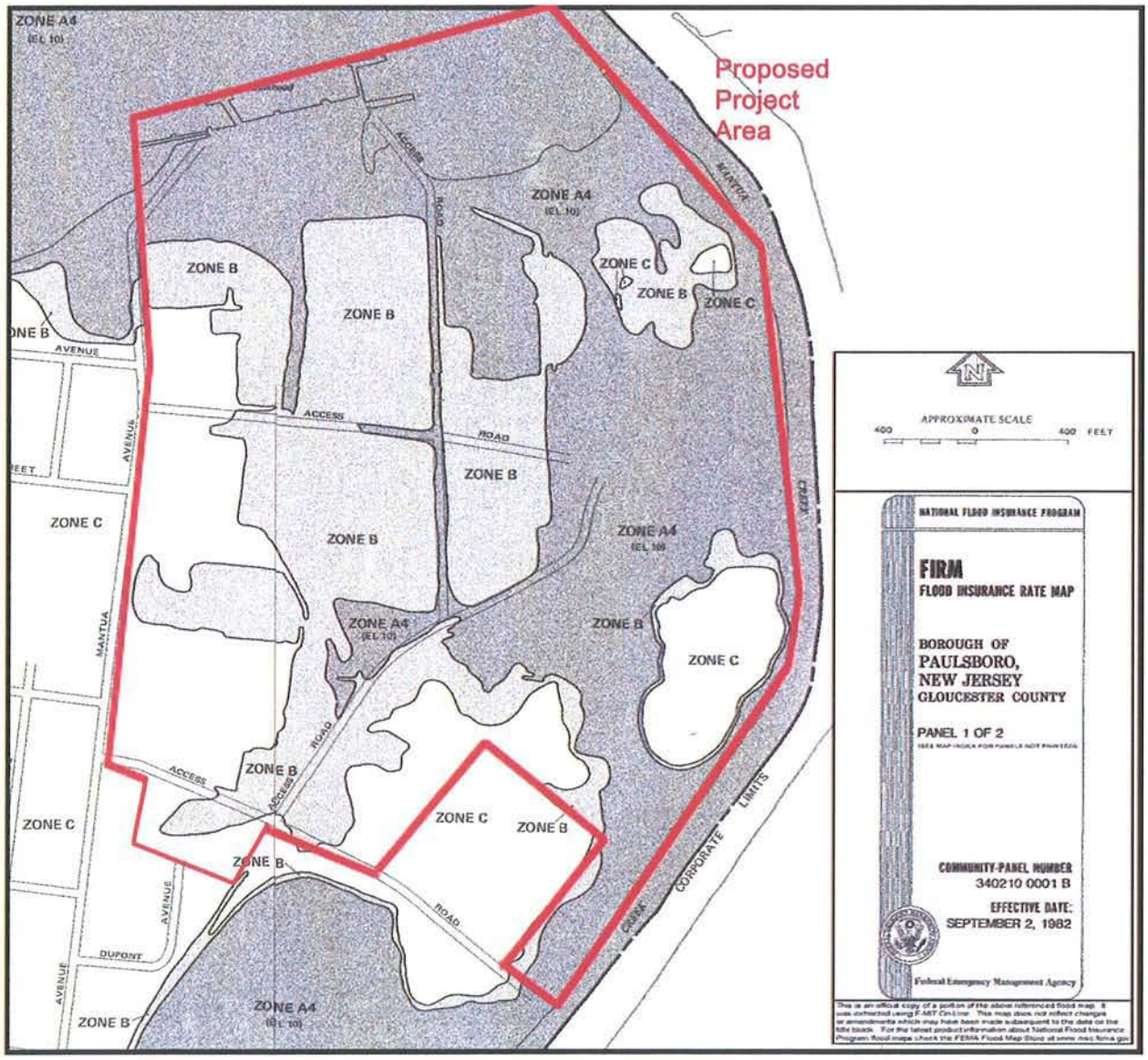


Figure 4.6 FEMA Flood Insurance Rate Map
Source: FEMA Flood Insurance Rate Map, Panel No. 340210 0001B

4.4 Wetlands

Freshwater wetlands were preliminarily identified and flagged in September, October, and November 2007. A site walk and wetlands evaluation was held on December 22, 2008, and again on March 24, 2009 with representatives from the NJDEP Division of Land Use Regulation and USACE Philadelphia District Regulatory Program. The December 22, 2008 meeting was also attended by representatives of the NJDEP Office of Dredging and Sediment Technology. The purpose of the December 22, 2008 site walk was to discuss the nature of the existing conditions at the site. The following sections detail the regulatory requirements and the findings of the delineation activities.

4.4.1 Regulatory Requirements and Definitions

USACE regulates "waters of the United States", including wetlands. The term waters of the United States has a broad meaning and incorporates both deepwater aquatic habitats and special aquatic sites including wetlands, as follows:

- The territorial seas with respect to the discharge of fill material;
- Coastal and inland waters, lakes, rivers, and streams that are navigable waters of the United States, including their adjacent wetlands;
- Tributaries to navigable waters of the United States, including adjacent wetlands;
- Interstate waters and their tributaries, including adjacent wetlands;
- All other waters of the United States not identified above, including intermittent streams and other waters that are not a part of a tributary system to interstate waters or navigable waters of the United States, the degradation or destruction of which could affect interstate commerce (USACE, 1987).

USACE does not have jurisdiction over isolated waters that are intrastate and non-navigable, where the sole basis for asserting the Clean Water Act jurisdiction is the actual or potential use of the waters as habitat for migratory birds that cross State lines in their migrations. However, isolated wetlands that are adjacent to regulated wetlands or waters of the United States may also be under USACE jurisdiction. USACE and the USEPA jointly define wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USEPA and USACE 42 Federal Register, 37, 125-126, 37128-29, July 19, 1977).

Wetlands in New Jersey are identified using the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineations, January 1989). Freshwater wetlands in New Jersey are regulated by the NJDEP *Freshwater Wetlands Protection Act* (NJAC 7:7A *et seq.*). Tidal wetlands in New Jersey are regulated by the *Tidal Wetlands Act of 1970* and the discharge of dredged or fill material and/or mechanized land clearing, ditching, draining, channelization or other excavation activities into waters of the United States including navigable waters, is under the jurisdiction of the USACE pursuant to Section 404 of the Clean Water Act. The Clean Water Act definition of wetlands is the same as the one provided above.

Coastal wetlands are defined under the *Tidal Wetlands Act of 1970* as "any bank, marsh, swamp, meadow, flat, or other low land subject to tidal action in the State of New Jersey along the Delaware Bay and Delaware River...or any inlet, estuary or tributary waterway or any thereof, including those areas now or formerly connected to tidal waters whose surface is at or below an elevation of 1 foot above local extreme high water, and upon which may grow or is capable of growing some, but not necessarily all of the following: salt meadow grass (*Spartina patens*), spike grass (*Distichlis spicata*), black grass (*Juncus gerardi*), saltmarsh grass (*Spartina alterniflora*), saltworts (*Salicornia europaea* and *Salicornia bigelovii*), sea lavender (*Limonium carolinianum*), saltmarsh bulrushes (*Scirpus robustus* and *Scirpus paludosus var. atlanticus*), sand spurrey (*Spergularia marina*), switch grass (*Panicum virgatum*), tall cordgrass (*Spartina pectinata*), hightide bush (*Iva frutescens var. oraria*), cattails (*Typha angustifolia* and *Typha latifolia*), spike rush (*Eleocharis rostellata*), chairmaker's rush (*Scirpus americana*), bent grass (*Agrostis palustris*), and sweet grass (*Hierochloe odorata*)."

NJDEP also regulates intertidal and subtidal shallows, which are defined in the NJDEP Coastal Zone Management Rules (N.J.A.C. 7:7E) as all permanently or temporarily submerged areas from the spring high water line to a depth of four feet below mean low water.

Wetlands at the project site are within the dual jurisdiction of the NJDEP and USACE. Pursuant to the MOA described above, USACE has jurisdiction over the Delaware River and Mantua Creek up to the mean high tide, as well as all wetlands within 1,000 feet of the mean high tide. The high tide line at the site was identified using National Oceanic Atmospheric Administration (NOAA) Tidal Station No. 8545240 data from the U.S. Coast Guard (USCG) Philadelphia Station for 2008. The highest recorded tide of 2008 was at elevation +5.73 (NAVD88). Hence, USACE has jurisdiction over all waters up to Highest Tide Line (HTL) at elevation +5.73 (NAVD88), as well as wetlands located entirely or partially within 1,000 feet of this elevation boundary line, unless it is concluded that any such wetlands do not have a significant nexus with a regulated wetland or water of the United States.

4.4.2 Existing Wetlands

Freshwater wetlands were preliminarily identified and flagged in September, October, and November 2007. A site walk and wetlands evaluation was held on December 22, 2008, and again on March 24, 2009 with representatives from the NJDEP Division of Land Use Regulation and USACE Philadelphia District Regulatory Program. The December 22, 2008 meeting was also attended by representatives of the NJDEP Office of Dredging and Sediment Technology. The purpose of the December 22, 2008 site walk was to discuss the nature of the existing conditions at the site. Guidance was also provided by the regulatory agencies at the December 22, 2008 field meeting with regard to the jurisdiction of man-made contaminated stormwater management basins and historic dredge spoil material placement areas. Stormwater management basins on the project site are contaminated and require remediation. In some instances, these basins are poly-lined, covered by aggregate, or other fill material and none of them provide any notable ecological function. For these reasons, NJDEP advised that these man-made basins would not be considered regulated wetlands or State open waters. Likewise, USACE would not consider these areas wetlands or waters of the U.S.

An approximate 22-acre area of the northeastern portion of the project was historically used as a USACE dredge spoil deposition area. These areas were often observed to display hydric soil colors (low chroma) but were frequently found to lack sufficient wetland hydrology to support hydrophytic vegetation. These areas were thoroughly evaluated during the December 22, 2008

field meeting and via the final wetland micro-delineation activities completed. As directed by the NJDEP and USACE, wetland determination of this area should be completed using best professional judgment to determine the presence or absence of adequate hydrology to sustain a wetland. A final regulatory review confirming the revised delineation areas was conducted at the March 24, 2009 field meeting.

A variety of wetlands were identified during the delineation activities including forested, scrub-shrub, emergent wetlands, as well as a combination of these communities. A total of seven freshwater wetlands were delineated and flagged under regulatory direction at the site. The wetland boundary flags were survey-located by a New Jersey licensed surveyor or using a Trimble GeoXH Global Positioning System (GPS) unit equipped with a pole-mounted satellite receiver, with sub-meter accuracy. The survey of the site was completed at two-foot contours and includes existing vegetation boundaries, and the current existing features (e.g., buildings, waterline features such as piers, etc.). The Highest Tide Line (HTL) and associated elevations along the Delaware River and the Mantua Creek were located and mapped to determine the presence and estimated quantity of tidal wetlands that border the site. Figure 4.7 and Table 4.7 summarize the findings. A detailed description of each of the delineated wetlands areas is provided below.

Wetland Area F/G

This forested freshwater wetland is a former NJPDES-permitted outfall associated with the former Essex property and transects the former USACE dredge spoil disposal area situated within the northeast corner of the site. This wetland ditch is perpendicular, and discharges to the Delaware River. This wetland feature is essentially defined by contour elevation +5.0 feet above mean sea level (MSL), and is located within and along the western edge of the forested area in the northeast corner of the project site. The forested portion of this wetland is dominated by gray birch (*Betula populifolia*) in the canopy with occasional box elder (*Acer negundo)* and cottonwood (*Populus deltoides*). The understory is dominated by patches of common reed (*Phragmites communis*) and soft rush (*Juncus effusus*). Soils within this wetland include fill material consisting of silty sandy loam with a matrix of 10YR 4/2. The delineated wetlands of Wetland Area F/G were surveyed and measure approximately 0.50 acres.

Wetland Area J

Wetlands Area J is a relatively small, linear freshwater forested/scrub-shrub wetland, and is situated in a shallow depression located in the western portion of the project site, near and perpendicular to the Delaware River. This forested/scrub-shrub wetland is dominated by gray birch in the canopy, raspberry species (*Rubus* spp.) in the scrub-shrub layer and tussock sedge (*Carex stricta*) in the sparse herbaceous layer. Wetland hydrology is evident in this area through inundation and saturated soils. Hydric soils within this wetland include fill material consisting of silty loam and silty sandy loam with a matrix of 10YR 3/2 and 10YR 3/1 with 10YR 4/2 mottling detected at the depths of 3 to 9 inches. Wetland Area J is delineated by 8 flags and comprises approximately 0.11 acres.

Wetland Area K

Wetland Area K is a relatively small drainage swale and is situated in the southern portion of the site near the former railroad siding and current solar panel array. Dominant species in this freshwater emergent wetland consist of common reed with patches of wool grass (*Scirpus cyperinus*). Hydric soils within this wetland include silty loam with a matrix of 10YR 2/1 throughout the soil profile from 0 to 20 inches. The delineated wetlands of Area K (5 flags) were surveyed and define an approximately 0.01 acre wetland.

Wetland Area L

Wetland Area L is relatively small emergent wetland situated in the southern portion of the site near the former railroad siding, west of Wetland Area K. This wetland is dominated by common reed. Hydric soils within this wetland include silty sandy loam and silty loam with a matrix of 10YR 2/1, 10YR 3/2 and 10YR 4/2 exhibiting mottling in the soil profile from 4 to 20 inches. Wetland hydrology is evident through inundation and ponding. The delineated wetlands of Wetland Area L (9 flags) were surveyed and this area is approximately 0.33 acres.

Wetland Area M

Wetland Area M is near a former marine pier area situated along the Mantua Creek. There are scattered trees throughout a dense stand of common reed located primarily along the shoreline of Mantua Creek. The dominant species in this freshwater forested and emergent wetland are box elder and red maple (*Acer rubrum*) in the canopy, and dense stands of common reed in the herbaceous layer. Soils are hydric, poorly drained, silty clayey loam with a matrix ranging from 10YR 7/1 to 10YR 5/2. Mottling is present in the soil profile from 4 to 20 inches. There are tidal flats located along the Mantua Creek shoreline adjacent to this freshwater wetland, below the HTL. The delineated wetlands of Wetland Area M (30 flags) were surveyed and contain only approximately 0.03 acres above the HTL; the remainder of these wetland are tidally influenced, are associated with Mantua Creek and are below the HTL.

Wetland Area N

Wetland Area N is relatively small and is situated in the southern portion of the site south of the former railroad siding and south of Wetland Area L. Dominant species in this freshwater scrub-shrub / emergent wetland include common reed and European alder (*Alnus glutinosa)*. The delineated wetlands of Wetland Area N (5 flags) were surveyed and are approximately 0.04 acres. Hydric soils within this wetland include silty sandy loam with a matrix of 10YR 3/2 and 10YR 4/2.

Wetland Area Z

Wetland Area Z is a small, scrub-shrub depressional wetland situated within the forested former USACE dredge disposal area in the northeast corner of the project site. Dominant vegetation in Wetland Area Z consists of silky dogwood (*Cornus amomum)*, elderberry (*Sambucus canadensis*), false indigo (*Amorpha fruticosa*), marsh mallow (*Althaea officinales*) and soft rush. A portion of this depressional wetland is also overhung by red maple. Wetland Area Z is delineated by 7 flags and consists of 0.06 acres. Two soil borings were taken within this wetland and soils are silty, sandy loam and have a matrix of 10YR 4/2, with mottling of 2.5YR 4/3 and 10YR 2/2 in one location, and a matrix of 10YR 2/1 in the second location. Soils in the second location consist of a histosol. Wetland Area Z is inundated in some locations and soils are typically saturated to the surface.

Figure 4.7 Field Delineated On-Site Freshwater Wetlands
Source: AECOM September 19, 21, 28; October 05, 28; and November 12, 2007 Delineations.

TABLE 4.7 PROPOSED PAULSBORO MARINE TERMINAL; SUMMARY OF DELINEATED FRESHWATER WETLANDS

Wetlands Area	Area		Wetland Type(s)	Dominant Species
	(Sq Ft)	(Acres)		
Area F/G	21,585.64	0.50	Freshwater Forested	Gray birch, common dewberry
Area J	4,768.78	0.11	Forested/scrub-shrub	Gray birch, common dewberry, tussock sedge
Area K	415.08	0.01	Emergent	Common reed, wool grass
Area L	14,235.00	0.33	Emergent	Common reed
Area M	1,370.24[1]	0.03[1]	Scrub-shrub/emergent	Box elder, red maple, Japanese knotweed, common reed, spatterdock
Area N	1,719.64	0.04	Scrub-shrub/emergent	Common dewberry, common reed, European alder
Area Z	2,782.50	0.06	Scrub-shrub	Silky dogwood, soft rush
Total	**46,876.88**	**1.08**	All delineated freshwater wetlands areas at the project site.	

Notes:
[1] : The portion of Area M that is situated above the HTL.

Intertidal Wetlands

Using bathymetric survey information, intertidal wetlands surrounding the project site in the Delaware River and Mantua Creek were evaluated. No vegetation was observed within the intertidal zone in the Delaware River (Figure 4.8). Sparse individuals of spatterdock (*Nuphar polysepala*) were the primary vegetation observed along the tidal flats of the Mantua Creek.

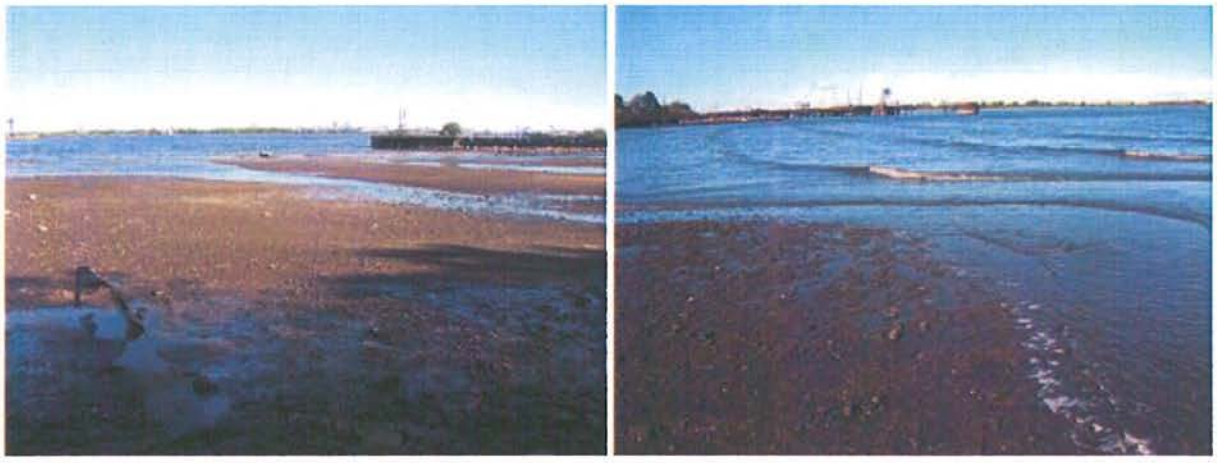


Figure 4.8 October 29, 2007 Delaware River Intertidal Zone
No vegetation or sub-aquatic vegetation observed in intertidal zone of Delaware River.
Source: AECOM Field Survey, October 29, 2007.

Subtidal Wetlands

Using the bathymetric survey, subtidal wetlands surrounding the project site in the Delaware River and Mantua Creek were evaluated. No vegetation was observed within the subtidal zones of the Delaware River or Mantua Creek.

An NJDEP Letter of Interpretation (LOI) application and a USACE Jurisdictional Determination (JD) application were submitted under separate cover to the respective agencies to confirm and approve the delineated wetlands at the site.

4.5 Groundwater Resources

Aquifers are underground saturated geologic formations that yield usable groundwater. The quantity of water provided by an aquifer is dependent upon the porosity of the underlying formation. Aquifers can hold water in pore spaces found between sand and gravel particles (primary porosity) or within fractures and fissures in bedrock (secondary porosity). The extent to which the aquifer is recharged depends generally upon the porosity and permeability of the overlying material.

Groundwater is commonly utilized as a drinking water source throughout much of southern New Jersey. Consequently, it is important that the quality of this resource be preserved and that the quantity of this resource is maintained via adequate recharge.

The Potomac and Magothy Formations of the New Jersey Coastal Plain underlie the site (Figure 4.9). As detailed in Section 4.1.2, these formations are generally characterized by fine- to coarse-grained sand, inter-bedded with clays and silt. These formations comprise the Potomac-Raritan-Magothy aquifer (PRM or Prma).

The PRM aquifer system is composed of Cretaceous deposits that are present at the base of the Coastal Plain sediments. These deposits extend southeast from the fall line (i.e., the contact between the Coastal Plain and Piedmont Physiographic provinces) and underlie southern New Jersey. The Delaware River flows across the outcrop of the aquifer system in the vicinity of Camden and Gloucester Counties, and lesser portions of Salem County, and is, therefore, hydraulically connected to the aquifer system. The river is affected by tides throughout this reach, but is fresh most of the time.

Figure 4.9 Aquifer Map and Well Head Protection Areas
Source: New Jersey Office of Information Technology 2007-08 High Resolutions Ortho-Photography

The PRM aquifer is further subdivided into three subsystems; the Upper PRM (Old Bridge Formation), the Middle PRM (Sayreville Formation), and the Lower PRM (Farrington Formation) units, with the Upper and Middle PRM outcropping predominant at the site.

The aquifer system is widely used for water supply. The Borough of Paulsboro uses the Lower Aquifer as their primary source of potable water and the Middle Aquifer is utilized as their secondary source of potable water. In addition, as documented in the USGS Scientific Investigations Report 2004-5096 (2005), 122 production wells, permitted by the NJDEP to pump more than 100,000 gallons per day, were located within 2 miles of the river in Camden, Gloucester, and Salem Counties.

The high rate of withdrawal has created a regional cone of depression in the aquifer system's potentiometric surface that extends more than 100 feet below sea level, reversing the natural hydraulic gradient between the aquifer system and the river. The magnitude of the groundwater withdrawal has resulted in several potentially deleterious circumstances or threats to the potable

supply from the aquifer: (1) deep cones of depression and continuing water-level decline, (2) movement of saline water from the downdip parts of the aquifer toward public-supply wells, (3) induced infiltration of saltwater from the Delaware River, and (4) induced infiltration of water containing contaminants from human-related activities on the aquifer system's outcrop area (USGS, 2007).

4.5.1 Aquifer Recharge

Aquifers are recharged by surface water and precipitation at a rate which is dependent upon the overlying geologic material. Coarse sand and gravel deposits are generally highly permeable; fine sand and silt deposits have medium permeability; and glacial till, clay and marsh deposits have low permeability, as do areas characterized by bedrock fractures.

To create a system to rank these aquifers, the NJGS analyzed statewide aquifer and well data that included well yield, hydraulic conductivity, specific capacity, transmissivity, and storativity. Using the methodology detailed in the New Jersey Geologic Survey Publication DGS07-1: *Aquifer Recharge Potential for New Jersey*, the aquifers were further ranked on the basis of the median yield of selected non-domestic well yields. Well yield values were ranked from A to E and assigned as: E, less than 25 gallons per minute (gpm); D, 25 to 100 gpm; C, greater than 100 gpm to 250 gpm; B, greater than 250 gpm to 500 gpm; and A, greater than 500 gpm. Each County's yield data were analyzed and ranked based upon the above scale. Each watershed management area (WMA) aquifers were categorized using the statewide yield data as applied to the above scale. In addition, Table 4.8 details the well yield data of the PRM in gpm.

TABLE 4.8 POTOMAC-RARITAN-MAGOTHY AQUIFER WELL YIELD; GALLONS PER MINUTE (GPM)

Gloucester Co. Hydrology	Mean Yield (gpm)	Median Yield (gpm)	Minimum Yield (gpm)	Maximum Yield (gpm)	Well Count	County Rank	State Rank
Upper, Middle, and Lower PRM	626	608	10	1,515	179	A	A

Source: New Jersey Geologic Survey Publication DGS07-1: *Aquifer Recharge Potential for New Jersey*

According to the ranking system, the aquifer at the project area was ranked as an "A", having a well yield greater than 500 gpm.

Aquifer-recharge potential coverage areas were created through the combination of ground-water recharge coverage and the aquifer rank coverage in the area of interest (County/WMA). Aquifer recharge or recharge to water-bearing geologic units is defined by this study as the groundwater which reaches the water table in the uppermost geologic unit with a thickness of 50 feet or greater. After the combination of the two systems, a composite ranking of 25 possible aquifer-recharge potentials was produced by combining the 5 possible ground-water recharge ranks with the 5 possible aquifer ranks. This composite, aquifer-recharge potential rank highlights the multiple relationships between the ground-water-recharge area ranks (indicative of the infiltration rate) and the underlying water-table aquifer ranks (indicative of the aquifer's capacity to absorb, transmit and supply water).

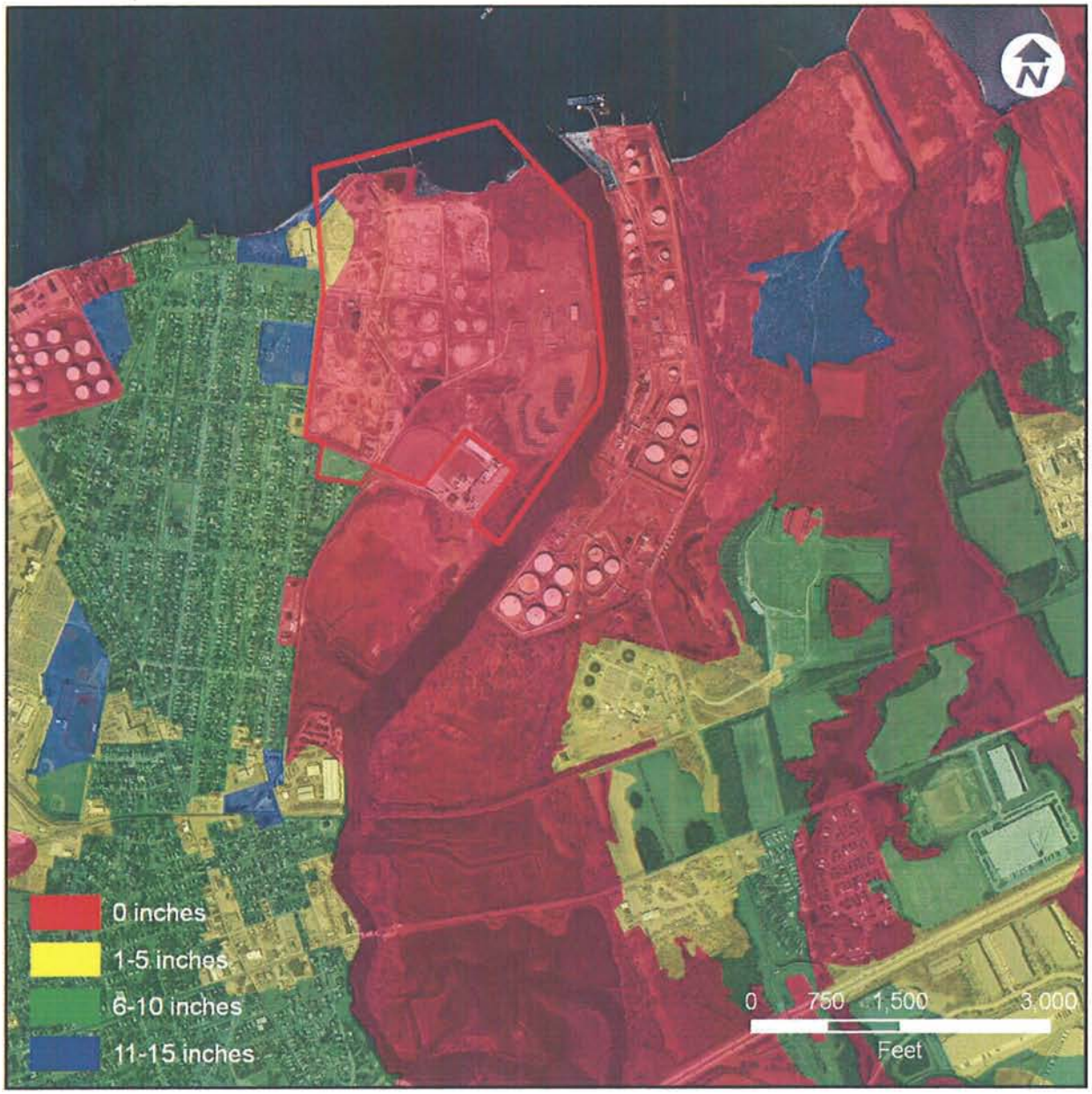


Figure 4.10 Aquifer Recharge Potential Areas
Source: New Jersey Office of Information Technology 2007-08 High Resolutions Ortho-Photography

According to the ranking system, the aquifer at the project area was ranked as an "AE", or as having a low recharge potential. This determination is also included graphically and numerically on the NJDEP's Geologic *i-MapNJ*. These areas are an estimation of groundwater recharge for New Jersey. Groundwater recharge on this website was estimated using the NJGS methodology from the NJ Geological Survey Report GSR-32 "*A Method for Evaluation of Ground-Water-Recharge Areas in New Jersey*". Land-use/land-cover, soil and municipality-based climatic data were combined and used by this website to produce an estimate of ground-water recharge in inches/year. The recharge was then ranked by volume (billions of gallons/year) using natural breaks in the percentage of total volume.

According to the NJDEP Geologic *i-MapNJ*, the majority of the site is characterized as having a Statewide Recharge Rank of 0 inches/year. The northeastern portion of the site (adjacent to the confluence of the Mantua Creek and the Delaware River) is ranked as wetlands / open water and therefore no recharge was calculated (Figure 4.10). Thus, the project site is not considered to be an area contributing to aquifer recharge.

4.5.2 Sole Source Aquifers

A Sole Source Aquifer (SSA) is one which represents the sole or principal source of drinking water that supplies at least 50% of its service area. Since a SSA is a major source of a safe drinking water supply, it is important that the quality of this water be maintained and that the aquifer is adequately recharged to maintain water supply. SSAs are defined by guidelines set forth by the United States Environmental Protection Agency (USEPA) as authorized in Section 1424(e) of the Safe Drinking Water Act of 1974. The USEPA sponsors a program called the Sole Source Aquifer Protection Program which enables the designation of sole or principal source aquifers. Upon designation of a SSA, Federal agencies could be barred from granting financial assistance to projects that could contaminate the aquifer.

The State of New Jersey is comprised of seven designated SSAs, which cover at least 80% of the State. The SSA systems in New Jersey are as follows: Highlands Aquifer, the Ridgewood Area Aquifer, the Rockaway River Basin Area Aquifer, the Buried Valley Aquifer, the Ramapo Aquifer, the New Jersey Coastal Plain Aquifer, and the Northwest New Jersey Fifteen Basin Aquifer Systems. According to the New Jersey Geological Survey mapping, the site is located within the New Jersey Coastal Plain Aquifer.

4.5.3 Well Head Protection Areas

The State of New Jersey has established well head protection areas (WHPA), which are a map areas calculated around a Public Community Water Supply (PCWS) well that delineates the horizontal extent of groundwater captured by a well pumping at a specific rate over a two-, five-, and twelve-year period of time. The area of capture over two-, five-, and twelve-years is defined using line boundaries and polygon areas generated with GIS. GIS shape files are produced for each PCWS well and for the set of all PCWS wells in a County. WHPA delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Safe Water Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination would be assessed and appropriate monitoring would be undertaken as subsequent phases of the NJDEP SWAP. According to the NJDEP Geologic *i-MapNJ*, the site is not located within any WHPA (Figure 4.8).

4.6 Vegetation

Conditions at the site can be classified into wetlands and uplands environments. The species identified within the wetlands primarily include;

Wetland Species

Box Elder (*Acer negundo*)
Broad-Leaf Cattail (*Typha latifolia*)
Common Dewberry (*Rubus flagellaris*)
Common Reed (*Phragmites australis*)
Cottonwood (*Populus deltoides*)
European Alder (*Alnus glutinosa)*
Gray Birch (*Betula populifolia*)
Japanese Honeysuckle (*Lonicera japonica*)

Japanese Knotweed (*Polygonum cuspidatum*)
Narrow-leaf Cattail (*Typha angustifolia*)
Northern Arrowwood (*Viburnum dentatum*)
Purple Loosestrife (*Lythrum salicaria*)
Red Maple (*Acer rubrum*)
Spatterdock (*Nymphaea odorata*)
Silky Dogwood (*Cornus amomum*)
Silver Maple (*Acer saccharinum)*
Soft Rush (*Juncus effuses)*
Trident Red Maple (*Acer rubrum var. trilobum*)
Tussock Sedge (*Carex stricta*)
White Willow (*Salix alba*)
Wool Grass (*Scirpus cyperinus*)
Yellow Flat Sedge (*Cyperus flavescens*

Uplands within the site generally consist of filled disturbed sites and thus tend to be dominated by opportunistic vegetative species capable of growing under disturbed conditions. The majority of the vegetated uplands are open space/successional fields. The upland vegetation and forested areas identified includes the following species;

Upland Species
American Holly (*Ilex opaca*)
Black Cherry *(Prunus serotina)*
Bushy Aster (*Symphyotrichum dumosum*)
Common Dandelion (*Taraxacum officinale*)
Common Mullein (*Verbascum thapsus*)
Common Plantain (*Plantago major*)
Common Pokeweed (*Phytolacca americana)*
Common Ragweed *(Ambrosia artemisiifolia)*
English Plantain (*Plantago lanceolata*)
Evening Primrose (*Oenothera biennis*)
Goldenrod, various (*Solidago spp*)
Grass, various (*spp*)
Honey Locust (*Gleditsia triacanthos)*
Honeysuckle, various (*Lonicera spp)*
Japanese Knotweed (*Polygonum cuspidatum*)
Little Bluestem (*Schizachyrium scoparium*)
Northern Catalpa (*Catalpa speciosa)*
Quaking Aspen (*Populus tremula*)
Queen Anne's Lace (*Daucus carota*)
Russian Olive (*Elaeagnus angustifolia)*
Spreading Dogbane (*Apocynum androsaemifolium)*
Sumac, various *(Rhus spp)*
Tree-of-Heaven *(Ailanthus altissima)*
Virginia Creeper (*Parthenocissus quinquefolia*)
White Oak (*Quercus alba)*

4.7 Wildlife

The former BP Oil Terminal property is primarily comprised of barren, vacant land formerly containing above ground petroleum storage tanks. All of the tanks and facilities have been razed and removed. Surface soil at the property is primarily comprised of sand and gravel and is sparsely vegetated with various grasses and common reed.

The former Essex property contains a variety of freshwater wetlands including forested, scrub-shrub, and emergent wetlands, and successional field uplands. Areas on the former Essex property are highly vegetated including sub-mature growth species of trees located at the former USACE dredge spoil area with increasing grasses on the uplands located in the southern portion of the property.

The tidal, freshwater waterways of the Delaware River and Mantua Creek border the site in the north and east, respectively. Tidal flats are present along the northeastern area of the site in the Delaware River and along the western shoreline of the Mantua Creek.

Wildlife inhabiting the site can be divided into two categories: year-round residents and transients. Resident wildlife primarily includes commonly occurring small mammals, birds, deer, and a limited number of reptiles and amphibians suited to living in the habitat provided on the site.

Site visits by staff and senior scientists were conducted throughout the fall and winter months of 2007 and during the early spring of 2008. Wildlife potential was judged in terms of habitat and supplemented by existing literature and field observations either by directly identifying a species or by identifying evidence consistent with the presence of a particular species. This section mainly discusses the resident and/or transient common species present at the site. Fish habitats and endangered and/or threatened species may be referenced in this section but are discussed in detail in Sections 4.7.3 and 4.8, respectively.

4.7.1 Bird Species

Numerous bird species were either observed directly, heard, or for which evidence was seen at the site include;

American Crow (*Corvus brachyrhynchos*)
Blue Jay (*Cyanocitta cristata*)
Canada Goose (*Branta canadensis)*
European Starling (*Sturnus vulgaris*)
Gray Catbird (*Dumetella carolinensis*)
Great Black-Backed Gull (*Larus marinus*)
Great Blue Heron (*Ardea herodias*)
Herring Gull (*Larus argentata*)
Wild Turkey (*Meleagris gallopavo*)
House Sparrow (*Passer domesticus*)
Mallard (*Anas platyrhynchos*)
Mourning Dove (*Zenaida macroura*)
Northern Mockingbird (*Mimus polyglottos)*
Osprey (*Pandion haliaetus*)
Red-Winged Blackbird (*Agelaius phoeniceus*)
Turkey Vulture (*Cathartes aura*)

Highly transient species of birds are commonly found along the Delaware River. Waterfowl migration is strongly influenced by the presence of the open water habitats of the Delaware River and Mantua Creek with the area located along the coastal periphery of the Atlantic Flyway which is utilized by many different bird species during migration. Therefore, the large amounts of open water and tidal areas near the site are conducive to migrating shorebirds and waterfowl. Such common species could include but not be limited to; American black duck (*Anas rubripes*); common pintail (*Anas acuta*); canvasback (*Aythya valisineria*); and the great egret (*Casmerodius albus).*

Habitats present at the site and the regional setting are conducive to terrestrial species which could include but not be limited to; rock dove (*Columba livia*); barn swallow (*Hirundo rustica*); American robin (*Turdus migratorius*); common yellowthroat (*Geothlypis trichas*); common grackle (*Quiscalus quiscula*); swamp sparrow (*Melospiza georgiana)*; and the American goldfinch (*Carduelis tristis*).

4.7.2 Terrestrial Animal Populations; Mammals, Reptiles, and Amphibians

Terrestrial animal populations at the site are generally characterized by low species diversity, although the limited number of species present may be locally abundant. Homogeneous vegetative cover and human disturbance reduces suitable habitat for mammals and herpetofauna, which may contribute to the low diversity. Species either observed directly, heard, or for which evidence was seen at the site include;

American Bullfrog (*Lithobates catesbeianus*)
Eastern Cottontail (*Sylvilagus floridanus)*
Eastern Garter Snake (*Thamnophis sirtalis*)
Eastern Gray Squirrel (*Sciurus carolinensis*)
Ground Hog (*Marmota monax*)
White-Tailed Deer (*Odocoileus virginianus*)

Though not seen, the terrestrial species which are common to the region and setting could include but not be limited to: various species of mice, moles and shrews; Norway rat (*Rattus norvegicus*); meadow vole (*Microtus pennsylvanicus*); weasel; chipmunk (*Tamias striatus)*; opossum (*Didelphis virginiana*); raccoon (*Procyon lotor*); striped skunk (*Mephitis mephitis*); and red fox (*Vulpes vulpes*).

4.7.3 Fish Habitats

The National Marine Fisheries Service (NMFS) and NOAA were contacted to determine the presence of Essential Fish Habitat (EFH) at the designated project area (Appendix A contains copies of the project correspondence). According to the NMFS, no EFH exists at the site. As further indicated by the NMFS, the following species can be found at or migrating past the site in the Delaware River.

American Shad (*Alosa sapidissima*)
Alewife (*Alosa pseudoharengus*)
Atlantic Sturgeon (*Acipenser oxyrhyncus*)
Blueback Herring (*Alosa aestivalis*)
Shortnose Sturgeon (*Acipenser brevirostrum*)
Striped Bass (*Morone saxatilis*)
Hickory Shad (*Alosa mediocris*)
White Perch (*Morone Americana*)

Other fish common to the Lower Delaware River include; American Eel (*Anguilla rostrata*), Common Carp (*Cyprinus carpio*), Channel Catfish (*Ictalurus punctatus*), and Largemouth Bass (*Micropterus salmoides*).

According to the NJDEP Division of Science, Research and Technology, there are consumption advisories for fish species caught in the Lower Delaware River and its tributaries. The advisories were developed by the NJDEP and include potential contamination by PCBs, dioxin, and mercury. According to the NJDEP, violating these advisories can increase the risk of cancer and other serious health issues. These advisories are listed in Table 4.9.

TABLE 4.9 FISH CONSUMPTION ADVISORIES FOR THE LOWER DELAWARE RIVER; NJDEP DIVISION OF SCIENCE, RESEARCH, AND TECHNOLOGY

Species	General Population Eat No More Than	High-Risk Individual Eat No More Than
Largemouth Bass	No restrictions	One meal per week
Hybrid Striped Bass		
American Eel	One meal per year	Do not eat
Channel Catfish		
White Catfish	One meal per month	
Striped Bass	Four meals per year	
White Perch	Four meals per year	

Note: High risk individuals include children and pregnant women.

T&M Associates included observations of fish in the Mantua Creek in their *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*. According to T&M's findings, the NJDEP Division of Fish and Wildlife indicated that American shad and river herring can occur near Mount Royal, approximately 2 miles upstream from the site. As a result, the Mantua Creek is considered an active migratory pathway for anadromous fish by the NJDEP.

Other fish species noted in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge* to be potentially present in the Mantua Creek include:

American Eel (*Anguilla rostrata*)
Bluegill (*Lepomis macrochirus)*
Brown Bullhead Catfish (*Ameiurus nebulosus)*
Chain Pickerel (*Esox niger* - syn. *Esox reticulatus*)
Channel Catfish (*Ictalurus punctatus*)
Largemouth Bass (*Micropterus salmoides*)
Pumpkinseed Sunfish (*Lepomis gibbosus*)
Red-breasted Sunfish (*Lepomis auritus)*
Smallmouth Bass (*Micropterus dolomieu)*
Striped Bass (*Morone saxatilis*)
White Catfish (*Ameiurus catus)*
White Perch (*Morone Americana)*
Yellow Perch (*Perca flavescens)*

4.8 Threatened, Endangered, and Protected Species

To determine the presence of any known threatened or endangered species within or proximate to the site, the United States Fish and Wildlife Service (USFWS), the NMFS, NOAA, and the NJDEP Natural Heritage Program (NHP) were contacted (Appendix A contains copies of the correspondence). In addition, the NJDEP Landscape Project *i-MapNJ* interactive mapping website was consulted regarding threatened and endangered species or suitable habitat within the site.

The following details the regulatory responses and list of species that possibly exist in the vicinity of the site and/or evidence or reports suggesting species have been located on or near the property.

American Bald Eagle (*Haliaeetus leucocephalus*)
The bald eagle was threatened with extinction in the lower 48 states because of DDT (a type of pesticide) poisoning. However, the bald eagle was recently removed from the Federal List of Endangered and Threatened Wildlife effective August 8, 2007. The bald eagle continues to be protected under the Federal Eagle Act and Migratory Bird Treaty Act, and also remains a State-listed species under the New Jersey Endangered and Nongame Species Conservation Act.

Bald eagles live near large bodies of open water such as lakes, marshes, and rivers, where there are plenty of fish to eat and tall trees for nesting and roosting. Bald eagles build large nests at the top of sturdy tall trees. The nests become larger as the eagles return to breed and add new nesting materials year after year. However, bald eagles are known to relocate nests upon return from their winter migration. Bald eagles use a specific territory for nesting, winter feeding, or a year-round residence. Bald eagles that reside in the northern United States migrate to the warmer southern climates of the United States during the winter to obtain easier access to food, especially fish. Bald eagles feed primarily on fish, but also eat small animals (ducks, coots, muskrats, turtles, rabbits, snakes, etc.) and occasional carrion (dead animals).

According to the USFWS correspondence dated December 4, 2007, the bald eagle's nesting and foraging habitat may occur in the project's impact area. In the fall of 2007, a bald eagle nest was reported to exist north and east of the Mantua Creek and the site. According to the NJDEP Landscape Project *i-MapNJ*, the eastern portion of the site is listed as a bald eagle foraging area. Ms. Ruth Foster of the NJDEP provided a map detailing the eagle's foraging and nesting buffer areas (Figure 4.11). As shown on the map, the 2007 nesting buffer area encompasses the majority of the former Essex property. The identified foraging areas mainly comprise the coastal areas along the Delaware River and the Mantua Creek, and the forested wetlands, wetlands, and grasses present on the former Essex property.

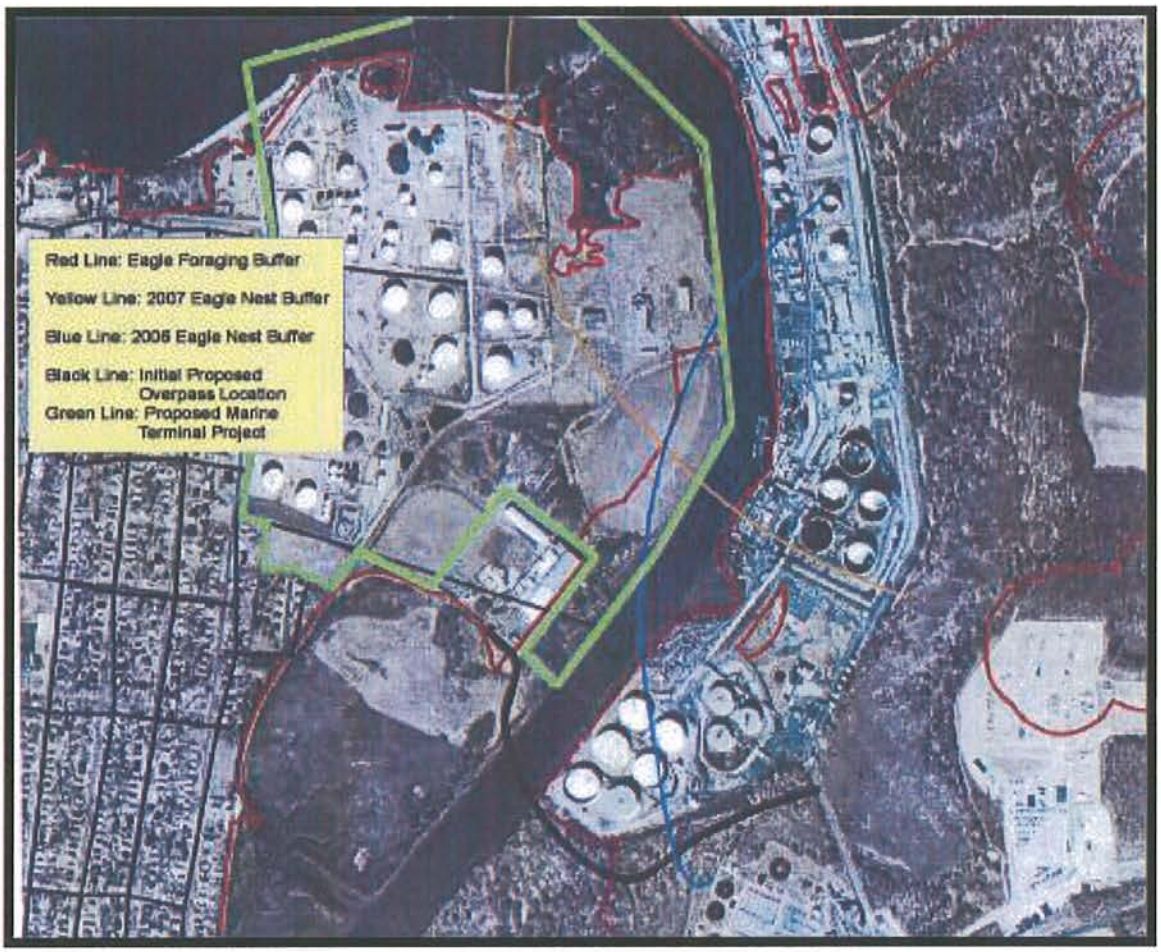


Figure 4.11 NJDEP Bald Eagle Nesting and Foraging Buffer Areas
Source: New Jersey Department of Environmental Protection, Ms. Ruth Foster

As documented in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, field surveys were completed on September 30, and October 11, 2005. No bald eagles or nests were identified within T&M's study area during these site visits. Furthermore, the report concluded that none of the wetlands or forested areas on, or in the vicinity of the site, contained suitable bald eagle nesting habitat, citing that eagles typically prefer mature-growth trees measuring at least 20-inches in diameter.

Staff scientists conducted site visits to the former BP Oil Terminal and the former Essex property during the fall and winter 2007 and during the early spring of 2008. Bald eagles were not observed directly, heard, and no evidence of the birds was seen at the site.

Osprey (*Pandion haliaetus*)
One of the largest birds of prey in North America, the osprey eats almost exclusively fish. It is one of the most widespread birds in the world, found on all continents except Antarctica. Though, as with the bald eagle, the number of ospreys declined in the 1950s through the 1970s as a result of DDT. The numbers of ospreys have rebounded, and according to the New Jersey Endangered and Nongame Species Conservation Act, the osprey is currently listed as a

threatened species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.

The osprey readily builds its nest on manmade structures, such as telephone poles, channel markers, duck blinds, and nest platforms designed especially for it. In some areas, nests are placed almost exclusively on artificial structures. The osprey breeds in a variety of habitats with shallow water and large fish, including boreal forest ponds, desert salt-flat lagoons, temperate lakes, and tropical coasts. The osprey winters along large waterbodies from the southern United States southward to South America. The osprey forages by often hovering over the water and diving feet-first into the water to grab fish near the surface.

An osprey nest is present on the current BP Oil Terminal pier structure located in the Delaware River. According to the operator of the facility, the nest was occupied by a pair of ospreys during the summer and fall 2007. However, no ospreys were observed at the nest throughout all of 2008. The nest remains empty as of this date.

Shortnose sturgeon (*Acipenser brevirostrum*)
The shortnose sturgeon is the smallest of the three sturgeon species that occur in eastern North America, having a maximum known total length of 143 centimeters and a weight of 23 kilograms. Maximum known age is 67 years for females, but males seldom exceed 30 years of age. Approximate age of a female at first spawning is 11 years in the Delaware River. Generally, females spawn every three years, although males may spawn every year.

Shortnose sturgeon is an anadromous fish that prefers the deeper waters (e.g., river channels) of the estuarine and riverine habitat found in large river systems. Shortnose sturgeon, unlike other anadromous species in the region, does not appear to make long distance offshore migrations. They are benthic feeders of insects, crustaceans, and mollusks.

According to NOAA correspondence dated November 2, 2007, a population of the federally endangered shortnose sturgeon occurs in the Delaware River from the lower bay upstream to at least Lambertville, New Jersey. Based upon mark-recapture data collected from January 1999 through March 2003, an estimated population of 12,047 adult shortnose sturgeon inhabits the Delaware River. The majority of these are present in the tidal river from Trenton, New Jersey to Philadelphia, Pennsylvania. According to the USFWS, the population level of the shortnose sturgeon is believed to have declined due to pollution and overfishing.

Historically, shortnose sturgeons were relatively rare below Philadelphia due to poor water quality. In the past decade, however, the water quality in the Philadelphia area has improved leading to an increased use of the lower river by the shortnose sturgeon. The area below Philadelphia (i.e., within the main shipping channel area) is likely utilized by the shortnose sturgeon moving through the area in the summer and is also believed to be an over-wintering area for juveniles and non-spawning adults.

Atlantic sturgeon (*Acipenser oxyrhyncus*)
The Atlantic sturgeon is one of the oldest fish species in the world. The Atlantic sturgeon can live for more than 60 years and has been known to reach a size of 15 feet and 800 pounds. Its range extends from Canada to the eastern coast of Florida. It was in great abundance when the first settlers came to America, but has since declined due to overfishing and water pollution.

According to NOAA correspondence dated November 2, 2007, Atlantic sturgeon are distributed along the entire East Coast of the United States and have been designated as a candidate species for the Endangered Species Act (ESA). The best available scientific information indicates that a reproducing population persists in the Delaware River, and individual Atlantic sturgeons are likely to occur south of the Paulsboro Marine Terminal near the Marcus Hook area. The Marcus Hook area is typically the northern-most location due to the saline conditions available. Freshwater quality conditions north of Marcus Hook are predominant and are generally less suitable for sturgeon above this saltwater-freshwater interface. Many populations, including those in the Delaware River, have undergone drastic declines since the late 1800's. NMFS is currently reviewing findings to determine if listing the species as threatened or endangered is warranted.

The sturgeon population along the East Coast remains at risk due to fishing pressure, incidental catches, ship strikes, and environmental degradation. Vessel strikes occur when the fish makes contact with a larger boat. Although it is a relatively rare event when a rare species such as the sturgeon is struck by a vessel, even a small number of strikes with such an at-risk species, could potentially further threaten the sturgeon population. According to the Seaboard Fisheries Institute data, 28 Atlantic sturgeon were killed by vessel strikes in the Delaware River between 2005 and 2008.

As an ESA-candidate species, the Atlantic sturgeon receives no substantive or procedural protection under the Endangered Species Act. However, NMFS recommends that persons undertaking actions that may potentially impact the fish consider implementing conservative actions to limit the potential adverse effects.

Essential Fish Habitat Determination

According to the October 23, 2007 NOAA correspondence, no Essential Fish Habitat (EFH) has been designated in the project area. In addition, according to the USFWS correspondence dated December 4, 2007, no federally listed or proposed threatened or endangered flora or fauna under the USFWS jurisdiction are known to occur within the proposed project's impact area.

4.9 Air Quality

Under Title I of the Federal Clean Air Act of 1970, the USEPA developed National Ambient Air Quality Standards (NAAQS) for specific criteria pollutants to protect public health and welfare. Primary and secondary NAAQS have been promulgated by the USEPA. Primary standards are intended to maintain public health with an adequate margin of safety and are established to protect the most sensitive population groups. Secondary standards were established to protect plants and animals and to prevent economic damage. An assessment of ambient air quality can be made by comparing the measured concentrations of a pollutant to the NAAQS.

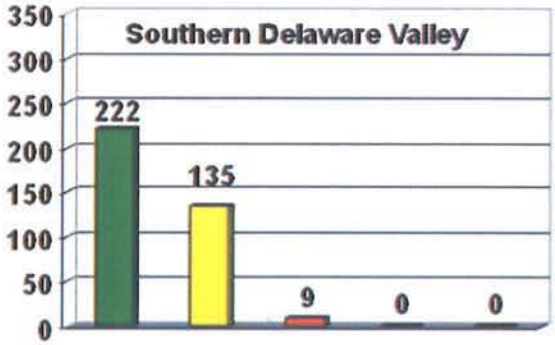


Figure 4.12 2004 AQI for the Southern Delaware Valley Region
Source: NJDEP 2004 Air Quality Report

The NJDEP produces an annual report that summarizes air quality measurements made in New Jersey during that year. The NJDEP makes each chapter available via download as it is completed. The most recent data year available for review is 2004. Therefore, the NJDEP's annual report for 2004 is presented unless otherwise noted.

The Air Quality Index (AQI) is a national air quality rating system based on the NAAQS. Generally, an index value of 100 is equal to the primary, or health based, NAAQS for each pollutant. This allows for a direct comparison of each of the pollutants used in the AQI (carbon monoxide, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide). The AQI rating for a reporting region is equal to the highest rating recorded for any pollutant within that region. In an effort to make the AQI easier to understand, a descriptive rating, and a color code, based on the numerical rating are used. Days rated as "Good" are green. Days rated as "Moderate" are indicated as yellow, and days rated as "Unhealthy for Sensitive Groups" are indicated as orange. More severe ratings as "Unhealthy" and "Very Unhealthy" are indicated as red and purple, respectively. Figure 4.12 shows the 2004 AQI for the Southern Delaware Valley Region. 222 days were reported to be "Good", 135 days were reported to be "Moderate", and 9 days were reported to be "Unhealthy for Sensitive Groups". No days were reported to be "Unhealthy" or "Very Unhealthy".

The air monitoring network in the State of New Jersey is divided into nine air quality index regions with the site being located in Region 8, the Southern Delaware Valley Region. The nearest State monitoring site location in the region is located in the Borough of Clarksboro, Gloucester County, New Jersey. Only ozone and sulfur dioxide are monitored continuously at the Clarksboro location. Pollutant characteristics of those compounds are as follows:

- *Ozone* – O_3 is formed through a series of chemical reactions, which occur in the presence of sunlight and hot weather. Motor vehicle exhaust and industrial emissions, gasoline vapors and chemical solvents are some of the major contributors to the formation of ground-level O_3. Elevated levels of O_3 can occur miles from the source since the series of chemical reactions is slow and pollutants are diffused downwind. It is also important to note that many factors including weather conditions, transport, growth, and the state of the economy, in addition to changes brought about by regulatory control measures can influence ground level ozone. Of these factors, weather probably has the most profound effect on year to year variations in ozone levels.
- *Sulfur Dioxide* – SO_2 emissions are primarily associated with the combustion of sulfur containing fuels such as oil and coal. The major sources of this emission are fossil fuel fired power plants and oil refineries. Significant quantities are not emitted from mobile sources.

With regard to O_3, the measured concentrations exceeding the level of the eight-hour NAAQS of 0.08 parts per million (ppm) were recorded only four days during the ozone monitoring season. Based on the 3-year period from January 1, 2001 through December 31, 2003, the USEPA designated all of New Jersey as non-attainment with respect to the 8-hour ozone standard.[19]

[19] An air pollutant is designated as non-attainment when one or more of the standards for the pollutant have been violated in one or more regions of the State. Statewide, the current designation for carbon monoxide (CO), nitrogen dioxide (NO_2,), lead (Pb), sulfur dioxide (SO_2), and coarse particulate matter (PM_{10}) is attainment. Fine particulate ($PM_{2.5}$) concentrations measured at Camden and Gibbstown were near the annual mean NAAQS. This finding is consistent with the non-attainment status of the region for $PM_{2.5}$.

In 2004, the SO_2 standards were never exceeded at the Clarksboro monitoring station. There are three NAAQS standards for SO_2: an annual average health standard: a 24-hour average health based standard: and a secondary (welfare based), 3-hour average concentration that is also not to be exceeded more than once per year. New Jersey has also set State air quality standards for SO_2. They are similar to the Federal standards but are expressed in micrograms per cubic meter (µg/m3) instead of ppm.

Other criteria pollutants are monitored in Camden, the next nearest monitoring site to Paulsboro. 2004 results for carbon monoxide (CO) and nitrogen oxides (NOx) and coarse particulates (PM_{10}) did not exceed the NAAQS.

4.10 Noise

4.10.1 Borough of Paulsboro Noise Ordinance

The *Noise Control Regulations of the Borough of Paulsboro* is contained in Chapter 43 of The Updated Code of the Borough of Paulsboro, New Jersey (Gloucester County), as revised on September 15, 2007.

In accordance with the Section 43-2 of the Code, it is the policy of the Borough to prevent excessive sound and vibration which may jeopardize the health and welfare or safety of its citizens or degrade the quality of life. Subsequently, the following prohibited acts have been excerpted from the Borough of Paulsboro's Code, which may apply to the operation of the proposed Paulsboro Marine Terminal.

Section 43-7, A., No person shall cause, suffer, allow or permit to be made, verbally or mechanically any noise disturbance, and, Section 43-7 B., no person shall cause, suffer, allow, or permit the following acts:

- Sound reproduction or amplification systems - Operating, playing or permitting the operation or playing of any radio, television, phonograph, compact disc player, reel-to-reel tape player, cassette player, loudspeakers, public address system and/or similar device that reproduces or amplifies sound in such a manner as to create a noise disturbance at any time for any person other than the operator of the device or that creates a noise disturbance across a residential real property line at any time.
- Loading and unloading - Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, liquids, garbage cans, refuse or similar objects, or the pneumatic or pumped loading or unloading of bulk materials in liquid, gaseous, powder or pellet form, or the compacting of refuse by persons engaged in the business of scavenging or garbage collection, whether private or municipal, between the hours of 10:00 p.m. and 6:00 a.m. the following day except by permit, when the sound there from creates a noise disturbance across a residential real property line.
- Standing motor vehicles - Operating or permitting the operation of any motor vehicle whose manufacturer's gross weight is in excess of ten thousand pounds, or any auxiliary equipment attached to such a vehicle, for a period of longer than five minutes in any hour while the vehicle is stationary, for reasons other than traffic congestion or emergency work, on a public right-of-way or public space within 150 feet (46 meters) of a residential area between the hours of 8:00 p.m. and 5 a.m. of the following day.
- Construction and demolition - Operating or permitting the operating of any tools or equipment used in construction, drilling, earthmoving, excavating or demolition work between the hours of 8:00 p.m. and 7:00 a.m. the following day on weekdays and

between the hours of 8:00 p.m. and 9:00 a.m. the following day when the latter is a legal holiday or a weekend day except by permit, when the sound there from creates a noise disturbance across a residential real property line.

4.10.2 Noise Criteria and Existing Conditions

Certain critical factors affect noise and the way it is perceived by the human ear. Such factors include the acoustical level (noise), the frequency, and the length of the exposure period. The sound or noise level is measured in units of decibels (dB). Due to the complex manner in which the human ear functions, measurements of different noise sources does not always correspond to relative loudness or annoyances. Therefore different scales have been developed to furnish guidance in evaluating the importance of different noise sources. As discussed in the T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, the "A" weighted scale (expressed as dBA) has been widely accepted for noise to compare well with human reactions.

The dBA descriptor can be applicable for noise levels at one single moment. However, very few noise sources are constant. One way of describing fluctuating sound is to address it as if the noise occurred at a steady, unchanging level over a specific time period. For this condition, the widely used descriptor accepted to express noise levels has become the dBA L_{eq}, or an A-weighted equivalent to noise. The dBA L_{eq} is the equivalent steady-state sound level, which in a specific period of time contains the same acoustical energy as the time-varying sound level during that same period. As discussed in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, the L_{10} descriptor is used to describe the noise level exceeded 10 percent of the time.

Noise Abatement Criteria (NAC) has been established by the Federal Highway Administration (FHWA) in accordance with 23 CFR 772. The NAC have been established for both noise descriptors; dBA L_{eq} and L_{10}. Table 4.10 below includes the threshold of noise interference levels and the NAC.

TABLE 4.10 THRESHOLD FOR NOISE INTERFERENCE AND NOISE ABATEMENT CRITERIA

Activity Category	Activity Category Description	Threshold of Noise Interference		Noise Abatement Criteria	
		dB L_{10}	dBA L_{eq}	dB L_{10}	dBA L_{eq}
A	Tracts of land which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.	48	45	60	57
B	Picnic areas, recreation areas, playgrounds, active sports areas, and (exterior) parks which are not included in Category A and residences, motels, public meeting rooms, schools, churches, libraries, and hospitals.	58	55	70	67
C	Developed lands, properties or activities not included in Categories A (exterior) or B above.	63	60	75	73
D	Undeveloped lands; refer to the Federal Aid Highway Program Manual Volume 7, Chapter 7, Section 3, paragraphs 11a and c.				
E	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums (interior).	43	40	55	52

Source: T&M Associates *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*.

According to FHWA guidance and current New Jersey Department of Transportation (NJDOT) policy, a project-related noise impact occurs if either of the following conditions is met:

1. Predicted dBA L_{eq} noise levels that approach or exceed the NAC (as provided in Table 4.10). Noise levels that approach the criteria are defined as occurring at 1dBA L_{eq} less than the NAC.
2. A substantial increase in predicted noise levels over existing conditions, even though the impact criterion level is not reached. This increase is considered to be 10 dBA L_{eq} or greater, which is roughly a doubling or more of the perceived noise levels.

Noise levels were measured in September 2005 for the Paulsboro Marine Terminal dedicated Access Road and Overpass and are contained in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*. The noise study was completed in accordance with the Noise Abatement Criteria included in 23 CFR 722, and performed pursuant to the FHWA Traffic Noise Model (TNM2.5).

4.11 Land Use and Zoning

Land Use

Land use refers to the type of activity that is actually occurring on the land and within the structures that occupy it.

The site is located along the Delaware River in the Borough of Paulsboro, directly across from the Philadelphia International Airport. The site is comprised of the former BP Oil Terminal and the former Essex facility. BP has demolished all of the above ground storage tanks, buildings, and other facilities. Only a service building remains at the entrance to the facility. Former ship berths are located along the shoreline of the Delaware River, once used for loading and off-loading petroleum and other products. The former Essex property is also mostly vacant, containing three vacant buildings. The majority of the property is currently grass-covered or contains sparse wooded areas.

Figure 4.13 Borough of Paulsboro Land Use and Zoning Map
Source: Borough of Paulsboro Zoning Map

The site is bordered by the Delaware River to the north and by Mantua Creek to the east. East of the Mantua Creek is the industrial Nu-Star (former CITGO) Asphalt Products facility. The site is bounded by residential neighborhoods to the west and by undeveloped wetlands in the south.

Zoning

The Paulsboro Borough Zoning Ordinance of 1955 is contained within Chapter 80 of the Paulsboro Code and was adopted by the Mayor and Council of the Borough of Paulsboro on June 21, 1955 by Ordinance No. 358 (pursuant to P.L. 1976, c. 115, this ordinance was readopted January 18,1977 by Ordinance No. 602 amendments noted where applicable). According to Article I of the Code, the ordinance was enacted for the following purposes: to promote the health, morals and general welfare of the inhabitants of the Borough of Paulsboro; to lessen congestion in the streets; secure safety from fire, panic and other dangers; provide adequate light and air; prevent the overcrowding of land or buildings; avoid undue concentration of population; and to conserve the value of property and encourage the most appropriate use of land.

According to the Borough of Paulsboro Zoning Map, the site is zoned as marine industrial business park (MIBP). Areas west of the site are zoned residential (R-1 and R-2). One property, situated south of Riverview Avenue, west of Mantua Avenue, and east of Beacon Street is zoned as Commercial (C-1). Zoning and land use information is included on Figure 4.13.

As stated in N.J.A.C. 19:4-3.9, the zoning regulations established by the adoption of redevelopment plans supersede all other applicable regulations in the subchapter.

4.12 Potentially Contaminated Materials Sites

As part of this EO 215 EIS, a contaminated and hazardous materials study was completed. The site and properties located within a 250-feet radius were reviewed to determine the potential presence of contaminated and/or hazardous materials. The following subsections details the findings.

4.12.1 Surrounding Properties

The following on-line databases from the NJDEP Division of Solid and Hazardous Waste and the NJDEP Site Remediation Program websites were reviewed for sites located within 250 feet of the site.

- Known Contaminated Sites in NJ Report 7th Edition (Spring 2006)
- NJ Approved Class "B" Recycling Facilities Centers, April 2007
- Class C Recycling Facilities – 2007
- Active Commercial RCRA Facilities - April 2007
- Authorized New Jersey Incinerators
- NJDEP Approved Operating Commercial Sanitary Landfills
- NJDEP Approved Operating Private Sanitary Landfills
- Transfer Station/Intermodal Container/Material Recovery Facilities - March, 2007
- Authorized "Class D" Used Oil Facilities - 2007
- Publicly Funded Cleanups Site Status Report - 2003
- New Jersey Superfund Sites on the National Priorities List – July 2005

According to the information reviewed, four sites (including the former BP Oil Terminal) were determined to be located within 250 feet. All of the sites were included on NJDEP's Known Contaminated Sites in NJ Report 7th Edition (Spring 2006). The reported sites are included in Table 4.11 and Figure 4.14.

TABLE 4.11 NJDEP KNOWN CONTAMINATED SITES WITHIN 250 FEET OF THE PROPOSED PAULSBORO MARINE TERMINAL

Site Name	Site Address	Town	Zip Code	NJDEP Pref. ID
BP Oil Inc. Paulsboro Terminal	303 Mantua Ave	Paulsboro	08066	4975
CITGO Asphalt Products (Nu-Star)	4 Paradise Rd	Paulsboro	08066	G000004377
Paulsboro Packaging Inc.	Universal Rd	Paulsboro	08066	30676
Peabody Clean Industry Inc.	85 Riverview Ave	Paulsboro	08066	G000003458

Source: NJDEP Known Contaminated Sites in NJ Report 7th Edition, Spring 2006.

Figure 4.14 NJDEP Known Contaminated Sites
Source: NJDEP, Known Contaminated Sites in NJ Report 7th Edition, 2006.

4.12.2 Former BP Oil Paulsboro Terminal

The Paulsboro Oil Terminal has long been used as a petroleum and chemical storage and distribution facility. During World War I, above ground storage tanks were built on the property to support the war effort. In 1929, Patterson Oil used those tanks to create an oil storage and fueling terminal at the site. Eastern Gas & Fuels took over in 1954, selling the Oil Terminal in 1960 to the Sinclair Refining Company, later known as Sinclair Oil Corporations. In 1969, Atlantic Richfield Corporation (ARCO) leased the Oil Terminal from Sinclair, but later that year, BP Oil Company bought Sinclair and took over operations.

BP took over operations at the Paulsboro Oil Terminal beginning in 1969, but releases of petroleum products and chemicals dating from the 1920's, were documented well before BP acquired the property. In 1981, components of petroleum products were discovered in the groundwater and corrective measures and remedial investigations were initiated. The NJDEP began regulatory oversight of environmental investigations in 1982. One of the first steps taken was to enter into an agreement with BP to recover light non-aqueous phase liquids (LNAPL), or the component of petroleum product that floats on the water table. BP installed several recovery wells throughout the Oil Terminal property. The arrangement was formalized in 1989, when BP signed an Administrative Consent Order (ACO) requiring LNAPL recovery. Efforts were expanded to include recovery of ethyl acetate, kerosene, and No. 6 oil shortly after LNAPL recovery began. The following details the recovery and remediation efforts completed by BP to date.

Refined liquid petroleum products, including various gasoline grades, fuel oils (No. 2, 4, and 6), diesel, kerosene, and jet fuel comprised the primary product types handled at the facility. A wide array of specialty liquid chemical products were also handled at the facility including fuel and food additives, solvents, surfactants, lubricants, acids, synthetic reagents, and boiler chemicals. Additionally, the industrial gas acetylene was handled at the facility.

Product delivery and distribution occurred via container barge vessels facilitated by two marine piers and a series of ship berths on the Delaware River, rail tankers, underground pipelines, and wheeled tanker trucks. The Oil Terminal included transfer areas for marine container vessels, rail tankers and trucks, segregated for handling the petroleum and specialty chemical loading activities.

Specialty chemical handling activities were phased out of the Oil Terminal operations beginning in the late 1980s. Product handling activities were discontinued in 1996 when the facility was being decommissioned.

4.12.2.1 *BP's Historical Remediation Activities*

In 1991, BP activated a groundwater recovery and treatment system to extract and treat groundwater containing chemical constituents and dissolved-phase petroleum, and achieve hydraulic control of the aquifer beneath the site in an effort to contain the migration of impacted groundwater.

In 1994, BP signed a Memorandum of Agreement (MOA) with the NJDEP agreeing to investigate and remediate 14 potential Areas of Concern (AOCs) on the Oil Terminal property. Several phases of soil and groundwater investigations were conducted and resulted in NJDEP approval of a *Final Remedial Investigation Report* in December 2007.

In 1996, petroleum vapors were reported in the basement of a residence to the west of the Oil Terminal. In response, BP conducted an indoor air study that encompassed homes both within and outside the immediate area. The study, conducted with the NJDEP and the NJ Department of Health, was overseen by Dr. Bernard Goldstein of the Environmental and Occupational Health Sciences Institute, NJ University of Medicine and Dentistry. It concluded that benzene concentrations in homes did not pose a health risk and were generally below national averages. In addition, there was no difference in benzene levels found in homes within the impacted area compared with homes located outside it. Subsequently, BP purchased several residential properties and instituted a Value Protection Plan (VPP) to help maintain property values in a two-block area of the neighborhood adjacent to the northwest part of the BP Oil Terminal.

BP Oil Terminal operations ceased in May 1996 triggering compliance with the NJ Industrial Site Recovery Act (ISRA) which imposes certain rules on the sale, transfer, or closure of industrial sites where hazardous chemicals are or were handled. A Remediation Agreement was also signed by BP and the NJDEP allowing for the sale or reuse of the property while environmental assessment continues and a comprehensive groundwater monitoring program was initiated. The Remedial Agreement was amended in 2002 and 2006 largely to update the corporate name changes.

In order to remove hydrocarbon vapors that had accumulated in the subsurface soils due to migration of LNAPL and impacted groundwater, a soil vapor extraction and treatment system (SVE) was installed by BP in the residential neighborhood next to the northwest portion of the Oil Terminal in 1997. This off-site SVE system, utilizing a network of 15 extraction wells, was expanded in 1999 and upgraded in 2001 and 2002 to include several on-site areas.

In 1998, BP emptied, cleaned out, and demolished more than 30 above ground storage tanks. Approximately 24 miles of underground pipes at the Oil Terminal were also cleaned and removed.

BP upgraded the groundwater recovery system in 1999 in order to more effectively extract impacted groundwater and, as of June 2007, it operates at an average rate of 268 gallons per minute. The groundwater recovery system has contained contaminated groundwater in the Upper Aquifer at the property boundary of the Oil Terminal.

BP began an air sparging (AS) system in October 2004 to address soil impacts in the saturated zone below the water table. This augmented the onsite SVE system which deals with onsite soil impacts above the water table.

A *Preliminary Assessment Report* (PAR) which identified all potential AOCs at the site and prioritized them for investigation and eventual remediation was completed in 2001 and submitted to the NJDEP in early 2002. The PAR identified approximately 160 areas of investigation consisting of 321 potential AOCs on the Oil Terminal property and on two additional parcels purchased by BP or its predecessors.

In 2002, deep groundwater monitoring wells were installed by BP to investigate the horizontal and vertical extent of impacted groundwater. Initial sampling of the wells showed the presence of volatile organic compounds (VOC) in the Middle Aquifer. Additional deep groundwater wells were installed in 2003, both on and off site. Follow-up tests at the municipal wells were completed and VOCs were detected; however, all levels in drinking water met drinking water standards. Furthermore, the NJDEP-approved August 2007 *Final Remedial Investigation*

Report found no evidence of migration of impacted groundwater from the Oil Terminal to the municipal wells. BP continues to sample the municipal wells and share data with the Borough and NJDEP on a semi-annual basis.

A Site Investigation (SI) was completed by BP in 2002 and a report was submitted to the NJDEP in May 2003. The SI involved extensive sampling of soil, sediment, and surface water of the AOCs identified in the PAR.

Starting in October 2003, all of the remaining above-ground storage tanks were demolished by BP along with a number of buildings. In addition, most of the remaining process piping (both above and below ground) was also removed (by 2004).

BP completed a Remedial Investigation (RI) with the findings included in a *Final Remedial Investigation Report* (RIR) dated August 2007. The RI and RIR were completed to assess supplemental remedial activities conducted at the site pursuant to the remedial investigation requirements of the NJDEP's *Technical Requirements for Site Remediation* (TRSR) and to present a Site Conceptual Model that would aid in the development of future remedial actions and selections at the site.

BP used information from the RI to develop the *Remedial Action Selection Report* (RASR) in August 2007. The RASR divided the site into 16 Remedial Management Units (RMUs) to better focus the cleanup efforts. Remedial strategies for each of the RMUs were evaluated by BP for the respective media (i.e., soil, soil vapor, and groundwater). The most applicable and effective remedial strategy for each media in the respective RMU was selected (proposed) by BP and submitted to the NJDEP for review and approval.

Several different avenues of communication were established by BP as part of the remediation project. A newsletter began publishing in 1998 and is now produced periodically to update the progress at the site. A public forum was held in 1999 where residents could ask one-on-one questions of BP staff, contractors, and local and State health and environmental agencies. BP has historically operated a website (http://www.bpaulsboronj.com/index.html) that has kept people apprised of the developments at the site and provides access to an electronic copy of the newsletter. More detailed information can be obtained via the NJDEP's Open Public Records Act (OPRA) website or through an OPRA file review request. A public meeting was most recently held by BP in January 2008 to inform the community of the findings of the completed Remedial Investigation and to outline the path forward for completing cleanup of the Oil Terminal.

4.12.2.2 *BP's Current Remediation Progress*

Remediating a site like the former BP Oil Terminal is an on-going process that involves detailed planning, with investigation and cleanup often taking place at the same time. BP is conducting on-going monitoring to assess the cleanup progress, as well as to determine how well current remediation systems are functioning. BP continually evaluates and adjusts these systems to optimize the cleanup efforts. The following details the remediation status at the site as of December 2008 pursuant to the August 2007 RASR.

Shallow Groundwater Investigations

As of August 2007, BP has installed approximately 141 active shallow monitoring wells on- and off-site. In the August 2007 RASR, BP indicated that the groundwater has been sufficiently

characterized and delineated to the extent to complete the remedial action screening and selection requirements of the NJDEP Technical Requirements for Site Remediation (TRSR). Some additional wells are planned to fill data gaps for the purposes of remedial planning, design, and monitoring.

Deep Groundwater Investigations

As of August 2007, BP has installed approximately 80 active deep monitoring wells on- and off-site; these include 65 wells in the deep zone of the Upper Aquifer, 13 wells in the Middle Aquifer, and 3 wells in the Lower Aquifer. In the August 2007 RASR, BP indicated that the groundwater has been sufficiently characterized and delineated to the extent to complete the remedial action screening and selection requirements of the TRSR. Some additional wells are planned to fill the data gaps for the purposes of remedial planning, design, and monitoring.

The primary Chemicals of Concern (COC) for all the groundwater aquifers include VOCs with lesser concerns and concentrations of Semi-Volatile Organic Compounds (SVOCs), Metals, and Pesticides.

Soil Investigations

BP has advanced approximately 1,400 soil borings and has collected approximately 2,000 discrete soil samples. The primary COCs include the VOCs with lesser concerns and concentrations of SVOCs, TPH, Metals, Pesticides, and PCBs. BP indicated in the August 2007 RASR that sufficient soil characterization and delineation have been conducted to complete the remedial action screening and selection process.

Ecological Investigations

Through completion of the RI, BP has collected approximately 14 surface water samples and 169 sediment samples. According to the August 2007 RASR, sufficient characterization of environmentally sensitive areas (ESAs) has been conducted to complete the remedial action screening and selection process for onsite areas. BP is currently in the process of completing characterization of off-site areas (Delaware River and Mantua Creek).

Interim Remedial Measures (IRMs)

According to the June – December 2008 *Semi-Annual Remedial Progress Report*, BP's IRM activities had removed over 4.96 million pounds of COC mass from the subsurface via groundwater extraction, LNAPL removal, AS/SVE, and source excavation (excluding product recovered from tanks and piping during demolition). Mass removal volumes have been diminishing over time, which is indicative that the goals of the remediation systems are being met. BP will continue to optimize the remediation systems to ensure the effectiveness of the recovery efforts. Groundwater containment, LNAPL removal, High Vacuum Extraction, and AS/SVE remedial measures would continue at the site.

BP has proposed a Classification Exception Area (CEA) for the site and surrounding area based on information provided in BP's August 2007 *Final Remedial Investigation Report*. The CEA is proposed to encompass the entire site and would extend to the south and east into portions of the Borough of Paulsboro and West Deptford Township. The CEA is a State institutional control designed to restrict the use of groundwater within its boundaries as a further means to protect human health and the environment.

Demolition Measures
To date, BP has demolished all former Oil Terminal operation facilities including tanks, piping, buildings and ancillary features. The exception is one tank that remains and is temporarily used for remediation purposes.

Receptor Evaluations
Confirmatory soil gas sampling was conducted by BP in August 2007 in the southwest corner of the BP site due to the presence of a sensitive population (i.e., the Tra-Cee Nursery) which abuts this portion of the site. BP's investigation found no COC in soil gas samples above the NJDEP Vapor Intrusion (VI) screening criteria. BP indicated that this exposure pathway was therefore incomplete.

4.12.3 Former Essex Industrial Chemicals, Inc. Property

The former Essex property involved a sulfuric and hydrofluoric acid chemical plant and associated operations including a large gypsum landfill. The site was officially closed in 1991. Pursuant to the NJDEP ISRA regulations, soil and groundwater investigations were completed. The following details the final portions of the investigations completed by Essex at the site.

Site investigations, separate from BP's investigations, were completed at the former Essex property by The Dow Chemical Company (Dow) as part of their ISRA requirements. Work included demolition of the facility and storage tanks, and soil and groundwater sampling to characterize the site following the cessation of their operations. Dow submitted a Final Remedial Action Report on February 4, 2003, which included a Deed Notice (DN) for the property as well as a CEA and a Well Restriction Area (WRA) for the groundwater contained within the limits of the property and under portions of the Mantua Creek. The DN filed at the Gloucester County Clerk's Office detailed *Restricted Use* of the property as the institutional control. Engineering controls included covering and capping the selected affected areas, part of which are detailed as follows. The following details the AOCs included in the DN of the former Essex property.

Drainage Ditch (Area 10)
Elevated levels of lead were detected in soil of the drainage ditch which is located near the northeastern edge of the property. According to the DN, Dow indicated that this area is located within a known former USACE dredge disposal area and the source of the lead was not from on-site industrial activities. As part of the ISRA closure activities, Dow advanced excavations within the ditch to remove the impacted soils. However, elevated concentrations of lead were still detected at the base of these excavations. The excavations were subsequently backfilled with a minimum of 2 feet of clean fill and the remaining elevated concentrations of lead were included in the site-wide DN.

Former Fluorspar Storage Area (Area 4)
Soils impacted with TPH and arsenic was excavated around the warehouse used to store fluorspar. According to Dow's DN, the arsenic was believed to be related to historic fill material and not the industrial operations at the site. All TPH-impacted soil was excavated and disposed of accordingly and the arsenic-impacted soils were then placed at the bottom of the excavation and covered with at least 5 feet of clean fill.

In addition, two areas along the bulkhead of the Mantua Creek were not excavated due the proximity of the tie rods and anchors for the wall. These areas are believed to contain elevated concentrations of TPH, polyaromatic hydrocarbons (PAHs), and arsenic.

Former Sodium Bifluoride Plant (Area 5)
Concentrations of fluoride above the site-specific clean-up level of 3,400 milligrams per kilogram (mg/kg) were detected on the west side of the former sodium bifluoride plant. Excavations were advanced to a depth of 9 feet in order to remove the fluoride-impacted soils. However, post-excavation sampling revealed concentrations of up to 6,067 mg/kg remained at the base of the excavation. The excavation was subsequently backfilled with a minimum of 3 feet of clean fill and the remaining elevated concentrations of fluoride were included in the site-wide DN.

USACE Dredge Spoil Area
According to the DN, the northeastern portion of the area of the former Essex property was historically used by the USACE as a dredge spoils area for the deepening and maintenance of the Delaware River and the Mantua Creek. According to the DN, thicknesses of the material range between 10 and 20 feet.

Dow reviewed charts from the USACE's July 1997 Delaware River Main Channel Deepening Project Supplemental Environmental Impact Statement and the locations, sediments, and sample results were cross-referenced. According to the charts, the area of the river at the site is located within Reach A of the navigation channel. The contaminants detected in the sediments in Reach A above the May 12, 1999 Revised NJDEP Residential Direct Contact Soil Cleanup Criteria include antimony, arsenic, lead, and selenium. In September 1990, a total of 31 soil borings were advanced in the Dredge Spoil Area. From these borings, samples were collected for analyses including TPH, volatile organic compounds (VOCs), base neutrals (BNs), phosphorus, sulfate, fluoride, and pH. As a result of these analyses, elevated concentrations of TPH, benzo(a)pyrene, and benzo(b)fluoranthene were detected in soils. Dow applied these concentrations to the entire dredge spoils area and has restricted the use via the DN.

Former Gypsum Landfill
The former gypsum landfill is contained within approximately 15 acres on the former Essex property. It measures approximately 40-feet in height and contains approximately 380,000 cubic yards (CY) of gypsum. Currently, the former landfill is capped and contains a solar panel array on top that in part provides electricity for BP's groundwater treatment plant and is currently not within the footprint of the proposed project. The landfill was closed in accordance with the NJDEP Division of Solid and Hazardous Waste regulations between 1994 and 1995. According to the operations and maintenance manual, it is monitored on a periodic basis pursuant to the regulations. The NJDEP's *No Further Action* determination does not include the former landfill. Any actions and notifications would be the responsibility of the NJDEP Division of Solid and Hazardous Waste. The former landfill is not part of the footprint of the project and is not included in the proposed Paulsboro Marine Terminal (Figure 1.2).

CEA and WRA
The CEA and Well Restriction Area (WRA) at the site applies to the following constituents present in the groundwater located beneath the site (Block 1: Lots 1, 19, 20) and portions of the Mantua Creek: fluoride, ammonia, sulfate, total dissolved solids, pH, benzene, chlorobenzene, 1,2-dichloropropane, and total xylenes. The duration of the CEA is set for 6 years from the date of the NJDEP's approval (i.e., until June 9, 2009). It should also be noted that BP has a CEA

that also encompasses this area. BP's CEA is separate from the former Essex property CEA and contains different conditions and timeframes.

The NJDEP, in correspondence dated June 9, 2003, issued a conditional *No Further Action* determination for Dow's Final Remedial Action Report which included the approval of the DN for restricted use of the property and the CEA and WRA.

4.12.4 Documented Recent On-Water Oil Spills

The United States Coast Guard (USCG), NOAA, and other periodical reference websites were reviewed to determine recent, documented on-water oil spills that have occurred on the Delaware River at or near the site. The following details the findings.

M/T ATHOS I – November 26, 2004
On November 26, 2004, the M/T ATHOS I struck a large, submerged anchor while preparing to dock at the former CITGO Asphalt Refinery (Nu-Star) in Paulsboro, New Jersey (immediately east of Mantua Creek). The anchor punctured the vessel's bottom, resulting in the discharge of nearly 265,000 gallons of crude oil into the Delaware River and nearby tributaries.

According to the NOAA report, within the first few hours, thick oil covered the River and moved upriver with the flood tide to about the Walt Whitman Bridge, approximately six miles north. Over the following weeks and months, oil from the ruptured tanker spread downriver, exposing natural resources over 115 river miles of the Delaware River (280 miles of shoreline), as well as its tributaries, from the Tacony-Palmyra Bridge (north) to south of the Smyrna River in Delaware. Key resources exposed to the spilled oil include shorelines (marshes, sandy beaches, tidal flats, etc.), aquatic organisms (fish, shellfish, etc.), birds and other wildlife that use the Delaware River and Bay, and recreational areas. The incident also forced the USCG to close the Delaware River to commercial traffic for over a week, and submerged oil resulted in the contamination of water intakes and the closure of the Salem Nuclear Power Plant.

The USCG, the States of New Jersey and Delaware, and the Commonwealth of Pennsylvania created a Unified Command for directing clean-up efforts. NOAA, the U.S. Fish and Wildlife Service, and natural resource agencies within Delaware, New Jersey, and Pennsylvania also responded to the incident to supervise and assist in clean-up and to assess the impact of the spill on natural resources.

CITGO Asphalt Refinery – October 10, 2007
On October 10, 2007, approximately 2,300 gallons of oil spilled from a tanker berthed at the former CITGO Asphalt Refinery (currently Nu-Star) in Paulsboro, New Jersey and coated parts of the Delaware River shoreline.

The oil leaked from a cracked exhaust scupper pipe on a tanker berthed at the former CITGO facility. The oil was used to fuel the ship and was not part of the cargo. Cleanup crews responded to skim the oil off the surface of the river and set up booms to contain the spill from migrating up the Woodbury and Mantua Creeks.

The NJDEP described a "light coating" of oil on the New Jersey shore, extending a half-mile north of the former CITGO facility and a quarter-mile south. The USCG indicated at the time of the incident that the environmental impact appeared to be minimal.

Evidence of oil was seen on the easternmost shoreline of the site during fieldwork on October 19, 2007. Small globs of oil residue were observed to be spotty, in part covering the rocks and on the sand in this area. The oil residue was not seen at areas of the shoreline further west (south) on the site.

4.13 Sediments

Sediment samples were collected as part of the development of the Paulsboro Marine Terminal and were evaluated by BP for site investigational purposes. The following sections detail the findings and existing conditions of the sediments in the Delaware River and Mantua Creek that border the site.

4.13.1 BP's Sediment Sampling Programs and Results

BP completed a Baseline Ecological Evaluation (BEE) Report and Remedial Investigation Report (RIR) for the former BP Oil Terminal in June 2004. As part of the investigation, BP was required to sample sediments from portions of the Delaware River and the Mantua Creek. The BEE report concluded that chemicals of potential ecological concern were present in the Delaware River and the Mantua Creek. However, the conditions identified were similar to conditions identified throughout the Lower Delaware River watershed.

In part, the NJDEP required BP to conduct additional characterization of the Delaware River and the Mantua Creek sediments in their January 2007 conditional work plan approval. The investigation and results were reported in the August 2007 Final RIR. The additional assessment was intended to characterize TPH and/or PCB concentrations in the benthic sediments in areas of the Delaware River and Mantua Creek. Background samples were also collected to gauge the ambient/regional concentrations. The results from the initial investigation and the supplemental assessment were evaluated to assess the current conditions and any statistical variations.

BP sampled 26 locations during the supplemental assessment, including five locations on the former DuPont property portion of the site, five locations in the Mantua Creek adjacent to the former DuPont property, five locations in the Delaware River in/near their off-shore wharf complex, five background locations in the Mantua Creek, and five background locations in the Delaware River. An additional background location was sampled at the confluence of the Delaware River and the Mantua Creek. Samples were analyzed for PCBs, TPH, BNs, Priority Pollutant Metals, and Pesticides.

BP's investigations again indicated that chemicals of potential ecological concern were present in the Delaware and Mantua Creek. However, BP contended that much of these conditions were related to more recent spills (e.g., *M/T Athos I*) and activities at and along the waterways and were not the result of the former operations at the site. BP gained a No Further Action with regards to the sediment investigations.

4.13.2 Preliminary Sediment Quality Investigation

On behalf of the project, one round of preliminary sediment quality testing was completed on sediments in the Delaware River off-shore of the former Essex property during the geotechnical investigation for the development of the Paulsboro Marine Terminal. Six borings were extended into the sediments and samples were collected from the intervals of 0-2 feet, 2-4 feet, 4-6 feet,

10-12 feet, and 18-20 feet, below the riverbed. All the samples were analyzed for semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, total metals, and total petroleum hydrocarbons (TPH). The results of this investigation were comparable to results of the BP sediment sampling as reported by BP's investigations.

4.13.3 Essex Industrial Chemicals, Inc. Final Remedial Action Report Sediment Results

No sediment samples were physically collected on behalf of the former Essex Industrial Chemicals, Inc. company from the Delaware River or Mantua Creek. As part of the ISRA closure activities for the former Essex property, Dow Chemical Company reviewed information presented in the USACE's July 1997 Delaware River Main Channel Deepening Project Supplemental Environmental Impact Statement to ascertain the characteristics of the approximately 17 acre dredge disposal area present at the northeast portion of the facility. In the Final Remedial Action Report for the former Essex property, sample locations, results and navigational charts were reviewed from the USACE's July 1997 Delaware River Main Channel Deepening Project Supplemental Environmental Impact Statement and the locations, sediments, and sample results were cross-referenced. According to the July 1997 EIS, the contaminants detected in the sediments from the Delaware River included antimony, arsenic, lead, mercury, chlordane, dieldrin, DDT, PAHs, and PCBs. Specifically, sediments deposited at the USACE dredge disposal site were from Reach A of the navigation channel of the Delaware River, which was reported to be proximal to the project site. The contaminants detected in the sediments from Reach A above the May 12, 1999 Revised NJDEP Residential Direct Contact Soil Cleanup Criteria were antimony, arsenic, lead, and selenium.

4.13.4 Paulsboro Marine Terminal Proposed Dredging

In December 2008, on behalf of the project, a Sediment Sampling and Characterization Plan (SAP) was submitted to the NJDEP Office of Dredging and Sediment Technology in support of the Proposed Dredging Project for the site. The Proposed Dredging Project involves the dredging of sediments to -40 feet with 2-feet of overdredge. The resulting dredge materials would then either be disposed off-site or dewatered and applied on-site as fill material, in part depending on the engineering characteristics of the sediments.

The SAP will characterize a total potential volume of approximately 675,000 CY of Delaware River sediment at and adjacent to the site, which represents the amount required to be dredged for the three deep water berths and the one barge berth of the project. A total of 24 composite samples will be collected from Reaches A through D and analyzed for the following parameters:

- Priority Pollutants + 40 (Method 6010B / 7471A)
- Diesel Range Organic Compounds (Method 8015b), excluding dioxin and furans
- Total Aroclors (Method 8082)
- Grain Size
- Total Organic Carbon
- Percent Moisture

In a letter dated January 22, 2009, the NJDEP Office of Dredging and Sediment Technology approved and concurred with the sampling plan (Appendix A). The project will continue to coordinate and work with the NJDEP's Office of Dredging and Sediment Technology.

4.14 Traffic

Changes in the traffic patterns could be realized via motor vehicles, shipping, and railroad activities. The following sections detail the current conditions at the site.

4.14.1 Marine

The site contains a former offshore wharf that serviced the former BP Oil Terminal. This wharf has not been in service since BP closed the facility in the mid 1990's. Therefore, no ships have routinely used the facility since that time.

Discussions regarding the volume of goods, products, and commodities shipped on the Delaware River from Trenton, New Jersey to the sea are included in the Purpose and Need section of this EIS (Section 2.2). The information and calculations were developed in part using the USACE Waterways Resource Data. Also refer to the Purpose and Need section for the projected volumes and related port requirements as a result of any increases or decreases in the locations, types, and quantities of the products shipped.

4.14.2 Recreational Boating

Ziggy's Marina in Paulsboro is the only existing commercial marina on Mantua Creek and is located between the swing bridge and the lift bridge, approximately 1.6 miles east of the Delaware River. The marina is equipped to handle boats up to 27 feet in length, including sailboats, and typically docks boats between 15 and 25 feet in length.

The nearest recreational boating club is the National Park Boat Club, which typically has inboard and outboard recreational watercraft between 14 and 30 feet in length. This club typically uses Woodbury Creek rather than Mantua Creek. Information obtained from the Maritime Exchange in Philadelphia indicated that most commercial vessels utilizing the Delaware River do not enter Mantua Creek. In addition, there are no known private docks or moorings in excess of 25 feet long located along Mantua Creek.

4.14.3 Motor Vehicles

Motor vehicle traffic impacts were investigated and reported in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*.

4.14.4 Freight Railroads

Conrail operates about 372 miles of track in the Philadelphia/South Jersey region. In Southern New Jersey, Conrail provides local freight service on virtually all rail lines south of Trenton and provides connections with the short lines serving the remainder of the region.

The center of Conrail's southern New Jersey operations is the Pavonia Yard in Camden, New Jersey. Other local rail service yards are located at Burlington City and Mount Holly in Burlington County, and at Paulsboro and Woodbury in Gloucester County.

Train service in the area of the proposed Paulsboro Marine Terminal would be dispatched from Conrail's Pavonia Yard with probable support from Paulsboro. Access to the site is via the Paulsboro Industrial Track which is a single track from the main line. Conrail currently operates 2 trains per day on the main line, which typically incorporates 80 to 90 cars per train.

Seven gated railroad grade crossings are currently located in close proximity to the proposed project site. These grade crossings include:

- The Paulsboro Packaging, Inc. Sidetrack Grade Crossing
- The Universal Road/Conrail Grade Crossing
- Mantua Avenue (side track)
- Mantua Avenue (main line)
- Beacon Avenue
- North Delaware Avenue
- Penn Line Road

4.14.5 Bus Service

Two NJ Transit bus routes service the Borough of Paulsboro. Bus Routes No. 402 and No. 455 travel along Crown Point Road (S.R. 44) and both use the intersection of Broad Street (S.R. 44) and Billingsport Road as the designated bus stop. The towns/stops for each of the bus routes for which they serve are as follows:

Bus Route No. 402
Philadelphia; Camden; Gloucester; Brooklawn; Westville; Woodbury; West Deptford; Paulsboro; Gibbstown; Beckett; Pureland Industrial Complex; Logan Township; and Penns Grove with connections to NJ Transit's Bus Routes 315, 317, 318, 400, 401, 403, 404, 405, 406, 407, 409, 410, 412, 413, 419, 451, 455, 463, and 551. Stops in Camden include the Walter Rand Transportation Center which is a central station connecting multiple bus routes to the PATCO train station and NJ Transit's River LINE.

Bus Route No. 455
Cherry Hill; Cherry Hill Mall; JFK Hospital (C.H. Division); Kingston Estates; Haddonfield; Haddonfield PATCO; Haddon Heights; Barrington; Runnemede; Deptford; Deptford Mall; Woodbury; National Park; Thorofare; and Paulsboro with connections to NJ Transit's Bus Routes 401, 410, 412, and 463. Also, as indicated, the bus stops at the Haddonfield PATCO rail station.

4.14.6 Air Traffic

The Philadelphia International Airport Runway 17-35 Extension Final EIS was reviewed to ascertain that the cranes of the proposed Paulsboro Marine Terminal would not be within the flight paths of any arriving and departing air flights. Models based upon existing conditions for the year 2003 were reviewed and the main flight path for Runway 17-35 is shown to be located north and east of the Paulsboro Marine Terminal and east (river north) of the mouth of the Mantua Creek.

4.15 Demographics

4.15.1 Socioeconomic Status

Demographic information was obtained from the United States Census Bureau website (http://factfinder.census.gov) utilizing information obtained during the 2000 decennial census count. Information was obtained to the Census Tract, Block, and/or Block Group level based upon the availability of the data. Based on definitions provided by the Census Bureau, a Census Tract is "a small, relatively permanent statistical subdivision of a County delineated by a local committee of census data users for the purpose of presenting data. Census Tract boundaries normally follow visible land features, but may follow governmental unit boundaries and other non-visible features in some instances; they are always contained within Counties. Designed to be relatively homogeneous units with respect to population characteristics, economic status and living conditions at the time of establishment; census tracts average about 4,000 inhabitants. They may be split by any sub-County geographic entity."

A Block "is a subdivision of a Census Tract (or, prior to 2000, a block numbering area). A Block is the smallest geographic unit for which the Census Bureau tabulates [what is referred to as] 100-percent data. A Block Group or BG "is a subdivision of a Census Tract (or, prior to 2000, a block numbering area). A Block group is the smallest geographic unit for which the Census Bureau tabulates sample data. A Block Group consists of all the blocks within a census tract with the same beginning number."

Gloucester County is comprised of 59 Census Tracts. The Borough of Paulsboro is contained within Census Tract 5004 and the proposed Project Area is located in this Census Tract within Block Group 1 (Figure 4.15). Blocks 1001 and 1014 are subsets of Block Group 1 and are contained within the proposed Project Area site boundaries.

Blocks 1001 and 1014 are bounded on the west by a portion of Mantua Avenue and an arbitrary line that extends out to the Delaware River; on the north by the Delaware River; to the east by the centerline of Mantua Creek; and, on the south by Universal Road. Therefore, Block Group 1 and Blocks 1001 and 1014 comprise the proposed Project Area for this analysis. The project study area for the purposes of identify the demographics includes a 250-feet radius from the project area boundary. Additional Blocks 1007, 1015, and 1016 within Block Group 1 are partially incorporated in this project study area as are portions of Block Group 7 and Block 7000.

Table 4.12 provides demographic data for the Borough of Paulsboro, as well as Gloucester County and the State of New Jersey. The population of Paulsboro decreased by slightly more than 6 percent between the years 1990 and 2000. This was in contrast to the 11 percent growth experienced in Gloucester County for that same period along with the State of New Jersey with growth of approximately 8 percent.

Figure 4.15 Borough of Paulsboro Census Tract Information
Source: NJDEP / US Census Bureau, 2000 Census.

TABLE 4.12 DEMOGRAPHIC DATA: BOROUGH OF PAULSBORO, GLOUCESTER COUNTY, AND THE STATE OF NEW JERSEY

Demographic Parameter	Paulsboro Borough	Gloucester County	State of New Jersey
Population			
Population in 1990	6,577	230,082	7,730,188
Population in 2000	6,160	254,673	8,414,350
Change from 1990 to 2000	- 417	+24,591	+684,162
Median Age	34.3	36.1	36.7
Family Households with a Member over 65 Years of Age	658	21,150	1,122,728
Households with a Member under 18 Years of Age	908	39,196	793,781
Racial Composition			
White	3,915	221,742	6,104,705
Black or African American	1,949	23,084	1,141,821
American Indian and Alaska Native	15	487	19,492
Asian	20	3,805	480,276
Native Hawaiian/Other Pacific Islander	6	75	3,329
Hispanic or Latino (of Any Race)	268	6,583	1,117,191
Some Other Race	81	2,173	450,972
Two or More Races	174	3,307	213,755
Housing			
Percentage of Occupied Housing Units that are Rented	40%	20.1%	34.4%
Median Gross Rent	570	645	751
Median Value of Owner-Occupied Housing Units	78,600	120,100	170,800
Number of Housing Units	2,628	95,054	3,310,275
Owner-Occupied Units	1,385	65,838	1,701,732
Renter-Occupied Units	930	18,017	1,049,127
Vacancy Status	275	4,337	245,630
Income			
Median Household Income	$35,569	$54,273	$55,146
Per-capita Income	$16,368	$22,708	$27,006
Median Family Income (1999)	$41,359	$62,482	$65,370
Individuals-Percent Below Poverty Level (1999)	17.7%	6.2%	8.5%
Education			
Percentage over 25 with Bachelor's Degree or Higher	6%	22%	18.8%

Note: (X) Detailed Information Not Available at this Level.
Sources: U.S. Census Bureau, 2000 Census of Population and Housing Summary File 1 (SF 1) and Summary File 3 (SF 3), Tables DP-1, DP-2, DP-3, and DP-4

Also, as shown in Table 4.12, the population in Paulsboro and Gloucester County is predominantly white, comprising approximately 64 percent and 87 percent, respectively. Black or African American persons comprise 32 percent of the Paulsboro population, compared with approximately 9 percent in Gloucester County. Other minority groups in Paulsboro and

Gloucester County are represented, including: American Indian/Alaska Native; Asian; Native Hawaiian/Other Pacific Islander and Hispanic or Latino, but in much lower numbers, as seen in Table 4.12, when compared to the total population for both the Borough and the County.

Table 4.12 also details approximately 20 percent of the housing units in Paulsboro are rented, while in Gloucester County the percentage is approximately 34 percent. Both the median gross rent and median value of owner-occupied homes in Paulsboro are lower than the County median.

The median household and per-capita incomes in Paulsboro, $35,569 and $16,368 respectively, are lower than those for Gloucester County ($54,273 and $22,708 respectively). The median family income in Paulsboro is $41,359 while Gloucester County had a median family income of $62,482. Paulsboro had a 17.7 percent poverty rate in 1999, which is not quite triple the Gloucester County rate of 6.2 percent.

In Paulsboro, the percentage of residents over 25 that have bachelor's degrees or higher is 6 percent compared to 22 percent for Gloucester County.

Table 4.13, on the following page, details the population, racial composition, housing, and education statistics for the census tracts at and surrounding the proposed project area.

TABLE 4.13 AVAILABLE DEMOGRAPHIC DATA FOR THE PROJECT STUDY AREA

Demographic Parameter	Census Tract 5004	Block Group 1 (Project Site)	Block 1001 (Project Site)	Block 1014 (Project Site)	Block 1007 (Project Study Area)	Block 1015 (Project Study Area)	Block 1016 (Project Study Area)	Block Group 7 (Project Study Area)	Block 7000 (Project Study Area)
Population									
Population in 2000	6,160	699	62	0	55	0	156	779	42
Racial Composition									
White	3,915	642	61	0	54	0	131	716	42
Black or African American	1,949	34	1	0	1	0	9	32	0
American Indian and Alaska Native	0	1	0	0	0	0	0	3	0
Asian	0	0	0	0	0	0	0	2	0
Native Hawaiian/Other Pacific Islander	0	0	0	0	0	0	0	6	0
Hispanic or Latino (of Any Race)	0	7	0	0	0	0	3	30	0
Some Other Race	0	2	0	0	0	0	0	12	0
Two or More Races	174	20	0	0	0	0	16	8	0
Housing									
Percentage of Occupied Housing Units that are Rented	40%	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Median Gross Rent	570	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Number of Housing Units	2,628	281	29	0	25	0	61	350	21
Owner-Occupied Units	1,422	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Renter-Occupied Units	931	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Vacancy Status	275	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Income									
Median Household Income	$35,569	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Per-Capita Income	$16,368	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Median Family Income (1999)	$41,359	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)

Note: (X) Detailed Information Not Available at this Level.
Sources: U.S. Census Bureau, 2000 Census of Population and Housing Summary File 1 (SF 1) and Summary File 3 (SF 3), Tables DP-1, DP-2, DP-3, and DP-4

The dominant occupations of Paulsboro residents are in manufacturing, wholesale and retail trades and the educational, health, and social services industries (Table 4.14). These occupations also are dominant in Gloucester County.

TABLE 4.14 OCCUPATIONS OF EMPLOYED RESIDENTS; BOROUGH OF PAULSBORO, GLOUCESTER COUNTY AND THE STATE OF NEW JERSEY

Type of Occupation	Paulsboro Borough	Gloucester County	New Jersey
Agriculture, Forestry, Fishing & Hunting	9	616	12,618
Construction	162	8,912	220,817
Manufacturing	533	15,446	472,684
Wholesale and Retail Trade	465	21,757	620,512
Transportation, Warehousing & Utilities	177	8,657	234,801
Information	52	3,515	173,865
Finance, Insurance, Real Estate, Renting & Leasing	110	8,179	352,722
Professional, Scientific, Management, Administrative & Waste Management Services	213	11,504	453,842
Educational, Health & Social Services	413	27,592	783,137
Arts, Entertainment, Recreation, Accommodation and Food Services	200	7,752	271,864
Other Services	106	5,282	173,686
Public Administration	114	5,574	179,481
Total	**2,554**	**124,786**	**3,950,029**

Sources: U.S. Census Bureau, 2000 *Census of Population and Housing Summary File 1 (SF 1) and Summary File 3 (SF 3)*, Tables DP-1, DP-2, DP-3, and DP-4

Population Forecasts

The population of Paulsboro is forecast to grow from 2005 to 2035 by approximately 182 persons (Table 4.15); which is an increase of 3 percent. The growth rate projected for Gloucester County during the same time period is 35%.

TABLE 4.15 POPULATION FORECASTS; BOROUGH OF PAULSBORO AND GLOUCESTER COUNTY

Area	2005	2010	2015	2020	2025	2030	2035
Paulsboro	6,037	6,072	6,105	6,136	6,166	6,194	6,219
Gloucester County	274,229	292,486	309,751	326,116	341,468	355,993	369,374

Source: Delaware Valley Regional Planning Commission, *Regional, County and Municipal Population and Employment Forecasts, 2005-2035*, No. 14, August 2007

Employment Forecasts

Employment growth County-wide is forecast to be approximately 34 % between 2005 and 2035. The employment forecast for Paulsboro is anticipated to grow at a fairly steady rate of an approximate average of 60 employment opportunities every five-year period.

Employment opportunities in Paulsboro are anticipated to grow by approximately 14% between 2005 and 2035 (Table 4.16).

TABLE 4.16 EMPLOYMENT FORECASTS; BOROUGH OF PAULSBORO AND GLOUCESTER COUNTY

Area	2005	2010	2015	2020	2025	2030	2035
Paulsboro	2,515	2,584	2,650	2,713	2,771	2,827	2,878
Gloucester County	108,229	115,456	122,291	128,757	134,847	140,597	145,895

Source: Delaware Valley Regional Planning Commission, *Regional, County and Municipal Population and Employment Forecasts, 2005-2035*, No. 14, August 2007

4.15.2 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, signed by President Clinton on February 11, 1994, requires Federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse affects of Federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. The goal of Executive Order 12898 is stated as:

> *"... each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations in the United States" ...(emphasis added) (Section 1-101, Executive Order 12898, 1994).*

The purpose of the environmental justice review is to determine if a disproportionate share of the proposed project's adverse impacts are borne by low-income and minority communities. The review consists of two parts:

- The identification of disadvantaged (low-income and/or minority) populations; and
- A determination of whether any disadvantaged populations are disproportionately impacted by the proposed project.

The Council on Environmental Quality (CEQ) has oversight responsibility for and has written guidance regarding compliance with Executive Order 12898 and the NEPA process. Likewise, the USEPA has developed guidelines to provide direction regarding compliance with the Environmental Justice requirements.

Identification of Disadvantaged Populations in the Proposed Project Area
In accordance with the CEQ *Guidance for Federal Agencies on Key Terms* in Executive Order 12898, Minority and Low-Income Populations are defined as the following:

> *Minority*: is defined as "Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic."

United States Bureau of the Census definitions expand on this by further defining each ethnicity identified:

> *Black or African American:* "A person having origins in any of the Black racial groups of Africa. It includes people who indicate their race as 'Black, African American, or Negro,'

or provide written entries such as African American, Afro American, Kenyan, Nigerian, or Haitian."

American Indian or Alaska Native: "A person having origins in any of the original peoples of North and South America (including Central America) and who maintain tribal affiliation or community attachment."

American Indian: "Includes people who indicated their race as 'American Indian,' entered the name of an Indian tribe, or reported such entries as Canadian Indian, French-American Indian or Spanish-American Indian."

Alaska Native: "Includes written responses of Eskimos, Aleuts, and Alaska Indians as well as entries such as Arctic Slope, Inupiat, Yupik, Alutiiq, Egegik, and Pribilovian. The Alaska tribes are the Alaskan Athabascan, Tlingit, and Haida."

Asian: "A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam. It includes 'Asian Indian,' 'Chinese,' 'Filipino,' 'Korean,' 'Japanese,' 'Vietnamese', and 'Other Asian.'"

Native Hawaiian and Other Pacific Islander: "A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands. It includes people who indicate their race as 'Native Hawaiian,' 'Guamanian or Chamorro,' 'Samoan', and 'Other Pacific Islander.'"

Hispanic: Persons of Hispanic origin were identified by a question that asked for self-identification of the person's origin or descent. Respondents were asked to select their origin (and the origin of other household members) from a "flash card" listing ethnic origins. Persons of Hispanic origin, in particular, were those who indicated that their origin was Mexican, Puerto Rican, Cuban, Central or South American, or some other Hispanic origin. It should be noted that persons of Hispanic origin may be of any race."

Minority population: "Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent; or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis."

Low Income population: "Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census Current Population Reports, Series P-60 on Income and Poverty. The most current thresholds are presented in Table 4.17.

TABLE 4.17 UNITED STATES BUREAU OF CENSUS POVERTY THRESHOLDS 2006

Size of Family Unit	Weighted Average Thresholds	Related Children Under 18 Years								
		None	1	2	3	4	5	6	7	8 or More
1 Person (Unrelated Individual)	$10,294									
Under 65 Years	$10,488	$10,488								
65 Years and Over	$9,669	$9,669								
2 People	$13,167									
Householder Under 65 Years	$13,569	$13,500	$13,896							
Householder 65 Years and Over	$12,201	$12,186	$13,843							
3 People	$16,079	$15,769	$16,227	$16,242						
4 People	$20,614	$20,794	$21,134	$20,444	$20,516					
5 People	$24,382	$25,076	$25,441	$24,662	$24,059	$23,691				
6 People	$27,560	$28,842	$28,957	$28,360	$27,788	$26,938	$26,434			
7 People	$ 31,205	$33,187	$33,394	$32,680	$32,182	$31,254	$30,172	$28,985		
8 People	$ 34,774	$37,117	$37,444	$36,770	$36,180	$35,342	$34,278	$33,171	$32,890	
9 People or More	$ 41,499	$44,649	$44,865	$44,269	$43,768	$42,945	$41,813	$40,790	$40,536	$38,975

Source: United States Bureau of Census.

Another measure of poverty typically utilized in Low-income Population analyses are the United States Department of Health and Human Services (HHS) Poverty Guidelines provided in Table 4.18. The 1999 Poverty Guidelines are included for comparison purposes. As with the Poverty Guideline incomes, household incomes are expected to increase for 2007.

TABLE 4.18 UNITED STATES DEPARTMENT OF HEALTH AND HUMAN SERVICES POVERTY GUIDELINES

Persons in Family of Household	1999	2007 (48 Contiguous States and D.C.)
1	$8,240	$10,210
2	$11,060	$13,690
3	$13,880	$17,170
4	$16,700	$20,650
5	$19,520	$24,130
6	$22,340	$27,610
7	$25,160	$31,090
8	$27,980	$34,570
For Each Additional Person, Add	$2,820	$3,480

Source: Department of Health and Human Services.

This section presents existing conditions for minority and low-income populations within the proposed project area.

Information for this Environmental Justice evaluation was obtained from information provided by the United States Bureau of the Census through American Factfinder (http://factfinder.census.gov). Information on racial composition is available for the project site and information for the Project Study Area is available to the Block Level and the Census Tract Level for Low-Income Populations.

Information was obtained for the appropriate Census Tract, Block Groups and Blocks as available and information for the Borough of Paulsboro, Gloucester County and New Jersey were also added for comparison purposes.

The FHWA Environmental Justice Guidance Document defines low-income as a household income at or below the HHS Poverty Guidelines. These guidelines are updated annually by HHS. The Census Bureau tabulates persons in the United States by poverty status. These Census Bureau numbers were utilized in this analysis.

Minority Populations

Census Tract 5004 (i.e., Paulsboro) has a minority population of 2,376 persons or 38.6 percent of the Census Tract total, as compared with 14.3 percent in Gloucester County, and 33.9 percent in New Jersey (Table 4.19).

TABLE 4.19 SUMMARY OF MINORITY POPULATIONS FOR THE SITE AND PROJECT STUDY AREA

Area	Total Population	White Only	Total Minorities	Percent Minorities
Census Tract 5004	6,160	3,784	2,376	38.6%
Block Group 1 (Project Site)	758	729	29	3.8%
Block Group 7 (Project Study Area)	788	703	85	10.8%
Paulsboro Borough	6,160	3,784	2,376	48.6%
Gloucester County	254,673	218,249	36,424	14.3%
New Jersey	8,414,350	5,554,478	2,859,872	33.9%

Sources: U.S. Census Bureau, *2000 Census of Population and Housing Summary File 1 (SF 1) and Summary File 3 (SF 3)*, Tables DP-1, DP-2, DP-3, and DP-4

The specific Block Groups and Blocks within the site and Project Study Area do not contain environmental justice minority communities, as minority populations in these areas do not exceed 50 percent and the minority populations that do exist within the site and the Project Study Area are not significantly greater than the minority population percentage in the general population or other appropriate units of geographic analysis evaluated.

Low Income Populations

For the purposes of this analysis, low-income populations from the 2000 Census (the most recent data available) were evaluated and are included herein. The HHS Poverty Guidelines are based on household income and the 2000 Census includes household incomes and income below the poverty level for 1999. Median Household Income and Poverty Level information is included in Table 4.20.

Census data for income status typically is not available below the Census Tract or Block Group Level. In this case, Census Tract 5004 is the smallest Census-defined geographical area for which a number of individuals below the poverty level could be identified for the proposed Project. The population below poverty level is 17.7 percent in Census Tract 5004 as well as in the Borough of Paulsboro. Gloucester County has 6.2 percent of its population living below the poverty level and 8.5 percent of the population of the State of New Jersey is identified as living below the poverty level.

As can be seen in Table 4.20, the median household income in 1999 for Census Tract 5004 was $35,569, equal to the Median Household Income of Paulsboro, which is approximately 35% less than those for both Gloucester County and the State of New Jersey.

TABLE 4.20 SUMMARY OF LOW INCOME POPULATIONS (1999); PROJECT STUDY AREA. BOROUGH OF PAULSBORO, GLOUCESTER COUNTY, AND THE STATE OF NEW JERSEY

Location	Total Population	Individuals with Income Below Poverty Level	Individuals by Percent Below Poverty Level	Median Household Income ($) 1999
Census Tract 5004	6,160	1,084	17.7%	$35,569
Block Group 1 (Project Site)	699	(X)	(X)	$44,063
Block Group 7 (Project Study Area)	779	(X)	(X)	$33,750
Paulsboro Borough	6,160	1,084	17.7%	$35,569
Gloucester County	254,673	15,395	6.2%	$54,273
New Jersey	8,414,350	699,668	8.5%	$55,146

Note: (X) Detailed Information Not Available at this Level.
Sources: U.S. Census Bureau, *2000 Census of Population and Housing Summary File 1 (SF 1) and Summary File 3 (SF 3)*, Tables DP-1, DP-2, DP-3, and DP-4

Table 4.20 presents information regarding Low Income Populations in terms of numbers of individuals in a household, while Table 4.21 was utilized to identify potential Low Income Populations within the site and the Project Study Area. Whether compared against the United States Bureau of the Census criteria or those of the United States Department of Health and Human Services, it does not appear that any major Low Income household populations are present although there are individuals that are identified as living below the poverty level.

TABLE 4.21 SUMMARY OF AVERAGE HOUSEHOLD SIZE FOR THE SITE AND PROJECT STUDY AREA

Area	Total Population	Average Household Size
Census Tract 5004	6,160	(X)
Block Group 1 (Project Site)	699	2.64
Block 1001 (Project Site)	62	2.48
Block 1014 (Project Site)	0	0.00
Block 1007 (Project Study Area)	55	2.20
Block 1015 (Project Study Area)	0	0.00
Block 1016 (Project Study Area)	156	2.74
Block Group 7 (Project Study Area)	779	2.39
Block 7000 (Project Study Area)	42	2.00
Paulsboro Borough	6,160	2.61
Gloucester County	254,673	2.75
New Jersey	8,414,350	2.68

Note: (X) Detailed Information Not Available at this Level.
Sources: U.S. Census Bureau, *2000 Census of Population and Housing Summary File 1 (SF 1) and Summary File 3 (SF 3)*, Tables DP-1, DP-2, DP-3, and DP-4

4.16 Community Services and Facilities

Police Department

The Borough of Paulsboro Department of Police is situated within the Paulsboro Municipal Building located at 1211 Delaware Street (Figure 4.16) and employs 20 full time sworn uniformed police officers. The Police Department also employs between 2 and 4 special officers used to augment patrols and for apprentice programs. A total of 36 personnel (including custodians and administrative assistants) are employed by the Department.

Fire Protection

The Paulsboro Volunteer Fire Association #1 and the Billingsport Volunteer Fire Association Inc. serve the Borough of Paulsboro. The Paulsboro Volunteer Fire Association #1 station is located at 1500 Swedesboro Avenue. The Billingsport Volunteer Fire Association is located at 437 Billingsport Road (Figure 4.16). The services provided include; firefighting, hazardous material response, vehicle rescue, support, and search and rescue. These volunteer fire departments primarily serve the residential community.

Additionally, the Mobil Oil Refinery and Terminal (currently operated by Valero), located in the western portion of Paulsboro and eastern portions of Greenwich Township, contains their own dedicated fire protection service with members that are on a paid status. The Mobil Oil Fire Department - Station 21-4 is located at 800 Billingsport Road and operates from two stations that protect a primarily industrial area. The two Borough volunteer fire departments provide support for the refinery fire service, if needed.

Emergency Services

The Paulsboro Emergency Medical Service (EMS) is located at 32 East Broad Street. The EMS is a volunteer ambulance squad. The Paulsboro EMS responds to over 800 calls per year within Paulsboro and runs mutual aid to Gibbstown and East Greenwich. The EMS has approximately 14 active members and approximately 10 auxiliary members.

Emergency Management

Every governmental jurisdiction in the State of New Jersey is required to have an approved emergency operations plan (EOP). The plan specifies the vulnerabilities for major emergencies the municipality may have (e.g., chemical factories, airports, etc.) and outlines the resources that are accessible to meet the emergency. Each EOP is reviewed by the County and State Offices of Emergency Management and the format of the EOP is approved by the FEMA.

The Borough of Paulsboro Emergency Management Department operates out of the Paulsboro Municipal Building located at 1211 Delaware Street (Figure 4.16).

Medical Facilities

There are no hospitals in the Borough of Paulsboro. The nearest hospital is the Underwood Memorial Hospital located at 543 North Broad Street in Woodbury, Gloucester County, New Jersey, which is approximately 8.5 miles driving distance from the site. This hospital provides emergency, inpatient, and outpatient medical care.

Schools

The Borough of Paulsboro contains three public schools and one parochial school.

The Billingsport Elementary School is located at 441 Nassau Avenue and includes pre-school through second grade. According to the Paulsboro Public School District's 2005-2006 School Report, enrollment at the Billingsport Elementary School was 384 students (Figure 4.16).

The Loudenslager Middle School is located at 100 Baird Avenue and includes 3rd through 6th grade students. According to the Paulsboro Public School District's 2005-2006 School Report, enrollment at the Loudenslager Middle School was 344 students. The Paulsboro Active Learning Center is contained at the Middle School which is eligible for 4th through 6th grade students.

The Paulsboro High School is located at 670 North Delaware Street (Figure 4.16) and includes grades 7 through 12. According to the Paulsboro Public School District's 2005-2006 School Report, enrollment at the High School was approximately 694 students.

The Guardian Angels Regional School including a 4th grade to 8th grade campus (parochial) is located at 712 Mantua Avenue (Figure 4.16). The Guardian Angels campus is the former site of the St. John's School.

Sanitary Sewer Services

The Gloucester County Utilities Authority (GCUA) provides sanitary sewer services to the Borough of Paulsboro. The GCUA is a regional wastewater collection and treatment system located at 2 Paradise Road in West Deptford, New Jersey. The GCUA serves 16 municipalities and several industrial customers in Gloucester County. The GCUA accepts and treats 17 million gallons of wastewater a day (MGD) from the residents, businesses and industries it serves. The GCUA has the capacity to treat 24 MGD of wastewater. Each and every year, the GCUA reclaims the wastewater and returns it back into the environment as a high quality resource into the Delaware River Estuary.

Potable Public Water

The proposed Paulsboro Marine Terminal is located within Critical Water Area 2 which could require water supply allocation purchases between municipalities. Three active water supply wells (Well 4, Well 5, and Well 7R) are located in the Borough of Paulsboro and are operated by the Paulsboro Water Department. BP samples these wells on a semi-annual basis to determine if any contaminants are present in the water. No contamination has been confirmed in these wells related to BP's on-site sources.

Classification Exception Areas (CEAs) and Well Restricted Areas (WRAs) associated with the former BP Oil Terminal and the former Essex property currently exist at the site. The installation of potable wells would probably be restricted. In addition, NJDEP approval would be required for new potable wells that would withdraw from aquifers that are experiencing salt water intrusion.

Solid Waste

The Borough of Paulsboro contracts with a private solid waste collection company to collect residential solid waste. Recycling collection is completed by the pubic works department.

Gloucester County is one of twenty-two solid waste districts in New Jersey. The nearest solid waste complex is the Gloucester County Solid Waste Complex which is owned and operated by the GCIA. Located in South Harrison Township, the Solid Waste Complex is a sanitary landfill situated on a 540-acre tract of land.

Natural Gas and Electric

The natural gas purveyor in the area is South Jersey Gas, a subsidiary of South Jersey Industries. South Jersey Gas currently serves more than 332,000 residential, commercial and industrial customers in Atlantic, Cape May, Cumberland, Salem, and significant portions of Gloucester, Burlington, and Camden counties. The company's 5,441 miles of distribution and transmission lines encompass over 112 municipalities in southern New Jersey.

Deregulation has allowed consumers to choose their electric generation supplier; however, transmission and local distribution are the responsibility of Atlantic City Electric Company which serves nearly 540,000 customers in a 2,700 square mile area comprising eight counties in southern New Jersey.

Telephone Service

Deregulation has allowed consumers to choose their telephone service; however, the primary provider of telephone service in the area is Verizon.

Other Public Facilities

The Gill Memorial Library is located at the intersection of Mantua Avenue and Crown Point Road; S.R. 44 (Figure 4.16). The library building itself was constructed almost 200 years ago and, according to the Gloucester County records, was one of the first to be built in the Borough of Paulsboro.

Figure 4.16 Community Services and Facilities
Source: The Borough of Paulsboro, and the New Jersey Department of Environmental Protection i-MapNJ Geographic Information Systems (GIS) Interactive Mapping website.

4.17 Cultural Resources

Files of the New Jersey State Historic Preservation Office (NJ SHPO) and the New Jersey State Museum (NJSM) were reviewed to document the results of previous investigations completed in and surrounding the site and to assess the potential for cultural resources to be present on the property. The following section details the findings of the results and provides current site observations.

The vast majority of the buildings and industrial facilities at the site have been removed as part of the decommissioning procedures at both the former BP Oil Terminal and former Essex properties. One service building remains at the former BP Oil Terminal and three former warehousing and/or maintenance buildings remain on the former Essex property. All the other industrial buildings and facilities have been removed. Thus, the Paulsboro Marine Terminal property has been stripped of the great majority of the buildings and structures that demarked its industrial usage. The property now consists mostly of a level expanse of made land, interspersed with secondary vegetation, breached sandy containment berms, a few scattered buildings and some marine structures along the Delaware River and Mantua Creek shoreline. Four buildings stand within the limits of the site; a one-story cinder block office building at BP's entrance gate, and three vacant, former industrial/warehouse buildings on the former Essex property. One of these vacant buildings may date as early as the 1930s; the other two appear to be less than 50 years of age A modern building that serves as a pumping station for ground water treatment is also present on the property.

A number of waterfront features are present along the segments of the Mantua Creek shoreline within the project limits. These include wooden bulkhead structures and their wooden underpinnings and stone containment walls along the Delaware River and Mantua Creek, as well as a number of sunken barges in the Delaware River that date to *circa* 1952. An abandoned loading pier for liquid petroleum products and pump is also present on the Mantua Creek shoreline within the property. An intact, but deteriorating concrete, steel and wood docking facility, pipes, pumps, etc. is also present along the Delaware River shoreline within the property limits. This more recent facility partially overlays an older, wooden pier, in part comprised of sunken barges, now mostly submerged along the shoreline. A rip-rap jetty, extending approximately 200 feet out into the river, is also present at the confluence of the Mantua Creek and the Delaware River.

According to the NJDEP website (Table 4.22), there are four resources in Paulsboro that are listed on the New Jersey or National Register of Historic Places as of August 6, 2007 (NJSHPO 2007). Of these, one was demolished in 1996 (First National Bank and Trust Company); only the Tinicum Island Range Rear Light is within the visual range of the project site (Figure 4.17).

TABLE 4.22 NEW JERSEY OR NATIONAL REGISTER OF HISTORIC PLACES; BOROUGH OF PAULSBORO (AS OF AUGUST 6, 2007)

NJ-HPO ID # - Opinion Date	Site Name	Location	Distance from Project
#4153 - 1/4/2002	First National Bank and Trust Building	10 W. Broad Street	6,000 Ft, South; DEMOLISHED
#1410 – 11/4/1974	Fort Billings Park	Riverfront, Billingsport Road at Third Street, Clonmell Road and North Delaware Street);	1,300 Ft., West
#2596 - 11/16/1999	The Municipal Building	Broad Street	6,000 Ft., South
#208 – 11/16/1999	Tinicum Island Range Rear Light	1211 Delaware Street	400 Ft., West

Source: NJSHPO files, August 2007.

Figure 4.17 NJ State Historic Registered Sites
Source: NJ-SHPO, January 2009

Archaeological sites were reviewed on August 6, 2007 at the New Jersey State Museum (NJSM). As shown by the following table (Table 4.23) and Figure 4.18, twelve sites were found to be in close proximity to the project.

TABLE 4.23 DOCUMENTED ARCHAEOLOGICAL RESOURCES WITHIN 5,000 FEET OF THE PROPOSED PROJECT AREA

NJSM Site No.	Site Name	Known Characteristics
28-GL-23	Mantua Creek	Ceramics, celts, atl-atl weights, knives, flakes*
28-GL-24	Paulsboro	Ceramics and lithics‡
28-GL-30	Caesar #21	"Sandy knoll near field, undisturbed"*
28-GL-32	Caesar #13	Reported to have been destroyed*
28-GL-34	Caesar #8	Reported to have been destroyed*
28-GL-35	Caesar #27	Numerous types of lithic artifacts reported*
28-GIL36	Caesar #27	Numerous types of lithic artifacts reported*
28-GL-192	Strikmater	80,000 sq ft site with hammerstones, FCR, flakes‡
28-GL-193	Collins	60,000 sq ft site with points, hammerstones, FCR pottery, flakes‡
28-GL-239	Billingsport	Reportedly a village site†
28-GL-246	Field 1	Numerous (11) prehistoric loci†††***
28-GL-307	Parking Lot Site	Late Archaic temporary procurement camp‡‡‡

Sources: NJSM files*; Skinner and Schrabisch 1913†; Cross 1941‡; Wilson 1978**; Moolin Associates 1992††; CRCG 2002‡‡

According to the resources reviewed, two prehistoric sites are reported to be within the project limits. The Mantua Creek Site (28-GL-23) is indicated to be one of the earliest sites recorded in the County and is considered to be well documented. It was reported in 1938 to have been located on high ground adjacent to the marsh at the mouth of the Mantua Creek (A detailed site map is contained within the NJSM site files, giving the site's precise location and dimensions). The site was recorded as containing an intact ceramic pot and numerous stone artifacts, some of which may extend back to the Archaic Period. The Billingsport site (28-GL-239) is believed to have been located near the northwest corner of the project site but is not as well documented. Excerpts from the records indicated that the authors' only comment was, "Dr. Abbott reports a village with abundant remains at Billingsport" (Skinner and Schrabisch [1913:60]). By the information included in the file, it does not appear that they independently viewed the site.

As shown by Figure 4.18, several archaeological sites are reported in the vicinity of the project, mostly on uplands between the Mantua and Little Mantua Creeks, east of the project limits. The surveys present information about the potential historic archaeological resources near the site (CRCG 1999, 2002; Hunter Research 2005; Wilson 1978; Frank Moolin & Associates 1992; Zerbe *et al.* 2005). Several other archaeological resources reported to the NJSM appear to have been documented in close proximity by local collectors, such as M. Caesar. Other surveys on file at the NJSHPO also reference potential historic maritime archaeological resources in the area (Wilson 1978; McHugh 1983; Cox 1995).

Of the investigations reviewed, complete National Historic Preservation Act (NHPA) Section 106 review processes were conducted on four prehistoric sites; NJSM 28-GL-30, 28-GL-307, 28-GL-246, and 28-GL-308.

NJSM Site 28-GL-246 included a 1992 Phase I/II survey completed on 303 acres between the Mantua and Little Mantua Creeks by Frank Moolin & Associates on behalf of a proposed coal-fired electric generating plant by Crown Energy L.P. and Vista Energy L.P. Fifteen prehistoric loci were identified during that survey, eleven of which were incorporated into a single site. This site was recommended to be eligible for listing on the National and New Jersey Register of

Historic Places (Frank Moolin & Associates 1992:8-1). Prehistoric sites were tested during that survey and assessed to be eligible for inclusion in the National Register of Historic Places (NRHP). The report did not clearly state the recommended NRHP status for the remaining loci.

In 1999 and in 2002 respectively, Phase I/II and Phase III archaeological investigations were conducted for the Mantua Creek Generating Project, on the same parcel of land. Data recovery investigations of four sites produced significant information on prehistoric occupation of the area. Each of the four sites was interpreted to reflect short-term camps inhabited by small groups of people during the Late Archaic Period (4000-2000 BC) during periodic, seasonal hunting/gathering forays to the area. Two of these sites (i.e., 28-GL-30 and 28-GL-307) border the east bank of the Mantua Creek, across the creek from the project site.

Figure 4.18 Known Cultural Resource Surveys
Source: NJ-SHPO, August 2007

Additional reconnaissance-level surveys conducted in and/or adjacent to the current project site provide assessments of the cultural resources sensitivity of the area (Figure 4.18). A Phase IA cultural resource survey for the Eagle Point Inter-Refinery Pipeline System Connection reviewed a narrow, linear transect across the proposed project area (Hunter Research 2005). The survey corridor measured 90 feet wide by six miles long, beginning to the east of the current project and bisecting it on an east-west transect approximately 1,200 feet south of the current Delaware River shoreline. Hunter (2005:8) concluded that the location of the Paulsboro Marine Terminal property had low potential for intact archaeological deposits because of prior disturbance from its industrial past and recommended no further work in this area. The report did not include details regarding the nature or extent of prior disturbances on this property.

A terrestrial cultural resources survey was conducted as part of the T&M Associates *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, which focused exclusively on the proposed route of the access road and bridge that connects the existing Universal Avenue with either Crown Point Road or Paradise Road. The purpose of that survey was to identify previously-reported architectural and/or archaeological resources in the Area of Potential Effect (APE) for the proposed access road and to assess the potential need to conduct more detailed studies for further Section 106 consultation to satisfy NHPA requirements (Zerbe *et al.* 2005).

T&M's report concluded that there was a high potential for unreported undocumented prehistoric archaeological sites in an upland setting proximate to the Mantua Creek, as over 50 sites have been reported within a two-mile radius of the APE established in the Zerbe *et al.* (2005) report. Current land surfaces may be anticipated to contain Middle Archaic through Late Woodland archaeological deposits. The report also concluded that land surfaces now deeply buried due to rising sea levels and alluviation may contain Paleoindian and Early Archaic Period archaeological sites. T&M's Associates *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge* references cited several studies that had reported archaeological finds from buried tidal marsh settings in the Middle Atlantic region as well as elsewhere (Zerbe *et al.* 2005:42). The report recommended surficial archaeological testing in upland portions of the APE and deep testing in tidal settings along the Mantua Creek.

In regards to historic archaeological resources, the T&M Associates *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge* concluded that there was little potential for this resource type in their APE (Zerbe *et al.* 2005:43). Historic map research did not indicate the presence of any colonial or nineteenth-century structures in the area and reported that the few historic sites in the area that have been archaeologically tested have been determined not eligible for listing in the NRHP.

Three architectural resources were surveyed for the T&M Associates *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge* study, the Delaware River Railroad, a residential property at 57 Crown Point Road, and an industrial building and water tower on Universal Road. None of these properties was found to be eligible for listing in the NRHP and no further investigation or recordation was recommended (Zerbe *et al.* 2005:39).

There have been a number of studies documenting the potential for maritime resources within or adjacent to the proposed project area (Wilson 1978, McHugh 1983, Louis Berger 1983, Cox 1995). The naval engagement between the Continental and British forces for control over the lower Delaware River during the autumn of 1777 is the single most important historical event for

which remains may be located in near-shore portions of the project area. The defensive posture taken by the Continental forces included the erection of Fort Billings and the installation of *chevaux de fries* in two separate lines across the Delaware River. *Chevaux de fries* were wood-frame cribs filled with stone and sunk in the river, with long poles tipped with iron spikes extending upwards from the crib frame. They were designed to puncture the hull of unwary ships.

The exact location of Fort Billings is unknown, but was probably along the waterfront further west or downstream and outside the project area. Similarly, the two lines of *chevaux de fries* were to the east and west of the Mantua Creek and it is very unlikely that any were situated in the project area. The majority of them were removed from the river in 1784, although portions of one were dredged from the river off Fort Mifflin in the 1930s (McHugh 1983:16). However, another was found more recently in the Delaware River adjacent to the Sunoco Logistics pier next to Fort Mifflin in Philadelphia, Pennsylvania (Philadelphia Inquirer, November 15, 2007).

The one resource related to the military engagement of 1777 potentially located within the project area is the British sloop of war *Merlin*. It is reported to have run aground along the south bank of the Delaware River near the mouth of the Mantua Creek during the British attack on Fort Mifflin. Contemporary eighteenth century accounts indicate that it went down east (upstream on the Delaware River) of the Mantua Creek but there are no later and more accurate reports of its location. The *Merlin* and its sister ship the *Augusta*, which was also sunk during the same engagement, are reported to have been holding between one and two million dollars of gold and silver each when they went down. Sources indicate that the *Augusta* blew up while it was being abandoned by the British, but its hull was still visible in the river as late as 1917 (McHugh 1983:15, 25; A-14). The *Merlin* was scuttled by the British, but the sources did not indicate the subsequent fate of the ship (Cox 1995:22). Cox did perform a side-scan sonar survey of the side slopes of the main channel of the Delaware River in the Billingsport area and did not report any potentially significant finds (Figure 4.18). However, that survey did not extend to the area surrounding the mouth of the Mantua Creek and therefore it is unknown whether the remains of the *Merlin* exist within the project site.

The only other maritime-related cultural resource noted in previous surveys was wooden bulkheads along the Delaware River shore within the proposed project area. These were noted during a survey of the river conducted by Louis Berger and Associates in 1983; no determination of New Jersey Register of Historic Places (NJRHP) eligibility of these features were made and no clear recommendations for further investigation were made at that time. Similar features were observed along the Mantua Creek during the walk-over reconnaissance for the current survey, as were what are identified as two sunken barges along the Delaware River shore. Survey of these features and the potential archaeological (both terrestrial and maritime) sites may be required to determine whether they are eligible for listing on the NJRHP.

4.18 Parks and Recreation Facilities

Parklands are open spaces consisting of any combination of 1) active recreational facilities, such as athletic fields, playgrounds, and running tracts; and 2) passive recreational facilities such as picnic areas, walking paths, wildlife viewing locations, and sitting areas.

One municipal recreational facility, the Louis Damminger, Jr. Sports Complex, was identified within 250 feet of the site. The facility is located immediately west of Mantua Avenue and contains athletic fields (Figure 4.16).

The NJDEP Green Acres Program Recreation and Open Space Inventory (ROSI) online database was reviewed to determine what open spaces are included in the NJDEP Green Acres Program in the vicinity of the proposed project.

Each Local Unit (municipality or County) is required to prepare a ROSI as a condition of applying for and receiving Green Acres funding. The ROSI lists all Green Acres-funded properties ("funded parkland") as well as all other lands held for conservation and/or recreation purposes at the time the Local Unit last received funding from Green Acres ("unfunded parkland"). Lands listed on a ROSI include those owned, leased, or otherwise controlled by the Local Unit and may include land owned in fee, land leased by the Local Unit for recreation purposes, land owned by a private entity upon which the Local Unit holds a conservation easement, or any land in which the Local Unit holds a specific recreation and/or conservation interest. Table 4.24 details the recreational and open spaces in Paulsboro included on the NJDEP Green Acres database.

TABLE 4.24 NJDEP GREEN ACRES PROGRAM OPEN SPACE DATABASE: BOROUGH OF PAULSBORO, GLOUCESTER COUNTY, NEW JERSEY

Facility Name	Block	Lot	Interest	Type	Green Acres Funded?
Little League	12	1	Entire Taking/Fee Simple	Municipal	No
Little League	12	2	Entire Taking/Fee Simple	Municipal	No
Baird Avenue Rec Area	125	2	Leased Land	Municipal	Yes
Little League	4	1	Entire Taking/Fee Simple	Municipal	No
Little League	4	9	Entire Taking/Fee Simple	Municipal	No
Fort Billings Park	50	9	Entire Taking/Fee Simple	Municipal	No

Source: NJDEP Green Acres Program Open Space On-Line Database, reviewed on February 25, 2008.

4.19 Aesthetic Features

The site is a former petroleum storage terminal and former chemical storage facility. The facility is currently vacant and BP continues to remediate the property. The site is separated from the surrounding community via a chain-link fence. Views of the site from the west and the residential properties are of the relic sand berms. All of the storage tanks and ancillary facilities and buildings have been demolished.

Looking northward from the site is the Delaware River. Looking towards the east is the Mantua Creek. However, located on the eastern shore of the Mantua Creek is the Nu-Star Asphalt Products facility (formerly CITGO).

5.0 ANTICIPATED IMPACTS

This section presents a discussion of the potential environmental, social, and economic impacts resulting from the proposed Paulsboro Marine Terminal project. All impacts are evaluated and reported for the preferred alternative, Alternative 3. Table 5.1 provides a summary of the anticipated project impacts.

The associated dedicated access road and bridge are components of the proposed Port of Paulsboro and the impacts resulting from this aspect of the project were evaluated as part of T&M Associates' *Executive Order No. 215 Environmental Impact Statement for the Proposed Paulsboro Marine Terminal Access Road and Bridge*.

Summary of Findings
The preferred alternative would be highly responsive to the project goals and objectives as summarized below:

- As described in Chapter 3 of this EIS and Section 5.13 of this chapter, the preferred alternative would enable southern New Jersey to capture a greater market share of local and regional discretionary bulk and break-bulk commodity movements thereby making a positive contribution to local and regional economic development through the provision of transportation and value-added services;
- The Paulsboro Marine Terminal would create new employment opportunities within an existing community that was previously supported by local industrial facility jobs, as described in Chapter 3 and Section 5.16 of this chapter.
- As described in Sections 4.11, 4.12 of Chapter 4 and Sections 5.10 and 5.11 of this chapter, the preferred alternative would re-use former industrial properties that are in a ready condition for redevelopment and has been designated by the Borough of Paulsboro for water-dependent marine terminal use;
- Alternative 3 was selected as the preferred alternative in part because it would have the least impact on the natural and human environments (Section 3.2.7, Chapter 3). Potential adverse impacts would be avoided in the areas of geology, groundwater resources, land use and zoning, contaminated sites, traffic, community facilities and services, and aesthetics. Unavoidable adverse impacts have been minimized through conceptual design in the areas of topography, soils, wetlands, intertidal/subtidal shallows, floodplains surface waters, vegetation and wildlife, air quality and noise, and cultural resources. Conceptual mitigation strategies have been identified to offset residual impacts in Chapter 6.
- Under the umbrella of the DRPA's Green Ports Initiative, sustainability strategies would be part of the final engineering design of the preferred alternative (Sections 5.8 and 5.10 of this chapter and Sections 6.8, 6.10 and 6.17 of Chapter 6); and,
- The preferred alternative would be consistent with the NJ Freight Plan and Visioning Plan (Section 2.2.8, Chapter 2) as well as the NJ State Development and Redevelopment Plan and Paulsboro Master Plan (Section 5.10 of this chapter).

TABLE 5.1 PAULSBORO MARINE TERMINAL SUMMARY OF ANTICIPATED IMPACTS AND PREFERRED MITIGATION

PARAMETER	ANTICIPATED IMPACTS	MITIGATION FOR PREFERRED ALTERNATIVE
Topography	**Impact to be mitigated**. Fill and grading at the site to create a relatively flat surface to approximately elevation +11.0 feet above MSL covering current topography.	A SESCP approved by the Gloucester County Soil Conservation District would be implemented to avoid or minimize soil erosion and to prevent sediment-laden runoff from leaving the site or discharging to the Delaware River or Mantua Creek.
Soils	**Temporary impact**. Construction, grading, and filling activities have the potential to result in soil erosion.	Earth disturbance and cuts would be limited. Soil erosion would be minimized through implementation of an approved SESCP certified by the GCSCD.
Geology	**No anticipated impact**. Minimal disturbance via the installation of bulkheads, piles, etc.	Piles and bulkheads would be driven and not excavated. No blasting would be necessary for construction or dredging activities.
Freshwater Wetlands	**Impact to be mitigated**. Permanent Impacts: 1.05 acres of the 1.08 total of freshwater wetlands are anticipated to be impacted. Impacts include 0.34 acres emergent wetlands, 0.21 acres scrub-shrub wetlands, and 0.50 acres forested wetlands. No temporary impacts anticipated.	Permanent wetland impacts would be mitigated in accordance with the NJDEP Freshwater Wetlands Protection Act Rules, Coastal Zone Management Rules and USACE Section 404/10 permit requirements.
Intertidal/ Subtidal Shallows	**Impact to be mitigated**. A total of 6.7 acres of intertidal/subtidal shallows of the Delaware River are anticipated to require mitigation.	Permanent intertidal/subtidal wetland impacts would be mitigated in accordance with the NJDEP Freshwater Wetlands Protection Act Rules, Coastal Zone Management Rules and USACE Section 404/10 permit requirements.
Floodplains	**Impact to be mitigated**. Fill and structures are anticipated to be placed within approximately 98.8 acres of Zone A of the floodplain.	Approximately 587,000 CY of material would be dredged from the Delaware River thereby increasing water column capacity in the Delaware River and offsetting fill in the floodplain.
Surface Water Resources	**Impact to be mitigated**. Dredging of 587,000 CY of river bottom would temporary suspend sediments that would eventually settle out of the water column. No open water fill is to be placed within the Delaware River or Mantua Creek.	BMPs would be used for dredging activities to minimize sediment suspension and turbidity. Impacts would be minimized through the design of the Terminal and implementation of BMPs to maintain existing hydrologic connectivity and to maintain water quality. All work to be completed in accordance with the NJDEP and USACE requirements. Dredging would be completed within the USACE/NJDEP approved seasonal timing restriction windows.

PARAMETER	ANTICIPATED IMPACTS	MITIGATION FOR PREFERRED ALTERNATIVE
		A SESC Plan approved by the GCSCD would be implemented and strictly adhered to during construction to avoid soil erosion and sedimentation in the Delaware River and Mantua Creek. A stormwater management plan adhering to the NJDEP regulations will be designed and constructed at the site to maintain stormwater runoff quality and quantity discharging to the Delaware River and Mantua Creek.
Groundwater Resources	**No impact anticipated**. Site has low groundwater recharge potential under existing conditions.	The introduction of impervious surfaces at the site would preclude groundwater recharge; however, recharge at the site is negligible under existing conditions. Impacts would be minimized through implementation of BMPs. Conduits, baffles and oil water separator systems can be installed in lieu of SWM basins to eliminate impacts to the ongoing groundwater remediation at the site.
Upland Vegetation	**Permanent impact.** Permanent impacts to the existing forested uplands, scrub/shrub uplands, and upland grassed areas.	A landscaped, vegetated, 80-foot wide buffer area would be created along the western perimeter of the Terminal.
Aquatic Wildlife / Habitat	**Impact to be mitigated.** Dredge of approximately 587,000 CY within the Delaware River would temporarily displace fish and other aquatic organisms. 10.6 acres of wharf and trestle coverage over open water. Approximately 9 acres of revetment to be placed proximal to berth area.	Dredging activities would adhere to recommendations and timing restrictions made by the NJDEP and USACE requirements. Piles and 9-acre revetment provide for additional aquatic habitat. The pre-existing sunken barges are intended to remain to keep the current aquatic habitat.
Terrestrial Wildlife	**Permanent impact.** Existing foraging and cover habitat for terrestrial wildlife would be removed.	Mobile terrestrial wildlife may re-locate to surrounding areas.
Threatened, Endangered and Protected Species	**Permanent impact.** A portion of forested bald eagle foraging habitat would be impacted at the site.	Construction restrictions may be employed limiting construction to times when bald eagle foraging activity is less active. Bald eagle foraging habitat would remain throughout the Delaware River and Mantua Creek adjacent to the proposed Terminal.

PARAMETER	ANTICIPATED IMPACTS	MITIGATION FOR PREFERRED ALTERNATIVE
Air Quality	**Impacts to be mitigated.** Terminal operations will produce higher than current air emissions at the site. However, emissions from marine vessels are expected to be similar or below pre-existing estimates. Temporary impacts from construction equipment emissions and fugitive dust	Proposed low emission equipment at the Terminal may be used to minimize air emissions from facility operations to the extent practicable. Schedule and queue vessels and equipment to minimize air emissions. Extend Green Ports Initiative to develop mitigation techniques dedicated to the Terminal.
Noise	**Impacts to be mitigated.** Noise from Terminal operations is expected to have a potential impact on noise-sensitive receptors.	Creation of an 80-foot wide landscaped buffer area with structure along the western perimeter of the proposed Terminal will separate Terminal activities from the adjacent residential neighborhood. Truck traffic accessing the site will utilize the proposed overpass roadway, eliminating truck traffic and associated noise impacts from residential roadways. Construction vehicle operation would occur only during hours permitted by the Borough of Paulsboro Noise Ordinance for construction.
Land Use and Zoning	**No impact anticipated**. Consistent with past industrial land use and existing zoning.	None Required.
Consistency with Local/State/ Regional Land Use Policies	**No impact anticipated**. Consistent with existing zoning and State Development and Redevelopment Plan.	None Required.
Contaminated Sites	**No impact anticipated**. BP's remediation activities at the site will continue. Remedial actions at the former Essex property will remain intact and/or be upgraded by the installation of a soil/asphalt cap.	BP's Remedial Action Work Plan activities have been completed. Coordination with BP would continue during construction to ensure remediation efforts are not compromised. BP's remediation will continue after construction is completed. All provisions contained within the Deed Notice on the former Essex site would be monitored, followed, or updated as needed. The development of the Paulsboro Marine Terminal may be completed in accordance with an MOA and any remedial activities will be completed as required by N.J.A.C. 7:26E.

PARAMETER	ANTICIPATED IMPACTS	MITIGATION FOR PREFERRED ALTERNATIVE
Sediments	**Temporary impact**. A total of 587,000 CY of materials would be dredged at the berths and for vessel access to/from the main channel of the Delaware River.	A Dredge Material Management Plan would be completed in accordance with NJDEP's publication, *The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters* (October 1997) and the January 22, 2009 NJDEP concurrence letter. Dredging would be completed within the USACE/NJDEP approved seasonal timing restriction windows. USACE Section 404/10 permits will be obtained. All dredging would be completed in accordance with Federal, State, and local requirements and dredge spoil materials would be disposed of at suitable locations, including potential placement at the Paulsboro Marine Terminal through a Beneficial Use Permit.
Motor Vehicle Traffic	Impacts related to the access road and bridge are addressed in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road.*	Impacts related to the access road and bridge are addressed in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road..*
Shipping Traffic	**No impact anticipated.** Ship traffic within the River would increase by approximately one ship every 3 days within 3 years and by one ship daily within 10 years.	None Required.
Freight; Railroad Traffic	**No impact anticipated.** Existing single rail track from main line.	The projected annual rail use is 10% or 15 rail cars per day.
Air Traffic	**No impact anticipated**. The cranes of the proposed Paulsboro Marine Terminal would not be within the current or proposed flight paths of Runway 17-35 of the Philadelphia International Airport.	FAA-required lighting will be installed on the cranes, as applicable.
Community Facilities and Services	**No impact anticipated.** The Paulsboro Marine Terminal is consistent with previous land use and existing zoning.	Community outreach and integration will be completed as the Terminal enters into operations.

PARAMETER	ANTICIPATED IMPACTS	MITIGATION FOR PREFERRED ALTERNATIVE
Cultural Resources	**No impact anticipated**. Approximately 30 feet of material will separate native landforms from proposed grade. Frequent maintenance dredging has altered river and creek bed profiles. The re-alignment of the Mantua Creek and mid-20th century industrial use of the site have severely altered pre-existing landforms at the site.	Two terrestrial archaeological resources, one marine archaeological resource, and the former bulkheads and one building greater than 50 years of age were identified at the site. Where applicable, the Section 106 and New Jersey Register review processes will be conducted to formally assess the cultural resources and determine applicable mitigation measures to be completed, if necessary.
Socio-economics	**Positive impact anticipated**. Economic development includes generation of jobs, income, and tax revenues.	No disproportionate or adverse ecological, cultural, economic or social impacts are anticipated on low income or minority populations.
Solid Waste	**No impact anticipated.** Waste generated will be disposed of at an approved facility.	None Required.
Aesthetics	**No Impact anticipated**.	A naturally vegetated, 80-foot wide buffer would separate the Terminal from the existing neighborhood along Mantua Avenue, providing an improvement over past and existing land uses.
Sustainability	**Positive impact anticipated**. The project would redevelop former industrial properties consistent with NJ Smart Growth polices which would transform a former oil and chemical bulk storage facility into a Marine Terminal and Distribution Center.	None Required.

5.1 Topography, Geology and Soils

The majority of the grading and filling activities at the project site would require the placement of large quantities of fill to raise the grade to the required elevation of +11.0 feet above MSL. Most of the fill would be placed on land near the Delaware River, sloping and thinning towards the south and the center of the site. Excavation into the native soils would be limited, predominantly associated with the installation of underground utilities. Any excavations into the current soils would be completed with the coordination of BP and the on-site environmental consultants to limit the disturbance of any contaminated materials. Piles and foundations, where necessary, would be driven in a manner to limit the disturbance of any contaminated materials and the native geology and soils at the site.

An approved SESCP would be implemented for the proposed action to avoid and minimize soil erosion.

5.2 Wetlands

A total of 1.08 acres of freshwater wetlands have been delineated at the site using the 1989 *Federal Manual*, as well as by direction provided by the NJDEP and USACE specifically for areas within the former USACE dredge spoil management area. Using Alternative 3, only 1.05 acres of wetlands would be impacted at the site. Impacts to freshwater wetlands consist of 0.50 acres of forested, 0.21 acres of scrub-shrub, and 0.34 acres of emergent areas. Wetland Area M will be avoided during development of the Paulsboro Marine Terminal.

The majority of the wetlands being impacted at the site consist of non-contiguous areas that occur in small depressional pockets at an elevation whereby groundwater influence is present. The largest contiguous wetland being impacted is Area F/G. Wetland Area F/G consists of a former NJPDES-permitted drainage ditch that discharges into the Delaware River in the northeast portion of the project site. Wetland Area M is anticipated to be avoided during construction and development of the Paulsboro Marine Terminal. The northeast portion of the project site, incorporating the former USACE dredge disposal area, is designated as foraging habitat for bald eagle; however, this area contains only Wetland Area F/G and Wetland Area Z. The remainder of the former USACE dredge disposal area can be characterized as an upland forested area. Figure 4.7 shows the delineated wetlands.

The wetlands are primarily associated with the floodplains of the Delaware River and Mantua Creek. It is anticipated that wetland transition areas for most of the on-site wetlands will be either zero for ordinary resource value wetlands or 50-feet for intermediate resource value wetlands. A transition area of 150-feet would apply should a wetland at the site be classified as having an exceptional resource value (e.g., endangered or threatened species habitats). This standard width can only be modified through the issuance of a transition area waiver from the NJDEP.

A freshwater wetland of exceptional resource value is one which:

- Discharges into FW1 or FW2 trout production waters or their tributaries;
- Is a present habitat for threatened or endangered species; or
- Is a documented habitat for threatened or endangered species which remains suitable for breeding, resting or feeding by these species during the normal period these species would use the habitat.

A freshwater wetland of ordinary resource value is one which does not exhibit any of the characteristics of an exceptional resource value wetland, as described above, and which is:

- An isolated wetland which is smaller than 5,000 square feet and has the one or more of the following uses covering more than 50 percent of the area within 50 feet of the wetland boundary: lawns; maintained landscaping; impervious surfaces; active railroad rights-of-way; and graveled or stoned parking/storage areas and roads.
- A drainage ditch;
- A swale; or
- A detention facility created by humans in an area that was upland at the time the facility was created.

A freshwater wetland of intermediate resource value, or intermediate resource value wetland, is any freshwater wetland not defined as exceptional or ordinary.

In addition, a total of 6.7 acres of intertidal/subtidal shallows within the Delaware River are anticipated to require mitigation via NJDEP/USACE permitting requirements. Impacts are related to the dredging activities for proposed berth construction.

5.3 Floodplains

The project would impact approximately 98.8 acres of floodplains in Zone A4, which could be subject to inundation by the 100-year flood. The site is designed to be raised to approximately elevation +11.0 feet NAVD88. This new elevation would protect the proposed Paulsboro Marine Terminal from tidal storm surges and potential increases in rising water levels.

Dredging and stormwater management designs and plans would mitigate and offset the loss in floodplains at the site, as described in Section 6.3.

5.4 Surface Water Resources

The site is bordered by the Delaware River on the north and by Mantua Creek on the east. The on-pile design of the preferred alternative wharf eliminates any open water fill. However, the design will require approximately 587,000 CY of dredging which will impact 6.7 acres of subtidal/intertidal shallows which will require mitigation via NJDEP/USACE permitting. Dredged material would be removed to a suitable dredge spoil facility location off-site or would be used on-site as deemed appropriate through a Beneficial Use Permit.

In addition, the on-pile structure will require 10.6 acres of wharf decking and trestles of open water coverage on the Delaware River. However, much of the deck coverage will be centrally located at Berth 2 and, in part, at Berth 1. Berth 3 in its entirety will allow ambient light beneath much of the wharf on both the north and south sides. This condition is also present at the end of Berth 1. The rail and access trestles connecting to the wharf will be of high enough elevation and thin enough as to not add to coverage impacts.

5.5 Groundwater Resources

According to the NJDEP Landscape Project *i-MapNJ* interactive mapping website, recharge at the site is zero inches per year. Therefore, the placement of impervious material (i.e., asphalt, concrete, and/or structure) would not alter the recharge capacity at the site. Recharge to the underlying aquifer at the site is anticipated to remain consistent with existing conditions.

As stated in Section 4.12, the remedial activities at the former BP Oil Terminal include a groundwater treatment system. In addition, the former BP Oil Terminal and the former Essex property have established CEAs and WRAs for the restricted use of groundwater in the areas at and immediately surrounding the site.

5.6 Vegetation, Wildlife and Fish Habitat

Terrestrial Wildlife

All terrestrial wildlife foraging habitat at the site will be impacted. Existing vegetation and associated wetland and upland habitats would be impacted for construction of the proposed Paulsboro Marine Terminal. Construction of the Paulsboro Marine Terminal will necessitate the clearing of certain areas of vegetation to accommodate the landside improvements. Displaced terrestrial species would be expected to relocate to nearby open spaces, such as vacant land to the south. Mobile wildlife species, such as birds, would also be expected to utilize available open space within a wider radius than would be expected for terrestrial wildlife.

Fish Habitat

Potential impacts to localized fishery resources would occur within the Delaware River as a result of the proposed Paulsboro Marine Terminal, due to dredging activities and the installation of the in-water structures. Dredging activities in the Delaware River may result in changes in physical or chemical properties (e.g., water temperature, salinity) of the water column; changes in underlying substrate, including sediment type, and changes in water depth. These potential impacts may occur temporarily (short-term impact) during construction of the proposed berth area, or permanently (long-term impact) due to ultimate changes in bathymetry, shoreline configuration, shading, available water column, sedimentation and hydraulic patterns (e.g., estuarine mixing).

Short-term water quality impacts to fishery habitat due to project construction would most likely be limited to changes in turbidity levels and suspended solids in the immediate construction area footprints of the proposed berths. Resuspended sediment can disperse more than 1,000 feet from a dredge site and may remain in the water column for days. Turbidity can affect any potentially present spawning and nursery habitat for finfish or shellfish. Also, some change in dissolved oxygen (DO) may occur with sediment resuspension, but this is expected to be negligible due the small area of construction as compared with the much larger size of the Delaware River and in consideration of the constant tidal effects in the channel.

Both short- and long-term impacts to fishery habitat would vary by species and life stage, depending upon life history, habitat use, distribution, and abundance. Potential fishery resource impacts in the project area would be limited primarily to demersal (i.e., bottom-oriented) species and life stages.

The on-pile, off shore wharf system of the preferred alternative eliminates the need for open water fill within the Delaware River. However, the pile-supported structure will require 10.6 acres of wharf and trestle, thereby covering and shading the near shore waters of the Delaware River. In addition, temporary coverage impacts would be created while a ship or barge is at berth.

The majority of the shading impacts are anticipated to be associated with Berth 2, and to a lesser extent Berth 1, where the approximately 1.5 acres of pile-supported wharf would extend to the landside operations. Light in this area would not be able to fully reach beneath the wharf.

However, due to the width and elevations of the wharf for most of Berth 1, all of Berth 3, and all of the trestles, light will be able to reach beneath most of these over-water structures, thereby limiting the potential shading impacts.

The preferred alternative will require the placement of 9 acres of revetment on the slopes and bottom of the Delaware River. The revetment will create an aquatic habitat that can offset the coverage impacts on the Delaware River.

Invasive/Foreign Aquatic Species

Bulk/break-bulk and the RO-RO cargo ships that will utilize the Paulsboro Marine Terminal do not require the use of ballast water. Different than a containerized cargo ship operation, where the ship usually returns to sea virtually empty, bulk/break-bulk and RO-RO cargo ships at the Paulsboro Marine Terminal often are only partially unloaded or are re-loaded with commodities and cargo for a future destination. The loaded cargo is used as the ballast to maintain the ship's balance and buoyancy while at sea. Therefore, the ships that will utilize the Paulsboro Marine Terminal will neither discharge nor need to obtain ballast water to/from the Delaware River. The potential to discharge invasive foreign species from the ships into the waters of the Delaware River will be limited to only bilge water discharges. In addition, aquatic wildlife (e.g., juvenile fish, eggs, etc.) in the Delaware River will not be threatened by the need to intake ballast water onto the awaiting ships.

5.7 Threatened, Endangered and Protected Species

Bald Eagle

Portions of the project site are mapped by the NJ Landscape Project *i-MapNJ* as bald eagle foraging habitat, which has been confirmed by Ruth Foster of the NJDEP. These areas consist of tidally-connected ponds and forested areas along the northern and eastern property boundaries (Figure 4.10). The open water of the Delaware River and Mantua Creek adjacent to the site are also mapped as bald eagle foraging habitat.

According to the USFWS, several bald eagle nests have been established within the area. The closest identified nest is approximately 1 mile east (river north) of the proposed project area, along the Delaware River. According to the USFWS, height restrictions at the site would not be imposed. However, timing restrictions for construction may be required. These timing restrictions will be established upon submittal of the permit applications to the NJDEP and USACE.

The proposed project would permanently remove terrestrial bald eagle foraging habitat along the northern property boundary, including the forested area in the northeastern portion of the site. Temporary impacts to the Delaware River north of the site would occur as a result of dredging for creation of a 40 foot deep, plus 2 feet of overdredge, vessel berthing area. Foraging habitat would remain in the Delaware River, and in all of Mantua Creek, adjacent to the project site.

Osprey

A relic osprey nest is present on the former BP Oil Terminal's pre-existing offshore wharf. Ospreys were observed at the nest in 2007. However, no nesting pairs of ospreys were observed at the nest throughout all of 2008. Therefore, the nest can be removed without impact to a nesting pair of ospreys.

5.8 Air Quality

5.8.1 General Air Quality

"Air Pollution" is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants degrade the atmosphere by reducing visibility, damaging property, reducing the productivity or vigor of crops or natural vegetation, or reducing human or animal health.

The SJPC is proposing to develop the Paulsboro Marine Terminal on a land primarily occupied by the former BP Oil Terminal and Essex Industrial Chemicals, Inc. properties. The proposed action would include wharf construction, harbor dredging, surcharge work, rail mounted gantry or other crane installation and other site development. Air quality impacts may be experienced on a localized basis during construction as a result of construction vehicle emissions and fugitive dust from cleared land surfaces. All work would be conducted in accordance with the local ordinances and in accordance with the Gloucester County Soil Conservation District to limit any such emissions (e.g., BMPs to include wetting temporary roadways, stone aprons, etc.). These impacts are therefore anticipated to be temporary and are not expected to be significant. A project environmental control plan can be completed prior to construction to ensure that all work is completed in compliance with the regulatory statutes.

Vehicle traffic via the dedicated access road and bridge is addressed in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, prepared for the GCIA.

5.8.2 Marine Terminal Related Air Quality

Standard diesel engines used at ports to power ships, trucks, trains, and cargo-handling equipment can impact the local and regional air quality. Major air pollutants from diesel engines at ports that can affect human health include particulate matter (PM), volatile organic compounds (VOCs), nitrogen oxides (NOx), ozone (O_3), and sulfur oxides (SOx).

Terminal Operations

From the landside perspective, engine emissions from non-marine vessels (i.e., trucks and cargo handling equipment) would be a primary source of potential air quality impacts that Federal regulations are being promulgated for phasing in low-sulfur fuel use at industrial facilities such as marine terminals. These regulations and the highest efficiency terminal design will minimize emissions wherever feasible. As such, the SJPC anticipates that all shiploading cranes and rubber-tired gantry cranes at the Paulsboro Marine Terminal will run on electric power. In addition, the SJPC will also evaluate the use of compressed natural gas, propane, or dual-fuel engines for the port-owned fleet of equipment.

Marine Vessels

Information from the USEPA's July 2002 *Commercial Marine Emission Inventory Development* was reviewed to provide estimated marine emissions per each type of ship that may call at the Paulsboro Marine Terminal. Ships evaluated in the USEPA's study were those larger in size, having engines that displace greater than or equal to 30 liters/per cylinder. For the purposes of this EIS, the study evaluated for vessels that once used the former BP Oil Terminal (i.e., tankers) and vessels expected to call at the Paulsboro Marine Terminal (i.e., bulk carriers, general cargo, reefers, and RO-RO ships). Emission types evaluated in the USEPA's study for

those ships were hydrocarbons (HC), carbon monoxide (CO), nitrogen oxides (NOx), particulate matter (PM) and sulfur dioxides (SO_2).

The USEPA 2002 study developed typical emission profiles for each of the ships taking into consideration past investigations and estimated loads. Selected U.S. deep-water ports were then evaluated against each of the datasets, inclusive of the ports of Philadelphia and Delaware Bay located along the Delaware River. The type of transit mode was then evaluated against the transit speed as the vessels approach the port. The transit modes detailed for each vessel type included:

- Cruise (up to 25 nautical miles out from port for ocean going vessels),
- Reduction speed zone (RSZ) or as the vessel approaches port,
- Maneuvering, and
- Hotelling (idling at berth / dwell time)

Subsequently, the USEPA's 2002 study used information collected in 1996 as the baseline for their evaluation. Table 5.2 details the combined estimated total emissions by ship type in 1996 for the transit modes; cruise, RSZ, maneuvering and hotelling. Information is included for those vessels that would have previously used the BP Oil Terminal (tankers) and for those ships that can be expected to use the Paulsboro Marine Terminal. Predicted emissions for the years of 2020 and 2030 are included in Section 5.21.8.

TABLE 5.2 SUMMARY OF U.S. EMISSION ESTIMATES BY SHIP TYPE FOR 1996 (TONS/YR)

Ship Type	HC	CO	NOx	PM	SO_2
Former Vessel Type Used at the BP Oil Terminal					
Tanker	1,175	3,950	32,022	3,048	22,507
Vessels Expected to Call at the Paulsboro Marine Terminal					
Bulk Carrier	1,461	5,906	45,196	2,668	18,812
General Cargo	478	2,060	16,078	996	6,940
Reefer	257	756	4,160	263	1,952
RO-RO	140	567	4,830	421	3,114

Source: USEPA *Commercial Marine Emission Inventory Development*, Final Report, July 2002.

Estimates for 2010 were also completed for each emission type. According to the USEPA's 2002 study, HC, NOx, PM, and SO_2 are expected to increase +/-50 percent from 1996. Concentrations of CO were predicted to increase more than two-fold during the same timeframe. The large increase in CO and the other emissions during that timeframe were reportedly related to the increase in containerized cargo transports.

As previously indicated, the total emissions in Table 5.3 are cumulative combining modes of transit from up to 25 miles at sea from the berth. In the case of the Paulsboro Marine Terminal, the cruise mode would approximate transit approaching and travel within the Delaware Bay while the RSZ would include travel along the Delaware River and approaching port. Maneuvering and hotelling are near/at berth activities. Therefore, the primary transit mode having direct impact to any specific port location would be the hotelling of the ship.

Hotelling comprises a large percentage of the overall emissions output. However, it is important to note that much of the hotelling is not completed by the larger engines responsible for the larger output of emissions experienced while at sea. Except for vessels that require high electrical loads such as some refrigerated cargo (reefers), most ships expected to call at the Paulsboro Marine Terminal are anticipated to use smaller auxiliary engines while hotelling at port. Besides the size of the engine, other factors influence the hotelling emissions including the type of engine, the type fuel, and also the length of dwell or stay at berth. Table 5.3 provides hotelling emission estimates, while Table 5.4 provides the estimated average time for each mode of transit for the Philadelphia Ports in 1996.

TABLE 5.3 1996 SUMMARY OF HOTELLING EMISSION ESTIMATES FOR PHILADELPHIA PORTS (TONS/YR)

Ship Type	Hotel HC	Hotel CO	Hotel NOx	Hotel PM	Hotel SO_2
Former Vessel Type Used at the BP Oil Terminal					
Tanker	13	227	1234	55	339
Vessels Expected to Call at the Paulsboro Marine Terminal					
Bulk Carrier	5	90	484	12	53
General Cargo	3	50	270	6	29
Reefer	2	42	228	5	24
RO-RO	0	6	33	1	4

Source: USEPA *Commercial Marine Emission Inventory Development*, Final Report, July 2002.

TABLE 5.4 1996 SUMMARY OF ESTIMATE TRANSIT MODES AND TIMES FOR DELAWARE RIVER PORTS

Ship Type	Calls	Avg Cruise Time (hrs/call)	Avg RSZ (hrs/call)	Avg Maneuver (hrs/call)	Avg Hotel (hrs/call)
Former Vessel Type Used at the BP Oil Terminal					
Tanker	868	3.4	14.8	2.4	85.1
Vessels Expected to Call at the Paulsboro Marine Terminal					
Bulk Carrier	411	3.4	14.9	1.7	95.8
General Cargo	414	3.6	13.4	1.6	91.3
Reefer	305	2.7	11.7	1.5	63.0
RO-RO	57	3.3	12.9	1.2	60.7

Source: USEPA *Commercial Marine Emission Inventory Development*, Final Report, July 2002.

According to the tables above, emissions from tankers (i.e., the vessels that previously called at the former BP Oil Terminal) gave off more emissions than the vessels expected to utilize the Paulsboro Marine Terminal combined (i.e., bulk/break-bulk, reefers, general cargo, and RO-RO vessels). This also takes into consideration that these ships were estimated to have more calls and longer lengths of hotelling than tankers. Therefore, emissions for ships calling at the Paulsboro Marine Terminal will not be dissimilar to the pre-existing conditions experienced

when BP operated the facility. It also can be expected that emissions will be less than what historically operated at the site due to more stringent regulations and that the ships using the facility will be newer and more efficient than those that previously called at the BP Oil Terminal.

5.9 Noise

As described in Sections 1.2 and 4.16, the project site is located just east of and adjacent to a residential community of Paulsboro. The nearest noise-sensitive receptors to the proposed Paulsboro Marine Terminal consist of residences along Mantua Avenue and the Tra-Cee Nursery School located at the corner of Mantua Avenue and Universal Road:

- The nearest residence along Mantua Avenue is situated approximately 64 feet from the western property line of the project site and approximately 144 feet from the portion of the Terminal yard that would be used for wheeled cargo storage. Residences along Mantua Avenue were present when the BP site was in operation and as such, experienced operation-related noise from this facility.
- The Tra-Cee Nursery School is situated approximately 80 feet from the western property line of the project site and approximately 160 feet from the Terminal yard on the south side of Universal Road. The school is located approximately 253 feet from the boundary of the project site on the north side of Universal Road and approximately 333 feet from the Terminal yard.

The Paulsboro Marine Terminal design will provide an 80-foot wide vegetated buffer area along the western boundary of the project site. This vegetated buffer may consist of an earthen berm, landscape trees, and/or associated structures that will serve to visually screen the Terminal from the community, including the Mantua Avenue residences and the Tra-Cee Nursery School. The width of the vegetated buffer and provision for a berm and trees will add some noise benefit during facility operations by providing distance between the community and Terminal activities.

The proposed dedicated access road to the Paulsboro Marine Terminal is intended to provide the primary route for trucks and other vehicles destined for the facility and keep truck traffic off local streets in Paulsboro. Thus, most traffic-related facility noise would be remote from the community. This operational pattern would be an improved noise condition compared to the truck routing through local streets that occurred when the BP Oil Terminal and Essex operated at the site.

It is also important to note that a proposed dedicated access road and bridge between the site and I-295 is included in the current Transportation Improvement Program (TIP) (DB #04321 Gloucester County). By inclusion in the TIP, the transportation and air quality elements of the project are considered in the context of other planned and programmed projects in the southern New Jersey region. Collectively, these projects have been determined to be in conformity with the Clean Air Act to protect air quality.

5.10 Land Use and Zoning

Current land use at the project site consists of a former oil terminal and chemical storage facility. Seventy-nine above ground storage tanks and 17 buildings have been demolished, and 26,000 feet of piping have been removed at the former BP Oil Terminal. The property is all but vacant. According to the Paulsboro Borough Zoning Ordinance of 1955, Chapter 80 of the Paulsboro Code, the area of the proposed Paulsboro Marine Terminal is zoned for marine industrial business park (MIBP). Therefore, the Paulsboro Marine Terminal would be consistent with the

current zoning of the site by the Borough of Paulsboro and would constitute an improvement over the vacant, former industrial use of the site.

Land use surrounding the Paulsboro site consists of residential on the west, the Delaware River on the north, Mantua Creek on the east, and vacant land to the south. The project proposes to create an 80-foot wide landscaped buffer along the entire western perimeter of the Terminal facility, which would visually shield the neighboring residences from Terminal operation activities.

Paulsboro is listed as a Village in the New Jersey State Development and Redevelopment Plan (State Plan). Villages are compact, primarily residential communities that offer basic consumer services for their residents and nearby residents. The Paulsboro Marine Terminal would be consistent with the goals of the State Plan:

- By remediating and revitalizing existing, former, vacant industrial properties,
- By using ecologically sound redevelopment of the former, vacant industrial properties,
- By creating a beneficial economic use that will create job opportunities for the region,
- By avoiding development of a previously undeveloped area; and
- Through the implementation of *green* practices through the extension of SJPC's Green Ports Initiative.

5.11 Potentially Contaminated Materials

Sites containing potentially contaminated materials exist at and surrounding the site. The following sections detail the potential impacts, if any, on these properties.

5.11.1 Surrounding Sites

No impacts are anticipated to or from properties or sites surrounding the proposed Paulsboro Marine Terminal.

5.11.2 Former BP Oil Terminal

As part of their continued remediation efforts, BP has and will continue to modify their remediation systems in order to integrate with the design of the Paulsboro Marine Terminal. These modifications could realize improved efficiencies by focusing and increasing efforts of their remediation efforts, such as remediating sediments in the former SWM ponds and near term remediation of the subsurface in the central portion of the former Oil Terminal. Improvements to their treatment system will have a peripheral beneficial impact on the groundwater and subsurface quality at the proposed Paulsboro Marine Terminal.

Coordination with BP and the NJDEP will continue throughout the design, construction, and operation of the Paulsboro Marine Terminal. BP's remediation efforts will not be negatively impacted as a result of the construction or operation of the Paulsboro Marine Terminal.

5.11.3 Former Essex Industrial Chemical, Inc. Property

Site investigations, separate from BP's investigations, were completed at the former Essex Chemical Company property by Dow as part of their ISRA requirements. Work included soil and groundwater sampling to characterize the site following cessation of their operations. Dow submitted a Final Remedial Action Report on February 4, 2003, which included a Deed Notice

(DN) for the property, and a CEA and a WRA for the groundwater contained within the limits of the property and under portions of the Mantua Creek. The DN filed at the Gloucester County Clerk's Office detailed Restricted Use of the property as the institutional control. Engineering controls included covering and capping the selected affected areas to limit the exposure pathways to the remaining contaminants.

The DN subsequently provides provisions, restrictions, and notification policies should the property be required to be disturbed. All provisions set forth in the DN would be followed. Proper notifications would be maintained and the site would be restored to an acceptable level that meets or exceeds the NJDEP requirements.

As detailed in Section 4.12, soils containing concentrations above the NJDEP Residential Direct Contact Soil Cleanup Criteria still exist at the site. In most instances, these soils are covered by at least 2 feet of clean fill. In addition, a former USACE dredge spoils disposal area is located in the northeastern portion of the proposed Paulsboro Marine Terminal (former Essex property). In their DN, Dow indicated that these former sediments were from the Delaware River and/or Mantua Creek, in particular, Reach A of the Delaware River. The charts contained in the USACE's July 1997 *Delaware River Main Channel Deepening Project Supplemental Environmental Impact Statement* were reviewed and the locations, sediments, and sample results were cross-referenced. According to the charts, the area of the Delaware River at the site is located within Reach A of the navigation channel. The contaminants detected in the sediments in Reach A above the May 12, 1999, Revised NJDEP Residential Direct Contact Soil Cleanup Criteria include antimony, arsenic, lead, and selenium. Dow applied these concentrations to the entire dredge spoils area and has restricted the use of the land via the DN. No cover or capping was installed in this area.

The construction of the proposed Paulsboro Marine Terminal would require grading of these materials and the subsequent capping with additional fill material. The fill material would be capped with asphalt, concrete or structure thereby eliminating exposure pathways to the contaminants.

The redevelopment of the site will be completed in conjunction with a Memorandum of Agreement (MOA) with the NJDEP. All work will be completed in accordance with the regulations and requirements set forth by the *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E).

5.12 Sediments

As part of the proposed Paulsboro Marine Terminal, a total of approximately 587,000 CY of sediment dredging will be required in the Delaware River along the northern property perimeter to facilitate access to the facility by cargo vessels and to provide the berthing areas shown for the preferred alternative on Figure 3.13. Dredging activities would be completed to facilitate a depth of -40 feet, plus 2 feet of overdredge, from the main channel of the Delaware River to the proposed berths.

As proposed in the Sediment Sampling and Characterization Plan (SAP), approved by the NJDEP in their January 22, 2009 letter (Appendix A), prior to dredging activities, a total of 24 composite sediment samples will be collected in order to characterize the dredge material. These samples will be analyzed for Priority Pollutants + 40, diesel range organic compounds, total aroclors, grain size, total organic carbon, and percent moisture. In addition, as required by the NJDEP Office of Dredging and Sediment Technology, modified elutriate testing will be

conducted in accordance with the *Dredge Manual* to evaluate the quality of water produced as a result of sediment dewatering activities. This will also include a separate analysis of site water taken from the area to be dredged in order to evaluate potential impacts which may be associated with the release of any return water. The results of these investigations will be used to determine which, if any, of the dredged sediments will need to be disposed off-site.

A Dredge Material Management Plan detailing the proposed program would be completed in accordance with the NJDEP's publication, *The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters* (October 1997), prior to initiating any dredging activities. Concurrently, dredging activities and sediment disposal would take place in accordance with the USACE Section 404/10 permit requirements. Sediment analysis and disposal would also incorporate all appropriate sampling requirements, surveying (i.e. bathymetry), Best Management Practices, highest and best use alternatives, and applicable design considerations for the upland placement of the sediments. Dredging and all in-water work will be subject to the respective seasonal NJDEP/USACE timing restrictions. All dredging activities and sediment disposal would be completed in accordance with all Federal, State, and local requirements.

Based on the sediment and elutriate analytical results, engineering-suitable sediments will be used on-site, as feasible. Sediments available for reuse would be installed within cofferdams and water from the sediments would be allowed to settle and drain back into the Delaware River. The use of dredge materials on-site will be maximized to the extent practicable by placing the materials beneath the anticipated cap, preventing COCs in the sediment from migrating with stormwater. A Beneficial Use Permit would be submitted to the NJDEP, as applicable, following the sediment characterization analyses.

5.13 Traffic

Marine

The site contains a former offshore, wharf that serviced the former BP Oil Terminal. This wharf has not been in service since BP closed the facility in the mid 1990's. Therefore, no ships have used the facility since that time.

According to estimates for the proposed Paulsboro Marine Terminal, the initial 3 year period will generate approximately 120 ships per year. This equates to 1 additional ship every 3rd day. In year 10 of operation, it is anticipated that 300 ships will use the Paulsboro Marine Terminal. That equates to less than 1 additional ship per day. Significant impacts to the shipping traffic on the Delaware River are not anticipated.

Motor Vehicles

Motor vehicle traffic impacts were investigated and reported and an analysis is contained in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*.

Freight Traffic

Conrail currently operates 2 trains per day on the main line, which typically incorporates 80 to 90 cars per train. In 2007, the SJPC facilities transported 25,000 tons per month using the local rail service. This represents 5 percent of the total freight transported from the facilities or 10 rail cars per day.

The projected throughput at the Paulsboro Marine Terminal is 3 million tons at operation year 10. The projected annual rail use is 10% or 15 rail cars per day. The current design envisions enough storage within the facility for up to 50 rail cars. Additional on-site storage requirements may be accommodated based upon commodities or vendor needs. Cumulative impacts are not anticipated.

Recreational Boating

Ziggy's Marina in Paulsboro is the only existing commercial marina on Mantua Creek and is located between the swing bridge and the lift bridge, approximately 1.6 miles east of the Delaware River. The marina is equipped to handle boats up to 27 feet in length, including sailboats, and typically docks boats between 15 and 25 feet in length.

The nearest recreational boating club on the Delaware River is the National Park Boat Club, which typically moors both inboard and outboard recreational watercraft measuring between 14 and 30 feet in length. This club typically uses Woodbury Creek rather than Mantua Creek. Information obtained from the Maritime Exchange in Philadelphia indicated that most commercial vessels utilizing the Delaware River do not enter Mantua Creek. In addition, there are no known private docks or moorings in excess of 25 feet located along Mantua Creek.

Water-related recreation also encompasses activities undertaken for amusement and relaxation. These activities encompass two broad categories of use: consumptive (e.g., harvesting resources by hunting and fishing); and non-consumptive (e.g., canoeing and sight-seeing). No public water-side access is available at or adjacent to the Paulsboro Marine Terminal site and existing water access to adjacent waterbodies would not be impeded by the proposed construction activities. Access at or in close proximity to the Paulsboro Marine Terminal is not warranted due to potential safety and security issues.

The proposed Paulsboro Marine Terminal would use Best Management Practices and mitigation measures to minimize impacts to existing water resources to the maximum extent practicable. Based on proposed mitigation measures (i.e., implementation of an approved Soil Erosion and Sediment Control Plan and a stormwater management plan), the recreational value of existing water resources within the project area would not be impacted. In addition, the proposed berthing area would be located outside of the Delaware River navigation channel and therefore, would not physically interfere with water-related recreation in surrounding waterbodies.

Air Traffic

The proposed Paulsboro Marine Terminal is not located within the main flight path of the Philadelphia International Airport. The proposed Paulsboro Marine Terminal is located to the east of the flight path for Runway 17-35 and east (river north) of the mouth of the Mantua Creek.

5.14 Community Facilities and Services

The proposed Paulsboro Marine Terminal would be serviced by the Billingsport Volunteer Fire Company on Billingsport Road, approximately 0.70 miles from the Paulsboro Marine Terminal. The Paulsboro Police Department, located at 1211 Delaware Street, is responsible for police protection within Paulsboro Borough. The Billingsport Volunteer Fire Company and Paulsboro Police Department were also responsible for servicing the BP and Essex sites when they were in operation. Therefore, the Paulsboro Marine Terminal is not anticipated to burden the resources of the Borough.

The proposed Paulsboro Marine Terminal will be surrounded by a perimeter fence with a staffed administration/security gate complex. The Terminal gate will require an electronic access device or will be controlled remotely from inside the security booth or administration building for access to and egress from the Paulsboro Marine Terminal. Security cards will be required for all dedicated personnel entering/exiting the facility. Security lighting shall be installed throughout the Terminal to deter nighttime criminal and trespassing activities.

The Paulsboro Marine Terminal will be required to provide security systems that are satisfactory to the Customs and Border Patrol (CBP), the United States Coast Guard (USCG) and other governing bodies, as appropriate, including the standards for perimeter fencing. Security will be provided to prevent theft and unlawful access to or exit from the Terminal.

Truck traffic accessing the site would be allowed to enter or exit the Terminal only through the Terminal gate via the access road and bridge. Private occupancy vehicles would only be granted Terminal access following a security check. Maintenance vendor vehicles would be granted Terminal access after security checks are conducted, proper identification is provided, and escorts by SJPC personnel are arranged, as appropriate.

A central security office may control remote gate openings in the perimeter fence if so desired. Closed-circuit television (CCTV) cameras may be used to cover such openings with central monitoring in the security office. Gate entrances should be provided with a CCTV, keypad, voice or other such systems to facilitate controlled entry. Pedestrian access at all fence penetration points would access control through the use of electronic access devices.

No impacts are anticipated. The Paulsboro Marine Terminal will coordinate with the Borough to ensure that facility service needs are integrated with the overall local community and services planning.

5.15 Cultural Resources

5.15.1 Regulatory Definitions

The New Jersey Register of Historic Places Act (N.J.S.A. 13:1B-15.128 *et seq.*) details the criteria for determining whether an undertaking would encroach upon or damage a historic property. An undertaking would have an adverse effect, and therefore constitute an encroachment, when the effect on a property eligible for, or listed on, the New Jersey Register of Historic Places may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Encroachments include:

1. Physical destruction, damage, or alteration of all or part of the property;
2. Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the New Jersey Register of Historic Places;
3. Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting; and,
4. Acquisition, transfer, sale, lease, easement on, or an agreement or other permission allowing the use of a property.

As detailed below and on Figure 5.1, the following cultural resources were identified to be located within or proximal to the proposed Paulsboro Marine Terminal;

- Archaeological Site NJSM No. 28-Gl-23,
- Archaeological Site NJSM No. 28-Gl-239,
- Potential remains of the *Merlin*, the British revolutionary vessel,
- The bulkheads which are greater than 50 years of age,
- The former Essex Fluorspar Storage Building (greater than 50 years of age), and
- The sunken barges within the Delaware River proximal to BP's existing pier.

Figure 5.1 Previously Identified Archaeological Resources and Structures Potentially Greater Than 50 Years of Age
Source: NJSM, August 2007

5.15.2 Cultural Resources and Altered Site Conditions

The cultural resources were reviewed in context to the current landforms and the geomorphological changes that have occurred at the site relative to the proposed Paulsboro Marine Terminal. At least four man-made activities have severely altered the landscape within the early- to mid- 20th century at the project site;

- The realignment and dredging of the Mantua Creek,
- Deposition of dredge material along the Delaware River and the Mantua Creek,
- Periodic maintenance dredging of the channels of the Delaware River and the Mantua Creek, and
- The industrial use and facilities associated with the former BP Oil Terminal and former Essex Industrial Chemicals, Inc properties.

Historical maps and information of the region were reviewed as part of the cultural resources investigation. Figure 5.2 details the *Plan of Billingsport, 1779.* As shown on the figure, Mantua Creek is a meandering creek with the mouth of the Mantua Creek located further east (river north) along the River (Note that the present-day boundary line between the Borough of Paulsboro and West Deptford still continues to follow the previous configuration of the Creek).

More recently, beginning in the 1920's, the Mantua Creek was straightened to provide for more direct marine travel up the Creek. As detailed by the 1930 historic aerial photograph (Figure 5.3), the majority of the realignment and dredging of the Creek was completed. Work within the Creek continued up until the mid-1940's when the alignment represents much of its present day location and configuration. Much of this dredged material was deposited on the west and east sides of the bulkhead at the mouth of the Mantua Creek, which helped develop the landside features at the project area and covered the pre-existing landforms.

The Delaware River and Mantua Creek have been subject to intense and periodic dredging activities. Dredging activities associated with the main channel of Delaware River and the mouth and channel of the Mantua Creek were conducted. In addition, dredging for the development and maintenance of the former BP Oil Terminal piers, and the piers of the current Nu-Star facility were required; thereby, severely altering the river and creek beds of the Delaware River and Mantua Creek in these areas.

A review of historical aerial photographs and documents shows the increased industrial development at the site beginning in the 1920s. In addition, during this time, the increased landside development was furthered by the deposition of dredge material along the shore of the Delaware River and near the Mantua Creek, further extending the shoreline into the Delaware River and altering the pre-existing conditions. According to project documentation and boring logs from the site, the dredge material can measure 10 to 20 feet in thickness above the pre-existing landforms.

This landside development helped foster the industrial nature of the site. As indicated in Section 4.12.2, the former BP Oil Terminal site was used as a petroleum and chemical storage and distribution facility as far back as World War I when above ground storage tanks were built on the property to support the war effort. Since 1929, the site was used continuously as oil storage and fueling terminal at the site, expanding in size until BP ceased operations at the site in 1996.

As part of the preferred alternative of the Paulsboro Marine Terminal, over 300,000 cubic yards of fill are designed to be placed at the site, raising the elevation by 7 to 9 feet along the Delaware River in the north and with the new fill material sloping to a thickness of 2 feet towards the south. Therefore, almost 30 feet of fill and former dredge material would separate the proposed grade from the reported native material.

The majority of the invasive work at the site is intended to be via driven piles or bulkheads. Excavations would primarily be within the new fill material and would be mostly related to the installation of utilities and spread footings for the structures. Given the depths of the intended fill placement, the majority of this work would be completed in the newly installed fill or former dredge material. Disturbance of the current landforms would be primarily limited to areas in the southern portion of the site away from the previously identified terrestrial archaeological resources.

In addition, the sunken barges located within the Delaware River are not intended to be disturbed by the development of the Paulsboro Marine Terminal. These submerged features currently create an aquatic habitat for native and migratory fish species. Keeping these barges preserves the habitat as well as the integrity of the potential cultural resource.

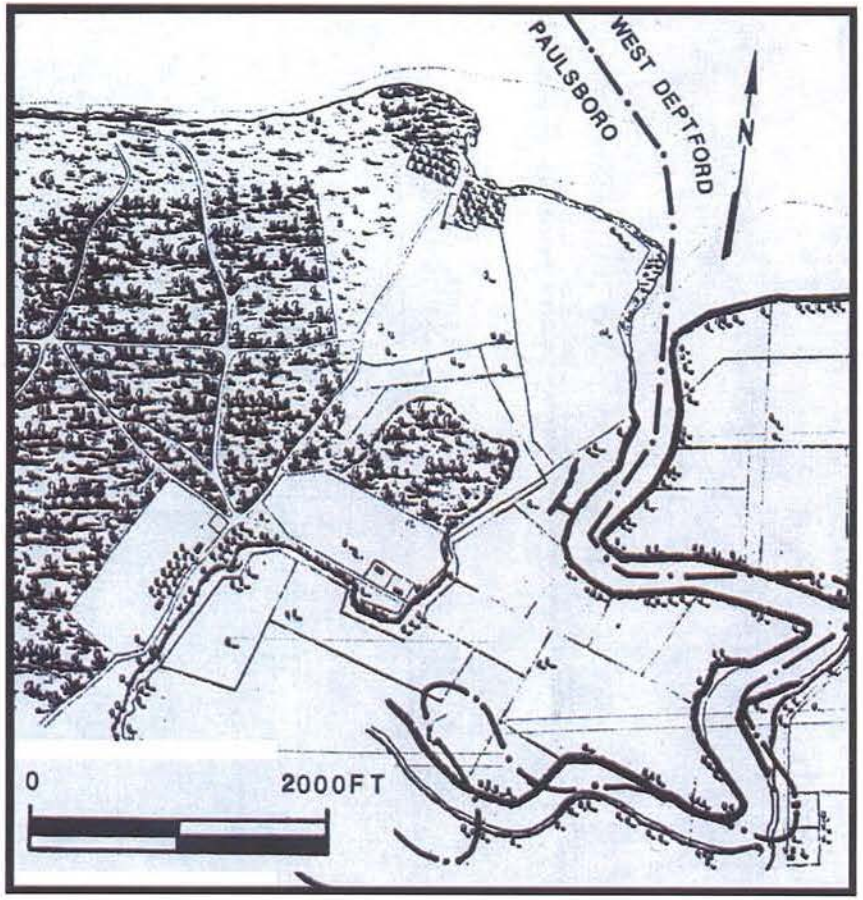


Figure 5.2 Plan of Billingsport, 1779
Source: Villefranche, 1779 (Hunter, November 1992)

Figure 5.3 Historical Aerial Photograph, 1930
Source: NJDEP-iMapNJ, 2008

The Paulsboro Marine Terminal project will continue to coordinate with all applicable State and Federal agencies to determine if additional investigations are required (e.g., Phase 1 archaeological investigation, geomorphological evaluations, marine archaeological investigations, construction monitoring, etc.). Based upon the preferred alternative, an Area of Potential Effects (APE) of the site can be developed which could include any marine and terrestrial features and work associated with the proposed Paulsboro Marine Terminal. If applicable, the Section 106 process and/or New Jersey State Register consultation would begin with the applicable State and Federal concurrence of the information presented to date and/or the APE. Any required mitigation activities can be evaluated in consultation with the agencies at that time.

5.16 Socioeconomic and Environmental Justice

Executive Order No. 12898 (EO 12898), entitled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* provides that Federal agencies shall ensure achievement of environmental justice by identification and assessment of disproportionately high and adverse human health or environmental affects of its actions on minority and/or low-income populations. The Presidential Memorandum accompanying the EO 12898 emphasized that EO 12898 was "...intended to promote non-discrimination in Federal programs substantially affecting human health and the environment, and to provide minority and low-income communities' access to public information on, and opportunity for public participation in matters relating to human health and/or the environment."

Information for this Environmental Justice evaluation was obtained from the US Bureau of Census website (http://factfinder.census.gov). Information for the Paulsboro Marine Terminal study area was obtained to the Block Group level. A Block Group is a subdivision of a census tract (or, prior to 2000, a block numbering area). A Census Tract is a small, relatively permanent statistical subdivision of a County delineated by a local committee of census data users for the purpose of presenting data. Census Tract boundaries normally follow visible features, but may follow governmental unit boundaries and other non-visible features in some instances; they always nest within Counties. Census Tracts average about 4,000 inhabitants and were designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time of establishment. They may be split by any sub-County geographic entity. Block Groups are the smallest geographic unit for which the Census Bureau tabulates sample data.

According to the FHWA publication, *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (December 1998), low-income means a household income at or below the Department of Health and Human Services (HHS) guidelines; and, minority means a person who is:

1. Black (having origins in any of the black racial groups of Africa);
2. Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
3. Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or
4. American Indian and Alaskan Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

Since the most recent available data through the U.S. Census Bureau for low income populations is 1999 and for minority populations is 2000, these years were analyzed for Environmental Justice populations. According to the HHS *1999 Poverty Guidelines* (Table 5.5), poverty status is as follows for the 48 contiguous United States:

TABLE 5.5 HHS 1999 POVERTY GUIDELINES

Family Unit Size	Annual Income
1	$9,490
2	$11,060
3	$13,880
4	$16,700
5	$19,520
6	$22,340
7	$25,160
8	$27,980
For each additional person, add	$2,820

Source: HHS *1999 Poverty Guidelines*

The U.S. Bureau of Census tabulates persons in the U.S. by poverty status. These Census Bureau numbers were used in this analysis.

Existing Conditions

The Paulsboro Marine Terminal project study area is situated within Census Tract 5004, which encompasses all of Paulsboro Borough. This Census Tract is further broken down into 7 Block Groups. The proposed Paulsboro Marine Terminal is contained within Block Group 1 and is located adjacent to Block Group 7. A description of each of the seven Block Groups is provided below and the Block Group boundaries are shown on Figure 4.14.

Poverty Status

As can be seen in Table 5.6, 17.7% of Paulsboro Borough's population is below poverty level. This is greater than the poverty levels for Gloucester County (6.2%), and New Jersey (8.5%). However, the percent of low income population for Block Group 1, in which the project site is located, is the lowest of all the areas analyzed, with 2.4% of the population below the poverty level. Block Group 7, which is situated southwest of the project site, has 127 individuals or 16.1% of its population below the poverty level. This is less than the percentage for Paulsboro (17.7%) but higher than that for the County or the State. Examination of this data indicates that Block Groups 2, 3, 4, 5, and 7 contain qualifying low income populations because the percentages are greater than the percentages of low income populations in the larger demographic areas.

TABLE 5.6 LOW INCOME POPULATIONS AND PERCENTAGES, 1999

Location	Individuals Below Poverty Level (1999)	Total Population	Percent of Total Population Below Poverty Level
Block Group 1	18	758	2.4%
Block Group 2	366	1,501	24.4%
Block Group 3	249	814	30.6%
Block Group 4	160	920	17.4%
Block Group 5	130	495	26.3%
Block Group 6	34	884	3.8%
Block Group 7	127	788	16.1%
Census Tract 5004 (Borough of Paulsboro)	1,084	6,134	17.7%
Gloucester County	15,395	249,843	6.2%
New Jersey	699,668	8,232,588	8.5%

Source: US Census Bureau website, www.factfinder.census.gov, 2000.

Minority Populations

Minority population percentages for each Paulsboro Block Group as well as for Paulsboro as a whole, Gloucester County and New Jersey are shown in Table 5.7. Of the seven Block Groups in Paulsboro, Block Groups 2, 3, 4 and 5 contain greater percentages of minority population than Paulsboro as a whole, Gloucester County and New Jersey. The populations in these Block Groups are qualifying minority populations for the purpose of this environmental justice assessment. Minority population percentages in Block Groups 1 (in which the project site is located), 6 and 7 are lower than those of Paulsboro as a whole, Gloucester County and New Jersey; these populations are not qualifying minority communities for the purposes of this assessment.

TABLE 5.7 MINORITY POPULATIONS AND PERCENTAGES, 2000

Ethnic Group	Block Group							Census Tract 5004 (Paulsboro)	Gloucester County	New Jersey
	1	2	3	4	5	6	7			
White	729 (96.2%)	579 (38.6%)	240 (29.5%)	470 (51.1%)	243 (49.1%)	820 (92.8%)	703 (89.2%)	3,784 (61.4%)	218,249 (85.7%)	5,554,478 (66.0%)
Hispanic or Latino	0 NA	99 (6.6%)	34 (4.2%)	45 (4.9%)	0 NA	0 NA	85 (10.8%)	263 (4.3%)	6,234 (2.4%)	1,116,149 (13.3%)
Black or African American alone	18 (2.4%)	719 (47.9%)	520 (63.9%)	376 (40.9%)	233 (47.1%)	14 (1.6%)	0 NA	1,880 (30.5%)	21,958 (8.6%)	1,085,330 (12.9%)
American Indian / Alaska Native	0 NA	28 (1.9%)	0 NA	0 NA	9 (1.8%)	0 NA	0 NA	37 (0.6%)	555 (0.2%)	11,798 (0.1%)
Asian alone	0 NA	13 (0.9%)	0 NA	0 NA	0 NA	0 NA	0 NA	13 (0.2%)	4,141 (1.6%)	478,645 (5.7%)
Native Hawaiian / Other Pacific Islander	0 NA	0 NA	0 NA	0 NA	0 NA	0 NA	0 NA	0 NA	44 (0.02%)	1,791 (0.02%)
Some Other Race alone	0 NA	0 NA	0 NA	0 NA	0 NA	0 NA	0 NA	0 NA	282 (0.1%)	19,229 (0.2%)
Two or More Races	11 (1.4%)	63 (4.2%)	20 (2.5%)	29 (3.2%)	10 (2.0%)	50 (5.7)	0 NA	183 (2.9%)	3,210 (1.3%)	146,930 (1.8%)
Total Minorities	**29 (3.8%)**	**922 (61.4%)**	**574 (70.5%)**	**450 (48.9%)**	**252 (50.9%)**	**64 (7.2%)**	**85 (10.8%)**	**2,376 (38.6%)**	**36,424 (14.3%)**	**2,859,872 (33.9%)**
Total Population	758	1,501	814	920	495	884	788	6,160	254,673	8,414,350

Source: US Census Bureau website, www.factfinder.census.gov, 2000.

The conceptual design for the Paulsboro Marine Terminal was developed with particular consideration toward avoiding adverse community impacts such as noise and truck traffic on local streets by including design elements to appropriately buffer the community from those undesirable effects. In particular, the western vegetated buffer will screen the Terminal from the adjacent community. Also, the proposed dedicated access road will assure that truck traffic does not use local community roads. These design elements are intended to benefit the community as a whole. For these reasons, the proposed project is not anticipated to have a disproportionately high or adverse effect on qualifying minority or low-income populations within the community.

5.17 Solid Waste

Excess construction material and general operating material requiring disposal would be removed from the site to a licensed disposal facility in accordance with all State, regional, and local requirements.

5.18 Aesthetics

The visual character of the area would be minimally impacted by the construction of the Paulsboro Marine Terminal. The site is a former petroleum storage terminal and chemical manufacturing facility. The properties are currently vacant and BP continues to remediate contamination at the property. All of the storage tanks and most of the ancillary facilities and buildings have been razed and demolished.

The redevelopment alternative would include a continuous greenbelt (80 feet in width) that would visually separate the Terminal from the existing neighborhood along Mantua Avenue. This greenway would provide an aesthetic feature to the current and future industrial use property and provide a buffer to the neighborhood. This greenway would be consistent with the 2002 *Redevelopment Plan Summarization* completed by Remington and Vernick which recommended a buffer separating any potential marine or distribution related industry at the site.

5.19 Sustainable Development

Sustainable development takes both environmental protection and economic development into consideration. According to the *New Jersey Sustainable Institute* (Rutgers, 2004), the environmental component of sustainability is about maintaining our natural resources and the quality of our environment for the enjoyment and benefit of future generations. The economic component of sustainability is about living today at a level of income and material comfort that our descendents would be able to enjoy. Maintaining current lifestyles through new technology and well-designed policy versus reducing current consumption to be sustainable are important considerations in economic development.

Construction of a port facility at the former BP Oil Terminal and the former Essex properties provides for the redevelopment of vacant, former industrial properties, which would aid the economic growth opportunities in the Borough of Paulsboro. The proposed project would reuse a former oil terminal and transform it into the Paulsboro Marine Terminal. The land on which the former BP Oil and Essex facilities were located was an industrial use and the proposed Paulsboro Marine Terminal would be consistent with this historical use.

BP's remediation of contamination at the site would not be impeded or adversely affected by the construction of the proposed Paulsboro Marine Terminal. Construction activities would contribute to remediation opportunities such as additional capping of the former Essex and BP sites, identifying and cleaning up "hot spots", and addressing areas in a more expedient manner then may have otherwise occurred.

The proposed project is consistent with the New Jersey's Smart Growth approach to land-use planning. The proposed project would utilize currently vacant land and create a new Marine Terminal facility that would strengthen the existing infrastructure, economy and the local communities.

5.20 Construction-Related Impacts

The following details the potential impacts as they may relate to the construction of the Paulsboro Marine Terminal.

5.20.1 Surface Water Resources

Best Management Practices (BMPs) would be used for dredging activities to minimize temporary sediment suspension and turbidity. Impacts would be minimized through the design of the Paulsboro Marine Terminal and implementation of BMPs to maintain existing hydrologic connectivity and to maintain water quality. All work will be completed in accordance with the NJDEP and USACE requirements and approved seasonal timing restriction windows.

The proposed project would not involve the permanent use, storage, or disposal of materials that may violate New Jersey effluent regulations. Temporary fueling facilities used during construction would be located away from waterways, wetlands, and floodplains to avoid potential impacts in case of an accidental spill.

In addition, indirect surface water impacts via construction are anticipated to be insignificant as the proposed action would be designed to meet the NJDEP requirements for stormwater management, waterfront development, coastal zone consistency and USACE Section 404/10 permit requirements. Furthermore, an approved Soil Erosion and Sediment Control Plan would be implemented to minimize water quality impacts during construction.

5.20.2 Air Quality

Impacts from airborne pollutant emissions for the proposed Paulsboro Marine Terminal project would be associated with construction vehicles and equipment. However, the anticipated construction staging sequence includes construction of the dedicated access road and bridge prior to construction of the Marine Terminal. This will allow construction vehicles and equipment to use this dedicated access during construction and thereby keeping the construction-related traffic off the local roadways.

Fugitive dust emissions have the potential to create locally high levels of TSS due to construction activities. An Environmental Construction Control Plan can be developed to maintain the environmental integrity at the site during construction. BMPs will be used, including the wetting of work access roads and installing stone aprons on access points to limit the generation of fugitive dust and debris. Construction vehicles and the associated air emissions would be temporary. The following measures can be incorporated into the mitigation measures at the site.

- Incorporate Diesel Emission Control measures into construction contracts. The following measures have been developed in consultation with USEPA and State and local agencies in New Jersey:
  - Use Ultra Low Sulfur Diesel fuel in off-road construction equipment with an engine horsepower (HP) rating of 50 HP or above.
  - Use Tier II diesel engines in all off-road construction equipment (with an engine HP rating of 50 or above) with diesel particulate filter (DPF) retrofit technology, where commercially reasonably available.
  - Alternatively, use diesel oxidation catalysts (DOC) where DPFs are not reasonably available and with Best Available Technology (BACT).
  - Use of Tier II or better non-road construction equipment on the project site and DPFs or DOCs, as applicable, would be validated when equipment is first brought on site.
  - Whenever possible, use electrically-powered equipment, compressors, welders, and pumps.
- Implement Diesel Emission Control measures in consultation with USEPA and State and local agencies in New Jersey.
- Limit unnecessary idling times on diesel-powered engines to three minutes. Exceptions on mobile sources include, but are not limited to the following:
  - When forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control.
  - When it is necessary to operate heating, cooling or auxiliary equipment to accomplish the intended use of the mobile source.
  - To bring the mobile source to the manufacturer's recommended operating temperature.
  - When the outdoor temperature is below 20 degrees Fahrenheit.
  - When the mobile source is being repaired.
- Locate diesel-powered exhausts away from fresh air intakes, air conditioners, and windows.
- Implement a Dust Control Plan and a Soil Erosion and Sediment Control Plan to control dust resulting from construction activities. The plan can detail sources and measures to reduce dust, as well as monitoring and enforcement provisions, and include, among other things, spraying of a suppressing agent (non-hazardous, biodegradable), containing fugitive dust through windscreens and barriers, prevention, cleanup, construction equipment wheel washing, and other measures, and adjusting construction activities to respond to meteorological conditions, as appropriate.
- Post-construction measures include:
  - Revegetate any disturbed land not used;
  - Remove unused material;
  - Remove dirt piles; and,
  - Revegetate all vehicular paths created during construction to avoid future off-road vehicular activities.

To minimize emissions and potential fugitive dust impacts generated by traffic during construction, every effort should be made during the construction phase to limit disruption to traffic, especially during peak travel periods. Mitigation for the temporary impacts is also discussed in Section 6.2 of this document.

5.20.3 Noise

Facility construction activities would temporarily generate noise from activities such as wharf construction, harbor dredging, surcharge work, crane installation and other site development. As shown in Table 5.8, construction activities will require the use of primarily diesel-engine powered equipment.

TABLE 5.8 TYPICAL CONSTRUCTION EQUIPMENT NOISE EMISSION LEVELS AT 50 FEET (DBA)

Typical Equipment	Noise Level (dBA)
Backhoe	80
Compactor	82
Compressor	81
Concrete Pump	82
Concrete Screed	85
Concrete Spreader	76
Crane, American	88
Crane, Manitowoc	83
Dozer (CAT D5)	85
Dredge/Crane	88
Dredging Pump	76
Dump Truck, 10 Yd	88
Excavator (CAT 320/345)	85
Forklift	80
Generator	81
Loader (CAT 950)	85
Paver (CAT 1055B)	89
Redimix Truck, Cement	88
Roller (CAT 434C)	74
Tugboat/Barges	81
Water Truck	88

Source: DMJM Harris, New York, March 2007.

To reduce temporary construction noise impacts that may occur at nearby residences, several "good housekeeping" practices are recommended. For example, the following noise-control measures could be incorporated into the construction process:

- Use alternative construction methods that avoid impact pile-driving near noise-sensitive receptors, such as residences, schools and hospitals. Whenever possible, the contractor should consider using drilled piles or sonic/vibratory pile drivers to reduce excessive vibration.
- Similarly, dredging activities should be conducted during the daytime to minimize any sleep disturbances from impact noise.
- Erect temporary noise barriers and/or place equipment between noisy activities and noise-sensitive receptors,

- Establish equipment and material staging areas away from sensitive receptors.
- Require contractors to use reasonably available control technologies (RACT) to limit excessive noise at nearby residences.
- Whenever possible, conduct all construction activities during the daytime between 7 AM and 6 PM in accordance with the NJDEP *Noise Control Act*.
- Adequately notify the public of construction operations and schedules. Methods such as construction-alert publications could be used to handle complaints quickly.

All mitigation measures should be re-evaluated during the final design phase of the project when the details of the project components and the construction scenarios are finalized.

5.20.4 Traffic

Motor Vehicle
The dedicated access road and bridge is scheduled to be completed prior to the construction of the Paulsboro Marine Terminal. Once completed, all construction traffic would be required to use the proposed dedicated access road and bridge. Use of the proposed access road and bridge would preclude construction vehicles from using nearby residential streets, thereby avoiding impacts to local residential neighborhoods.

Any traffic delays approaching the proposed access road and bridge as a result of construction would be minimized in accordance with NJDOT policies and procedures. The local and State police would be notified and any lane restrictions or roadway closures would be coordinated accordingly. If needed, a Maintenance and Protection of Traffic (MPT) Plan would be prepared and implemented during construction to ease traffic congestion and maximize vehicular safety during construction. The MPT would include, at a minimum, use of pre-determined routes and prohibiting construction traffic from using unauthorized roadways.

Construction impacts related to the access road and bridge are contained in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, prepared for the GCIA.

Marine
In-water work such as dredging and bulkhead installation would require notifying the local Marine Police and United States Coast Guard (USCG). In-water work is anticipated to occur outside (south and east) of the main navigation channels of the Delaware River. Therefore, no marine traffic impacts are anticipated.

5.20.5 Wildlife

Wildlife
All wildlife foraging habitat at the site will be impacted. Displaced terrestrial species would be expected to relocate to nearby open spaces, such as vacant land to the south. Mobile wildlife species, such as birds, would also be expected to utilize available open space within a wider radius than would be expected for terrestrial wildlife.

Fish Habitat
Potential impacts to fishery resources could occur within the Delaware River as a result of the proposed Paulsboro Marine Terminal, due to dredging activities and installation of the in-water structures.

Potential increases in suspended solids and turbidity during dredging would be minimized using approved equipment and techniques for sediment dredging (e.g., sealed-bucket dredge, controlled hoist speeds). Barge overflow would be employed where appropriate and in locations where the concern for temporary discharge of overflow would not represent a threat to fishery resources. No blasting is anticipated to be necessary. For these reasons, no appreciable short term impact is expected.

The proposed in-water work could potentially disturb early life stages of demersal fish species, which frequently are not motile. Pelagic larval and egg life stages (i.e., those life stages with limited mobility) would be carried through the active project area with prevailing tides and currents, resulting in limited exposure to construction-related disturbance. Juveniles and adult individuals would avoid the immediate construction area opting for other usable habitat within the river. This avoidance would be necessary only in the area of the proposed berth construction when active dredging and pile driving activities are underway. Other similar habitats within the river would remain available during the proposed berth construction activities.

In accordance with Table E of N.J.A.C. 7-13, Flood Hazard Act 7:13-10.5 – "Requirement for a regulated activity in or along water with fishery resources" in-water work restrictions for the Mantua Creek are indicated to be from April 1 through June 30. However, National Marine Fisheries Service communicated to SJPC representatives that the upper reach of the Mantua Creek is a potential spawning area for shad. Therefore, similar restrictions may be required as those of the other nearby streams and tributaries of the Delaware River, which include March 1 through June 30 and September 1 through November 30 of any given year due to the migratory fish. The exact in-water restrictions will be finalized via the required NJDEP and USACE permits in consultation with the respective regulatory agencies.

5.20.6 Threatened, Endangered and Protected Species

Portions of the project site are mapped by the NJ Landscape Project *i-MapNJ* as bald eagle foraging habitat. The closest identified nest is approximately 1 mile east (river north) of the proposed project area along the Delaware River. According to the USFWS, height restrictions would not be imposed. However, timing restrictions for construction may be required. These timing restrictions will be established upon submittal of the applicable permits to the NJDEP and USACE.

5.20.7 Cultural Resources

The project does not appear to have the potential to affect any of the NRHP-eligible properties currently listed in the Borough Paulsboro. Historical and archaeological resources have been previously documented at and proximal to the project, should they still exist. However, the terrestrial resources have been covered by up to 10 to 20 feet of dredge materials and fill, and the marine resources have been subject to repeated and intense dredging activities.

Construction activity will be undertaken in accordance with agreements or conditions resulting from any necessary Section 106 and New Jersey Register of Historic Places Act consultation to protect any cultural resources. A Construction Environmental Control Plan can be developed during construction to protect against impacting any known, cultural resources that still exist at and surrounding the site.

5.20.8 Contaminated Materials

BP's remediation of the former Oil Terminal will continue during construction. Development of the Paulsboro Marine Terminal will include continued coordination with BP and the NJDEP throughout the design and subsequent construction of the facility to ensure that impacts to BP's operations are minimized.

The construction of the Paulsboro Marine Terminal would require grading and reworking of former dredge spoils on the former Essex property that currently are identified for Restricted Use by the on-site Deed Notice. These materials will be re-graded and subsequently capped with additional fill material and asphalt, thereby eliminating exposure pathways to the contaminants.

BP would also be afforded access to the Paulsboro Marine Terminal during and after construction. BP would be able to monitor construction activities to ensure that the integrity of the remediation systems and groundwater monitoring wells remain intact or are relocated accordingly, and to verify and document that no further contamination is uncovered.

The redevelopment of the site will be completed in conjunction with an MOA with the NJDEP. All work will be completed in accordance with the regulations and requirements set forth by the *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E *et seq.*).

5.20.9 Sediments

A total of approximately 587,000 CY of sediment dredging will be required in the Delaware River as part of the project. Dredging activities would be completed to a depth of -40 feet, plus 2 feet of overdredge.

All work will be completed using BMPs during the dredging activities. All work will be completed in accordance with the USACE and NJDEP regulations, inclusive of the NJDEP's publication, *The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters* (October 1997), and the January 22, 2009 NJDEP concurrence correspondence. Sediment analysis and disposal would also incorporate all appropriate sampling requirements, surveying (i.e., bathymetry), BMPs, highest and best use alternatives, and applicable design considerations for the upland placement of the sediments. Dredging and all in-water work will be subject to the respective seasonal NJDEP/USACE timing restrictions. All dredging activities and sediment disposal would be completed in accordance with all Federal, State, and local requirements.

5.21 Cumulative Impacts

The following section, in part, references cumulative impacts that may be associated with the dedicated access road and bridge. Actual estimates and impacts are detailed in the T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, prepared for the GCIA.

5.21.1 Topography, Geology and Soils

Cumulative impacts would be associated with the clearing and grading of the dedicated access road and bridge. An approved SESCP would be implemented for the proposed actions to avoid and minimize soil erosion. Piles, bulkheads, and foundations, where necessary, would be

driven to further limit the disturbance of any contaminated materials and the native geology and soils at the site.

5.21.2 Wetlands and Waterbodies

The proposed Paulsboro Marine Terminal is anticipated to impact approximately 1.05 acres of freshwater wetlands and 6.7 acres of intertidal/subtidal shallows within the Delaware River. Additional impacts may be associated with the installation of the dedicated access road and bridge.

Compensatory wetland mitigation would be required to offset impacts to freshwater wetlands and intertidal/subtidal shallows occurring as a result of the proposed Paulsboro Marine Terminal. Additional impacts may be associated with the access road and bridge. Impacts related to the access road and bridge are contained in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, prepared for the GCIA.

Wetland mitigation will occur in accordance with the NJDEP Freshwater Wetlands Act, Coastal Zone Management Rules and USACE Section 404 Permit requirements. It anticipated that wetlands compensation will be completed within the same watershed.

5.21.3 Floodplains

No cumulative impacts are anticipated. The approximately 587,000 cubic yards of sediment anticipated to be dredged from the Delaware River along the north side of the Paulsboro Marine Terminal would increase the water column volume of the waterbody in this area, thereby mitigating the floodplain impacts at the site. Furthermore, adequate flood storage volume will be accommodated via the design and implementation of a stormwater management system at the site. Therefore, the proposed project would not result in flood hazard impacts.

5.21.4 Surface Water Resources

No cumulative impacts are anticipated. All dredging will be completed using BMPs, and in accordance with all USACE and NJDEP regulations. An approved SESCP would be implemented for the proposed action to avoid and minimize soil erosion or sediment-laden runoff from entering the surrounding waterways. In addition, the design and implementation of a stormwater management system will be completed in accordance with all updated NJDEP regulations.

5.21.5 Groundwater Resources

No impacts, direct or cumulative are anticipated on the groundwater resources at or surrounding the site. All work will be coordinated with BP to ensure that their groundwater remediation activities are not impacted.

5.21.6 Vegetation and Wildlife

Terrestrial Vegetation and Wildlife

There are no unique habitats on the project site. All vegetation at the site will be impacted as a result of the Paulsboro Marine Terminal. All habitats and foraging areas will be removed. Displaced terrestrial species would be expected to relocate to nearby open spaces, such as

vacant land to the south. Mobile wildlife species, such as birds, would also be expected to utilize available open space within a wider radius than would be expected for terrestrial wildlife.

Fish Habitat

Potential impacts to fishery resources would occur within the Delaware River as a result of the proposed Paulsboro Marine Terminal, due to dredging activities, the installation of the in-water structures, and the movement of marine vessels.

Short-term water quality impacts to fishery habitat due to project construction would most likely be limited to changes in turbidity levels and suspended solids in the immediate construction area footprints of the proposed berths. Long-term impacts to the waters of the United States primarily include the near shore dredging of approximately 587,000 CY to create the berth areas.

Both short- and long-term impacts to fishery habitat would vary by species and life stage, depending upon life history, habitat use, distribution, and abundance. Potential fishery resource impacts in the project area would be limited primarily to demersal (i.e., bottom-oriented) species and life stages.

The on-pile, offshore wharf system of the preferred alternative eliminates the need for open water fill within the Delaware River. However, the pile-supported structure will require 10.6 acres of wharf and trestle, thereby covering and shading the near shore waters of the Delaware River. In addition, temporary coverage impacts would be created while a ship or barge is at berth.

The installation of on-pile wharf and trestles increases the open water coverage on the Delaware River. However, the piles and the required 9-acre revetment of the project conversely would increase the aquatic habitat for the marine life at the facility. In addition, the project intends to not impact the sunken barges at the site which leaves an essential fish habitat area intact.

Invasive/Foreign Aquatic Species

Bulk/break-bulk and the RO-RO cargo ships that will utilize the Paulsboro Marine Terminal do not require the use of ballast water. The potential to discharge invasive foreign species from the ships into the waters of the Delaware River will be extremely limited. In addition, aquatic wildlife (e.g., juvenile fish, eggs, etc.) in the Delaware River will not be threatened by the need to intake ballast water onto the awaiting ships.

5.21.7 Threatened, Endangered and Protected Species

On-site bald eagle foraging habitat associated with the freshwater wetlands will be impacted as a result of the development of the Paulsboro Marine Terminal. The bald eagle continues to be protected under the Federal Eagle Act and Migratory Bird Treaty Act and also remains a State-listed species under the New Jersey Endangered and Nongame Species Conservation Act. However, as of August 8, 2007, the bald eagle was removed from the Federal List of Endangered and Threatened Wildlife list. As detailed by the NJDEP, the nearest bald eagle nest is located approximately 1 mile east of the project site along the Delaware River. This location places the nest beneath and/or in close proximity to the flight path for Runway 17-35 of the Philadelphia International Airport. The bald eagle's ability to adapt to the existing conditions will allow it to adapt as land use changes continue in the southern New Jersey region.

According to the USFWS, height restrictions are not anticipated to be imposed at the site. However, timing restrictions for construction may be required. These timing restrictions will be established and adhered to upon submittal of the appropriate permit applications to the NJDEP and USACE.

5.21.8 Air Quality

Total emission estimates were completed in the USEPA's 2002 study for selected ships and U.S. deep water ports. Estimates were projected for the years 2010, 2020, and 2030.

According to the calculations, HC, NOx, PM and SO_2 emission totals are expected to increase +/- 50% between 1996 and 2010 due to ship borne activity. Concentrations of CO were predicted to increase more than 2-fold during the same timeframe.

Estimates from 2010 to 2020 show an average of 40% increase for all emissions at the U.S. ports evaluated. Overall, increases in HC, NOx, PM, and SO_2 are expected to nearly quadruple by 2030 while CO emissions were predicted to be 71,958 tons/year as compared to 2,159 tons/year in 1996. The largest increase in CO and the other emissions were related to the increase in containerized cargo transports.

Table 5.9 provides the estimated emissions in 1996 while hotelling at selected ports, including those of the Delaware River. As detailed, by the table, the Philadelphia area ports ranked 5th of the deep water ports evaluated.

TABLE 5.9 1996 SUMMARY OF HOTELLING EMISSION ESTIMATES FOR SELECTED PORTS (TONS/YR)

Consolidated Detail Port	HC	CO	NOx	PM	SO_2
Lower Mississippi	437	2,560	23,204	1,337	9,243
Puget Sound	231	986	11,174	1,135	8,511
New York	189	937	8,745	685	4,953
Baltimore	160	586	7,444	530	3,844
Delaware River (Philadelphia *et al.*)	**124**	**674**	**6,284**	**403**	**2,837**
Corpus Christi	44	191	1,862	209	1,573
Tampa	41	241	2,055	140	987

Source: USEPA *Commercial Marine Emission Inventory Development*, Final Report, July 2002.

The construction and operation of the Paulsboro Marine Terminal would not significantly impact the USEPA's air emission projections or significantly increase the USEPA's hotelling estimates.

USEPA regulations for vehicle engines and fuels (such as ultra-low sulfur diesel fuel) will cause overall mobile source air toxics (MSAT) to decline significantly over the next 20 years. Recent FHWA studies have shown that MSAT will decline between 50% to almost 90% in the next 20 years based on regulations now in effect. This will both reduce the background level of MSAT as well as reduce future emissions from facility-related activities. In addition, as the nearby intermodal facility comes on-line, increased use of freight rail service may reduce over-the-road (OTR) truck trips. The cumulative air quality impacts from the proposed access road and bridge

are discussed in the air quality analysis contained in the T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*.

5.21.9 Noise

In accordance with the Section 43-2 of *The Noise Control Regulations of the Borough of Paulsboro*, the Paulsboro Marine Terminal will prevent excessive sound and vibration which may jeopardize the health and welfare or safety of its citizens or degrade the quality of life. During final design of the Paulsboro Marine Terminal, the need for and effectiveness of other noise control strategies during operations would be considered. No cumulative impacts are anticipated.

5.21.10 Land Use and Zoning

The development of the Paulsboro Marine Terminal is consistent with the local zoning as well as regional and Statewide Smart Growth planning studies. At present, the proposed Paulsboro Marine Terminal site is essentially vacant, as all oil storage tanks and ancillary facilities that were part of the BP site, have been razed and removed from the site. In addition, the site is presently undergoing remediation activities for soil and groundwater contamination. Re-use of the site for the Paulsboro Marine Terminal would be consistent with past land uses at the site, as well as current surrounding land uses to the north, east and south. In addition to the proposed Paulsboro Marine Terminal, a dedicated access road and bridge is proposed to provide direct truck and other motor vehicle access to the Terminal. This access road and bridge will allow trucks to avoid traveling on local residential roads. This would eliminate truck-related impacts on these residents, such as potential diesel air emissions and noise. The provision for a direct truck access route to the industrial section of Paulsboro is consistent with smart land use practices.

5.21.11 Potentially Contaminated Materials

The proposed Paulsboro Marine Terminal is currently undergoing remediation for soil and groundwater contamination at the site. These remediation activities would continue during construction of the proposed Paulsboro Marine Terminal. Furthermore, the introduction of impervious surfaces at the proposed Paulsboro Marine Terminal would essentially cap the area of contamination on the Essex property, preventing contact with the COCs associated with soils. With the on-going remediation activities, coupled with the proposed impervious cap on the contaminated area, the condition of this site would ultimately be improved over past use and existing conditions. No cumulative impacts are anticipated.

5.21.12 Sediments

As part of the proposed Paulsboro Marine Terminal, a total of 587,000 CY of sediment is estimated to be dredged to facilitate access to the facility and to allow for vessel berthing. Dredging activities would be completed to facilitate a depth of -40 feet, plus 2 feet of overdredge. Dredging would occur within the footprints of the proposed berths, as well as for side slope areas to preclude sediment from re-entering the berth footprint. The proposed dredging area would allow ship ingress and egress to and from the berthing area. It is anticipated to reuse the engineering-suitable sediments as surcharge for the required land creation portions of the site, as deemed suitable by the proposed SAP. Sediments available for reuse are anticipated to be installed within cofferdams and allow excess water to drain back into the Delaware River. The placement of dredged sediments on-site would limit the need for off-

site disposal of the sediments in an area of the Delaware River Watershed that already has limited space for placement of any additional material. Those dredge materials used on-site will be placed beneath a cap, preventing any potential migration of COCs associated with the sediments in stormwater.

The proposed access road and bridge project would not require the dredging of sediments from Mantua Creek and as such, only sediments proposed for the Paulsboro Marine Terminal berthing area would be removed from the Delaware River.

5.21.13 Traffic

Motor Vehicle

Traffic analysis was included as part of the proposed access road and bridge and is included in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*, prepared for the GCIA.

Marine

According to the URS Phase II Study, proper navigational aids would need to be installed to provide safe berthing conditions for vessel calls to accommodate the approximate 25-degree turn in the river channel at this location to limit on-river ship collisions.

According to a USACE-Philadelphia District study, 55,966 ships travelled up the Delaware River in 2005. Of that, 3,143 ships were of international origin, with 1,053 of those ships destined for berths in New Jersey. According to estimates for the proposed Paulsboro Marine Terminal, the initial 3 year period will generate approximately 120 ships per year. This equates to 1 additional ship every 3rd day. In year 10 of operation, it is anticipated that 300 ships will use the Paulsboro Marine Terminal. That equates to less than 1 additional ship per day. Significant impacts to the shipping traffic on the Delaware River are not anticipated.

With regards to annual international ship movements, currently 3,143 ships travel to ports along the Delaware River. Should port expansion occur as indicated in the Purpose and Need, the estimated international ship movements at 10 years is +/-6,600. That is an approximate 2-fold increase for ships travelling along the Delaware River which realizes 18 additional ships per day.

Recreational Boating

Neither the proposed Paulsboro Marine Terminal nor the access road and bridge would impact recreational boating use on either the Delaware River or the Mantua Creek.

Freight Traffic

Conrail currently operates 2 trains per day on the main line, which typically incorporates 80 to 90 cars per train. In 2007, the SJPC facilities transported 25,000 tons per month using the local rail service. This represents 5 percent of the total freight transported from the facilities or 10 rail cars per day.

The projected throughput at the Paulsboro Marine Terminal is 3 million tons at operation year 10. The projected annual rail use is 10 percent or 15 rail cars per day. The current design envisions enough storage within the facility for up to 50 rail cars. Additional on-site storage requirements may be accommodated based upon commodities or vendor needs. Cumulative impacts are not anticipated.

Air Traffic
No impacts to air traffic would occur as a result of the proposed Paulsboro Marine Terminal from the proposed access road and bridge.

5.21.14 Community Facilities, Services and Utilities

Cumulative impacts are not anticipated. Community outreach and integration will be completed as the Paulsboro Marine Terminal enters into operations.

5.21.15 Cultural Resources

Where applicable, any immediate impact to cultural resources at the site or access road and bridge will be mitigated in accordance with the development and adherence to the Section 106 consultation process. As such, the site has been subject to heavy industrialization including fill deposition (in some areas up to 20 feet), and regular/periodic dredging to ensure the mouth of the Mantua Creek remains accessible. Much of the resources at the site, if remaining, would therefore be anticipated to be present at depth. These resources have not been accessible and will remain beneath an operating industrial site. Therefore, no cumulative impacts are anticipated.

5.21.16 Socioeconomic and Environmental Justice

No cumulative impacts regarding socioeconomics or environmental justice are anticipated. The Paulsboro Marine Terminal is consistent with the historic use of the site; the Borough's zoning of the site; the Borough's redevelopment plans; and is consistent with the demographics and trades of the residents residing in the Borough of Paulsboro. The Paulsboro Marine Terminal will have a positive impact on the local and regional economy and development.

5.21.17 Aesthetics

The Paulsboro Marine Terminal includes an 80-feet wide greenway buffer to be constructed between the residential properties and the Terminal facility. This greenway will provide aesthetics to the community as well as separate the port operations from the community.

5.21.18 Sustainable Development

The proposed Paulsboro Marine Terminal site will transform a former oil terminal and industrial chemical facility into an economically sustaining operation. The redevelopment opportunity is consistent with smart land use practices, the local zoning, and is consistent with the regional and Statewide Smart Growth planning strategies.

6.0 METHODS OF PROMOTING APPROPRIATE ENVIRONMENTAL DESIGN AND MITIGATING ADVERSE ENVIRONMENTAL IMPACTS

The following discussion examines potential adverse impacts for the preferred alternative of the proposed project as identified in Section 5.0. All anticipated impacts are based upon the preliminary designs evaluated to date. Adverse affects may be further minimized during the final design when design refinements would continue to be examined and applied. The following provides information on minimizing and mitigating potential adverse environmental impacts that could result from the proposed Paulsboro Marine Terminal project.

6.1 Topography, Geology and Soils

The majority of the grading and filling activities at the project site would require the placement of large quantities of fill to raise the grade to the required elevation of +11.0 feet above MSL. Excavation into the native soils would predominantly be associated with the installation of underground utilities. Any excavations into the current soils would be completed with the coordination of BP and the on-site environmental consultants to limit the disturbance of any contaminated materials. Piles and bulkheads, where necessary, would be driven to further limit the disturbance of any contaminated materials and the native geology and soils at the site.

An approved SESCP would be implemented for the proposed action to avoid and minimize soil erosion and to prevent sediment-laden runoff from entering the waterways that border the site.

6.2 Wetlands

As discussed in Section 5.2, it is anticipated that approximately 1.05 acres of freshwater wetlands will be impacted for the construction of the proposed Paulsboro Marine Terminal. These impacts would be mitigated in accordance with the NJDEP FWPA and USACE Section 404 Permit requirements and conditions. Meetings with the NJDEP and USACE have been on-going throughout the project planning process and suitable off-site wetland mitigation sites and/or banks would be identified and all wetland impacts would be mitigated at a ratio deemed suitable by the regulatory agencies.

In addition, 6.7 acres of impacts to intertidal/subtidal shallows would be mitigated pursuant to the NJDEP Coastal Zone Management Regulations and in accordance with NJDEP Waterfront Development Permit conditions.

6.3 Floodplains

Approximately 98.8 acres of Zone A4 floodplains are anticipated to be impacted. The 587,000 CY of material to be dredged from the Delaware River will increase the water column volume of the River to offset the loss of floodplains. In addition, a stormwater management system would further mitigate the impacts by stormwater runoff prior to discharge into the Delaware River. Adequate flood storage volume would be provided, as necessary.

6.4 Surface Water Resources

Mitigation measures, such as an approved SESCP and a stormwater management plan for the site in compliance with the NJDEP Stormwater Management Rules, would be implemented for

both the proposed Paulsboro Marine Terminal and the access road and bridge project to protect surface water and groundwater and maintain water quality in the surrounding waterbodies.

Furthermore, all dredging activities for the Paulsboro Marine Terminal would be conducted using BMPs and equipment that would result in the least amount of turbidity within the water column. The stormwater management plan implemented for the access road and bridge would include a manufactured treatment device (e.g., Vortex Chamber) for pre-treatment of stormwater runoff before discharging to receiving waterbodies. Potential water quality impacts would be avoided and minimized in the design, as well as through implementation of BMPs and stormwater management measures.

6.5 Groundwater Resources

As stated in Section 4.12, the remedial activities at the former BP Oil Terminal include a groundwater treatment system. In addition, the former BP Oil Terminal and the former Essex property have established CEAs and WRAs for the restricted use of groundwater in the areas at and immediately surrounding the site.

To maintain the integrity of the groundwater remediation activities at the site, stormwater management basins may be restricted. Therefore, an enclosed system may be required to be installed that discharges via an oil water separator directly to the adjoining surface water. The project will continue to coordinate with BP and the respective NJDEP agencies to ensure the groundwater resources are not compromised at the site.

6.6 Vegetation, Wildlife and Fish Habitat

The proposed in-water work could potentially disturb early life stages of demersal fish species, which frequently are not mobile. In accordance with Table D of 7:13-10.5 – "*Requirement for a regulated activity in or along water with fishery resources*" in-water work restrictions for the Mantua Creek are indicated to be from March 1 through June 30 of any given year. However, the National Marine Fisheries Service communicated to SJPC representatives that the upper reach of the Mantua Creek is a potential spawning area for shad. Therefore, similar restrictions may be required as those of the other nearby streams and tributaries of the Delaware River, which include March 1 through June 30 and September 1 through November 30 due to the migratory fish. The exact in-water restrictions will be finalized via the required NJDEP and USACE permits in consultation with the respective regulatory agencies.

The on-pile, offshore wharf system of the preferred alternative eliminates the need for open water fill within the Delaware River. However, the pile-supported structure will cover 10.6 acres of open water, and in part, shade the near shore waters of the Delaware River. In addition, temporary coverage impacts would be created while a ship or barge is at berth.

Potential mitigation opportunities may be provided by the wharf structure itself along with the approximately 9 acres of rock/stone revetment required to stabilize the slope and river bottom. The numerous piles supporting the wharf will provide newly created habitat that will encourage the growth of marine organisms. The interstitial space and irregular surface of the rock revetment will also provide increased habitat opportunities for marine life to re-colonize the near shore areas that were impacted due to the *ATHOS* oil spill and other documented releases. These features could promote the return of marine life to this area and provide for mitigation for the coverage impacts.

The SJPC has entered into a planning assistance agreement with the USACE for the Delaware Estuary Salinity Monitoring Study in the States of Delaware and New Jersey. The purpose of this study is to examine the effects of flow dynamics, salinity, and water quality on the Eastern Oyster, the Atlantic Sturgeon, and the Shortnose Sturgeon in the oligohaline zone of the Delaware Estuary. The oligohaline zone supports essential habitats for juvenile anadromous fish and provides critical disease refuge for oyster brood stocks. This work will serve to augment the work being conducted to restore oyster habitat in the Delaware Bay and to provide a better understanding of the sturgeon's habitat requirements within the Delaware Estuary.

6.7 Threatened, Endangered and Protected Species

Portions of the project site are mapped by the NJ Landscape Project *i-MapNJ* as bald eagle foraging habitat. The closest identified nest is approximately 1 mile east (river north) of the proposed project area, along the Delaware River. According to the USFWS, height restrictions would not be imposed. However, timing restrictions for construction may be required. These timing restrictions will be established upon submittal of the applicable permits to the NJDEP and USACE.

6.8 Air Quality

Emissions at the Paulsboro Marine Terminal will be evaluated via the following methods, systems or via the institution of the following programs. The potential air quality mitigation measures to be evaluated could include:

Ships/Marine Vessels

- Provide for shore side electric power which will allow ships to turn off their auxiliary diesel engines which will produce lower emissions.
- Moor older more inefficient vessels at Berths 2 and 3, further away from the local community, whenever possible.
- Develop quicker more efficient cargo handling systems to lessen dwell (hotelling) times.
- Work with shipping lines to use lower sulfur diesel fuel (ranging from 15–2,000 ppm sulfur) while at dock.
- Work with tugboats servicing the port to be retrofitted with cleaner diesel engines, which can reduce aggregate NOx emissions, and/or to provide tugboats the capability to plug into on-shore electrical power while not in use.
- Work with shipping lines and the local maritime agencies to establish a voluntary vessel-speed reduction program within the Delaware River and approaching the Paulsboro Marine Terminal.

Cargo-Handling, Yard Equipment and Cranes

- All shiploading cranes and rubber-tired gantry cranes (RTGs) at the Paulsboro Marine Terminal are anticipated to run on electric power.
- An alternative-fuel vehicle policy can be instituted for the port-owned fleet. The vehicles can run on compressed natural gas, liquefied petroleum gas (propane), or via the use of dual-fuel engines.
- Retrofit older equipment (if applicable) to run on the best available control technology, including diesel particulate filters with lean NOx catalysts and, if not feasible, with diesel oxidation catalysts. The use of diesel oxidation catalysts in combination with the use of emulsified diesel can reduce PM and NOx emissions by an estimated 50 percent and 20 percent, respectively.

- Use of regenerative or hybrid power systems that save energy.

On-Road Trucks

- The Paulsboro Marine Terminal will provide for a dedicated access road and bridge which is located away from the local community, eliminating direct exposure to truck traffic and the associated emissions to the local residents.
- The Paulsboro Marine Terminal will establish truck queuing locations away from the local community and residences. Truck idling may also be reduced as a result of appointment or well established queuing systems.
- Emissions can be reduced by minimizing truck idling and enforcing idling limits or by encouraging vendors to install idle shut-off controls.
- Incentive programs with vendors can be created that encourage fleet modernization, the retirement of older trucks, and their replacement with modern lower-emitting trucks.
- Cleaner fuels, such as diesel emulsions or low-sulfur diesel, can be made available at the Terminal to offsite trucks.
- The Paulsboro Marine Terminal can provide for the on-site manufacturing and assembly of cargo which lessens over-road transportation and provides for the direct loading onto awaiting cargo ships, thereby lessening the local, regional and global emissions.

Locomotive/Rail Improvements

- The Paulsboro Marine Terminal provides for an intermodal terminal on-site to lessen off-site vehicle transportation and related local and regional emissions.
- The preferred alternative includes on-dock rail to move freight via rail car, capitalizing on existing rail capacity to reduce the need to further expand the local and regional roadways.
- The Paulsboro Marine Terminal can work with Conrail to encourage the use of cleaner locomotives and fuel.
- Evaluate using port-dedicated switching locomotives that meet standards established by the EPA with electric hybrid or alternative fuel engines.
- Evaluate the use of engine emissions controls and automatic engine shut-off controls to minimize unnecessary idling.

The SJPC will continue to work with the local community and regulators to decrease potential impacts on the local community and the environment. The SJPC is currently participating in the DRPA's Green Ports Initiative. Working in conjunction with the DRPA, the Philadelphia Regional Port Authority and PATCO, the SJPC is participating in a review of the ports and activities to develop and evaluate environmentally friendly operations.

Additional activities could include evaluating successful environmental measures at other ports, air monitoring, PM control from dry bulk cargo, funding for off-site air quality improvements, special studies, emission inventories, carpool programs, and offering better mass transit opportunities while working with NJ Transit to relocate a bus stop at or in close proximity to the Paulsboro Marine Terminal to further remove vehicles from the local roadways.

6.9 Noise

In accordance with the Section 43-2 of *The Noise Control Regulations of the Borough of Paulsboro*, the Paulsboro Marine Terminal will need to be designed to prevent excessive sound and vibration which may jeopardize the health and welfare or safety of its citizens or degrade the quality of life. During final design of the Paulsboro Marine Terminal, the need for and

effectiveness of other noise control strategies during operations would be considered. Examples of such strategies include:

- Strategically locate cranes, generators, compressors and other stationary noise sources away from noise-sensitive receptors.
- If possible, position buildings and other large structures between the object/facility noise sources and the closest residences to block the "line-of-sight".
- Utilize acoustical or "hospital grade" mufflers for both intake cowl and engine exhausts to eliminate potential impacts from the diesel engines of the cranes and electrical generators.
- Schedule heavy duty operations with a higher potential for noise annoyance during daytime hours.
- Locate inspection and check-in plaza away from residences to minimize noise impacts from accelerating and decelerating diesel haul trucks.
- Eliminate speed bumps and other roadway imperfections to eliminate impulse noise impacts from banging trucks.

All mitigation measures should be confirmed during the final design phase of the project when the details of the project components and the construction scenarios are finalized.

6.10 Land Use and Zoning

No mitigation is required. The Paulsboro Marine Terminal will redevelop and revitalize the currently vacant, former BP Oil Terminal and Essex Industrial Chemicals, Inc. properties. The development of the Marine Terminal in Paulsboro is consistent with the local zoning and consistent with the regional and Statewide Smart Growth planning studies.

6.11 Contaminated Materials

The construction of the Paulsboro Marine Terminal would not interfere with BP's ongoing remediation at the site. BP would continue with the operation of their remedial systems and would continue to sample the groundwater monitoring wells as required by the NJDEP. BP would have access to the site should additional soil borings or groundwater wells need to be advanced. Operation of the systems, as applicable, would continue throughout the construction and operation of the Paulsboro Marine Terminal.

Additionally, remediation could consider potential exposure scenarios which could also include volatilization to inhabited building interiors (e.g., warehouses, transit sheds, and offices) and volatilization to subsurface utility structures. Specifications and site remedial measures would be developed to limit potential exposure to volatile emissions. Mitigation against the collection and exposure to volatile emissions would be completed. Such measures could include locating buildings, utilities, and enclosures away from areas containing volatile compounds, using impermeable surfaces, installing vapor barriers, venting any preferential pathways, and conducting periodic monitoring of the enclosed spaces.

To minimize altering the preferred groundwater flow patterns, the stormwater management conduits and basins on the former BP Oil Terminal property may be required to be fully enclosed and lined. Other mitigation efforts could include locating the SWM basins on properties related to the former Essex property, away from BP's groundwater containment system. Oil/Water separators could further be installed to reduce the likelihood of future spills impacting the surface waters, the subsurface, or the current remediation activities.

An MOA has been completed with the NJDEP for the remediation aspects of the project. Specifically, a Preliminary Assessment dated December 2008 was completed for the former Essex property. All findings from the Preliminary Assessment were completed in accordance with the NJDEP regulations to characterize and report the current conditions of this property and to propose potential remedial options regarding capping of the former USACE dredge spoil disposal area and other applicable areas of concern. The primary media of concern included the soils, and to a lesser extent the groundwater and sediments at the site.

Proper health and safety precautions would be implemented during construction since active remediation is ongoing at the site. Required personnel will be trained in accordance with the OSHA regulations for hazardous waste operations and emergency response (29 CFR 1910.120). Work would proceed in accordance with a site-specific Health and Safety Plan (HASP) which would be regularly monitored and inspected. Construction workers and the Paulsboro Marine Terminal workers would have access to the required Right-to-Know documents and information regarding the site and Chemicals of Concern.

6.12 Sediments

A Dredge Material Management Plan detailing the proposed program would be completed in accordance with the January 22, 2009 Office of Dredging and Sediment Technology's correspondence and the NJDEP's *The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters* (October 1997) prior to initiating any dredging activities. Also, in accordance with the USACE, Section 10/404 permits would be sought that would include the required dredging activities. These permit applications and investigations would include all appropriate sampling requirements, surveying (i.e., bathymetry), Best Management Practices, highest and best use alternatives, and applicable design considerations for the upland placement of the sediments. Timing restrictions for all in-water work will be followed. All dredging activities would be completed in accordance with all Federal, State, and local requirements.

6.13 Traffic

As stated, the proposed access road and bridge would provide direct access to the Paulsboro Marine Terminal from I-295 for trucks and other vehicles accessing the Terminal. This direct access would allow trucks to avoid using local, residential roads. Traffic analysis is included in T&M Associates' *Executive Order 215 Environmental Impact Statement, Paulsboro Marine Terminal Access Road and Bridge*.

No mitigation is anticipated for any increase in the rail or marine traffic.

FAA required lighting will be installed on the cranes, as applicable.

6.14 Cultural Resources

As detailed previously, the following cultural resources were identified to be located at or proximal to the proposed Paulsboro Marine Terminal;

- Archaeological Site NJSM No. 28-Gl-23,
- Archaeological Site NJSM No. 28-Gl-239,
- Potential remains of the *Merlin*, the British revolutionary vessel,
- The bulkheads which are greater than 50 years of age,

- The former Essex Fluorspar Storage Building (greater than 50 years of age), and
- The sunken barges within the Delaware River proximal to BP's existing pier.

The project does not appear to have the potential to affect any of the NRHP-eligible properties currently listed in the Borough Paulsboro. Historical and archaeological resources have been previously documented at and proximal to the project, should they still exist. However, the terrestrial resources have been covered by up to 10 to 20 feet of dredge materials and fill. In addition, the preferred alternative includes increasing the grade by approximately 7 to 9 feet, further separating the proposed work from any pre-existing landforms. In addition, the marine resources have been subject to repeated and intense dredging activities which have severely altered the beds of the Delaware River and Mantua Creek.

The Paulsboro Marine Terminal project will continue to coordinate with all applicable State and Federal agencies to determine if additional investigations and monitoring are required (e.g., Phase 1A archaeological survey, geomorphological evaluations, underwater archaeological survey, review of side-scan sonar data, construction monitoring, etc.). In addition, the bulkheads and one building on the project site were identified to be greater than 50 years of age. Therefore, evaluation and documentation may be required to ascertain that these structures do not meet the criteria for inclusion in the NRHP.

Based upon the preferred alternative, an APE of the site could be required at the site which could include any marine and terrestrial features and work associated with the proposed Paulsboro Marine Terminal. If applicable, the Section 106 process and/or the New Jersey State Register consultation would begin with the applicable State and Federal concurrence of the information presented to date and/or the approval of the APE. Any required mitigation activities can be evaluated in consultation with the agencies at that time.

6.15 Socioeconomic and Environmental Justice

Early and meaningful public participation will be facilitated in the EO 215 process and the environmental permitting processes for the proposed Paulsboro Marine Terminal. The EO 215 and permitting processes each allow for a public hearing and comment period to provide the public with the opportunity to learn more about the proposed project, the alternatives analyzed, and afford the public the ability to submit comments on the proposed project.

In assessing the potential for the project to adversely impact qualifying minority and low income populations, the rationale for selecting the Paulsboro site for the proposed facility as described in Section 3.4 was reviewed. The Paulsboro site previously had a water-dependent industrial use that provided employment opportunities and economic benefit to the Paulsboro community as a whole. The Borough is actively seeking to fulfill its Master Plan to redevelop the site with a new marine terminal that would provide new employment opportunities and economic benefit for the community. The proposed Paulsboro Marine Terminal is consistent with the Borough plan.
The conceptual design for the Paulsboro Marine Terminal was developed with particular consideration toward avoiding adverse community impacts such as noise and truck traffic on local streets by including design elements to appropriately buffer the community from those undesirable effects. In particular, the western vegetated buffer will screen the Paulsboro Marine Terminal from the adjacent community. Also, the proposed dedicated access road will assure that truck traffic does not use local community roads. These design elements are intended to benefit the community as a whole. For these reasons, the proposed project is not anticipated to have a disproportionately high or adverse effect on qualifying minority or low-income populations within the community.

6.16 Aesthetics

The Paulsboro Marine Terminal includes an 80-feet wide greenway buffer to be constructed between the residential properties and the Terminal facility. This greenway will provide aesthetics to the community as well as separate the port operations from the community.

6.17 Sustainable Development

The SJPC is partnered with the Delaware River Port Authority (DRPA) and the Philadelphia Regional Port Authority (PRPA) in a "Green Ports" initiative to develop environmental programs and projects aimed at reducing or neutralizing the impact of port operations upon the environment and surrounding community. The Green Ports Initiative will contain long- and short-term recommendations to make port operations more environmentally friendly. These recommendations may include energy/water conservation, electric or alternative fuel vehicles and equipment, renewable sources of energy (solar and wind installations), new technologies and innovations in logistics (traffic management controls, congestion mitigation), and green buildings/facilities. The GCIA will coordinate closely with the DRPA and SJPC to include strategies consistent with the Green Ports initiatives in the design and development of the proposed Paulsboro Marine Terminal.

7.0 LIST OF PREPARERS

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Mr. Tabachnick has over 22 years of experience conducting all types of cultural resource management studies on projects across the United States. He has prepared all types of Section 106 documentation, including survey forms, Determination of Eligibility Reports, Determination of Effect Reports as well as Mitigation Documentation. Mr. Tabachnick also has extensive experience preparing a variety of NEPA documentation, including Categorical Exclusions, Environmental Assessments, and Environmental Impact Statements, as well as Section 4(f) Evaluations.

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APPENDIX A

Project Related Regulatory Correspondence and Regulatory Meeting Minutes

Section 22 Delaware Estuary Sturgeon and Oyster Study (DE SOS)

Project Partners:

South Jersey Port Corporation
Seaboard Fisheries Institute
Rutgers University Haskin Shellfish Research Laboratory
Rutgers University Institute of Marine and Coastal Sciences
Environmental Research and Consulting, Inc.
Academy of Natural Sciences
U.S. Army Corps of Engineers, Philadelphia District

Project Status:

This fall investigators of the Delaware Estuary science community initiated a study to examine the effects of flow dynamics, salinity, and water quality on the eastern oyster, the Atlantic sturgeon, and the shortnose sturgeon in the Delaware Estuary. The study will focus on the oligohaline zone, the area where fresh and salt water interface. The oligohaline zone supports essential habitats for juvenile anadromous fish and provides critical disease refuge for oysters. The project study area will flank this critical zone with assessments occurring from the Marcus Hook area south to the Maurice River, including sites in New Jersey, Delaware and Pennsylvania.

Though very different in their functional significance to the estuary, oysters and sturgeon both represent important ecological indicators of the health of the estuary. Additionally both groups of animals are particularly vulnerable to anthropogenic and climatic changes effecting estuarine flow dynamics. The Haskin Shellfish Research Laboratory is presently involved in a multi-institutional National Science Foundation funded study focusing on understanding how oyster host genetics, population dynamics, and environment interact with disease organisms to structure host populations. The NSF study will examine how climate change may interact with these inter-related processes. As part of this effort a circulation-biogeochemical model (ROM v.3) has

The eastern oyster is one of, if not the most important, species of the Delaware Estuary. Foremost, the oyster is a keystone organism in the bay, providing several vital ecological services. The oyster has also served as a principal Delaware Bay fishery, holding particular economic, social and cultural-historical significance to communities along the Delaware Bay shore. There has also long been a considerable brain trust of oyster researchers in the region, generating a wealth of data and knowledge on oyster biology, ecology and population models. Such models have been critical to the management and sustainability of the Delaware Bay oyster resource. Additionally, there has been a highly successful oyster restoration program in recent years, which promises to preserve this critical resource for generations to come if the effort can be sustained.

been developed to identify dominant circulation phenomena in Delaware Bay and on the adjacent continental shelf that affect general changes in oyster parasite and larval transport. The model output also provides temperature, salinity, and flow velocities, which are not only essential to modeling oyster population dynamics, but are also valuable in modeling and examining other biological and environmental interactions occurring in the Estuary.

Of particular interest are the biological and environmental interactions taking place in the oligohaline zone at the fresh-salt water interface. The DE SOS research effort will utilize the ROM v.3 model to investigate interactions of flow dynamics, salinity, and water quality on the eastern oyster (*Crassostrea virginica*), the Atlantic sturgeon (*Acipenser oxyrinchus*), and the shortnose sturgeon (*Acipenser brevirostrum*) in the Delaware Estuary.

Study approach:

1) Gather information on spatial and temporal variability in water quality and food supply parameters to better ground truth and enhance the utility of the ROM v.3 model for modeling hydrodynamic influences, specifically freshwater inflow, on oyster population dynamics.

(2) Track juvenile sturgeon using acoustic telemetry to examine seasonal distribution and movements in relation to water quality and hydrodynamic factors.

(3) Apply the ROM v.3 model as a tool for examining the relationship of juvenile sturgeon distribution and environmental parameters with a view toward identifying essential habitats and examining the sensitivity of essential habitats to past, present, and future anthropogenic and natural alterations in flow and water quality.

Benefits:
This work will augment efforts to restore and protect oyster and sturgeon habitats in the Delaware Bay. Refinement of the ROM v.3 model will enhance its utility for examining a wide variety of questions relating to the effects of climatic shifts and flow alterations on the biological resources of the Estuary.

The Atlantic and shortnose sturgeon belong to a prehistoric group of fish that have existed for more than 70 million years. Being anadromous, they migrate between fresh and marine environments returning to their natal estuaries to spawn. Atlantic sturgeon supported a principal fishery in the Delaware Estuary in the late 1800s and early1900s; their roe being heavily sought for the international caviar trade. Populations of Atlantic and shortnose sturgeons are at historically low levels along the Atlantic coast of North America. The shortnose sturgeon is presently listed as endangered and the Atlantic sturgeon is currently a candidate for listing as a threatened or endangered species. Considerable research on the biology of sturgeon in the Delaware River and Bay has been performed. However, little is known regarding the occurrence, distribution, and movements of juveniles. Knowledge of the seasonal utilization of different parts of the estuary by, and habitat requirements of juvenile sturgeon is critical to the species' protection, management, and recovery. The lack of informed knowledge of their essential habitats precludes the implementation of appropriate protection and enhancement management strategies.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JON S. CORZINE
Governor

MARK N. MAURIELLO
Acting Commissioner

Office of Dredging and Sediment Technology
P.O. Box 028
Trenton, NJ 08625
(609) 292-1250
FAX (609) 777-1914

January 22, 2009

Mr. Marlin Peterson
Gloucester County Improvement Authority
254 County House Road
Clarksboro, NJ 08020

RE: Sediment Sampling and Characterization Plan (SAP) Concurrence for
Proposed Dredging of Port of Paulsboro
Paulsboro, Gloucester County, NJ

Dear Mr. Peterson:

On December 12, 2008, the Office of Dredging and Sediment Technology (ODST) received the captioned Sediment Sampling/Characterization Plan for the subject project.

The SAP that you have submitted is proposed to characterize a total dredge volume of 675,000 cubic yards. The project depth varies from –20' MLW to –40' MLW with 2' of overdredge. In addition, you have indicated that the sediment will be hydraulically dredged and either disposed off-site or dewatered and applied onsite as fill material.

The sampling plan is depicted on two sheets entitled: "SEDIMENT SAMPLING PLAN - PORT OF PAULSBORO, BOROUGH OF PAULSBORO, Gloucester County, NJ, dated 11/11/08 and prepared by AECOM.

Sampling

The ODST concurs with the proposed SAP including the core locations and compositing scheme as described in Table 1 below:

Table 1
Paulsboro Marine Terminal – Geographic Region 3
Sediment Sampling and Composite Plan

Reach	Estimated Dredge Quantity (CYDs)	Sub-Reach	No. of Cores Within Reach	Composite Samples	Composite Core Samples	Bottom Composite Core Samples
A	60,000	N/A	8	A^1	A1 & A2	
				A^2	A3 & A4	1
				A^3	A5 & A6	
				A^4	A7 & A8	1
B	15,000	N/A	4	B1	B1 & B3	1
				B2	B2 & B4	1
C	560,000					
		CI	12	$CI^{1A \& 1B}$	CI1 & CI2	
				$CI^{2A \& 2B}$	CI3, CI4 & CI6	1
				$CI^{3A \& 3B}$	CI5 & CI7	1
				$CI^{4A \& 4B}$	CI8 – discreet	
				$CI^{5A \& 5B}$	CI9 – discreet	
				$CI^{6A \& 6B}$	CI10, CI11 & CI12	1
		CM	12	$CM^{1A \& 1B}$	CM1 & CM2	1
				$CM^{2A \& 2B}$	CM3 & CM4	
				$CM^{3A \& 3B}$	CM5 & CM8	1
				$CM^{4A \& 4B}$	CM6 & CM7	1
				$CM^{5A \& 5B}$	CM9 & CM12	
				$CM^{6A \& 6B}$	CM10 & CM11	
		CO	6	CO1	CO1 & CO3	
				CO2	CO2 & CO4	
				CO3	CO5 & CO6	1
D	40,000	N/A	6	D1	D1 & D2	1
				D2	D3 & D5	1
				D3	D4 & D6	
TOTALS			48	24 (max 36)		13

CI – designation for Sub-reach C Interior
CM – designation for Sub-reach C Middle
CO – designation for Sub-reach C Outside

Cl^{1A} – correlates to composite sample of core Cl1 and Cl2 within the sediment's silt strata**

Cl^{1B} – correlates to composite sample of core Cl1 and Cl2 within the sediment's sand strata**

N/A – not applicable

** - if verified / observed during field drilling

Note: *The specific guidelines for homogenizing and composting cores found on Pages 9-11 and Appendix A of the Dredging Manual should be followed. Separate cores may be composited only if grain size and likelihood of contamination is similar based on depositional characteristics, etc. Cores greater than 6' in length may be homogenized unless there are distinct visual strata in grain size and composition that are at least 2 feet in depth. For those cores that show grain size stratification, each stratum with a depth of 2 feet or greater must be analyzed separately, (i.e. the entire core should not be homogenized for testing purposes if distance strata are present). Approval from the Department must be obtained prior to implementing changes in the compositing scheme listed here.*

Testing

The physical and analytical testing protocol below must be followed:

A bulk sediment chemistry analysis is required on each composite or discrete sample as indicated above for the target analytes found in Appendix B of the Dredging Manual, excluding volitales, and dioxin/furans.

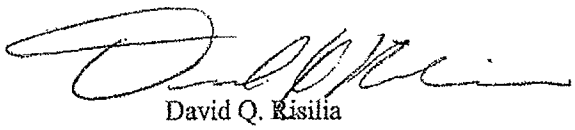
> ***Regarding chromium, if total chromium values exceed 20 PPM a further analysis must be performed to determine the speciation of the chromium.*

Because the dredged material will be dewatered with an endpoint discharge into the surface waters of the State, the ODST is requiring modified elutriate testing to evaluate impacts which may be associated with the release of the return water. Please refer to Appendix B of the Dredging Manual for testing requirements for bulk sediment chemistry and modified elutriate. Please be sure to include a separate analysis (taken from the area to be dredged) of the site water sample used for the modified elutriate testing.

Be advised that all holding times and minimum detection limits must be met for acceptance of the data. The submitted data must include summary tables providing a comparison of the Department's Soil Remediation Standards (for bulk parameters), and the Surface Water Quality Standards (for modified elutriate data). This office requires the submission of the data summary sheets provided in an electronic format such as Microsoft Word Accell Spreadsheet on compact disk along with the standard hard-copy submission.

Should you have any questions concerning this letter, or the information required by the Dredging Manual, please contact me at (609) 292-9342.

Sincerely,



David Q. Risilia
Supervising Environmental Specialist
Office of Dredging and Sediment Technology

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Habitat Conservation Division
James J. Howard Marine
Sciences Laboratory
74 Magruder Road
Highlands, New Jersey 07732

October 23, 2007

TO: Eileen Flarity-Loftus
DMJM Harris
485B U.S. 1 South
Iselin, NJ 08830

SUBJECT: Proposed Paulsboro Marine Terminal
Borough of Paulsboro, Gloucester County, NJ .

Karen Greene
(Reviewing Biologist)

We have reviewed the information provided to us regarding the above subject project. We offer the following preliminary comments pursuant to the Endangered Species Act, the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act:

Endangered Species Act

Federally endangered shortnose sturgeon as well as Atlantic sturgeon, a candidate for listing under the ESA can be found in the project area. Once detailed project plans are available, the federal action agency will be required to coordinate with NMFS regarding the potential impacts of the proposed marine terminal on these species. For additional information on threatened and endangered species under NMFS jurisdiction contact NMFS' Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930. ATTN: Endangered Species Coordinator.

Fish and Wildlife Coordination Act

A wide variety of resources under NMFS jurisdiction occur within Delaware River and in Mantua Creek including anadromous and resident fish, forage and benthic species such as Atlantic sturgeon, American shad, alewife, blueback herring, striped bass, hickory shad and white perch.

DEPENDING UPON THE PROJECT DETAILS POSSIBLE RECOMMENDATIONS INCLUDE:

Without additional information about the nature and the scope of the work proposed, detailed recommendations are not possible. However, the Delaware Fish and Wildlife Management Cooperative and the State of NJ have developed seasonal work restrictions for the Delaware River and its tributaries. These include no bucket or hopper dredging or pile driving from March 15 to June 30, no hydraulic dredging or overboard disposal from March 15 to July 31, no blasting from March 15 to November 30. New dredging is shallow water should be avoided as should placing fill in the Delaware River or Mantua Creek.

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat

No Essential Fish Habitat (EFH) has been designated in the project area. Further EFH consultation by the federal action agency will not be required as part of the permit process unless project plans change, or if new information becomes available that changes the basis for this determination, or new species are listed. For a listing of EFH and further information, please go to our website at: http://www.nero.noaa.gov/hcd. If you wish to discuss this further, please call 732-872-3023.

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

JON S. CORZINE
Governor

Division of Parks and Forestry
Office of Natural Lands Management
Natural Heritage Program
P.O. Box 404
Trenton, NJ 08625-0404
Tel. #609-984-1339
Fax. #609-984-1427

LISA P. JACKSON
Commissioner

October 23, 2007

Eileen Loftus
DMJM+Harris, Inc.
Woodbridge Corporate Plaza
485-B U.S. Route One South
Iselin, NJ 08830

Re: Paulsboro Marine Terminal Project

Dear Ms. Loftus:

Thank you for your data request regarding rare species information for the above referenced project site in Paulsboro Borough, Gloucester County.

Searches of the Natural Heritage Database and the Landscape Project (Version 2) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Natural Heritage Database and the Landscape Project habitat mapping for occurrences of any rare wildlife species or wildlife habitat on the referenced site. Please see Table 1 for species list and conservation status.

Table 1 (on referenced site).

Common Name	Scientific Name	Federal Status	State Status	Grank	Srank
bald eagle foraging area	*Haliaeetus leucocephalus*		E	G4	S1B,S2N

We have also checked the Natural Heritage Database and the Landscape Project habitat mapping for occurrences of any rare wildlife species or wildlife habitat within 1/4 mile of the referenced site. Please see Table 2 for species list and conservation status. This table excludes any species listed in Table 1.

Table 2 (additional species within 1/4 mile of referenced site).

Common Name	Scientific Name	Federal Status	State Status	Grank	Srank
bald eagle nest buffer	*Haliaeetus leucocephalus*		E	G4	S1B,S2N

We have also checked the Natural Heritage Database for occurrences of rare plant species or ecological communities. The Natural Heritage Database does not have any records for rare plants or ecological communities on or within 1/4 mile of the site.

Attached is a list of rare species and ecological communities that have been documented from Gloucester County. If suitable habitat is present at the project site, these species have potential to be present.

Status and rank codes used in the tables and lists are defined in the attached EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive I-Map-NJ website at the following URL, http://www.state.nj.us/dep/gis/depsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292 9400.

PLEASE SEE THE ATTACHED 'CAUTIONS AND RESTRICTIONS ON NHP DATA'.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Herbert A. Lord

Herbert A. Lord
Data Request Specialist

cc: Robert J. Cartica
NHP File No. 07-3907572

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Land Use Regulation Program, P.O. Box 401, Trenton, NJ 08625-0401.

The Landscape Project was developed by the Division of Fish & Wildlife, Endangered and Nongame Species Program in order to map critical habitat for rare animal species. Natural Heritage Database response letters will also list all species (if any) found during a search of the Landscape Project. However, this office cannot answer any inquiries about the Landscape Project. All questions should be directed to the DEP Division of Fish and Wildlife, Endangered and Nongame Species Program, P.O. Box 400, Trenton, NJ 08625-0400.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

GLOUCESTER COUNTY

RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN

THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
*** Vertebrates						
ACCIPITER COOPERII	COOPER'S HAWK		T/T		G5	S3B,S4N
AMBYSTOMA TIGRINUM TIGRINUM	EASTERN TIGER SALAMANDER		E		G5T5	S2
AMMODRAMUS HENSLOWII	HENSLOW'S SPARROW		E		G4	S1B
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW		T/S		G5	S2B
ARDEA HERODIAS	GREAT BLUE HERON		S/S		G5	S2B,S4N
BARTRAMIA LONGICAUDA	UPLAND SANDPIPER		E		G5	S1B
BUTEO LINEATUS	RED-SHOULDERED HAWK		E/T		G5	S1B,S2N
CLEMMYS INSCULPTA	WOOD TURTLE		T		G4	S3
CLEMMYS MUHLENBERGII	BOG TURTLE	LT	E		G3	S2
DOLICHONYX ORYZIVORUS	BOBOLINK		T/T		G5	S2B
FALCO PEREGRINUS	PEREGRINE FALCON		E		G4	S1B,S?N
HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	LT	E		G4	S1B,S2N
HYLA ANDERSONII	PINE BARRENS TREEFROG		T		G4	S3
MELANERPES ERYTHROCEPHALUS	RED-HEADED WOODPECKER		T/T		G5	S2B,S2N
PANDION HALIAETUS	OSPREY		T/T		G5	S2B
PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE		T		G4T4	S3
PODILYMBUS PODICEPS	PIED-BILLED GREBE		E/S		G5	S1B,S3N
POOECETES GRAMINEUS	VESPER SPARROW		E		G5	S1B,S2N
STRIX VARIA	BARRED OWL		T/T		G5	S3B
*** Ecosystems						
CLADIUM MARISCOIDES HERBACEOUS VEGETATION	TWIG-RUSH COASTAL PLAIN INTERMITTENT POND HERBACEOUS VEGETATION				G3	S2

GLOUCESTER COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
ELEOCHARIS (OLIVACEA, MICROCARPA, ROBBINSII) - XYRIS (DIFFORMIS VAR DIFFORMIS, SMALLIANA) HERBACEOUS VEGETATION	SPIKERUSH (SMALLFRUIT, BRIGHT GREEN, ROBBIN'S) - YELLOWEYED GRASS (BOG, SMALL'S) COASTAL PLAIN INTERMITTENT POND HERBACEOUS VEGETATION				G2	S2
FRESHWATER TIDAL MARSH COMPLEX	FRESHWATER TIDAL MARSH COMPLEX				G4?	S3?
RHEXIA VIRGINICA - PANICUM VERRUCOSUM HERBACEOUS VEGETATION	VIRGINIA MEADOW-BEAUTY - WARTY PANICGRASS COASTAL PLAIN INTERMITTENT POND HERBACEOUS VEGETATION				G2G3	S1S3
*** Invertebrates						
ALASMIDONTA UNDULATA	TRIANGLE FLOATER		T		G4	S3
CATOCALA PRETIOSA PRETIOSA	PRECIOUS UNDERWING				G4T2T3	S2S3
CELITHEMIS MARTHA	MARTHA'S PENNANT				G4	S3S4
ENALLAGMA PICTUM	SCARLET BLUET				G3	S3
FARONTA RUBRIPENNIS	PINK STREAK				G3G4	S3
GOMPHUS APOMYIUS	BANNER CLUBTAIL				G4	S1
ITAME SP 1	BARRENS ITAME				G3	S3
LAMPSILIS CARIOSA	YELLOW LAMPMUSSEL		T		G3G4	S1
LAMPSILIS RADIATA	EASTERN LAMPMUSSEL		T		G5	S3
LEPTODEA OCHRACEA	TIDEWATER MUCKET		T		G4	S1
LIBELLULA AURIPENNIS	GOLDEN-WINGED SKIMMER				G5	S1S2
LIGUMIA NASUTA	EASTERN PONDMUSSEL		T		G4G5	S1
LITHOPHANE LEMMERI	LEMMER'S NOCTUID MOTH				G3G4	S2
MACROCHILO LOUISIANA	A NOCTUID MOTH				G4	S2S3
MACROCHILO SANTERIVALIS	A NOCTUID MOTH				G3G4	S1S3
MONOLEUCA SEMIFASCIA	A SLUG MOTH				G4G5	S2S3
NICROPHORUS AMERICANUS	AMERICAN BURYING BEETLE	LE	E		G2G3	SH

GLOUCESTER COUNTY

RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN

THE NEW JERSEY NATURAL HERITAGE DATABASE

	NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
	PYRGUS WYANDOT	APPALACHIAN GRIZZLED SKIPPER		E		G2	SH
	ZANCLOGNATHA SP 1	A NOCTUID MOTH				G3G4	S3
*** Other types							
	BALD EAGLE WINTERING SITE	BALD EAGLE WINTERING SITE				G?	S?
*** Vascular plants							
	AESCHYNOMENE VIRGINICA	SENSITIVE JOINT-VETCH	LT	E	LP	G2	S1
	AGASTACHE NEPETOIDES	YELLOW GIANT-HYSSOP				G5	S2
	ALOPECURUS CAROLINIANUS	TUFTED MEADOW-FOXTAIL				G5	S3S4
	AMIANTHIUM MUSCITOXICUM	FLY POISON				G4G5	S2
	ANEMONE CANADENSIS	CANADA ANEMONE				G5	SX
	APLECTRUM HYEMALE	PUTTYROOT		E		G5	S1
	ARISTIDA DICHOTOMA VAR CURTISSII	CURTISS' THREE-AWN GRASS				G5T5	S2
	ASCLEPIAS RUBRA	RED MILKWEED			LP	G4G5	S2
	ASCLEPIAS VARIEGATA	WHITE MILKWEED				G5	S2
	ASCLEPIAS VERTICILLATA	WHORLED MILKWEED				G5	S2
	ASIMINA TRILOBA	PAWPAW		E		G5	S1
	ASTER CONCOLOR	EASTERN SILVERY ASTER			LP	G4?	S2
	ASTER RADULA	LOW ROUGH ASTER		E		G5	S1
	BIDENS BIDENTOIDES	ESTUARY BURR-MARIGOLD				G3	S2
	BOUTELOUA CURTIPENDULA	SIDE-OATS GRAMA GRASS		E		G5T5	S1
	CACALIA ATRIPLICIFOLIA	PALE INDIAN PLANTAIN		E		G4G5	S1
	CALLITRICHE PALUSTRIS	MARSH WATER-STARWORT				G5	S2
	CARDAMINE LONGII	LONG'S BITTERCRESS		E		G3	SH
	CAREX BARRATTII	BARRATT'S SEDGE			LP	G4	S4
	CAREX FRANKII	FRANK'S SEDGE				G5	S3
	CAREX LIMOSA	MUD SEDGE		E		G5	S1
	CAREX MITCHELLIANA	MITCHELL'S SEDGE				G3G4	S2

GLOUCESTER COUNTY

RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN

THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
CAREX POLYMORPHA	VARIABLE SEDGE		E		G3	S1
CAREX PRAIREA	PRAIRIE SEDGE				G5?	S2
CAREX UTRICULATA	BOTTLE-SHAPED SEDGE				G5	S2
CASTANEA PUMILA	CHINQUAPIN		E		G5	S1
CASTILLEJA COCCINEA	SCARLET INDIAN-PAINTBRUSH				G5	S2
CORALLORHIZA WISTERIANA	SPRING CORALROOT				G5	SX
COREOPSIS ROSEA	ROSE-COLOR COREOPSIS			LP	G3	S2
CROTON WILLDENOWII	ELLIPTICAL RUSHFOIL			LP	G5	S2
CUPHEA VISCOSISSIMA	BLUE WAXWEED				G5?	S3
CYPERUS ENGELMANNII	ENGELMANN'S FLAT SEDGE				G4Q	S2
CYPERUS LANCASTRIENSIS	LANCASTER FLAT SEDGE		E		G5	S1
CYPERUS RETROFRACTUS	ROUGH FLATSEDGE		E		G5	SH
DALIBARDA REPENS	ROBIN-RUN-AWAY		E		G5	SH.1
DESMODIUM LAEVIGATUM	SMOOTH TICK-TREFOIL				G5	S3
DESMODIUM STRICTUM	PINELAND TICK-TREFOIL			LP	G4	S2
DESMODIUM VIRIDIFLORUM	VELVETY TICK-TREFOIL				G5?	S2
DOELLINGERIA INFIRMA	CORNEL-LEAF ASTER				G5	S2
DRABA REPTANS	CAROLINA WHITLOW-GRASS		E		G5	SH
ELEOCHARIS EQUISETOIDES	KNOTTED SPIKE-RUSH		E	LP	G4	S1
ELEOCHARIS TORTILIS	TWISTED SPIKE-RUSH		E		G5	S1
ELEPHANTOPUS CAROLINIANUS	CAROLINA ELEPHANT-FOOT		E		G5	SH
EPILOBIUM ANGUSTIFOLIUM SSP CIRCUMVAGUM	NARROW-LEAF FIREWEED				G5T5	S1
EPILOBIUM STRICTUM	DOWNY WILLOWHERB				G5?	S2
ERIOCAULON PARKERI	PARKER'S PIPEWORT				G3	S2
ERIOPHORUM GRACILE	SLENDER COTTON-GRASS		E		G5T?	SH
ERIOPHORUM TENELLUM	ROUGH COTTON-GRASS		E		G5	S1
EUPATORIUM RESINOSUM	PINE BARREN BONESET		E	LP	G3	S2
GLYCERIA LAXA	NORTHERN MANNA GRASS				G5	S1
GYMNOPOGON BREVIFOLIUS	SHORT-LEAF SKELETON GRASS		E		G5	S1

GLOUCESTER COUNTY

RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
HELONIAS BULLATA	SWAMP-PINK	LT	E	LP	G3	S3
HETERANTHERA MULTIFLORA	BOUQUET MUD-PLANTAIN				G4	S2
LESPEDEZA STUEVEI	STUEVE'S DOWNY BUSH-CLOVER				G4?	S2
LUDWIGIA LINEARIS	NARROW-LEAF PRIMROSE-WILLOW			LP	G5	S2
LUZULA ACUMINATA	HAIRY WOOD-RUSH		E		G5T4T5	S2
LYCOPODIELLA INUNDATA	NORTHERN BOG CLUB-MOSS				G5	S2
LYGODIUM PALMATUM	CLIMBING FERN			LP	G4	S2
LYSIMACHIA HYBRIDA	LOWLAND LOOSESTRIFE				G5	S3
MALAXIS UNIFOLIA	GREEN ADDER'S-MOUTH				G5	S2
MELANTHIUM VIRGINICUM	VIRGINIA BUNCHFLOWER		E		G5	S1
MICRANTHEMUM MICRANTHEMOIDES	NUTTALL'S MUDWORT		E		GH	SH
MUHLENBERGIA CAPILLARIS	LONG-AWN SMOKE GRASS		E		G5T?	S1
MUHLENBERGIA TORREYANA	PINE BARREN SMOKE GRASS			LP	G3	S3
NYMPHOIDES CORDATA	FLOATINGHEART			LP	G5	S3
OBOLARIA VIRGINICA	VIRGINIA PENNYWORT				G5	S2
ONOSMODIUM VIRGINIANUM	VIRGINIA FALSE-GROMWELL		E		G4	S1
PANICUM ACICULARE	BRISTLING PANIC GRASS		E		G4G5	S1
PASPALUM DISSECTUM	MUDBANK CROWN GRASS				G4?	S2
PENSTEMON LAEVIGATUS	SMOOTH BEARDTONGUE		E		G5	S1
PHASEOLUS POLYSTACHIOS VAR POLYSTACHIOS	WILD KIDNEY BEAN				G4T?	S2
PHLOX MACULATA VAR MACULATA	SPOTTED PHLOX				G5T?	S3
PHORADENDRON LEUCARPUM	AMERICAN MISTLETOE			LP	G5	S2
PINUS SEROTINA	POND PINE				G5	S2
PLATANTHERA CILIARIS	YELLOW FRINGED ORCHID			LP	G5	S2
POLYGALA INCARNATA	PINK MILKWORT		E		G5	SH
POLYGALA MARIANA	MARYLAND MILKWORT			LP	G5	S2
POLYGONUM HYDROPIPEROIDES VAR OPELOUSANUM	OPELOUSAS WATER-PEPPER				G5T?Q	S2
PRUNUS ANGUSTIFOLIA	CHICKASAW PLUM		E		G5T4T5	S2

GLOUCESTER COUNTY

RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN

THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
PUCCINELLIA FASCICULATA	SALTMARSH ALKALI GRASS				G3G5	S2
PYCNANTHEMUM TORREI	TORREY'S MOUNTAIN-MINT		E		G2	S1
QUERCUS IMBRICARIA	SHINGLE OAK		E		G5	S1.1
QUERCUS MUEHLENBERGII	YELLOW OAK				G5	S3
RANUNCULUS AMBIGENS	WATER-PLANTAIN SPEARWORT				G4	S2
RANUNCULUS LONGIROSTRIS	LONG-BEAK WATER BUTTERCUP				G5	S2
RHYNCHOSPORA GLOBULARIS	COARSE GRASS-LIKE BEAKED-RUSH		E		G5?	S1
RHYNCHOSPORA INUNDATA	SLENDER HORNED-RUSH			LP	G3G4	S2
RHYNCHOSPORA NITENS	SHORT-BEAKED BALD-RUSH				G4?	S2
RHYNCHOSPORA PALLIDA	PALE BEAKED-RUSH				G3	S3
RHYNCHOSPORA SCIRPOIDES	LONG-BEAK BALD-RUSH				G4	S2
ROTALA RAMOSIOR	TOOTHCUP				G5	S3
SAGITTARIA SUBULATA	AWL-LEAF ARROWHEAD				G4	S2
SCHEUCHZERIA PALUSTRIS	ARROW-GRASS		E		G5T5	SH
SCHIZAEA PUSILLA	CURLY GRASS FERN			LP	G3	S3
SCUTELLARIA NERVOSA	VEINED SKULLCAP				G5	S2
SISYRINCHIUM FUSCATUM	SAND-PLAIN BLUE-EYED GRASS				G5?	S2
SPHENOPHOLIS PENSYLVANICA	SWAMP OATS				G4	S2
SPIRANTHES LACINIATA	LACE-LIP LADIES'-TRESSES		E		G4G5	S1
SPIRANTHES ODORATA	FRAGRANT LADIES'-TRESSES				G5	S2
SPOROBOLUS COMPOSITUS VAR COMPOSITUS	LONG-LEAF RUSH-GRASS				G5T5	S2
STACHYS HYSSOPIFOLIA	HYSSOP HEDGE-NETTLE				G5	S2
STACHYS TENUIFOLIA	SMOOTH HEDGE-NETTLE				G5	S3
THASPIUM BARBINODE	HAIRY-JOINT MEADOW-PARSNIP				G5	SX
TIPULARIA DISCOLOR	CRANEFLY ORCHID				G4G5	S3
TRICHOSTEMA SETACEUM	NARROW-LEAF BLUECURLS				G5	S2
UTRICULARIA BIFLORA	TWO-FLOWER BLADDERWORT		E		G5	S1
UTRICULARIA GIBBA	HUMPED BLADDERWORT			LP	G5	S3
VALERIANELLA RADIATA	BEAKED CORNSALAD		E		G5	S1

GLOUCESTER COUNTY

RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN

THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
VERBENA SIMPLEX	NARROW-LEAF VERVAIN		E		G5	S1
VERNONIA GLAUCA	BROAD-LEAF IRONWEED		E		G5	S1
VULPIA ELLIOTEA	SQUIRREL-TAIL SIX-WEEKS GRASS		E		G5	SH

154 Records Processed

EXPLANATIONS OF CODES USED IN NATURAL HERITAGE REPORTS

FEDERAL STATUS CODES

The following U.S. Fish and Wildlife Service categories and their definitions of endangered and threatened plants and animals have been modified from the U.S. Fish and Wildlife Service (F.R. Vol. 50 No. 188; Vol. 61, No. 40; F.R. 50 CFR Part 17). Federal Status codes reported for species follow the most recent listing.

LE	Taxa formally listed as endangered.
LT	Taxa formally listed as threatened.
PE	Taxa already proposed to be formally listed as endangered.
PT	Taxa already proposed to be formally listed as threatened.
C	Taxa for which the Service currently has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.
S/A	Similarity of appearance species.

STATE STATUS CODES

Two animal lists provide state status codes after the Endangered and Nongame Species Conservation Act of 1973 (NSSA 23:2A-13 et. seq.): the list of endangered species (N.J.A.C. 7:25-4.13) and the list defining status of indigenous, nongame wildlife species of New Jersey (N.J.A.C. 7:25-4.17(a)). The status of animal species is determined by the Nongame and Endangered Species Program (ENSP). The state status codes and definitions provided reflect the most recent lists that were revised in the New Jersey Register, Monday, June 3, 1991.

D	Declining species-a species which has exhibited a continued decline in population numbers over the years.
E	Endangered species-an endangered species is one whose prospects for survival within the state are in immediate danger due to one or many factors - a loss of habitat, over exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow.
EX	Extirpated species-a species that formerly occurred in New Jersey, but is not now known to exist within the state.
I	Introduced species-a species not native to New Jersey that could not have established itself here without the assistance of man.
INC	Increasing species-a species whose population has exhibited a significant increase, beyond the normal range of its life cycle, over a long term period.
T	Threatened species-a species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.
P	Peripheral species-a species whose occurrence in New Jersey is at the extreme edge of its present natural range.
S	Stable species-a species whose population is not undergoing any long-term increase/decrease within its natural cycle.
U	Undetermined species-a species about which there is not enough information available to determine the status.

Status for animals separated by a slash(/) indicate a duel status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.

Special Concern applies to animal species that warrant special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming a Threatened species. This category would also be applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state.

Plant taxa listed as endangered are from New Jersey's official Endangered Plant Species List N.J.S.A. 13:1B-15.151 et seq.

E Native New Jersey plant species whose survival in the State or nation is in jeopardy.

REGIONAL STATUS CODES FOR PLANTS AND ECOLOGICAL COMMUNITIES

LP Indicates taxa listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction. Not all species currently tracked by the Pinelands Commission are tracked by the Natural Heritage Program. A complete list of endangered and threatened Pineland species is included in the New Jersey Pinelands Comprehensive Management Plan.

HL Indicates taxa or ecological communities protected by the Highlands Water Protection and Planning Act within the jurisdiction of the Highlands Preservation Area.

EXPLANATION OF GLOBAL AND STATE ELEMENT RANKS

The Nature Conservancy developed a ranking system for use in identifying elements (rare species and ecological communities) of natural diversity most endangered with extinction. Each element is ranked according to its global, national, and state (or subnational in other countries) rarity. These ranks are used to prioritize conservation work so that the most endangered elements receive attention first. Definitions for element ranks are after The Nature Conservancy (1982: Chapter 4, 4.1-1 through 4.4.1.3-3).

GLOBAL ELEMENT RANKS

G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout it's range; with the number of occurrences in the range of 21 to 100.

G4 Apparently secure globally; although it may be quite rare in parts of its range, especially at the periphery.

G5 Demonstrably secure globally; although it may be quite rare in parts of its range, especially at the periphery.

GH Of historical occurrence throughout its range i.e., formerly part of the established biota, with the expectation that it may be rediscovered.

GU Possibly in peril range-wide but status uncertain; more information needed.

GX Believed to be extinct throughout range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered.

G? Species has not yet been ranked.

GNR Species has not yet been ranked.

STATE ELEMENT RANKS

S1 Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.

S2 Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.

S3 Rare in state with 21 to 100 occurrences (plant species and ecological communities in this category have only 21 to 50 occurrences). Includes elements which are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.

S4 Apparently secure in state, with many occurrences.

S5 Demonstrably secure in state and essentially ineradicable under present conditions.

SA Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded; examples include European strays or western birds on the East Coast and vice-versa.

SE Elements that are clearly exotic in New Jersey including those taxa not native to North America (introduced taxa) or taxa deliberately or accidentally introduced into the State from other parts of North America (adventive taxa). Taxa ranked SE are not a conservation priority (viable introduced occurrences of G1 or G2 elements may be exceptions).

SH Elements of historical occurrence in New Jersey. Despite some searching of historical occurrences and/or potential habitat, no extant occurrences are known. Since not all of the historical occurrences have been field surveyed, and unsearched potential habitat remains, historically ranked taxa are considered possibly extant, and remain a conservation priority for continued field work.

SP Element has potential to occur in New Jersey, but no occurrences have been reported.

SR Elements reported from New Jersey, but without persuasive documentation which would provide a basis for either accepting or rejecting the report. In some instances documentation may exist; but as of yet, its source or location has not been determined.

SRF Elements erroneously reported from New Jersey, but this error persists in the literature.

SU Elements believed to be in peril but the degree of rarity uncertain. Also included are rare taxa of uncertain taxonomical standing. More information is needed to resolve rank.

SX Elements that have been determined or are presumed to be extirpated from New Jersey. All historical occurrences have been searched and a reasonable search of potential habitat has been completed. Extirpated taxa are not a current conservation priority.

SXC Elements presumed extirpated from New Jersey, but native populations collected from the wild exist in cultivation.

SZ Not of practical conservation concern in New Jersey, because there are no definable occurrences, although the taxon is native and appears regularly in the state. An SZ rank will generally be used for long distance migrants whose occurrences during their migrations are too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped and protected. In other words, the migrant regularly passes through the state, but enduring, mappable element occurrences cannot be defined.

Typically, the SZ rank applies to a non-breeding population (N) in the state – for example, birds on migration. An SZ rank may in a few instances also apply to a breeding population (B), for example certain lepidoptera which regularly die out every year with no significant return migration.

Although the SZ rank typically applies to migrants, it should not be used indiscriminately. Just because a species is on migration does not mean it receives an SZ rank. SZ will only apply when the migrants occur in an irregular, transitory and dispersed manner.

B Refers to the breeding population of the element in the state.

N Refers to the non-breeding population of the element in the state.

T Element ranks containing a "T" indicate that the infraspecific taxon is being ranked differently than the full species. For example *Stachys palustris* var. *homotricha* is ranked "G5T? SH" meaning the full species is globally secure but the global rarity of the var. *homotricha* has not been determined; in New Jersey the variety is ranked historic.

Q Elements containing a "Q" in the global portion of its rank indicates that the taxon is of questionable, or uncertain taxonomical standing, e.g., some authors regard it as a full species, while others treat it at the subspecific level.

.1 Elements documented from a single location.

Note: To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?). A range is indicated by combining two ranks (e.g., G1G2, S1S3).

IDENTIFICATION CODES

These codes refer to whether the identification of the species or community has been checked by a reliable individual and is indicative of significant habitat.

Y Identification has been verified and is indicative of significant habitat.

BLANK Identification has not been verified but there is no reason to believe it is not indicative of significant habitat.

? Either it has not been determined if the record is indicative of significant habitat or the identification of the species or community may be confusing or disputed.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

Eileen Flarity-Loftus
Senior Environmental Scientist
DMJM Harris
485B U.S. 1 South
Iselin, NJ 08830

NOV - 2 2007

Dear Ms. Flarity-Loftus,

This is in response to your letter dated October 15, 2007 regarding the proposed Paulsboro Marine Terminal project. The project area is located along the Delaware River and Mantua Creek in the Borough of Paulsboro, Gloucester County, New Jersey. Your letter requested information on the presence of species listed under the Endangered Species Act (ESA) of 1973, as amended, by NOAA's National Marine Fisheries Service (NMFS) near the proposed project. These comments are offered by NMFS Protected Resources Division.

A population of the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) occurs in the Delaware River from the lower bay upstream to at least Lambertville, New Jersey (rkm 238). Based on mark-recapture data collected from January 1999 through March 2003, an estimated population of 12,047 adult shortnose sturgeon inhabit the Delaware River (Brundage 2006). The abundance of adults is greatest in the tidal river from Trenton, New Jersey, to Philadelphia, Pennsylvania (Hastings et al. 1987; O'Herron et al. 1993). Historically, shortnose sturgeon were relatively rare below Philadelphia due to poor water quality. In the past decade, however, the water quality in the Philadelphia area has improved leading to an increased use of the lower river by shortnose sturgeon. The area below Philadelphia is likely utilized by shortnose sturgeon in the summer and is also believed to be an over-wintering area for juveniles and non-spawning adults.

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) are distributed along the entire East Coast of the U.S. and have been designated as a Candidate Species by NMFS. The best available scientific information indicates that a reproducing Atlantic sturgeon population persists in the Delaware River. Individual Atlantic sturgeon are likely to occur near the Paulsboro Marine Terminal. As a candidate species, Atlantic sturgeon receive no substantive or procedural protection under the ESA; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on Atlantic sturgeon from any proposed project. Many populations, including those found in the Delaware River, have undergone drastic declines since the late 1800s. In 2006, NMFS initiated a status review for this species to determine if listing as threatened or endangered under the ESA is warranted. NMFS is currently reviewing the findings of the Status Review team. If it is determined that listing is warranted, a final rule listing the species could be published within a year from the date of publication of the listing determination or proposed rule. The Status Review report is available at the following web address: *http://www.nero.noaa.gov/prot_res/CandidateSpeciesProgram/AtlSturgeonStatusReviewReport.pdf.*

It is unclear from your letter whether any work will occur within the Delaware River where endangered shortnose sturgeon may occur. In-water construction activities can affect shortnose sturgeon through direct injury or mortality, displacing the species from the area, or by altering habitat and destroying forage items. If in-water work will be conducted and a permit or other authorization will be obtained from a Federal agency, consultation pursuant to Section 7 of the ESA may be required. If no in-water work is planned, then no further coordination with NMFS Protected Resources Division is necessary. Should you have any questions about these comments or about the Section 7 consultation process in general, please contact William Barnhill of my staff at (978) 281-9300 ext. 6510 or by email (William.Barnhill@noaa.gov).

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

cc: Barnhill, F/NER3
Greene, F/NER4

File Code: Sec 7 technical assistance 2007 Paulsboro Marine Terminal project Delaware River NJ
PCTS: T/NER/2007/07230

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Jersey Field Office
Ecological Service
927 North Main Street, Building D
Pleasantville, New Jersey 08232
Tel: 609-646-9310
Fax: 609-646-0352
http://www.fws.gov/northeast/njfieldoffice

IN REPLY REFER TO:
08-I-0333

DEC - 4 2007

Eileen Flarity-Louftus, Senior Environmental Scientist
DMJM Harris
485B U.S. 1 South
Iselin, New Jersey 08830
Fax Number: (732) 636-6338

Reference: Proposed Paulsboro Marine Terminal
Paulsboro Borough, Gloucester County, New Jersey

The U.S. Fish and Wildlife Service (Service) has reviewed the above-referenced proposed project pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA) to ensure the protection of federally listed endangered and threatened species, and pursuant to the Bald and Golden Eagle Protection Act (54 Stat. 250; 16 U.S.C. 668-668d) (Eagle Act). The following comments do not address all Service concerns for fish and wildlife resources and do not preclude separate review and comment by the Service as afforded by other applicable environmental legislation. No federally listed or proposed threatened or endangered flora or fauna under Service jurisdiction are known to occur within the proposed project's impact area. Therefore, no further consultation pursuant the ESA is required. If additional information on federally listed species becomes available, or if project plans change, this determination may be reconsidered.

The following type(s) of bald eagle (*Haliaeetus leucocephalus*) habitat may occur in the project's impact area:

☒ nesting ☒ foraging ☐ wintering/communal roost

The bald eagle was removed from the federal List of Endangered and Threatened Wildlife effective August 8, 2007. The bald eagle continues to be protected under the federal Eagle Act and Migratory Bird Treaty Act (40 Stat. 755; 16 U.S.C. 703-712). The bald eagle also remains a State-listed species under the New Jersey Endangered and Nongame Species Conservation Act (N.J.S.A. 23:2A et seq.), which carries protections under the State land use regulation program. These federal and State laws prohibit take of bald eagles. For the continued protection of bald eagles, and to ensure compliance with federal and State laws, the Service recommends managing bald eagles in accordance with the National Bald Eagle Management Guidelines and all applicable State regulations. Links to State agencies and the Guidelines are available on this office's web site at http://www.fws.gov/northeast/njfieldoffice/Endangered.

Please also refer to our web site for further information including federally listed and candidate species lists, procedures for requesting ESA review, and contacts for obtaining information from the New Jersey Natural Heritage and Endangered and Nongame Species Programs regarding State-listed and other species of concern.

Reviewing Biologist: Wendy Walsh

Authorizing Supervisor: J. C. Stahl

eagle.doc 08/08/07

150 – 408.17

Pennoni

PENNONI ASSOCIATES INC.
CONSULTING ENGINEERS

December 23, 2008

GCIA 0701

Mr. Marlin Peterson
Project Manager
Gloucester County Improvement Authority
Shady Lane Nursing Home
256 County House Road
Clarksboro, NJ 08020

RE: Paulsboro Marine Terminal Access Road and Bridge Design
Threatened and Endangered Species Restrictions

Dear Marlin,

Pennoni contacted the United States Fish and Wildlife Service and spoke to Kathy Clark in regrads to timing restrictions for the Bald Eagle(s) nesting in the vicinity of the project. Kathy informed us that the nesting bald eagles in the area have several nests. The current nest is located on the Delaware River approximately one (1) mile from the proposed project area. We asked Kathy if there will height restriction for the construction of proposed bridge. She informed us that there are not. However, there may be time restrictions on building due to the eagles foraging area. If the eagles decide to nest closer to the proposed site then additional time restrictions will apply. No time restriction will be set until a submission is made to the NJDEP due to the possibility of the eagles nesting closer to the project area. In addition, there is no treshold decibel (dB) level for bald eagles according to Kathy. It all depends on the bird in question. USFWS has been working more with issues of military jets than the sound issue of pile driving disturbing the birds.

In regards to the in water construction constraints, we are still awaiting confirmation of the regulations as outlined in N.J.A.C. 7-13, Flood Hazard Act 7:13-10.5 – "Requirements for a regulated activity in or along a water with fishery resources" from the NJDEP. Table E of the aforemention regulation only indicates an in water restriction from April 1 through June 30 for the Mantua Creek. However, during the team's meeting with the NJDEP and other regulatory agencies it was learned from the representative from National Marine Fisheries that the upper reach of the Mantua Creek is a spawning area for shad. Therefore, an inference from Table E can be made that the retriction could the same as the other rivers/creeks entering the Delaware River (i.e. Tidal portions of Raccoon, Rancocas Creek, Crosswicks Creeks and Cooper River) that are restricted March 1 through June 30 and September 1 through November 30 due to migratory fish.

515 Grove Street • Suite 1B • Haddon Heights, NJ 08035-1756 • Tel 856•547•0505 • Fax 856•547•9174
www.pennoni.com

NJ Joint Permit Processing Meeting Request Form

Project Name: Paulsboro Riverfront Redevelopment

Contact Person: David Shields (Executive Director, GCIA)
John Savaltore (Borough of Paulsboro)
Marlin Peterson (DMJM+HARRIS)

Contact No.: GCIA: 856.848.4002
Borough of Paulsboro: 856.423.1500
DMJM+HARRIS: 212.701.2872

Applicant: Gloucester County Improvement Authority (to be determined)

Requested Meeting Date: January 14, 2004

Number of Attendees: 6

John Salvatore - Borough of Paulsboro
Carmen Trifiletti - GCIA
Joe Baker - GCIA
Marlin Peterson - DMJM+HARRIS
Timothy Hand - DMJM+HARRIS
Alfred Gutman - DMJM+HARRIS

Discussion Type: Pre-application

Detailed Project Description:

The Gloucester County Improvement Authority (GCIA) and the Borough of Paulsboro are proposing to redevelop a 190-acre former oil and chemical bulk storage facility into an integrated marine terminal and logistics/distribution center. As depicted in the enclosed Location Map, the proposed site is located along the eastern bank of the Delaware River just south of Mantua Creek.

The site consists of primarily two parcels: a 130-acre parcel that is owned by BP Oil Company and an adjacent 60-acre parcel identified as the Essex Chemical site, which is a wholly owned subsidiary of The Dow Chemical Company. The BP site is currently undergoing a multi-phased remedial investigation and action which is expected to continue for many years.

As shown in the attached Conceptual Drawings, the redevelopment program depicts a 3-phase approach for the site. Key aspects of this project are the construction of a ship-berthing area or wharf along the Delaware River, which could ultimately accommodate up to three vessels simultaneously and the construction of a dedicated truck access bridge across Mantua Creek to provide direct access to I-295. The project site is subdivided into

two primary uses: (1) a marine terminal and (2) an industrial/commercial development. From an operations standpoint, the marine terminal consists of an improved wharf and fender system that ranges from an initial phase of approximately 1,325 feet to a full-build length of roughly 1,925 feet and will be able to accommodate bulk, break bulk and containerized cargoes, whereas the industrial/commercial development consists of a series of warehouse or distribution facilities that augment the marine terminal operations.

New Jersey Department of Environmental Protection
Land Use Regulation Program

Meeting Attendance Sheet

Date: 14 Jan 04 Subject: Gloucester County

NOTE: The guidance provided at a pre-application meeting is not binding upon the Department, in accordance with N.J.A.C. 7:7A N.J.S.A. 58:16A-50 et seq. and N.J.S.A. 12:5-3. Therefore, the Department shall in no way commit itself to approval or rejectic proposed project as a result of these discussions. By attending this meeting all acknowledge this standard.

Name	Title	Telephone #	Affiliation
1. Larry Slavitter	Biologist	215 686-6734	US Army Corps of Engs
2. Anita Riportella	biologist	732 872-3116	NOAA / NMFS
3. Don Wilkinson	Biologist	856 785-2711	NJ F&W
4. Mark Watters	Case Mgr. (SR Oil Case)	609 633 1486	NJDEP
5. Timothy Hand	Senior Environmental Scientist	732-596-5015	DMJM+HARRIS
6. CARMEN TRIFILETTI	PROJECTS COORDINATOR	(856) x 208 848-4002	GLOUC. CNTY. IMP. AUTH.
7. Joseph Baker	Project manager	856-848-4002	Gloucester County Improv. Authority
8. John Salvatore	Admin Bar of Paulsboro	856 423-1566	Paulsboro
9. STEVEN MARS	BIOLOGIST	609 x23 646 0352	USFWS
10. BOB MONTGOMERY	ENVI. SCI.	212-637-3813	EPA
11. David Risilia	Proj Mgr	(609) 292-9342	NJDEP Office of Dredging & Sediment Tech
12.			
13.			
14.			

FACSIMILE COVER SHEET

US Army Corps
of Engineers®

Philadelphia District
Attn: CENAP-OP-R
100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

FROM: Lawrence M. Slavitter

TELEPHONE #: (215) 656-6734

FAX #: (215) 656-6724

DATE: December 16, 2003

Total Number of Pages: 3 (including cover sheet)

TO: Tim Hand
DMJM-Harris

PHONE: 732-596-5015
FAX: 732-636-6338

SUBJECT: 11 February 2004 Joint Permit Processing Meeting; Gloucester County Development and Improvement Authority

Mr. Hand, attached you will find a copy of the form you will need to complete in order to get on the agenda for the JPPM. The requested information must be submitted to all the agencies listed no later than two weeks prior to the scheduled meeting to ensure your place on the agenda. You have been provisionally placed on the 11 February JPPM agenda, 1:00-2:00.

Should you have any additional question regarding this matter, please field free to contact me at the phone number indicated above or by e-mail at Lawrence.M.Slavitter@nap02.usace.army.mil

Larry Slavitter
Biologist
Application Section II

MEETING MINUTES
From the NJDEP / NJPC/USACOE Joint Permit Process Meeting for the
PAULSBORO MARINE TERMINAL
ACCESS ROAD & BRIDGE
February 14, 2006

A Joint Permitting Process meeting was held at the NJDEP Offices in Trenton on Tuesday on February 14, 2006 to discuss the proposed access road and bridge to serve the proposed Paulsboro Marine Terminal. In attendance were::

- Charlie Welch (CW) – NJDEP – Land Use
- Joseph Corleto – NJDEP (JC) – Pollution Prevention & Permit Coordination
- Kenneth Koschek (KK) – NJDEP – Pollution Prevention & Permit Coordination
- Karl Braun (KB) – NJDEP
- Dan Wilkerson – NJDEP – Biologist (attend the last part of the meeting)
- Sam Reynolds (SR) – USACOE – Chief, Application Section II
- Frank Cianfrani (FC) – USACOE – Chief, Regulatory Branch
- George G. Strachan (GGS) – GCIA – Assistant Administrator
- Kathy Stuart (KS) – 3rd Legislative District
- David W. Munion (DWM) – T&M – Client Liaison
- Kris J. Krzyston (KJK) – T&M – Environmental Division
- Richard F. Hernon (RFH) – T&M – Project Manager

The purpose of the meeting was to formally introduce the Access Road and Bridge project to the permitting agencies. The meeting began with T&M (RFH) giving a brief description of both the proposed Paulsboro Marine Terminal and its proposed access road and bridge.

NJDEP (CW) and the USACOE (SR) want to see both projects. The USACOE will act (issue permits/approvals) on both projects together, not separately. NJDEP will act on the Access Road and Bridge separately; but, need to review both during the same time frame. The project (s) involve both Coastal and freshwater wetlands.

The agencies were interested in the funding for the project(s). The road and access bridge will be funded by an NJDOT Grant ($16 million) and the South Jersey Port Authority will bond for the terminal development.

The agencies asked if there is any controversy associated with this project(s). Only potential controversy is with one affected landowner whose property will have to be taken, probably by condemnation. Paulsboro supports the project(s) as evidenced by they made the original application for the road and bridge funding.

The consensus was that the South Jersey Port Authority should be asked to attend the next meeting. GCIA (GGS) will reach out to the Port for a representative to attend the next meeting.

The USCG will be the permitting agency for the bridge. T&M (KJK) will reach out to the USCG to determine the NEPA document that will be required.

NJDEP (KB) asked if the new road and bridge would generate secondary development. T&M (RFH) responded that the area of West Deptford the roadway is located in developed (two CITGO plants, GCUA plant), or are wetlands that would be difficult to develop. There is a proposed co-generation plant on the undeveloped highland. The road and bridge could support redevelopment of additional Paulsboro industrial sites on the Delaware River, south of the proposed marine terminal.

The EO215 process was discussed. A project EO215 must be submitted with a cover letter from a State agency, in this case NJDOT, possibly Local Aid. NJDEP (JC) advised that they cannot force the EO215 for the road and bridge be combined with the EO215 for the terminal (South Jersey Port). Six copies of the EO215 should be submitted with the NJDOT cover letter. NJDOT will review the traffic for NJDEP. Once the wetlands are delineated, the EO215 for the road and bridge will be completed and submitted; probably in March.

T&M (KJK) asked if the original permit issued for the water soil borings be modified to include the land soil borings. NJDEP (KB) responded that a new application will be needed. T&M advised that the application for the soil borings will be submitted after the wetlands are delineated and the boring plan is prepared. It is expected that the permit application will be submitted in early March.

NJDEP (DW) advised that construction in the creek will not be allowed between March 15 and June 30. Also, the presence of a Bald Eagle nest in the area may restrict construction between December 15 and July 31. NJDEP is also interested in public access to the creek.

Bridge clearance was discussed. T&M has been working with a horizontal channel clearance of 85-feet, and a vertical clearance of 25-feet. USACOE (SR) suggested Tom Groff (Project Manager, Operations Division) of their office be contacted concerning the clearances.

USACOE asked if there was information on hazardous waste for the project site. T&M (RFH) advised that when the land soil borings are taken a sniffer will be used and the samples will be observed; if hazardous material appears to be present, samples will be taken for testing. There is existing reports of hazardous material for the terminal site that should be available.

USACOE (SR) advised that they want to know where the borrow material is coming from. T&M (DWM) advised he may have a source for the fill material.

USACOE (SR) asked if there would have to be improvements at the Route 295 Exit 19 as a result of this project. T&M (RFH) advised that only signal timing changes would be needed.

NJDEP (CW) check the rules on Ports and Port Uses, a found Paulsboro listed. Therefore, site is okay for redevelopment as a port.

The next meeting will be arranged by Joseph Corleto. Sam Reynolds will invite the USCG to send a representative. A representative from the NJDEP Site Remediation unit will attend the next meeting. T&M will put together a draft agenda for review.

The agencies asked if information regarding the proposed terminal could be sent to them prior to the next meeting. The past study(s) on redevelopment may be the most current thinking.

Please advise by March 3, 2006 if there any additions or corrections needed.

Submitted,

Richard F. Hernon, PE
Project Manager

TO: Meeting Attendees
FROM: Marlin Peterson, Project Manager, GCIA
DATE: March 31, 2008
SUBJECT: **Paulsboro Marine Terminal and Access Road and Bridge – NJDOT Kick Off Meeting**
COPY TO: Meeting attendees

Project Reference: Paulsboro Port Project
Meeting Date: November 27, 2007; 10:00am to 1:00pm
Location: NJDOT Offices, Rte 70, Cherry Hill, NJ
Prepared By: Phillip Girandola, Lance Comas, Marlin Peterson

Meeting Attendees:

Name	Affiliation	Telephone No.	E-Mail Address
Chris Bergeman	NJDOT Local Aid	856 486 6714	chris.bergeman@dot.state.nj.us
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Jim Furey	"	"	jfurey@ " " "
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Lance Comas	" "	732 596 5010	lance.comas@dmjmharris.com
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Marlin Peterson	GCIA		mpeterson@gcianj.com
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Sam Reynolds	US Army Corps of Engrs.	215-656-5715	samuel.l.reynolds@usace.army.mil
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Jack McQuillan	NJDOT Envir. Res	609 530 2833	J.McQuillan@dot.state.nj.us
Arpan Dasgupta	Office of Economic Growth	609 777 0503	Arpan.Dasgupta@oeg.state.nj.us

General Purpose of Meeting:

NJDOT is providing state aid from NJ's Transportation Trust Fund for Paulsboro's planned Access Road and Bridge project. As part of providing state aid, NJDOT designated the local aid office as its project lead. As a result, Chris Bergeman, NJDOT local aid office, coordinated a kick off meeting to bring the various public and private-sector stakeholders together to discuss the project and identify appropriate next steps.

Discussion:

Item No.	General Description of Discussion	Suggested Action
01	Background: A brief background was stated by Chris Bergeman (NJDOT): explained that "Local Aid" is receiving the project from "Statewide Planning" to begin the design phase; $16MM of state aid monies are in place for 2006-2009; Previously DVRPC and DCA had involvement, but the Access Roadway and Bridge project is strictly NJ State money.	N/a
02	Mr. Marlin Peterson (GCIA) introduced an agenda (see attached at end of these minutes) and introduces T&M Associates to describe road and bridge alignment.	N/a
03	T&M utilizes white board posters and explains proposed bridge alignment. Intent is to provide direct access for trucks to and from Interstate 295 and the marine terminal.	N/a
04	T&M provides a Power Point presentation entitled, "Paulsboro Marine Terminal Access Road Alternative analysis and EO 215" and describes slides to audience. (see copy of the presentation at the end of these minutes).	N/a
05	After the presentation, a question / answer / comment session commenced. The following are general descriptions of accounts conveyed during the session, but are not presented as exact statements.	N/a
06	NJDOT: Requested that a Geologist as well as a Geomorphologist be employed by Pennoni during the geotechnical boring program	Pennoni to include during field work
07	ACOE inquired the extents of DOT's planned review (i.e. from I-295 to the marine terminal location?). T&M responded that the EO215 provides traffic count data and analysis	N/a
08	DOT asked if there are impacts at Exit 19. T&M stated that the recently upgraded intersections are forecasted to	N/a

	operate at Level C and that adjustments to signal timing may be required.	
09	ACOE asked if the designers know where 'cargo moves' are going primarily when leaving Port. GCIA stated that majority are likely heading South to DMB or CBB due to congestion of traveling through Philadelphia area, but that the ultimate cargo destination will drive the actual travel route.	N/a
10	ACOE stated that the I295 / 46 / I76 interchanges are being studied - will they relate to the Paulsboro Port project? GCIA responded that these projects are sponsored by other Local, State or Regional agencies and wiould enhance future off-port landside cargo movements but that the effectiveness of the marine terminal is not dependent upon the implementation of these projects.	N/a
11	ACOE asked if the road will be truck access only? GCIA stated that the roadway and bridge is intended to provide direct access to and from the marine terminal for employees, vendors and trucks. Access control along the roadway via a security gate is planned.	N/a
12	ACOE made the following comments: a. Provide details regarding existing truck route including rationale for why this route is un-acceptable, key issues such as geometry, noise, volume and safety are suggested.. b. Document the purpose and need of road including requirements throughout project duration c. Address cumulative impacts / benefits for future use d. Alternative construction types: such as viaduct vs. fill are to be included e. Provide details regarding available Public TransitInclude Essential Fish Habitat (EFH) discussion, however, shading impact since N-S alignment may be minimal. f. Finalize the marine terminal details and provide a description of what the project "IS" ; there is only one project with two components – the	The various comments will be considered during Marine Terminal and Access Road and Bridge project's environmental assessment

	marine terminal and roadway/bridge. g. The ACOE has made no proclamation that a NEPA and/or EIS will or will not be required. ACOE is waiting for a formal pre-application meeting whereby the details of the project are provided by the sponsoring agency h. Need to clear up that although no federal dollars are involved, NEPA needs to be addressed – Sect 106 process.	
13	At this point in time, the GCIA presented a PowerPoint entitled, "Paulsboro Program" copy of which is included at the end of these minutes. Mr. Peterson stated that the Roadway and Bridge's EO 215 was expedited to facilitate use of the roadway for construction as well as ultimately for operation of the 190 Acre marine terminal; 130 Acres are being remediated by BP – remedial action plan is under review by DEP, additional 60 Acres were previously owned by Essex Chemical, which has received a NFA letter from DEP.	N/a
14	ACOE asked how project is being looked at. Mr. Peterson stated 'phased'. ACOE stated NO.	N/a
15	ACOE states the following in succession: a. Finalize the project details (marine terminal and roadway / bridge) b. EO 215 means nothing to Corps and is solely for the State. c. If you make a case for 'capping' the site then OK, but this doesn't correlate to a phasing program. d. What about rail improvement and/or utility infrastructure – if required, include in impact assessment. e. At first GCIA meeting, Charlie Welts was told at this meeting that it is ONE project (approximately 2006 meeting date). There has been NO determination made by the ACOE, they can only glean information from an EO 215. A Federal EIS requires specific requirement that could entail a 4 to 5 year process f. First Step: Need someone to formally introduce the project to the ACOE.	See item 19

	g. BRIT meeting was a good start. ACOE wrestled with the same issues in Pennsauken. h. If you would tell us that remediation is taking place and roads for access do not fall under Nationwide. i. Railroad, utility crossings and other (water, sewer, electric), 128 KVA line runs also have to be prevalent. j. ACOE will ask what other sites are available in the area to be developed.	
16	ACOE inquires from NJDOT if they are funding the entire project. As indicated previously, NJDOT is providing funds associated with the roadway & bridge. DOT is not providing funds associated with the marine terminal development	N/a
17	The GCIA reiterated that the roadway / bridge purpose is to facilitate long term use (truck traffic) associated with the marine terminal and to minimize temporary construction impacts, if possible.	N/a
18	NJDOT stated that their recommendation would be to have ONE – EO215 document that includes both the marine terminal and roadway/bridge components.	N/a
19	GCIA, Mr. Peterson suggests summarizing future actions as follows: 1. Finalize schematic detailing of port infrastructure and incorporate roadway / bridge component 2. Submit to ACOE, DEP, DOT and Coast Guard. 3. ACOE will then make a determination regarding what is required via EA or EIS. Based on items 1 and 2, the appropriate next step for the existing EO 215 will be determined.	SJPC / GCIA SJPC / GCIA ACOE
20	ACOE suggests an "ALL AGENCY" meeting including Nat'l Marine Fisheries and US Fish and Wildlife.	To be scheduled after item 19
21	ACOE identified the Cherokee Development project as an example where the project decided to be federalized and under that scenario a whole socio and aquatic study took place.	N/a

22	ACOE stated that they are likely to be the lead federal agency for this project and that the overall federal agency mood is that EFH throughout the rivers are being impacted due to the various waterfront development initiatives that have been identified in Delaware, Pennsylvania and New Jersey.	This determination will follow item 19
23	Meeting adjourned.	

MEETING MINUTES

PAULSBORO MARINE TERMINAL & OVERPASS

NEW JERSEY BROWNFIELDS REDEVELOPMENT INTERAGENCY TEAM

PROJECT	Paulsboro Marine Terminal
NUMBER:	Miscellaneous Project Meeting No. M-02
DATE:	Wednesday, Oct 4th, 2007
TIME:	09:30 hrs
LOCATION:	NJ Environmental Infrastructure Trust, Lawrenceville, NJ

ATTENDEES:

George Strachan	GCIA
Gerald White	Gloucester County
Joseph Balzano	South Jersey Port Corporation (SJPC)
Bill Higgins	SJPC
Dennis Culnan	Phoenix Strategies / SJPC
Arpan Dasgupta	Office of Economic Growth
Alan Miller	NJ Department of Community Affairs (DCA)
Lorissa Whitaker	NJDCA
Dan DiFrancesco	Pennoni
Seth Gladstone	Pennoni
Marlin Peterson	DMJM Harris (DH)

Balance of attendees to be completed once sign-in sheet is received.

DMJM Harris
20 Exchange Place, 12th Floor
New York, NY 10005
212.701.2872
Marlin.peterson@dmjmharris.com

BRIT

Paulsboro Port – 10/04/07

WELCOME

NJ BROWNFIELDS INTERAGENCY TEAM - 2007

BROWNFIELDS REDEVELOPMENT INTERAGENCY TEAM MEETING

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Arpan Dasgupta — OEG — Arpan.Dasgupta@oeg.state.nj.us — 609-777-2640

Samuel Reynolds — USACE / PHILA. DIST. — SAMUEL.L.REYNOLDS@USACE.ARMY.MIL — 215-656-5715

The following topics were discussed during the BRIT meeting. While a comprehensive listing of all items discussed during the meeting is not provided, the meeting minutes attempt to include the key highlights, potential issues and resulting action items, which are intended to facilitate an expedited approach to achieving project implementation

Item	Description	Action Reqd By	Due Date	Status
M02-01	**Case Presentation: Borough of Paulsboro – Paulsboro Marine Terminal and Overpass Project** DISCUSSION DCA opened the meeting by stating that the purpose of today's meeting is for the State partners to be provided with an overview of the proposed project and to identify issues that may impede project implementation. After a series of introductions, a project overview of the marine terminal and the overpass was provided. A copy of the presentation material is attached to these minutes. General statements made during the meeting include the following: 1. Although the project has two primary components – site redevelopment for the marine terminal and the bridge / overpass project; from the regulatory permitting process – there is only one project. 2. BP is required to do the environmental clean-up as dictated by the State of NJ. 3. An updated cost estimate will be required. When developing the estimate, separate the cost items into the specific components but at the same time, categorize the items (and costs) as either part of environmental remediation or as terminal redevelopment. There are various revenue streams and potential financial incentives that may be available to the Borough, Gloucester or SJPC, including up to 75% of reimbursement for remediation costs beyond those that will be covered by BP. 4. The project team indicated the phased (or staged) development timeline is: 18 months for commencement of construction; 4 years to commencement of operations of the initial 2-berth facility; 7 years for the 3rd berth due to surcharge consolidation and the last 2 berths (if built) would be 10 years.			

	5. SJPC indicated that at present about 3% of the tonnage through SJPC facilities is carried by rail, the balance is via truck. It is intended that rail will be a much larger part of Paulsboro – therefore carrying upwards of 10% is a target. Discussion ensued regarding getting rail into the terminal and to the dock. Key statements or opinions from various meeting attendees follow.			
M02 – 02	**ACOE** <u>ACTION ITEM</u> Once the wetland delineation work is complete, a jurisdictional determination by the ACOE will be required. This activity needs to be an early action item. The ACOE suggested that the Project Team define what work (and associated permits) are required for the project and which are required by BP ONLY for the remediation. PBross to work with MPeterson to review initial list and confirm with BP and NJDEP. Consultation with the USEPA should be considered since they may be a significant player is the permit process. ACOE suggests that the SJPC indicate what type of terminal the development is going to be – container or bulk/breakbulk. Different terminals generate different impacts, therefore the project sponsor needs to identify the project such that the impacts can be avoided, if not avoided – then quantified - and correspondingly mitigated, such that regulations are adhered to. ACOE suggested that the alternatives study also include redevelopment options at SJPC's existing terminal facilities in Camden (Beckett / Broadway) as well as Salem and other facilities or brownfield sites along the Delaware River. The ACOE recommended that a meeting be held with the USCG since the Mantua Creek is a designated navigable waterway (it may be de-activated but it is not de-listed) therefore the USCG must be on-board regarding the overpass details as well as the terminal alignment and operational considerations. The ACOE will review the site details internally (as well as with other Federal Agencies) to determine if the project falls within the NEPA EA or EIS category and to determine if which Federal Agency is the appropriate			

	"Lead Federal Agency". Suggests allowing at least a year for permit process & approval.			
M-02-03	**NJEDA** EDA provides financing resources for items such as construction costs. If EDA $$ is used, requirements such as Prevailing Wage items must be incorporated into tender documents.			
M02-04	**Taxes** Once the cost estimate and financing models are generated, a follow on meeting with the finance departments needs to be scheduled in order to discuss taxes that will be generated by the development			
M02-05	**Environmental Infrastructure Trust (EIT)** Paulsboro is a very ambitious project. EIT could possibly finance some of the remediation costs that are not covered by BP. For example, a 50/50 split (50% equity by SJPC and 50% market rate loan from EIT) with the County and/or Borough is possible. In addition, once remediation is complete, EIT could finance up to 50% of the sewer, water and/or utility development costs. From a timing perspective, their program cycle requires preliminary data in early October for subsequent year financing, therefore if interested, a follow-on meeting in about June 08 is suggested.			
M02-06	**NJDEP – Dredging** DEP requests baseline data such that informed decisions can be made regarding impacts. Key baseline data include, but is not limited to the following: • MHW line delineated on a plan • Extent of proposed fill & overwater coverage (DEP prefers high level, pile supported deck structures) • Extent of intertidal shallows (less than 4' of water during MHW • Threatened and endangered species • Status of remedial action work plan (RAWP) Other comments included: What is driving the design considerations – remediation must be the lead such that the design enhances the RAWP The alternative analysis must look into (1) other regional ports (PAMT, Delaware, Beckett and Broadway) to indicate why expansion at these facilities can not accommodate the required growth and (2) other feasible port alternatives such as PONYNJ, Norfolk and			

	Baltimore.			
M02-07	**NJ Fish & Wildlife Service (NJFWS)** Birds Bald eagles are protected by NJ State Statute. A new bald eagle nest location has been identified to the East of the project (east of CITGO, within a parcel owned by Gloucester County). A graphic of the buffer area impacts was provided. These areas are protected for 5 years from date of nesting. Line of site analysis to the nest is a key driver Gantry cranes need to analyze and remove nesting opportunities for Osprey. Recommends that we meet with Cathy Clark, who was unable to attend today's meeting. Fish The presence of Atlantic and shortnose sturgeon are well documented from the project site down to the C&D canal. Both are listed on the federal registry and are on the NJ State's endangered species list. Part of the analysis needs to deal with identifying the volume of annual vessel traffic, type of traffic and suggest means of reducing the potential for fish and turtle strikes. The spawning of striped bass is also a concern as well as ballast water intake and the control of or minimization of the introduction of invasive species. Requirements such as environmental protection measures during the intake of ballast water while at the wharf or alternative means of taking on water via other sources than the river (e.g. BP groundwater by-pass opportunity) Vegetation SAV (submerged acquatic vegetation) within Mantua Creek and Little Mantua Creek needs to be surveyed / delineated. SAV exists from MHW down to -6 ft. Public Access Access is a requirement. The addition of a fishing pier is possible. How is recreational boating impacted, if at all? Are there homeland security issues / impacts? Additional impacts may include water quality and air impacts, beneficial reuse of materials is a positive and rail improvements could generate impacts along the alignment.			
M02-08	**Mitigation Banks** Seemed to be consensus within the group that none are			

	available. Process is to identify and quantify the impacts, then identify what the mitigation requirements are.			
M02-09	**Green Acres Program** The proposed public use area, known as the potential restaurant / marina / waterfront development has the potential to attract green acres funding. Green acres funding is in a loan format.			
M02-10	**NJ DEP (Waterfront Development)** As noted above, this permit requires some form of public waterfront access be included in the project. The access does not necessarily have to be integrated within the project footprint (for example, due to homeland security issues). Suggestions were made to partner with a local municipality to identify preferred alternatives.			
M02-11	**NJDEP – Remediation (Site Case Manager)** In general, the proposed development seems to be in-line with the remediation process although BP has not proposed any remediation in the waterfront area or within the areas identified as to be filled but have proposed containment of the groundwater. A key distinction needs to be presented that indicates what components of the development are designed to enhance remediation and which components are designed for the development. DEP has the authority to require certain engineering controls be implemented to achieve remediation. The timing is good for supporting / determining RAWP items. DEP anticipates returning comments to BP in Nov 07.			
M02-12	**NJDOT** The DOT has provided a $16 million local grant for the overpass project. The DOT has received the EO215 - Environmental document from T&M. Review by the DOT is underway.			
M02-13	**Public Utilities** Funding support may be possible for extending existing utilities to the site. Alternatively, utilities can negotiate directly with the user to provide the infrastructure at reduced or no cost in exchange for future service agreements. In smaller or more rural areas, the typical process is for a developer to provide a deposit which is paid back over time. Various renewable energy incentives ($$$ - offsets) are also available. Suggests looking at njcleanenergy.com for further information.			

M02-14	**Smart Growth** Various initiatives are available, which in general require the Borough or the County to meet with the State. Specific items that may assist include: Adjacent Sites / Access grants, Water quality management grants, smart future planning grants etc. A follow-on informational meeting is suggested between the project stakeholders and the Office of Smart Growth.			
M02-15	**Labor** Further down the development timeline, the Labor Department can assist with initiatives to attract and recruit staff for either construction or operational phases, including support via training grants. Labor department will support both public and private sector initiatives.			
M02-16	**Government Authorities Unit (GAU)** A key question for the GAU is how does Paulsboro fit within the overall SJPC and regional port growth operation?			
M02-17	**Storm water** The terminal and overpass construction aspects will require individual storm water permit requirements, which will be processed via the Gloucester County Conservation District. Storm water permits will require control measures for items such as oil and particulate separators. Design of these and other control measures need to be designed into each facility. It was also suggested to review recent Best Management Practices for high particulate items including stormwater control basins and other means to minimize potential for exceeding discharge limits.			
M02-18	**Next Meeting** Follow-on sub-meetings with each of the State and Federal agencies is highly suggested. Due to the tight timeframe (18 months), these meetings need to be expedited (e.g. scheduled throughout the next several months).	TBD		Open

The foregoing minutes constitute our understanding of the matters discussed and the items suggested for follow on actions. These meeting minutes are intended for internal team use ONLY and not for distribution to all parties in attendance. You are requested to review these items and advise the undersigned, in writing, of any errors, additions or omissions within 5 calendar days of receiving these minutes.

Prepared By: Marlin Peterson
Date Issued: October 8, 2007

T&M Associates

To: Record

From: Richard F. Hernon, PE

Cc: Staff Attendees from SJPC, GCIA, Gloucester County, DMJM+Harris, Pennoni & T&M

Date: June 11, 2008

Subject: Notes From JPP Meeting

A JPP meeting was held at NJDEP this date and in attendance were:

- Sam Reynolds – Chief of Applications Section, USACOE
- Michael Hayduk – Biologist, USACOE
- Larry Slavitter – Biologist, USACOE
- Gary Heyer – Bridge Section, USCG
- Robert Montgomery – Environmental Scientist, USEPA
- Janet Stewart – Acting Supervisor, NJDEP Land Use Regulation
- Allison Giehl – Project Manager, NJDEP Land Use Regulation
- David Risilia – Project Manager, NJDEP Dredging Unit
- Don Wilkinson – Biologist, NJDEP Fish & Wildlife
- Joseph Balzano –Chief Executive Officer, SJPC
- Gerald White – Deputy Administrator, Gloucester County
- Marlin Peterson – Director of Port Development, GCIA
- George Strachan – Administrator, GCIA
- Phillip Girandola – Project Manager, Terminal Design, DMJM
- Lance Comas – Project Manager, Terminal Environmental Permitting, DMJM
- Kevin Pierce – Vice President, DMJM
- Timothy Hand – Planning Department Manager, DMJM
- Ted Januszka – Project Manager, Access Road Design, Pennoni
- Seth Gladstone – Environmental Task Manager, Access Road, Pennoni
- Richard Hernon – Chief Engineer, T&M Associates

A hard copy of the Power Point Presentation was handed out, and Marlin Peterson made the presentation. The presentation was interrupted in order to allow Don Wilkinson to ask questions and make comments. In addition, he also provided Marlin Peterson with a copy of written comments from Karen Greene of the National Marine Fisheries.

Wilkinson's comments and questions were:

- Asked the status of the Ferro site – he understands that the LNG terminal may shift to there – Marlin stated that this would require 2 million cubic yards of dredging
- Advised that the University of Delaware is studying Atlantic Sturgeon – the study involves Hal Brundage and Doctor Fox – he's not sure where the Atlantic Sturgeon spawning area is – 100 Atlantic Sturgeon come up river each year and 10 are hit by ships (10%) – need method(s) to reduce the hits.
- The use of discharge from the on-site treatment plant to provide ballast for the empty ships in lieu of drawing the water from the river was discussed – he would like data on the #/? of ships that needing ballast intake at the proposed terminal – Joseph Balzano advised that very few ships in his current operations require ballast.
- He stated that Juvenile Striped Bass are in this area.
- Filling and sheeting in the NW corner of the site will result in the loss of habitat of 600 feet by 700 feet in a nest buffer.
- Old barges sunk in the river serve as habitat.
- Asked the depth of dredging in the NW corner – response was 20 feet.
- Asked the number of piles – response 1,600 to 1,800.
- Access road bridge piers should be out of channel – they are.
- Suggested this project consider combining with the Dupont Repauno mitigation – includes flood protection, wetland restoration (from tidal to freshwater upland), submerged aquatic vegetation – 500 acres involved – after he left both M. Hayduck and J Stewart expressed reservations about becoming involved in this site as because impacts could be significant including changing the chemistry of the water.
- Construction restriction on Eagle Nest, if they exist in the area, is 12/15 to 7/15.

David Risilia comments and questions:

- Project is heading in the right direction – NJDEP leans toward pile supported structures and minimizing dredging – M. Hayduk concurred.
- Asked if the wharf structure could be canted into the river at the North end to reduce dredging – will be considered.
- Question the statement that the BP facility did not have to do any maintenance dredging in the 20 years before they shut down (1975 to 1995) – M Peteson advised he had three historic bathymetric surveys that demonstrates this assertion.
- Suggested that the dredge sampling plan and soil evaluation be submitted.
- Asked about the BP site contamination – advised that there are hot spots to be removed and the groundwater treatment would be on going.

Michael Hayduk comments and questions:

- Asked why the access road is not on a viaduct or supported by retained fill to reduce the wetlands – viaduct option is cost prohibitive (triple the cost) and retained fill in most of the route would not gain much in impact reduction as the fill from grade to the roadway profile is shallow (4 – 6 feet).

Sam Reynolds comments and questions:

- Asked when the JD will be submitted – by the end of the month.
- Advised that the JD should include the potential mitigation sites. He suggested the same for the LOI's – J Stewart advised that some of the site listed already have LOI's.
- Advised that the USF&W was not at the meeting and they should be sent a copy of the Power Point Presentation – they will be concerned about contamination – they maybe concerned with the Short Nosed Sturgeon.
- Asked if there is any Federal Aid funds in the project – advised no – he wants proof G Strachan will send him a copy of the NJDOT letter stating no federal funds involved.
- At the request of which agency will be the Lead Federal Agency, advised they agencies will have to decide.
- Advised that he will speak to his Branch leader to determine an EIS will be required.

Based on discussion, it was decided that the agencies should review the presentation package and provide comments to GCIA by the end of June. Once GCIA has digested the comments, another meeting should be scheduled with the interested parties. Also, its best if separate meetings are not held with individual agencies.

T&M Associates

Memo

To: Record

From: Richard F. Hernon, PE

Cc: Staff Attendees from SJPC, GCIA, Gloucester County, DMJM+Harris, Pennoni & T&M, Ted Januszka, Phillip Girandola, Kevin Pierce, and Lance Comas

Date: October 22, 2008

Subject: Notes From JPP Meeting

A JPP meeting was held at NJDEP this date and in attendance were:

- Sam Reynolds (SR) – Assistant Section Chief, USACOE Regulatory Branch
- Michael Hayduk (MH) – Biologist, USACOE
- Gary Heyer (GH) – Bridge Section, USCG
- Robert Montgomerie (RM) – Environmental Scientist, USEPA
- Janet Stewart (JS) – Acting Supervisor, NJDEP Land Use Regulation
- Chris Bergeman (CB) – Project Engineer, NJDOT Local Aid
- Lorelee Rappleye (LR) – Supervising Environmental Specialist, NJDOT BEA
- Vincent Maresca (VM) – Historic Preservation Specialist, NJDEP SHPO
- Joseph Balzano (JB) – Chief Executive Officer, SJPC
- Gerald White (GW) – Deputy Administrator, Gloucester County
- Marlin Peterson (MJP) – Director of Port Development, GCIA
- George Strachan (GDS) – Administrator, GCIA
- Phyllis Bross (PB) – Attorney, Parker McKay
- Seth Gladstone (SG) – Environmental Task Manager, Pennoni
- Richard Hernon (RFH) – Chief Engineer, T&M Associates

Public Outreach Meeting of September 30, 2008

MJP opened the meeting by passing out copies of the comments received at the public outreach meeting, and a summary of the comments received. He advised that the Gallenthin Realty Development (GRD) suggested a revised alignment that would cross Mantua Creek at the southeasterly property line of their property, and then proceed through the center of their (GRD) to Industrial Road. There reasoning was they needed tugboat access to their entire site.

MJP advised that this alternative alignment was reviewed and it increases impact on wetlands by 40%, and would impact the eagle foraging area. MJP also advised that this alignment would also be included in the environmental document. SR stated that this alternative alignment should be presented on structure, as well as on fill. SR also, this alternative alignment should also have a sub-alternative having the road along the railroad rather than the center of the property.

RM asked why GDR wants the alignment through the middle of their property. RFH stated that it would appear GDR would want to fill all the wetlands on their property and have buildings, other uses on both sides of the road. RM also suggested an alternate of increasing the under clearance of the bridge. GH requested information on vessel use of Mantua Creek.

MJP advised that the other most significant comments were that the new access road alignment removed the traffic and noise from the Paulsboro residences, and what is taking so long in implementing the new terminal.

Pilot Surcharge Program

SG made a presentation on the pilot program including the location, extent, and the settlement information being sought. LR asked about the history of the site. SG advised that a geomorphology study was completed in conjunction with the geotechnical program.

The pilot program is located on the portion of alignment that will not change. Also, should the project not proceed, the surcharge area would be restored. MJP gave a copy of the French and Parello soil report on the GCIA landfill material to the USACOE and NJDEP. A copy of the geomorphology report will be sent to NJDOT BEA and NJDEP SHPO.

SR stated that the USACOE will also need to issue a permit for the pilot program. SG gave a copy of the revised NJDEPE GP-14 permit application to MH, and will follow up with a permit application to USACOE. SR also asked if the material was being excavated specifically for the pilot program. MJP advised that this material was available from an existing stockpile of material excavated for the landfill. Therefore, the material does not need to be part of the permitting or environmental review process.

Letter of Interpretation/Jurisdictional Determination

MJP advised that now that all the LOI/JD application are filed, a field review of the delineations by the agencies will be scheduled sometime in late November, or early December.

MJP advised that part of the BP site remediation involves filling five ponds that were established in 1970's.

RM asked what was the areas of wetlands to be impacted by the project. MJP responded that about two acres of wetlands would be impacted by the access road, and 7 to 10 acres would be impacted on the terminal site. Open water fill would consist of the piles installed to support the wharf deck.

SR stated that the delineation maps need to include high tide line, wetlands line(s), and mean high water line. JS also needs on the map the mapped coastal wetland line(s), and any unmapped coastal wetlands line(s). SR stated that USACOE needs a statement that the delineation was based on the 1989 manual, and also meets the requirements of the 1987 manual. Otherwise the map should include two lines (1989 and 1987).

JS asked if Gallenthin had signed the LOI application. The application will be checked, however if not PB felt that the court order for entry on to the property should suffice. PB will send a copy of the court order to JS, and she will have it reviewed by the DAGs. A copy of the court order will also be sent to SR.

Baseline Ecological Evaluation (BEE)

MJP advised that eight proposals to perform the BEE were received by GCIA. Award of the BEE has been delayed due to GCIA had to seek clarification of some issues with the proposers. He further stated that the BEE should be awarded at the November Board meeting, and the successful firm would be available to meet with the agencies in late November.

The apparent successful proposer will use a methodology used in previous BEE studies in New York Harbor. The methodology consists of:

- Determining the habitat types and mapping them
- Ranking the habitat sites using a quality scoring system
- The results will be able to be compared with the post construction habitats

SR requested a USACOE contact that was familiar with this methodology used in the previous study. MJP will provide the contact to SR right after the notice of award is issued to the successful firm. In late November the successful firm will be prepared to make a presentation to the agencies, and obtain their input.

Marine Terminal Proposed Grading and Drainage Strategy

MJP presented the concept grading and drainage plan indicating the property would be graded from elevation 15 to 13 on the upland limits to elevation 11 to 11.5 at the water edge. The 100 year flood is at elevation 8.5. There would be outfall into both the Delaware River and Mantua Creek with treatment facilities. BP will continue to treat the groundwater. Tenants will provide additional water treatment should their operations warrant it.

JS requested the grading and drainage plan including the proposed outfalls and treatment. SR asked JS if the NJDEP remediation staff would be given deference; she responded

with a yes. SR advised he wants a clear distinction between the remediation impacts and development project.

MJP advised that BP has a groundwater remediation plan. JS advised that BP will have to obtain land use permits, a GP-4 for the fill and a GP-15 for coastal.

VM stated that based on a Hunter Associates Phase IA archeological report, the terminal site has potential archeological site, and a Section 106 process will be needed. VM also stated that a Billingsport historic group is very interested in this area. He indicated that a Phase I backhoe survey will probably be needed. BP may be required to perform the backhoe survey on their property if they are responsible for the fill (cap).

The Essex Chemical site has a No Further Action (NFA). However, the NFA did not include the dredge fill area and the landfill area that may still need remediation. SR indicated that the capping of the Essex Chemical site may not be treated by the USACOE in the same manner as the BP site because the remediation was voluntary, not the result of a legal action. PB indicated that the remediation of the Essex Chemical site would likely be performed under and Memorandum of Agreement with NJDEP, and may not necessarily be considered voluntary.

MH suggested a pre-application Section 106 process. This would consist of providing the USACOE with information including: delineation of the permit area (similar to the area of potential impact), a public participation plan, and cultural resource investigations.

VM requested what information was available about the archeological significance of the area to be dredged. MJP advised that a multi-beam scan was performed and no evidence of wrecks was found. A copy of the scan results will be sent to VM.

Marine Terminal Dredging

The proposed dredging will provide the depths needed for three ship berths and one barge berth. The two southerly berths will require approximately 75,000 cubic yards of dredging of sandy material. This material would be loaded onto a barge, dewatered, and then used as fill on the terminal property above the cap.

The third berth would be dredge to depth of 40-feet, and the barge berth would be excavated to a depth of 20-feet. In both of these berth areas the soil consists of 20 to 25-feet of silty soil, underlain by sand. The dredge volume from these area is estimated to be 550,000 cubic yards. It is proposed to dispose of the silt material excavated at White's Basin, and process the sand material in the same manner as the other two berths. The dredged sand used as fill on site will be blended with the soil from the GCIA landfill.

SR stated that a water quality certificate will be required for disposal of the dredged material in White's Basin.

GH stated that the structures connecting the land and the wharf deck may be considered "bridges" under USCG regulations. He suggest an advance approval be sought. The advance approval application will include: bridge plan, description, pile foundation plan, height above water, and other required information.

Schedules

MJP handed out the following schedules:

- Environmental Permit Process
- Earthwork Preparation

MJP stated the following would be added to the schedules:

- Section 106 Process
- USCG Advance Approval Process

Next Meeting

The agencies requested MJP send out dates for the next meetings. The next meetings to be scheduled in late November are:

- Remediation meeting including BP
- A BEE meeting – presentation and discussion

Summary of Meeting Minutes
Port of Paulsboro Project

Meeting Date:	11 December 2008
Attendees:	Dave Risilia, NJDEP Office of Dredging and Sediment Technology, Karen Greene, National Oceanic and Atmospheric Administration (NOAA) Mike Hayduk, U.S. Army Corps of Engineers (USACE), Philadelphia District Marlin Peterson, Gloucester County Improvement Authority (GCIA) Phil Girandola, AECOM, Inc. Seth Gladstone, Pennoni Associates, Inc. Paul Bovitz, Weston Solutions, Inc. (Weston) Ryan Brown, Weston

Objective:

The objective of the meeting was to discuss the methodology by which alternatives may be compared, and by which mitigation requirements for the proposed project can be determined and agreed upon.

Initial Project Summary:

- Marlin Peterson, on behalf of the South Jersey Port Corporation (SJPC) and the GCIA provided (1) a brief overview of the site's existing conditions and previous / current remedial actions and (2) discussed the proposed redevelopment project including roles and responsibilities and potential impacts (in acres) resulting from dredging, shading, and placement of fill material within open waters of the Delaware River and Mantua Creek.
- The forested wetland in the northeastern corner of the proposed terminal is proposed for capping as a remedial action to address contaminated dredged material deposited historically by others.
- The wetland in this area has been impaired by historical disposition of dredged material.
- About one third of the area proposed for dredging was previously dredged to facilitate BP Terminal's receipt and distribution of internationally sourced petroleum based products.
- Weston presented proposed methodology for evaluation of aquatic impacts, consisting of HEP procedures to evaluate 3 selected fish species previously

recorded in the area as abundant and input results in the mitigation formula presented by King (2004).

Key Issues and Action Items:

General:

- The group agreed that evaluation of impacts will focus on those impacts with regulatory implications, e.g. wetlands and shallow water habitats. No evaluation of upland habitat value is proposed.
- Wetland mitigation requirements will be determined by regulatory requirements. Current state regulations require 2:1 mitigation for forested wetlands.
- A single individual permit will be required to address wetland impacts associated with the redevelopment project itself.
- There are few widely accepted methodologies for evaluation of aquatic mitigation. NOAA, USACE and others will consider Weston's proposal and get back to GCIA / SJPC. In general, the agencies agreed the HEP approach would be adequate using three indicator fish species, but needed more time to study the King (2004) approach for converting the data into mitigation requirements.

Northeastern Forested Wetland Area:

- Dave Risilia and USACE both agreed to contact NJDEP Bureau of Land-use Regulation in order to review the quality of the wetlands, and determine if portions may now be acting as uplands. Dave, Mike and NJDEP personnel tentatively plan to walk the boundary on December 22, 2008.
- GCIA is in the process of conducting a preliminary assessment (PA) of existing contaminant data and anticipate submitting a PA to NJDEP Site Remediation in support of the executed MOU. Based on the PA findings, additional site investigation (SI) & remedial investigation (RI) activities may be necessary to establish a preferable Remedial Action Work Plan (RAWP) for the proposed remediation alternatives to address exceedances of metals and other contaminants in soil.
- If Site Remediation agrees that capping is appropriate for the forested area, GCIA anticipates submittal of an application for a General Permit #4 and mitigation for the remedial action for any wetlands to be impacted.
- A meeting with NJDEP's mitigation personnel is warranted to discuss mitigation alternatives after the area is delineated. January 28, 2009 is proposed as the date for this field meeting.
- From USACE's perspective, the proposed capping action may qualify for a nationwide 38 permit; Mike Hayduk to follow up.

Aquatic Impacts from Dredging:

- In order to assess project impacts, the SJPC / GCIA will compare bathymetry data to existing definitions of intertidal, subtidal and shallow water habitats in order to quantify potential acreage impacts.
- In addition to acreage, the SPC / GCIA will compare bathymetry data and prior dredging depths to proposed dredging depths to quantify the extent of impact to intertidal and subtidal habitats.
- Once these impacts are known, and agency concurrence is received on the proposed habitat evaluation methodology, the team will evaluate alternatives and determine the appropriate acreage of mitigation required by habitat type.
- At the January 28, 2009 meeting GCIA hopes to achieve consensus with the reviewing agencies regarding the methodology to be adopted in deriving mitigation requirements.

Fish Issues:

- NOAA raised the issue of both Atlantic and short-nosed sturgeon in the Delaware River, indicating that the SJPC / GCIA would need to furnish information regarding whether the *Corbicula fluminea* clam is present within the study area. In support of Atlantic and short-nosed sturgeon research, the SJPC is acting as the non-federal sponsor of the Delaware Estuary Sturgeon and Oyster Study. The purpose of this study is to examine the effects of flow dynamics, salinity and water quality on the eastern oyster, the Atlantic sturgeon and the shortnose sturgeon. The study will focus on the oligohaline zone, which supports essential habitats for juvenile anadromous fish and critical disease refuge for oysters.
- Marlin Peterson indicated that vessels were not planning on using ballast water. Dave Risilia mentioned that most intakes are well below the water line and Marlin agreed to look into it.
- The ESA consultation process will need to be followed.

T&M Associates

Memo

To: Attendees

From: Richard F. Hernon, PE

Cc: Chris Bergeman, Vincent Voltaggio, Kevin Pierce, and Lance Comas

Date: March 6, 2009

Subject: Notes From JPP Meeting

A JPP meeting was held at NJDEP this date and in attendance were:

- Michael Hayduk (MH) – Biologist, USACOE
- Gary Heyer (GH) – Bridge Section, USCG
- Karen Greene (KG) – Fishery Biologist, NOAA/National Marine Fisheries
- David Risilia (DR) – Project Manager, NJDEP Office of Dredging & Sediment Technology, South
- Vincent Maresca (VM) – Historic Preservation Specialist, NJDEP SHPO
- Gerald White (GW) – Deputy Administrator, Gloucester County
- Marlin Peterson (MJP) – Director of Port Development, GCIA
- Phillip Girandola (PG) – Project Manager, AECOM
- Timothy Hand (TH) – Environmental Task Manager, AECOM
- Ted Januszka (TJ) – Project Manager, Pennoni Associates
- Paul Bovitz (PB) – Ecologist, Weston Solutions
- Richard Hernon (RFH) – Chief Engineer, T&M Associates

Attachments:

- SJPC/GCIA JPP Meeting – Follow Up Port of Paulsboro March 6, 2009 Power Point Presentation
- Draft BEE Report Tables

Project Overview/Update

MJP began the meeting with a recap of the environmental process completed to-date such as the BRIT meeting in Oct 2007 followed by a series of JPP meetings in June 2008 thru Dec 2008 to current (Mar 2009). In addition, MJP provided an overview of the project and an update of activities since the last JPP meeting.

USACOE Enforcement Section

The USACOE enforcement case was discussed. The USACOE is moving to wrap up the case and does not anticipate the issuance of fines or other actions. Elements of the case are:

- Borings in the Mantua Creek – Coastal Zone Management (CZM) was approved, but a Section 401 was not issued
- Land borings – fully comply
- Borings in the Delaware River – are considered part of a dredging application

At issue seems to be an inconsistency between State and Federal regulations. Sam Reynolds, USACOE Chief of Regulatory Branch is looking to close the case. To achieve this objective, MH asked NJDEP to issue a concurrence letter or email for 401B and not inconsistent with CZM regulations.

On a separate but related issue, MJP advised that the GCIA is in the process of rectifying an oversight by obtaining each of the property owner's signatures on the LURP General Permit 12 for the access road and bridge borings. Once obtained, a revised GP12 permit application will be forwarded to the NJDEP for file purposes.

Terminal Site Hazmat Remediation

MH asked if "Brownfields" means the site (BP and Essex Chemical) will be capped with fill prior to Port Redevelopment. MJP responded that the Essex site is ready for redevelopment, and the BP site continues to be remediated by BP. There are fourteen (14) remediation management units on the BP site of which the first unit (groundwater remediation) remedial action work plan (RAWP) has received NJDEP approval. The upland remediation will follow with BP submitting the RAWPs for the thirteen (13) remaining remediation units between May 2009 and October 2009.

MH advised if regulated work was required on the BP site, the activity could be under a Nationwide Permit 38. MJP advised that the fill on the Essex site will be done as part of the Port Redevelopment.

Gallenthin Realty Development (GRD)

GH asked the status of the issues with GRD. MJP advised that GRD's legal complaint against the Borough of Paulsboro / Gloucester County in Federal Court was recently dismissed (26Feb2009). In support of the Access Roadway and Bridge project, property appraisals are underway and the commencement of good faith negotiations is targeted for April 2009. GH asked for a written update. GW will send a copy of the court documents to USCG and have Archer Greiner contact GH.

Action:

- **GW to send court documents to GH and have attorney contact him.**

Mantua Creek Bridges

GH advised that the Route 44 Bridge Over Mantua Creek has been re-regulated to require four hour advance notice for openings year round.

MJP advised that the Port of Paulsboro project team is looking to change the procedure for opening the Conrail Bridge Over Mantua Creek. Trains now come to the bridge, stop, and then radio Pavonia Yard to remotely close the bridge. This process results in significant traffic congestion in both the morning and afternoon timeframes within the Borough of Paulsboro. Per discussion with CSX and Conrail, a possible solution, which the USCG is familiar with at other locations, is to install CCTV (cameras) that provide live feeds to Pavonia Yard. The 'live' camera pictures enable the dispatcher to view that no objects / people are within the perimeter of the bridge movements and therefore can commence bridge closing procedures while the train is approaching. This change would eliminate or significantly reduce the need for the train to stop and therefore block vehicular traffic both in Paulsboro as well as to the Paulsboro Marine Terminal access road. GH asked for a letter making the proposal.

Action:

- **MJP send a proposal for the change in the operation of the Conrail Over Mantua Creek Bridge.**
- **GH to provide available USCG best management practices (BMP) re: CCTV operations following request from GCIA**

Marine Terminal Project

MJP discussed Alternate No. 3 - the "bend" alignment of the wharf - that is approximately 2,350 linear feet, provides 3 berths, has 1,800 piles, and an upland retaining wall. DR asked about railroad access on the wharf and MJP used a plan to show him the location.

The schedule of implementation was requested. MJP stated that the initial development would include the BP site and two berths, and a second phase implementing a third berth on the Essex site. The full build out should occur between five and seven years. MH indicated that the USACOE permits are generally valid for a period of three years, however, if requested, this project could be provided with a permit that is valid for a period of ten years.

GH requested the schedule for the access road and bridge, and MJP advised that the construction period was 1-1/2 to 2 years. GH advised that a public notice for the advanced approval for the trestles connecting the upland with the wharf will be issued, and then the advanced approval will be issued.

DR indicated that the environmental document should include an alternatives analysis for the proposed rail trestle that serves the terminal's central rail storage and loading track

since this additional open water 'coverage' element may not be necessary for terminal operations.

MH advised that alternates studied need to be recapped with reasons why each was not selected. Off-site alternatives also need to be considered. MH recently saw an article on another proposed southern New Jersey port in the area. GW advised that initiative (i.e. Gibbstown / Repauno) is in the very early stages with no agreements to-date with Dupont – the current land owner. Paulsboro is the priority port. A potential follow-on port in Gibbstown fits with the two port strategy, but cautioned that it is only a concept at this time. MJP advised that the Paulsboro site was selected (over Gibbstown and other alternatives) as the preferred location because it has existing in-water facilities (i.e., two existing berths), requires less capital dredging, is an existing industrial property, adjacent labor force and executed redevelopment and long-term lease agreements.

MH advised that the Purpose and Need Statement is very important. DR suggested the analysis begin with the region and work to the site in the alternative analysis.

Wetland Delineation Summary

MJP reviewed the schedule to date of the wetlands delineation verification and that a field meeting will be held on March 24, 2009 to finalize the acceptance of the Marine Terminal and Access Road and Bridge (west side of Mantua Creek) delineations.

Baseline Ecological Evaluation (BEE)

PB described the BEE methodology and draft findings for the project (slides are attached in the Power Point Presentation). Three indicator species were selected because they have the most reliable models and data from the Delaware River; they are Striped Bass, Blueback Herring, and Juvenile Atlantic Croaker. A model was used to evaluate the habitat quality, and assign a quality score. The impact acreage is multiplied by the quality score to calculate the Annual Average Habitat Unit (AAHU). The AAHU were used to rank the terminal alternatives.

Potential impacts were calculated for: open water dredging, intertidal (spring high to four feet below mean low water) and subtidal (mean low water to four feet below), and piles. Alternate 4 had the least total impact (32.1 acres) followed by Alternate 3 (32.6 acres) whereas Alternate 2 had the most impacts (53.6 acres).

PB indicated that there is a freshwater wetland impact of approximately 1.2 acres on the terminal site for a total of roughly 4.7 acres when the 3.5 acres of impact due to the access road is added (pending field verification planned for March 24, 2009).

DR asked for the area of the piles. PG responded 0.17 acres. DR also asked about the location of the riprap revetment. PG pointed out the location on a section of the plan and stated the riprap for the proposed berths 1 and 2 would follow the alignment of an existing slope area. KG asked for the pile spacing. PG advised 8-9 feet.

The question of why Alternate 3 (bent wharf) was preferred over Alternate 4 (straight wharf). MJP gave the following reasons:

1. Navigation concerns – two primary issues (1) barge movements into / out from Mantua Creek and (2) run-away vessels within the Delaware River. The site is located on a bend in the Del River. Just upriver / adjacent to the site is the NuStar Asphalt Plant followed by the Mantua Anchorage, which is primarily used for barge mooring / layup, whereas just downstream is the Marcus Hook Anchorage, which is heavily used for ship mooring / waiting for berth availability. Per discussions with river pilots, tug assisted barge movements into Mantua Creek are difficult due to limited creek channel dimensions (i.e. +/- 100ft wide) and swirling or confused currents generated from the confluence of the river and the mouth of the creek combined with abrupt changes in water depth along the shoreline. Evidence of swirling currents at the mouth of the creek is displayed by the circular deposition of the existing mud-line. Introducing Alt 4's wharf extension will further complicate the movements by having to navigate from the south (down-river) around the end of the wharf and into the creek's navigation channel whereas Alt 3's bent wharf is located south and 'behind' the existing USACOE jetty that demarks the entrance to the creek. Moving Alt 4's wharf alignment further south or down-river is not an option because the southern extension will intrude on the adjacent Paulsboro community.

2. Security of roadway / rail trestle at the northeast end of the wharf is a vulnerability since vessel activity is focused on the riverside thereby exposing the trestle and pile supported wharf from attack from the creek.

3. Safety – Mantua Creek boats entering and leaving the creek will need to navigate the Alt 4 wharf extension prior to obtaining open water of the Del River. The pleasure craft will be susceptible to the same swirling current. In addition, as a boater travel down creek to access the river, lights atop Alt 4 Wharf for operating purposes may confuse the boater from navigation lights along the existing jetty and creek's channel markers.

4. Less tidelands license/grant area required

5. Debris and potential ice flows would more likely be caught by Alternate 4 thereby increasing annual maintenance and facility repair costs

PG stated that Alternate 4 would also require more piles. PB stated that Alternate 4 has less intertidal impact but more open water impact.

KG and MH advised that the open water between the wharf and the upland needs to be addressed in the environmental document. PG stated that water would circulate (be exchanged) in this area. PB stated that what the affect of the ship in berth would have on

the fish use of this open water area. As an industry rule, MJP advised that the terminal is targeting 70% vessel occupancy for each berth.

DR asked if there would be discharge of ballasting, and MJP advised no.

GH stated that Alternate 3 looks to be the best from a USCG safety and security perspective.

MJP asked if the USCG had any plans for the jetties on site. GH said he would check.

Access Road Wetlands Mitigation Approach

TJ, using 1930 and 2007 aerials, indicated that the concept mitigation would take advantage of existing hydrology. The concept contains tidal wetlands, freshwater wetlands, and four ponds. Pond elevations would be at 4.7; the elevation of ponds in the area.

MH advised that to ensure that the excavation does not expose contaminated material, and to develop the wetlands to allow influx of flow from Mantua Creek.

VM was concerned about potential archeological resources in the mitigation area. He wants a geomorphologist to observe the borings.

DR suggested that the mitigation allow for circulation in and out of Mantua Creek to the proposed site.

Those in attendance agreed that the concept was headed in the right direction. MJP advised that the terminal freshwater wetland mitigation may be included in the site. However, the mitigations were being kept separated for funding purposes.

PB suggested mitigation of intertidal impacts could consist of enhancements and addition of elements such as fish domes. KG needs information on the success of the fish domes installed as part of a Hudson River project.

PG suggested recreating some of the old Mantua Creek channel. MH stated such creation could go toward intertidal mitigation. KG advised that such a channel(s) need to be at least four feet deep for fish.

Action:

- **PG – provide KG with information on the success of the fish domes.**

DR advised that there is a need to provide public access to the water from the upland (i.e. Public Trust Rules). MJP stated that there is a proposed buffer/waterfront access along Mantua Avenue. DR stated that the access must be perpendicular and parallel to a waterway. It can also be on-site or of-site. MH suggested a boardwalk through the wetlands that may require USACOE permits.

Section 106 of the National Historic Preservation Act

MJP made a presentation of existing historic information including previous cultural resource studies. MJP provided VM with copies of cultural resources studies of the BP and Essex sites, and ownership history of the sites. He also provided VM with a plan showing the water depths and targets (i.e., anchors) obtained by side multi-scan.

The possible need for an underwater archeological survey using multi-beam / side-scan technology combined with a magnetometer, and the need for borings observed by a geomorphologist were discussed. It was decided that because the much of the area had been previously dredged (for BP operations, adjacent Nustar operations and to re-align / straighten / deepen Mantua Creek) that only project areas not previously dredged would need the underwater survey. Also, since the terminal site is, or will be, a capped remediation site with deed restrictions, or areas that had already been disturbed by industrial uses (tank farm), no Phase IB survey will be needed. VM requested documentation of the previous dredging in the project area.

MH advised that the Federal agencies will have to agree on a "permit area" that will consist of ground disturbance and dredge areas. This permit area should determine the potential for shipwrecks and other archaeological resources and would include the proposed Marine Terminal, Access Road, and mitigation sites. VM indicated that a Terrestrial Phase 1 survey would be required for all areas that are or will not be Deed Restricted (i.e., the aquatic area less previously dredged areas and the mitigation site).

VM advised that there are two approved underwater archeological survey firms if such a survey is needed; they are Lee Cox (Philadelphia) and Robinson (New York).

MH noted that he would investigate if they have additional Athos findings, other than those included in the NOAA report.

Action:

- **MJP submit a draft of the "project permit area", draft proposed cultural resources survey (e.g. Terrestrial Phase I for mitigation areas including geomorphology and aquatic survey of non-previously dredge areas), and draft Public Participation Process to the USACOE and USCG with cc to VM.**
- **MJP arrange for records of previous dredging on the site be forwarded to the NJ SHPO.**

Project Permit Schedule

MJP discussed the proposed permit schedule leading to the receipt and response to public comments in September 2009.

MH stated that if BP needs any permits to perform their remediation activities, they need to apply for them quickly.

Pilot Settlement Program

MH advised that the pilot settlement program is not eligible for a Nationwide Permit #6; it requires an individual permit. Further once the enforcement case is closed, it would take 60 days to process the individual permit. MH suggested moving the settlement fill to an upland where no Federal permit is required.

Action:

- **TJ determine if location the fill to the upland will provide useful information**
- **TJ prepare and submit revised GP12 application and plans for the fill in the upland location**

Bridge Plans

Per GH's request TJ will provide him with the bridge plans.

Action:

- **TJ send GH a copy of the bridge plans.**

Please advise within 7 days if there are additions and/or corrections to these minutes.