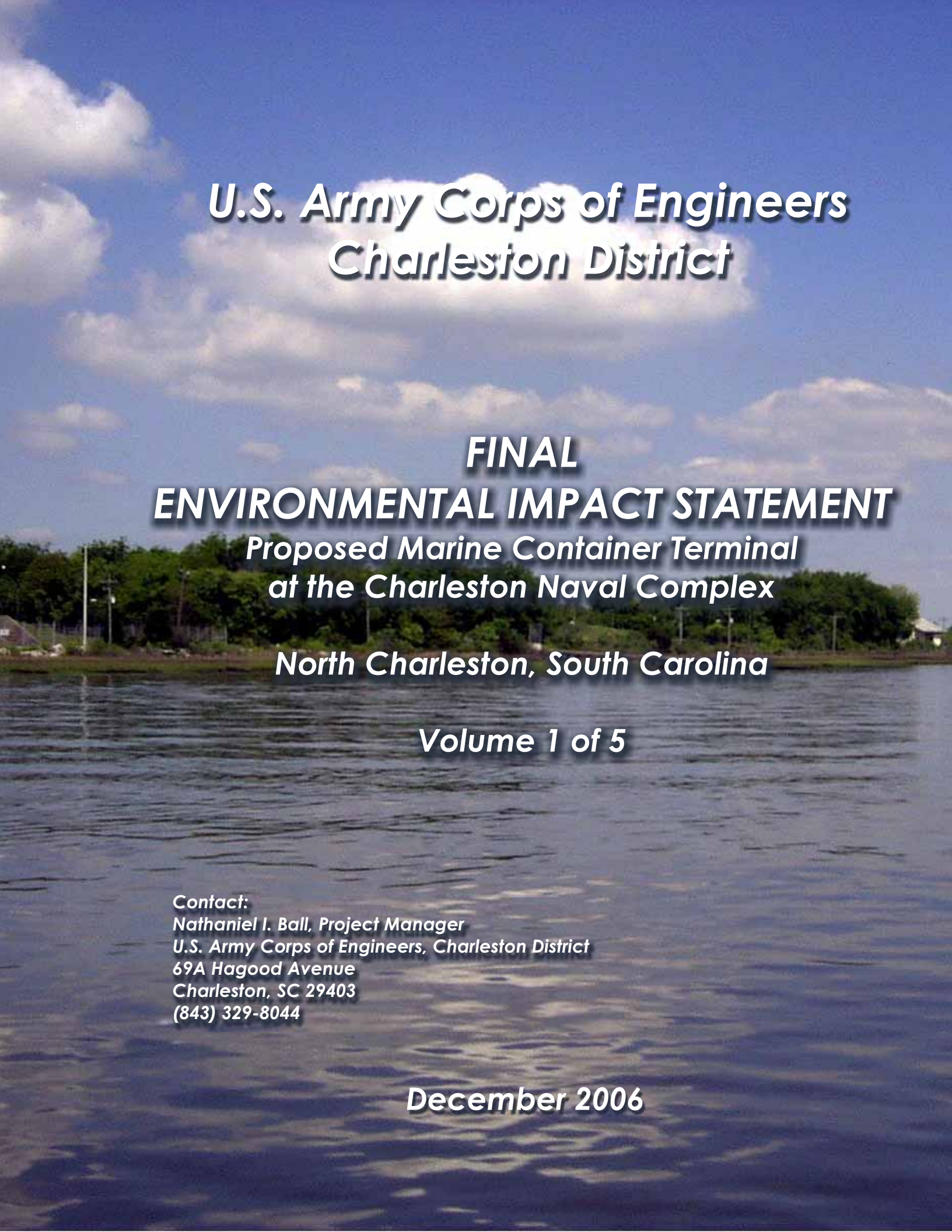


U.S. Army Corps of Engineers
Charleston District

FINAL
ENVIRONMENTAL IMPACT STATEMENT
Proposed Marine Container Terminal at the Charleston Naval Complex

North Charleston, South Carolina

Volume 1 of 5

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EXECUTIVE SUMMARY

This Final Environmental Impact Statement (FEIS) provides a comprehensive environmental analysis of a proposed marine container terminal and a proposed access roadway in North Charleston, Charleston County, South Carolina. The FEIS evaluates the potential environmental consequences of developing the proposed port facility and related actions, as well as reasonably foreseeable future conditions.

The U.S. Army Corps of Engineers (USACE), Charleston District has prepared this document to aid in evaluating an application for a Department of the Army (DA) Permit submitted by the South Carolina State Ports Authority (SCSPA) regarding the proposed port facility. In addition, the South Carolina Department of Transportation has submitted an application for a DA permit to construct an access roadway between the proposed port facility and Interstate 26, which is considered a related activity.

This FEIS was prepared in accordance with Corps of Engineers regulations (33 CFR Part 325, Appendix B), 404(b)(1) Guidelines for the Specification of Disposal Sites for Dredged Material (40 CFR Part 230), and Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508) for implementing the National Environmental Policy Act (NEPA). USACE is the lead agency for this FEIS, with Federal Highway Administration serving as a cooperating agency.

This Executive Summary consists of the following sections:

- A description of the Proposed Project,
- A description of the need for and purpose of the Proposed Project,
- A description of the alternatives considered in the EIS,
- A description of public involvement during the preparation of the EIS,
- A description of changes to the Proposed Project since the publication of the draft EIS,
- A description of potential environmental consequences of the Proposed Project and the alternatives,
- A description of future steps in the permitting process.

THE PROPOSED PROJECT

The Proposed Project consists of the development of a marine container terminal and the associated roadway infrastructure at the former Charleston Naval Complex (CNC) in North Charleston, South Carolina.

PROPOSED MARINE CONTAINER TERMINAL

On January 24, 2003, the SCSPA submitted an application for a Department of the Army permit to construct a marine container terminal and support facilities at the former Charleston Naval Base. The Proposed Project consists of the development of a 287-acre port facility on the Cooper River, as shown on Figure ES-1. Copies of the original permit application and

modifications to the Proposed Project and permit drawings that the SCSPA submitted are included in Appendix C of the FEIS.

The conceptual layout of the proposed port facility is shown on Figure ES-2. The port facility consists of the following major components:

Wharf. The SCSPA proposes to develop 11.5 acres of wharf structure on the west side of the Cooper River, with a berth area 49 feet deep and 150 feet wide. This wharf would be developed with an estimated six container cranes with a minimum outreach of 200 feet.

Berth and Access Channel. The SCSPA proposes to develop a 65.8-acre berth and access channel. This area extends approximately 850 feet from the edge of the proposed wharf to the edge of the existing Federal navigation channel. The berth and access channel will be excavated to a total depth of -49 feet at mean low water (MLW), which is equal to the depth of the adjacent federal navigation channel.

Container Yard and Support Facilities. The SCSPA proposes to develop 225 acres of lighted, paved area for container processing and storage upland of the wharf. In addition, the SCSPA proposes to build 40 acres of paved area and buildings for support gate structures and other operations and facilities.

Improvements to Tidewater Road. The SCSPA proposes to make improvements to Tidewater Road to provide access to Cooper River Marina, which is owned and operated by Charleston County Parks and Recreation Commission. This new two-lane paved roadway will also provide access to an employee parking area for the proposed port facility.

Stormwater Management Facilities. The SCSPA plans to develop approximately 25 acres of stormwater management facilities at the Proposed Project. The runoff would be collected from the support area, container yard, wharf, and portions of Tidewater Road and routed to a stormwater treatment pond that will be constructed along the south side of the terminal.

PROPOSED PORT ACCESS ROAD

The South Carolina Department of Transportation (SCDOT) submitted a permit application on August 11, 2005 to construct an access roadway as part of the Proposed Project. The permit application from SCDOT was subsequently amended on July 14, 2006. Copies of the permit application and modifications to the Proposed Project and permit drawings that were submitted by SCDOT are provided in Appendix D.

The location of the proposed access roadway is shown on Figure ES-3. The access roadway consists of the following major components:

Port Access Road. The SCDOT proposes to construct a four-lane access roadway from the entrance of the proposed port facility to Interstate 26. The majority of the proposed roadway will be elevated on structure to minimize the potential impact to Shipyard Creek and existing roadway and railway infrastructure (Spruill Avenue, Meeting Street Road, CSX Cooper Yard, etc).

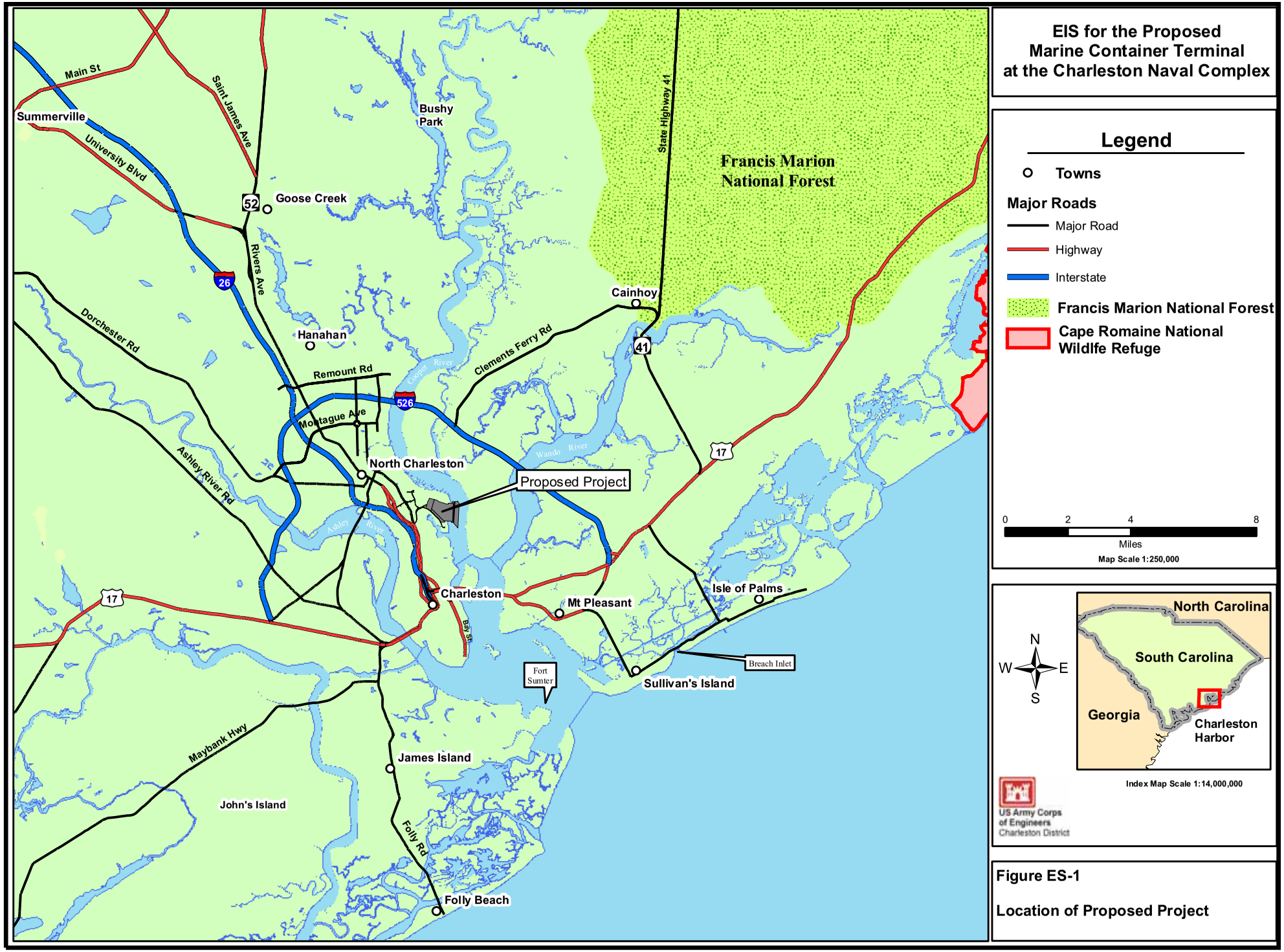
Meeting Street Interchange (Exit 217). The SCDOT proposes to rebuild the existing interchange in order to construct collector/distributor roads. These improvements consist of two additional lanes of traffic that are separated from the interstate by a concrete barrier,

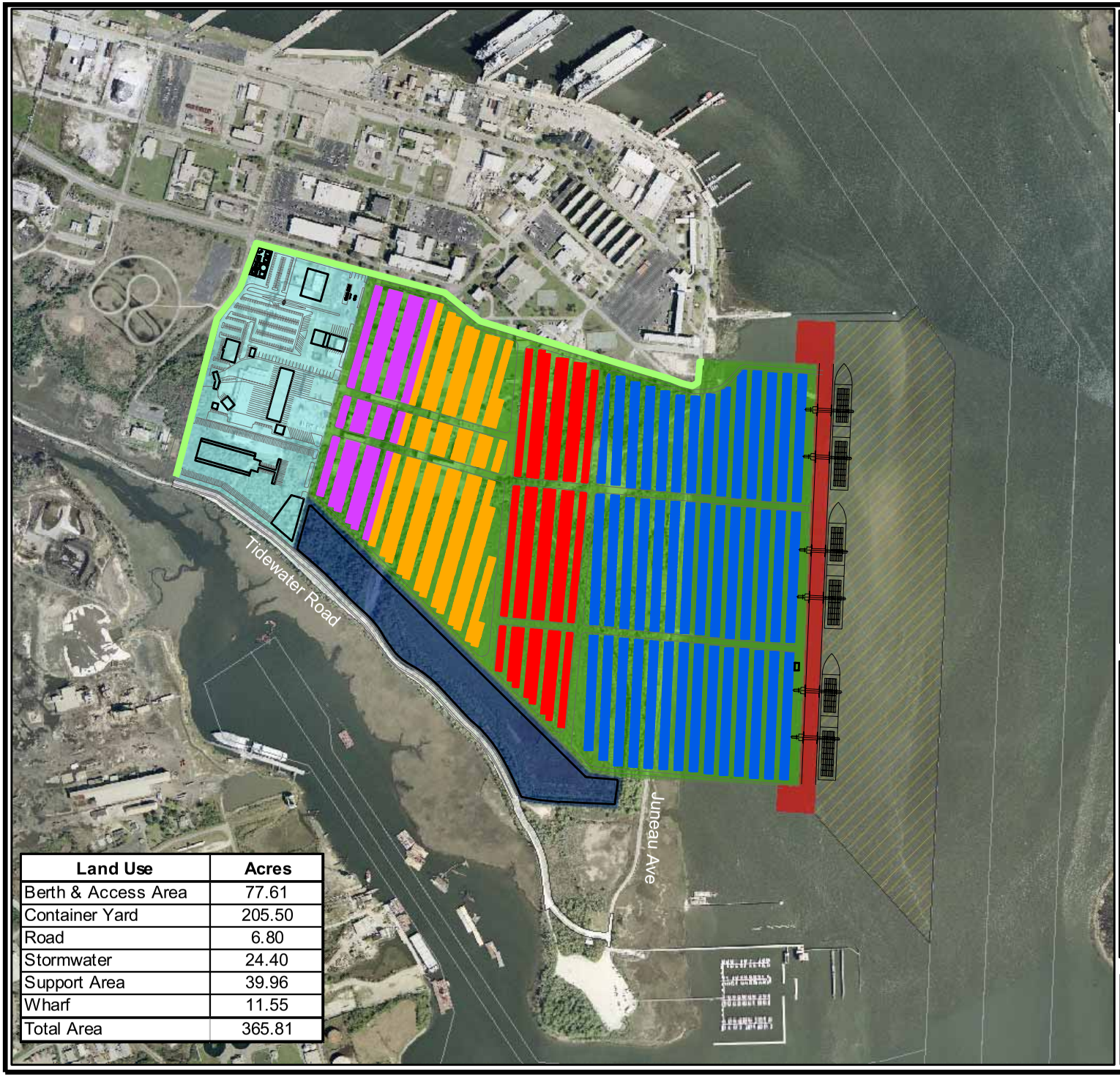
which will help vehicles from the proposed port access road and the existing interchange to safely and efficiently enter and exit the interstate.

Local Access Roadway. The SCDOT proposes to construct a four-lane roadway at Stromboli Avenue that provides eastbound and westbound access to Interstate 26 via the port access road. This roadway also establishes a new connection to Bainbridge Avenue that provides Veterans Terminal and the Federal Law Enforcement Training Center more direct access to Interstate 26 via the port access road.

Stromboli Avenue Improvements. The SCDOT proposes to reopen Stromboli Avenue to through traffic and to construct improvements to the existing intersection with Carner Avenue and Meeting Street.

Bridge to Tidewater Road. A second bridge would be constructed across Shipyard Creek from the local access roadway to Tidewater Road. This bridge will provide access to the Cooper River Marina and the employee entrance to the proposed port facility.


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Major Roads
Major Road
Highway
Interstate
Francis Marion National Forest
Cape Romaine National Wildlfe Refuge
0 2 4 8
Miles
Map Scale 1:250,000
Francis Marion National Forest
Proposed Project
Summerville
Main St
University Blvd
Saint James Ave
Bushy Park
State Highway 41
Goose Creek
Rivers Ave
Cainhoy
Hanahan
Dorchester Rd
Remount Rd
Clements Ferry Rd
Montague Ave
Ashley River Rd
North Charleston
Charleston
Mt Pleasant
Isle of Palms
Breach Inlet
Sullivan's Island
Fort Sumter
Bar St
Maybank Hwy
James Island
John's Island
Folly Rd
Folly Beach
Cooper River
Wando River
Ashley River
North Carolina
South Carolina
Georgia
Charleston Harbor
N
W
E
S
Index Map Scale 1:14,000,000
US Army Corps of Engineers
Charleston District
Figure ES-1
Location of Proposed Project



Land Use	Acres
Berth & Access Area	77.61
Container Yard	205.50
Road	6.80
Stormwater	24.40
Support Area	39.96
Wharf	11.55
Total Area	365.81

EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Storage yard
- Empty Containers
- Loaded Container
- Reefers
- Wheeled

Buffer Area

Proposed Terminal
- Berth & Access Area
- Container Yard
- Road
- Stormwater
- Support Area
- Wharf

Federal Navigation Channel

0 500 1,000 2,000
Feet
Map Scale: 1:12,000

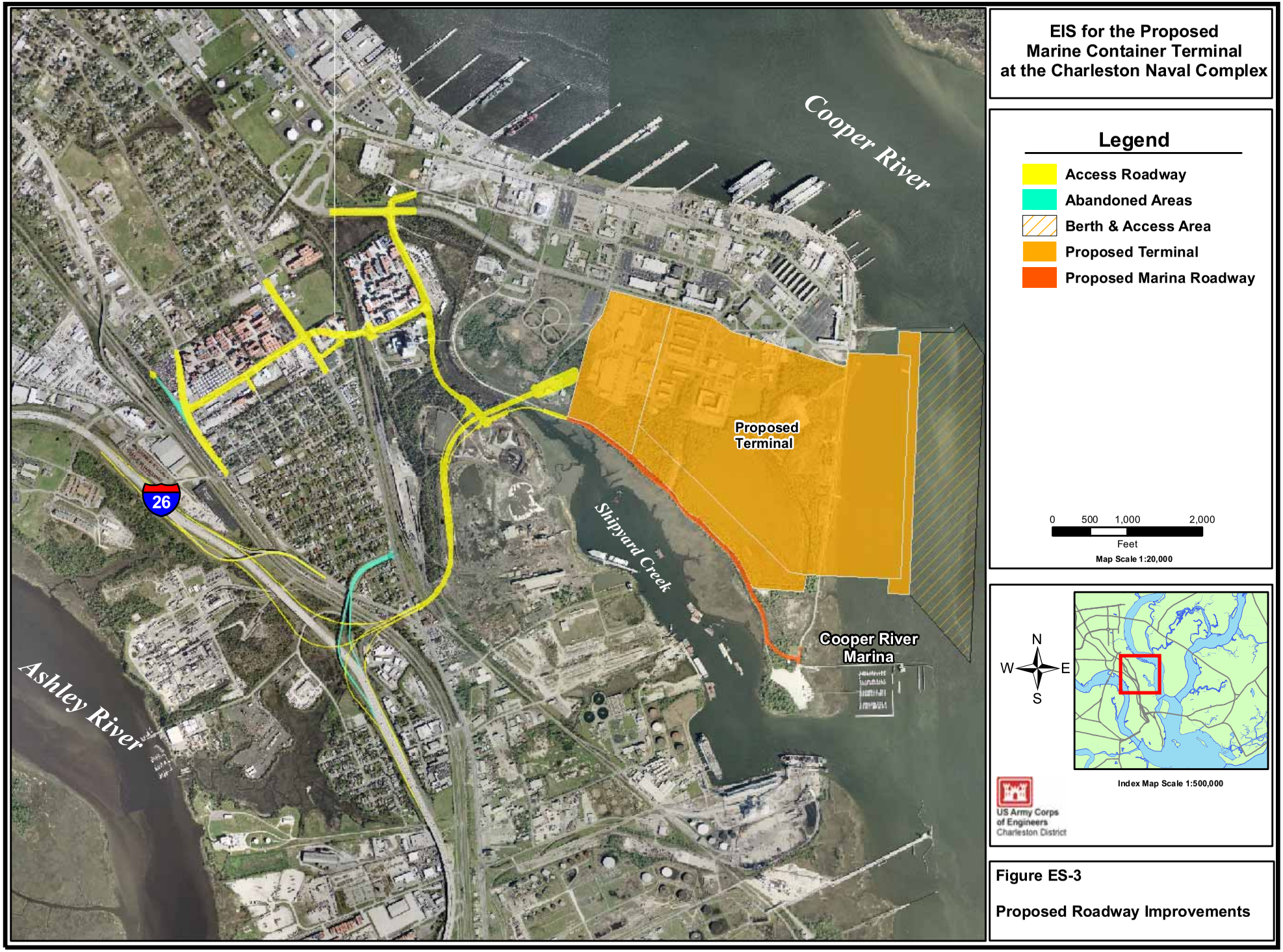
N W E S



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure ES-2
Conceptual Schematic Layout of the Proposed Terminal


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Access Roadway
Abandoned Areas
Berth & Access Area
Proposed Terminal
Proposed Marina Roadway
Cooper River
Proposed
Terminal
Shipyard Creek
Cooper River
Marina
Ashley River
26
0 500 1,000 2,000
Feet
Map Scale 1:20,000
N
W
E
S
Index Map Scale 1:500,000
US Army Corps
of Engineers
Charleston District
Figure ES-3
Proposed Roadway Improvements

NEED AND PURPOSE FOR THE PROPOSED PROJECT

According to the SCSPA, the Proposed Project consists of the development of a marine container terminal, which includes the construction of container processing and support facilities, wharf and crane structures, and navigational improvements. The following section summarizes both the SCSPA's "Statement of Need" and the USACE's determination of the Project Purpose.

SCSPA STATEMENT OF NEED FOR ADDITIONAL TERMINAL CAPACITY

Updated container cargo projections from a 1999 report titled, *South Carolina State Ports Authority Business Plan and Project Feasibility Study* were used to estimate the SCSPA's need for additional terminal capacity. These projections considered customer trade lane data compiled by the Port Import Export Reporting Service (PIERS), macroeconomic growth drivers and annual growth rates by trade lane projected by the Wharton Econometric Forecasting Associates (WEFA), and customer-specific information provided by the SCSPA. According to these projections, container throughput for the Port of Charleston would grow from 1.65 million TEU in 2004 to 4.0 million TEU in 2025. A TEU is an industry-standard measurement of volume in which one TEU is the equivalent of one standard 20-foot ocean shipping container. The projected growth represents a compound annual growth rate of 4.28 percent, which is shown in Figure ES-4.

The SCSPA estimates that their three existing container terminals have a maximum practical capacity (MPC) of 2.6 million TEU annual throughput. Further increases in throughput capacity are primarily constrained by the land area available for storage and processing of containers, and the length of wharf and apron available for unloading ships. Since TEU throughput volume will likely exceed the MPC of their existing terminals by 2014, the proposed facility is necessary to meet their 20-year growth projection.

The SCSPA maintains that the Port of Charleston offers numerous competitive advantages as a location for the proposed marine terminal. The project site is located immediately adjacent to a Federally maintained navigation channel and within a short sailing time of the ocean. In addition, a new port facility can be more effectively and economically provided from a location that is proximate to its existing facilities.

USACE'S REVIEW OF SCSPA'S STATEMENT OF NEED

In order to evaluate the growth projection submitted by the SCSPA, Charleston District compared information provided by the SCSPA to port related data prepared by the Institute for Water Resources (IWR). Between 1997 and 2001, the Port of Charleston handled approximately 8.6 percent of the total U.S. market for containerized cargo. The SCSPA has indicated that the development of the Proposed Project and the construction of improvements to their existing facilities will enable them to handle approximately 4 million TEU in the year 2025. Based on projections prepared by IWR, this represents a slight decrease in their current share of the total U.S. market.

While the SCSPA's growth projection is considered reasonable, there are concerns that the base year for their projections was low and as a result may understate their future needs for throughput capacity. Actual year end data on containerized cargo that has been reported by the SCSPA indicate that the Port of Charleston handled 1,725,000 TEU in 2004 and 1,980,000 TEU in 2005, which is greater than their projections for those years. If the SCSPA continues to exceed their projections each year, they will likely run out of available capacity prior to 2025.

The SCSPA has indicated that the development of the proposed facility will take approximately six years, and the new container terminal would not be operational until 2012. If the growth in containerized cargo at the Port of Charleston is more similar to IWR's national projection of 4.52 percent, the SCSPA would run out of additional capacity for containerized cargo before a new port facility could be constructed. Likewise, if the SCSPA attempts to maintain their share of the total U.S. market as projected by IWR, the Proposed Project will only enable them to meet their needs to 2022 (8 percent market share) or 2018 (9 percent market share).

USACE regulations regarding economics (33 CFR 320.4(q)) state that the USACE will generally not be concerned with whether a project would be economically viable or is needed in the marketplace. The USACE can defer to a state or other government entity for the decision to spend public money and should not assert that a governmental body's decision was incorrect for economic or policy reasons. However, the USACE must make an independent review of the public need for a project from the perspective of the overall public interest. The economic benefits of a project may be important to the local community and contribute to improvements in the local economic base. In addition, it will affect such factors as employment, tax revenues, community cohesion, community services, and property values. The USACE may question the public need for a proposed project if it appears to be unduly or unrealistically speculative.

After a review of the applicant's stated purpose and need, the USACE determined that the container traffic forecast is within the limits of acceptable forecasting procedures. The assumptions and methods used to forecast growth are reasonable and do not overstate the need for the proposed construction of new container capacity.

USACE STATEMENT OF PROJECT PURPOSE

According to Section 404 (b)(1) Guidelines (40 CFR 230.10(10)), it is the responsibility of the USACE to identify the basic and overall purposes of a proposed project. The basic purpose is used to determine whether the applicant's project is "water dependent." The Proposed Project consists of developing a marine container terminal and is considered water dependent.

The USACE must furthermore, under Section 404(b)(1) Guidelines, provide an overall project purpose statement. Its purpose is to ensure that a range of alternatives are considered. The definition must be formulated in such a manner that the range of practicable alternatives is (a) not unduly restricted, and (b) not so broad that an inordinately large number of alternatives would have to be considered. Based on these considerations, the USACE has developed the following statement of purpose for the Proposed Action:

> "To provide state-owned port facilities that meet the reasonably projected throughput capacity for containerized cargo in the state of South Carolina for the next twenty years"

The alternatives that were identified in accordance with this Statement of Purpose are presented in the following subsection.

ALTERNATIVES CONSIDERED

In addition to the Proposed Action or Project, NEPA requires that an EIS evaluate the No-Action Alternative and a range of reasonable alternatives that meet the purpose and need for a Proposed Project. One of the most important aspects of the NEPA process is the identification and evaluation of these reasonable alternative sites.

THE NO-ACTION ALTERNATIVE

For a project being reviewed under Section 404 of the Clean Water Act, there are two potential components of the No-Action Alternative that must be evaluated: the No-Build Alternative and the No-Permit Alternative.

No-Build Alternative

The No-Build Alternative assumes that the Proposed Project is not constructed and that land uses and development trends not associated with the Proposed Project and within the study area continue without the Proposed Project. This scenario is used to establish the baseline against which the potential impacts of the Proposed Project are compared.

No-Permit Alternative

The No-Permit Alternative assumes that the Proposed Project is constructed so as to require no permits under the Clean Water Act for the dredging and filling of waters of the United States. The USACE has concluded that the purpose of the Proposed Project cannot be met at any location without Department of the Army authorization. Therefore, for the purposes of this EIS, it has been concluded that the No-Permit Alternative is equivalent to the No-Build Alternative, and that both will be evaluated as the No-Action Alternative.

ALTERNATIVE SITES

The Proposed Project consists of constructing a new marine container terminal on the west bank of the Cooper River at the former Charleston Navy Base. For the purposes of this EIS, potential alternatives include a one berth expansion of an existing SCSPA terminal in conjunction with the construction of a new two berth container terminal at an alternative site, or the construction of a three berth container terminal at an alternative site.

Basic Siting Criteria

To identify reasonable and practicable alternative site locations for the proposed marine container terminal, the USACE developed a set of criteria against which potential sites would be evaluated. The first step was to identify a wide range of sites, all located in South Carolina, using the following basic siting criteria: (1) proximity to an existing navigation channel, which could be potentially deepened to a project depth of 45 feet; (2) 200 acres of backland that would be directly behind and contiguous to each berth; and (3) interstate highways and railroads no further than 50 miles from any prospective site. Based on these criteria, 58 alternative sites were initially identified for further screening.

Tiered Screening Process

The potential alternative sites were evaluated using a tiered screening process. This included a number of criteria that were related to (a) the construction and operation of a marine container terminal and (b) social and environmental impacts. The screening criteria included:

1. More detailed dredging requirements for the navigation channel and turning basin, as well as future maintenance dredging and disposal;

2. Engineering and construction constraints posed by existing structures, land use history, and geotechnical conditions;

3. Operational compatibility to support infrastructures such as intermodal capabilities and bridges with appropriate air draft and land geometry;

4. Transportation infrastructure that takes into account the relative magnitude of effort (i.e., obstacles and costs) involved in providing access;

5. Social impacts to existing community structures, roadways, educational and recreational facilities, and historic resources; and

6. Environmental impacts to freshwater and saltwater wetlands, natural resources, land uses, threatened or endangered species (loss of critical habitat), and any impacts to aquifers.

Information gathered on each of the alternative sites was used to narrow the list of potential project alternatives. Once the list of project alternatives was narrowed to five sites, conceptual layouts that included additional information on land requirements, dredging requirements, and transportation infrastructure were developed. These conceptual layouts were used to assist in determining that each of the project alternatives were considered reasonable and practicable. Based on this additional information, three alternative sites were eliminated from further consideration. The three project alternatives (including the Proposed Project) that are being evaluated in the EIS are listed below and are shown in Figure ES-5.

- Charleston Naval Complex (referred to as “Proposed Project” in this EIS)

- Daniel Island – Cooper River (referred to as “Daniel Island Alternative” in this EIS)

- Clouter Island – South (referred to as “Clouter Island Alternative” in this EIS)

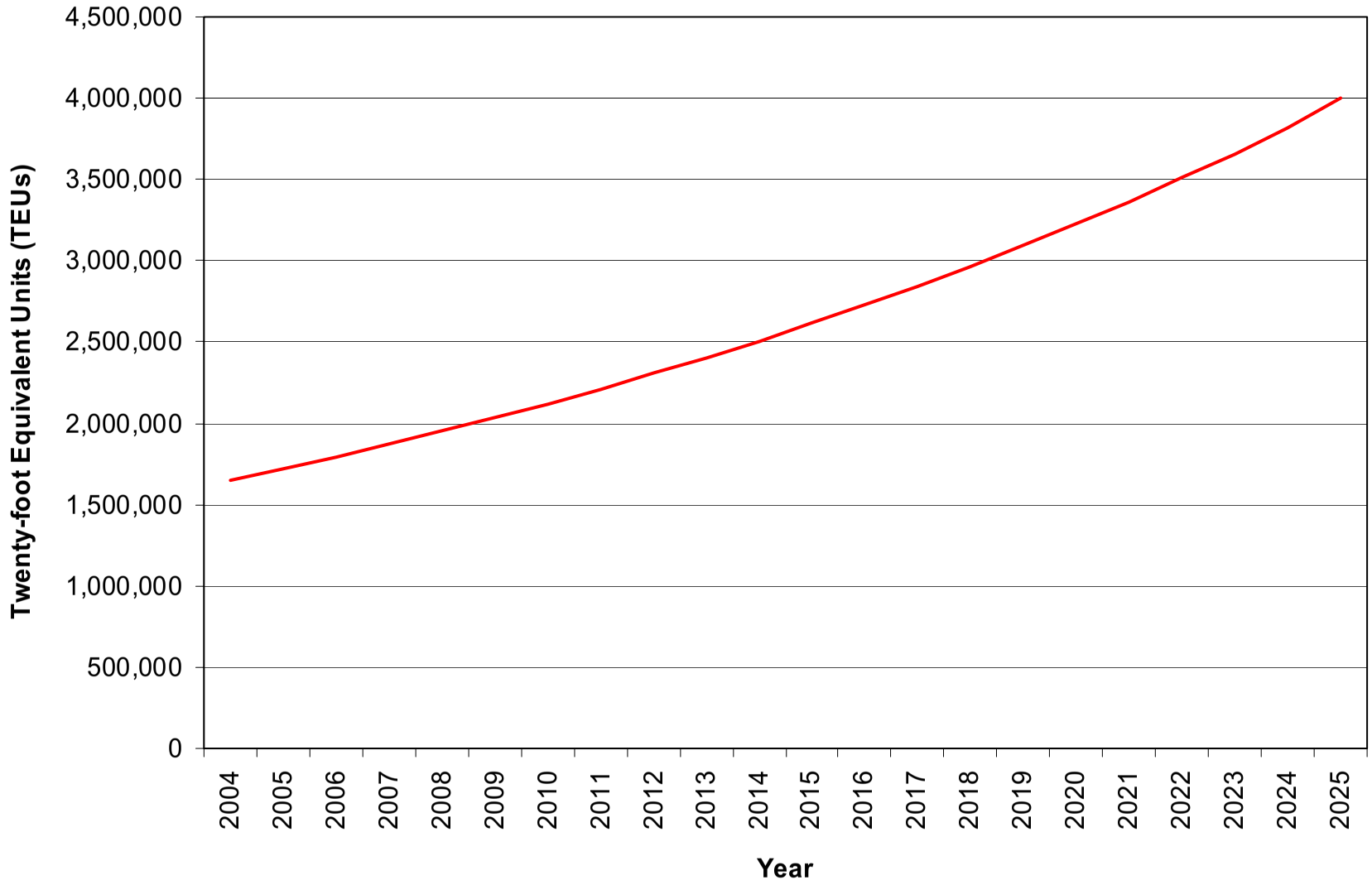
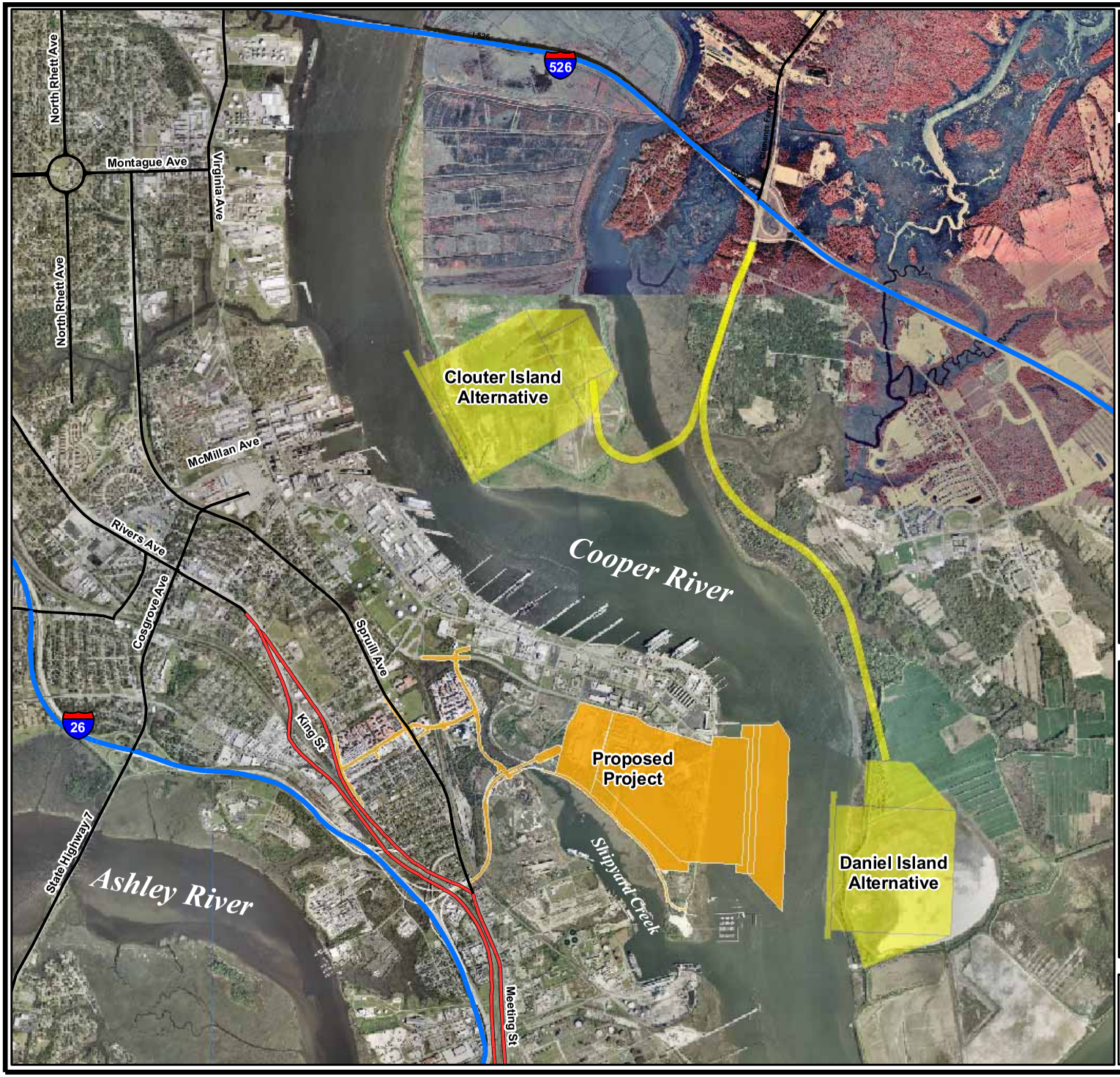


Figure ES-4
Projection of Container Throughput for the Port of Charleston for the Years 2004 – 2025 (Assuming a 4.28% Compound Annual Growth Rate).

U.S. Army Corps of Engineers
Charleston District



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

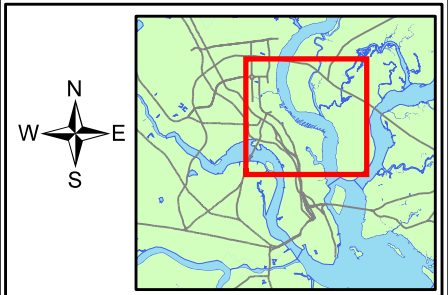
Legend

- Major Road
- Primary Hwy
- Interstate Hwy
- Proposed Project
- Project Alternatives

0 0.25 0.5 1

Miles

Map Scale 1:40,000



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure ES-5

Locations of Project Alternatives

PUBLIC INVOLVEMENT

Throughout the development of the EIS, the Corps has actively sought to disseminate information on the Proposed Project and the results of the studies that have been prepared to evaluate the potential impacts of the Proposed Project on the human and natural environments. These efforts include the following steps.

- *Notice of Intent*. A Notice of Intent to prepare this EIS was published in the *Federal Register*, Volume 69, No. 33, *February* 19, 2004. A copy of the Notice of Intent is included in Appendix G.

- *Scoping*. Public and agency scoping meetings were held on March 16, 2004 and March 22, 2004, respectively. The purpose of these scoping meetings was to solicit public and agency input on topics to be addressed in the EIS.

- *Public Notices*. Whenever significant events occurred during the permitting process or when critical information became available, the USACE issued public notices.

    - February 11, 2005 – Public Notice of Change in Affected Acreages
    - December 23, 2005 – Public Notice of Comment Period Extension
    - January 13, 2006 – Public Notice of Port Access Roadway
    - February 24, 2006 – Public Notice of Comment Period Extension
    - March 17, 2006 – Public Notice of Comment Period Extension and Public Information Workshop

- *Public Outreach Process*. In an effort to receive feedback from the public and provide information on the status of the EIS, the USACE has used alternate methods throughout the project. These have included neighborhood outreach meetings, public information workshops, a public hearing, a public-access project website (www.PortEIS.com), a telephone hotline (843-971-7970), email, U.S. Postal Service alerts, and newsletters.

  Five public information workshops were held to provide additional information on the Proposed Project and studies that were prepared to evaluate the potential impacts of the project on the human and natural environments.

    - August 25, 2004 – Citadel Alumni Center, Charleston, SC
    - May 12, 2005 – North Charleston Convention Center, North Charleston, SC
    - November 17, 2005 – North Charleston Performing Arts Center, North Charleston, SC
    - January 26, 2006 – Gethsemani Community Center, North Charleston, SC
    - March 30, 2006 – Military Magnet Academy, North Charleston, SC

A public hearing was held on November 17, 2005, at the North Charleston Performing Arts Center as part of the NEPA process to receive oral and written comments from the public on the draft EIS and the Proposed Project.

MODIFICATIONS TO THE PROPOSED PROJECT SINCE THE DRAFT EIS

The draft EIS describing the potential environmental consequences of developing the proposed port facility and the access roadway alternatives was released on October 21, 2005, and a public hearing was held on November 17, 2005. The original 60-day comment period was extended an additional 120 days to conduct two additional public workshops and stakeholder meetings regarding the impacts associated with the proposed access roadway corridors. The extension of the comment period until April 19, 2006, also gave the public more time to review and submit comments on the draft EIS.

There have been a number of changes to the proposed port facility and the access roadway since the release of the draft EIS. The SCSPA has revised the acreage of wetland and open water impacts to reflect the most recent wetland survey of the project site and adjustments that were made to the layout of the proposed port facility. The SCSPA has also reduced the overall acreage of the proposed access channel to avoid impacts to an existing contraction dike north of the project site and to minimize potential impacts to sedimentation rates within the federal navigation channel.

The portion of the Proposed Project that received the greatest attention from the public during the comment period for the draft EIS was the access roadway corridors. In order to evaluate the potential impacts, a conceptual layout was developed for each of the roadway corridors and additional traffic analyses were conducted. The Access Roadway Feasibility Study (Appendix W of the FEIS) and revised permit drawings that were submitted by SCDOT include additional information on the alignment of the proposed access roadway. SCDOT identified Alternative 1D as the proposed roadway corridor after further modifying the layout and design to avoid and minimize potential impacts to the environment and the adjacent community. The proposed roadway corridor is shown on Figure ES-3.

The access roadway uses a half diamond interchange to provide a grade separation so that port related truck traffic cannot access local streets from the port access roadway. However, the local community can access the interstate via the port access road. In addition, the design speed for the port access roadway was reduced to allow greater flexibility in the alignment and to minimize potential impacts to adjacent properties.

The local access portion of the proposed roadway was relocated northward to Stromboli Avenue to avoid potential impacts to existing residential properties on Hackerman Street. The local connector road was also extended to provide direct access from Bainbridge Avenue to the port access roadway. This extension provides Veterans Terminal, the Federal Law Enforcement Training Center (FLETC), and other facilities on the former Charleston Navy Base direct access to the interstate via the port access roadway and may help reduce future traffic on local streets.

According to the draft EIS, the construction of the interchange for the proposed access roadway would require the closure of Exit 217 (Meeting Street) and Exit 218 (Spruill Avenue) on I-26. SCDOT has proposed to construct improvements to Exit 217 (Meeting Street) and the interstate to allow this existing interchange to remain open. This will enable future traffic to continue accessing the interstate from both Spruill Avenue and Meeting Street, similar to existing conditions. In order to accommodate future traffic, SCDOT has also proposed to reopen and construct improvements to Stromboli Avenue between Spruill Avenue and Carner Avenue. In addition, the portion of Meeting Street that is located northwest of the three-way intersection with Carner Avenue and Stromboli Avenue would terminate in a cul-de-sac.

The proposed mitigation plan for the port facility and the access roadway has been expanded to address a number of comments that were received in response to the draft EIS. The revised mitigation plan includes the following: restoration of tidal marsh on Drum Island, funding for oyster restoration, funding to preserve Morris Island, funding to preserve uplands and aquatic resources in the Cooper River watershed, the installation of gates, lights, and signs at existing railroad crossings in the affected community, streetscape improvements, operational improvements along Meeting Street, construction of a noise barrier adjacent to Rosemont neighborhood, environmental monitoring during construction activities, support for community education programs, support for employment opportunities, support for community health care facilities, improvements to existing community centers, and support for community planning.

ENVIRONMENTAL CONSEQUENCES

The Proposed Project consists of the construction of a marine container terminal and an access roadway at the southern end of the former Charleston Navy Base. The development of the Proposed Project would result in localized impacts to the physical setting, shorelines, floodplains and flood zones. In addition, the Proposed Project would result in minimal impacts to land use, community infrastructure and municipal services, aesthetics, cultural resources, and hazardous waste and materials. The following sections discuss other aspects of the Proposed Project, the No Action Alternative, or the development of the other alternative sites that may have greater impacts on the human and the natural environment.

SOCIOECONOMICS

The construction and operation of the proposed port facility would create new jobs and spur ancillary commercial and industrial development within the region. Maritime support industries would likely locate in the Port Overlay District that was established by the City of North Charleston or other appropriately zoned areas. This would have an overall positive impact on reducing poverty, reducing unemployment, and improving housing characteristics (i.e., median home value and percentage of home ownership) in the adjacent community, Charleston County, and the region.

The proposed access roadway improvements are located almost entirely on commercial and industrial land in an attempt to minimize impacts to existing residential communities. Property owned and operated by these existing businesses would need to be acquired to construct the access roadway. The direct impacts to these existing businesses is considered an unavoidable adverse impact of the Proposed Project. The access roadway has been located and designed (e.g., by being placed on structures over major road and railroad corridors) to minimize impacts to existing business activity.

There are a number of ongoing and future development projects that are identified in the No-Action Alternative. These projects are expected to occur whether or not a new port facility is constructed at the former Charleston Navy Base. Many of these projects will benefit the surrounding community through the creation of new jobs, which would also have a positive impact on reducing poverty, reducing unemployment, and improving housing characteristics. The development of a new port facility and access roadway at the Daniel Island or Clouter Island alternative site would be expected to have a similar benefit to socioeconomics as the Proposed Project.

SOCIAL CHARACTERISTICS AND ENVIRONMENTAL JUSTICE

The proposed port facility is located at the southern end of the former Charleston Naval Base and is separated from the nearest residential community by Shipyard Creek, an existing rail yard, and several industrial properties. It is approximately 3,200 feet to the nearest residential structures, and the port terminal itself would have no direct impact on community stability, cohesion, and interaction within the adjacent residential neighborhoods.

The port access road is primarily an elevated structure and would be located near Union Heights in the City of North Charleston and Rosemont in the City of Charleston. The construction of the proposed access roadway would avoid a substantial increase in port related traffic on local streets because it would provide direct access to Interstate 26. In addition, the construction of improvements to local streets and intersections will likely benefit individual properties and the adjacent community.

The construction and operation of the proposed access roadway would avoid direct impacts to residences within the adjacent neighborhoods, which are predominantly minority and low income. The development of the proposed port facility would result in an increase in noise, light, and some aesthetic impacts to these adjacent communities. In addition, the removal of Exit 218 (Spruill Avenue) and the development of a new local access roadway that provides both eastbound and westbound access to the interstate at Stromboli Avenue and Spruill Avenue would affect local traffic patterns.

The No-Action alternative would result in the redevelopment of a number of commercial and industrial properties in North Charleston and may result in some new residential and commercial development on the Daniel Island site. In addition, the Navy Base site would likely be developed as some type of maritime or other commercial use. The future development of commercial and industrial properties would likely benefit the adjacent community.

The development of a new port facility at the Daniel Island or Clouter Island alternative site is expected to have similar impacts to the adjacent residential communities. However, the development of a port access road for these two sites would directly impact a number of residences and a church that are located adjacent to Clements Ferry Road. In addition, these properties would experience similar impacts - noise, light and aesthetics - as areas near the access roadway for the Navy Base site.

TRANSPORTATION

The proposed port facility will generate 10,920 trips per day under peak conditions, and 7,700 trips per day under average conditions at full build out in 2025. The proposed access road provides direct access between the port facility and Interstate 26. The greatest percentage of port related traffic would occur at the location of the new interchange on Interstate 26. As container trucks and other vehicles move away from the proposed port facility, traffic will disburse to both existing and future industries, warehouses, and businesses. Container trucks leaving the Charleston area on Interstate 26 represent 1.75 percent of future traffic between Interstate 526 and Remount Avenue at full build out.

As a result, regional traffic would be impacted from increased traffic coming and going to a new marine terminal at the CNC site. Approximately 23 percent of the trucks leaving the proposed port facility would deliver containers to the existing Norfolk Southern or CSX intermodal rail yards. In order to accommodate future increases in rail traffic associated with the Proposed Project and future growth of rail customers, Norfolk Southern and CSX will likely need to construct improvements to existing rail yards in the future. In addition, the closure of Exit 218 (Spruill Avenue) and the construction of the local access roadway at Spruill Avenue and Stromboli Avenue would also affect local traffic patterns.

There are two at-grade crossings on the CSX intermodal rail line within the North Charleston Study Area. In addition, there are several at-grade rail crossings on the Norfolk and Southern intermodal railway line within the study area and just northwest of the study area. It is estimated that an additional 18 minutes per day of at-grade rail crossings would be attributable to the Proposed Project at these existing rail crossings.

The No-Action alternative indicates that population growth will result in increased traffic on both Interstate 26 and 526. Several segments of Interstate 26 and the majority of the segments of Interstate 526 will reach a failing level of service over the next 20 years. As a result, I-26 will need to be widened in the future whether or not a new port facility is constructed. SCDOT has

already begun evaluating the widening of Interstate 26 and the proposed port access road is being designed to accommodate this future widening.

The development of a new port facility at the Daniel Island or Clouter Island alternative site is expected to generate the same number of vehicle trips as the Proposed Project. However, the additional traffic would have a much greater impact on regional traffic because it would be added to Interstate 526, which is expected to experience more significant traffic growth in the future. At this time, there are no ongoing plans to widen Interstate 526.

NAVIGATION AND TERMINAL FACILITIES

The Proposed Project would result in approximately 1300 additional container vessel trips per year on the upper Cooper River at full build out. Potential delays to commercial navigation resulting from temporary blockages of the Federal navigation channel as a result of container vessel turning operations at the proposed port facility are expected to have minimal economic impacts. This is considered an unavoidable adverse impact of the Proposed Project. The development of a new port facility at the Daniel Island or Clouter Island alternative site would result in similar temporary blockages and economic impacts to commercial navigation.

NOISE

Although noise emanating from the proposed port facility during construction and operation, such as the operation of a pile driver or a dropped hatch, may be audible in the nearby residential neighborhoods, it is not expected to adversely impact residences or other sensitive receptors. However, construction and operational noise associated with the proposed port facility would adversely impact noise levels on the adjacent FLETC campus and at Cooper River Marina. SCSPA has proposed to construct noise barriers and establish buffers that will reduce impacts to the FLETC campus and other adjacent properties.

The proposed access roadway is expected to impact sensitive receptors (residences, schools, parks, etc.) in the adjacent residential community. Since the proposed access roadway and the new interchange are located adjacent to existing roadways, many of these impacted properties already experience elevated noise levels from existing roadways. SCDOT has proposed to construct noise barriers where they are both practical and effective, which will reduce impacts to 71 residences in the Rosemont neighborhood. The traffic from the access roadway is expected to increase noise levels for some residents in the southern part of Union Heights and Rosemont neighborhoods.

The No-Action Alternative would result in an increase in local traffic associated with future population growth. This would likely result in an incremental increase in noise for residences and other sensitive receptors that are located adjacent to local streets and the interstate. The construction and operation of a new port facility at the Daniel Island or Clouter Island alternative site is not expected to adversely impact residences or other sensitive receptors. However, residents adjacent to Clements Ferry Road would likely be impacted by the incremental increase in noise from port related traffic on surface roads.

LIGHT

Sky glow would be the primary lighting impact from the proposed port facility. Lights at the proposed port facility would likely be visible from bridges and other elevated structures in the area. Sky glow impacts within the adjacent residential community would likely be minimal when compared to existing urban lighting. Light trespass would likely impact nighttime residents of the FLETC campus and the Cooper River Marina. SCSPA has indicated that appropriate measures,

such as reducing the height of the lamp poles and the use of cut off fixtures, will minimize potential impacts to adjacent properties.

The proposed port access roadway would not be lighted, similar to the adjacent interstate. Therefore, light impacts would primarily be limited to non-port related traffic using the proposed access roadway to access the interstate and local streets.

The No-Action Alternative would result in the redevelopment of a number of commercial and industrial properties and an increase in local traffic associated with future population growth. Redevelopment of commercial and industrial properties that are located closer or further away than the Proposed Project will have a greater or lesser impact on portions of the adjacent residential community. However, it would be speculative to attempt to estimate these future impacts.

The construction and operation of a new port facility at the Daniel Island or Clouter Island alternative site is not expected to adversely impact residences or other sensitive receptors. Impacts to residents adjacent to Clements Ferry Road would likely be minimal because the incremental increase in port related traffic would primarily occur during daytime hours when the port facility is open and container trucks are making deliveries.

AIR QUALITY

The construction and operation of the Proposed Project would result in an increase in emissions from mobile sources, such as marine vessels, container trucks, employee automobiles, and support equipment. Overall these additional air quality emissions represent a very small percentage of total permitted and mobile emissions in the region. Therefore, the Proposed Project is expected to result in a minimal adverse impact to air quality.

The No-Action Alternative would likely result in the redevelopment of a number of commercial and industrial properties and an increase in local traffic associated with future population growth. Similar to the Proposed Project, many of these emissions do not require a permit and are only a small percentage of total emissions in the region. Therefore, the No-Action Alternative is also expected to have a minimal adverse impact on regional air quality.

The construction and operation of a new port facility at the Daniel Island or Clouter Island alternative site would result in a slightly greater increase in emissions from mobile sources than the Proposed Project. Container trucks would be required to travel further to reach the existing intermodal railyards and marine vessels would be required to travel further to reach the Clouter Island alternative site. The Daniel Island alternative would also result in minimal impacts to air quality. However, air quality models indicate that the operation of a port facility at the Clouter Island alternative site would have a significant impact on air quality as a result of cumulative impacts associated with interactions with other permitted sources in the region.

SECTION 4(f) PROPERTIES, SECTION 6(f) LANDS, AND OTHER RECREATIONAL FACILITIES

The proposed port facility is located immediately adjacent to Cooper River Marina, which is identified as a Section 4(f) property. This marina is currently located across Shipyard Creek from a shipping terminal that stockpiles coal and operates aboveground storage tanks. In addition, upland access to the existing marina is provided by driving through industrial and commercial portions of the former Charleston Naval Base. The construction of the proposed port facility will block the existing roadway. Therefore, a new two lane paved roadway that

crosses Shipyard Creek will be constructed to provide access to the marina. The development of the proposed port facility will impact the upriver view from this existing facility. In addition, the operation of the proposed port facility will result in an increase in noise and light at the existing marina.

The proposed access roadway would result in direct impacts to two existing container storage yards that are located immediately adjacent to Park South, which is also identified as a Section 4(f) property. The development of the roadway is not expected to adversely impact the existing community park. It is our understanding that the City of North Charleston has been considering relocating the park because of the existing industrial nature of this area. In addition, the construction of the new interchange on Interstate 26 will directly impact a portion of Rosemont Field. The City of Charleston has begun construction of a new baseball field on this property, which is immediately adjacent to Interstate 26. Construction of a new interchange and a sound barrier may require adjustments to the location of the new baseball field.

The No-Action Alternative would likely result in the redevelopment of a number of commercial and industrial properties including the Navy Base site. However, it is uncertain whether some other development of this property would require the construction of a new access road for Cooper River Marina. As described above, the City of North Charleston would likely continue their efforts to relocate Park South to a less industrial area.

The construction and operation of a new port facility and access roadway on Daniel Island or Clouter Island would not be expected to directly impact any existing Section 4(f) property, Section 6(f) land, or other recreational facilities.

WATER RESOURCES

The development of the proposed port facility and access roadway will result in minimal, localized impacts to stormwater and groundwater resources on the project site. In addition, the construction of the proposed port facility will require the excavation and filling of 56.6 acres of waters of the United States, which include tidal marsh and wetlands, and the deepening of an additional 77.9 acres of open water within the Cooper River to provide deepwater access. These activities will result in minimal, localized impacts to salinity, dissolved oxygen, existing flows, and sedimentation rates. SCDHEC has evaluated the Proposed Project using their new 3-D hydrodynamic model and has determined that the Proposed Project will have minimal impacts to water quality.

The No-Action Alternative would likely result in the redevelopment of a number of commercial and industrial properties including the Navy Base site. However, it is uncertain whether some other development of this property would require similar impacts to the surface waters of the Cooper River. The construction and operation of a new port facility and access roadway on Daniel Island or Clouter Island would be expected to have similar, but even less impacts on water quality than the Proposed Project.

AQUATIC SEDIMENTS AND DREDGING

The construction of the proposed port facility would require dredging of approximately 6.5 million cubic yards of material. A portion would be excavated from the area between the river shoreline and the proposed wharf and backfilled with more stable soils upon which the container yard and support facilities would be constructed. Another portion would be dredged from the berth and access channel. The dredging would likely occur over a period of 12 to 15 months and would be

conducted using a 24-inch hydraulic cutterhead dredge. The dredged material would be placed in the Daniel Island CDF.

Based on the results of the Tier II analysis, the dredged materials may include small amounts of pollutants. However, the dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants. The construction of the Proposed Project would also cause a shift in the location of shoaling and an increase in the total shoaling in the Federal navigation channel.

In addition, the proposed access roadway would require two separate bridges across Shipyard Creek. Construction of these bridges would result in disturbance of aquatic sediments in the waterway during pile driving. Because of the potential presence of contaminated sediments in this portion of Shipyard Creek, aquatic sediment to be disturbed or excavated for pile foundation and abutment work would require appropriate management measures.

The No-Action Alternative would likely result in the redevelopment of a number of commercial and industrial properties, including the Navy Base site. However, it is uncertain whether some other development of the Navy Base site or of the Daniel Island site would require dredging of aquatic sediments. The construction and operation of a new port facility and access roadway on Daniel Island or Clouter Island would be expected to have less direct impacts on aquatic sediments than the Proposed Project. However, the loss of a portion of the Clouter Island confined disposal facility would likely have a major adverse impact on future maintenance dredging of the existing Federal navigation channel.

NATURAL RESOURCES

The construction of the Proposed Project would primarily impact previously disturbed and developed upland areas. The plant and animal communities on the Navy Base site have been impacted by past development activities and, as a result, consist of relatively common species that have adapted to living in close proximity to human development. The development of the proposed port facility would result in the loss of the available habitat on the project site because this entire area would be developed to construct the proposed port facility.

In addition, the development of the Proposed Project would also result in the loss of 9.6 acres of tidal wetland, 2.4 acres of freshwater wetlands, and 56.6 acres of open-water habitat due to the placement of fill material. EFH impacts in the Proposed Project footprint include the above-mentioned loss of saltwater marsh and open water (estuarine water column) due to the placement of fill material and include approximately 2.1 acres of intertidal mudflats, 2.4 acres of shallow subtidal water (less than 2 feet deep), and 52.1 acres of deep water (greater than 2 feet deep). EFH impacts also include the modification (deepening) of 77.9 acres of estuarine water column. The channel modification and disturbance impacts to EFH would be from water quality changes in DO, salinity, turbidity, and current velocity, but all of these are predicted to be small and localized.

The proposed access roadway would require impacts to 4.2 acres of tidal marsh on Shipyard Creek and 0.4 acres of freshwater wetland, although the majority of these impacts will be limited to the placement of piles and support structures for bridges and elevated roadways.

The No-Action Alternative would likely result in the redevelopment of a number of commercial and industrial properties, including the Navy Base site. However, it is uncertain whether some other development of the Navy Base site or of the Daniel Island site would result in such intensive development. The construction and operation of a new port facility and access

roadway on Daniel Island or Clouter Island would result in a slightly greater impact to natural resources because although these sites have been used as confined disposal facilities in the past, these sites are not presently developed with buildings and other hard structures.

THREATENED AND ENDANGERED SPECIES

The Proposed Project will result in direct impacts to disturbed and developed upland and wetland habitats on the project site. The available habitat is not considered suitable for any federally listed threatened or endangered species that are known to occur in Charleston County. However, the operation of the proposed port facility will result in an increase in the number of large marine container vessels, support vessels, and dredging activities in Charleston Harbor. The increase in the number of vessels would result in an incremental increase in the likelihood of a ship strike with manatees, turtles, right whales and humpback whales, which are known to occur within or near the approaches to Charleston Harbor. The SCSPA has agreed to conduct aerial monitoring in the vicinity of the approaches to Charleston Harbor so that the Proposed Project will not adversely impact the endangered right whale.

The No-Action Alternative would likely result in the redevelopment of a number of commercial and industrial properties including the Navy Base site. However, it is uncertain whether some other development of the Navy Base site or of the Daniel Island site would result in an increase in the number of large marine container vessels, support vessels, and dredging activities in Charleston Harbor. The construction and operation of a new port facility and access roadway on Daniel Island or Clouter Island would be expected to have similar impacts to federally listed threatened or endangered species as the Proposed Project.

SIGNIFICANT IMPACTS TO THE HUMAN AND NATURAL ENVIRONMENT

If permitted, the Proposed Project would have unavoidable impacts to waters of the United States, which include both freshwater and saltwater wetlands and Essential Fish Habitat. In addition, the construction and operation of the proposed port facility and access roadway will have unavoidable secondary and cumulative impacts on air quality, noise, lighting, navigation, and roadway and railway traffic. Mitigation has been proposed by the SCSPA and SCDOT to offset each of these unavoidable impacts.

NEXT STEPS IN THE PERMITTING PROCESS

The final EIS includes responses to all comments received regarding the draft EIS, copies of additional analyses that have been conducted or updated to address specific concerns regarding the Proposed Project, copies of modified project plans and permit drawings, and modifications to the text made in response to comments. The most recent edition of the Project Newsletter and a local Public Notice have been sent to individuals and organizations on the project mailing list and individuals and organizations that provided comments on the draft EIS. In addition, a Notice of Availability has been published in the Federal Register. There will be a 30-day comment period on the final EIS. Any comments that are received in response to the final EIS will be addressed in the Record of Decision (ROD) that will be prepared for the Proposed Project and will be used to support our decision on the SCSPA's and the SCDOT's permit application. The ROD will identify the environmentally preferred alternative, as required by NEPA, and the least environmentally damaging practicable alternative, as required by Section 404 permitting guidelines.

1.0 INTRODUCTION

1.1. DESCRIPTION OF THIS DOCUMENT

This Environmental Impact Statement (EIS) has been developed by the U.S. Army Corps of Engineers (USACE), Charleston District, in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA)(42 USC 4321-4347), 40 CFR Parts 1500 - 1508, and 33 CFR Parts 230 and 325. This document has been prepared to assess and disclose potential environmental consequences of Federal actions requested by the South Carolina State Ports Authority (SCSPA) related to the proposed development of a "Proposed Marine Container Terminal at the Charleston Naval Complex" (the Proposed Project). The Proposed Project is described in Section 3.2 of this EIS. The specific Federal agency actions requested by the SCSPA and the South Carolina Department of Transportation (SCDOT) are described in Section 1.3. This EIS is presented in five volumes. Volume I presents the EIS documentation, and Volumes 2 through 5 contain technical appendices.

1.2. PROJECT BACKGROUND

1.2.1. Role of the SCSPA

1.2.1.1. Authorizing Legislation and Powers of the SCSPA

The SCSPA was established in 1942 by Act No. 626 of the South Carolina General Assembly. The SCSPA is an agency of the State of South Carolina that is comprised of a Board of nine members appointed by the Governor. The Board is supported by a staff based primarily in Charleston, SC.

The powers of the SCSPA are established by Section 2 of the Act No. 626, which reads:

SECTION 2: *Through the agency hereinabove created, the State of South Carolina may engage in promoting, developing, constructing, equipping, maintaining, and operating the harbors or seaports within the State, or its jurisdiction, namely Beaufort, Charleston and Georgetown, and works of internal improvement incident thereto, including the acquisition or construction, maintaining and operating at such seaports or harbor water craft and terminal railroads, as well as other kinds of terminal facilities, and belt line roads or highways and bridges thereon, and other bridges and causeways necessary or useful in connection therewith. Said Authority is created as an instrumentality of the State of South Carolina for the accomplishment of the following general purposes, all or any of them, which are intended to broaden, and not to restrict, any other powers given to it in, this Act, namely:*

To develop and improve the harbors and seaports of Beaufort, Charleston and Georgetown for the handling of waterborne commerce from and to any part of the State of South Carolina and other states and foreign countries;

To acquire, construct, equip, maintain, develop and improve said harbors or seaports and of their port facilities;

To foster and stimulate the shipment of freight and commerce through said ports, whether originating within or without the State of South Carolina, including the investigation and handling of matters pertaining to all transportation rate and rate structure affecting the same;

To cooperate with the United States of America, and any agency, department, corporation or instrumentality thereof, in the maintenance, development, improvement and use of the said

harbors and seaports in connection with and in furtherance of the war operations and needs of the United States;

To accept funds from any of said counties, and to use the same in such manner, within the purposes of said Authority, as shall be stipulated by the said county, and to act as agent or instrumentality for any of said counties in any matter coming within the general purposes of said Authority;

To act as agent for the United States of America, or any agency, department, corporation or instrumentality thereof, in any matter coming within the purposes or powers of the Authority;

And in general to do and perform any act or function which may tend to or be useful toward the development and improvement of the said harbors and seaports of this State, and to the increase of waterborne commerce, foreign and domestic, through said harbors and seaports.

1.2.1.2. Role of the SCSPA in the Proposed Project

In addition to being the proposed developer of the Proposed Project, the SCSPA is the applicant for the permit described in Section 1.3. In the event that a permit is issued by USACE, the SCSPA will be responsible for compliance with that permit and the implementation of any mitigative actions required by that permit.

1.2.2. Previous Port Development in Charleston

1.2.2.1. Federal Channel Improvements

The original authorization for Charleston Harbor was included in the Rivers and Harbors Act of 1852. The first components of the present harbor system were authorized by the Rivers and Harbors Act of 1878, and included a channel draft of 21 feet mean low water (MLW) across the bar and two stone jetties. Additional studies and authorizations occurred in 1898, 1904, 1911, 1914, 1924, 1926, 1939, 1941, 1954, 1958, 1986, and 1996.

In 1996, Congress authorized the deepening of the Federal navigation channels in Charleston Harbor to a depth of 45 feet MLW. This authorization was based on a feasibility study developed between 1993 and 1996. Construction of the deepening project was begun in 1998 with the removal of a contraction dike at the southern end of Daniel Island; channel deepening was funded and initiated in 1999. Included in this project was the deepening of the entrance channel to a depth of 47 feet MLW and a width of 800 feet. Most of the remaining channels were deepened to a depth of 45 feet MLW, with the exception of Tidewater Reach, Upper Town Creek, Upper Shipyard River, and the Anchorage Basin.

The channel deepening portion of the authorized project was completed in 2004. At this time, the only portion of the authorized project that has not been constructed is a turning basin that was originally designed to serve the proposed Daniel Island Terminal that is described below. The construction of this turning basin was contingent upon the development of a new marine container terminal. Therefore, this portion of the Charleston Harbor Project has not been funded or constructed.

There are approximately 36.5 nautical miles of Federally maintained channels in Charleston Harbor. The channel system is comprised of 35 reaches ranging in length from 0.15 to 9 nautical miles in length, and from 400 to 1,400 feet in width. A more detailed listing of channel dimensions and a map of the existing channel system is presented in Section 4.7.

1.2.2.2. Public Port Terminals

The first docks and wharfs in Charleston Harbor were built in the 18th century for the shipment of agricultural products. By the early 19th century, several public wharfs were operating in the harbor. In 1856, the present site of the Columbus Street Terminal was purchased by the South Carolina Railroad, and in 1883, the first pier was constructed on that site. The first major wharfs in Charleston were located at Columbus Street and at Union Pier.

By the end of the 19th century, railroad companies began to acquire and consolidate Charleston shipping terminals. The leading company in this process was the Charleston Terminal Company (CTC), which had been formed by the Atlantic Coast Railroad. By 1910, the CTC owned most of the port waterfront. The remainder of the commercial waterfront was operated by a variety of private entities for single products. The City of Charleston acquired the CTC properties in 1921, after which they were operated by the Public Utilities Commission (PUC).

In 1944, the firm of Lockwood Greene developed plans for the newly formed SCSPA to construct additional wharfs from the Columbus Street Terminal north to Shipyard Creek along Town Creek and the Cooper River. However, these plans were ultimately abandoned due to high levels of siltation and strong currents in Town Creek.

In 1945, the SCSPA acquired the Embarkation Dock on the Cooper River in North Charleston from the Federal government. Thereafter, the SCSPA began the transition of that facility into the North Charleston Terminal. In 1947, the SCSPA acquired and began operation of the PUC properties along the Charleston Peninsula.

Rail service to existing intermodal yards in North Charleston is provided by CSX and Norfolk Southern Railroads. Rail access to the Union Pier, Columbus Street, and North Charleston Terminals is provided to both major freight carriers by short line railroads operated by the State Carolina Public Railways Commission.

In 1972, the SCSPA began development of their most modern marine container terminal. The construction of the Wando Welch Terminal began in 1979, and the last phase of wharf development was completed in 1994. The Wando-Welch Terminal is the only SCSPA facility that is located on the Wando River. There is no rail service to this facility.

Following the closure of the Charleston Naval Complex in 1996, the SCSPA acquired 110 acres of land and four of the former U.S. Navy piers on the Cooper River for operation of a bulk, break-bulk, Roll-on-Roll-off (Ro-Ro), and project cargo facility. In 2003, the SCSPA began operation of Veteran's Terminal at the former Charleston Navy Base. Veteran's Terminal is also served by the South Carolina Public Railways Commission.

A more detailed description of the existing SCSPA port terminal facilities is included in Appendix M, which describes the identification and evaluation of potential Project Alternatives.

1.2.3. History of the CNC Marine Container Terminal Proposal

The SCSPA's previous proposal for port expansion in Charleston Harbor consisted of a 1,300-acre marine cargo complex on Daniel Island in Berkeley County. A Draft EIS for the proposed Daniel Island Terminal was published in September 1999. However, in April 2000 the SCSPA elected to withdraw their permit application for the proposed facility.

In 2002, the South Carolina General Assembly passed a joint resolution, found in Appendix A, directing the SCSPA to begin environmental impact studies and other required actions to locate a new terminal facility on the west bank of the Cooper River. In addition, the General Assembly directed the CNC Redevelopment Authority (RDA) to convey certain parcels to the SCSPA for the development of breakbulk, roll on roll off, and container terminals and dock operations. The location of these parcels was delineated in a *Memorandum of Understanding and Agreement* (MOUA) that was signed by the SCSPA and the City of North Charleston regarding future development plans at the former Charleston Naval Station. A copy of the MOUA is included in Appendix B.

On January 27, 2003, the SCSPA submitted an application to the USACE for a Department of the Army permit to construct a marine container terminal at the southern end of the CNC property. The USACE reviewed this application and on February 3, 2003, notified the SCSPA that the proposed action is likely to have a "significant impact on the quality of the human environment", and therefore, warranted the preparation of an EIS.

Since the original permit application submittal, the SCSPA made the following amendments to their permit application:

- **Amendment No. 1.** On February 13, 2003, the SCSPA submitted additional information regarding their permit application. In this amendment, the SCSPA specified both the type and estimated quantity of material to be discharged by dredge and/or associated fill activities, the acreages of the different aquatic habitat types predicted to be affected by dredge and/or fill activities, and a preliminary description of the infrastructure required to operate the proposed facility (e.g., support structures, utilities, and road/rail systems).

- **Amendment No. 2.** On January 29, 2004, the SCSPA submitted an amendment to their permit application that consisted of an expansion of the scope of work to include approximately 40 acres of additional container yard, and clarification that the proposed work will affect 13.9 acres of freshwater wetlands, 7.2 acres of tidal marsh, and 143.3 acres of open waters.

- **Amendment No. 3.** On January 28, 2005, the SCSPA amended its permit application to modify the project boundary. This change resulted in an approximately 5-acre reduction in the size of the container storage yard and the installation of a sediment suspension system to discourage sedimentation within the berth area.

- **Amendment No. 4.** On September 21, 2005, the SCSPA submitted an amendment to their permit application that consisted of extending the proposed wharf structure 510-linear feet. The overall length of the proposed wharf (3,510 feet) does not increase the total number of berths (3) at the proposed facility. According to the SCSPA, the additional wharf structure is necessary from an operational standpoint to accommodate an increase in the percentage of 1,000-foot ships that are expected to call at east coast ports during the life of the proposed project.

- **Amendment No. 5.** On July 25, 2006, the SCSPA submitted an amendment to their permit application that revised the proposed new land use conditions and affected waters / wetlands.

- **Amendment No. 6.** On September 29,2006, the SCSPA amended its permit application to update the proposed new land use conditions and affected waters / wetlands.

A copy of the permit application and these amendments is provided in Appendix C.

1.3. AGENCY INVOLVEMENT

1.3.1. U.S. Army Corps of Engineers, Charleston District

The USACE is the lead Federal agency involved in the review process of the Proposed Project. The USACE's responsibilities and specific considerations are discussed in the following sections.

1.3.1.1. Requested Agency Actions

On January 24, 2003, the SCSPA submitted an application to the USACE for a Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act in order to conduct the following activities:

- Placement of fill in the waters of the United States and construction of facilities in the navigable waters of the United States for the development of a marine container terminal and associated access roadway improvements at the Charleston Naval Complex on Cooper River; and

- Dredging of berthing areas adjacent to the proposed terminal to a depth of 50 MLW feet in the Cooper River.

1.3.1.2. Applicable Laws and Regulations

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The construction of any structure in or over any navigable water of the United States, the excavating from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters is unlawful unless the work has been permitted by the USACE. The regulations specifically applicable to permits under Section 10 are found at 33 CFR Part 322.

The USACE regulates the discharge of dredged or fill material into the waters of the United States under the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500; 33 U.S.C. 1344), as amended by the Clean Water Act of 1977 (P.L. 95-217; 33 U.S.C. 1251 et seq.). The selection and use of disposal sites for dredged and/or fill material is guided by regulations at 40 CFR Part 230. The USACE's regulatory program is described in 33 CFR Parts 320-331. The USACE regulations applicable to permits under Section 404 of the Clean Water Act are found at 33 CFR Part 323.

Other Federal statutes and regulations which must be considered in the USACE permitting process are listed in Section 1.4.3.

1.3.1.3. Specific Agency Considerations

Activities Regulated Under the Rivers and Harbors Act and the Clean Water Act

Under its regulatory authorities (see 33 CFR 320.4), the USACE must consider a wide variety of probable project impacts in order to determine whether a proposed Federal action (here, the permitting of the Proposed Project) is contrary to the public interest. The Proposed Project must also be consistent with the Environmental Protection Agency (EPA)'s 404(b)(1) Guidelines (see discussion, below). NEPA analyses (like this EIS) assist agency decision makers making a public interest determination by ensuring that they are informed and understand the environmental consequences of the proposed action and reasonable alternatives. Factors

applicable to the permitting of the Proposed Project that is the subject of this EIS are described briefly in the following paragraphs. Beginning with the subsection entitled *Public Interest* and continuing through the subsection entitled *Mitigation*, the discussions are taken from 33 CFR Part 320.4, except for the last paragraph on land use restrictions under *Other Federal, State or Local Requirements*."

Need for the Proposed Action

The relative extent of public and private need for a proposed project is a factor to be considered in every permit application. In conducting the public interest review, the USACE must balance the public and/or private need against other factors of the public interest. The proposals of private applicants frequently involve both a public as well as private need (e.g., providing the public with needed goods and services). Proposals by public sector applicants presumably address some public need (e.g., public recreation). For private enterprise applications, the USACE will generally assume that appropriate economic evaluations have been performed, and that the proposal is economically viable (i.e., will earn a profit) and needed in the marketplace. Similarly, the Corps may defer to a state or local public entity's determination of need on the basis of that entity's decision to spend public money, and will not assert that such a decision was incorrect for economic or policy reasons. A project's need will generally only be questioned (requiring the applicant to submit a more detailed needs assessment) if the project is unduly speculative and/or if there is a substantiated reason to do so. In such cases, the USACE should make an independent review of the need for the project from the overall perspective of the public interest.

The SCSPA's Statement of Need for the Proposed Project and the USACE's review of this Statement of Need is included in Section 2.0.

Purpose of the Proposed Project and Alternatives

Defining the project purpose(s) is essential to the evaluation of any permit application. The project purpose will help determine what alternatives to the project should be considered, and whether there has been compliance with the 404(b)(1) Guidelines and NEPA.

The 404(b)(1) Guidelines, specifically entitled, "Guidelines for Specification of Disposal Sites for Dredged or Fill Material," are found at 40 CFR Part 230, a copy of which is found in Appendix E. Under the 404(b)(1) Guidelines, the assessment of the project purposes includes two related, but distinct, determinations: the "basic" project purpose, and the "overall" project purpose. The basic project purpose is the fundamental, essential or irreducible purpose of the Proposed Project. The basic project purpose is used to assess whether the project is "water dependent," i.e., whether it requires access or proximity to, or siting within, a special aquatic site such as wetlands in order to fulfill its "basic" purpose. If the project is not water dependent, then "practicable" alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise by the applicant. Even if the project is water dependent, practicable alternatives must still be considered by the USACE. The "overall" project purpose is used to determine whether "practicable" alternatives exist to a proposed project. Regulations state that "[a]n alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." 40 CFR 230.10(a)(2). No discharge of dredged or fill material will be permitted "if there is a practicable alternative to the proposed discharge that would have a less adverse impact on the aquatic ecosystem." 40 CFR 230.10(a)(1). "Practicability" and the attendant factors of cost, technology and logistics are determined from the standpoint of the applicant. The determination

of basic, project purpose, overall project purposes and of whether the 404(b)(1) Guidelines have been satisfied will be made independently by the USACE.

NEPA also requires a detailed discussion of alternatives to the proposed action; however, NEPA requires that all "reasonable" alternatives be examined. "Reasonable" alternatives include those that are practical or feasible from a technical or economic standpoint based on common sense, rather than those that are simply desirable to the applicant. "Reasonable" alternatives do not include remote or speculative alternatives, or alternatives that would not achieve the project purpose. A determination that an alternative is reasonable requires that an agency fully examine the environmental impacts of that alternative in an EIS, even though the alternative may ultimately be rejected. In most cases, the analysis of reasonable alternatives required for NEPA-related documents will provide the information for the evaluation of practicable alternatives under the 404(b)(1) Guidelines. In some cases, however, the NEPA range of alternatives may be broader than that required to be considered under the 404(b)(1) Guidelines or may not have considered the alternatives in sufficient detail to respond to the requirements of these Guidelines. Refer to 40 CFR 230.10(a)(4).

Section 2.0 of this EIS provides the USACE's Statement of Overall Project Purpose.

Public Interest Review

(The following sections are taken from 33 CFR 320.4, General policies for evaluating permit applications. For additional information on the Regulatory Programs of the Corps of Engineers, see 33 CFR 320-331.)

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. Evaluation of the probable impact that the proposed activity may have on the public interest requires a careful weighing of all those factors that become relevant in each particular case. The benefits that reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. The decision whether to authorize a proposal, and if so, the conditions under which it will be allowed to occur, are therefore determined by the outcome of this general balancing process. That decision should reflect the national concern for both protection and utilization of important resources. All factors which may be relevant to the proposal must be considered including the cumulative effects thereof: among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people. For activities involving 404 discharges, a permit will be denied if the discharge that would be authorized by such permit would not comply with the Environmental Protection Agency's 404(b)(1) guidelines. Subject to the preceding sentence and any other applicable guidelines and criteria (see Section 320.2 and 320.3), a permit will be granted unless the district engineer determines that it would be contrary to the public interest.

The following general criteria will be considered in the evaluation of every application:

- The relative extent of the public and private need for the proposed structure or work;

- Where there are unresolved conflicts as to resource use, the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure or work; and

- The extent and permanence of the beneficial and/or detrimental effects which the proposed structure or work is likely to have on the public and private uses to which the area is suited.

The specific weight of each factor is determined by its importance and relevance to the particular proposal. Accordingly, how important a factor is and how much consideration it deserves will vary with each proposal. A specific factor may be given great weight on one proposal, while it may not be present or as important on another. However, full consideration and appropriate weight will be given to all comments, including those of Federal, state, and local agencies, and other experts on matters within their expertise.

Effect on Wetlands

Most wetlands constitute a productive and valuable public resource, the unnecessary alteration or destruction of which should be discouraged as contrary to the public interest. For projects to be undertaken or partially or entirely funded by a Federal, state, or local agency, additional requirements on wetlands considerations are stated in Executive Order 11990, dated 24 May 1977.

Wetlands considered to perform functions important to the public interest include:

- Wetlands that serve important natural biological functions, including food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species;

- Wetlands set aside for study of the aquatic environment or as sanctuaries or refuges;

- Wetlands the destruction or alteration of which would affect detrimentally natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics;

- Wetlands that are important in shielding other areas from wave action, erosion, or storm damage. Such wetlands are often associated with barrier beaches, islands, reefs and bars;

- Wetlands that serve as valuable storage areas for storm and flood waters;

- Wetlands that are ground water discharge areas that maintain minimum baseflows important to aquatic resources and those which are prime natural recharge areas;

- Wetlands that serve important water purification functions; and

- Wetlands that are unique in nature or scarce in quantity to the region or local area.

Although a particular alteration of a wetland may constitute a minor change, the cumulative effect of numerous piecemeal changes can result in a major impairment of wetland resources. Thus, the particular wetland site for which an application is made will be evaluated with the

recognition that it may be part of a complete and interrelated wetland area. In addition, the district engineer may undertake, where appropriate, reviews of particular wetland areas in consultation with the Regional Director of the U. S. Fish and Wildlife Service, the Regional Director of the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration, the Regional Administrator of the Environmental Protection Agency, the local representative of the (Natural Resources) Conservation Service of the Department of Agriculture, and the head of the appropriate state agency to assess the cumulative effect of activities in such areas.

No permit will be granted which involves the alteration of wetlands identified as important by paragraph (b)(2) of this section or because of provisions of paragraph (b)(3), of this section unless the district engineer concludes, on the basis of the analysis required in paragraph (a) of this section, that the benefits of the proposed alteration outweigh the damage to the wetlands resource. In evaluating whether a particular discharge activity should be permitted, the district engineer shall apply the section 404(b)(1) guidelines (40 CFR Part 230. 10(a) (1), (2), (3)).

In addition to the policies expressed in this subpart, the Congressional policy expressed in the Estuary Protection Act, Pub. L. 90-454, and state regulatory laws or programs for classification and protection of wetlands will be considered.

Fish and Wildlife

In accordance with the Fish and Wildlife Coordination Act (paragraph 320.3(e) of this section) district engineers will consult with the Regional Director, U.S. Fish and Wildlife Service, the Regional Director, National Marine Fisheries Service, and the head of the agency responsible for fish and wildlife for the state in which work is to be performed, with a view to the conservation of wildlife resources by prevention of their direct and indirect loss and damage due to the activity proposed in a permit application. The Army will give full consideration to the views of those agencies on fish and wildlife matters in deciding on the issuance, denial, or conditioning of individual or general permits.

Water Quality

Applications for permits for activities that may adversely affect the quality of waters of the United States will be evaluated for compliance with applicable effluent limitations and water quality standards, during the construction and subsequent operation of the proposed activity. The evaluation should include the consideration of both point and non-point sources of pollution. It should be noted, however, that the Clean Water Act assigns responsibility for control of non-point sources of pollution to the states. Certification of compliance with applicable effluent limitations and water quality standards required under provisions of section 401 of the Clean Water Act will be considered conclusive with respect to water quality considerations unless the Regional Administrator, Environmental Protection Agency (EPA), advises of other water quality aspects to be taken into consideration.

Historic, Cultural, Scenic, and Recreational Values

Applications for DA permits may involve areas that possess recognized historic, cultural, scenic, conservation, recreational or similar values. Full evaluation of the general public interest requires that due consideration be given to the effect which the proposed structure or activity may have on values such as those associated with wild and scenic rivers, historic properties and National Landmarks, National Rivers, National Wilderness Areas, National Seashores, National Recreation Areas, National Lakeshores, National Parks, National Monuments,

estuarine and marine sanctuaries, archaeological resources, including Indian religious or cultural sites, and such other areas as may be established under Federal or state law for similar and related purposes. Recognition of those values is often reflected by state, regional, or local land use classifications, or by similar Federal controls or policies. Action on permit applications should, insofar as possible, be consistent with, and avoid significant adverse effects on the values or purposes for which those classifications, controls, or policies were established.

Consideration of Property Ownership

Authorization of work or structures by DA does not convey a property right, nor authorize any injury to property or invasion of other rights.

An inherent aspect of property ownership is a right to reasonable private use. However, this right is subject to the rights and interests of the public in the navigable and other waters of the United States, including the Federal navigation servitude and Federal regulation for environmental protection.

Because a landowner has the general right to protect property from erosion, applications to erect protective structures will usually receive favorable consideration. However, if the protective structure may cause damage to the property of others, adversely affect public health and safety, adversely impact floodplain or wetland values, or otherwise appears contrary to the public interest, the district engineer will so advise the applicant and inform him of possible alternative methods of protecting his property. Such advice will be given in terms of general guidance only so as not to compete with private engineering firms nor require undue use of government resources.

A riparian landowner's general right of access to navigable waters of the United States is subject to the similar rights of access held by nearby riparian landowners and to the general public's right of navigation on the water surface. In the case of proposals that create undue interference with access to, or use of, navigable waters, the authorization will generally be denied.

Where it is found that the work for which a permit is desired is in navigable waters of the United States (see 33 CFR Part 329) and may interfere with an authorized Federal project, the applicant should be apprised in writing of the fact and of the possibility that a Federal project which may be constructed in the vicinity of the proposed work might necessitate its removal or reconstruction. The applicant should also be informed that the United States will in no case be liable for any damage or injury to the structures or work authorized by Sections 9 or 10 of the Rivers and Harbors Act of 1899 or by section 404 of the Clean Water Act which may be caused by, or result from, future operations undertaken by the Government for the conservation or improvement of navigation or for other purposes, and no claims or right to compensation will accrue from any such damage.

Proposed activities in the area of a Federal project that exists or is under construction will be evaluated to insure that they are compatible with the purposes of the project.

A DA permit does not convey any property rights, either in real estate or material, or any exclusive privileges. Furthermore, a DA permit does not authorize any injury to property or invasion of rights or any infringement of Federal, state or local laws or regulations. The applicant's signature on an application is an affirmation that the applicant possesses or will possess the requisite property interest to undertake the activity proposed in the application. The

district engineer will not enter into disputes but will remind the applicant of the above. The dispute over property ownership will not be a factor in the Corps public interest decision.

Activities Affecting Coastal Zone

Applications for DA permits for activities affecting the coastal zones of those states having a coastal zone management program approved by the Secretary of Commerce will be evaluated with respect to compliance with that program. No permit will be issued to a non-Federal applicant until certification has been provided that the proposed activity complies with the coastal zone management program and the appropriate state agency has concurred with the certification or has waived its right to do so. However, a permit may be issued to a non-Federal applicant if the Secretary of Commerce, on his own initiative or upon appeal by the applicant, finds that the proposed activity is consistent with the objectives of the Coastal Zone Management Act of 1972 or is otherwise necessary in the interest of national security. Federal agency and Indian tribe applicants for DA permits are responsible for complying with the Coastal Zone Management Act's directives for assuring that their activities directly affecting the coastal zone are consistent, to the maximum extent practicable, with approved state coastal zone management programs.

Other Federal, State, or Local Requirements

Processing of an application for a DA permit normally will proceed concurrently with the processing of other required Federal, state, and/or local authorizations or certifications. Final action on the DA permit will normally not be delayed pending action by another Federal, state or local agency (See 33 CFR 325.2 (d)(4)). However, where the required Federal, state and/or local authorization and/or certification has been denied for activities which also require a Department of the Army permit before final action has been taken on the Army permit application, the district engineer will, after considering the likelihood of subsequent approval of the other authorization and/or certification and the time and effort remaining to complete processing the Army permit application, either immediately deny the Army permit without prejudice or continue processing the application to a conclusion. If the district engineer continues processing the application, he will conclude by either denying the permit as contrary to the public interest, or denying it without prejudice indicating that except for the other Federal, state or local denial the Army permit could, under appropriate conditions, be issued. Denial without prejudice means that there is no prejudice to the right of the applicant to reinstate processing of the Army permit application if subsequent approval is received from the appropriate Federal, state and/or local agency on a previously denied authorization and/or certification. Even if official certification and/or authorization is not required by state or Federal law, but a state, regional, or local agency having jurisdiction or interest over the particular activity comments on the application, due consideration shall be given to those official views as a reflection of local factors of the public interest.

The primary responsibility for determining zoning and land use matters rests with state, local and tribal governments. The district engineer will normally accept decisions by such governments on those matters unless there are important issues of overriding national importance. Such issues would include but are not necessarily limited to national security, navigation, national economic development, water quality, preservation of special aquatic areas, including wetlands, with substantial interstate importance, and national energy needs. Whether a factor has overriding importance will depend on the degree of impact in an individual case.

A proposed activity may result in conflicting comments from several agencies within the same state. Where a state has not designated a single responsible coordinating agency, district

engineers will ask the Governor to express his views or to designate one state agency to represent the official state position in the particular case.

In the absence of overriding national factors of the public interest that may be revealed during the evaluation of the permit application, a permit will generally be issued following receipt of a favorable state determination provided the concerns, policies, goals, and requirements as expressed in 33 CFR Parts 320-324, and the applicable statutes have been considered and followed: e.g., the National Environmental Policy Act; the Fish and Wildlife Coordination Act; the Historical and Archaeological Preservation Act; the National Historic Preservation Act; the Endangered Species Act; the Coastal Zone Management Act; the Marine Protection, Research and Sanctuaries Act of 1972, as amended; the Clean Water Act, the Archaeological Resources Act, and the American Indian Religious Freedom Act. Similarly, a permit will generally be issued for Federal and Federally-authorized activities; another Federal agency's determination to proceed is entitled to substantial consideration in the Corps' public interest review.

Where general permits to avoid duplication are not practical, district engineers shall develop joint procedures with those local, state, and other Federal agencies having ongoing permit programs for activities also regulated by the Department of the Army. In such cases, applications for DA permits may be processed jointly with the state or other Federal applications to an independent conclusion and decision by the district engineer and the appropriate Federal or state agency. (See 33 CFR 325.2(e).)

The district engineer shall develop operating procedures for establishing official communications with Indian Tribes within the district. The procedures shall provide for appointment of a tribal representative who will receive all pertinent public notices, and respond to such notices with the official tribal position on the proposed activity. This procedure shall apply only to those tribes that accept this option. Any adopted operating procedures shall be distributed by public notice to inform the tribes of this option.

Floodplain Management

Floodplains possess important natural values and carry out numerous functions important to the public interest. These include:

- Water resources values (natural moderation of floods, water quality maintenance, and groundwater recharge);
- Living resource values (fish, wildlife, and plant resources);
- Cultural resource values (open space, natural beauty, scientific study, outdoor education, and recreation); and
- Cultivated resource values (agriculture, aquaculture, and forestry).

Although a particular alteration to a floodplain may constitute a minor change, the cumulative impact of such changes may result in a degradation of floodplain values and functions and in increased potential for harm to upstream and downstream activities. In accordance with the requirements of Executive Order 11988, district engineers, as part of their public interest review, should avoid to the extent practicable, long and short-term significant adverse impacts associated with the occupancy and modification of floodplains, as well as the direct and indirect support of floodplain development whenever there is a practicable alternative. For those

activities which in the public interest must occur in or impact upon floodplains, the district engineer shall ensure, to the maximum extent practicable, that the impacts of potential flooding on human health, safety, and welfare are minimized, the risks of flood losses are minimized, and, whenever practicable the natural and beneficial values served by floodplains are restored and preserved.

In accordance with Executive Order 11988, the district engineer should avoid authorizing floodplain developments whenever practicable alternatives exist outside the floodplain. If there are no such practicable alternatives, the district engineer shall consider, as a means of mitigation, alternatives within the floodplain that will lessen any significant adverse impact to the floodplain.

Navigation

Section 11 of the Rivers and Harbors Act of 1899 authorized establishment of harbor lines shoreward of which no individual permits were required. Because harbor lines were established on the basis of navigation impacts only, the Corps of Engineers published a regulation on 27 May 1970 (33 CFR 209.150) which declared that permits would thereafter be required for activities shoreward of the harbor lines. Review of applications would be based on a full public interest evaluation and harbor lines would serve as guidance for assessing navigation impacts. Accordingly, activities constructed shoreward of harbor lines prior to 27 May 1970 do not require specific authorization.

The policy of considering harbor lines as guidance for assessing impacts on navigation continues.

Protection of navigation in all navigable waters of the United States continues to be a primary concern of the Federal government.

District engineers should protect navigational and anchorage interests in connection with the NPDES program by recommending to EPA or to the state, if the program has been delegated, that a permit be denied unless appropriate conditions can be included to avoid any substantial impairment of navigation and anchorage.

Environmental Benefits

Some activities that require Department of the Army permits result in beneficial effects to the quality of the environment. The district engineer will weigh these benefits as well as environmental detriments along with other factors of the public interest.

Economics

When private enterprise makes application for a permit, it will generally be assumed that appropriate economic evaluations have been completed, the proposal is economically viable, and is needed in the market place. However, the district engineer in appropriate cases may make an independent review of the need for the project from the perspective of the overall public interest. The economic benefits of many projects are important to the local community and contribute to needed improvements in the local economic base, affecting such factors as employment, tax revenues, community cohesion, community services, and property values. Many projects also contribute to the National Economic Development (NED), (i.e., the increase in the net value of the national output of goods and services).

Mitigation

[NOTE : This is a general statement of mitigation policy which applies to all Corps of Engineers regulatory authorities covered by these regulations (33 CFR Parts 320-330). It is not a substitute for the mitigation requirements necessary to ensure that a permit action under section 404 of the Clean Water Act complies with the section 404(b)(1) Guidelines. There is currently an interagency Working Group formed to develop guidance on implementing mitigation requirements of the Guidelines.]

Mitigation is an important aspect of the review and balancing process on many Department of the Army permit applications. Consideration of mitigation will occur throughout the permit application review process and includes avoiding, minimizing, rectifying, reducing, or compensating for resource losses. Losses will be avoided to the extent practicable. Compensation may occur onsite or at an off-site location. Mitigation requirements generally fall into three categories.

- Project modifications to minimize adverse project impacts should be discussed with the applicant at pre-application meetings and during application processing. As a result of these discussions and as the district engineer's evaluation proceeds, the district engineer may require minor project modifications. Minor project modifications are those that are considered feasible (cost, constructability, etc.) to the applicant and that, if adopted, will result in a project that generally meets the applicant's purpose and need. Such modifications can include reductions in scope and size; changes in construction methods, materials or timing; and operation and maintenance practices or other similar modifications that reflect a sensitivity to environmental quality within the context of the work proposed. For example, erosion control features could be required on a fill project to reduce sedimentation impacts or a pier could be reoriented to minimize navigational problems even though those projects may satisfy all legal requirements (paragraph (r)(1)(ii) of this section) and the public interest review test (paragraph (r)(1)(iii) of this section) without such modifications.

- Further mitigation measures may be required to satisfy legal requirements. For Section 404 applications, mitigation shall be required to ensure that the project complies with the 404(b)(1) Guidelines. Some mitigation measures are enumerated at 40 CFR 230.70 through 40 CFR 230.77 (Subpart H of the 404(b)(1) Guidelines).

- Mitigation measures in addition to those under paragraphs (r)(1) (i) and (ii) of this section may be required as a result of the public interest review process. (See 33 CFR 325.4(a).) Mitigation should be developed and incorporated within the public interest review process to the extent that the mitigation is found by the district engineer to be reasonable and justified. Only those measures required to ensure that the project is not contrary to the public interest may be required under this subparagraph.

All compensatory mitigation will be for significant resource losses which are specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment. Also, all mitigation will be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable. District engineers will require all forms of mitigation, including compensatory mitigation, only as provided in paragraphs (r)(1) (i) through (iii) of this section. Additional mitigation may be added at the applicants' request.

1.3.2. U.S. Department of Transportation, Federal Highway Administration

1.3.2.1. Requested Agency Actions

The U.S. Department of Transportation, Federal Highway Administration's (FHWA) is the **cooperating Federal agency** for the development of this EIS. As a cooperating agency (i.e., an agency with jurisdiction by law or special expertise), the FHWA must comment on issues in the EIS that are within the administration's jurisdiction, expertise, or authority. If the FHWA is satisfied that its views are adequately reflected in the EIS, it should simply comment accordingly. Conversely, if the cooperating agency determines that the draft EIS is incomplete, inadequate or inaccurate, or it has other comments, it should promptly make such comments.

To address its NEPA responsibilities, the FHWA issued regulations (23 CFR Part 771, *Environmental Impact and Related Procedures*). The FHWA guidance for implementing these regulations was issued in the form of a Technical Advisory (T.6640.8a), *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. The Technical Advisory provides detailed information on the contents and processing of environmental documents.

The FHWA was invited to be a cooperating agency because of the potential impacts the construction and operation of the proposed marine container terminal may have on existing transportation infrastructure and potential improvements. In addition to commenting on the EIS, the FHWA has reviewed and commented on technical reports developed during the preparation of the EIS. In particular, the FHWA and S.C. Department of Transportation (SCDOT) reviewed potential transportation infrastructure improvements identified in the MOUA and evaluated in the *Access Roadway Feasibility Study* that was prepared to evaluate and identify an access roadway corridor.

The FHWA also has specific policies, that were put forth in the Federal Register, dated February 11, 1998 (Volume 63, Number 28), for adding interchanges to the existing Interstate System. These requirements and guidelines are in place to provide access control to the Interstate System, which is critical in maintaining the services of the Interstate System in terms of safety and mobility

The proposed port access roadway would require modifications to the I-26 interchanges at Exits 217 and 218. In accordance with 23 USC 111, any additional access (new or revised) to the Interstate System requires the approval of the Secretary of Transportation. The Secretary has delegated this authority to FHWA pursuant to 49 CRF 1.48(b)(10). Under the authority of FHWA, the proposed interchange modifications constitute a Federal action and, as such, compliance with NEPA is required. In addition to compliance with NEPA, FHWA must also evaluate the proposed Interstate modifications for engineering and operational acceptability.

1.3.3. U.S. Environmental Protection Agency

Under Section 309 of the Clean Air Act (CAA), EPA is required to review and publicly comment on the environmental impacts of major Federal actions including actions which are the subject of draft and final Environmental Impact Statements, proposed environmental regulations, and other proposed major actions. If EPA determines that the action is environmentally unsatisfactory, it is required by Section 309 to refer the matter to the U.S. Council on Environmental Quality (CEQ).

Additionally, the EPA has important review responsibilities under the Clean Water Act in regard to USACE authorizations for the disposal of dredged and fill materials. In order to ensure the full

involvement of the EPA in the development of this EIS, the agency has been requested to participate in various technical working groups.

Under the provisions of the Section 404 of the Clean Water Act, the EPA has review authority over permits issued by the USACE for the placement of fill into waters of the United States. Specific guidance regarding the placement of fill into the waters of the United States is provided by Guidelines adopted pursuant to Section 404(b)(1) of the Act (40 CFR Part 230). If the EPA disagrees with the determination of the USACE regarding such authorizations, the EPA may veto a permit under the provisions of Section 404(c).

For permits issued under Section 404 of the Clean Water Act, the primary consideration of the EPA is the compliance of the proposed action with the Section 404(b)(1) Guidelines (40 CFR Part 230); a copy of EPA's 404(b)(1) Guidelines is included in Appendix E.

The EPA has concurrent responsibility to review the potential impacts of the proposed action on water quality. While certification of compliance with applicable effluent limitations and water quality standards issued by a state under the provisions of Section 401 of the Clean Water Act is considered conclusive with respect to water quality considerations, the EPA may advise the USACE of other water quality aspects to be taken into consideration.

1.3.4. S.C. Department of Health and Environmental Control

The USACE, Charleston District and the State of South Carolina have established a joint application process for activities (i.e., those activities affecting waters of the U.S. or critical areas of the State) requiring both Federal and State review and approval. As such, SCDHEC's offices of Ocean and Coastal Resource Management (OCRM) and Environmental Quality Control (EQC) also have regulatory authority over the proposed action.

Section 401 of the CWA requires the SCDHEC to certify that the discharge of dredge and fill material into waters of the U.S. complies with state water quality standards. This discharge of dredge and fill material for the Proposed Project would require Section 401 water quality certification. The USACE cannot issue the DA permit without Section 401 water quality certification.

The applicants are proposing construction in the coastal zone; therefore, Coastal Zone Consistency Certification will be required from SCDHEC, OCRM. The State of South Carolina also requires a permit to construct in a critical area of the State.

1.4. THE NEPA PROCESS

1.4.1. Previous and Future Actions

1.4.1.1. Notice of Intent

A Notice of Intent to prepare this EIS was published in the *Federal Register*, Volume 69, No. 33, February 19, 2004. A copy of the Notice of Intent is included in Appendix G.

1.4.1.2. Scoping

Public and Agency Scoping Meetings

Public and agency scoping meetings were held on March 16, 2004 and March 22, 2004, respectively. The purpose of these scoping meetings was to solicit public and agency input on topics to be addressed in the EIS. Written and oral comments were received during the meetings. In the 30-day commenting period that followed each of the meetings, individuals and agencies were also able to submit comments via a hotline (843-971-7970) and a project website (www.PortEIS.com). Scoping comments were considered when developing the scope of the EIS. Copies of the public notices announcing these Scoping Meetings are included in Appendix H.

1.4.1.3. Public Outreach Process

In an effort to receive feedback from the public and provide information on the status of the EIS, the USACE offered several alternate methods throughout the project. Additional information on the Public Outreach Process is summarized in Section 7.0 of this draft EIS.

Public Information Workshops

The Public Information Workshops are a means for the USACE to provide the public up-to-date information related to the development of the EIS. These workshops have been held at key times during the development of the EIS when advancements were made and information became available. The workshops that have been held thus far are listed below:

- Public Information Workshop, March 16, 2004; Sterett Hall, North Charleston, SC
- Public Information Workshop, August 25, 2004; Citadel Alumni Center, Charleston, SC
- Public Information Workshop, May 12, 2005; North Charleston Coliseum, North Charleston, SC
- *Tour of the Draft EIS*, November 1, 2005; Sterett Hall, North Charleston, SC
- Public Information Workshop, November 17, 2005; North Charleston Performing Arts Center
- Public Information Workshop, January 26, 2006, Gethsemani Community Center, North Charleston, SC
- Public Information Workshop, March 30, 2006, Military Magnet Academy, North Charleston, SC

Neighborhood Outreach Meetings

These neighborhood meetings were a means for the USACE to go to the communities that are within the study area of the EIS and provide information on the Proposed Project and the process of developing an EIS. These meetings were a valuable opportunity for community residents to meet with the USACE in a familiar setting, ask questions relevant to their needs, and submit scoping comments/feedback. The neighborhood meetings that the USACE attended are listed below:

- Liberty Hill Neighborhood Association, March 18, 2004; Felix Pinckney Community Center, North Charleston, SC

- Glenn Terrace/Oak Ridge Neighborhood Association, April 5, 2004; Collins Park Road Community Center, North Charleston, SC

- City of North Charleston Neighborhood Association Presidents, April 13, 2004; City of North Charleston City Hall, North Charleston, SC

- Chicora-Cherokee Neighborhood Association, April 14, 2004; Chicora Elementary School, North Charleston, SC

- Union Heights Neighborhood Association, April 16, 2004; Gethsemini Community Center, North Charleston, SC

- Olde North Charleston Neighborhood Council, May 11, 2004; Olde North Charleston Meeting Place, North Charleston, SC

- Citizens Advisory Group Meeting, August 4, 2005; City of North Charleston City Hall, 1st Floor Meeting Room.

Other Outreach Methods

In addition to hosting public outreach meetings, the USACE provided several alternate methods for the public to receive and submit information pertaining to the EIS, including:

- A public-access project website (www.PortEIS.com) maintained throughout the development of the EIS and provides readers the latest news about the status of the EIS, supporting documents, and the ability to provide information via online feedback forms;

- A hotline (843-971-7970) providing brief announcements on the latest EIS developments and the ability for interested parties to leave a recorded message that is later transcribed and documented as public feedback;

- Email and U.S. Postal Service alerts sent out to members of the public that registered to receive updates on the EIS via either or both of these methods. People could request to be added to the mailing list(s) online via the project website, over the phone via the hotline, or in person at the public outreach meetings; and

- A series of newsletters, called PortEIS News, beginning in July, 2004 and distributed at key points throughout the development of the EIS. Hardcopies and electronic copies of PortEIS News were sent to people on the U.S. Postal Service mailing list

and email list, respectively. Electronic copies of PortEIS News issues were also available for downloading on the project website.

1.4.1.4. Public Hearing

A Public Hearing was held on November 17, 2005 at the North Charleston Performing Arts Center. The USACE conducted the Public Hearing as part of the NEPA process to receive oral and written comments from the public on the draft EIS. These comments were then incorporated and addressed in the final EIS. Representatives of the USACE and its consultant team were present at a public information workshop that was held concurrently to provide input on specific issues and concerns.

1.4.1.5. Final Environmental Impact Statement (FEIS)

After the Public Hearing and the comment period that followed, the USACE prepared this final EIS. The final EIS will include responses to all comments received regarding the draft EIS and modifications made to the EIS in response to those comments. The release of the final EIS will be published in the Federal Registrar.

1.4.1.6. Record of Decision (ROD)

Following the publication of the final EIS, the USACE will prepare a Record of Decision regarding the USACE's decision on the SCSPA's permit application.

1.4.2. The Scope of this EIS

This EIS has been prepared to disclose the potential environmental impacts associated with the SCSPA's proposed development of a marine container terminal at the southern end of the Charleston Naval Complex in North Charleston, South Carolina. This EIS also addresses all reasonably foreseeable developments associated with the proposed terminal including roadway access to the terminal for a 20-year planning and development timeframe from 2005 to 2025.

According to the SCSPA, harbor deepening is not required to construct or operate the Proposed Project. The USACE believes this assessment is reasonable because the SCSPA currently operates three marine container terminals in Charleston Harbor. Therefore, any future requirements for harbor deepening cannot be directly or individually linked to the Proposed Project. For the purposes of this EIS, future harbor deepening is considered a speculative activity because it would require the preparation of a detailed economic and environmental assessment and Congressional Authorization and funding.

At this time, the SCSPA has requested that the Corps of Engineers conduct a preliminary reconnaissance study to evaluate harbor deepening. Currently this study has not been funded. In the event that a preliminary study is funded and determines that it is reasonable to evaluate future harbor deepening, the public will be able to participate and provide comments on those future economic and environmental studies.

1.4.3. Environmental Regulations That Must Be Considered

The Proposed Project must be developed in accordance with all applicable Federal laws and regulations. Applicable laws and regulations include, but are not limited to, the following:

1.4.3.1. Federal Statutes

- The National Environmental Policy Act of 1969 ("NEPA" P.L. 91-190; 42 U.S.C. 4321);

- The Clean Air Act (as amended by P.L. 91-604);
- The Noise Control Act of 1972 (P.L. 92-574; 42 U.S.C. 4901);
- Homeland Security Act of 2002;
- Section 106, National Historic Preservation Act of 1966 (P.L. 89-665; 16 U.S.C. 470(f));
- The Archaeological and Historic Data Preservation Act of 1974 (P.L. 86-253, as amended by P.L. 93-291, 16 U.S.C. 469);
- The Endangered Species Act of 1973 (P.L. 93-205; 16 U.S.C. 1531(a)-(d));
- The Rivers and Harbors Act of 1899 (33 U.S.C. 403);
- Federal Water Pollution Control Act Amendments for 1972 (P.L. 92-500; 33 U.S.C. 1344), as amended by the Clean Water Act of 1977 (P.L. 95-217; 33 U.S.C. 1251 et seq.);
- The Fish and Wildlife Act of 1956 (16 U.S.C. 7421. et seq.);
- The Migratory Marine Game-Fish Act (16 U.S.C. 760c-760g);
- The Magnuson-Stevens Fishery Conservation Management Act;
- The Fish and Wildlife Coordination Act (16 U.S.C. 661-666c);
- The Wild and Scenic Rivers Act (16 U.S.C. 1279 et seq.);
- The Coastal Zone Management Act of 1972 (P.L. 92-583; 16 U.S.C. 1451-1464);
- The Coastal Barrier Resources Act of 1982 (P.L. 97-348; 16 U.S.C. 3501-3510);
- The Water Bank Act (P.L. 91-559; 16 U.S.C. 1301);
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-528; 42 U.S.C. 4601);
- The Farmland Protection Policy Act (P.L. 97-98 and 7 CFR Part 658);
- The Federal Land Policy and Management Act of 1976 (P.L. 94-579; 43 U.S.C. 1701 et seq.);
- The Department of Transportation Act (49 U.S.C.);
- The Resource Conservation and Recovery Act of 1976 (P.L. 94-580; 42 U.S.C. 6901 et seq., as amended by the Solid Waste Disposal Act of 1980 (P.L. 96-482), and the 1984 Hazardous and Solid Waste Amendments (P.L. 98-616);
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (P.L. 96-510; 42 U.S.C. 9601 et seq.);

- The Community Environmental Response Facilitation Act of 1992 (P.L. 102-426; 42 U.S.C. 9601 et seq.);
- Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378:16 U.S.C. 1600-1614) as amended by the National Forest Management Act of 1976 (P.L. 94-588); and
- The Weeks Law of March 1, 1911 (P.L. 61-435, 36 Stat. 961, as amended).

1.4.3.2. Federal Regulations

- 33 CFR Parts 1 - 200;
- 33 CFR Parts 320 - 331;
- 40 CFR Parts 220 - 230;
- 40 CFR Parts 1500-1508;
- 36 CFR Part 800 (39 FR 3365; January 25, 1974, and 51 FR 31115; September 1986);
- 7 CFR Part 657 (43 FR 4030; January 31, 1978);
- 49 CFR Part 18 (March 11, 1988);
- 49 CFR Part 24 (March 2, 1989);
- 33 CFR Part 320 et seq.;
- 40 CFR Part 230;
- 36 CFR Part 215;
- 36 CFR Part 251; and
- 36 CFR Part 254.

1.4.3.3. Executive Orders

- Executive Order 11593, Protection and Enhancement of the Cultural Environment, May 13, 1971;
- Executive Order 11988, Floodplain Management (43 FR 6030);
- Executive Order 11990, Protection of Wetlands;
- Executive Order 123772, Intergovernmental Review of Federal Programs, July 14, 1982;
- President's 1979 Environmental Message Directive on Wild and Scenic Rivers, August 2, 1979;

- Executive Order 11514, Protection and Enhancement of Environmental Quality, March 4, 1970;

- Executive Order 11296, Flood Hazard Evaluation Guidelines;

- Executive Order 12898, Federal Actions Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994; and

- Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks.

1.4.3.4. State Regulations

- South Carolina Coastal Zone Management Act, §48-39-10, et seq., 1976 SC Code Ann., as amended.

- South Carolina Coastal Zone Management Program (1979), as amended.

- SCDHEC/OCRM Rules and Regulations for Permitting in the Critical Areas of the Coastal Zone, R. 30-1, et seq., 1976 SC Code Ann., as amended.

- SCDHEC 401 Water Quality Certification Regulations, R. 61-101, 1976 SC Code Ann., as amended.

- SCDHEC Water Classifications and Standards, R. 61-68, 1976 SC Code Ann., as amended.

- SCDHEC Classified Waters, R. 61-69, 1976 SC Code Ann., as amended

- SCDHEC Hazardous Waste Management, R. 61-79 (June 2004)

Agency Orders

- Order DOT 5650-2-Floodplain Management and Protection, April 23, 1979;

- Order DOT 5660.1A, Preservation of the Nation's Wetlands August 24, 1978; and

- 49 CFR Part 17, Intergovernmental Review of DOT Programs and Activities.

2.0 NEED AND PURPOSE FOR THE PROPOSED PROJECT

This section contains the Applicant's "Statement of Need" for the Proposed Project, the USACE's review of the Applicant's Statement and the USACE's determination of "Purpose" for the Proposed Project. The "Overall Project Purpose" is the central factor that guides the EIS for identifying and evaluating all reasonable and practicable alternatives.

2.1. SCSPA STATEMENT OF NEED

This section summarizes the Statement of Need written by the SCSPA. A copy of the SCSPA's Statement of Need is included in Appendix K.

2.1.1. The Need for Additional Terminal Capacity

2.1.1.1. Existing and Projected Throughput Demand

The total container throughput for the Port of Charleston for the fiscal year 2003 was an estimated 1.68 million twenty-foot equivalent units (TEU). A TEU is an industry-standard measurement of volume in which one TEU is the equivalent of one standard twenty-foot ocean shipping container. For the time period of 1998 to 2003, the container throughput for the Port of Charleston grew at a compound annual growth rate of 5.97%.

A forecasting model was used to predict future container volumes for the Port of Charleston. The model was based on customer trade lane data compiled by the Port Import Export Reporting Service (PIERS), macroeconomic growth drivers and annual growth rates by trade lane projected by the Wharton Econometric Forecasting Association (WEFA), and customer-specific information provided by the SCSPA. Model forecasting predicted container throughput for the Port of Charleston to grow from 1.65 million TEU in 2004 to 4.0 million TEU in 2025. This represents a compound annual growth rate of 4.28%. This projection is illustrated in Figure 2.1-1.

2.1.1.2. Existing Throughput Capacity and Constraints

The SCSPA estimates that nine berths at its three existing terminals have a maximum practical capacity (MPC) of 2.6 million TEU annual throughput. These terminals are described in Section 4.5 of this EIS. This MPC estimate takes into account ongoing improvements to existing facilities. Further increases in throughput capacity are primarily constrained by the land area available for storage and processing of containers, and the length of wharf and apron available for unloading ships. *Based on the projected container growth rate, throughput volume will exceed the MPC by 2014.* The existing maximum practical throughput capacity for the SCSPA's existing terminals is listed in Table 2.1-1.

Table 2.1-1. SCSPA's Current Thoughput and Maximum Practical Throughput Capacity.

Terminal	Current Throughput (TEUs) (Year 2003)	Maximum Throughput (TEUs)
Columbus Street	239,111	349,592
North Charleston	410,315	712,678
Wando-Welch	1,018,025	1,583,739
Total	*1,667,459*	*2,646,009*

Source: "Updated Throughput Analysis" (SCSPA, November 13, 2004).

2.1.1.3. Cost-Competitive Advantages of a Charleston Location

The SCSPA has stated that the Greater Charleston area offers numerous competitive advantages as a location for the proposed marine terminal, and the projected need for the facility is based upon market surveys assuming a Charleston location and the transportation and infrastructure advantages it offers to the Port of Charleston service area. From a port management perspective, services such as Management, Maintenance, Engineering, Information Technology and Security can be more effectively and economically provided from a location central to existing facilities. As facility locations become more remote there is the potential that inefficiencies would arise in the delivering of the needed services. In addition, the Port of Charleston has Federally maintained navigation channels with terminals within a short sailing time of the ocean. Other infrastructure includes two major railroads with services to Atlanta and Charlotte, several motor carriers with highway access via I-26 to I-95, I-77, I-20, and I-85, and a strong labor force. The SCSPA maintains that all services are provided at competitive rates because of the competitive and cooperative working relationships that have developed in the evolution of the Port of Charleston.

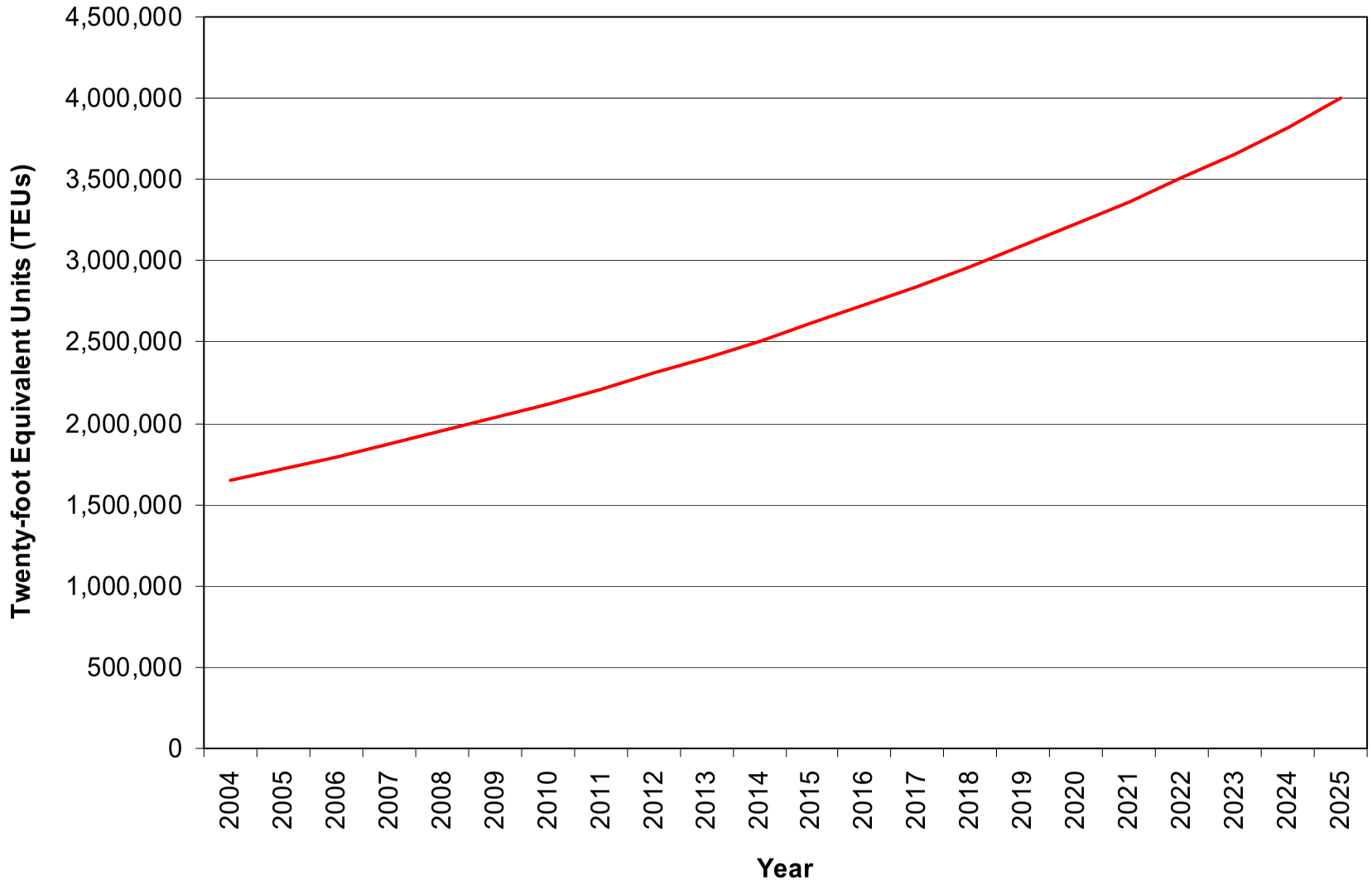


Figure 2.1-1.
Projection of Container Throughput for the Port of Charleston for the Years 2004 – 2025 (Assuming a 4.28% Compound Annual Growth Rate).

U.S. Army Corps of Engineers
Charleston District

2.2. USACE DETERMINATION OF OVERALL PROJECT PURPOSE AND REVIEW OF NEED

2.2.1. Purpose of the SCSPA's Proposed Action

2.2.1.1. USACE's Responsibility

Under Section 404 of the Clean Water Act, as implemented through the Section 404(b)(1) Guidelines (40 CFR 230.10(10)), it is the responsibility of the USACE to identify the basic and overall purposes of a proposed project. The basic purpose is the fundamental, essential, or irreducible purpose of the proposed project and is used to determine whether the applicant's project is "water dependent" (40 CFR 230.10(a)(3)). The basic project purpose includes only the physical aspects of the project and does not include nonphysical aspects, such as project viability. The overall project purpose is determined by further defining the basic project purpose to describe the applicant's specific project. The alternatives analysis required under the Section 404(b)(1) Guidelines is based on the overall project purpose. The Corps must ensure that the overall project purpose of an applicant's proposal is not defined in an overly narrow manner merely for the purpose of precluding the possible existence of practicable alternatives. The Corps must consider the applicant's and other Federal agencies' views on the proper definition of overall project purpose, regarding a proposed project's appropriate size, need, and configuration. However, the Corps must independently determine the proper definition of overall project purpose to ensure that the range of potential practicable alternatives is not unduly restricted and at the same time not so broad that an inordinately large number of alternatives would have to be considered.

Section 3.0 of this EIS includes a general discussion of the Proposed Project, the process that was used to identify Project Alternatives, and a comparison of the potential impacts associated with each of the alternatives that are being evaluated in this EIS.

2.2.1.2. USACE Statement of Project Purpose

The USACE has developed the following statement of purpose for the Proposed Action:

> *"To provide state-owned port facilities that meet the reasonably projected throughput capacity for containerized cargo in the state of South Carolina for the next twenty years"*

The alternatives that were developed in accordance with this Statement of Purpose are presented in Section 3.0 of this EIS.

2.2.1.3. USACE's Review of SCSPA's Statement of Need

The need for a project is a public interest factor which is separate from the Corps' determination of overall project compliance with the Section 404(b)(1) Guidelines. As discussed previously, the USACE's public interest review must balance the public and/or private need for a project against other factors of the public interest (see discussion in Section 1.3.1.3, Need for the Proposed Project).

A summary of the USACE's review of the Applicant's Statement of Need is provided in the following paragraphs. A copy of the USACE's review of the Statement of Need is included in Appendix L.

Growth in Containerized Cargo

After a review of the SCSPA's traffic projections, it is the opinion of the USACE that the traffic forecast for the Port of Charleston is conservative but is within the limits of acceptable forecasting procedures.

Table 2.2-1 shows the projected volumes of containerized cargo for the Port of Charleston from 2004 to 2025. The first column of projections was based on a compound annual growth rate of 4.28% and a base volume of 1,500,000 TEU in 2002 (actual data at the time of the analysis), which were provided by the SCSPA. The second two columns of projections were based on information obtained from the Institute for Water Resources Report 00-R-04, *National Dredging Needs Study of U.S. Ports and Harbors: Update 2000*. An 8% and a 9% market share were applied to the U.S. container trade projections to estimate projected TEU in the Port of Charleston through 2025.

Table 2.2-1. Projected Volumes of Containerized Cargo for the Port of Charleston from 2004 until 2025 (both SCSPA and USACE projections are presented).

Year	Projected TEU		
	SCSPA Projections	Charleston at 8% market share*	Charleston at 9% market share*
2004	1,650,000	1,763,680	1,984,140
2005	1,720,620	1,832,395	2,061,444
2006	1,794,263	1,935,467	2,177,400
2007	1,871,057	2,038,539	2,293,357
2008	1,951,138	2,141,611	2,409,313
2009	2,034,647	2,244,684	2,525,269
2010	2,121,730	2,347,756	2,641,225
2011	2,212,540	2,519,543	2,834,486
2012	2,307,237	2,691,330	3,027,746
2013	2,405,986	2,863,117	3,221,006
2014	2,508,962	3,034,904	3,414,267
2015	2,616,346	3,206,691	3,607,527
2016	2,728,326	3,298,311	3,710,599
2017	2,845,098	3,389,930	3,813,672
2018	2,966,868	3,481,550	3,916,744
2019	3,093,850	3,573,170	4,019,816
2020	3,226,267	3,664,790	4,122,888
2021	3,364,351	3,825,124	4,303,265
2022	3,508,345	3,985,459	4,483,641
2023	3,658,503	4,145,793	4,664,017
2024	3,815,087	4,306,128	4,844,394
2025	4,000,000	4,466,462	5,024,770

* *USACE projections*

The compounded growth rate used in the SCSPA's analysis for determining future needs was 4.28 percent, which is reasonable when compared to the compounded growth of 4.52 percent that was derived by the Institute for Water Resources for U.S. container trade projections from

2000 to 2025. The estimate of 1,650,000 TEU in 2004 (best estimate at the time of the analysis) is lower than the actual TEU handled in that year (1,725,000 TEU). This under estimation of TEU may negatively skew the SCSPA's projections for the period 2005 through 2025.

The Port of Charleston has undergone rapid growth in the past twenty years. During this time of rapid expansion the port established itself as the major container port in the southeast second only to New York for the entire East Coast. However, it is reasonable to assume that this rapid growth is not sustainable in the future due to the limited capacity at existing and proposed terminals. In any case the assumptions and the methods used by the Port of Charleston are reasonable and do not overstate the need for the proposed expansion of port capacity.

3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1. INTRODUCTION

The identification and evaluation of alternative methods of accomplishing the purpose and need for the Proposed Action are two of the most important elements of an EIS. NEPA requires that in addition to the Proposed Action, an EIS must evaluate a No-Action Alternative and other reasonable alternative actions which would meet the defined project purpose and need. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and make common sense.

3.2. PROPOSED PROJECT

As described in Section 1.0, the SCSPA has submitted an application for a Department of the Army permit to develop a marine container terminal at the southern end of the Charleston Naval Complex, North Charleston, SC. The U.S. Army Corps of Engineers is preparing this EIS to assist in evaluating the permit application and to determine whether to authorize the dredging and placement of fill material in waters of the United States associated with developing the Proposed Project. Copies of the permit application and amendments that were submitted by the SCSPA during the preparation of this EIS are included in Appendix C.

In addition, SCDOT has submitted a permit application to develop a four-lane access roadway that will directly connect the proposed terminal with Interstate 26. The access roadway is considered an integral part of the future operation of the proposed port facility. Therefore, the access roadway is included in this EIS and is being evaluated in conjunction with the proposed port facility. Likewise, the conceptual alternatives evaluated in this EIS consist of a proposed port facility and an access roadway, which would improve connectivity with existing transportation infrastructure. Copies of the SCDOT's permit application and its amendments are included in Appendix D.

3.2.1. Proposed Marine Container Terminal

The location of the Proposed Project is shown in Figure 3.2-1. Schematic layout of the marine container terminal facilities are shown in Figure 3.2-2. Important components of the Proposed Project are described in the following subsections.

3.2.1.1. Wharf and Cranes

The Proposed Project includes the development of 11.6 acres of wharf structure on the west side of the Cooper River as shown in Figure 3.2-2. The proposed wharf structure would be 3,510 feet long, 120 feet wide, and 19 feet above Mean Low Water (MLW). The wharf structure would be developed with an estimated twelve container cranes of sufficient size to service the future fleet of container vessels expected to call at the Port of Charleston, i.e., "post-Panamax ships". According to the SCSPA, the future vessel fleet would require cranes with a minimum outreach of 200 feet.

The proposed wharf structure would be a steel reinforced concrete deck supported by beams and steel-reinforced pre-stressed concrete piles. Similar structures have 30-inch piles spaced at an average of 16 feet on center, except under crane rails. Crane rails typically are supported by larger support beams and piles spaced at approximately 8 feet on center.

3.2.1.2. Container Yard and Support Facilities

The container yard will consist of grounded storage for all types of loaded and empty containers of varying sizes, bare chassis, and chassis/container units. As described above, the proposed wharf structure will be pile supported. The portion of the container yard that extends into the Cooper River will be excavated and backfilled. The container yard and wharf structure will extend approximately 1,000 feet into the Cooper River as shown in Figure 3.2-2. The construction of the container yard and support facilities will require placement of approximately 6.45 million cubic yards excavated from a local borrow source. The placement of this fill will cover 56.6 acres of existing open water habitat, 9.6 acres of tidal marsh and 2.4 acres of freshwater marsh.

The container yard will consist of storage for wheeled containers, wheeled refrigerated containers, grounded loaded containers, and grounded empty containers. The support area will consist of buildings for operations, administration, security, amenities, etc. Known design features include a slight slope toward the west with finish elevations that vary between 13 and 16 feet MLW. As a result, the finish grade of the terminal facility will vary approximately 2 to 9 feet higher than existing elevations on the project site and adjacent properties. The grade within the facility will generally be sloped 1 to 2 percent as needed to route stormwater runoff to internal drainage inlets.

Utilities will likely be provided by existing services located on the Charleston Naval Complex. Water will be provided by the Charleston Water System (CWS) (formerly the Charleston Commissioners of Public Works), sanitary sewer will be provided by North Charleston Sewer District, electrical service will be provided by South Carolina Electric & Gas (SCE&G), and telephone service will be provided by BellSouth.

3.2.1.3. Stormwater Management Facilities

The SCSPA has proposed to develop approximately 24.4 acres of stormwater management facilities. The stormwater runoff from the wharf, container yard, and support area would be collected by a network of pipes and inlets and routed to a stormwater treatment pond located along the south side of the terminal. The stormwater runoff would be detained as required by the appropriate State and local regulations before being released into Shipyard Creek through a series of controlled outfall structures.

The SCSPA anticipates having the stormwater treatment pond built during the early stages of site development as an integral part of the stormwater and erosion control plan during construction of the container yard and support area.

3.2.2. Proposed Navigation Improvements

3.2.2.1. Berth and Access Area

The SCSPA proposes to develop a 12.1 acre berth adjacent to the wharf structure. The berth will be 150 feet wide by 3,510 feet long and will be excavated to a depth of -49 feet MLW (a design depth of -47 feet plus 2 feet of overdredge allowance). This matches the dredge elevation of the navigation channel (-45 feet authorized depth plus 2 feet of advance maintenance and 2 feet of allowable overdredge). The SCSPA also proposes to develop a 65.5 acre access channel at the same depth that extends approximately 850 feet from the existing Federal navigation channel to the proposed berth.

3.2.2.2. Water Jet Sedimentation Control System

The SCSPA proposes to install a water jet sedimentation control system to minimize future sedimentation within the berth immediately adjacent to the face of the wharf structure. The water jet units will be attached to the wharf piles near the river bottom.

3.2.2.3. Dredged Material Management

The SCSPA proposes that all material that is dredged from the Cooper River to develop the container yard, the berth, and the turning basin will be placed in the Daniel Island Confined Disposal Facility (CDF), which is located on the southern end of Daniel Island between the Wando River and the Cooper River. As shown in Figure 3.2-3, the Daniel Island CDF consists of three diked cells with a combined area of 651 acres.

3.2.3. Proposed Roadway Improvements

3.2.3.1. Access Roadway Feasibility Study

A feasibility study was performed to evaluate potential road corridors and to identify a preferred road corridor for an access road connecting the proposed facility to the existing Interstate Highway System. The *Access Roadway Feasibility Study* (ARFS) includes the development of conceptual designs to evaluate the impact of constructing and operating potential roadway alternatives. A copy of the feasibility study is included in Appendix W. The SCDOT identified the proposed access roadway improvements in a supplemental report included as part of the ARFS. The SCDOT intends to use available Federal, State, and local funding to complete the detailed roadway design and construction.

SCDOT has submitted a separate application for a Department of the Army permit to develop the proposed four lane limited access highway to begin at I-26 and end at the entrance to the proposed SCSPA marine container terminal. The proposed access roadway is shown in Figure 3.2-4. Since the access roadway is considered an integral part of the proposed project, it is included in this EIS and the review of the Proposed Project. The overall project purpose of the access roadway is to support the future operation of the proposed marine container terminal. Since the overall purposes of these two projects are linked, the Corps plans to fully evaluate both projects in this EIS.

3.2.3.2. Cooper River Marina Access Road

Access to Cooper River Marina is currently provided by Juneau Avenue, which is immediately adjacent to the Cooper River. The Schematic Layout of the Proposed Project, Figure 3.2-2, shows that Juneau Avenue passes through the center of the proposed container storage yard. Therefore, the construction and operation of the proposed facility will result in the elimination of Juneau Avenue.

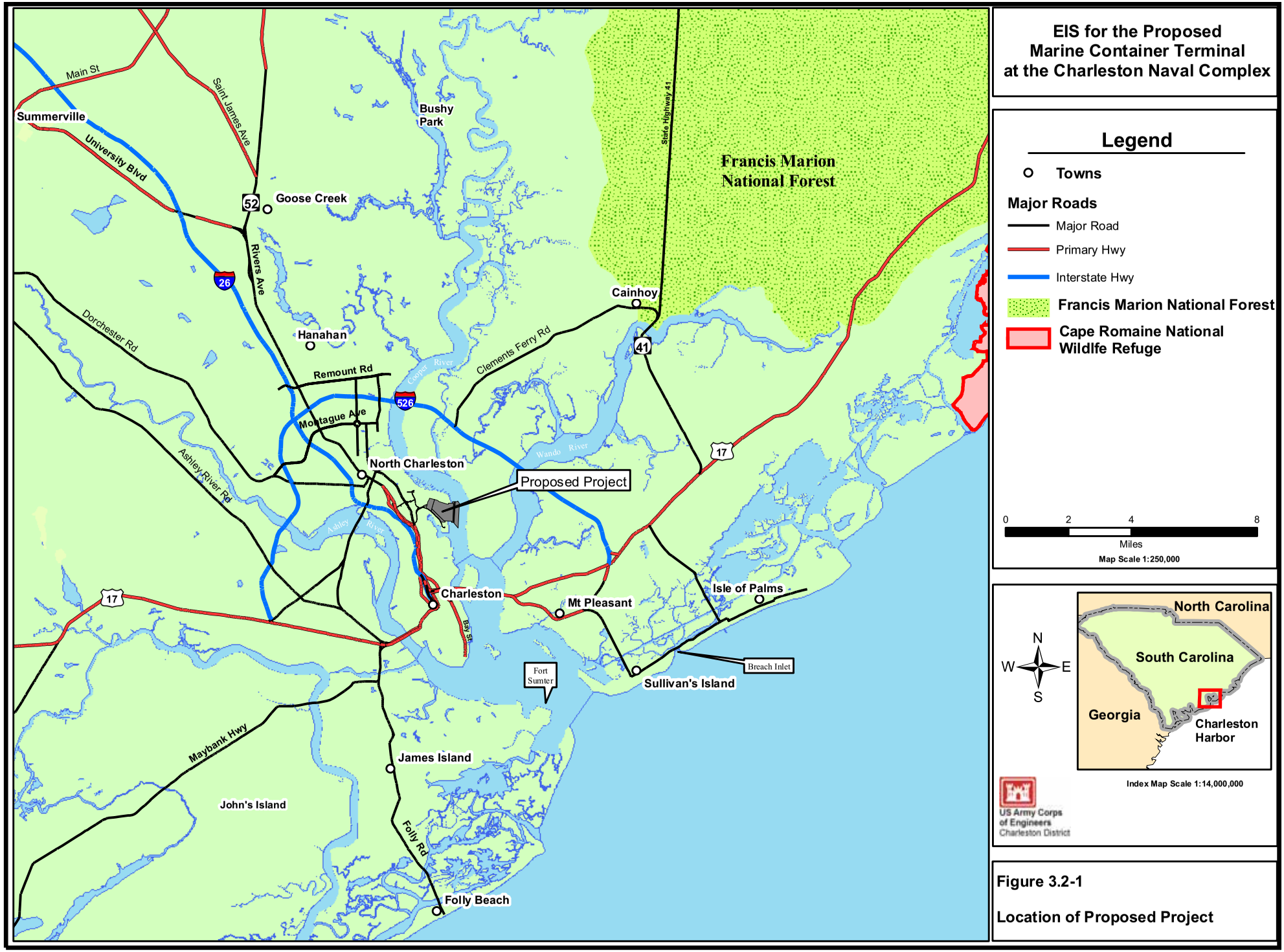
In order to accommodate marina traffic, the SCSPA proposes to provide future access to Cooper River Marina by Tidewater Road. Improvements to Tidewater Road, which is located along the SCSPA boundary between the proposed port facility and Shipyard Creek, will be designed to carry marina traffic. Tidewater Road will also be widened and improved along the Shipyard Creek side of the Cooper River Marina property and tie into the existing marina parking area. Tidewater Road would be connected to the proposed access roadway and a local connector road by a separate bridge crossing Shipyard Creek. These improvements will greatly improve access to the Cooper River Marina, especially from I-26.

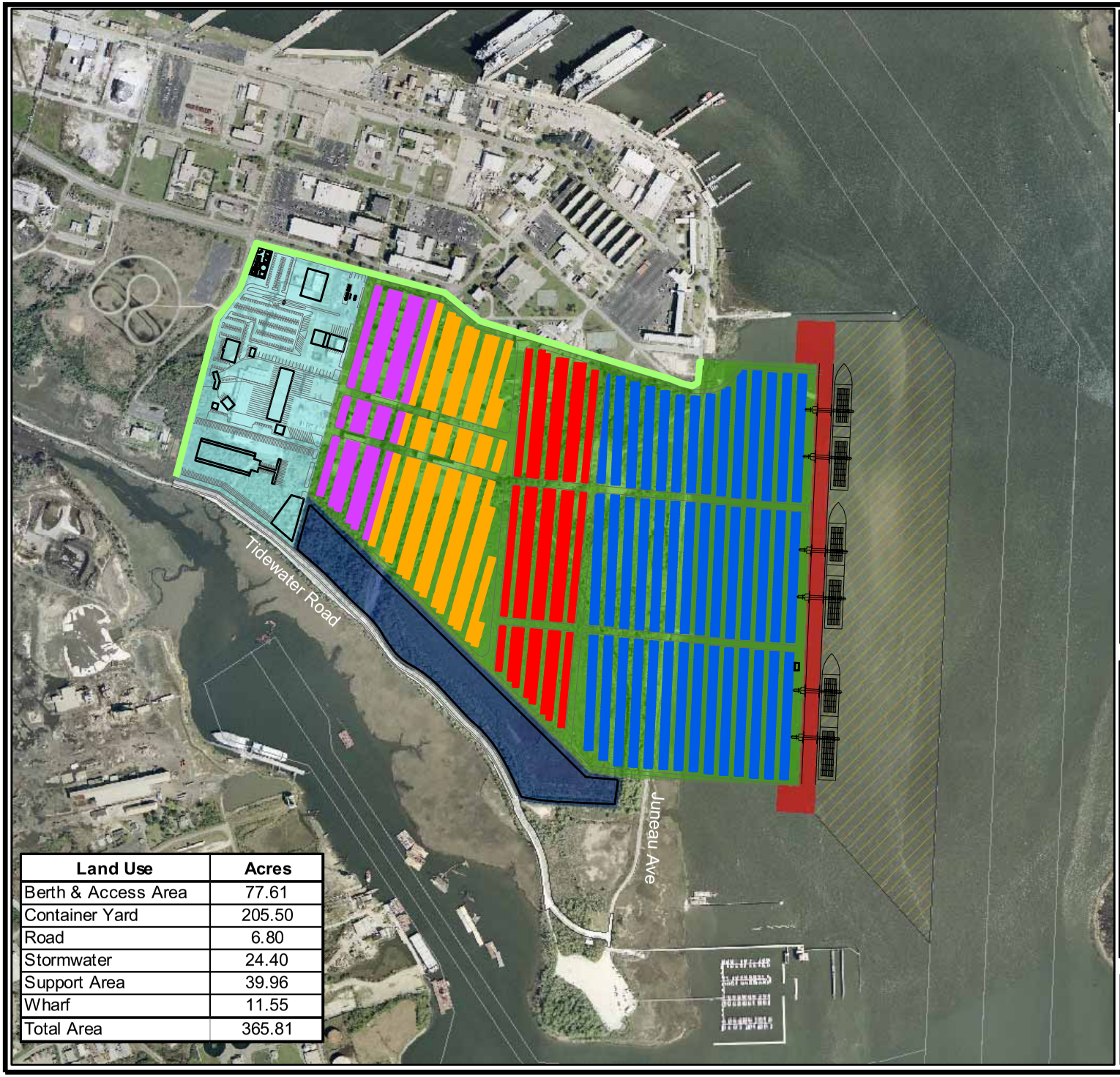
3.2.4. Proposed Railway Access

The proposed project does not include the construction of any new rail facilities on the project site, nor does it include constructing improvements to any existing rail facilities located on the remainder of the Charleston Naval Complex property. According to the SCSPA, all container cargo that enters or exits the project site by land will be carried by trucks. The truck trip distribution pattern that was developed by the SCSPA to model vehicle traffic generated by the Proposed Project indicates that between 20 and 25 percent of all containers leaving the proposed port facility will be carried to existing intermodal railyards in North Charleston. The proposed marina road improvements are shown in Figure 3.2-4.

3.2.5. Port Facility Design

The permit application that was submitted by the SCSPA in January 2003 included conceptual drawings of the proposed port facility. The SCSPA selected a contractor in April 2005 to develop design drawings for the proposed port facility. It should be noted that all design drawings are conceptual and will likely change as plans for the Proposed Project progress. Permit amendments are issued as changes to the port facility design are made.


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Major Roads
Major Road
Primary Hwy
Interstate Hwy
Francis Marion National Forest
Cape Romaine National Wildlfe Refuge
0 2 4 8
Miles
Map Scale 1:250,000
North Carolina
South Carolina
Georgia
Charleston Harbor
Index Map Scale 1:14,000,000
US Army Corps of Engineers
Charleston District
Figure 3.2-1
Location of Proposed Project
Francis Marion National Forest
Proposed Project
Summerville
Goose Creek
Bushy Park
Cainhoy
Hanahan
North Charleston
Charleston
Mt Pleasant
Isle of Palms
Sullivan's Island
Breach Inlet
Fort Sumter
James Island
John's Island
Folly Beach
Main St
University Blvd
Saint James Ave
Rivers Ave
Dorchester Rd
Ashley River Rd
Remount Rd
Montague Ave
Clements Ferry Rd
Maybank Hwy
Folly Rd
Bar St
State Highway 41
Cooper River
Wando River
Ashley River
26
52
526
41
17



Land Use	Acres
Berth & Access Area	77.61
Container Yard	205.50
Road	6.80
Stormwater	24.40
Support Area	39.96
Wharf	11.55
Total Area	365.81

EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Storage yard
- Empty Containers
- Loaded Container
- Reefers
- Wheeled

Buffer Area

Proposed Terminal
- Berth & Access Area
- Container Yard
- Road
- Stormwater
- Support Area
- Wharf

Federal Navigation Channel

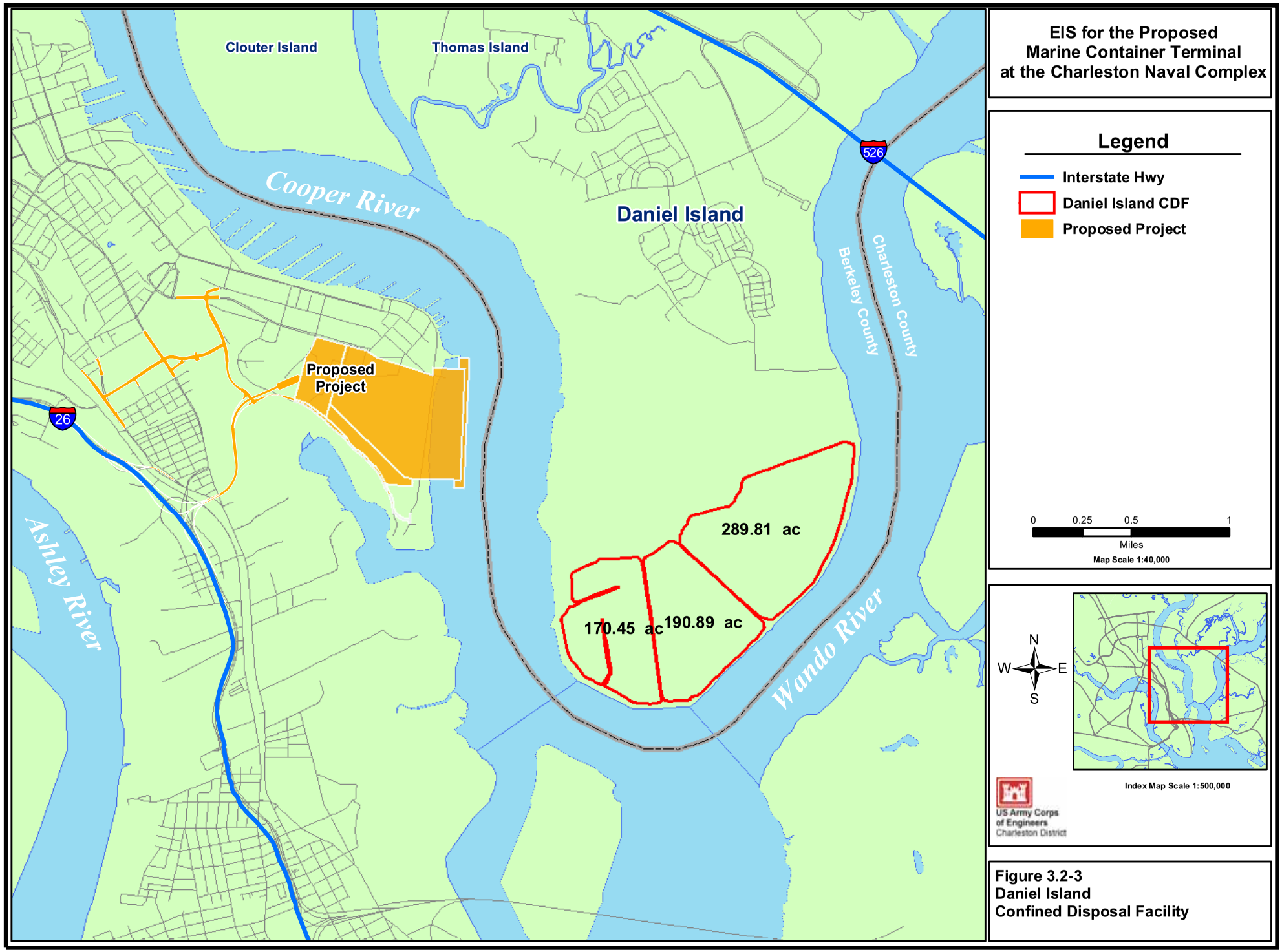
0 500 1,000 2,000
Feet
Map Scale: 1:12,000

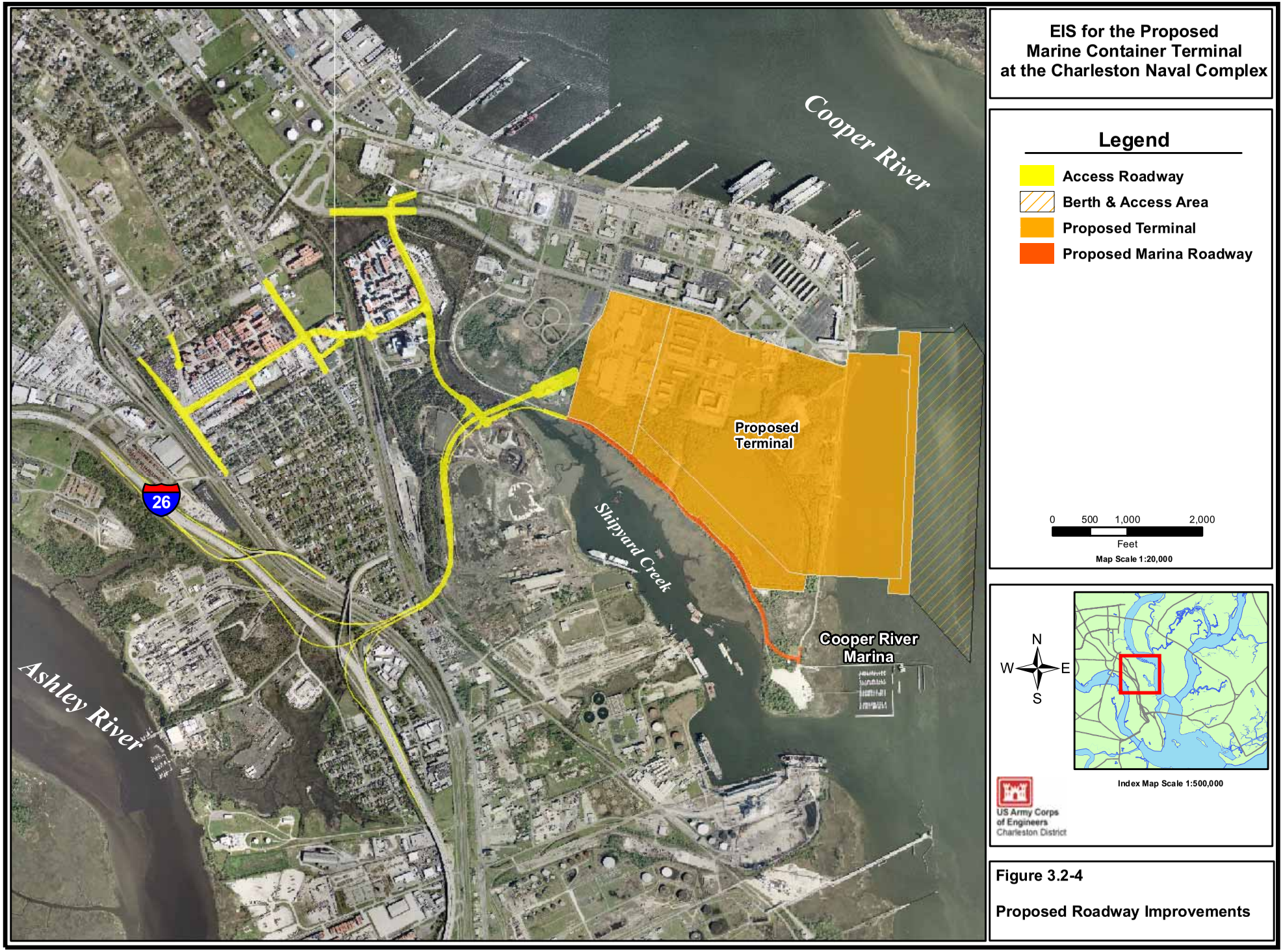
N W E S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 3.2-2
Conceptual Schematic Layout of the Proposed Terminal


Clouter Island
Thomas Island
Cooper River
Daniel Island
526
Berkeley County
Charleston County
Proposed Project
26
Ashley River
289.81 ac
170.45 ac
190.89 ac
Wando River
EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Interstate Hwy
Daniel Island CDF
Proposed Project
0
0.25
0.5
1
Miles
Map Scale 1:40,000
N
W
E
S
Index Map Scale 1:500,000
US Army Corps
of Engineers
Charleston District
Figure 3.2-3
Daniel Island
Confined Disposal Facility


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Access Roadway
Berth & Access Area
Proposed Terminal
Proposed Marina Roadway
Cooper River
Proposed
Terminal
Shipyard Creek
Cooper River
Marina
Ashley River
26
0 500 1,000 2,000
Feet
Map Scale 1:20,000
N
W E
S
Index Map Scale 1:500,000
US Army Corps
of Engineers
Charleston District
Figure 3.2-4
Proposed Roadway Improvements

3.3. NO-ACTION ALTERNATIVE

For a project being reviewed under Section 404 of the Clean Water Act, there are two components of the No-Action Alternative that must be evaluated: (1) the No-Build Alternative and (2) the No-Permit Alternative.

3.3.1. No-Build Alternative

The No-Build Alternative assumes that the Proposed Project is not constructed. It assumes that ongoing and reasonably foreseeable future land uses and development trends not associated with the Proposed Project within the study area continue as projected by regional planning studies without changes induced by the Proposed Project. This scenario is used to establish the conditions which would be likely to exist if the Proposed Project is not constructed and to which the projected impacts of the Proposed Project are compared.

3.3.2. No-Permit Alternative

This scenario assumes that the proposed facilities are constructed so as to require no permits under the Clean Water Act for the dredging or filling of waters of the United States. The USACE has concluded that the purpose of the Proposed Action cannot be met at any location without Department of Army Authorization. Therefore, for the purposes of this EIS, it has been concluded that the No-Permit Alternative is equivalent to the No-Build Alternative, and that both will be evaluated as the No-Action Alternative.

3.4. PROJECT ALTERNATIVES

As described in Section 1.3, the identification and evaluation of reasonable and practicable Project Alternatives is necessary to comply with both NEPA and Section 404 (b)(1) Guidelines. This section describes the methods used to identify potential alternative sites, and identifies the Project Alternatives that will receive detailed analysis in this EIS.

3.4.1. Site Identification Process

A tiered approach was used to identify Project Alternatives. A detailed description of the process that was used to identify reasonable and practicable alternative sites which would meet the defined project purpose and need is included in Appendix M. The following is a brief overview of the site identification process:

- Basic siting criteria were developed using general information about the Proposed Project. These basic siting criteria were used to identify a wide range of potential alternative sites in the state of South Carolina.

- Tier I consisted of developing preliminary screening criteria related to the construction and operation of a marine container terminal. Tier I screening criteria were applied to the entire list of 59 potential alternative sites to determine which sites should be evaluated further in Tier II.

- Tier II consisted of developing more focused screening criteria related to the construction and operation of a marine container terminal. Tier II screening criteria were applied to the list of 24 potential alternative sites that passed Tier I.

- The information gathered during Tier II was presented to an Expert Panel consisting of representatives specializing in various areas related to planning, design, construction or operation of a marine container terminal and/or its associated infrastructure.

- The information gathered during Tier II and the comments provided by the Expert Panel were used to identify the range of reasonable and practicable alternative sites that will receive detailed analysis in this EIS.

3.4.2. Project Alternatives

The Proposed Project consists of constructing a new marine container terminal in Charleston Harbor. For the purposes of this EIS, potential Project Alternatives included constructing a one berth expansion of an existing SCSPA terminal or at least two 1,000-foot long berths at a new alternative site to accommodate the projected increase in container volume.

3.4.2.1. Project Alternatives (July, 2004)

The site identification process resulted in the selection of four alternatives to be evaluated in more detail. The following list of Project Alternatives includes two single-site alternative locations and two combined alternative locations, which consist of a two berth alternative location and a one berth expansion at the existing SCSPA North Charleston Terminal.

- Daniel Island, Cooper River
- Clouter Island, South
- Drum Island + Expansion at North Charleston Terminal
- Charleston Naval Complex, North + Expansion at North Charleston Terminal

3.4.2.2. Elimination of Project Alternatives

Following the selection of the above listed Project Alternatives in July 2004, additional information was gathered for the Proposed Project and each of the alternative locations to develop conceptual terminal layouts as shown in Appendix M. These conceptual layouts were used to assist in developing the overall scope of work for this EIS and to refine the acreage of available backland, the volume of dredging, and the location of transportation infrastructure improvements for each Project Alternative.

Based on additional information that was gathered on each of these Project Alternatives and the conceptual layouts, the following alternative locations are no longer considered reasonable or practicable alternatives to the Proposed Project. Therefore, these alternatives were eliminated from further consideration in this EIS.

Expansion at North Charleston Terminal (NCT)

The existing NCT was identified as a potential site for a one berth expansion. The existing NCT is located on the west side of the Cooper River between Mead-Westvaco and Naval Weapons Station Charleston (NWSC). The NCT is approximately 200 acres and has 2,500 linear feet of continuous wharf. Demolishing the existing grain elevator and extending the existing wharf approximately 700 linear feet would provide sufficient space to berth three 1,000 foot long marine container ships. However, backfilling the area behind the new wharf structure and redeveloping the footprint of the grain elevator provides less than 15 acres of additional container storage area. Since this is far less than the 50+ acres that are required to meet the defined project purpose and needs for a one berth expansion, adjacent properties were evaluated to determine if there is potential to expand NCT.

The 841st Transportation Battalion operates the Transportation Command (TC) Dock at the NWSC. This facility consists of approximately 10 acres of staging area and 1,500 linear feet of continuous wharf that is located upriver from the NCT. Comments that were received during the Scoping Process suggest that a former Department of Defense (DOD) initiative encourages the development of intermodal facilities on military property that would benefit both commercial industry and DOD. The 841st Transportation Battalion and the Military Surface Deployment and Distribution Command (SDDC) were contacted to determine if there are opportunities for a mutually beneficial use of TC Dock or the adjacent staging areas. According to SDDC, increased activity at the facility since September 11, 2001, ongoing plans to construct improvements, and the incompatibility of operations that occur at NCT and TC Dock preclude any consideration of a joint use facility. Since NWSC is a Federal owned property it is not subject to condemnation procedures by the state. Since this land is not available to the SCSPA, an expansion of NCT upriver is not considered a reasonable or practicable alternative.

Mead-Westvaco owns and operates the adjacent facility downriver from NCT. According to Mead-Westvaco approximately 65 acres of land was conveyed to the SCSPA more than 30 years ago to develop the existing container yard at NCT. The immediately adjacent property (approximately 34 acres) is developed with two large warehouses that are used for storage and

to operate their production line, railroad tracks and truck loading facilities, and approximately 500 linear feet of wharf. Any potential expansion of NCT beyond the footprint of the existing warehouses would further impact the operation of the existing paper mill. Therefore, an expansion of NCT downriver would likely be land constrained.

In order to meet the defined project purpose and need of the Proposed Project, a one berth expansion would increase existing throughput capacity at NCT by 50 percent. Therefore, from an operational standpoint this would also require major improvements to the existing gate structure and more backland for support facilities, which is not available. For the reasons described above, an expansion at NCT (onsite, upriver, or downriver) is no longer considered a reasonable or practicable alternative for the Proposed Project.

The SCSPA has indicated that they plan to continue to construct improvements at all three of their existing terminals to help meet their long-term needs for additional throughput capacity in the Port of Charleston. Therefore, activities such as the demolition of the grain elevator at NCT will likely occur in the future. However, limited available backland would prevent the SCSPA from constructing the improvements necessary to meet the defined project purpose and need for the Proposed Project.

Charleston Naval Complex (CNC), North

CNC-North was originally evaluated as a two berth alternative location in conjunction with a one berth expansion at NCT. Once the expansion at NCT was eliminated from consideration in this EIS, CNC-North was evaluated to determine if a three berth facility could be constructed at this alternative location. Conceptual layouts that were prepared for CNC North indicate that the development of a three berth facility would require the relocation of the SCSPA Veteran's Terminal, the development of a large portion of Solid Waste Management Unit (SWMU) 9, and the acquisition of additional property from the Federal Law Enforcement Training Center and the City of North Charleston.

SWMU 9 is a former landfill that was operated by the U.S. Navy and is currently undergoing monitoring to determine the extent of groundwater contamination. The U.S. Navy has proposed land use controls that will affect the future development of this property. Any land disturbing activities that cause the release of contaminated groundwater would be the responsibility of the individual undertaking those activities. In order to develop this property as a marine container terminal it would likely be necessary to excavate and backfill SWMU 9, which may lead to unacceptably high costs and delays in the overall project schedule.

Based on the conceptual layouts, the development of a three berth facility at the CNC-North alternative location would have slightly less impacts to waters of the United States as the Proposed Project. However, when the relocation of Veteran's Terminal and the acquisition of additional property from FLETC and the City of North Charleston are taken into consideration this alternative would likely have greater impacts to both the community and the natural environment than the Proposed Project. Therefore, CNC North is no longer considered a reasonable or practicable alternative for the Proposed Project.

Drum Island

Drum Island was originally evaluated as a two berth alternative location in conjunction with a one berth expansion at NCT. Once the expansion at NCT was eliminated from consideration in this EIS, Drum Island was evaluated to determine if a three berth facility could be constructed at this alternative location. Conceptual layouts that were prepared for the Drum Island alternative location indicate that the development of a three berth facility would require the placement of fill

material in more than 75 acres of tidal wetlands and other waters of the United States. However, development of this alternative site would require less dredging than the Proposed Project because the wharf is located near the edge of the Federal navigation channel.

U.S. Coast Guard, Marine Safety Office and Charleston Branch Pilots Association (Pilots) were provided copies of the conceptual layout for this alternative location to assist in determining if the location of the facility would pose a hazard to navigation safety. According to the Pilots, approximately 80 percent of the ships that enter Charleston Harbor pass under the Cooper River Bridge and proceed up the Cooper River (35 percent) or the Wando River (45 percent). Due to the location of the wharf, docking or undocking of a vessel would likely halt ship transits for 45 minutes or more, negatively impacting 80 percent of shipping in Charleston Harbor.

The Pilots stated that the location of the Drum Island alternative relative to the Federal navigation channel and strong tidal currents would require additional tug boats to control ship movements. In addition, variable currents near the confluence of the Cooper and Wando Rivers require transiting ships to use power when making the turn into either of these two rivers. The wake generated while making a turn would likely impact loading and/or unloading of vessels moored at the facility.

USCG, Bridge Branch stated that any fixed span bridge over Town Creek would likely be required to provide 65 feet of clearance above mean high water or a movable span would be required to provide 15 feet of clearance. Since the slope of a fixed span bridge would exceed the requirements for safe acceleration and deceleration of loaded container trucks, a moveable span was considered. However, opening a moveable span bridge would likely cause unacceptable delays to port operations, such as trucks waiting in line to exit the alternative site or trucks waiting in line to enter the alternative site or Columbus Street Terminal.

In addition, the SCSPA uses Drum Island as a CDF for disposal of material that is dredged from Columbus Street Terminal. Therefore, the development of a terminal at this alternative location may require additional impacts to waters of the United States to develop a new CDF. For the reasons described above the Drum Island alternative is no longer considered a reasonable or practicable alternative for the Proposed Project.

3.4.2.3. Project Alternatives (February, 2005)

The elimination of three alternative locations, as described above, reduces the number of additional Project Alternatives to two potential single-site alternative locations. The Proposed Project, the No-Action alternative, and the following two Project Alternatives will receive a detailed evaluation in this EIS:

- Daniel Island, Cooper River
- Clouter Island, South

The location of the Proposed Project and the Project Alternatives is shown on Figure 3.4-1. Conceptual schematic layouts of these two Project Alternatives are shown in Figures 3.4-2 and 3.4-3. For narrative simplicity, the Project Alternatives will be identified as the Daniel Island Alternative and the Clouter Island Alternative in this EIS.

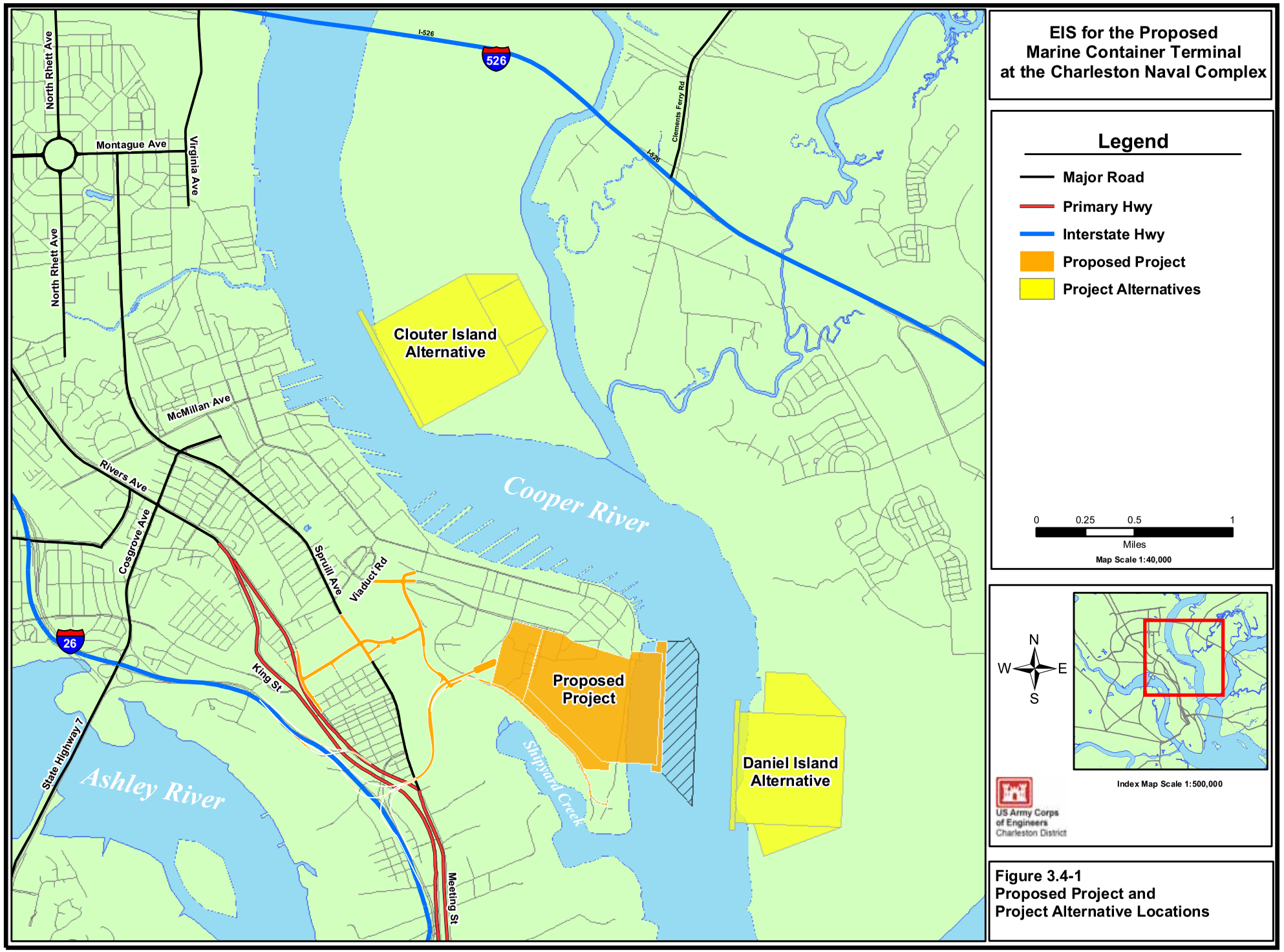


Figure 3.4-1
Proposed Project and
Project Alternative Locations

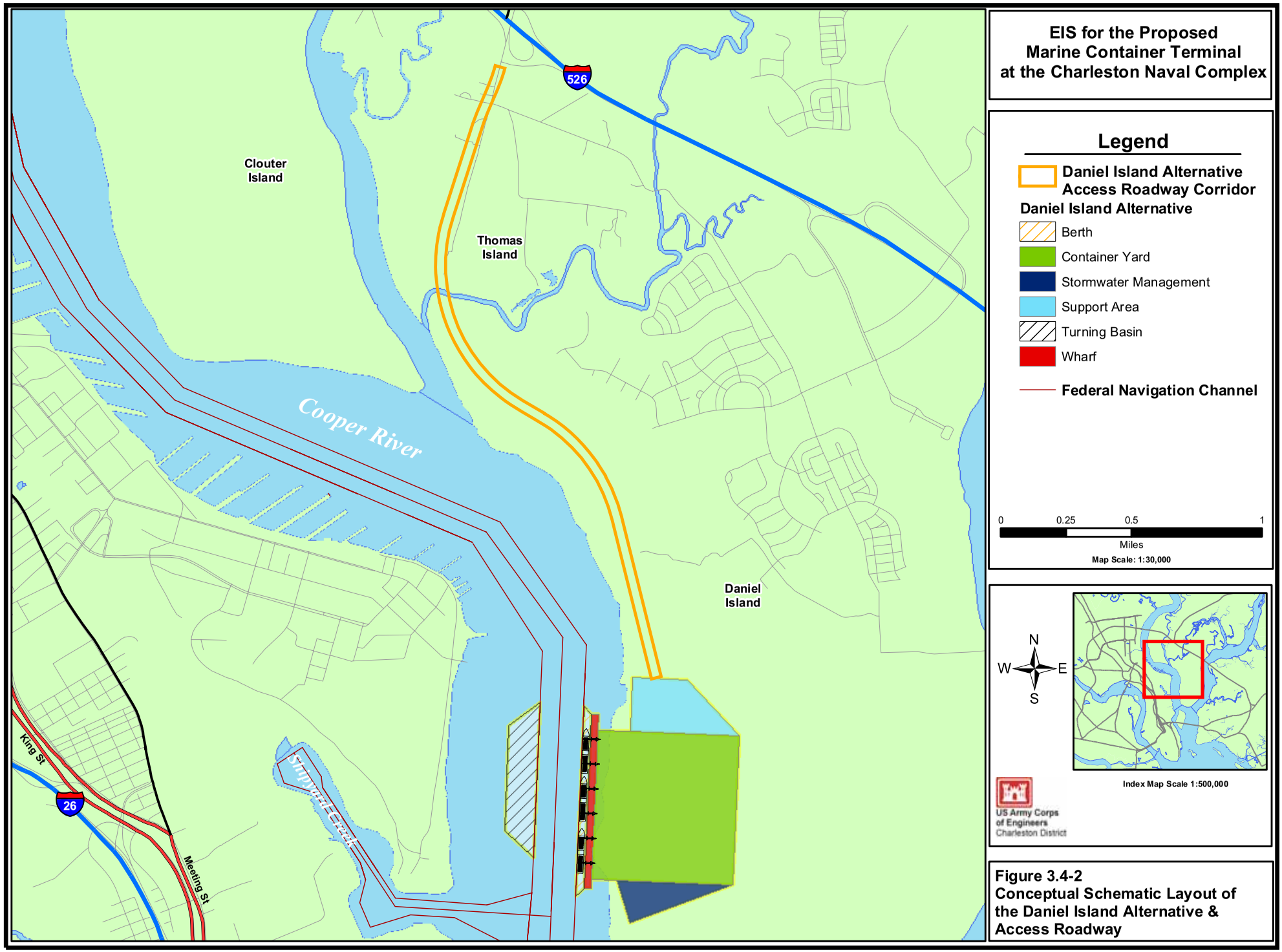


Figure 3.4-2
Conceptual Schematic Layout of the Daniel Island Alternative & Access Roadway

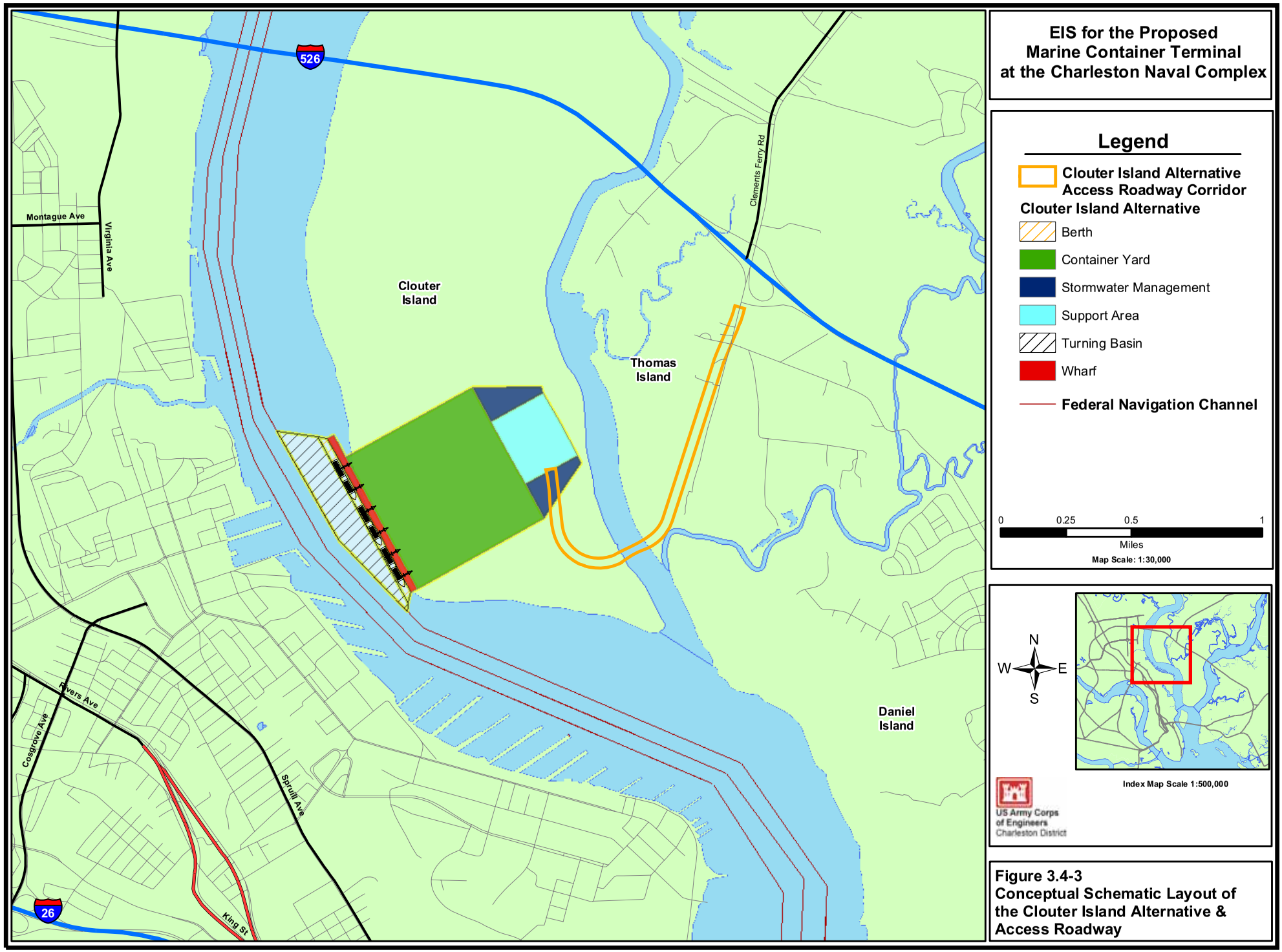


Figure 3.4-3
Conceptual Schematic Layout of the Clouter Island Alternative & Access Roadway

3.5. COMPARISON OF ALTERNATIVES AND THEIR IMPACTS

This section provides a summary and comparison of the environmental impacts of the project alternatives considered in detail in this EIS, including the Proposed Project, two Project Alternative locations and the No-Action Alternative. The impacts are presented according to the environmental topics addressed for each project alternative evaluated in this EIS. Detailed discussions of the impacts summarized and compared in this section are found in Section 5.

Table 3.5-1 presents a summary matrix of the impacts described for each environmental topic and for each project alternative. Table 3.5-1 summarizes the impacts from the No-Action Alternative, Proposed Project, Daniel Island Alternative, and Clouter Island Alternative. The summary table includes the impacts of roadway improvements for each project alternative evaluated.

Table 3.5-1. Summary Comparison of Environmental Consequences from Project Alternatives.

Topic	No-Action Alternative	Proposed Project	Daniel Island Alternative	Clouter Island Alternative
Land Use	• The region will experience dramatic changes as a result of urban growth (urban land use in the BCD COG region is projected to increase approximately 96% by 2025). • Redevelopment of the Charleston neck area will continue; commercial and industrial properties will be relocated to the Macalloy property. • Proposed Project site would likely be industrially developed. • Urban development on Daniel Island would continue; SCSPA land at the southern end of Daniel Island would possibly be sold for mixed use development. • Residential/commercial development of Thomas Island/Cainhoy Peninsula would continue.	• 208 acres of institutional land use at the CNC south would change from mostly undeveloped to industrial. An additional 66 acres of marsh and open water would convert to industrial land use. • Land use zoning in the port-overlay district will change to industrial. • Secondary development (businesses, etc.) offsite of the CNC in the port-overlay district will likely occur. • 1.2 miles of access roadway, including a number of local roadway improvements would be added.	• Land use would change 273 acres of inactive CDF, marsh and open water industrial land use. • Secondary development (businesses, etc.) along Clements Ferry Rd. would likely occur. • 2.7 miles of access roadway improvements would be added.	• Land use would change 284 acres of active CDF, marsh and open water industrial land use. • Adverse impacts to the dredged material storage capacity of Charleston Harbor; a replacement site would be required. • Secondary development (businesses, etc.) along Clements Ferry Rd. would likely occur. • 1.7 miles of access roadway improvements would be added, which would provide roadway connection to Clouter Island.
Physical Setting	• Negligible impact to regional climate other than small increases in temperature associated with global climate change. • Minor localized increases in temperature resulting from urban growth. • Localized, small-scale changes to existing topography and surficial geology associated with future development and mining in the region.	• Negligible impact to the regional climate. • Minimal adverse impacts to the local climate as a result of localized increases in temperature associated paving of the terminal area and roadway. • Minor localized impacts to the topography and surficial geology, limited to changes at the terminal site and within the roadway right-of-way. • Increased demand on local borrow sources as a result of the 6.5 Mcy fill requirements.	• Similar to the Proposed Project, except less fill material would be needed.	• Similar to the Proposed Project, except less fill material would be needed.
Socio-Economic Environment	• Continued growth in the regional economy and the SCSPA would continue to support the economy of SC. • Property values in some areas of North Charleston may increase as a result of the Noisette and Magnolia Projects. • Continued redevelopment of industrial areas along Shipyard Creek, including the Macalloy site.	• Port expansion would spur additional economic development in the region and state without adversely impacting local development projects. • Improved Interstate highway access. Also, local connector roads would improve business conditions and maritime support industries in the Charleston Neck area.	• Similar regional and statewide benefits as the Proposed Project. • Industrial development would likely increase along Clements Ferry Rd.	• Similar regional and statewide benefits as the Proposed Project. • Industrial development would likely increase along Clements Ferry Rd.
Social Characteristics and Environmental Justice	• Populations by 2025: Berkeley Co. - 194,160 Charleston Co. - 359,630 Dorchester Co. - 144,260 • No major shift in demographics would likely occur in the region, but redevelopment projects surrounding the CNC will have localized effects.	• Same projected population increases as the No-Action Alternative. • Improvements to poverty, employment, home ownership, etc. because of the SCSPA's expanded role in the local and regional economy. • Impacts to demographics are likely to be minimal. Population in the area surrounding the CNC is approximately 75% minority with lower than average household incomes. Minimal increases in noise, light, and mobile source air emissions could impact existing neighborhoods. • The proposed access roadway would avoid direct impacts to residential areas and would not allow trucks from the port on local roads. The local connector road could improve community interaction along the Stromboli Ave corridor.	• Population increase would be similar to that for the Proposed Project. • No impacts to demographics. • The construction of the access roadway would adversely impact a predominantly minority community and may result in the displacement of some residential homes.	• Similar to the Daniel Island Alternative.
Community Infrastructure and Municipal Services	• Demand for public services (i.e., police, fire, and EMS) would increase commensurate with the projected increase in population in the study area. • Municipal services will be adequate thorough 2025.	• Demand for public services (i.e., police, fire, and EMS) would increase commensurate with the minimal population increase associated with the project. • Existing power, water supply, and wastewater treatment facilities would have adequate capacity; new utility lines would be required on the CNC.	• Similar to the Proposed Project, except for connection to utilities. There would be longer distances to existing utility lines than for the Proposed Project.	• Similar to the Proposed Project, except for connection to utilities. There would be longer distances to existing utility lines than for the Proposed Project and the need for costly river crossings.

Topic	No-Action Alternative	Proposed Project	Daniel Island Alternative	Clouter Island Alternative
Transportation	• I-26 is projected to have moderate growth in traffic demand by 2025, which would cause some Interstate segments to fail. The segment of I-26 between Dorchester Road and Montague Avenue will reach a failing level of service in 2012/2013. Other segments will also fail by 2025. I-526 traffic volume is expected to double by 2025. Of 26 segments studied, 23 are predicted to operate at LOS E or F; the other 3 are predicted to operate at LOS D. • Traffic delays due to railroad crossings will increase as traffic volume increases.	• At build-out in 2025, the proposed terminal would generate 10,920 trips per day under peak conditions, and 7,700 daily trips under average conditions, of which 63 percent would be made by trucks. • New 1.2-mile access roadway, which would be elevated through mostly industrial areas and pass over major road and rail crossings, would tie in directly to I-26. • The access roadway would carry all truck traffic from the terminal to the interstate highway. The access roadway would also connect to the FLETC and Veteran's Terminal, and improve traffic conditions within and adjacent to the CNC. • Traffic on I-26 immediately north of I-526 would increase by 1.75% during peak hour traffic conditions. • Increase in traffic would cause failure of the I-26 highway sooner than the No-Action Alternative. These cumulative impacts to I-26 would likely require the widening of segments south of I-526 prior to 2025. Impacts from the widening are being addressed in a separate study by the SCDOT and are expected to occur within the existing right of way. • Impacts to I-526 would be minimal. • The access roadway would affect local access to the I-26 highway, specifically Exit 218 would be closed. A new access for local traffic to I 26 would be provided at Stromboli Ave. • Access roadway will add one at-grade crossing of CSX line north of Cooper Yard by local connector road. • Approximately 23% of trucks leaving the Proposed Project would go to intermodal yards. Rail yards expect to have to expand services to accommodate capacity (approximately an additional 2 trains per day). • Up to an additional 18 minutes to vehicular traffic delays per at-grade railroad crossing per day. • According to the MOUA with City of North Charleston, 3 rail overpasses will be constructed.	• New 2.75-mile access roadway would be required along the western side of Daniel Island, crossing Beresford Creek, and tying in with the Clements Ferry Rd/I-526 interchange. • Traffic on I-26 immediately north of I-526 would increase by 1.75% during peak hour traffic conditions. • Moderate impacts to I-26 south of I-526. • Adverse impacts to I-526 traffic conditions carrying over 80% of the port terminal traffic. Of 40 segments studied, 33 are predicted to operate at LOS E or F; another 6 would operate at LOS D. • Approximately 23% of trucks leaving the Daniel Island Alternative would go to intermodal yards and would travel over 6 miles longer than for the Proposed Project. • Impacts to rail yards and at-grade crossings similar to that for the Proposed Project.	• New 1.7-mile access roadway would be required to cross Clouter Creek, travel north, and tie in with the Clements Ferry Rd/I-526 interchange. • Traffic on I-26 immediately north of I-526 would increase by 1.75% during peak hour traffic conditions. • Traffic impacts are same as for the Daniel Island Alternative. • Approximately 23% of trucks leaving the Clouter Island Alternative would go to intermodal yards and would travel over 5 miles longer than for the Proposed Project. • Impacts to rail yards and at-grade crossings similar to that for the Proposed Project.
Navigation and Terminal Facilities	• Annual commercial vessel trips for the Upper Cooper River would increase from 1,354 in 2004 to about 1,906 by 2025 (a 41 percent increase). • The SCSPA will expand existing terminals and improve technology to obtain a maximum throughput capacity of 2.6 million TEU by 2014. • Redevelopment of waterfront facilities in Shipyard Creek are likely and may increase shallow and deep draft vessel trips to the Cooper River and Shipyard Creek. • Improvements to port security should reduce risks associated with vessel and container traffic.	• Increase in container vessel traffic would be 1,300 vessel trips per year, which would be a 68% increase in Upper Cooper River deep-draft vessel traffic, as compared to the No-Action Alternative. • Would cause minor delays to commercial navigation and minor economic impacts resulting from temporary blockage of the navigation channel for container vessel turning operations. • Minimal increase in risk to port security as a result of increased container traffic, as compared to the No-Action Alternative. • Minimal impacts to navigational safety.	• Similar to that for the Proposed Project.	• Similar to that for the Proposed Project.
Noise	• Potential future development in the area, including the southern end of the CNC would likely be industrial in nature and increase noise levels on the CNC.	• Noise from the construction and operation of the proposed terminal would have a negligible impact on nearby residential neighborhoods. • The nearby FLETC dormitory and Cooper River Marina would be adversely impacted by construction and operational noises at the proposed terminal site. However, noise from construction activities would be contained to certain areas of the site at various times during the construction phase. • Noise from traffic on access roadway would impact 129 sensitive receptors where the existing noise levels already approach or exceed FHWA's noise abatement criteria at many of these sites.	• Similar noise levels as the Proposed Project. • No noise impacts to sensitive receptors from the construction and operation of the terminal. • Some adverse impacts to residences from the construction and operation of the access roadway.	• Similar noise levels as the Proposed Project. • No noise impacts to sensitive receptors from the construction and operation of the terminal. • Some adverse impacts to residences from the construction and operation of the access roadway.

Topic	No-Action Alternative	Proposed Project	Daniel Island Alternative	Clouter Island Alternative
Light	• Potential future development around Shipyard Creek, including the southern end of the CNC would likely be industrial in nature and may increase lighting levels in the area.	• Minimal increase in sky glow for adjacent residential neighborhoods. • Light trespass impacts up to approximately 300 feet beyond terminal boundaries, primarily FLETC. • Light trespass from lighting of the proposed access roadway would primarily affect industrial and institutional areas; impacts to residential areas would be minimal. • Truck traffic to and from the terminal would primarily occur during daylight hours, so light impacts from vehicle headlights at night would be likely be minimal.	• Similar sky glow impacts as for the Proposed Project. • No light trespass impacts from the terminal. • Minimal impact from traffic and roadway lighting (similar to the Proposed Project).	• Similar sky glow impacts as for the Proposed Project. • No light trespass impacts from the terminal. • Minimal impact from traffic and roadway lighting (similar to the Proposed Project).
Aesthetics	• New industrial or institutional land uses would likely be developed on the south end of the CNC. The property would retain its current industrial and institutional appearance.	• Minimal change in visual character since surrounding land use is already mostly industrial. • Impact to FLETC and Cooper River Marina viewsheds.	• Substantial change in the visual character.	• Substantial change in the visual character.
Air Quality	• Traffic increases related to population growth will increase mobile emissions. Newer fuels and technologies would tend to offset the impact of increased emissions. • Little to no changes expected in overall ambient air quality.	• Mobile emissions will increase with traffic increases and delays. • No adverse impact to ambient Air Quality. • Construction: Short-term adverse $PM_{2.5}$ impact from fugitive dust. Short-term increases from diesel fuel combustion emissions (i.e., NO_x, SO_2, CO, VOCs, PM_{10}). • Operation: Long-term increase from fuel combustion emissions caused by terminal operations (i.e., trucks, vessels, container-handling equipment). • The Proposed Project is located closer to intermodal yards and other regional destination than Daniel Island and Clouter Island Alternatives, which would minimize the increase in overall emissions.	• Mobile emissions similar to the Proposed Project, except truck trips will be longer with more congested traffic conditions on I-526. • No adverse impact to ambient Air Quality. • Construction: Short-term adverse $PM_{2.5}$ impact from fugitive dust. Short-term increases from fuel combustion emissions (i.e., NO_x, SO_2, CO, VOCs, PM_{10}). • Operation: Long-term increase from fuel combustion emissions caused by terminal operations (i.e., trucks, vessels, container-handling equipment).	• Mobile emissions similar to the Proposed Project, except truck trips will be longer with more congested traffic conditions on I-526. • SO_2 emission increases would likely cause adverse impact to ambient Air Quality. • Construction: Short-term adverse $PM_{2.5}$ impact from fugitive dust. Short-term increases from fuel combustion emissions (i.e., NO_x, SO_2, CO, VOCs, PM_{10}). • Operation: • Long-term increase from fuel combustion emissions caused by terminal operations (i.e., trucks, vessels, container-handling equipment).
Cultural Resources	• Potential future development near the southern end of the CNC is not likely to affect cultural resources. • Not likely to affect 10 NRHP listed properties in the APE.	• No effect to archaeological or historical resources. • No impacts from an access roadway to cultural resources.	• Potential impact to 2 unevaluated submerged archaeological resources in the Cooper River. • No effect to historical or potential historic properties.	• Potential impact to 4 submerged archaeological resources in the Cooper River. • No effect to historical or potential historic properties.
Section 4(f) Properties, Section 6(f) Lands, and Other Recreational Facilities	• The Cooper River Marina, a Section 4(f) property, is located near existing industrial facilities and would be minimally impacted by future industrial development(s) under the No-Action Alternative.	• 1 Section 4(f) property, the Cooper River Marina, would be minimally impacted. • The proposed access roadway would impact a City of Charleston district park in the Rosemont neighborhood to some degree and will be adjacent to Park South. • Increase in commercial vessel traffic may impact recreational facilities related to boating.	• Impacts to Section 4(f) properties are similar to the Proposed Project. • Increase in commercial vessel traffic may impact recreational facilities related to boating.	• No impact to the Cooper River Marina, except for increase in ship traffic. • Increase in commercial vessel traffic may impact recreational facilities related to boating. • Port terminal would be very visible to North Charleston Waterfront Park visitors.
Hazardous Waste and Materials	• Site remediation program would continue as planned at the CNC. • Potential future redevelopment may affect contaminated sites.	• Ongoing and planned remediation projects would need to be considered in final design of project. • Minimal release of contaminants if media is disturbed during construction. Potential UXO in dredging area will require monitoring. • Impervious cap over most of the site would reduce the release of contaminants post-construction. • Minimal increase in risk for oil and/or hazardous materials spills. • The proposed access roadway would pass over (on elevated structure) contaminated properties on the CNC, Macalloy, and Van Ness.	• There are no known contaminated sites in study area. • Minimal increase in risk for oil and/or hazardous materials spills.	• No known contaminated sites in study area, except AOCs on Clouter Island (with No Further Action) from previous Navy Base. • Minimal increase in risk for oil and/or hazardous materials spills.

Topic	No-Action Alternative	Proposed Project	Daniel Island Alternative	Clouter Island Alternative
Water Resources	• Additional impervious area from development is likely to increase the amount and intensity of stormwater runoff, but stormwater management measures would be designed to offset impacts. • Minimal changes to water resources.	• Negligible impacts to groundwater. • Minimal impacts from stormwater runoff. • Berth and access area will cause small local reduction in current velocities. • Negligible impacts to salinity intrusion events that affect the Bushy Park Reservoir • Small, localized increase in salinity and decrease in DO will occur as a result of increased water depths at berth and access area. • Dredging would cause temporary increases in suspended solids and turbidity • Minimal impacts from water jet sedimentation control system and negligible increases in daily average suspended sediment concentrations. • Minimal impacts from CDF effluent discharge during dredging operations	• Similar to Proposed Project, except: • Smaller dredge volume than the Proposed Project would likely cause shorter duration of dredge related impacts to surface water. • Smaller turning basin area than the Proposed Project would cause smaller impacts to DO and salinity.	• Similar to Proposed Project, except: • Smaller dredge volume than the Proposed Project would likely cause shorter duration of dredge related impacts to surface water. • Smaller turning basin area than the Proposed Project would cause smaller impacts to DO and salinity.
Aquatic Sediments and Dredging	• It is likely that the aquatic sediments and dredging environment will be similar to existing conditions. • Maintenance dredging will continue similar to present practices. • Existing contaminant in sediments outside of the Federal Navigation Channel will likely remain undisturbed.	• Dredge volume is 6.5 Mcy (including side slopes, turning basin, berths, wharf, and container support area). • Minor increase in Federal navigation channel total maintenance dredging rate (about $2x10^4$ cy/yr). • Shoaling in navigation channel will shift. Would be an increase in Daniel Island Reach, Daniel Island Bend, and Myers Bend navigation channel long-term maintenance dredging ($5x10^4$ cy/yr) and a small reduction of upstream dredging. • Long-term maintenance dredging of access area on the order of 170,000 cy/yr (initial rates may be higher). • Contamination levels in sediments to be dredged are not expected to affect water quality or marine resources. • Disposal of dredged material at Daniel Island CDFs would not affect long-term maintenance of harbor.	Similar to Proposed Project, except: • Dredge volume is 3.8 Mcy (including side slopes, turning basin, berths, and wharf) • No impact to total maintenance dredging rates in navigation channel. • Long-term maintenance dredging of berth and access area about 61 percent lower than that predicted for Proposed Project. • Contamination levels in sediments to be dredged will not adversely affect water quality or marine resources. • Disposal of dredged material at Daniel Island CDFs would not affect long-term maintenance of harbor.	Similar to Proposed Project, except: • Dredge volume is 5.1 Mcy (including side slopes, turning basin, berths, wharf, and container support area) • Increase in Navy Yard Reach navigation channel long-term maintenance dredging (on the order of $6x10^4$ cy/yr). • Long-term maintenance dredging of berth and access area about 22 percent greater than that predicted for Proposed Project. • Contamination levels in sediments to be dredged will not adversely affect water quality or marine resources. • Disposal of dredged material at Daniel Island CDFs would not affect long-term maintenance of harbor. • Construction of the terminal and roadway on an active CDF would adversely affect long-term maintenance of Charleston Harbor. As a result, new CDF sites would likely need to be constructed.
Natural Resources	• Potential future industrial development of the CNC is likely to occur. Additionally, navigation improvements associated with existing facilities may occur in the future. • Upland habitat includes impervious, wooded, landscaped, and CDF areas. The upland animal communities in the Study Area have been previously disturbed by a range of industrial uses and, as a result, consist of low value species. Study Area marshes and estuary consist of typical species and are generally healthy ecosystems despite dredging, extensive coastal development and other commercial/recreational marine activities.	• Habitat Impacts (Terminal): 9.6 acres of tidal wetland; 2.4 acres of freshwater wetland; 75.9 acres of wooded upland; 146 acres of open water. • Habitat Impacts (Access Roadway): 4.2 acres of tidal wetland; 0.4 acres of freshwater wetland; 6.5 acres of wooded upland; 0.8 acres of open water. • EFH impacts (loss and modification) include: <u>Loss:</u> 9.6 acres (terminal) + 4.2 acres (road) of tidal wetland; 2.4 acres of shallow, subtidal waters (< 2'); 52.1 acres of deep water (> 2'); 3042 linear feet of shoreline; 2.1 acres of mudflats; <u>Modification (deepening. shading, etc.):</u> 101.9 acres of deep water; 1.4 acres of roadway shading • Red drum, shortnose sturgeon, and shrimp are EFH species of concern.	• Habitat Impacts (Terminal): 20.4 acres of tidal wetland; 0 acres of freshwater wetland; 26.1 acres of wooded upland; 73.0 acres of open water. • Habitat Impacts (Access Roadway): 21.8 acres of tidal wetland; 1.3 acres of freshwater wetland; 29.1 acres of wooded upland; 0.6 acres of open water. • EFH impacts (loss and modification) include: <u>Loss:</u> 20.4 acres (terminal) + 21.8 acres (road) of tidal wetland 3.7 acres of shallow, subtidal waters (< 2'); 6.1 acres of deep water (> 2'); 3207 linear feet of shoreline; 2.2 acres of mudflats; <u>Modification (Deepening, shading, etc.):</u> 61.0 acres of deep water; 0.6 acres of roadway shading • Red drum, shortnose sturgeon, and shrimp are EFH species of concern.	• Habitat Impacts (Terminal): 9.5 acres of tidal wetland; 0 acres of freshwater wetland; 19.4 acres of wooded upland; 69.6 acres of open water. • Habitat Impacts (Access Roadway): 10.3 acres of tidal wetland; 0 acres of freshwater wetland; 12.3 acres of wooded upland; 2.9 acres of open water. • EFH (loss and modification) impacts include: <u>Loss:</u> 9.5 acres (terminal) + 10.3 acres (road) of tidal wetland; 4.9 acres of shallow, subtidal waters (< 2'); 0 acres of deep water (> 2'); 3068 linear feet of shoreline; 2.1 acres of mudflats; <u>Modification (Deepening, shading, etc.):</u> 62.6 acres of deep water; 2.9 acres of roadway shading • Red drum, shortnose sturgeon, and shrimp are EFH species of concern. • Loss of Clouter Island CDF would likely result in construction of new CDFs that would cause impacts to natural resources.

Topic	No-Action Alternative	Proposed Project	Daniel Island Alternative	Clouter Island Alternative
Threatened and Endangered Species	• Will not affect Threatened and Endangered Species.	• Will not affect Threatened and Endangered Species or Critical Habitat; except right and humpback whales and manatees designated 'not likely to affect' due to increase in shipping traffic.	• Similar to the Proposed Project.	• Similar to the Proposed Project.
Shorelines	• Shorelines will continue present day trends into the future. • Sea level rise will cause some shoreline recession.	• Shoreline erosion caused by ship wakes and propeller wash associated with increased ship traffic would be minimal. • Shoreline will be stabilized by wharf at project site. • Sea level rise will cause some shoreline recession. • Bridging over Shipyard Creek or two crossings will likely add some armoring to existing shorelines.	• Similar to the Proposed Project.	• Similar to the Proposed Project.
Floodplains	• Floodplains will likely be similar to existing conditions. • Low-lying areas of the floodplains will occasionally flood, and storm surge will occasionally impact properties within the study area. • Future development will result in the construction of buildings and structures in the floodplains in accordance with the applicable guidelines.	• Would change elevations within the floodplain, including areas within existing AE and VE flood zones • Most of post-project facility elevations will be above 100-yr flood elevations, but some area will still flood during 100-year storm conditions. • Project will not cause a rise in flood elevations in adjacent areas of the floodplains. • Access roadway will be located primarily on elevated structure and have no affect on flooding.	• Similar to the Proposed Project.	• Similar to the Proposed Project.

3.5.1. Land Use

3.5.1.1. No-Action

The land use in the region is expected to experience dramatic changes as a result of urban growth. Planned projects in the study area in close proximity to the Proposed Project and project alternative sites that will affect future land use include: redevelopment of the CNC; Noisette and Magnolia Projects; expansion of Kinder Morgan; relocation of commercial or industrial properties to the Macalloy property; continued development of Daniel Island and the property along Clements Ferry Road; and the possible sale of SCSPA land on Daniel Island for mixed use development. Without the Proposed Project, the CNC South site would likely be redeveloped for industrial or institutional uses.

3.5.1.2. Proposed Project

Development of the site as a marine container terminal will change the site land use; however, this impact would be in keeping with the current zoning and planned redevelopment of the CNC. Approximately 66 acres of freshwater wetlands, marsh, and open water will be filled and converted to industrial use. With the possible exception of the access roadway described below, the proposed port facility is not expected to adversely impact other land uses within the CNC.

Development of the Proposed Project may be reasonably expected to spur ancillary commercial and industrial development within the region; it is assumed that such development would occur in appropriately zoned areas. Maritime support industries are likely to locate within the Port Overlay District that was established by the City of North Charleston.

The proposed access roadway would cause minor adverse impacts to existing industrial and commercial land uses. Property owned and operated by several industries and businesses would need to be acquired to construct the proposed port access roadway and a new interchange on Interstate 26.

The Proposed Project would likely have some beneficial impacts to land uses along Meeting Street, Spruill Avenue, and Stromboli Avenue as they would likely become more commercial in nature. Vacation of Meeting Street at the intersection with Carner Avenue could open area to expand existing businesses or could create land area for “higher” land uses.

The access roadway was designed to avoid direct impacts to existing residential land use, and as a result of the Proposed Project would not take any residential land. The MOUA would prohibit residential uses and would not allow the development of any new residential areas within 500 feet of Port Facility Lands, and would not rezone properties within the Port Overlay District for residential use in the future (to the extent allowed by law).

The removal of Exit 218 would potentially be a beneficial land use impact by creating open space. This space could be used for housing or to create an open area for residents.

The eastbound interchange ramps of the proposed access roadway would have a minor adverse impact to Rosemont Field, but it would not prevent the intended use of this land.

3.5.1.3. Daniel Island Alternative

The Daniel Island Alternative would develop 261 acres of an inactive CDF that is owned by the SCSPA into industrial land use. The SCSPA is currently seeking to sell this land for mixed use development. Therefore, the Daniel Island Alternative would create a large area of industrial

land use in place of what would otherwise be a mix of residential, commercial and open space land uses. The conceptual access roadway would likely cause direct impacts to existing residential land use on Thomas Island. Similar to the Proposed Project, development of the Daniel Island Alternative may be reasonably expected to spur ancillary commercial and industrial development within the region.

3.5.1.4. Clouter Island Alternative

Considering the existing use as a CDF, the development of a container terminal at the Clouter Island Alternative site would change 275 acres of an active CDF, open water, and marsh areas to industrial land use. The loss of CDF capacity in Charleston Harbor would likely need to be replaced by the development of a new CDF adjacent to the Cooper River. The access roadway associated with the Clouter Island Alternative would likely impact existing residential land use on Thomas Island similar to the access roadway for the Daniel Island Alternative. Similar to the Proposed Project, development of the Clouter Island Alternative may be reasonably expected to spur ancillary commercial and industrial development within the region.

3.5.2. Physical Setting

3.5.2.1. No-Action

The No-Action Alternative assumes that the proposed terminal would not be constructed. However, it is reasonable to assume that some other industrial development of the site would occur. Impacts to the physical setting would be limited to the site work necessary to develop the subject property and to accommodate stormwater detention and drainage. No regional impacts to climate, geology, or topography would be expected. It is uncertain how much additional fill material will be needed from locally available mining sites.

3.5.2.2. Proposed Project

The Proposed Project would cause negligible impacts to the physical setting. The Proposed Project would cause negligible adverse impacts to the local climate as a result of localized increases in temperature associated with paving of the terminal area and roadway. It would have negligible impacts to regional climate change. The Proposed Project would cause negligible impacts to the topography, limited to localized changes at the terminal site, dredging areas, and within the roadway right-of-way. The Proposed Project would cause negligible localized impacts to the surficial geology and hydrogeology at the terminal site. It would increase the demand for local borrow sources as a result of the 6.5 Mcy fill requirements.

3.5.2.3. Daniel Island Alternative

The Daniel Island Alternative would cause negligible impacts to the physical setting similar to the impacts that would be caused by the Proposed Project. The Daniel Island Alternative would create an increased demand for local borrow sources as a result of the 3.8 Mcy fill requirements, which is less than that required for the Proposed Project.

3.5.2.4. Clouter Island Alternative

The Clouter Island Alternative would cause negligible impacts to the physical setting similar to the impacts that would be caused by the Proposed Project. The Clouter Island Alternative would create an increased demand for local borrow sources as a result of the 5.1 Mcy fill requirements, which is less than that required for the Proposed Project.

3.5.3. Socioeconomic Environment

3.5.3.1. No-Action

The Tri-County regional economy is expanding, with most growth-driving industries projecting continued growth and the rate of job expansion accelerating. The Charleston Metropolitan area's labor force is also growing at a rapid pace. Although this is a sign of confidence in the area's labor market, there is pressure on the local unemployment rate, which has increased steadily over the last several quarters to over 5.5 percent. SCSPA operations would continue to be the major economic factor in the region, but container throughput capacity would be limited and may limit future economic growth potential in the region.

A study of the existing conditions for the North Charleston study area showed greater poverty, lower income, and greater housing vacancies relative to the State and the City of North Charleston as a whole. For the No-Action Alternative, there will likely be some improvements to nearby communities caused by the ongoing redevelopment projects. For the No-Action Alternative, the anticipated growth in businesses and jobs, as well as the influx of residents attracted by ongoing redevelopment projects, will likely improve income, poverty, and housing statistics.

3.5.3.2. Proposed Project

The Proposed Project will result in a major socioeconomic benefit to the region and the State of South Carolina by supporting future job growth and industrial development. The Proposed Project will also benefit the local economy surrounding the CNC by increasing employment opportunities, spurring additional business and maritime support services, and developing a new commercial corridor along Stromboli Avenue. The Proposed Project will have a minimal impact on nearby housing conditions. However, the proposed roadway improvements will likely have both beneficial and adverse impacts to nearby housing and property values.

3.5.3.3. Daniel Island Alternative

The Daniel Island Alternative would result in a major socioeconomic benefit to the region and the State of South Carolina by supporting future job growth and industrial development similar to the Proposed Project. However, there would likely be a negligible effect to the projected future socioeconomic conditions of the areas surrounding Daniel Island. The largest concentration of business growth from the Daniel Island Alternative would likely be along Clements Ferry Road north of I-526. It is uncertain how many, and to what degree, businesses would locate south of I-526 on Thomas Island. However, the access roadway for the Daniel Island Alternative would likely have an adverse impact on housing values immediately adjacent to the roadway corridor.

3.5.3.4. Clouter Island Alternative

The Clouter Island Alternative would have similar impacts to socioeconomics as the Daniel Island Alternative.

3.5.4. Social Characteristics and Environmental Justice

3.5.4.1. No-Action

For the No-Action Alternative, the population in the North Charleston study area is not expected to grow at the same rate as that of the Tri-County region. It is assumed that the decreasing population trend for the North Charleston study area will continue for the short-term until new residents are attracted to the area as a result of ongoing development and revitalization projects nearby. Presently, the North Charleston study area's population is approximately 74 percent

minority. It is likely that the ongoing development and revitalization projects will result in more racially mixed neighborhoods. Similar to what has occurred at Daniel Island, more residents will move to the area in the future and the percent of minority residents will likely decrease.

With the potential change in the number of residents and racial mix, it is uncertain whether the population in the North Charleston environmental justice (EJ) study area will remain an EJ population. Potential impacts to this population are difficult to predict, but will likely include those impacts commonly associated with commercial and industrial developments, most notably, increases in noise, light, and traffic.

3.5.4.2. Proposed Project

It is likely that the proposed terminal will create new jobs, either directly or indirectly. However, the addition of households resulting from new jobs is uncertain. It is expected that most jobs will be filled by residents already living in the Tri-County region. In contrast, the local access roadway improvements along Stromboli Avenue from Spruill Avenue to Meeting Street would likely benefit local income statistics as a result of new businesses and jobs occurring along this corridor.

Overall, the Proposed Project would not adversely impact community stability, cohesion, or interaction. Development of the proposed terminal would be located on vacant land transferred to the SCSPA. Therefore, no acquisition or relocation of residences, businesses, or community facilities would be required to develop the terminal. The construction of the proposed access roadway would require the acquisition of some parcels of land. The majority of these land parcel impacts would be to commercial and light industrial properties, as well as several vacant properties. No residences or community facilities would be directly impacted by the construction of the proposed access roadway.

An EJ assessment determined that the North Charleston study area does meet the criteria set for an EJ population. Many of the transportation-related issues that were a concern in the early planning stages of the Proposed Project have been avoided by designing an access roadway with local access improvements. For example, the proposed access roadway between the proposed terminal site and I-26 would avoid the impacts caused by heavy truck traffic on local neighborhood roads. Other impacts to this EJ population would include a minimal increase in mobile air emissions, increases in noise and light (in terms of sky glow), and changes to the visual character of the area. The potential adverse impacts have been minimized to the degree practicable in the planning of the Proposed Project and the transportation improvements will likely benefit the local communities.

3.5.4.3. Daniel Island Alternative

With the opening of I-526, the Cainhoy Peninsula, Thomas Island, and Daniel Island quickly changed from rural to urban and suburban land use, with extensive commercial and residential development occurring within a short time. The Daniel Island Community is now a relatively high-income community. Thomas Island is predominantly a minority community and this area is also experiencing development pressure as the area continues to undergo the transition from rural to urban. The Daniel Island Alternative terminal site, which would be located on undeveloped land, would not cause the displacement of residences or businesses.

It is likely that the Daniel Island Alternative will create new jobs, either directly or indirectly. However, the addition of households resulting from new jobs is uncertain. It is expected that most jobs will be filled by residents already living in the Tri-County region. In contrast, the local

access roadway would likely benefit local income statistics as a result of new businesses and jobs occurring along this corridor, specifically Clements Ferry Road.

Overall, the Daniel Island Alternative would not adversely impact community stability, cohesion, or interaction. The access roadway associated with the Daniel Island Alternative would cross Beresford Creek and tie into Clements Ferry Road. This roadway would be nearly twice as long as the access roadway for the Proposed Project and would likely require acquisition of residential properties on Thomas Island. Therefore, the Daniel Island Alternative would cause more direct impacts to residents than the Proposed Project. It should be noted that while the study area that includes Daniel Island did not meet the criteria set for an EJ population, historical records indicate that residential areas along the access roadway corridor (i.e., Clements Ferry Road on Thomas Island) has been predominantly minority.

3.5.4.4. Clouter Island Alternative

Clouter Island is currently developed as a CDF for the disposal of dredged material. The development of a container terminal at the Clouter Island Alternative site would not cause the displacement of residences and businesses and would not likely affect minority and low-income communities. However, the access roadway associated with the Clouter Island Alternative is longer than the access roadway for the Proposed Project and is aligned similar to the access roadway for the Daniel Island Alternative. Therefore, the construction of the roadway would likely require acquisition of residential properties on Thomas Island. As such, the Clouter Island Alternative would cause more direct impacts to residents than the Proposed Project.

3.5.5. Community Infrastructure and Municipal Services

3.5.5.1. No-Action

Future changes to infrastructure and services are primarily linked to the projected population growth over the next twenty years. The following paragraphs summarize the anticipated changes associated with the No-Action Alternative.

Water Supply and Wastewater Treatment

Demands on water supply and wastewater treatment will increase commensurate with the anticipated growth and development of the Tri-County region. The available capacity at water treatment and wastewater treatment plants appears to be adequate to support expected regional growth.

Fire, Law Enforcement, and Emergency Medical Services

Assuming that similar service provider to population ratios will be maintained, fire fighter personnel are expected to increase by 27.8 percent, 10.5 percent, and 33.2 percent for Berkeley, Charleston, and Dorchester Counties respectively. Law enforcement personnel are expected to increase by 28.6 percent, 10.6 percent, and 33.1 percent for Berkeley, Charleston, and Dorchester Counties respectively. Emergency Medical Service personnel are expected to increase by 28.1 percent, 10.4 percent, and 34.0 percent. These expected personnel increases are for the period 2005 through 2025.

Schools

Public school enrollment is projected to decline slightly in Berkeley and Charleston Counties, but to increase substantially in Dorchester County by 2025. Projected changes in enrollment are as follows: Berkeley County –2.4 percent, Charleston County –1.4 percent, and Dorchester

County +104.4 percent. It is assumed that private primary and secondary school enrollment changes would be similar to those for public schools.

Enrollment in colleges, universities and technical schools is expected to increase commensurate with population increases within the Tri-County region; out of region student enrollment will likely increase as the overall enrollment at colleges, universities, and technical schools in the region increase.

Solid Waste Generation and Disposal

The existing solid waste management facilities within the Tri-County region have adequate capacity to handle the anticipated population increase.

Utilities

Future utility expansion is expected to accommodate the projected population increase within the Tri-County region.

3.5.5.2. Proposed Project

Water Supply and Wastewater Treatment

The Proposed Project would not require any additional capacity expansions of potable and/or wastewater treatment facilities. There would be no adverse impacts to water supply and wastewater treatment facilities.

Fire, Law Enforcement, and Emergency Medical Services

The Proposed Project is expected to impact public service providers through a relatively small increase in the requirements for personnel and equipment in the Tri-County region and in response times due to increased traffic and rail crossing delays. Population growth is not likely to differ from the projected overall regional growth. Therefore, the impact to public services from the Proposed Project would be negligible.

Schools

The net influx of households required to fill new jobs is likely to be minimal, as is the likely number of new students. Therefore, student enrollment in schools should be similar to that of the No-Action Alternative.

Solid Waste Generation and Disposal

The projected remaining capacity available at existing solid waste facilities will be sufficient to accommodate waste generated by the Proposed Project. No adverse direct or indirect impacts to solid waste capacity within the Tri-County region are anticipated as part of the Proposed Project.

Utilities

The Proposed Project would require utility services similar to the No-Action Alternative (assuming that the site would be industrially developed under the No-Action Alternative).

3.5.5.3. Daniel Island Alternative

The Daniel Island Alternative would have similar impacts to community infrastructure and municipal services as the Proposed Project. However, utility lines would need to be extended from the closest mains to the facility.

3.5.5.4. Clouter Island Alternative

The Clouter Island Alternative would have similar impacts to community infrastructure and municipal services as the Proposed Project. However, utility lines would need to be constructed from the closest mains to the facility.

3.5.6. Transportation

3.5.6.1. No-Action

The traffic analysis for current conditions within the study area near the Proposed Project shows that several roadway segments are currently operating at or near capacity at compromised Levels of Service (LOS). The current level of traffic congestion is primarily caused by periods of heavy traffic, configuration and number of intersections and interchanges, and inadequate traffic signals and controls. Presently, several arterial corridors, including Rivers Avenue and Dorchester Road, carry heavy traffic volumes and are projected to operate at or over capacity in 2025 solely due to future projected regional growth. Furthermore, the traffic study projects that there will likely be a traffic bottleneck in the area surrounding the I-26/I-526 interchange and including segments of I-26 and I-526. Potential future transportation improvements have been identified by the CHATS for the Tri-County area. However, few major roadway improvement projects have been planned within the study area.

I-526 is projected to have high traffic demand in the future due to expected employment and housing growth in the BCDCOG planning area, especially east of the Cooper River. The I-526 traffic volume in 2025 is expected to be double the current traffic volume. This estimated growth in traffic will likely create substantial traffic problems on I-526 and a majority of the Interstate segments would fail or be over capacity.

In comparison, I-26 is projected to have moderate growth in traffic demand by 2025, which would cause some Interstate segments to fail, but not on as system-wide or severe a basis as I-526. Traffic analyses predict that the segment of I-26 between Dorchester Road and Montague Avenue will reach a failing level of service in 2012/2013 as a result of background traffic growth. Other segments will also fail by 2025, including the segment from Cosgrove Avenue to Dorchester Road, and the segment from I-526 to Remount Road. The remaining segments between Mt Pleasant Street and I-526 would not reach failure by 2025.

Several arterial roadway segments within the North Charleston study area are projected to operate at LOS E or F (at capacity and over capacity respectively) in 2025, and most of the arterial segments within the Daniel Island and Clouter Island study areas are projected to operate at LOS E or F.

Traffic delays at railroad crossings will increase with an increase in rail traffic. As the vehicular traffic volume within the North Charleston study area increases, it is reasonable to assume that some increase in traffic delays at crossings can be expected (there are no rail crossings within the Daniel Island and Clouter Island study areas).

3.5.6.2. Proposed Project

Traffic studies were conducted to evaluate existing roadways and intersections that would likely be used by vehicles entering and leaving the Proposed Project. Since the proposed container terminal is expected to reach capacity in 2025, the study evaluated future traffic conditions through 2025.

At build-out in 2025, the proposed terminal would generate 10,920 trips per day under peak conditions (where one trip is equal to one vehicle entering or leaving the proposed facility). Under average conditions 7,700 daily trips are projected, of which 63 percent would be made by trucks.

Direct access between I-26 and the Proposed Project is referenced in the Memorandum of Understanding and Agreement (MOUA) between the SCSPA and the City of North Charleston (November 2002), which is included as Appendix B. The MOUA states that "the SPA acknowledges that The City requires that certain minimum infrastructure must be in place before the SPA commences container operations. This minimum infrastructure includes a truck access road leading directly from the Port Facility Area to I-26..." The USACE has determined that the potential impacts from construction and operation of an access roadway between I-26 and the Proposed Project would be evaluated in this EIS.

The additional traffic from the Proposed Project would add to the overall future traffic congestion picture in the study area. However, the congestion is contained along the I-26 freeway corridor due to the access roadway that will connect the proposed terminal with I-26 and carry all truck traffic from the terminal to the interstate highway. The access roadway will also connect to the FLETC and Veterans Terminal, and a majority of the impact to I-26 traffic from the Proposed Project would be caused by the rerouting of FLETC and Veterans Terminal traffic.

Assuming the interstate highways have the same number of lanes as they do presently, the additional traffic from the Proposed Project on I-26 and I-526 would impact an already congested condition. The Proposed Project would cause the greatest impact to traffic on I-26, and the impacts to traffic on I-526 would be minimal due to the smaller fraction of traffic from the proposed terminal that would travel on I-526.

The daily traffic volume (all vehicle types) on I-26 between I-526 and Remount Road, which is the most heavily traveled I-26 segment, is projected to increase by 1.75 percent due to the traffic generated by the Proposed Project. The proportion of trucks in 2025 traffic along the I-26 segment between I-526 to Remount Road is projected to increase by only one percent, from 8 percent trucks to 9 percent trucks, due to the traffic from the Proposed Project.

The impact to traffic on I-26 south of I-526 would result in the failure (LOS F) of several segments. Although the I-26 highway congestion would primarily be due to background growth in traffic and inadequate number of lanes, the Proposed Project would cause at-capacity or over-capacity conditions sooner than the No-Action Alternative. These cumulative impacts to I-26 would likely require the widening of segments south of I-526 prior to 2025. Impacts from the widening are being addressed in a separate study by the SCDOT and are expected to occur within the existing right of way.

The access roadway would affect local access to the I-26 highway, specifically Exit 218 would be closed. A new access for local traffic to I-26 would be provided by developing a connector road to Spruill Avenue and Meeting Street along Stromboli Avenue. Extension of the local connector road along Stromboli Avenue to Meeting Street would provide further improvements

to traffic and may help establish a business corridor in the area. Also, Meeting Street traffic would need to be rerouted to Carner Avenue. In general, the Proposed Project would improve traffic conditions within and adjacent to the CNC.

3.5.6.3. Daniel Island Alternative

The Daniel Island Alternative includes a conceptual direct access roadway to connect the terminal to I-526 (Figure 3.4-2). The conceptual access roadway from the Daniel Island Alternative would traverse the western edge of Daniel Island and cross Beresford Creek near its Clouter Creek confluence with a bridge allowing 25 feet of vertical clearance. The conceptual access roadway would be a divided 4-lane highway and tie into the southern terminus of Clements Ferry Road on Thomas Island, and use the existing Clements Ferry Road/I-526 interchange. The access roadway would likely result in the relocation of residents on Thomas Island and a substantial increase in traffic on Clements Ferry Road (primarily south of the I-526/Clements Ferry Road interchange). The majority of this new traffic would be from trucks going to and from the terminal.

A majority of the I-526 segments in the study area would operate at a failing LOS due to the additional traffic volume resulting from regional growth. At build-out in 2025, the Daniel Island Alternative would contribute to a substantial increase in the traffic volume of Clements Ferry Road and the interchange of I-526 with I-26. Approximately 80 percent of the Daniel Island Alternative traffic would travel on I-526 between the Clements Ferry Road interchange and I-26 as a primary route for truck and car traffic. It is likely that the additional traffic on I-526 from the Daniel Island Alternative would adversely impact traffic on already congested I-526 segments. During periods of congested interstate traffic, trucks would likely travel through areas of North Charleston on secondary routes.

The projected daily traffic volume percent increases on I-26 north of I-526 and on I-526 west of I-26 related to the Daniel Island Alternative is the same as that projected for the Proposed Alternative.

Since containers would be transported to the same intermodal rail yards, impacts to at-grade railroad crossings within the North Charleston study area would be similar to those associated with the Proposed Project. However, it should be noted that the travel distance would be over six miles greater on average to both intermodal rail yards [i.e., Bennett Yard (CSX) and 7-Mile Yard (NS)].

3.5.6.4. Clouter Island Alternative

The Clouter Island Alternative includes a new, direct access roadway to connect the terminal to I-526 (Figure 3.4-3) since there is currently no road providing access to Clouter Island. The conceptual access roadway for the Clouter Island Alternative would cross over Clouter Creek using a fixed-span bridge with a 65-foot clearance, tie into the southern terminus of Clements Ferry Road on Thomas Island, and use the existing Clements Ferry Road I-526 interchange. The new roadway would be approximately 1.7 miles long.

Since both the Clouter Island and Daniel Island Alternatives tie into Clements Ferry Road at the same point, the potential impacts to communities and roadway traffic would be similar to those for the Daniel Island Alternative.

Since containers would be transported to the same intermodal rail yards, impacts to at-grade railroad crossings within the North Charleston study area would be similar to those associated

with the Proposed Project. However, it should be noted that the travel distance would be over five miles greater on average to both intermodal rail yards [i.e., Bennett Yard (CSX) and 7-Mile Yard (NS)].

3.5.7. Navigation and Terminal Facilities

3.5.7.1. No-Action

Overall, the No-Action Alternative will include growth in vessel traffic and possible changes to the navigation channel. Changes will likely include construction of future navigation channel and marine terminal improvement projects. The SCSPA will expand existing terminals and improve technology to increase throughput capacity to 2.6 million TEU. Given that the Proposed Project is not constructed for the No-Action Alternative, demand will likely exceed maximum SCSPA terminal throughput capacity by about 2014. Redevelopment of waterfront facilities in Shipyard Creek are likely and may increase shallow and deep draft vessel trips to the Cooper River and Shipyard Creek. Vessel calls on waterfront facilities on the Cooper River are expected to increase approximately 1 percent per year except for container vessels calling on North Charleston Terminal which are expected to increase 4 percent per year until the planned maximum throughput capacity for North Charleston Terminal is reached in 2011. The total number of deep-draft vessel trips on the Upper Cooper River above Shipyard Creek is projected to increase by about 41 percent between 2004 and 2025.

3.5.7.2. Proposed Project

It is expected that the Proposed Project would be in operation by calendar year 2012, and it would increase vessel traffic in the Cooper River and Charleston Harbor by about 300 additional container vessel trips in the year 2012 (where one vessel calling on the terminal generates two trips: one entering and one leaving the port). Assuming additional vessel trips increase by 100 trips a year, the stated TEU capacity of the Proposed Project of 1.4 million TEU would be reached in 2022. The maximum increase in container vessel traffic as a result of the proposed terminal would be 1,300 vessel trips per year in the harbor, which would be a 68 percent increase in Upper Cooper River deep-draft vessel traffic, as compared to the No-Action Alternative.

The Proposed Project would not impact SCSPA terminals or other private terminals, except for impacts as a result of the increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers. The Proposed Project would cause minor delays to commercial navigation resulting from temporary blockage of the navigation channel for container vessel turning operations. These delays would result in minor economic impacts as a result of increased costs to shipping companies.

The Proposed Project would slightly increase the risk to port security as a result of increased container traffic, as compared to the No-Action Alternative. This potential increase in risk would be minimized by ongoing improvements to port security.

The Proposed Project vessel traffic would be able to safely navigate to and from the proposed terminal, including turning maneuvers. The increased vessel traffic associated with the Proposed Project would also slightly increase the risk for a collision with recreational vessels.

3.5.7.3. Daniel Island Alternative

Given that the Daniel Island Alternative is located across the Cooper River from the Proposed Project, the impacts to navigation would be similar to those for the Proposed Project.

3.5.7.4. Clouter Island Alternative

The Clouter Island Alternative is located upstream from the Proposed Project and would have similar impacts to navigation and terminal facilities.

3.5.8. Noise

3.5.8.1. No-Action Alternative

For the No-Action Alternative, it is assumed that the south end of the CNC would be developed for another industrial use. It is also assumed that such industrial development would comply with applicable noise ordinance requirements and would have minimal impacts to residential areas and other noise sensitive receptors.

3.5.8.2. Proposed Project

Noise emanating from the proposed terminal during construction and operational phases is expected to have a negligible impact on nearby residential neighborhoods. Construction and operational noises at the terminal site are expected to have some adverse impact to the nearby FLETC dormitory and Cooper River Marina. However, it should be pointed out that some construction activities, and their associated noise, will be contained to certain areas of the site at various times during the construction phase. For example, pile driving will be contained to the wharf area. During times when pile driving is occurring at the north or south end of the wharf, the FLETC dormitory, or Cooper River Marina, respectively, would experience considerably higher noise levels than on average.

Noise from the proposed access roadway will impact approximately 129 sensitive receptors. In many cases, the existing noise levels already approach or exceed FHWA's noise abatement criteria at these sites. None of these receptors will experience a substantial increase over existing conditions.

3.5.8.3. Daniel Island Alternative

The Daniel Island Alternative terminal would not be expected to cause adverse noise impacts to sensitive receptors. Noise levels generated by the Daniel Island Alternative would be similar to the Proposed Project. The Daniel Island Alternative roadway would cause adverse noise impacts to sensitive receptors located along Clements Ferry Road south of I-526 during both construction and operational phases.

3.5.8.4. Clouter Island Alternative

The Clouter Island Alternative terminal would not be expected to cause adverse noise impacts to sensitive receptors. However, noise levels generated by the terminal operation would be similar the Proposed Project. The Clouter Island Alternative roadway would cause adverse noise impacts to residences located along Clements Ferry Road south of I-526 during both construction and operational phases. The expected roadway noise impacts would be similar to those for the Daniel Island Alternative and generate the similar noise levels as the access roadway for the Proposed Project.

3.5.9. Light

3.5.9.1. No-Action Alternative

Under the No-Action scenario, it is assumed that the south end of the CNC would be developed for another industrial use. Future industrial development of the CNC would likely result in an increase in nighttime lighting; however, overall impacts would be expected to be negligible.

3.5.9.2. Proposed Project

Light impacts from the Proposed Project would likely be somewhat greater than for the No-Action Alternative. Sky glow would be the primary light impact from the proposed terminal. However, the contribution to sky glow would be minor compared to the existing urban lighting within the North Charleston study area. Light trespass from the facility would likely impact nighttime residents of the FLETC campus and the Cooper River Marina. Portions of the proposed access roadway would be lighted and light trespass would be the primary impact. These light impacts would be mostly to industrial and institutional areas with impacts to residential areas being minimal. Truck traffic to and from the port terminal would primarily occur during daylight hours, so light impacts from vehicle headlights at night would likely also be minimal.

3.5.9.3. Daniel Island Alternative

The lighting impacts from the Daniel Island Alternative are expected to be similar as those for the Proposed Project, i.e., minimal. However, the access roadway for the Daniel Island Alternative is nearly twice the length of the proposed access roadway. Therefore, impacts from lighting would affect a greater number of sensitive receptors.

3.5.9.4. Clouter Island Alternative

The lighting impacts from the Clouter Island Alternative are expected to be similar as those for the Proposed Project, i.e., minimal. However, the access roadway associated with the Clouter Island Alternative would likely be located closer to adjacent residents.

3.5.10. Aesthetics

3.5.10.1. No-Action Alternative

Redevelopment of the south end of the CNC would likely proceed as managed by the CNC Redevelopment Authority. New industrial and/or commercial land uses would continue to be developed and, accordingly, the property would retain its current industrial and institutional appearance. Development of this area would likely be noticeable to adjacent land owners and future residences and businesses on Daniel Island located directly across the Cooper River.

3.5.10.2. Proposed Project

The construction of the Proposed Project would change the appearance of the south end of the CNC. It is expected that the shoreline of the terminal site will appear much the same as the Wando Welch Terminal. From the landside, viewers from residential areas would only be able to see the tops of the cranes and the elevated roadways. The existing aesthetic character of the area surrounding the Proposed Project is already dominated by industrial and commercial land uses. Therefore, the development of the Proposed Project would be in keeping with the existing and historical use of the CNC as a whole and the surrounding maritime industries.

3.5.10.3. Daniel Island Alternative

The Daniel Island Alternative would be similar in appearance to the Proposed Project. However, the development of the Daniel Island Alternative would have a greater visual impact because the western shoreline of Daniel Island is currently undeveloped. The access roadway associated with the Daniel Island Alternative would be visible to existing residences and a church located along Clements Ferry Road on Thomas Island.

3.5.10.4. Clouter Island Alternative

The Clouter Island Alternative would be similar in appearance to the Proposed Project. However, the Clouter Island Alternative would have a greater visual impact because the western shoreline of Clouter Island is currently undeveloped. The access roadway associated with the Clouter Island Alternative would be visible to existing residences and a church located along Clements Ferry Road on Thomas Island.

3.5.11. Air Quality

3.5.11.1. No-Action Alternative

Air quality in the Tri-County region will be affected by numerous factors, including regional growth, technology improvements, and regulatory programs and initiatives. Anticipated increases in emissions associated with the expected regional growth will also be accompanied by more stringent EPA emission standards. It is expected that the Tri-County region air quality conditions would remain at or near their current levels (except ozone, which should improve), and the region will continue to be designated an attainment area for meeting the National Ambient Air Quality Standards (NAAQS).

The No-Action Alternative would likely include some type of industrial development of the project site in lieu of the Proposed Project. It is also likely that state of the art emissions control technology would be employed and no contravention of air quality standards would occur.

3.5.11.2. Proposed Project

Under the Proposed Project scenario, regional air emissions associated with direct and indirect terminal activities would increase above the current levels due to construction phase emissions and operational phase emissions. Construction phase emissions would include temporary generation of fugitive dust and fuel combustion emissions during construction of the terminal and access roadway improvements. Operational phase emissions would include: emissions from container-handling yard equipment; emissions from container ships and other small marine vessels; and emissions from cars and trucks along terminal access routes and while idling on site. Altogether, these emissions would be a small fraction of the total regional emissions (generally less than 1 percent).

The *Air Quality Report* (Appendix S) completed for this EIS concluded that these emissions would cause minimal adverse impact to regional and local air quality. The results of the air quality modeling indicate that the Proposed Project emissions:

- will not cause or contribute to an exceedance of the NAAQS or PSD increments within the Class I area (i.e., Cape Romain Wildlife Refuge);

- will not cause or contribute to an exceedance of the NAAQS or PSD increments in the Class II area (i.e., the study area outside the Cape Romain Wildlife Refuge);

- will not cause or contribute to an exceedance of the NAAQS for sensitive populations in the study area (the emissions will disperse and will have minimal impact to the adjacent sensitive receptors);

- will not affect the Charleston and Cape Romain Wildlife Refuge areas' current attainment status for ozone;

- is not anticipated to have an adverse affect on visibility within the Cape Romain Wildlife Refuge; and

- is not likely to cause an adverse impact to the Class I area as a result of nitrogen and sulfur deposition (less than a 2% increase).

3.5.11.3. Daniel Island Alternative

Overall, the Daniel Island Alternative would result in similar regional air quality impacts as that described for the Proposed Project in Section 5.2.11. The Daniel Island Alternative would result in increased emissions as a result of the construction and operation of the project. These emissions would be similar to those for the Proposed Project, except the operational emissions would be slightly higher as a result of longer travel times for trucks to reach their primary destinations and congested traffic conditions on I-526. Similar to the Proposed Project, the emissions would cause minimal adverse impact to regional and local air quality.

3.5.11.4. Clouter Island Alternative

Overall, the Clouter Island Alternative would result in similar increases in regional air quality impacts as that described for the Proposed Project in Section 5.2.11. The Clouter Island Alternative would result in increased emissions as a result of the construction and operation of the project. These emissions would be similar to those for the Proposed Project, except the operational emissions would be slightly higher as a result of longer travel times for trucks to reach their primary destinations and congested traffic conditions on I-526. However, in contrast to the Proposed Project, air dispersion modeling predicted that the Clouter Island Alternative would potentially contribute to some localized exceedances of air quality standards. Based on air dispersion modeling, the Clouter Island Alternative would potentially contribute to at least one predicted exceedance event and location for the 3-hour SO2 NAAQS and the 24-hour and 3-hour PSD increments. Therefore, the Clouter Island Alternative was not shown to be in compliance with the NAAQS or PSD increments in the Class II area.

3.5.12. Cultural Resources

3.5.12.1. No-Action Alternative

For the No-Action Alternative, there are no proposed plans that would effect historic or potentially historic properties or archaeological resources within the Area of Potential Effect (APE).

3.5.12.2. Proposed Project

The Proposed Project would have no effect on historic or potentially historic properties or archaeological resources within the APE.

3.5.12.3. Daniel Island Alternative

The Daniel Island Alternative would have no effect on historic or potentially historic properties or archaeological resources within the APE.

3.5.12.4. Clouter Island Alternative

The Clouter Island Alternative would have no effect on historic or potentially historic properties or archaeological resources within the APE.

3.5.13. Section 4(F) Properties, Section 6(F) Properties, and Other Recreational Facilities

3.5.13.1. No-Action Alternative

For the No-Action Alternative, it is unlikely that any Section 4(f) or Section 6(f) properties or other recreational facilities would be directly impacted. Indirect impacts include minor increases in noise and light.

3.5.13.2. Proposed Project

The Proposed Project would have minor adverse impacts on recreational facilities in the study area. The proposed terminal may potentially impact the Cooper River Marina, a Section 4(f) property, inasmuch as the upriver view from the marina would change substantially with the development of the Proposed Project. Noise levels at the marina would also increase as a result of the development of the proposed terminal. The increase in commercial marine vessels will result in minor adverse impacts to recreation boating in Charleston Harbor.

The proposed access roadway would not directly impact any Section 4(f) or 6(f) properties. However, the roadway will be located adjacent to the Park South Recreation Center and Rosemont Field.

3.5.13.3. Daniel Island Alternative

The Daniel Island Alternative is unlikely to directly impact any Section 4(f) or Section 6(f) properties or other recreational facilities in the study area. Indirect impacts include minor increases in noise and light. Impacts to recreational boating would be similar to the Proposed Project.

3.5.13.4. Clouter Island Alternative

The Clouter Island Alternative is unlikely to directly impact any Section 4(f) or Section 6(f) properties or other recreational facilities in the study area. Indirect impacts include minor increases in noise and light. Impacts to recreational boating would be similar to the Proposed Project.

3.5.14. Hazardous Waste And Materials

3.5.14.1. No-Action Alternative

Several Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) have been identified within and near to the Proposed Project footprint. Any future development of the Proposed Project site would have to take the identified SWMU/AOCs into account during the design and construction phases. Most of the SWMU/AOCs have No Further Action required (NFA) status except for SWMU 17, which will most likely require remediation of soil and

groundwater contamination. It is expected that a remedial plan will be developed, planned, and implemented for SWMU 17 in the future.

3.5.14.2. Proposed Project

Design and construction of the proposed terminal would have to consider the locations of SWMUs and AOCs within the project footprint and the level of contaminant concentrations. The Proposed Project would provide some benefit to the area in terms of expedited remediation and other measures to address contamination and suspected unexploded ordnance. For instance, the entire site would be covered with clean fill, thereby reducing the potential exposure to contaminated surface and subsurface soils.

The proposed access roadway would traverse two previously remediated soil contamination sites in the Macalloy Superfund site as well as one area of groundwater contamination. Engineering controls may be required when installing support pilings to reduce the possibility of contaminated groundwater in the upper surficial aquifer cross-contaminating the lower zone.

The Proposed Project would handle a relatively small percentage (typically less than 5 percent) of total containers that contain some amount of hazardous materials. With the increase in throughput generated by the Proposed Project, it is likely that there will be some incremental increase in the risk of spills.

3.5.14.3. Daniel Island Alternative

The development of the Daniel Island Alternative would not affect existing contaminated sites or remediation activities. The Daniel Island Alternative would handle the same volume of hazardous materials as the Proposed Project terminal and would have the same incremental increase in the risk of spills.

3.5.14.4. Clouter Island Alternative

The Clouter Island Alternative terminal could potentially impact two AOCs located near the southern end of Clouter Island. Both of these AOCs have NFA status. The Clouter Island Alternative would handle the same volume of hazardous materials as the Proposed Project terminal and would have the same incremental increase in the risk of spills.

3.5.15. Water Resources

3.5.15.1. No-Action Alternative

It is reasonable to assume that water resources 20 years in the future will be similar to present day conditions (including hydrology, groundwater resources, water quality, stormwater runoff pollution, ballast water pollution, and wastewater pollution). Overall, future water quality impacts from pollution related to the increase in developed lands and impervious areas in the watershed will tend to be offset by an increase in stormwater controls, management practices, and other regulatory programs affecting discharges into Charleston Harbor. Predicting specific changes to the future water resources environment would be uncertain and speculative (e.g., changes to National Pollutant Discharge Elimination System (NPDES) permits may occur). Therefore, it is assumed that there will be minimal impacts to water resources for the No-Action Alternative.

3.5.15.2. Proposed Project

Overall, the Proposed Project would have negligible impacts to groundwater resources, and it would have minor adverse impacts to stormwater runoff and surface water quality.

The Proposed Project would increase stormwater runoff quantity and pollution. However, the Proposed Project would be required to comply with SCDHEC stormwater regulations, and the adverse impacts of the Proposed Project on surface waters resulting from the stormwater runoff would be minimal as a result of stormwater treatment and BMPs.

The Proposed Project would create an additional water column near the river bottom where the berth and access area would be excavated. This area would exhibit increased salinity concentrations as compared to the existing bottom salinity in this area. The Proposed Project would cause minimal adverse impacts to salinity upstream and downstream from the terminal, and it would cause negligible impacts to salinity intrusion events that affect the Bushy Park Reservoir.

The Proposed Project would cause small increases and decreases in DO concentrations in the lower Cooper River. The maximum adverse impacts (i.e., decreases) to DO would occur in the berth and turning basin near the river bottom, and the maximum adverse impacts also occur at times when the Pinopolis Dam flows are low. The maximum adverse impacts to depth-averaged DO in the berth and access area would be about –0.015 to -0.077 mg/l averaged over a 3-month period, and about -0.107 to -0.165 mg/l averaged over twenty-four hours.

The Proposed Project would cause temporary increases in suspended sediment concentrations caused by dredge operations during project construction (over a 12 to 15 month period) and during maintenance dredging events. The large increases in suspended sediment concentrations would be limited to a localized area at the river bottom near the dredge (within 50 m). The increases are less than suspended sediment concentrations that occur during storm events (both in concentration and spatial extent), and therefore, these adverse impacts are considered minor.

Other aspects of the Proposed Project would have minimal adverse impacts to suspended sediment concentrations. Effluent from the CDF during dredging operations would have minimal adverse impact to in-stream suspended sediment concentrations. Backfilling of the terminal area in the Cooper River would have minimal adverse impact to suspended sediment concentrations because the area would be enclosed by a sheet pile wall prior to backfilling. Access roadway construction would have minimal adverse impacts to suspended sediment concentration as a result of pile foundation and abutment construction. The water jet sedimentation control system would be designed to keep sediments in suspension, and although the system may cause short-term fluctuations in suspended sediment concentrations (for periods of minutes), the system would have negligible impacts to the daily averaged suspended sediment concentrations.

The Proposed Project would have minimal adverse impacts to water column concentrations of toxic chemicals during dredging operations, either at the dredge site or at the CDF outfall. Adverse impacts to water quality resulting from bilge water discharges, accidental spills or container washwater would be minimal.

3.5.15.3. Daniel Island Alternative

Similar to the Proposed Project, the Daniel Island Alternative would cause negligible impacts to groundwater resources. The adverse impacts of the Daniel Island Alternative on surface waters resulting from the stormwater runoff would be minimal as a result of stormwater treatment and BMPs.

Similar to the Proposed Project, the Daniel Island Alternative would cause minor adverse impacts to dissolved oxygen, salinity, nutrients, heavy metals, and suspended sediments. However, because the size of the berth area and access area to be dredged is smaller than that for the Proposed Project, these minor adverse impacts will be less than that for the Proposed Project.

Similar to the Proposed Project, the Daniel Island Alternative would have minimal adverse impacts to water column concentrations of toxic chemicals during dredging operations, either at the dredge site or at the CDF outfall. Adverse impacts to water quality resulting from bilge water discharges, accidental spills or container washwater would be minimal.

3.5.15.4. Clouter Island Alternative

Similar to the Proposed Project, the Clouter Island Alternative would cause negligible impacts to groundwater resources. The adverse impacts of the Clouter Island Alternative on surface waters resulting from the stormwater runoff would be minimal as a result of stormwater treatment and BMPs.

Similar to the Proposed Project, the Clouter Island Alternative would cause minor adverse impacts to dissolved oxygen, salinity, nutrients, heavy metals, and suspended sediments. However, because the size of the berth area and access area to be dredged is smaller than that for the Proposed Project, these minor impacts will be less than that for the Proposed Project.

Similar to the Proposed Project, the Clouter Island Alternative would have minimal adverse impacts to water column concentrations of toxic chemicals during dredging operations, either at the dredge site or at the CDF outfall. Adverse impacts to water quality resulting from bilge water discharges, accidental spills or container washwater would be minimal.

3.5.16. Aquatic Sediments and Dredging

3.5.16.1. No-Action Alternative

It is reasonable to assume that future sedimentation and maintenance dredging rates will be similar to present conditions. However, environmental factors and changes to the navigation channel geometry may affect future maintenance dredging rates. Maintenance dredging will continue to dispose of dredged material into CDFs in the harbor area and at the ODMDS.

Contamination that is sequestered by existing aquatic sediments in the study area will likely remain undisturbed. However, if the sediments are disturbed by a construction project, the results of the sediment quality evaluation indicate that it would cause minimal adverse impacts.

3.5.16.2. Proposed Project

For the project construction, a total of approximately 6.5 million cubic yards (Mcy) of material would be excavated. The dredging would occur over a period of 12-15 months. The dredged material would be placed in the Daniel Island CDF, which is owned and managed by the SCSPA.

The Proposed Project would have minimal effects on long-term maintenance dredging rates of the Federal navigation channel by altering the river geometry. Sedimentation modeling results indicate that the Proposed Project would cause an increase in the total shoaling in the Federal navigation channel on the order of $2x10^4$ cy/yr. The changes would include an increase in Daniel Island Reach/Bend and Myers Bend shoaling ($5x10^4$ cy/yr) and small reductions in

shoaling some of the other adjacent reaches ($2x10^4$ cy/yr in Drum Island Reach and $1x10^4$ cy/yr in the Navy Yard Reach). The Proposed Project is not expected to impact shoaling rates downstream of Myers Bend.

The Proposed Project would also impact sedimentation rates in areas outside the Federal navigation channel, such as the berth and access area constructed as part of the Proposed Project. The Proposed Project is estimated to cause long-term shoaling of approximately $6x10^4$ cy/yr in the berth area if a water jet sedimentation control system is not in operation. The Proposed Project includes installation of a water jet sedimentation control system, and therefore, the shoaling rate in the berth would be much lower. The Proposed Project is expected to cause shoaling at a rate of about $17x10^4$ cy/yr in the access area.

Based on an evaluation of sediment quality, the dredged materials could contain small amounts of the following contaminants of potential concern (CoPCs): nutrients, metals, phenols, phthalate esters, PAHs, PCBs, butyltins, dioxins and furans, pesticides, non-metals and other pollutants. The dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants. Potential impacts from dredging the contaminants of concern were comprehensively evaluated in the *Sediment Quality Evaluation Report,* Appendix X).

The development of the proposed access roadway would require two bridges across Shipyard Creek. Construction of the bridges could result in disturbance of aquatic sediments in the waterway from pile driving. Because of the potential presence of contaminated sediments in this portion of Shipyard Creek, aquatic sediment to be disturbed or excavated for pile foundation and abutment work may require appropriate management measures.

3.5.16.3. Daniel Island Alternative

For the project construction, approximately 3.8 million cubic yards (Mcy) of material would be dredged from the river (approximately 58 percent of the volume required to be dredged from the river for the Proposed Project). Because of the smaller dredging volume, the duration of dredging operations for the project should be less than the 12 to 15 months estimated for the Proposed Project. Similar to the Proposed Project, the dredged material would be placed in the Daniel Island CDF.

In contrast to the Proposed Project, the results indicate that the Daniel Island Alternative would not change the total overall shoaling volume in the Federal navigation channel in the lower Cooper River (not including the berth or turning basin, which are not part of the navigation channel). As with the Proposed Project, the Daniel Island Alternative is not expected to impact shoaling rates downstream of Myers Bend. The project would cause some reduction of the shoaling in upstream areas.

There is currently an authorized turning basin that could be constructed to support a new facility on Daniel Island. In such case, the turning basin shoaling would be an impact to the Federal navigation channel. The Daniel Island Alternative is estimated to cause long-term shoaling in the berth and turning basin area at a rate of approximately $9x10^4$ cy/yr, which is 61 percent less than that predicted for the Proposed Project.

Similar to the Proposed Project, the dredged materials could include CoPCs. The dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants. Potential impacts from dredging the contaminants of concern were evaluated in the *Sediment Quality Evaluation* (Appendix X).

3.5.16.4. Clouter Island Alternative

For the project construction, approximately 5.1 million cubic yards (Mcy) of material would be dredged from the river (approximately 78 percent of the volume required to be dredged from the river for the Proposed Project). Because of the smaller dredging volume, the duration of dredging operations for the project should be less than the 12 to 15 months estimated for the Proposed Project. Similar to the Proposed Project, the dredged material would be placed in the Daniel Island CDF.

Similar to the Proposed Project, the Clouter Island Alternative would affect shoaling in the Federal navigation channel in the lower Cooper River. The sedimentation model results indicate that the Clouter Island Alternative would cause an increase in the total shoaling in the Federal navigation channel on the order of $6x10^4$ cy/yr (not including the proposed berth or turning basin, which are not part of the navigation channel), which is $4x10^4$ cy/yr greater than that predicted for the Proposed Project. All of the increase is predicted to occur in the Navy Yard Reach of the channel, and the project would not cause an appreciable change in shoaling volume in the other reaches of the navigation channel.

The Clouter Island Alternative is estimated to cause long-term shoaling in the berth and turning basin area at a rate of approximately $28x10^4$ cy/yr, which is 22 percent greater than that predicted for the Proposed Project.

Similar to the Proposed Project, the dredged materials could include CoPCs. The dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants. Potential impacts from dredging the contaminants of concern were evaluated in the *Sediment Quality Evaluation* (Appendix X).

The Clouter Island Alternative would result in the loss of CDFs for dredged material disposal, and new CDF sites in the estuary would likely be constructed to meet continuing maintenance dredging disposal needs.

3.5.17. Natural Resources

3.5.17.1. No-Action Alternative

Under the No-Action Alternative, future development of the CNC and adjacent properties is likely to occur. Additionally, navigation improvements associated with existing facilities also in Charleston Harbor will likely occur. Therefore, further upland habitat loss and fragmentation as well as increased dredging is likely to occur in this industrial and urban port area.

3.5.17.2. Proposed Project

The predicted impacts on Natural Resources from the Proposed Project are as follows:

- Habitat impacts from the proposed terminal include 9.6 acres of tidal wetland, 2.4 acres of freshwater wetland, 75.9 acres of wooded upland, and 146 acres of open water.
- Habitat impacts from the proposed access roadway include 4.2 acres of tidal wetland, 0.4 acres of freshwater wetland, 6.5 acres of wooded upland, and 0.8 acres of open water.
- The Proposed Project will cause small, localized decreases in DO near the project site, particularly at the river bottom. In general, crabs and shrimp (especially bottom-

dwellers) are considered more vulnerable to low dissolved oxygen than are vertebrate fish.

- EFH impacts from loss of habitat include 13.8 acres of tidal marsh (9.6 acres from the proposed terminal and 4.2 acres from the proposed roadway), 2.4 acres of shallow, subtidal waters (< 2'), 141.3 acres of deep water (> 2'), 3042 linear feet of shoreline, and 2.1 acres of mudflats. EFH impacts from modification of habitat include 101.9 acres of deep water.
- Crab and shrimp are the EFH species most likely to be impacted by the Proposed Project (i.e., direct short-term impacts as a result of dredging activities).
- The Proposed Project would increase future ship traffic, thereby increasing the chance for an accidental release of aquatic exotic species into the Charleston Harbor via ship ballast water and, to a lesser extent, within cargo or from exterior ship hulls.

3.5.17.3. Daniel Island Alternative

The predicted impacts on Natural Resources from the Daniel Island Alternative are as follows:

- Habitat impacts from the terminal include 20.4 acres of tidal wetland, 0.0 acres of freshwater wetland, 26.1 acres of wooded upland, and 73.0 acres of open water.
- Habitat impacts from the access roadway include 21.8 acres of tidal wetland, 1.3 acres of freshwater wetland, 29.1 acres of wooded upland, and 0.6 acres of open water.
- The Daniel Island Alternative will cause small, localized decreases in DO near the project site, particularly at the river bottom. In general, crabs and shrimp (especially bottom-dwellers) are considered more vulnerable to low dissolved oxygen than are vertebrate fish.
- EFH impacts from loss of habitat include 42.2 acres of tidal marsh (20.4 acres from the proposed terminal and 21.8 acres from the proposed roadway), 3.7 acres of shallow, subtidal waters (< 2'), 6.1 acres of deep water (> 2'), 3207 linear feet of shoreline, and 2.2 acres of mudflats. EFH impacts from modification of habitat include 61.0 acres of deep water.
- Crab and shrimp are the EFH species most likely to be impacted by the Daniel Island Alternative.
- The Daniel Island would increase future ship traffic, thereby increasing the chance for an accidental release of aquatic exotic species into the Charleston Harbor via ship ballast water and, to a lesser extent, within cargo or from exterior ship hulls.

3.5.17.4. Clouter Island Alternative

The predicted impacts on Natural Resources from the Clouter Island Alternative are as follows:

- Habitat impacts from the terminal include 9.5 acres of tidal wetland, 19.4 acres of wooded upland, and 69.6 acres of open water. There would be no loss of freshwater wetland.

- Habitat impacts from the access roadway include 10.3 acres of tidal wetland, 12.3 acres of wooded upland, and 2.9 acres of open water. There would be no loss of freshwater wetland.

- The Clouter Island Alternative will cause small, localized decreases in DO near the project site, particularly at the river bottom. In general, crabs and shrimp (especially bottom-dwellers) are considered more vulnerable to low dissolved oxygen than are vertebrate fish.

- EFH impacts from loss of habitat include 19.8 acres of tidal marsh (9.5 acres from the proposed terminal and 10.3 acres from the proposed roadway), 4.9 acres of shallow, subtidal waters (< 2'), 0 acres of deep water (> 2'), 3068 linear feet of shoreline, and 2.1 acres of mudflats. EFH impacts from modification of habitat include 62.6 acres of deep water.

- Crab and shrimp are the EFH species most likely to be impacted by the Proposed Project.

- The Proposed Project would increase future ship traffic, thereby increasing the chance for an accidental release of aquatic exotic species into the Charleston Harbor via ship ballast water and, to a lesser extent, within cargo or from exterior ship hulls.

3.5.18. Threatened and Endangered Species

3.5.18.1. No-Action Alternative

The Federally listed species identified to potentially inhabit or transit the study area include the bald eagle, shortnose sturgeon, American alligator, manatee, sea turtles, humpback whale, and blue whale. The least tern, a State listed species, has nested sporadically within the Proposed Project site.

It is likely that the No-Action Alternative condition for threatened and endangered species in the study area will be similar to present day conditions. The natural resources throughout the region will likely change as a result of urban growth and development projects. However, predicting changes 20 years in the future to threatened and endangered species would be uncertain and speculative. Some of the species have experienced a recovery over the years, while others have not rebounded from the protection and management afforded to them.

3.5.18.2. Proposed Project

The Proposed Project is expected to have no effect on the following Federally-listed species identified to potentially inhabit or transit the study area: bald eagle, shortnose sturgeon, and American alligator. Other Federally-listed species potentially occurring in the study area include sea turtles, manatees, humpback whales, and right whales.

Dredging and filling activities have the potential to affect sea turtles and manatees. The dredging technique expected to be employed during the construction of the Proposed Project, i.e., a cutterhead dredge, is much slower than other dredges and will occur in an inland area where sea turtles and manatees do not usually occur. Also, the predicted increase in vessel traffic by 1300 trips per year resulting from the Proposed Project at build-out may affect, but is not likely to adversely affect, the loggerhead sea turtle, manatee, humpback whale, and right whale. No impacts to designated Critical Habitat would occur.

The Proposed Project is not expected impact the two State listed species known to occur in the study area: the brown pelican and the least tern.

3.5.18.3. Daniel Island Alternative

Impacts to threatened and endangered species from the development of the Daniel Island Alternative would be similar to those of the Proposed Project.

3.5.18.4. Clouter Island Alternative

Impacts to threatened and endangered species from the development of the Clouter Island Alternative would be similar to those of the Proposed Project.

3.5.19. Shorelines

3.5.19.1. No-Action Alternative

For the No-Action Alternative the shorelines will continue present day trends. The majority of shorelines have been previously armored or are relatively stable. Those areas that are unstable will likely continue to be subject to erosive forces in the future. Likewise, areas that are developed may be armored or protected in the future. Ship wakes would likely continue to have a lesser impact on shorelines than natural forces such as wind waves and storm action. Sea level will continue to rise and cause a slow, gradual recession of natural unprotected shorelines.

3.5.19.2. Proposed Project

Direct impacts to shorelines would be caused by construction of the terminal and wharf. This would stabilize the shoreline at the project site and may cause accretion in areas immediately adjacent to the terminal due to the reduced current velocities in these areas. The Proposed Project would cause negligible adverse impacts to shorelines as a result of the terminal construction and increased vessel traffic (and the resultant ship wakes and propwash).

3.5.19.3. Daniel Island Alternative

The Daniel Island Alternative would cause similar impacts to shorelines as the Proposed Project.

3.5.19.4. Clouter Island Alternative

The Clouter Island Alternative would cause similar impacts to shorelines as the Proposed Project.

3.5.20. Floodplains and Flood Zones

3.5.20.1. No-Action Alternative

In summary, for the No-Action Alternative, floodplains will be similar to existing conditions. Low-lying areas of the floodplains will occasionally flood, and storm surge will occasionally impact properties within the study area. Future development will result in the construction of buildings and structures in the floodplains in accordance with the applicable guidelines.

3.5.20.2. Proposed Project

The Proposed Project would change elevations within the floodplain, including areas within existing AE and VE flood zones. Some areas within the terminal and roadway boundaries would

still flood during 100-year return period storm surge events. However, the Proposed Project would cause negligible adverse impacts to flooding in areas outside the project footprint.

3.5.20.3. Daniel Island Alternative

The Daniel Island Alternative would cause similar impacts to floodplains as the Proposed Project.

3.5.20.4. Clouter Island Alternative

The Clouter Island Alternative would cause similar impacts to floodplains as the Proposed Project.

4.0 AFFECTED ENVIRONMENT

Specific individual study areas are defined for each resource (e.g., wetlands, transportation, noise, light, etc.) to address the areas potentially affected by the alternatives being considered. Descriptions of the specific study areas are found at the beginning of each section. This section gives both a general description of the affected environment in the region, as well as a detailed description of the affected environment within the study area for each resource.

4.1. LAND USE

This section describes the existing land uses in the region and the land use study area (shown in Figure 4.1-1). Land use within the study area is described in Section 4.1.2 as three geographic areas: west of the Ashley River, between the Ashley and Cooper Rivers and east of the Cooper River. Municipal boundaries in the Charleston Metropolitan Area are shown in Figure 4.1-2.

4.1.1. Regional Land Use

The Charleston area is a large metropolitan area that is growing. As shown by Figure 4.1-3, existing development in the Tri-County region is concentrated in Mount Pleasant, Cainhoy, Daniel Island, Charleston, West Ashley, James Island, North Charleston, Hanahan, Goose Creek, and Summerville.

In recent years, the Tri-County area has experienced rapid growth in residential and commercial development. Figure 4.1-4 illustrates the estimated urban growth pattern in the region during the period between 1973 and 2005. This urban growth estimate is the result of a growth projection model study conducted by Allen and Lu (2003) at the Clemson University Strom Thurmond Institute.

4.1.1.1. Agricultural Land

There are 350,864 acres of agricultural land within the entire Tri-County area. Of that, 38,544 acres are in Charleston County, 114,400 acres are in Dorchester County, and 197,920 acres are in Berkeley County. However, within the land use study area, only the Cainhoy Peninsula and other small areas west of the Ashley and east of the Wando River contain farmland. Farmland represents less than 1 percent of the total land coverage in the land use study area.

4.1.1.2. Francis Marion National Forest

As shown on Figure 4.1-3, the Francis Marion National Forest (FMNF) is located within Berkeley and Charleston Counties. It contains approximately 250,000 acres and accounts for about 12 percent of the public land in the state. The land use study area shown in Figure 4.1-1 does not include any of the FMNF. The forest occupies land that forms a triangle defined by the Santee River to the north, the Intracoastal Waterway to the east, and Lake Moultrie and the Cooper River to the west. Table 4.1-1 presents the acreage within the forest by county.

Table 4.1-1. Current Francis Marion National Forest Acreage within the Study Area.

County	Total Acres
Berkeley	189,979
Charleston	59,524
Total	***249,503***

Source: FEIS for the Revised Land and Resource Management Plan, U.S. Forest Service, March 1996.

The forest is an extensive lowland area where elevations range from 0 to 80 feet above sea level. Topography in the forest is characterized by a series of parallel ridges of sandy beach deposits with large areas of swamps, bays, and upland flats between the ridges. Coastal marshes and river floodplains are also found on the forest. Carolina bays and limestone sinks are geological features found in some areas of the forest. Poorly drained areas such as swamps, floodplains, upland flats, and coastal marshes provide wintering and breeding habitat for many species of waterfowl, osprey (a federally-listed threatened species), and wading birds. These areas also provide foraging and nesting habitats for the bald eagle.

The National Forest Management Area Act of 1976 regulations require that Forest Plans be revised on a 10- to 15-year cycle or sooner, if conditions or the area addressed by the plan change substantially. The purpose and need for the Forest Plans are to provide a framework for analyzing and approving future site-specific projects and programs. The forest goals of the Revised Land and Resource Management Plan dated March 1996 are as follows: provide for forest diversity, protect and conserve unique areas, provide for high quality recreational use, contribute to local community and social considerations, consolidate ownership and acquire unique areas, establish and manage trees for present and future generations, protect and manage habitat for sustainable populations of native wildlife, and incorporate an ecological approach in management of the forest.

4.1.2. Land Use in the Study Area

A detailed map that identifies existing land uses within the study area is shown in Figure 4.1-5. The land use data presented in this figure is based on comprehensive municipal plans, recent aerial photography and accumulated GIS databases from Charleston County, Berkeley County, Dorchester County, SCDNR and BCDCOG.

Existing developed land uses include low-, medium-, and high-density residential; commercial districts and parcels; light-, medium-, and heavy-industrial areas; institutional uses such as government, churches, schools, universities and hospitals; and community features such as parks and civic centers. Open space includes conservation areas, mitigation sites, easements, and floodplain areas.

4.1.2.1. West of the Ashley River

This area is defined for this EIS as including those portions of the cities/areas of James Island, portions of the City of Charleston, and Folly Beach in the counties of Charleston and Dorchester Counties within the extents of the area shown by Figure 4.1-5.

Residential Land Uses

Residential and developable vacant land uses represent approximately 49 percent of the total land coverage in this area. Residential uses are concentrated north and south of Highway 17.

The portion of James Island within the land use study area shown on Figure 4.1-5 is predominantly residential and serves as a bedroom community to Charleston.

Commercial Land Uses

Commercial uses in James Island are predominantly situated along Folly Road. Commercial uses represent approximately 9 percent of the total land coverage in West Ashley.

Industrial Land Uses

Industrial land uses are less than 1 percent of the total land coverage in this area.

Institutional Land Uses

Institutional land uses (i.e., land used for places of worship, schools, cemeteries, and hospitals) are less then 1 percent of the total land coverage in this area. Small institutional facilities are scattered throughout this area.

Community Features

Less than 10 percent of the land area west of the Ashley River is occupied by community features. The highest concentration of parks and facilities are located along U.S. Highway 17 and Highway 61. A specific community feature parcel that is located in this area but is west of the land use study area is Charlestown Landing.

Open Spaces

Approximately 38 percent of the land west of the Ashley River is considered open spaces or conservation land use. The majority of this land is floodplain found along the numerous marshes, creeks, and rivers west of the Ashley River.

4.1.2.2. Between the Ashley and Cooper Rivers

This area is defined as including those portions of the cities/areas of Charleston, North Charleston, and Hanahan in the counties of Charleston and Berkeley as shown on Figure 4.1-5.

Port Overlay District Zoning

The SCSPA and the City of North Charleston entered into a Memorandum of Understanding and Agreement (MOUA) regarding the Charleston Naval Complex (CNC) dated October 25, 2002 (Appendix B). The MOUA, among numerous points, stipulated that the City of North Charleston would establish and maintain a transitional port overlay district that would change residential uses of this land to industrial uses. The City agreed to not allow any new residential uses within 500 feet of port facility land. The City also agreed, to the extent allowed by law, not to rezone any property in the overlay area for residential uses in the future. However, existing residential uses within the zone would be “grandfathered.”

As shown in Figure 4.1-6, the Port Overlay District extends from Pittsburgh Avenue to the south to approximately Jacksonville Road to the north along the east side of Spruill Avenue and extending eastward to the CNC property. To date, three parcels (TMS 466-04-00-007, 466-04-00-008, and 466-04-00-013) have been rezoned from Light Industry to Heavy Industry within the overlay zone (Gore, 2006).

Residential Land Use

Residential and developable vacant land uses represent approximately 30 percent of the total land coverage in this area. Residential uses are concentrated on the southern tip of the Charleston peninsula and the central portion of North Charleston east of I-26. Vacant developable land is sparse and primarily found in an industrialized area between the Cooper and Ashley Rivers west of Shipyard Creek known locally as the Neck.

In the vicinity of the southern half of the CNC, the land use east of Spruill Avenue and Meeting Street is primarily industrial and commercial. Most of the residential land use in this area is west of Spruill Avenue. The only residential land uses east of Spruill Avenue are lots associated with the Howard Heights and Chicora neighborhoods. The Howard Heights residential areas are within the Port Overly District (described on the previous page) and are "grandfathered" as residential land use within this industrial area.

Commercial Land Use

Commercial uses in the Neck area are primarily found along a corridor defined by Rivers Avenue and King and Meeting Streets. In the City of Charleston, commercial business, especially retail and tourism-oriented businesses are predominately located south of U.S. Highway 17. In North Charleston, commercial land uses exist along I-26 and its associated interchanges and connecting roads. Commercial uses represent approximately 25 percent of the total land coverage.

Industrial Land Use

Industrial land uses represent the predominant land use in the Neck area and along the western bank of the Cooper River. Waterfront Industrial facilities on the west bank of the Cooper River are present between Vendue Range in downtown Charleston to the SCSPA North Charleston Terminal, north of the I-526 Cooper River Bridge. There are 14 industrial waterfront parcels identified in Figure 4.1-7 for this area: SCSPA Union Pier, SCSPA Columbus Street Terminal, SCSPA Wando Welch Terminal, Kinder Morgan, former Macalloy property, former Charleston Naval Base, SCSPA Veteran's Terminal, Detyen's Ship Repair Facility, Koch Refining Terminal, Shell Oil Terminal, Marathon Oil Terminal, Hess Oil Terminal, Mead Westvaco Paper Mill and the SCSPA North Charleston Terminal. Vacant developable land presently zoned heavy industrial is available at the CNC and the Macalloy property. The Charleston International Airport and U.S. Air Force Base is shown as industry/commercial land use in Figure 4.1-5. Approximately 13 percent of the land use study between the Ashley and Cooper Rivers in the study area is industrial.

Institutional Land Use

Institutional land uses in this area include the Citadel, the Medical University of South Carolina, the College of Charleston, Roper Hospital, VA Hospital, the Department of Homeland Security (DHS) Federal Law Enforcement Training Center (FLETC) at the CNC and the Charleston Naval Weapons Station. Institutional land use represents approximately 10 percent of the total land coverage between the Ashley and Cooper Rivers.

Community Features

Less than 5 percent of the area between the Ashley and Cooper Rivers is occupied by community features. The highest concentration of parks and civic centers are located in the southern Charleston peninsula, south of U.S. 17 and in the City of North Charleston, east of I-26. The southern Charleston peninsula includes the Charleston Historic District, parks and

public facilities. Parks and civic centers in the City of North Charleston include Park Circle and the new Waterfront Park.

Open Spaces

Approximately 21 percent of the area between the Ashley and Cooper Rivers is considered open space or conservation land use. The majority of this land is floodplain found along the numerous marshes, creeks, and rivers. Floodplain areas include those associated with the Back River Reservoir, Goose Creek, the Goose Creek Reservoir and Filbin Creek.

4.1.2.3. East of the Cooper River

This area includes the Cainhoy Peninsula, Daniel Island, the Town of Wando, the Town of Cainhoy, the Town of Mount Pleasant and the Town of Sullivan's Island in the counties of Charleston and Berkeley, as shown in Figure 4.1-5.

During the past decade, areas east of the Cooper River have experienced rapid growth, both in population and urban/suburban development. The completion of I-526 opened large, previously rural tracts of land for development on Daniel Island, Cainhoy Peninsula, and northeast of Mt. Pleasant along U.S. Highway 17 and S.C. Highway 41.

Land use on the Cainhoy Peninsula has rapidly changed from rural residential to suburban residential, commercial and industrial. The southern end of the Cainhoy Peninsula adjacent to Pinefield Road has recently been developed commercially (office buildings, marina, boat sales, etc.) and residentially in the form of upscale properties fronting on both Clouter Creek and an unnamed tidal creek that separates the extreme southern end of the Cainhoy Peninsula from Thomas Island.

The completion of I-526 initiated a rapid change from agricultural to urban/suburban land use on Daniel Island. Daniel Island is a large planned urban development (PUD) consisting of residential, commercial, institutional, and recreational land uses. The approved development plan includes more than 5,000 single and multi-family housing units on Daniel Island at build-out.

Residential Land Uses

Residential and vacant land uses represent approximately 41 percent of the total land coverage in this area. Residential uses are concentrated at the southern end of the Cainhoy Peninsula in the Daniel Island community and along Clements Ferry Road. Vacant developable land is the predominant land use on the Cainhoy Peninsula. Residential and developable vacant land uses predominate the area east of the Wando River, representing 30 and 25 percent of the land coverage, respectively. Residential development is evenly divided north and south of U.S. 17. Land use on Sullivan's Island is primarily residential.

Commercial Land Uses

Commercial uses are concentrated along U.S. 17, Houston Northcutt Road, I-526 Business, Long Point Road, along Clements Ferry Road and within the Daniel Island Community. Commercial land uses account for approximately 2 percent of the total land coverage in this area.

Industrial Land Uses

Industrial parcels are primarily located along Clements Ferry Road and Long Point Road and make up approximately 2 percent of the land area. Two large industrial parcels are shown in Figure 4.1-5: the Mikasa plant and the SCSPA Wando Welch Terminal. Smaller light industrial parcels are scattered along Clements Ferry Road and Cainhoy Road.

Institutional Land Uses

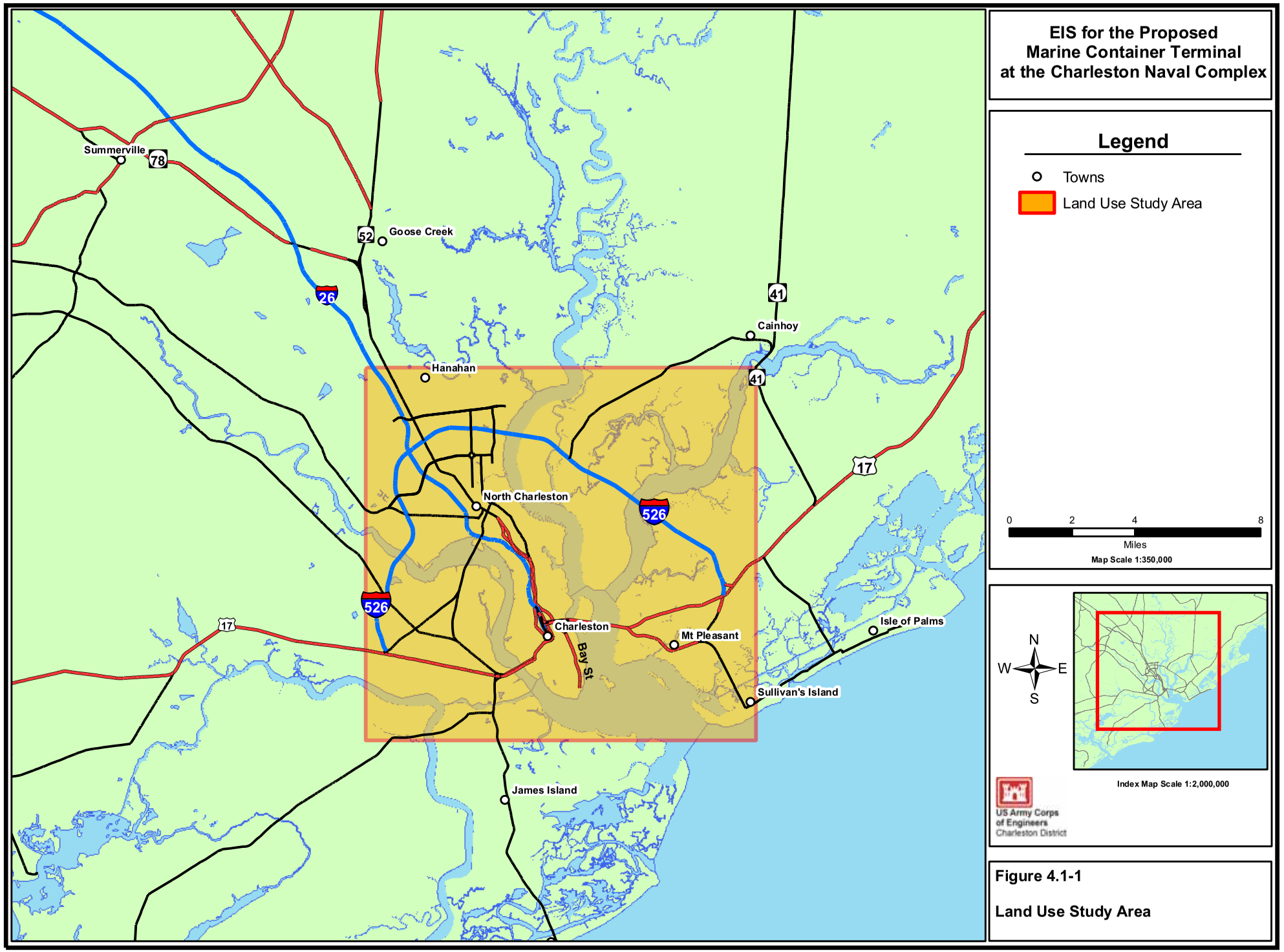
Institutional parcels are scattered throughout the area. Confined Disposal Facilities (CDFs) are located on the east bank of the Cooper River and in Charleston Harbor. CDFs on Clouter Island are owned and operated by the USACE and are classified institutional. The CDFs on the southern end of Daniel Island are owned and operated by the SCSPA and considered to be institutional. Institutional land uses occupy approximately 8 percent of the total land coverage.

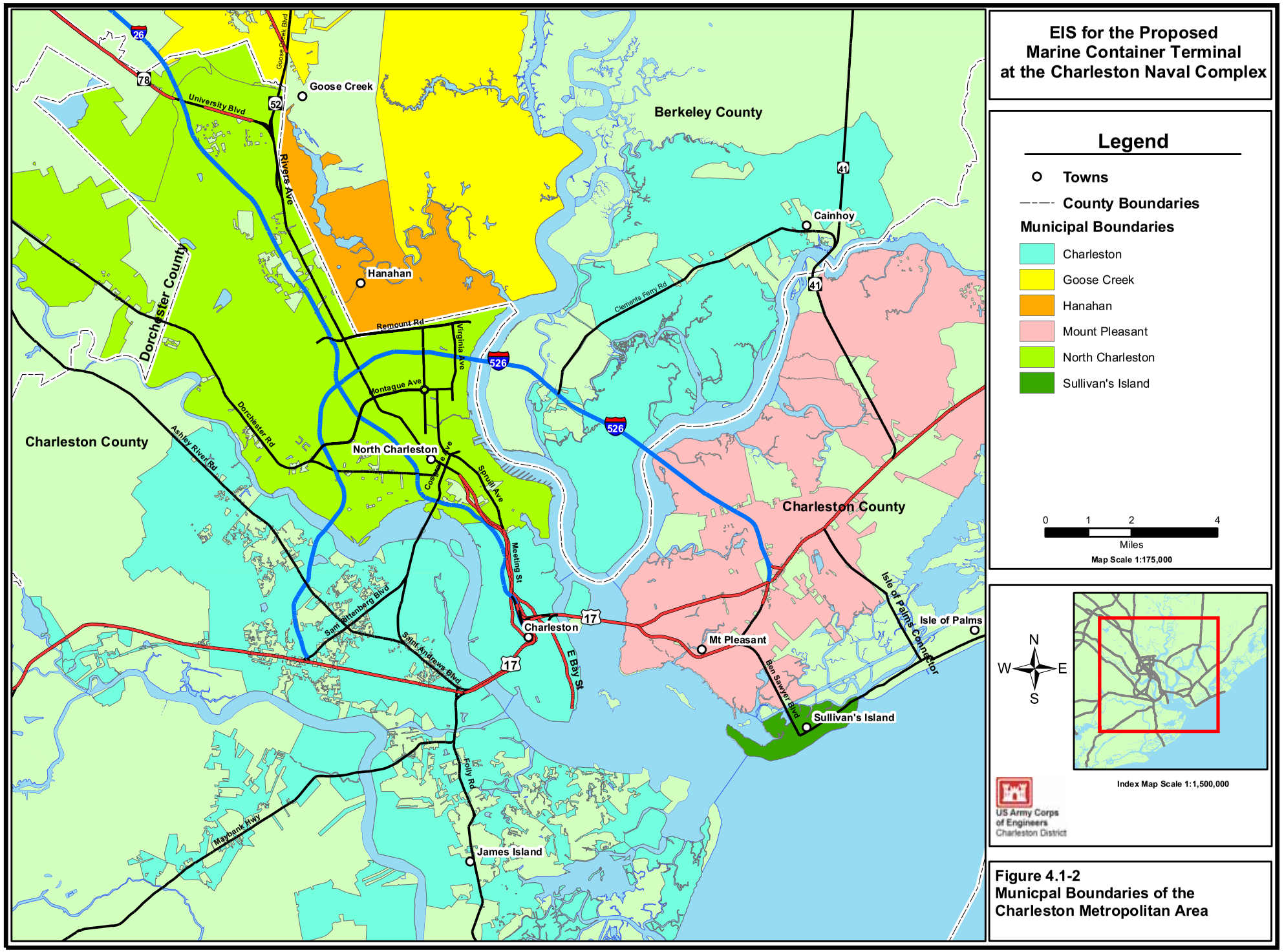
Community Features

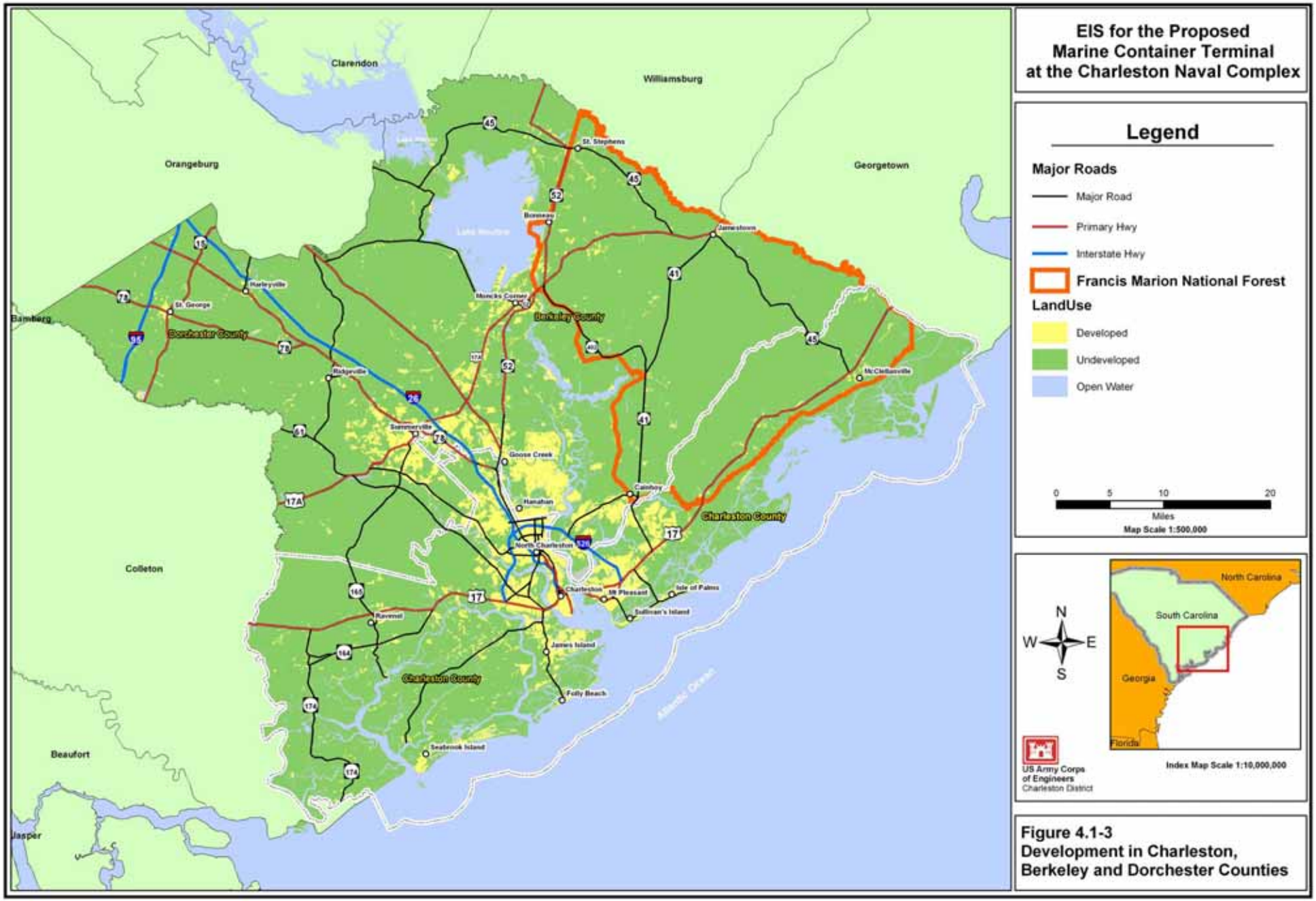
Community features are located on the Cainhoy Peninsula, on Daniel Island, in the Town of Mount Pleasant and in the Town of Sullivan's Island. Three of the largest single parcels include Patriots Point, Snee Farm Golf Course, and the Palmetto Island County Park. Community features represent approximately 1 percent of the area east of the Wando River.

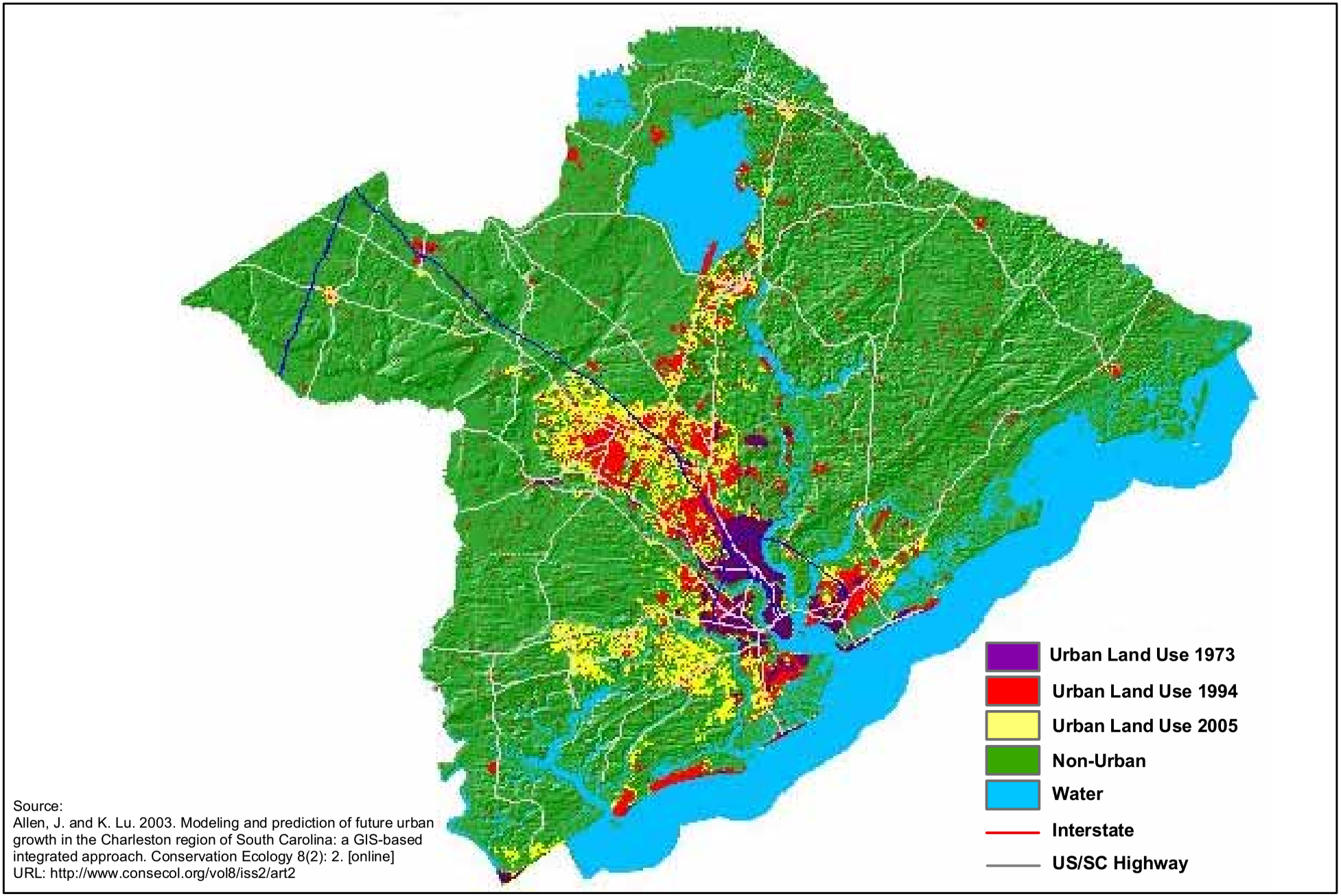
Open Spaces

Approximately 44 percent of the land east of the Cooper River is considered open space or conservation land use. The majority of this land is floodplain found along the numerous marshes, creeks, and rivers. Floodplain areas include those found in association with the Daniel Island community, Beresford Creek, Thomas Island, Nobles Creek, Rhoden's Island, Ralston Creek, Wagner Creek and Horlbeck Creek. Over 700 acres of conservation and parkland have been set aside in the master plan for Daniel Island and over 90 acres of conservation land is associated with the Mikasa development.


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Land Use Study Area
0
2
4
8
Miles
Map Scale 1:350,000
N
W
E
S
Index Map Scale 1:2,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.1-1
Land Use Study Area
Summerville
78
52
Goose Creek
26
41
Cainhoy
Hanahan
North Charleston
526
17
Charleston
Bay St
Mt Pleasant
Isle of Palms
Sullivan's Island
James Island


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
County Boundaries
Municipal Boundaries
Charleston
Goose Creek
Hanahan
Mount Pleasant
North Charleston
Sullivan's Island
0 1 2 4
Miles
Map Scale 1:175,000
Index Map Scale 1:1,500,000
US Army Corps
of Engineers
Charleston District
Goose Creek
Berkeley County
Cainhoy
Hanahan
Dorchester County
Charleston County
North Charleston
Charleston
Mt Pleasant
Isle of Palms
Sullivan's Island
James Island
University Blvd
Rivers Ave
Remount Rd
Virginia Ave
Montague Ave
Dorchester Rd
Ashley River Rd
Clements Ferry Rd
Spruill Ave
Meeting St
E Bay St
Sam Rittenberg Blvd
Saint Andrews Blvd
Folly Rd
Maybank Hwy
Isle of Palms Connector
Ben Sawyer Blvd
Figure 4.1-2
Municpal Boundaries of the
Charleston Metropolitan Area


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Major Roads
Major Road
Primary Hwy
Interstate Hwy
Francis Marion National Forest
LandUse
Developed
Undeveloped
Open Water
0 5 10 20
Miles
Map Scale 1:500,000
Clarendon
Williamsburg
Orangeburg
Georgetown
Bamberg
Colleton
Beaufort
Jasper
Dorchester County
Berkeley County
Charleston County
Atlantic Ocean
N
W E
S
North Carolina
South Carolina
Georgia
Florida
US Army Corps
of Engineers
Charleston District
Index Map Scale 1:10,000,000
Figure 4.1-3
Development in Charleston,
Berkeley and Dorchester Counties



Source:
Allen, J. and K. Lu. 2003. Modeling and prediction of future urban growth in the Charleston region of South Carolina: a GIS-based integrated approach. Conservation Ecology 8(2): 2. [online] URL: http://www.consecol.org/vol8/iss2/art2

Figure 4.1-4

Estimated Urban Growth between 1973 and 2005 in the Tri-County Region

US Army Corps of Engineers
Charleston District

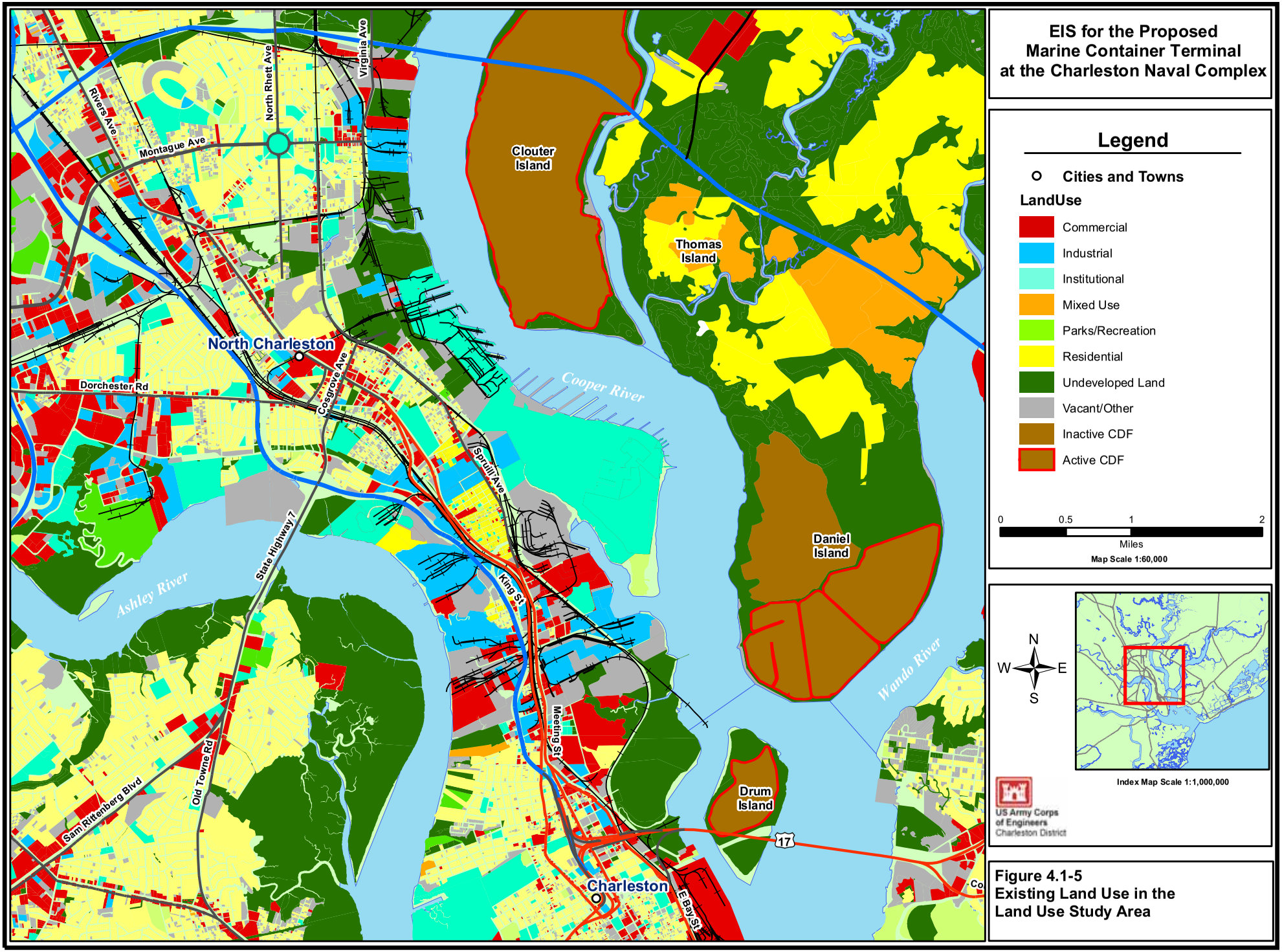
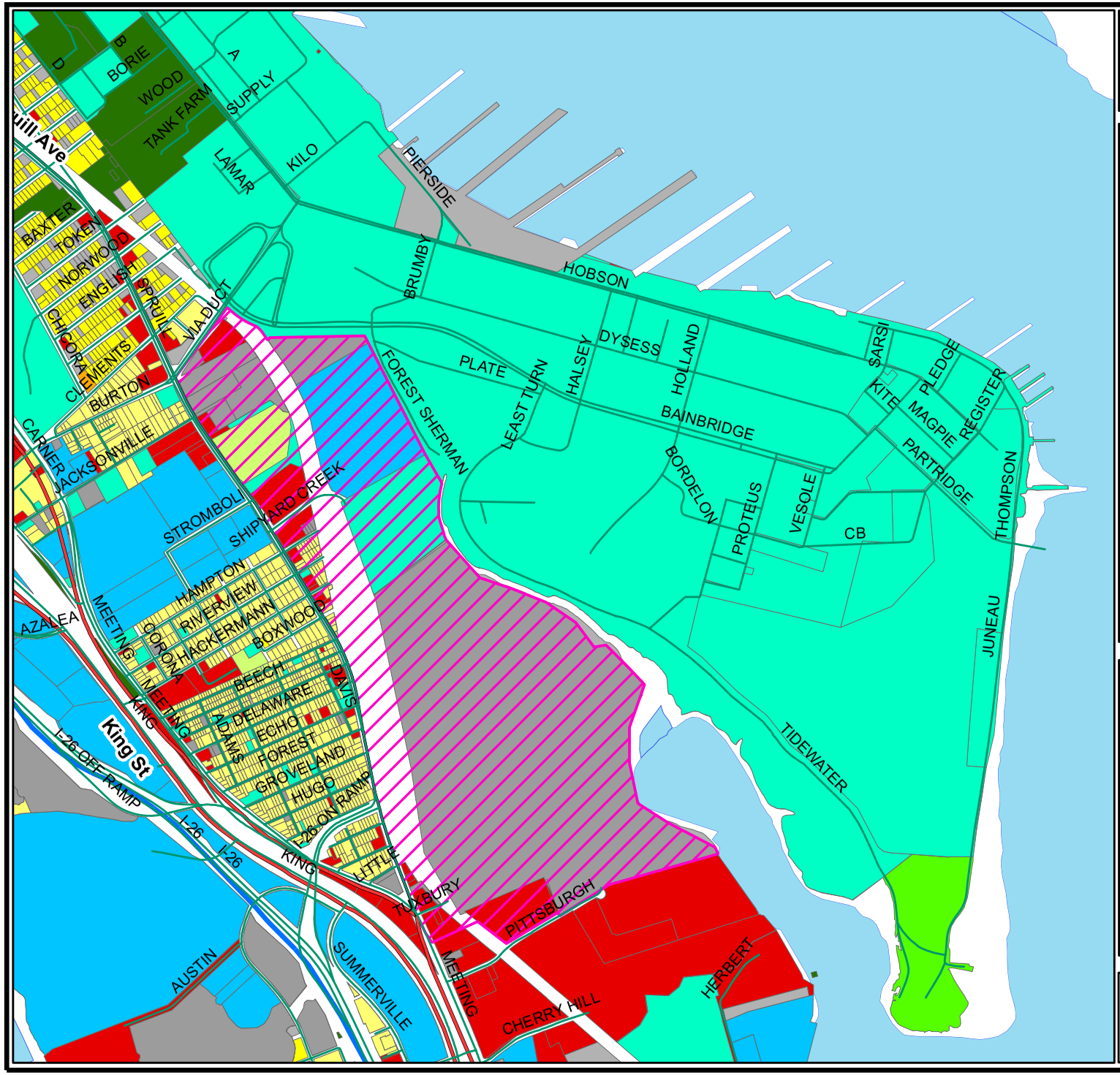


Figure 4.1-5
Existing Land Use in the
Land Use Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Cities and Towns
- Port Overlay District

Charleston County Land Use

- Commercial
- Industrial
- Institutional
- Mixed Use
- Parks/Recreation
- Residential
- Undeveloped Land
- Vacant

0 500 1,000 2,000
Feet

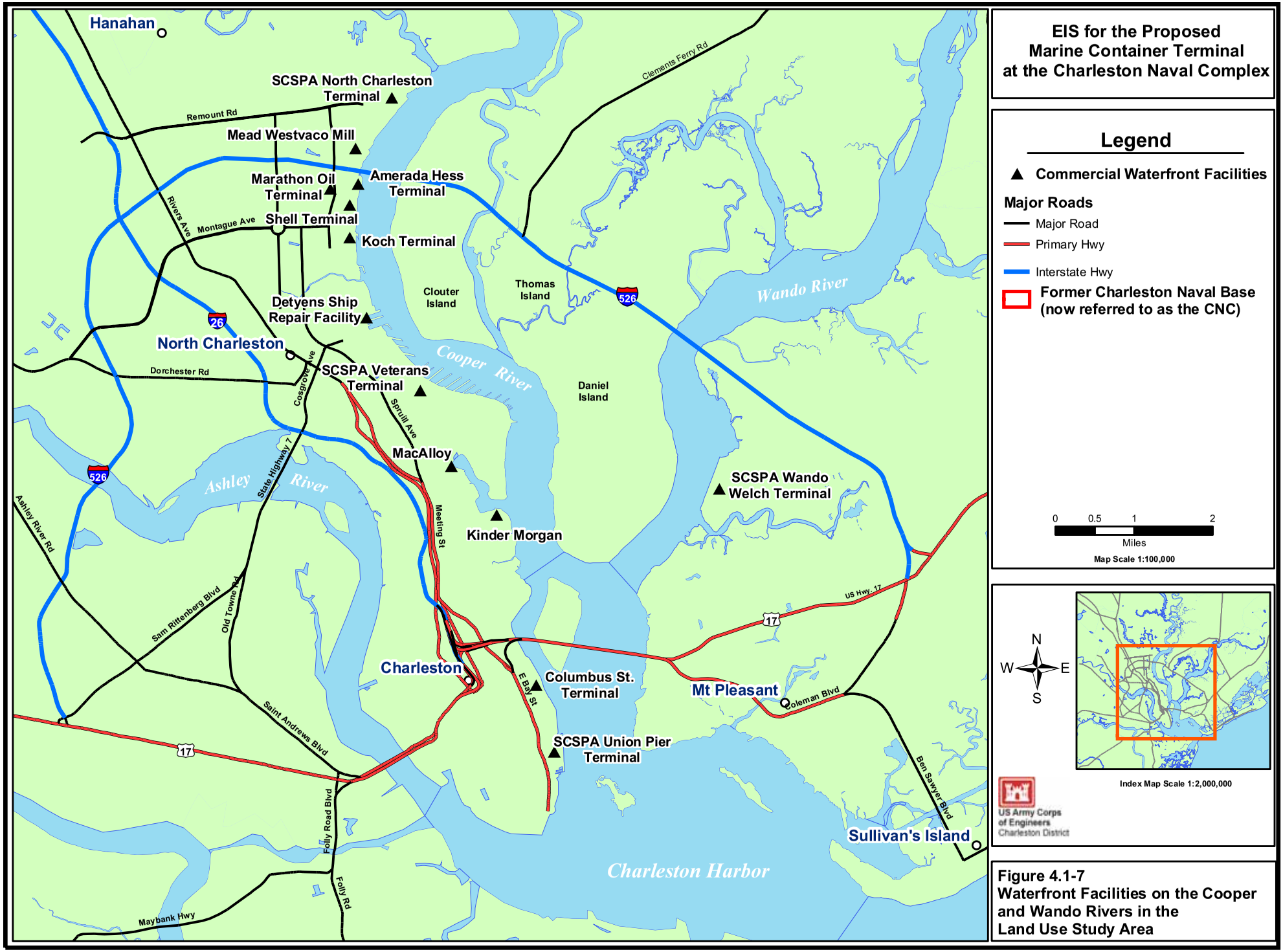
Map Scale 1:16,000

N
W E
S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 4.1-6
Existing Land Use and the Port Overlay District



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- ▲ Commercial Waterfront Facilities

Major Roads

- Major Road
- Primary Hwy
- Interstate Hwy
- Former Charleston Naval Base (now referred to as the CNC)

Figure 4.1-7
Waterfront Facilities on the Cooper and Wando Rivers in the Land Use Study Area

4.2. PHYSICAL SETTING

For the purpose of this EIS, the physical setting is described by the parameters of climatic conditions, topography, and geologic characteristics of the Tri-County region (Figure 4.2-1). The following subsections provide descriptions of each of these parameters.

4.2.1. Climate

4.2.1.1. Temperature and Precipitation

Climate within the Tri-County region is subtropical and characterized by long, hot summers, relatively mild winters of short duration, and plentiful precipitation, usually as rainfall.

The average annual rainfall at the National Weather Service (NWS) Charleston station (located at Charleston International Airport) is 50.33 inches and rainfall is fairly well distributed throughout the year. However, monthly rainfall averages are greatest during the summer months resulting from local thunderstorm events and the effects of tropical storm systems.

January is the coldest month, with an average high temperature of 59.1ºF and an average low temperature of 39.2ºF. July is the warmest month, with an average high temperature of 89.7ºF and an average minimum temperature of 73.1ºF. The highest recorded temperature at NWS Charleston was 105ºF on August 1, 1999. The coldest temperature was 6ºF, recorded on January 21, 1985. The annual average maximum temperature is 75.2ºF and the average annual minimum temperature is 56.1ºF. These data are based on a period of record from January 1, 1930 to March 31, 2004.

The South Carolina Department of Natural Resources (SCDNR) maintains weather stations throughout the Tri-County region, and historic meteorological data are available through the Southeast Regional Climate Center. In general, summer and winter daily average temperatures are somewhat milder at locations on the immediate coast compared to inland stations due to the moderating influence of the Atlantic Ocean. Table 4.2-1 provides a summary and comparison of monthly average temperatures and monthly average precipitation at various stations throughout the Tri-County region, as well as average annual values. The average annual temperatures and annual average precipitation throughout the Tri-County region are shown in Figure 4.2-2.

Spring is a season of rapid temperature transition. March is typically a month of heavy rain and warming temperatures. In late spring, scattered thunderstorms are actively generated. Autumn tends to be warm and pleasant. The average length of the freeze-free growing season is approximately 260 days, and the average date of the first freezing temperature in the fall is November 2.

4.2.1.2. Severe Weather

The study area is occasionally affected by hurricanes, which are severe tropical storms that typically occur during the months of June through November. During the early part of the season, hurricanes typically originate in the Caribbean Sea or Gulf of Mexico. However, during the peak hurricane months of August and September, they typically originate as tropical waves moving off West Africa into the Atlantic Ocean. Hurricanes that form in the far eastern Atlantic Ocean during these months often develop over the waters south of the Cape Verde Islands and often become major hurricanes (Saffir/Simpson Category 3 through 5).

Table 4.2-1. Average Maximum Monthly High Temperatures, Average Monthly Minimum Temperatures and Average Total Monthly Precipitation by Station for the Tri-County Region.

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Pinopolis Dam (Berkeley County)													
Average Max. Temp (F)	57.0	60.0	67.0	75.3	82.7	88.0	90.9	89.7	85.0	76.4	68.1	59.5	75.0
Average Min. Temp (F)	35.2	37.2	43.5	51.2	59.8	66.9	70.6	69.8	64.6	53.4	43.8	36.8	52.7
Average Total Precipitation (in)	3.75	3.44	4.12	2.89	4.03	5.43	6.34	6.52	4.57	3.05	2.38	3.09	49.61
Charleston City (Charleston County)													
Average Max. Temp (F)	57.3	59.8	65.4	72.9	79.9	85.0	88.1	87.0	82.6	75.0	67.2	59.7	73.3
Average Min. Temp (F)	42.1	44.5	50.5	58.4	66.6	72.9	75.9	75.2	71.0	61.2	52.0	44.6	59.6
Average Total Precipitation (in)	3.03	2.80	3.86	2.46	3.06	5.01	6.12	6.25	5.72	3.09	2.05	2.69	46.13
NWS Charleston (Charleston County)													
Average Max. Temp (F)	59.1	61.5	67.9	75.4	82.4	87.3	89.7	88.6	84.4	76.6	68.5	60.9	75.2
Average Min. Temp (F)	39.2	41.1	47.2	54.3	63.0	70.0	73.1	72.4	68.1	57.0	47.3	40.6	56.1
Average Total Precipitation (in)	3.22	3.18	4.06	2.73	3.53	5.73	7.45	6.76	5.45	2.92	2.31	2.98	50.33
McClellanville (Charleston County)													
Average Max. Temp (F)	57.8	60.7	67.4	75.1	81.9	86.9	90.0	88.9	84.7	77.2	69.7	61.2	75.1
Average Min. Temp (F)	35.4	38.0	43.9	51.5	59.8	67.5	71.4	70.3	65.2	54.7	46.0	38.2	53.5
Average Total Precipitation (in)	4.15	3.73	4.31	2.92	3.34	5.79	6.46	7.19	5.44	4.10	2.66	3.24	53.33
Edisto Island (Charleston County)													
Average Max. Temp (F)	55.7	58.7	64.8	73.4	80.3	86.0	89.2	88.2	84.4	76.7	68.1	59.3	73.7
Average Min. Temp (F)	37.5	40.2	47.1	55.4	64.1	71.0	74.5	73.4	68.8	57.7	49.4	40.6	56.6
Average Total Precipitation (in)	3.52	3.21	4.23	2.82	3.04	4.44	5.25	6.52	5.52	3.98	2.47	3.06	48.05
Sullivan's Island (Charleston County)													
Average Max. Temp (F)	57.6	60.2	66.2	73.8	81.1	86.2	88.9	88.3	84.1	76.9	68.8	61.1	74.4
Average Min. Temp (F)	39.9	41.7	48.0	56.1	64.3	71.1	74.2	73.6	69.3	59.4	50.4	42.7	57.6
Average Total Precipitation (in)	3.77	3.34	3.99	2.74	3.08	4.56	5.56	6.09	4.76	3.69	2.68	3.24	47.51
Summerville (Dorchester County)													
Average Max. Temp (F)	59.1	61.8	68.7	76.3	83.4	88.2	90.4	89.4	85.3	77.3	68.8	60.8	75.8
Average Min. Temp (F)	35.6	37.2	43.7	50.8	59.7	67.2	70.7	70.0	65.3	53.3	43.2	36.4	52.8
Average Total Precipitation (in)	3.56	3.38	4.07	3.01	3.75	5.65	6.71	6.70	5.23	2.89	2.42	3.00	50.38

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Givhans Ferry (Dorchester County)													
Average Max. Temp (F)	-	-	-	-	-	-	-	-	-	-	-	-	-
Average Min. Temp (F)	-	-	-	-	-	-	-	-	-	-	-	-	-
Average Total Precipitation (in)	3.55	3.53	4.25	2.96	3.63	5.67	6.17	6.21	4.40	2.88	2.42	3.20	48.87

Southeast Regional Climate Center, 2005

Notes: Periods of Records:

Pinopolis Dam Station 7/1/1948 to 5/31/1998
Charleston City Station 7/1/1948 to 3/31/2004
McClellanville Station 10/1/1957 to 1/31/2003
Edisto Island Station 8/1/1956 to 1/31/2004
Sullivan's Island Station 7/1/1951 to 3/31/2004
Summerville Station 1/1/1930 to 3/31/2004
Givhans Ferry Station 7/1/1948 to 3/31/2004
NWS Charleston Station 1/1/1930 to 3/31/2004
"-" denotes insufficient data.

During the period 1870-2004, 29 tropical storms passed within 65 miles of Charleston, hence the area is typically affected by tropical storms every 4.62 years. Charleston can be expected to experience direct hits (landfall or passage within 40 miles) once every 14.88 years. During the period 1900-2000, 16 hurricanes, 4 of them major, directly hit the state of South Carolina (once every 6.25 years). During that same period, September was the most active month for major hurricanes (3), with one occurring during the month of October.

The most recent hurricane to affect the Tri-County region was Hurricane Gaston, which made landfall as a Category 1 hurricane near Awendaw, South Carolina, on August 29, 2004.

The most recent major hurricane to affect the region was Hurricane Hugo (Category 4) that made landfall at Sullivan's Island on September 22, 1989. Hugo was the 11th most intense hurricane (based on barometric pressure) and the second most costly storm to strike the United States during the period 1900-2000, causing a reported $7 billion in damage.

Table 4.2-2 summarizes hurricane strikes by state (Georgia, North Carolina and South Carolina only) and Table 4.2-3 summarizes hurricane strikes by month for these states.

Tornado season is roughly March through August, with April being the month of greatest tornado activity. Most tornado activity occurs at inland areas away from the coast, although the Tri-County region experiences occasional tornado outbreaks. Waterspouts occur with some regularity in association with strong thunderstorms over the coastal waters and estuaries. Tornado records for the period January 1, 1960 through March 31, 2003 obtained from the University of South Carolina Hazards Research Laboratory are provided in Table 4.2-4.

Table 4.2-2. Hurricane Strikes by State 1900 – 2004.

State	Category Number (Saffir/Simpson)					All (Cat1-5)	Major (Cat 3-5)
	1	2	3	4	5		
Georgia	1	4	0	0	0	5	0
North Carolina	11	7	10	1	0	29	11
South Carolina	9	4	2	2	0	17	4

National Hurricane Center Tropical Prediction Center, 2005

Table 4.2-3. Hurricane Strikes by Month 1900 – 2004.

State	June	July	August	September	October	All
Georgia	0	0	0	0	0	0
North Carolina	0	0	2	8	1	11
South Carolina	0	0	1	3	1	5

National Hurricane Center Tropical Prediction Center, 2005

Table 4.2-4 Reported Tornados in the Tri-County Region: 1960 - 2003.

County	Date	Injuries	Fatalities	Property Damage
Berkeley	5/10/1998	7	1	$5,000,000
Berkeley	9/3/1998	9	0	$2,800,000
Berkeley	4/28/1999	0	0	$50,000
Berkeley	11/7/1995	0	0	$15,000

County	Date	Injuries	Fatalities	Property Damage
Berkeley	5/15/1995	0	0	$3,000
Berkeley	5/10/1998	0	0	$3,000
Charleston	9/11/1960	10	0	$500,000
Charleston	7/23/2000	0	0	$200,000
Charleston	3/14/1997	0	0	$75,000
Charleston	4/12/1961	0	0	$50,000
Charleston	3/14/1997	0	0	$30,000
Dorchester	5/12/1997	2	0	$500,000
Dorchester	5/18/1976	1	0	$50,000
Dorchester	4/22/1997	0	0	$30,000
Dorchester	5/10/1998	0	0	$4,500

University of South Carolina Hazards Research Laboratory, 2005.

4.2.2. Topography

In general, there is relatively little topographic relief in the Tri-County region. On a regional basis, land surface elevations range from about 125 feet mean sea level (msl) in western Dorchester County to sea level in eastern Charleston County. Typically, areas to the northwest of Summerville occur at altitudes greater than 75 feet msl and areas to the southeast occur at elevations less than 50 feet msl (Park, 1985).

Rivers within the Tri-County region (Edisto, Ashley, Cooper, Wando, and Santee) as well as smaller streams are highly sinuous and meandering, reflecting the low topographic gradient within the area.

Topographic relief within the Charleston Metropolitan area is less than that of the Tri-County region in general. Maximum naturally occurring land surface elevations typically do not exceed 40 feet above mean sea level and range down to mean sea level.

Land surface elevations across the Proposed Project site range from approximately +8 to +21 feet mean low water in upland areas to mean sea level along the Cooper River waterfront. A substantial part of the project site consists of a confined disposal facility (CDF) for dredged materials. The CDF has approximately 10 to 15 feet of topographic relief higher than adjacent land surfaces. The CDF impoundment floor itself is level with little topographic relief, as are the adjacent land surfaces.

4.2.3. Geology

The South Carolina Coastal Plain is divided into three physiographic provinces: The Upper, Middle, and Lower Coastal Plains. The Tri-County region is located within the Lower Atlantic Coastal Plain Physiographic Province. The Coastal Plain formations thicken progressively seaward as a sedimentary wedge, attaining a maximum thickness of about 3,500 feet offshore on the continental shelf. At Charleston, the Coastal Plain sediments extend from land surface to the base of the Middendorf/Cape Fear formation(s) at approximately 3,000 feet depth. Table 4.2-5 lists and describes the stratigraphic units within the Coastal Plain section in the Tri-County region. The coastal plain sediments are underlain by Triassic age crystalline basement rocks composed of diabase, basalt, or quartzitic sandstone depending on location.

South Carolina has approximately 540 active mine operating permits. There are an estimated 367 sand and dirt mines, with over 100 of these mines located near the Charleston metropolitan area. All together, the state's mines take up approximately 10,863 acres. Operators currently have permits to mine and additional 13,000 acres across the state.

Table 4.2-5. Stratigraphic Units within the Coastal Plain Section in the Tri-County Region.

System	Series	Formation	Lithology
Quaternary	Holocene And Pleistocene	Terrace Deposits	Highly variable. Fine to medium-grained sand, shelly sands and shell beds; clays. Locally coarse-grained sand; thin limestone beds.
Tertiary	Miocene	Hawthorn	Fine, sandy, phosphatic limestone, and thin sand and clay beds. Not well represented within region.
		Edisto	Sandy, fossiliferous limestone. Present in the northwest of the region along the Edisto River.
	Oligocene	Cooper *Harleyville Member* *Parkers Ferry Member* *Ashley Member*	*Harleyville Member*: phosphatic, calcareous clay to clayey, very fine-grained limestone. *Parkers Ferry Member*: glauconitic, clayey, fine-grained, fossiliferous limestone. *Ashley Member*: phosphatic, muddy, calcareous sand.
	Eocene	Santee Limestone *Moultrie Member* *Cross Mem*ber	*Moultrie Member: biosparrites and bryozoan hash.* *Cross Member*:: brachiopod-bivalve biomicrite.
	Paleocene	Black Mingo	Fossiliferous limestone, argillaceous sands, carbonate and silica cemented sandstones, and clays.
		PeeDee	Fossiliferous muddy sands and silty and sandy calcareous clays.
Cretaceous	Upper Cretaceous	Black Creek	Muddy sands, silty clays, fine to medium-grained sands and shelly limestones with minor amounts of glaauconite, phosphate, mica, and pyrite.
		Middendorf	Poorly sorted feldspathic sands, clays, silty clays, clayey silts.

From: The Ground-Water Resources of Charleston, Berkeley, and Dorchester Counties South Carolina. State of South Carolina Water Resources Commission Report 139, 1985.

4.2.3.1. Hydrogeology

Available groundwater resources within the Tri-County region are limited to the various hydrostratigraphic units that comprise the Coastal Plain formations. Few data are available to assess the hydraulic properties of the crystalline basement rocks that underlie the Coastal Plain sediments. Given the reported lithologies (diabase, basalt, quartzitic sandstone) of the

basement rocks, it is unlikely that a major aquifer system is present within these rocks and groundwaters that may be present would likely be highly mineralized.

The Middendorf Formation is the most extensive water-bearing formation of the South Carolina Coastal Plain. The Middendorf aquifer occurs under artesian (confined) conditions throughout the South Carolina Coastal Plain. Ambient water quality within the Middendorf aquifer is low due to its waters being highly mineralized; the water is a sodium bicarbonate type with elevated fluoride concentrations.

The surficial or water table aquifer is contained within the shallow terrace formations of Plio-Pleistocene age and occurs under unconfined conditions. The surficial aquifer yields relatively small amounts of water of generally good quality, but contains elevated dissolved iron concentrations in many locations and is vulnerable to contamination from anthropogenic sources. Table 4.2-6 summarizes the hydrogeologic characteristics of the coastal plain formations.

Table 4.2-6. Hydrogeologic Characteristics of Coastal Plain Formations in the Tri-County Region.

System	Series	Formation	Hydrogeologic Characteristics
Quaternary	Holocene And Pleistocene	Terrace Deposits	Groundwater occurs under water table or poorly confined conditions. Transmissivities are generally less than 1,000 ft^2/day. Well yields are up to 200 gpm. Water is acidic and high in dissolver iron.
Tertiary	Miocene	Hawthorn	Confining unit where present.
		Edisto	Water table or poorly confined, low yield aquifer.
	Oligocene	Cooper	Regional confining unit. Permeable bryozoan limestone unit (limited extent) may yield up to 300 gpm. Yields low quality, brackish water in southern Charleston County.
	Eocene	Santee Limestone	Artesian aquifer, except in outcrop areas. Typically yields less than 300 gpm. Calcium bicarbonate type water with dissolved iron in excess of 0.3 milligrams/liter. Contains brackish water along coastline.
	Paleocene	Black Mingo	Artesian. Transmissivities range from 500 to 8,500 ft^2/day. Yields 300 –500 gpm in most areas. Water is soft, alkaline, sodium bicarbonate type. Locally contains elevated fluoride concentrations and brackish water.
		PeeDee	Artesian. Poor aquifer, generally yields less than 300 gpm. Highly mineralized sodium bicarbonate type water with elevated fluoride concentrations and brackish water.
Cretaceous	Upper Cretaceous	Black Creek	Artesian. Transmissivities range from 900 to 2,000 ft^2/day. Yields 250 –1,000 gpm. Water is soft, alkaline, sodium bicarbonate type. Fluoride exceeds 1.6 milligrams/liter in eastern part of region.
		Middendorf	Artesian. Transmissivities less than 4,300 ft^2/day. Yields up to 2,000 gpm. Highly mineralized, sodium bicarbonate type water. Fluoride concentrations up to 11.0 milligrams/liter.

From: The Ground-Water Resources of Charleston, Berkeley, and Dorchester Counties South Carolina. State of South Carolina Water Resources Commission Report 139, 1985.

Although some residents may use groundwater for irrigation purposes, groundwater is generally not used as a potable water source within the Charleston Metropolitan area. The Charleston Commissioners of Public Works supplies potable water.

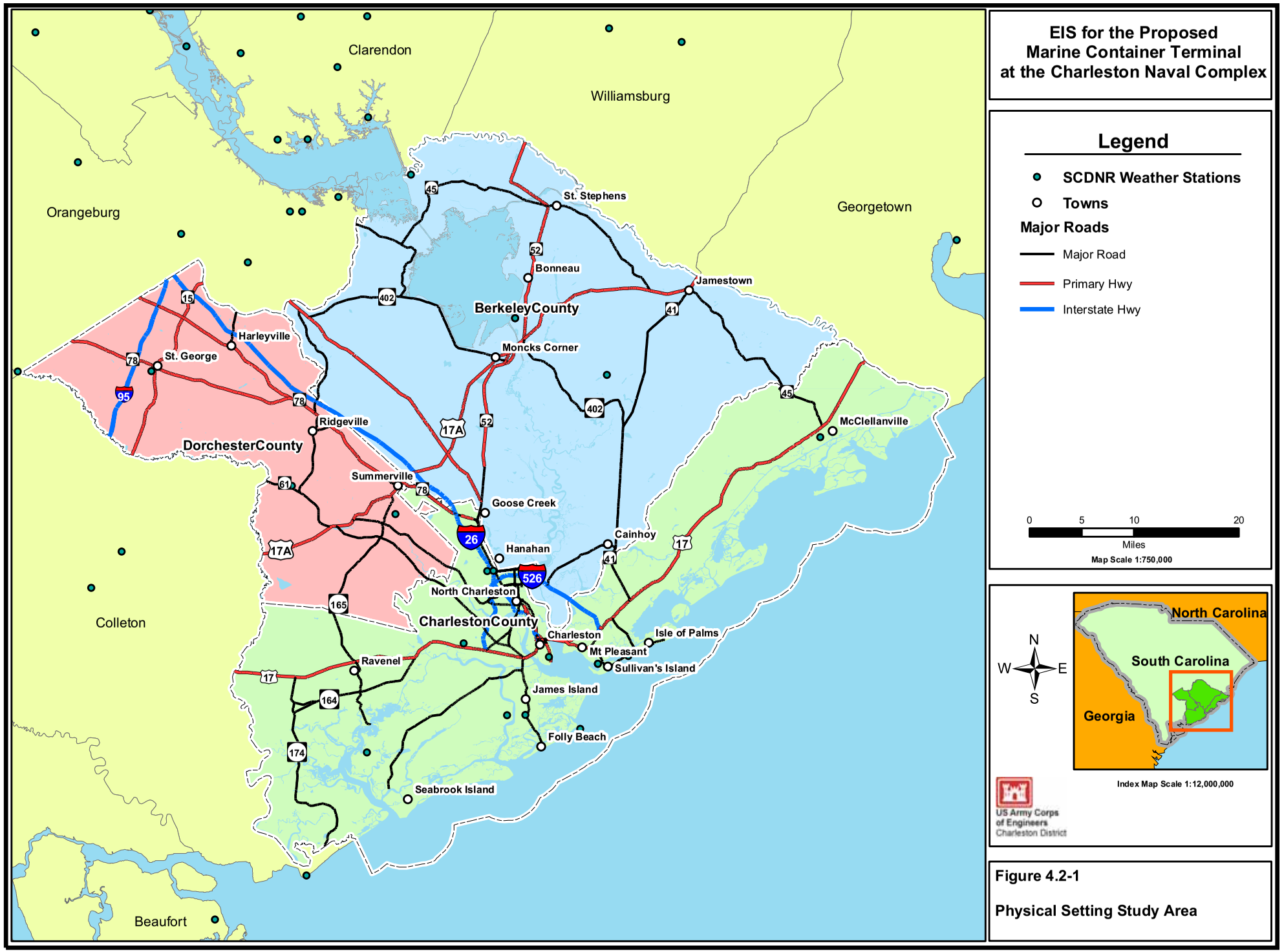
During the late 1800s, several deep wells were drilled in peninsular Charleston that were open to the Middendorf and Black Creek aquifers. These wells were artesian (free flowing due to high hydrostatic pressure) and many residents reportedly used these wells to obtain drinking water. As demand for water grew within the area and more wells were constructed into the Middendorf and Black Creek aquifers, the hydrostatic pressure within these aquifers was reduced and eventually the Charleston deep wells stopped flowing and were abandoned.

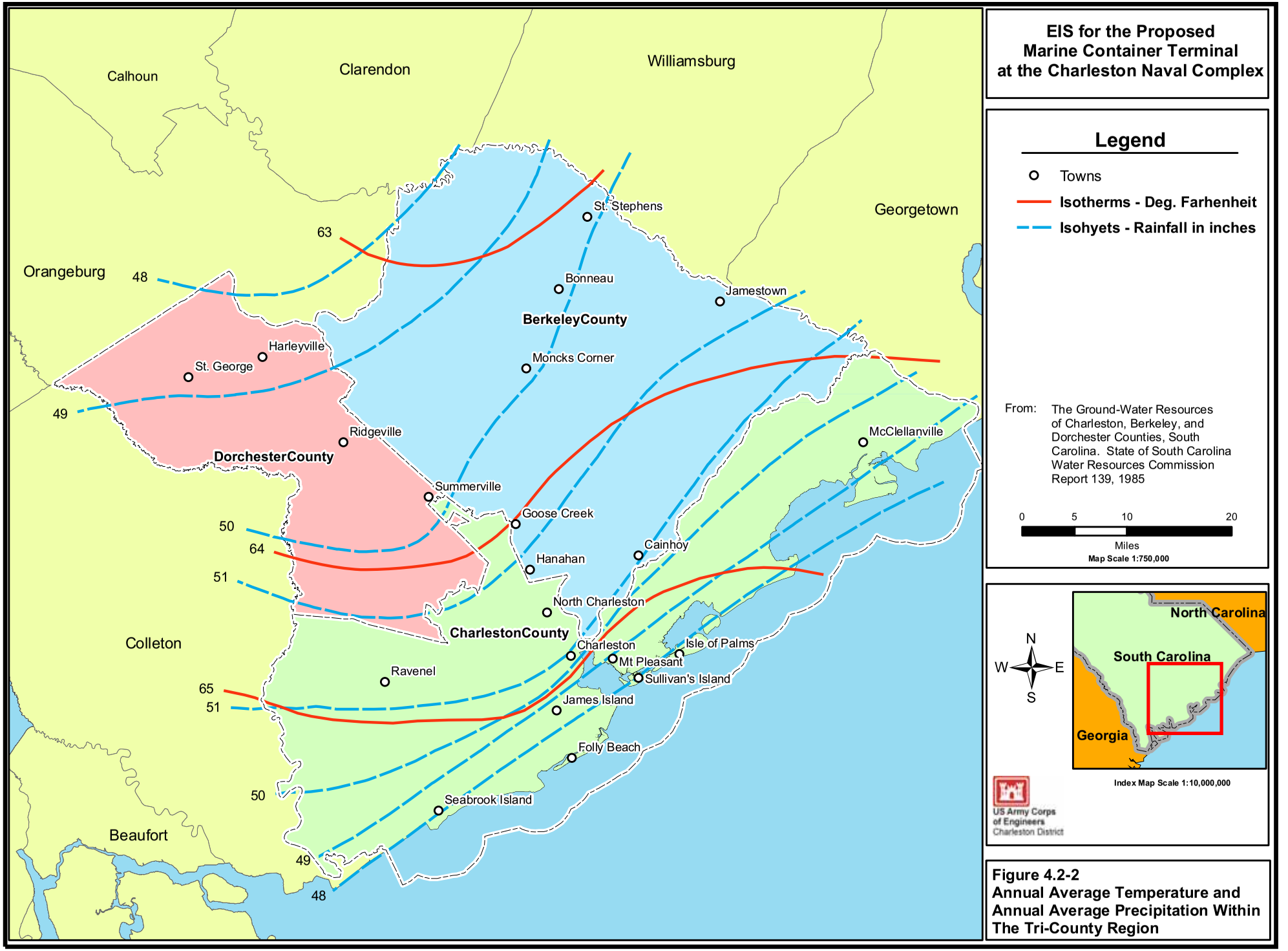
The hydrogeology of the Proposed Project site is comparable to that of the Charleston Metropolitan area and the region in general.

4.2.3.2. Seismotectonics

Despite its intraplate tectonic setting, the Tri-County region is a seismically active area. The historic seismic record of the southeastern United States is dominated by the 1886 Charleston earthquake and its aftershocks. The 1886 event pre-dated instrumentation, but estimates of the magnitude of the earthquake based on Modified Mercalli Intensity (MMI) observations made by Dutton (1889) range from 6.6 to 6.9 M_b; however, others have estimated the 1886 earthquake to have had a magnitude of 6.5 to 7.5 M_s. Despite its moderate magnitude, evidence of MMI X ground motion was observed within the 1886 meisoseismal zone (approximately 2,000 square miles) and almost the entire state of South Carolina was subjected to MMI VII ground motion. The 1886 Charleston earthquake had a felt area of approximately 2 million square miles. The Tri-County region continues to experience small magnitude earthquakes and paleoseismic studies conducted within the area suggest a recurrence rate for moderate magnitude earthquakes such as the 1886 event of 500 to 600 years.

Instrumental seismic monitoring has been ongoing at Charleston since November 1974; observed seismic data have indicated a dense cluster of earthquake epicenters located in what is known as the Middle Place-Summerville Seismic Zone (MPSSZ). 2001 was an especially active year for earthquakes within the MPSSZ, with 31 seismic events recorded. During the period of November 1974 through December 2004, 292 earthquakes were recorded within the MPSSZ, with the largest being a magnitude 3.99 event on August 21, 1992 (South Carolina Seismic Network, 2005).


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
SCDNR Weather Stations
Towns
Major Roads
Major Road
Primary Hwy
Interstate Hwy
0 5 10 20
Miles
Map Scale 1:750,000
Clarendon
Williamsburg
Orangeburg
Georgetown
Colleton
Beaufort
St. Stephens
Bonneau
Jamestown
BerkeleyCounty
Moncks Corner
Harleyville
St. George
Ridgeville
DorchesterCounty
Summerville
Goose Creek
Hanahan
North Charleston
CharlestonCounty
Cainhoy
McClellanville
Charleston
Isle of Palms
Mt Pleasant
Sullivan's Island
Ravenel
James Island
Folly Beach
Seabrook Island
North Carolina
South Carolina
Georgia
N
W
E
S
Index Map Scale 1:12,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.2-1
Physical Setting Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Towns
- **Isotherms - Deg. Farhenheit**
- **Isohyets - Rainfall in inches**

From: The Ground-Water Resources of Charleston, Berkeley, and Dorchester Counties, South Carolina. State of South Carolina Water Resources Commission Report 139, 1985

0 5 10 20

Miles

Map Scale 1:750,000

Index Map Scale 1:10,000,000

US Army Corps of Engineers
Charleston District

Figure 4.2-2
Annual Average Temperature and Annual Average Precipitation Within The Tri-County Region

4.3. SOCIOECONOMIC ENVIRONMENT

This section describes the existing socioeconomic environment of the Tri-County region, each county within the region, and individual community study areas. Socioeconomic characteristics evaluated in this section include economic sectors, employment trends, income and poverty statistics, and housing characteristics.

The economic integration of the Tri-County region is shown by the geographic distribution of the place of residence data for employees of the SCSPA-Charleston facilities. As shown in Table 4.3-1, in 1997, 68 percent of all persons employed by the SCSPA-Charleston resided within Charleston County, 16.4 percent resided within Berkeley County, and 10.6 percent resided within Dorchester County.

The Tri-County region is classified by the U.S. Census Bureau as a Metropolitan Statistical Area (MSA). MSAs are areas consisting of one or more counties with a large population nucleus and nearby communities that have a large degree of connection based upon population density and commuting patterns. The Tri-County region is also classified as a Major Labor Market Area (LMA) by the U.S. Department of Labor. Major LMAs are economically integrated counties with a central community of at least 50,000 persons. Within a Major LMA, workers can usually change jobs without changing their place of residency.

Table 4.3-1. Geographic Distribution of SCSPA-Charleston Employees by Town and County.

County	Town	No. of Employees[1]	Percent of Total
Charleston County	Peninsula Charleston	143	28.6%
	North Charleston	91	18.2%
	John's Island, Seabrook Island, Kiawah Island, Folly Beach, Hollywood, Wadmalaw Island, Ravenel	24	4.8%
	McClellanville, Awendaw	15	3.0%
	Mount Pleasant, Dewees Island, Isle of Palms	67	13.4%
	Subtotal	***340***	***68.0%***
Berkeley County	Goose Creek, Mount Holly	36	7.2%
	Jamestown, Shulerville, Bonneau, Huger, St. Stephen/Alvin, Pineville	13	2.6%
	Moncks Corner	5	1.0%
	Ladson	25	5.0%
	Daniel Island, Cainhoy, Wando	3	0.6%
	Subtotal	***82***	***16.4%***
Dorchester County	Dorchester, Ridgeville	2	0.4%
	Summerville, Lincolnville	51	10.2%
	Subtotal	***53***	***10.6%***
	Tri-County Region Subtotal	***475***	***95.0%***
Other S.C. Counties	(Colleton, Georgetown, Horry, Beaufort, Clarendon, Orangeburg)	20	4.0%
	Total South Carolina	***495***	***99.0%***
	Total Out-of-State	***5***	***1.0%***
	Total Employees	***500***	***100.0%***

Source: SCSPA, November 12, 1997.

[1] Does not include employment information for the International Longshoremen's Association, local transportation, or other businesses associated with the SCSPA-Charleston.

Community study areas were defined using 2000 U.S. Census block groups. Two smaller community study areas surrounding the Proposed Project site and the two alternative locations were used to characterize the communities that may be directly impacted by the development of a marine container terminal. It is important to note that the Clouter Island and Daniel Island Alternative sites are located within the same block group. The two community study areas are shown in Figure 4.3-1 and are as follows:

- The North Charleston Community Study Area (U.S. Census Block Groups 31111, 33002, 33003, 33004, 33005, 34001, 35001, 35002, 35003, 36001, 36002, 36003, 36004, 37001, 37002, 37003, 37004, 38001, 38002, 40001, 40002, 41001, 41002, 42001, 43001, 43002, 43003, 43004, 44001, 44002, 44003, 45001, 45002)

- The Clouter and Daniel Islands Community Study Area (U.S. Census Block Group 04022)

Due to its relatively sparse population, U.S. Census Block Group 04022 is quite large (58.8 square miles). Only 11.6 square miles of the block group are illustrated in Figure 4.3-1 to denote the Clouter and Daniel Islands community study area. The data set is representative of the smaller area shown in the map, because the remainder of the census block is only sparsely populated. While the Daniel Island and Clouter Island Alternatives share the same census block group, existing socioeconomic data is not applicable for Clouter Island because it is developed as a CDF and has no residents or businesses.

4.3.1. Tri-County Region

4.3.1.1. Economic Sectors and Employment

The closure of the Charleston Naval Base and the subsequent loss of over 20,000 jobs in the Charleston region was a significant impact to the economy. However, the Tri-County region is home to the second busiest containerized cargo port on the entire Atlantic and Gulf coasts, one of the Southeast's most prestigious medical hubs, a multi-billion dollar tourism industry, and a growing base of national and international businesses. In the past 12 years since the closure of the Charleston Naval Shipyard and Naval Station, the Charleston regional economy has evolved from one focused heavily on the military to one that is much more diversified. Since 1995, new and expanding businesses have invested more than $5 billion in the region (Charleston Regional Development Alliance, 2004).

The $5 billion invested by businesses since 1995 has resulted in nearly 50,000 net new jobs and greater economic diversity. Table 4.3-2 illustrates civilian workforce characteristics from 1999 until 2004 for the Tri-County region. As shown, the civilian workforce in the region has grown from 269,727 workers to 309,080 workers in the years between 1999 and 2004, which is nearly a 13.5 percent growth rate. In comparison, the national workforce growth rate was only 4.3 percent. However, because the migration of new residents to the Charleston area has also increased along with the creation of new jobs, the region's unemployment rate increased to 5.4 percent in 2005.

Table 4.3-2. Tri-County Region Civilian Workforce Characteristics, 1999-2004.

	1999	2000	2001	2002	2003	2004
Civilian Labor Force	269,727	274,787	269,765	280,510	290,810	309,080
Number Employed	260,471	266,581	259,853	269,449	277,448	295,395
Number Unemployed	9,256	8,206	9,912	11,061	13,362	13,685
Unemployment Rate	3.4%	3.0%	3.7%	3.9%	4.6%	4.4%

Source: Charleston Regional Development Alliance

Table 4.3-2 shows employment (full-time plus part-time, including non-civilians) by economic sector for the years 1990 and 2000. The Tri-County region's full-time and part-time employment increased from 291,029 workers in 1990 to 325,669 workers in 2000. Within the Tri-County region, the county with the greatest increase in employment was Berkeley (26.5 percent). In comparison, total employment in the State of South Carolina increased by 16.0 percent.

Total full-time and part-time employment by industry are estimates based on a place-of-work count and is the average annual number of jobs. Each job that a person holds, whether full-time or part-time, is considered to be a job. As shown in Table 4.3-3, from 1990 to 2000, the services industry experienced an almost 25 percent increase and, by 2000, became the most dominant employment sector in the Tri-County region, with 98,140 workers. The next two leading employment sectors in the Tri-County region in 2000 were government, with 65,520 workers, and retail trade, with 59,648 workers. The fastest growing industry in the Tri-County region was transportation/public utilities. This sector grew 57.6 percent from 1990 until 2000. As expected, the employment sectors that experienced a decline during these 10 years were military and federal civilian. These two industries declined by 160.4 percent and 130.4 percent, respectively, during the years following the Charleston Naval Base closure.

Table 4.3-3. Employment (Full-time plus Part-time) by Economic Sector, 1990 and 2000.

Industry		Berkeley County	Charleston County	Dorchester County	Tri-County Region	South Carolina
Farm, Agricultural Services, Forestry, Fishing	1990	304	2,157	523	2,984	15,844
	2000	N/A	3,180	966	4,146	25,589
	% Change	***N/A***	***32.2%***	***45.9%***	***28.0%***	***38.1%***
Construction	1990	3,969	14,945	2,228	21,142	133,831
	2000	5,237	15,783	2,822	23,842	154,538
	% Change	***24.2%***	***5.3%***	***21.0%***	***11.3%***	***13.4%***
Manufacturing	1990	7,083	10,151	5,112	22,346	389,540
	2000	7,913	10,501	5,035	23,449	352,570
	% Change	***10.5%***	***3.3%***	***-1.5%***	***4.7%***	***-10.5%***
Transportation / Public Utilities	1990	1,532	10,992	748	13,272	73,625
	2000	3,097	13,412	1,758	18,267	108,496
	% Change	***50.5%***	***18.0%***	***57.5%***	***27.3%***	***32.1%***
Wholesale Trade	1990	639	7,883	818	9,340	66,465
	2000	1,196	8,367	1,205	10,768	86,829
	% Change	***46.6%***	***5.8%***	***32.1%***	***13.3%***	***23.5%***
Finance, Insurance, Real Estate	1990	1,204	13,728	1,165	16,097	109,161
	2000	1,881	16,531	1,247	21,659	139,523

Industry		Berkeley County	Charleston County	Dorchester County	Tri-County Region	South Carolina
	% Change	***36.0%***	***17.0%***	***6.6%***	***25.7%***	***21.8%***
Services	1990	5,971	53,590	6,083	65,644	405,137
	2000	9,269	80,780	8,091	98,140	595,779
	% Change	***35.6%***	***33.7%***	***24.8%***	***33.1%***	***32.0%***
Retail Trade	1990	5,773	38,081	5,794	49,648	331,726
	2000	8,399	44,209	7,040	59,648	410,390
	% Change	***31.3%***	***13.9%***	***17.7%***	***16.8%***	***19.2%***
Government	1990	6,642	77,694	4,309	88,645	360,965
	2000	7,850	52,261	5,409	65,520	383,222
	% Change	***15.4%***	***-48.7%***	***20.3%***	***-35.3%***	***5.8%***
Federal Civilian	1990	342	19,230	195	19,767	40,068
	2000	415	7,955	208	8,578	30,962
	% Change	***17.6%***	***-141.7%***	***6.3%***	***-130.4%***	***-29.4%***
Military	1990	886	32,846	577	34,309	84,762
	2000	714	11,977	482	13,173	58,597
	% Change	***-24.1%***	***-174.2%***	***-19.7%***	***-160.4%***	***-44.7%***
State and Local	1990	5,414	25,618	3,537	34,569	236,135
	2000	6,721	32,329	4,719	43,769	293,663
	% Change	***19.4%***	***20.8%***	***25.0%***	***21.0%***	***19.6%***
Total	1990	33,753	229,894	27,382	291,029	1,925,779
	2000	45,919	245,655	34,095	325,669	2,291,238
	% Change	***26.5%***	***6.4%***	***19.7%***	***10.6%***	***16.0%***

Source: U.S. Department of Commerce, Bureau of Economic Analysis

The economic influence of the military and government sectors is still strong despite the closure of the Charleston Naval Base; its economic impact in the Tri-County region has been estimated to be at $2 billion annually. Moreover, in 2004, the top four major employers in the region were still connected to the Federal, state, or local government. These major employers were the United States Navy (16,219 employees, government sector), the Medical University of South Carolina (8,200 employees, government sector), the Charleston Air Force Base (5,594 employees, government sector), and the Charleston County School District (5,000 employees, government sector). A complete list of the region's 20 largest employers is provided in Table 4.3-4. The SCSPA is 35th largest employer in the Tri-County region, with 600 employees. It should be noted that the information given for SCSPA employees in Table 4.3-1 showing 500 employees is from November 1997.

Table 4.3-4. Twenty Largest Employers in the Tri-County Region.

Employer	Product/Service	People
US Navy	Various naval commands	16,219
Medical University of South Carolina (MUSC)	Healthcare, research, post-secondary education	8,200
Charleston Air Force Base	United States Air Force	5,594
Charleston County School District	Primary & secondary education	5,000

Employer	Product/Service	People
Roper St. Francis Healthcare	Healthcare	4,000
Berkeley County School District	Primary & secondary education	3,414
Piggly Wiggly Carolina Co. Inc.	Grocery headquarters & 23 area stores	2,500
Charleston County	County government	2,243
Robert Bosch Corporation	Fuel injection & braking systems	2,243
Wal Mart Stores	Retail general merchandise (8 area stores)	2,153
Trident Health System	Trident and Summerville Medical Centers	2,082
Dorchester County School District	Primary & secondary education	2,000
Santee Cooper	Electric utility	1,725
MeadWestvaco	Specialty paper, packaging, chemicals, lumber, etc.	1,596
City of Charleston	Municipal government	1,470
Bi-Lo Inc.	15 area grocery stores	1,300
U.S. Postal Service	Postal service	1,200
R.H. Johnson Dept. of Veterans Affairs Hospital	Healthcare	1,100
Cummins Engine Divisions & Joint Ventures	Automotive products	1,062
OSI	Billing & accounts receivable services	1,000

Historically, the Port of Charleston (the Port) has ranked first among international container cargo ports on the Southeast and Gulf Coasts. The combined ports of New York and New Jersey have typically handled more containers than Charleston on the East Coast. Nationwide, Charleston was ranked the United States' fourth busiest container port (Charleston Metro Chamber of Commerce, 2005). It should be noted that recent growth in container volume at container ports in Savannah, GA and Norfolk, VA will likely equal or exceed the container volume in Charleston for 2006. Activities at the Port that are stimulated by the SCSPA result in economic benefits for South Carolina. Within the state alone, 281,000 jobs, $9.4 billion in personal income, and $2.5 billion in tax revenues result from international cargo movements through South Carolina's ports and its induced effects (Charleston Metro Chamber of Commerce, 2005).

4.3.1.2. Income and Poverty

The 1990 and 2000 U.S. Census income and poverty data for the Tri-County region and the state of South Carolina are summarized in Table 4.3-5. In both years, all three counties in the region had median household incomes that were higher than that for the state. Dorchester County had the highest median household income in both years, while Charleston County had the lowest. However, in terms of per capita income, Charleston County had the highest income in both years. In 2000, Charleston County had the highest percent of persons living below poverty level (16.4 percent) when compared to the other counties in the region and to the State of South Carolina. Berkeley and Dorchester Counties had 11.8 and 9.7 percent of their population living below the poverty level, respectively, and the State of South Carolina had 15.4 percent. Charleston County also had the highest percent of persons living below 50 percent of the poverty level.

Table 4.3-5. Regional Income and Poverty Data, 1990 and 2000.

	Berkeley County		Charleston County		Dorchester County		South Carolina	
	1990	2000	1990	2000	1990	2000	1990	2000
Median Household Income	$29,106	$39,908	$26,875	$37,810	*$30,764*	*$43,316*	$26,256	$37,082
Per Capita Income	$10,942	$16,879	$13,068	$21,393	*$11,884*	*$18,840*	$11,897	$18,795
Total for whom poverty status is determined	127,471	136,671	279,595	300,183	*81,126*	*94,316*	3,368,125	3,883,329
Persons Below Poverty Level[1]	15,672	16,066	48,508	49,330	*9,360*	*9,108*	517,793	547,869
Percent of Persons Below Poverty Level	12.3%	11.8%	17.3%	16.4%		*9.7%*	15.4%	14.1%
Persons Below 50% of Poverty Level	7,000	7,185	24,064	25,022	*4,289*	*3,932*	220,400	251,689
Percent of Persons Below 50% of Poverty Level	5.5%	5.3%	8.6%	8.3%		*4.2%*	6.5%	6.5%

[1] *% based on persons for whom poverty status is determined.*

Source: 1990 and 2000 U.S. Census Bureau

4.3.1.3. Housing Characteristics

The 1990 and 2000 U.S. Census housing data for the Tri-County region and the State of South Carolina are summarized in Table 4.3-6. The highest housing vacancy rate was observed for Charleston County in both 1990 and 2000 (13.3 percent and 12.6 percent, respectively). In general, the other two counties in the region had vacancy rates that were approximately 4-6 percent less than the Charleston County rate. Homeownership rates were highest in both years for Dorchester County and lowest for Charleston County. In 2000, the statewide rate of homeownership was 72.2 percent while Charleston County's rate was 61.1 percent.

In both 1990 and 2000, all three counties in the region had higher median home values than the State of South Carolina. Charleston County had the highest median home value during both years and, interestingly, the median value of a home in Charleston County increased greatly in the years from 1990 to 2000. In 1990, the median home value was $73,800, and by 2000, the median home value was $130,000. Charleston County also had a higher rental rate in 2000 (nearly 40 percent) compared to Berkeley and Dorchester Counties (25.8 percent and 25.0 percent, respectively). The median rent in 2000 for a residence on Charleston County was $605.

Table 4.3-6. Regional Housing Characteristics, 1990 and 2000.

	Berkeley County		Charleston County		Dorchester County		South Carolina	
	1990	2000	1990	2000	1990	2000	1990	2000
Housing Units	45,697	54,717	123,550	141,031	30,632	37,237	1,424,155	1,753,670
Vacant Housing Units	3,311	4,795	16,481	17,705	2,419	2,528	166,111	219,816
Housing Vacancy Rate	7.2%	8.8%	13.3%	12.6%	7.9%	6.8%	11.7%	12.5%
Tenure - Total	42,386	49,922	107,069	123,326	28,213	34,709	1,258,044	1,533,854
Owner Occupied	29,533	37,042	61,641	75,291	20,034	26,023	878,704	1,107,619
Homeownership Rate	69.7%	74.2%	57.6%	61.1%	71.0%	75.0%	69.8%	72.2%

Median Age of Housing (Years)	14	20	19	25	20	17	18	22
Median Home Value	$68,500	$91,300	$73,800	$130,200	$73,600	$104,600	$61,100	$94,900
Rental Rate	30.3%	25.8%	42.4%	38.9%	29.0%	25.0%	30.2%	27.8%
Median Rent	$357	$562	$346	$605	$335	$568	$276	$510

Source: 1990 and 2000 U.S. Census Bureau

4.3.2. North Charleston Community Study Area

4.3.2.1. Economic Sectors and Employment

Specific information on economic sectors and employment is not available for the block groups that make up the North Charleston community study area. However, the regional information provided in Section 4.3.1.1 is considered a suitable representation of the employment trends of the overall area.

4.3.2.2. Income and Poverty

Income and poverty information for the North Charleston community study area is shown in Table 4.3-7. Historically, the median household income of this study area had been much lower than for any of the counties in the region. In 2000, the median household income was $21,134; in comparison, the median household income for Charleston County was $37,810. Reflected in the low median household income is the high percent of persons living below the poverty level in the North Charleston study area. According to the 2000 U.S. Census, approximately 34 percent of the population in the study area is living below the level of poverty. Furthermore, almost 18 percent of the study area was living below 50 percent of the poverty level.

Table 4.3-7. Income and Poverty Data for the North Charleston Community Study Area, 1990 and 2000.

	North Charleston Community Study Area	
	1990	**2000**
Median Household Income	$16,221	$21,134
Per Capita Income	N/A	N/A
Total for whom poverty status is determined	34,420	26,469
Persons Below Poverty Level [1]	11,181	9,028
Percent of Persons Below Poverty Level	32.5%	34.1%
Persons Below 50% of Poverty Level	6,241	4,705
Percent of Persons Below 50% of Poverty Level	18.1%	17.8%

[1] *Percent based on persons for whom poverty status is determined.*

Source: 1990 and 2000 U.S. Census Bureau

4.3.2.3. Housing Characteristics

The housing characteristics of the North Charleston community study area are presented in Table 4.3-8. According to the 2000 U.S. Census, the houses in the study area had a 14.3

percent vacancy rate, which is similar to that of Charleston County. However, the rate of homeownership was much less. In 2000, the study area had only a 40.4 percent homeownership rate, while Charleston County's was 61.1 percent. This is also reflected in the rental rate that was 59.6 percent in 2000. The median rent for places of residence in the study area was $424.

In 2000, the median home value for residences in the study area was $56,414, which was almost $75,000 less than the median home value of residences in Charleston County ($130,200).

Table 4.3-8. Housing Characteristics for the North Charleston Community Study Area, 1990 and 2000.

	North Charleston Community Study Area	
	1990	**2000**
Housing Units	14,985	12,230
Vacant Housing Units	2,032	1,752
Housing Vacancy Rate	13.6%	14.3%
Tenure - Total	5,452	10,478
Owner Occupied	12,953	4,228
Homeownership Rate	42.1%	40.4%
Median Age of Housing (Years)	N/A	N/A
Median Home Value	N/A	$56,414
Rental Rate	57.9%	59.6%
Median Rent	N/A	$424

4.3.3. Clouter Island and Daniel Island Community Study Area

4.3.3.1. Economic Sectors and Employment

Specific information on economic sectors and employment is not available for the block groups that make up the Clouter Island and Daniel Island community study area. Until the annexation of Daniel Island by the City of Charleston in 1991, the Clouter Island and Daniel Island study area (and all of the Cainhoy Peninsula) was rural and sparsely populated. After the annexation and construction of the I-526 bridge over the Cooper River, a period of large and rapid growth began on Daniel Island. The area is being developed as an upscale, mixed-use community development. Many local, national, and international businesses have invested in the area and are building their infrastructure on Daniel Island. As a result, several economic sectors are expanding into the area and are providing jobs to the residents as well as to workers from outside the area. It should be noted that Thomas Island is part of the Clouter Island and Daniel Island community study area. However, Thomas Island appears to be developing more slowly than Daniel Island.

4.3.3.2. Income and Poverty

Table 4.3-9 presents the income and poverty data for the Clouter Island and Daniel Island community study area. The annexation of Daniel Island in 1991 by the City of Charleston and the ensuing rapid growth and development of the area is evident in the striking differences between the 1990 and 2000 U.S. Census datasets. For instance, within these years, the median household income changed greatly from $22,029 to $64,117, which is an approximate 190

percent increase. For comparison, the median household income of Berkeley County, the county in which the Clouter Island and Daniel Island study area resides, increased by only 37 percent. Furthermore, the percent of persons living below the poverty level decreased from 21.5 percent to 9.5 percent.

Table 4.3-9. Income and Poverty Data for the Clouter Island and Daniel Island Community Study Area, 1990 and 2000.

	Clouter Island and Daniel Island Community Study Area	
	1990	**2000**
Median Household Income	$22,029	$64,117
Per Capita Income	N/A	N/A
Total for whom poverty status is determined	1,314	2,132
Persons Below Poverty Level [1]	283	202
Percent of Persons Below Poverty Level	21.5%	9.5%
Persons Below 50% of Poverty Level	153	112
Percent of Persons Below 50% of Poverty Level	11.6%	5.3%

[1] *Percent based on persons for whom poverty status is determined.*

Source: 1990 and 2000 U.S. Census Bureau

4.3.3.3. Housing Characteristics

The housing characteristics of the Clouter Island and Daniel Island community study area are shown in Table 4.3-10. Again, the socioeconomic changes taking place in the study area are reflected in the 1990 and 2000 U.S. Census datasets. While the housing vacancy and homeownership rates changed little between 1990 and 2000, the median home value figures changed greatly. In 1990, the median value of homes in the study area was $70,400. However, by 2000, the median value of homes was $250,300, which was an increase of $179,900. In contrast, between 1990 and 2000, the median value of homes in all of Berkeley County increased by only $12,800.

The rapid growth of Daniel Island is further illustrated in the median age of houses. In 1990, the median age of houses was 13 years. By 2000, the median age of houses was only 4 years.

Table 4.3-10. Housing Characteristics for the Clouter Island and Daniel Island Community Study Area, 1990 and 2000.

	Clouter Island and Daniel Island Community Study Area	
	1990	**2000**
Housing Units	425	815
Vacant Housing Units	45	80
Housing Vacancy Rate	10.6%	9.8%
Tenure - Total	334	735
Owner Occupied	380	688
Homeownership Rate	87.9%	93.6%
Median Age of Housing (Years)	13	4
Median Home Value	$70,400	$250,300
Rental Rate	12.1%	6.4%
Median Rent	$200	$454

Source: 1990 and 2000 U.S. Census Bureau

4.3.4. Clouter Island Community Study Area

Clouter Island is developed as a CDF, which is primarily used for the maintenance of the federal navigation channel. There are no residents or businesses on Clouter Island.

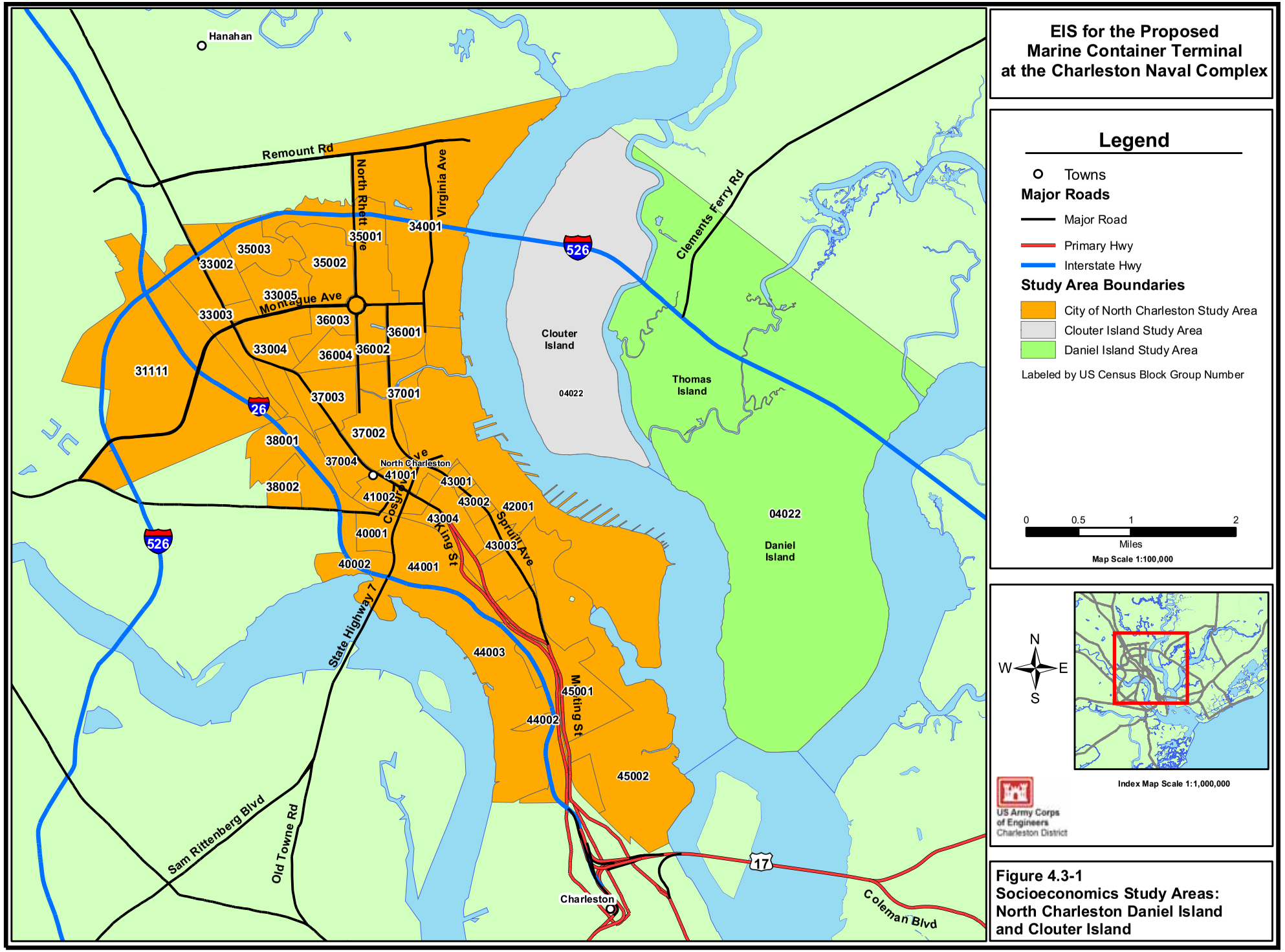


Figure 4.3-1
Socioeconomics Study Areas: North Charleston Daniel Island and Clouter Island

4.4. SOCIAL CHARACTERISTICS AND ENVIRONMENTAL JUSTICE

This section describes existing social characteristics of the Tri-County region, each county within the region, and community study areas. The community study areas are illustrated in Figure 4.4-1 and are defined by the same U.S. Census block groups that were used to evaluate socioeconomics (Section 4.3). The social characteristics that are assessed in this section include population, race, age, education, income, poverty, unemployment, and housing. Neighborhoods and community features (i.e, schools, libraries, hospitals, nursing homes, and places of worship) are also identified in this section and are shown in Figures 4.4-2 and 4.4-3, respectively.

4.4.1. Social Characteristics

4.4.1.1. Tri-County Region

Population Trends

The population growth trends from 1970 through 2000 for the Tri-County region are shown in Table 4.4-1. The Tri-County region as a whole has experienced a rapid rate of growth since 1970. According to the 2000 U.S. Census, the Tri-County region has had a 63.3 percent population growth between 1970 and 2000, with a net population increase of 212,908 residents.

Table 4.4-1. Tri-County Region: Population Growth, 1970-2000.

Place	1970	1980	1990	2000	Percent Increase 1970-2000
Berkeley County	56,199	94,727	128,776	142,651	153.8%
Charleston County	247,650	276,974	295,041	309,969	25.2%
Dorchester County	32,276	58,761	83,060	96,413	198.7%
Tri-County Region	336,125	430,462	506,877	549,033	63.3%
South Carolina	2,590,713	3,122,814	3,486,310	4,012,012	54.9%

BCDCOG, Population Growth Trends Berkeley-Charleston-Dorchester Region.

U.S. Census Bureau.

The 2000 population density for the Tri-County region was estimated by the U.S. Census Bureau to be 211 persons per square mile. Population density varied extensively for the three counties from a low of 136 persons per square mile in Berkeley County, 186 persons per square mile in Dorchester County, and a high of 356 persons per square mile in Charleston County.

Racial Composition

As shown in Table 4.4-2, all three counties, the Tri-County region, and the state of South Carolina have higher percentages of minority populations than the United States according to the 2000 U.S. Census. In the Tri-County region, Charleston County has a higher percentage of minority populations than Dorchester and Berkeley Counties. In 2000, the Tri-County region as a whole had a similar racial composition as the state of South Carolina, with approximately 65 percent of the population white, 30 percent of the population black, and 5 percent of the population either American Indian, Asian, Hispanic, or another race.

Table 4.4-2. Tri-County Region: Racial Composition, 2000.

Race	Berkeley County		Charleston County		Dorchester County		Tri-County Region		S.C. (%)	U.S. (%)
	No.	%	No.	%	No.	%	No.	%		
White	96,997	68.0%	191,928	61.9%	68,498	71.0%	357,423	65.1%	67.2%	75.1%
Black	37,985	26.6%	106,918	34.5%	24,176	25.1%	169,079	30.8%	29.5%	12.3%
American Indian	748	0.5%	813	0.3%	703	0.7%	2,264	0.4%	0.3%	0.9%
Asian, Pacific	2,785	2.0%	3,635	1.2%	1,152	1.2%	7,572	1.4%	0.9%	3.8%
Hispanic (any race)	3,935	2.8%	7,434	2.4%	1,722	1.8%	13,091	2.4%	2.4%	12.5%
Other	1,718	1.2%	3,071	1.0%	570	0.6%	5,359	1.0%	1.0%	5.5%
Total Minority	47,171	33.2%	121,427	39.2%	28,323	29.4%	196,921	35.9%	34.2%	35.0%

Source: U.S. Census Bureau, Census 2000.

Age Distribution

The age characteristics of the Tri-County region are shown in Table 4.4-3. All three counties and the Tri-County region have lower median ages than the state of South Carolina and the nation according to the 2000 U.S. Census. In 2000, the median age was 32 in Berkeley County, 34.5 in Charleston County, 34.7 in Dorchester County, and 33.7 in the whole Tri-County region. The median ages for state of South Carolina and the nation were 35.4 and 35.3, respectively. The lower median age for the Tri-County region is partly because both Berkeley and Dorchester Counties have higher percentages of children under the age of 18 than the Tri-County region, the state of South Carolina, or the nation.

Table 4.4-3. Tri-County Region: Age Characteristics, 2000.

Age Group	Berkeley County		Charleston County		Dorchester County		Tri-County Region		S.C. (%)	U.S. (%)
	No.	%	No.	%	No.	%	No.	%		
Under 18	39,942	28.0%	73,463	23.7%	27,863	28.9%	141,268	25.7%	25.2%	25.7%
18-64	91,439	64.1%	199,620	64.4%	59,776	62.0%	348,636	63.5%	62.7%	62.9%
65 or above	11,261	7.9%	36,858	11.9%	8,791	9.1%	56,910	10.4%	12.1%	12.4%
Median Age	32	N/A	34.5	N/A	34.7	N/A	33.7	N/A	35.4	35.3

Source: U.S. Census Bureau, Census 2000.

Income Distribution

As shown in Table 4.4-4, the median and average household incomes for the Tri-County region are higher than those of the state of South Carolina, but lower than those of the nation. The 2000 U.S. Census median household income for the nation was $41,994, in contrast to $37,082 for the state of South Carolina and $40,345 for the Tri-County region. The percent of the population in poverty is another indicator of income distribution. With 13.5 percent of its population in poverty, Charleston County has the highest percent of population in poverty among Berkeley and Dorchester Counties (11.0 percent and 10.0 percent, respectively), the

state of South Carolina (12.3 percent), and the nation (11.2 percent). Along with with the higher percentage of population in poverty, Charleston County has a relatively low median household income ($37,810).

Table 4.4-4. Tri-County Region: Income Distribution, 2000.

Household Income	Berkeley County		Charleston County		Dorchester County		Tri-County Region		S.C. (%)	U.S. (%)
	No.	%	No.	%	No.	%	No.	%		
Under $15,000	7,635	15.3%	23,366	19.0%	4,653	13.5%	35,654	17.2%	18.8%	15.8%
$15,000 - $24,999	6,624	13.3%	17,078	13.8%	4,350	12.5%	28,052	13.5%	14.3%	12.9%
$25,000 - $34,999	7,218	14.4%	16,765	13.6%	4,547	13.1%	28,530	13.7%	13.9%	12.8%
$35,000 - $49,999	10,029	20.1%	19,279	15.7%	6,430	18.5%	35,738	17.2%	17.5%	16.6%
$50,000 - $74,999	10,519	21.1%	22,296	18.1%	7,886	22.7%	40,701	19.6%	18.8%	19.4%
$75,000 - $99,999	4,710	9.4%	10,885	8.8%	3,809	11.0%	19,404	9.3%	8.4%	10.2%
Over $100,000	3,133	6.3%	13,591	11.0%	3,013	8.7%	19,737	9.5%	8.1%	12.3%
Population in Poverty	15,662	11.0%	41,832	13.5%	9,776	10.0%	67,270	12.3%	12.6%	11.2%
Median Household Income	$39,908		$37,810		$43,316		$40,345		$37,082	$41,994
Average Household Income	$46,791		$52,985		$52,882		$50,886		$48,349	$56,644

Source: U.S. Census Bureau, Census 2000.

Educational Attainment

The educational attainment levels of the Tri-County region are shown in Table 4.4-5. The Tri-County region, the state of South Carolina, and the nation have similar percentages of high school and college graduates. Both the Tri-County region and the U.S. have approximately 19 percent of the adult population without a high school degree, which is actually lower than the South Carolina figure of 31.7 percent. The Tri-County region has 30.4 percent of persons age 25 or over with some sort of college education. This figure is a higher percentage than the state percentage of 26.0 percent or the national percentage of 27.4 percent. At 30.4 percent, Charleston County had by far the highest percentage of persons age 25 or over with a college degree (a Bachelor's degree or higher) compared to Berkeley and Dorchester Counties (14.4 percent and 21.4 percent, respectively), the state of South Carolina (20.4 percent), and the nation (24.4 percent). This result could be in part due to the presence of several colleges within Charleston County along with a wide range of local employment opportunities.

Table 4.4-5. Tri-County Region: Education Attainment for Persons Age 25 and Older, 2000.

Status	Berkeley County		Charleston County		Dorchester County		Tri-County Region		S.C. (%)	U.S. (%)
	No.	%	No.	%	No.	%	No.	%		
Persons Aged 25 +	86,020	60.3%	199,126	64.2%	61,099	63.4%	346,245	63.1%	64.7%	64.7%
Not a High School Graduate	17,037	19.7%	36,852	18.5%	10,929	17.8%	64,818	18.7%	23.4%	19.6%
High School Graduate Only	29,521	34.3%	45,752	22.9%	18,206	29.7%	93,479	29.0%	30.0%	28.6%
Some College	27,065	31.5%	55,504	27.9%	19,066	31.1%	101,635	30.2%	26.0%	27.4%
College Graduate	12,392	14.4%	61,253	30.8%	13,133	21.4%	86,778	22.2%	20.4%	24.4%

Source: U.S. Census Bureau, Census 2000.

4.4.1.2. North Charleston Community Study Area

As shown in Figure 4.4-1, the North Charleston community study area has been designated down to the Block Group level within Census Tracts 31, 33, 34, 35, 36, 37, 38, 40, 41, 42, 43, 44, and 45. Most of the study area is located within the City of North Charleston; however, a small portion along Interstate 26 is located in the City of Charleston. Information in the following paragraphs is summarized for the entire area.

Population Trends

An urbanized area surrounds the CNC, with a 2000 population density of approximately 2,000 people per square mile. Surrounding land uses include residential, office, institutional, and commercial uses. Most of the housing dates back to World War II and in many cases was built to house civilian workers at the CNC. Based on the U.S. Census, the population in the North Charleston study area has decreased from 41,456 residents in 1990 to 27,448 residents in 2000 (Table 4.4-6). This population decline of -33.8 percent was primarily due to the base closure of the CNC and a notable difference from the 25.2 and 63.3 percent population growths observed for Charleston County and the Tri-County region, respectively. Within the North Charleston study area, there are several ongoing revitalization and redevelopment projects, including the CNC. At this time, it is uncertain how these redevelopment projects have affected population growth within the North Charleston study area since the 2000 Census.

Table 4.4-6. North Charleston Community Study Area: Population Growth, 1990 and 2000.

Place	1990	2000	Percent Change 1990-2000
North Charleston Community Study Area	41,456	27,646	-33.8%
Charleston County	295,041	309,969	25.2%
Tri-County Region	506,877	549,033	63.3%

Source: U.S. Census Bureau, Census 2000.

Racial Composition

The racial composition of the North Charleston study area is presented in Table 4.4-7. This area's population is 69.7 percent black and 26.3 percent white, which is a marked contrast from the racial composition of the Tri-County region (30.8 percent black and 65.1 percent white). In 2000, the total percent of minority residents living in the North Charleston study area was nearly 74 percent.

Table 4.4-7. North Charleston Community Study Area: Racial Composition, 2000.

Race	North Charleston Community Study Area		Charleston County		Tri-County Region	
	No.	%	No.	%	No.	%
White	7,264	26.3%	191,928	61.9%	357,423	65.1%
Black	19,267	69.7%	106,918	34.5%	169,079	30.8%
American Indian	35	0.1%	813	0.3%	2,264	0.4%
Asian, Pacific	362	1.3%	3,635	1.2%	7,572	1.4%
Hispanic (any race)	825	3.0%	7,434	2.4%	13,091	2.4%
Other	689	2.5%	3,071	1.0%	5,359	1.0%
Total Minority	20,382	73.7%	121,427	39.2%	196,921	35.9%

Source: U.S. Census Bureau, Census 2000.

Age Distribution

As shown in Table 4.4-8, the North Charleston study area has a higher percentage of persons under the age of 18 and over the age of 65 (29.6 percent and 12.2 percent, respectively) than Charleston County (23.7 percent and 11.9 percent, respectively) and the Tri-County region (25.7 percent and 10.4 percent, respectively). The median age of persons living within the North Charleston study area is lower than Charleston County and the Tri-County region (31 years versus 34.5 and 33.7 years, respectively).

Table 4.4-8. North Charleston Community Study Area: Age Characteristics, 2000.

Age Group	North Charleston Community Study Area		Charleston County		Tri-County Region	
	No.	%	No.	%	No.	%
Under 18	8,179	29.6%	73,463	23.7%	141,268	25.7%
18-64	16,105	58.3%	199,620	64.4%	348,636	63.5%
65 or above	3,362	12.2%	36,858	11.9%	56,910	10.4%
Median Age	31	N/A	34.5	N/A	33.7	N/A

Source: U.S. Census Bureau, Census 2000.

Income Distribution

The income distribution for the North Charleston study area presented in Table 4.4-9 reveals that the median household income for this area ($21,134) is much less than that for either Charleston County or the Tri-County region ($37,810 and $40,345, respectively). Also, the percent population in poverty for the North Charleston study area is 34.1 percent, which is much higher than 13.5 percent for Charleston County and 12.3 percent for the Tri-County region.

Table 4.4-9. North Charleston Community Study Area: Income Distribution, 2000.

Household Income	North Charleston Community Study Area		Charleston County		Tri-County Region	
	No.	%	No.	%	No.	%
Under $15,000	3,981	37.3%	23,366	19.0%	35,654	17.2%
$15,000 - $24,999	2,016	18.9%	17,078	13.8%	28,052	13.5%
$25,000 - $34,999	1,558	14.6%	16,765	13.6%	28,530	13.7%
$35,000 - $49,999	1,489	14.0%	19,279	15.7%	35,738	17.2%
$50,000 - $74,999	1,137	10.7%	22,296	18.1%	40,701	19.6%
$75,000 - $99,999	316	3.0%	10,885	8.8%	19,404	9.3%
Over $100,000	174	1.6%	13,591	11.0%	19,737	9.5%
Population in Poverty	9,028	34.1%	41,832	13.5%	67,270	12.3%
Median Household Income	$21,134		$37,810		$40,345	
Average Household Income	N/A		$52,985		$50,886	

Source: U.S. Census Bureau, Census 2000.

Educational Attainment

As shown in Table 4.4-10, the educational attainment levels for the North Charleston study area are less than the attainment levels for Charleston County and the Tri-County region. In 2000, approximately 37 percent of the population 25 years and older had not completed high school, which is in contrast to the 18.5 percent for Charleston County and the 18.7 percent for the Tri-County region. Also, within this study area, only 9.1 percent of the population age 25 and older earned a college degree. In Charleston County and the Tri-County region, 30.8 percent and 22.2 percent of the population age 25 years and older had college degrees, respectively.

Table 4.4-10. North Charleston Community Study Area: Education Attainment for Persons Age 25 and Older, 2000.

Status	North Charleston Community Study Area		Charleston County		Tri-County Region	
	No.	%	No.	%	No.	%
Persons Aged 25 +	16,513	59.7%	199,126	64.2%	346,245	63.1%
Not a High School Graduate	6,173	37.4%	36,852	18.5%	64,818	18.7%
High School Graduate Only	4,998	30.3%	45,752	22.9%	93,479	29.0%

Status	North Charleston Community Study Area		Charleston County		Tri-County Region	
	No.	%	No.	%	No.	%
Some College	3,843	23.3%	55,504	27.9%	101,635	30.2%
College Graduate	1,499	9.1%	61,253	30.8%	86,778	22.2%

Source: U.S. Census Bureau, Census 2000.

Neighborhood Descriptions

The North Charleston community study area has a number of neighborhoods that date back to the late 19th and early 20th centuries. In the 1940s and 1950s neighborhoods began developing to house workers employed at the Charleston Naval Base. The character of the North Charleston study area changed during the 1990s with the closure of the Charleston Naval Base. This change is most evident in the population reduction observed between the 1990 and 2000 U.S. Censuses (from 41,456 to 27,448, respectively). During the same time period, the percentage of minority population increased from approximately 56 percent to 75 percent.

This collection of neighborhood descriptions includes only the major neighborhoods within the study area. It should be noted that a small percentage of households represented in the census data for this study area is not included on the neighborhoods described. In trying to characterize the neighborhoods within the study area, it was necessary to combine some of them. This was primarily due to the methods used to collect census data and a lack of neighborhood-specific data. Maps showing the locations of major neighborhoods and community features in the study area are presented in Figures 4.4-2 and 4.4-3, respectively.

Accabee

The Accabee neighborhood is located east of Cosgrove Avenue, south of the Norfolk Southern rail line and north of I-26. The neighborhood is generally bounded by the rail corridor to the north, Misroon Street to the east, S.T. Simmons Drive to the south, and Azalea Drive to the west.

According to 2000 census data, the community is more than 90 percent minority. Approximately 20 percent of the people living in the neighborhood were below poverty level in 1999. Approximately 10 percent of the housing units were unoccupied in 2000. During site visits conducted early in 2005, a relatively large number of unoccupied homes were observed. As shown in Figure 4.4-3, Mary Ford Elementary School and Mary Ford Community Center are located within the Accabee neighborhood. The community also has two churches.

Cameron Terrace, Cameron Terrace West, and Century Oaks

Located in the northwestern corner of the City of North Charleston study area, Cameron Terrace began to take shape in the 1950s and 1960s. Other developments affecting this neighborhood include reconstruction of the Century Oaks area, the new combined-magnet schools at the nearby Bonds-Wilson school site, and plans for the Park Circle recreation area. These three communities are located northwest of Park Circle. Block group data for the Cameron Terrace area are combined with data for the northern portion of Park Circle. Block group data for Cameron Terrace West include Century Oaks.

- ***Cameron Terrace*** - The Cameron Terrace neighborhood is bounded by I-526 to the north, Parkside Drive to the east, Wando Road and Lackawanna Boulevard to the south, and East Dolphin Street to the west.

  Cameron Terrace is predominantly non-minority. The median household income for the community was slightly higher than the median household income for North Charleston and approximately 46 percent higher than the median household income for the North Charleston study area. Homes in the neighborhood were relatively large and well maintained. As shown in Figure 4.4-3, within the Cameron Terrace neighborhood is a church and two parks.

- ***Century Oaks*** - The Century Oaks neighborhood is bounded by Dolphin Avenue on the north and west, Iroquois to the east, and West Enterprise to the south. Until recently, Century Oaks was a community of World War II vintage homes. In 2003, the City bought the 55-acre community and tore down 200 homes. Beginning in 2005, the City has plans to redevelop the area and build 387 new homes. This redevelopment is part of the larger Noisette Project. Within the Century Oaks neighborhood are three schools: the Charleston County School of the Arts (grades 6-12), the Charlestowne Academy (grades K-12), and the Special Day School Program (a special needs school). Refer to Figure 4.4-3 for the locations of these schools.

- ***Cameron Terrace West*** - Cameron Terrace West is located immediately west of Century Oaks and is bounded by Wasp Street to the north, Monterey Street to the east and south, and Sterrett Street to the west. The neighborhood is characterized by larger, all-brick homes that are well maintained. The community is relatively isolated, with access only from the east through Century Oaks.

Cherokee

The Cherokee community is located immediately west of the Chicora neighborhood. Cherokee is bounded by Spruill Avenue on the north, Reynolds Street on the east, Meeting Street on the south, and Commander to the west. This area includes the smaller community of Nafair 2. Nafair 2 is located in the southwest quadrant, bounded by Rivers Avenue on the north and Meeting Street on the south. Cosgrove Avenue runs through the center of the community, with the largest number of homes west of Cosgrove Avenue. The small community of Nafair is located immediately west of Nafair 2 and has a single road, Admiral Drive, running through the neighborhood. Admiral Drive has two intersections with Dorchester Road on the east side of the community.

The Cherokee and Nafair neighborhoods are approximately 75 percent minority. For the 2000 census, the neighborhoods fell within two census block groups. The western block group, which included Nafair and Nafair 2, had a median household income of $20,714. The eastern block group had a lower median household income of $14,353. However, the number of persons living below the poverty level was the same, at about 41 percent.

During site visits conducted in early 2005, the overall condition of the Nafair neighborhoods appeared to be somewhat better than the more eastern side of the Cherokee neighborhood. Fewer abandoned or vacant buildings were observed on the west side of the community. As shown in Figure 4.4-3, several community resources are located within the Cherokee neighborhood, including the Cooper River Memorial Library, a mosque, and several churches and nursing homes. Also, the Naval Hospital is located just outside the community.

Chicora

The Chicora community is located in an area that was purchased in the late 1800s by the City of Charleston. Charleston purchased hundreds of acres along the Cooper River for development of Chicora Park, a grand open space connected by trolley to the City's downtown. Charleston sold most of the land in 1901 for development of the former Navy Base. The Chicora community is bounded by the CNC to the northeast, Burton Lane and Naval Base Road to the southeast, Meeting and Rivers Streets to the southwest, and Reynolds Street to the northwest.

The Chicora neighborhood is a predominantly minority community. In 2000, approximately 21.5 percent of the people in the neighborhood were living below the poverty level. Median household income levels, however, varied widely within the neighborhood. The 2000 Census divided the Chicora neighborhood into four block groups, which also included the neighborhoods of Howard Heights and Windsor. Median household incomes ranged from $19,531 in the northern most part of the community to $47,045 in the portion of Chicora between Spruill and the CNC (including the Howard Heights community). The racial composition did not vary much between the four block groups. There appeared to be a higher correlation between median household income and median age, with the areas with higher median household income having a higher median age.

Within the Chicora neighborhood are two schools: Chicora Elementary School and the Military Magnet Academy (grades 6-11). The Live Oak Community Center is also located within the Chicora neighborhood, as well as a few nursing homes and churches. These community resources are shown in Figure 4.4-3.

Dorchester Terrace

Dorchester Terrace is located west of the Accabee community and is bounded by Dorchester Road and CSX railroad to the north, Cosgrove Avenue to the east, and I-26 to the south and west. The Happy Hill neighborhood is located on the west side of I-26 and is considered part of the Dorchester Terrace community.

The 2000 Census data for the Dorchester Terrace east of I-26 indicated that the community was approximately 87 percent minority. The median household income in 2000 was approximately $20,000 with approximately 30 percent of the population living below the poverty level. Almost 20 percent of the homes were vacant in 2000. From visual observations made during site visits conducted in early 2005, it was inferred that the number of unoccupied homes was lower than indicated in the 2000 Census. There are two churches located within this Dorchester Terrace.

Ferndale

The Ferndale community is bounded by I-526 to the north, CSX railroad to the east, Poplar and Singley Streets to the south (one to two blocks south of Montague Street), and Rivers Avenue to the west.

Based on the 2000 Census, the Ferndale community is approximately 62 percent minority. The median household income was $21,354, with almost 29 percent of the population living below the poverty level. Approximately 13.5 percent of the homes in the Ferndale area were vacant. As shown in Figure 4.4-3, community resources within the neighborhood include Ferndale Community Center, Ferndale Baptist Church School (grades K-12), a nursing home, and three churches.

Four-Mile/Hibernian

The Four-Mile/Hiberian neighborhood is located to the south of the study area within the City of Charleston. This neighborhood is bounded by Meeting Street to the west, Pittsburgh Avenue to the north, Cooper River to the east and Greenleaf Street to the south. The Rosemont neighborhood is immediately to the west of Four-Mile/Hibernian.

Howard Heights

Howard Heights is a small neighborhood located east of Spruill Avenue and south of Shipyard Creek Road. The neighborhood comprises approximately 3 square blocks. The Windsor community is located immediately west of Howard Heights. Howard Heights is bounded by Shipyard Creek Road to the north, the Port Terminal Railroad tracks to the east, and Spruill Avenue to the south and west. South Park, a North Charleston community park, is located immediately north of Howard Heights.

The Howard Heights community was included in the same census block group as a portion of the Chicora neighborhood, which is about one-third of a mile north of Howard Heights. According to the 2000 census, this block group was approximately 95 percent minority. The median household income was $29,662, and approximately 13 percent of the population was living below the poverty level. This was a higher average income than that for the North Charleston study area. Observations of the neighborhood gave the impression that there may have been a greater connection between the Howard Heights neighborhood and the Windsor neighborhood in the past. However, over time, Spruill Avenue has become a barrier between the two neighborhoods.

Iron Dog

The Iron Dog neighborhood is located southwest of the Park Circle community. This small neighborhood is bounded by CSX railroad to the north, Rivers Avenue to the east, Macon Avenue to the south, and Meeting Street to the west.

According to the 2000 census data, which included the neighborhoods of Iron Dog and the northern portion of Whipper Barony, this area is approximately 65 percent minority. The median household income is $32,750, substantially greater than the $21,134 median household income for the North Charleston study area and somewhat greater than North Charleston as a whole ($29,307). Twenty percent of the residents of the neighborhood lived below the poverty level as compared with 34 percent for the North Charleston study area and 23 percent for North Charleston as a whole. The housing vacancy rate in this neighborhood was relatively low, at 8 percent. Currently, much of the Iron Dog community is commercially developed; there is one church located in the neighborhood (Figure 4.4-3).

Liberty Hill, Calhoun Homes, Deas Hill, and Morningside

The Liberty Hill neighborhood is a unique neighborhood in the Noisette Project area. Initiated in 1871 as one of the earliest home ownership developments for freed slaves, many of the original properties purchased by the founders of Liberty Hill have been subdivided for multiple heirs, resulting in progressively smaller lots. Some of the real estate is still owned by descendants of families from over 130 years ago.

Liberty Hill and Calhoun Homes are located between Park Circle and Ferndale in the northern portion of the North Charleston study area. Morningside is located immediately south of Ferndale and Deas Hill is located on the west side of the CSX railroad immediately north of the

Iron Dog neighborhood. Liberty Hill is a relatively large neighborhood bounded by the Century Oaks neighborhood to the north (there is no major east-west road separating the neighborhoods or north-south roads connecting the neighborhoods), Mixson Avenue to the east, Rowan Drive to the south, and Gaynor Street to the west. Calhoun Homes can be considered an extension of the Liberty Hill neighborhood. Calhoun Homes, low-income housing constructed during World War II, was recently purchased and is planned for redevelopment. The redevelopment will replace the low-income housing with a mix of residential and commercial development. Community resources within the two communities include several churches, a few nursing homes, and two parks (Figure 4.4-3).

Deas Hill is an isolated neighborhood bordered by Rivers Avenue on the north and east and the CSX railroad to the south and west. The one entrance to the community is Piggly Wiggly Drive off Rivers Avenue.

Morningside is separated from the Ferndale neighborhood by Montague Avenue. Like the Deas Hill community, Morningside is relatively isolated with only one entrance into the community from Montague Avenue. The Morningside Middle School is located within this approximate 30-acre community.

Data from the 2000 Census showed that these communities were 90 to 95 percent minority. Median household income was approximately $12,400, with 50 to 55 percent of the residents living below the poverty level. Housing vacancies were approximately 20 percent.

North Park Village and River Place

North Park Village and River Place are two neighborhoods located north of McMillan Avenue between Spruill and Rivers Avenues. While the two communities are adjacent to one another, there is no road connection between them. River Place has access to McMillan Avenue at two locations via Old Pine Circle. North Park Village has access to Spruill Avenue from Lake Drive and access to Rivers Avenue from Goodman Boulevard.

North Park Village is bounded by open space and Noisette Creek to the north, Spruill Avenue to the east, the River Place neighborhood to the south, and Rivers Avenue to the west. Rivers Place is bounded by Spruill Avenue on the east, McMillan to the south, and Rivers Avenue on the west. There is commercial development between the roads and the neighborhood along McMillan and the southern portion of Rivers Avenue. Similarly, the western boundary of North Park Village has some commercial development. Within the two communities are a couple of churches and parks.

The North Charleston's Housing Authority is located in North Park Village on Goodman Boulevard. North Park Village and River Place were approximately 85 percent minority in 2000. The median household income for the two neighborhoods was $15,500; below the median household income for the North Charleston study area. Over 51 percent of the residents were living below poverty level. The housing vacancy rate in 2000 was approximately 21 percent.

Park Circle

Park Circle is one of the largest neighborhoods in North Charleston. Park Circle is located in the northern portion of the North Charleston study area and is bounded by I-526 on the north, Virginia Avenue on the east, and Bexley Street on the South. The Cameron Terrace, Liberty Hills, and Calhoun Homes neighborhoods form the western boundary. For the purposes of this report, Palmetto Gardens has been included with Park Circle. Palmetto Gardens is bounded by

Montague on the north, Park Circle on the east, Durant Avenue to the southeast, and Holmes Avenue to the southwest.

- ***Northeast Park Circle*** - This wedge-shaped neighborhood is bordered by Park Circle, Filbin Creek and an industrial site. The construction of Northeast Park Circle was spurred by the boom-times of the World War II era, and housing styles are typical of the 1940s and 50s. The new North Charleston Elementary School, the state's first LEED-certified school facility, is located in Northeast Park Circle. A LEED facility is constructed according to a new set of sustainability standards focusing on energy efficiency, indoor environmental quality and minimal environmental impact.

- ***Palmetto Gardens*** - As the nation geared up industrial support for future World War allies, the Federal government launched a project to build housing for base workers and officers; an effort that became Palmetto Gardens. Between the spring and fall of 1941, about 240 homes were built in this area just west of Park Circle. The Palmetto Gardens neighborhood is quite active in community landscaping projects. They built and maintain a well-kept, tree-canopied parkway/playground that spans the neighborhood on both sides of Montague Avenue. Community identity is also strong, as evidenced by a local initiative to update deteriorating obelisk-style street markers with replacements that reflect the current distinctive streetscape.

While African Americans and Caucasians are the predominant racial groups throughout North Charleston, the Park Circle neighborhood is probably the most ethnically diverse of all of the neighborhoods. In 2000, Park Circle had the largest populations of Native American and Asians of any neighborhoods in North Charleston. The Park Circle neighborhood, including Palmetto Gardens, Cameron Terrace, and a small area north of I-526, was divided into seven Census block groups in 2000.

In 2000, Park Circle neighborhood was approximately 40 percent minority. Median household income in the census block groups ranged between $21,429 and $38,750. The range in per capita income levels was $10,756 to $15,436. The percentage of residents living below poverty level ranged between 24 and 63 percent. The number of vacant houses ranged between zero and 80 percent, with most of the areas having a vacancy rate of 10 to 12 percent.

The community resources located within the Park Circle community include the Felix C. Davis Community Center, several churches, three parks, and three schools (the Malcolm C. Hursey Elementary School, the North Charleston Elementary School, and the North Charleston High School).

Rosemont

Rosemont is located west of I-26 between Exits 218 and 219. The neighborhood is bounded by Austin Avenue and Exit 218 to the north, I-26 to the east, Braswell Street to the south, and the Ashley River to the west.

The Rosemont neighborhood was approximately 75 percent minority in 2000. The median household income was $17,554 and approximately 29 percent of the residents lived below the poverty level. Twenty-three percent of the homes were vacant at the time of the 2000 Census.

Homes in the Rosemont neighborhood are small and well kept. The Freddie Whaley Community Center is located in the southern end of the neighborhood. There is only one road leading into the community, which is Austin Avenue. Austin Avenue goes under I-26 and intersects

Summerville Avenue immediately south of King Street. The northern portion of Austin Avenue is commercial and industrial.

Russelldale

Russelldale is located immediately south of Liberty Park and west of Ferndale. I-526 separates Russelldale from Liberty Park. Russelldale is bounded by I-526 to the north, commercial development along Rivers Avenue to the east, forested open space to the south, and Norfolk Southern railroad to the west. Rebecca Street is the only access into the neighborhood. Within Russelldale are a community center and a nursing home.

In 2000, the neighborhood was approximately 75 percent minority with a median household income of $23,750. Approximately 26 percent of the residents lived below the poverty level and slightly less than 20 percent of the homes were vacant.

St. John's/O'Hear

St. John's O'Hear is a small neighborhood situated immediately adjacent to the CNC along St. John's and O'Hear Avenues. The neighborhood is bounded on the north by Noisette Creek and open space, on the east by the CNC, McMillan Avenue to the south, and Spruill Avenue and CSX railroad on the west.

The community is approximately 90 percent minority. The median household income is $22,500, with 38 percent of the residents living below the poverty level. The housing vacancy rate in 2000 was 19 percent.

The St. John Catholic Church is located in the St. John/O'Hear neighborhood and offers private schooling for grades K-12.

Union Heights

The Union Heights neighborhood is located adjacent to the Windsor neighborhood. There are no direct road connections between the two neighborhoods. Union Heights is bounded by Spruill Avenue to the east, the intersection of Spruill Avenue and Meeting Street on the south, and Meeting Street to the west. The Union Heights neighborhood appears to be a close-knit community and is characterized by a large number of churches, as well as a mosque. Also, the Gethsemani Community Center is located within the Union Heights neighbood.

In 2000, the neighborhood was more than 95 percent minority. The median household income was $17,150 with 40 percent of the population living below the poverty level. Approximately 20 percent of houses were vacant.

A freeway on/off ramp (I-26 Exit 218, Spruill Avenue) currently splits the southern portion of the community between Irving and Joppa Avenues.

Waylyn

The Waylyn neighborhood is located west of I-26 and north of Dorchester Avenue. The neighborhood is bounded by I-26 and Bennett Yard (a CSX rail yard) to the north, I-26 to the east, Dorchester Road to the south and CSX railroad to the west. The tracks on the west separate the Waylyn neighborhood from the Brentwood neighborhood. The median household income ranged between $19,261 and $25,912, with approximately 40 percent of the population living below the poverty level. The vacancy rate for housing was approximately 16 percent.

The community resources within Waylyn include the Garrett Academy of Technology (grades 9-12) and three churches.

Whipper Barony

Developed to meet the severe local housing shortage in the years just before World War II, Whipper Barony was a private, 79-acre community billed as "Charleston's most ideal suburb." Residents have a strong community identity, and much of their activity is promoted through an active community center. The Exchange Club is also headquartered in Whipper Barony, and many residents participate in club functions.

According to the 2000 census data, Whipper Barony was approximately two-thirds minority. The median household income of $10,025 was less than half of the median household income for the North Charleston study area. Over 50 percent of the residents of this neighborhood lived below the poverty level, as compared to 32 percent for the North Charleston study area or 23 percent for North Charleston as a whole.

Windsor

The Windsor neighborhood is situated immediately north of Union Heights and is similar in character. The Howard Heights neighborhood is located across Spruill Avenue from the Windsor neighborhood.

The 2000 Census demographic data for the Windsor neighborhood was combined with a portion of the Chicora neighborhood data. Windsor was approximately 85 percent minority. The median household income for the block group covering the Windsor neighborhood was relatively high at $47,045, as compared to $21,134 for the North Charleston study area. Per capita income for the block group was $22,975, the highest for any block group in the study area. Only eight percent of the residents were living below poverty, compared with 34 percent for the study area. The housing vacancy rate in 2000 was less than 5 percent.

4.4.1.3. Clouter Island and Daniel Island Community Study Area

As shown in Figure 4.4-1, the Clouter Island and Daniel Island Alternatives are located within the same Census Block Group (04022). There are currently no residents living on Clouter Island as the area is currently being used as a CDF.

Population Trends

As shown in Table 4.4-11, up until the 1990s and before the I-526 bridge over the Cooper River was built, the Clouter Island and Daniel Island study area was sparsely populated. According to the 2000 U.S. Census, the population of the study area rose to 2,134 from the 1990 estimate of 1,122, which is a 70.3 percent population growth. In contrast, Berkeley County has experienced only an approximate 10 percent growth since 1990.

It is important to note for this evaluation that Thomas Island is still relatively rural. At this time, the observed population growth has taken place primarily on Daniel Island.

Table 4.4-11. Clouter Island and Daniel Island Community Study Area: Population Growth, 1990 and 2000.

Place	1990	2000	Percent Change 1990-2000
Clouter Island and Daniel Island Community Study Area	1,253	2,134	70.3%
Berkeley County	128,776	142,651	10.8%
Tri-County Region	506,877	549,033	63.3%

Source: U.S. Census Bureau, Census 2000.

Racial Composition

The racial composition of the Clouter Island and Daniel Island study area is described in Table 4.4-12. In 2000, the percent minority in the study area dropped to 42 percent from the 1990 estimate of approximately 70 percent. This decrease in the percent minority is not an indication of a loss of minority residents from the area, but likely a result of a migration of non-minority persons into the area, most likely to Daniel Island. Indeed, the number of white residents increased from 376 individuals (30 percent) in 1990 to 1,242 individuals (58 percent) in 2000.

Data is not available to describe the racial composition of communities on Thomas Island. However, based on historic data and field observations, the communities of Thomas Island are mostly composed of minority persons.

Table 4.4-12. Clouter Island and Daniel Island Community Study Area: Racial Composition, 2000.

Race	Clouter Island and Daniel Island Community Study Area		Berkeley County		Tri-County Region	
	No.	%	No.	%	No.	%
White	1,242	58.2%	96,997	68.0%	357,423	65.1%
Black	874	41.0%	37,985	26.6%	169,079	30.8%
American Indian	1	0.0%	748	0.5%	2,264	0.4%
Asian, Pacific	11	0.5%	2,785	2.0%	7,572	1.4%
Hispanic (any race)	15	0.7%	3,935	2.8%	13,091	2.4%
Other	6	0.3%	1,718	1.2%	5,359	1.0%
Total Minority	899	42.1%	47,171	33.2%	196,921	35.9%

Source: U.S. Census Bureau, Census 2000.

Age Distribution

The age distribution for the Clouter Island and Daniel Island study area is shown in Table 4.4-13. In 2000, the study area had a substantially lower percentage of its population aged 65 years or more (5.2 percent) when compared to Berkeley County (7.9 percent) or the Tri-County region (10.4 percent). The Clouter Island and Daniel Island study area also has a larger percent of its population under 18 years of age (30.8 percent). These two figures, in part, point to the trend of young families migrating into this area.

Table 4.4-13. Clouter Island and Daniel Island Community Study Area: Age Characteristics, 2000.

Age Group	Clouter Island and Daniel Island Community Study Area		Berkeley County		Tri-County Region	
	No.	%	No.	%	No.	%
Under 18	657	30.8%	39,942	28.0%	141,268	25.7%
18-64	1,367	64.1%	91,439	64.1%	348,636	63.5%
65 or above	110	5.2%	11,261	7.9%	56,910	10.4%
Median Age	32	N/A	32	N/A	33.7	N/A

Source: U.S. Census Bureau, Census 2000.

Income Distribution

The 2000 income distribution for the Clouter Island and Daniel Island study area is presented in Table 4.4-14. The income distribution of the study area reflects the up-scale, mixed-use communities developing in the study area, particularly Daniel Island. For instance, nearly 25 percent of the population in the study area has a household income of $100,000 or more; this is in contrast to 6.3 percent for Berkeley County and 9.5 percent for the whole Tri-County region. Also, the median household income for the Clouter Island and Daniel Island study area is $64,117. The median incomes for Berkeley County and the Tri-County region are much less, at $39,908 and $40,345, respectively. In 1990, the median income for the study area was only $22,029, which was less than that for the Tri-County region ($28,915). The nearly 200 percent increase in median household income within 10 years is likely due to the new community development taking place on Daniel Island.

Table 4.4-14. Clouter Island and Daniel Island Community Study Area: Income Distribution, 2000.

Household Income	Clouter Island and Daniel Island Community Study Area		Berkeley County		Tri-County Region	
	No.	%	No.	%	No.	%
Under $15,000	53	7.5%	7,635	15.3%	35,654	17.2%
$15,000 - $24,999	56	7.9%	6,624	13.3%	28,052	13.5%
$25,000 - $34,999	64	9.0%	7,218	14.4%	28,530	13.7%
$35,000 - $49,999	100	14.1%	10,029	20.1%	35,738	17.2%
$50,000 - $74,999	157	22.1%	10,519	21.1%	40,701	19.6%
$75,000 - $99,999	113	15.9%	4,710	9.4%	19,404	9.3%
Over $100,000	168	23.6%	3,133	6.3%	19,737	9.5%
Population in Poverty	202	9.5%	15,662	11.0%	67,270	12.3%
Median Household Income	$64,117		$39,908		$40,345	
Average Household Income	N/A		$46,791		$50,886	

Source: U.S. Census Bureau, Census 2000.

Educational Attainment

The educational attainment characteristics for the Clouter Island and Daniel Island study area are shown in Table 4.4-15. The educational attainment levels for this area are higher than the attainment levels for Berkeley County or the Tri-County region. For instance, approximately 34 percent of the population in the study area has earned a college degree (Bachelor's degree or higher), which is greater than the 14.4 percent in Berkeley County and 22.2 percent in the Tri-County region. The study area also has the lowest percent of people without a high school degree (12.5 percent) in comparison to Berkeley County (19.7 percent) and the Tri-County region (18.7 percent).

Table 4.4-15. Clouter Island and Daniel Island Community Study Area: Education Attainment for Persons Age 25 and Older, 2000.

Status	Clouter Island and Daniel Island Community Study Area		Berkeley County		Tri-County Region	
	No.	%	No.	%	No.	%
Persons Aged 25 +	1,260	59.0%	86,020	60.3%	346,245	63.1%
Not a High School Graduate	157	12.5%	17,037	19.7%	64,818	18.7%
High School Graduate Only	308	24.4%	29,521	34.3%	93,479	29.0%
Some College	365	29.0%	27,065	31.5%	101,635	30.2%
College Graduate	430	34.1%	12,392	14.4%	86,778	22.2%

Source: U.S. Census Bureau, Census 2000.

Neighborhood Descriptions

The area of Thomas Island south of I-526 is primarily residential and mostly borders both sides of Clements Ferry Road. Access to Daniel Island is primarily from I-526; however, the community can also be accessed via Clements Ferry Road. There are two interchanges with I-526 on Daniel Island and Thomas Island, one at Clements Ferry Road (Exit 23) and one at the Daniel Island Parkway (Exit 25).

Since 1990, Daniel Island, particularly on the east side, has been developed as a planned residential and commercial community. The Master Plan for the Daniel Island community envisions 4,000 to 7,000 residences, 700 acres of parks and green spaces, a golf course, a town commercial center, and an office complex, which includes the Healthsource and Blackbaud Corporate Headquarters. Additional residential development is occurring on Daniel Island north of I-526. Over the past several years, there has been substantial industrial growth along Clements Ferry Road north of I-526, followed by increasing residential growth.

As described previously, Clouter Island is developed as a CDF. There are currently no residents on Clouter Island. Consequently, an evaluation of the existing social characteristics of the study area is not needed.

4.4.2. Environmental Justice

An environmental justice analysis was conducted to assess whether the populations currently residing near the Proposed Project and project alternative sites (i.e., Clouter Island and Daniel Island) can be defined as minority and/or low-income populations. The following subsections

describe the regulatory requirements for this analysis, the methodology for identifying environmental justice populations, and the determination of whether the populations meet the environmental justice criteria.

4.4.2.1. Regulatory Requirements

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (included as Appendix J), provides that "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 memorandum to heads of departments and agencies that accompanied Executive Order 12898, the President specifically recognized the importance of procedures under NEPA for identifying and addressing environmental justice concerns. The memorandum states "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of federal actions, including effects on minority communities and low-income communities, when such analysis is required by [NEPA]." The memorandum particularly emphasizes the importance of NEPA's public participation process, directing that "each Federal agency shall provide opportunities for community input in the NEPA process." Agencies are further directed to "identify potential effects and mitigation measures in consultation with affected communities, and improve the accessibility of meetings, crucial documents, and notices."

The Department of Transportation Order 5610.2 and Federal Highway Administration Order 6640.23 define "adverse effects", in part, as "the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of benefits of FHWA programs, policies, or activities."

These same Orders define "disproportionately high and adverse effects on minority and low-income populations" as an adverse impact that:

- is predominantly borne by a minority population and/or a low-income population; or
- will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non low-income population.

Methodology for the Identification of Environmental Justice Populations

The requirements of Executive Order 12898 do not define the terms "minority" or "low-income". However, guidance provided by the Council on Environmental Quality (CEQ) describes these terms in the context of an environmental justice analysis.

- **Minority Individual** – A minority individual is classified by the CEQ as belonging to one of the following groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black (not of Hispanic Origin), and Hispanic.

- **Minority Populations** – According to the CEQ guidelines, 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 are identified where individuals have incomes below the U.S. Department of Health and Human Services poverty guidelines. A low-income population is either a group of low-income individuals living in proximity to one another or a set of individuals who share common conditions of environmental exposure or effect.

Two study areas were defined for the environmental justice analysis (Figure 4.4-4). Census block group data were collected for eight block groups within the North Charleston study area and one larger block group containing Clouter, Daniel, and Thomas Islands (since the alternative sites located in Clouter and Daniel Islands are part of the same Census block group, they are considered together).

Impacts to block groups meeting the environmental justice threshold have the potential to be disproportionately borne by minority or low-income populations. The environmental justice analysis performed for this project focuses on these areas. Further impact analysis may not be needed on those areas not meeting the environmental justice threshold.

This analysis evaluates the racial and income characteristics of persons within the community study areas. The evaluation consists of the following two steps to determine whether each study area's populations meet the environmental justice thresholds for further analysis:

Step 1: Calculation of Minority or Low-income Populations – The following 2000 Census information was collected for each block group in the study area: (1) the total population, (2) the total minority population, and (3) the total low-income population. From these raw numbers the percentage of persons who are labeled minority and persons below the poverty level were determined.

Step 2: Calculation to Determine if Environmental Justice Threshold is Met – Once the baseline minority and low-income populations were determined for comparison purposes, specific block groups that meet the environmental justice threshold were identified. The environmental justice threshold is met for block groups where the minority or low-income population equals or exceeds 50 percent of the population in that block group.

A determination of whether populations within the two environmental justice study areas meet the environmental justice threshold is provided in the following paragraphs.

North Charleston Study Area

The results of the environmental justice analysis are presented in Table 4.4-16. The data illustrates that there is a large population of minority and low-income residents living in the North Charleston study area. In 2000, approximately 83 percent of the North Charleston study area was of minority population. This is a noticeably larger minority percentage than Charleston

County (39 percent) or South Carolina (34 percent). Also, the percentage of persons living below the poverty level in the North Charleston study area was 45 percent in 2000, which is more than 10 percent higher than the poverty statistics for Charleston County (16 percent) and South Carolina (14 percent).

As described previously, the North Charleston study area is comprised of seven Census block groups. All seven block groups met either the minority or poverty threshold for environmental justice status. Seven out of the eight block groups met the minority threshold and four out of eight block groups met the poverty threshold. Therefore, it has been determined that the study area does contain an environmental justice population.

Clouter/Daniel/Thomas Islands Study Area

As shown in Table 4.4-16, the Clouter/Daniel/Thomas Island area had a minority population of 42 percent in 2000, which is higher than percentages in Charleston County (39 percent), Berkeley County (33 percent) and the state of South Carolina (34 percent). Daniel Island has been experiencing substantial residential and commercial growth in recent years. Based on field observations, it appeared that the majority of the residential growth between 1990 and 2000 on Daniel Island was due to an influx of higher income and non-minority households. According to the growth reported by the City of Charleston over the past few years, it is likely that the minority population percentage within the study area is now closer to 20 percent. However, the racial makeup of the residents living along Clements Ferry Road (the western portion of Daniel Island, south of I-526 Exit 23) is still likely to be predominantly minority.

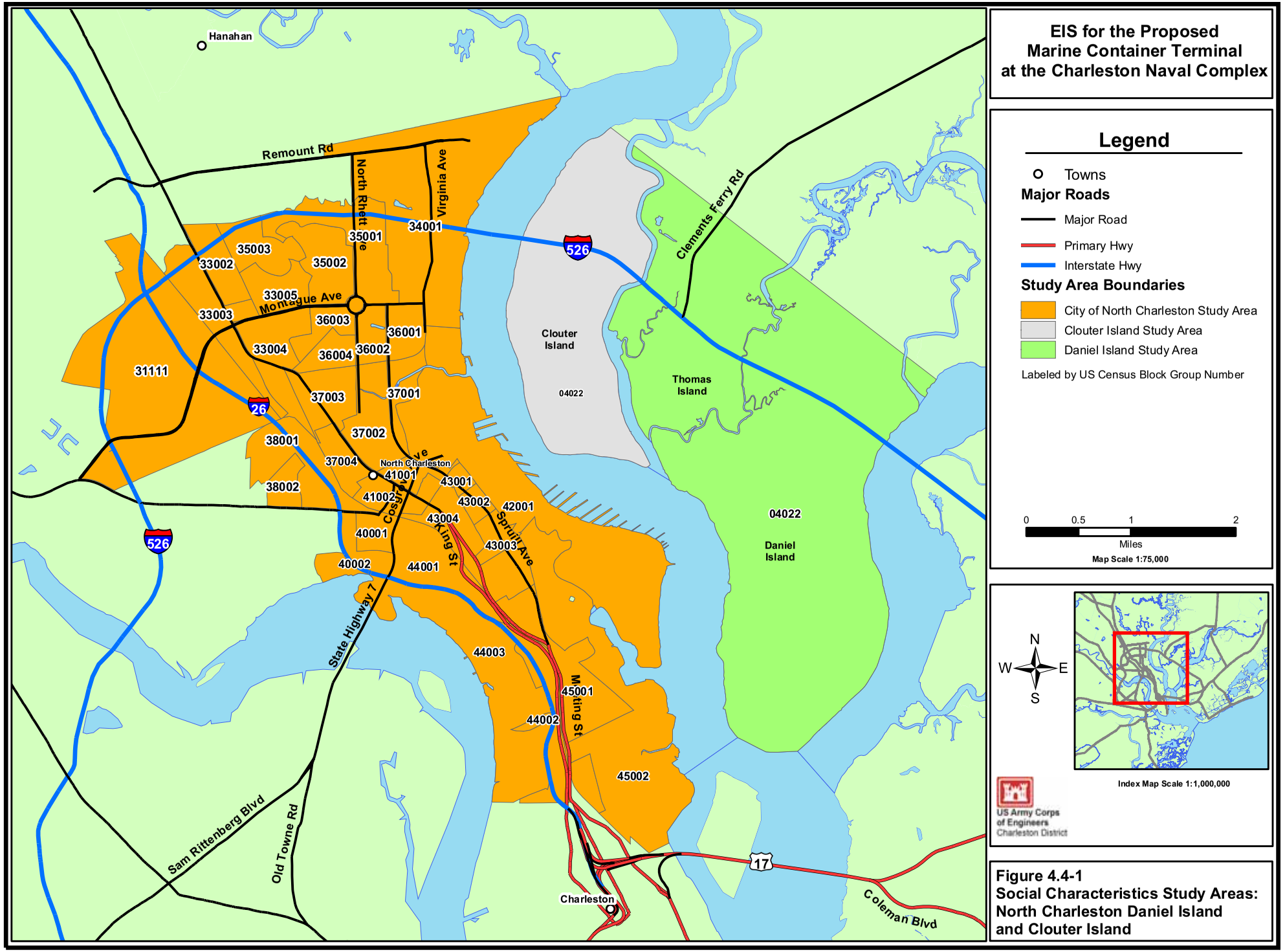
The Clouter/Daniel/Thomas Island study area has experienced a significant increase in median household income and a notable decrease in poverty levels between 1990 and 2000 (Table 4.4-16). The median household income of the study area increased substantially from $22,029 in 1990 to $64,029 in 2000, which outpaces income increases for Charleston County, Berkeley County, and South Carolina during the same time period. The percentage of people living below the poverty level in the study area decreased from 21.5 percent in 1990 to 9.5 percent in 2000.

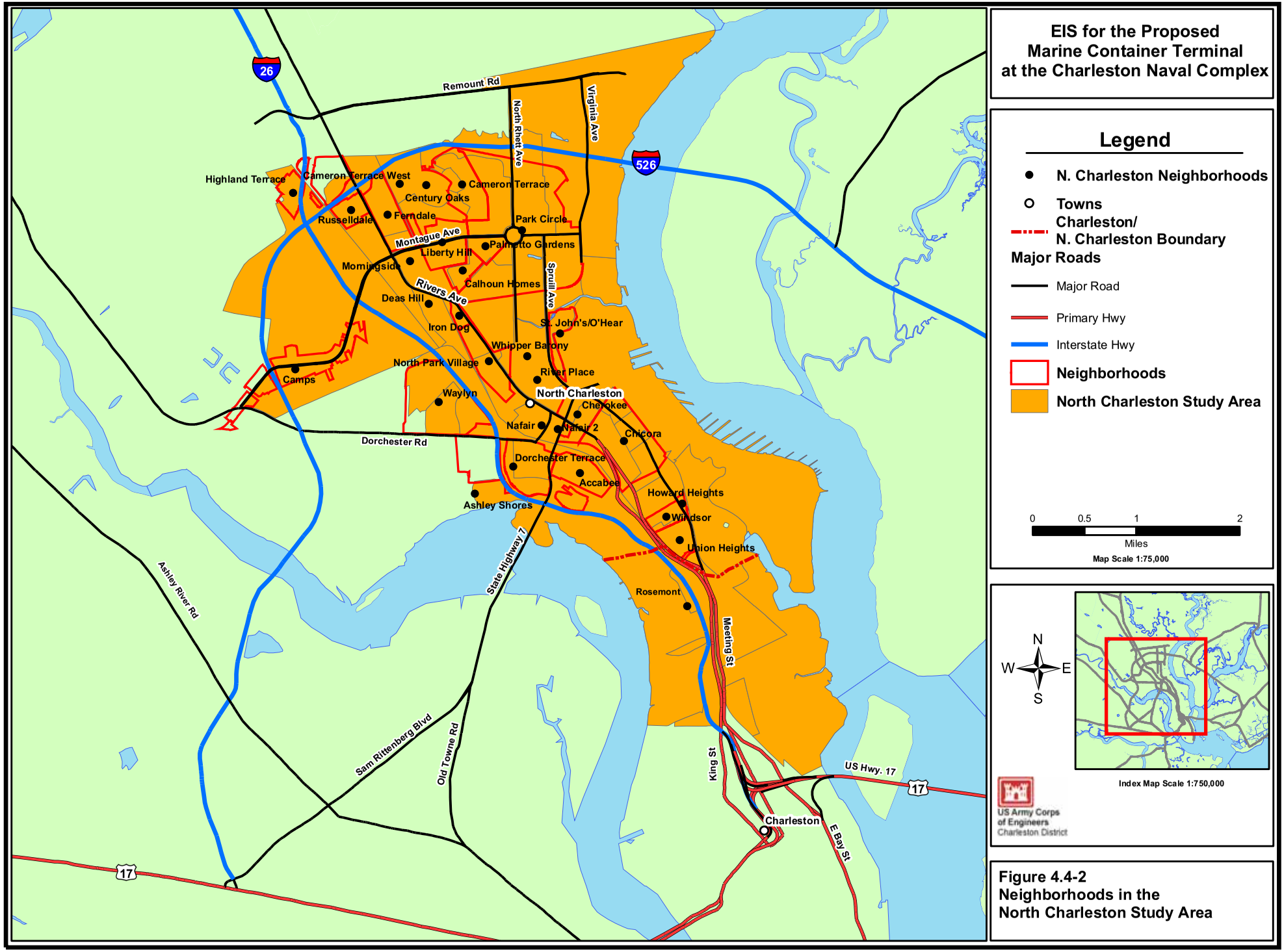
The results of the environmental justice analysis presented in Table 4.4-16 show that Census block group 2, tract 204.02 does not meet the environmental justice threshold for minority or low-income residents exceeding 50 percent of the total block group population. However, a review of available records and information for residential areas along the access roadway corridor considered for the Daniel and Clouter Island Alternatives (i.e., Clements Ferry Road on Thomas Island) indicate that the immediate area is primarily made up of minority populations. Therefore, impacts to Clements Ferry Road residents would likely be disproportionately borne by minority or low-income populations. However, no further household surveys were performed for the area along Clements Ferry Road.

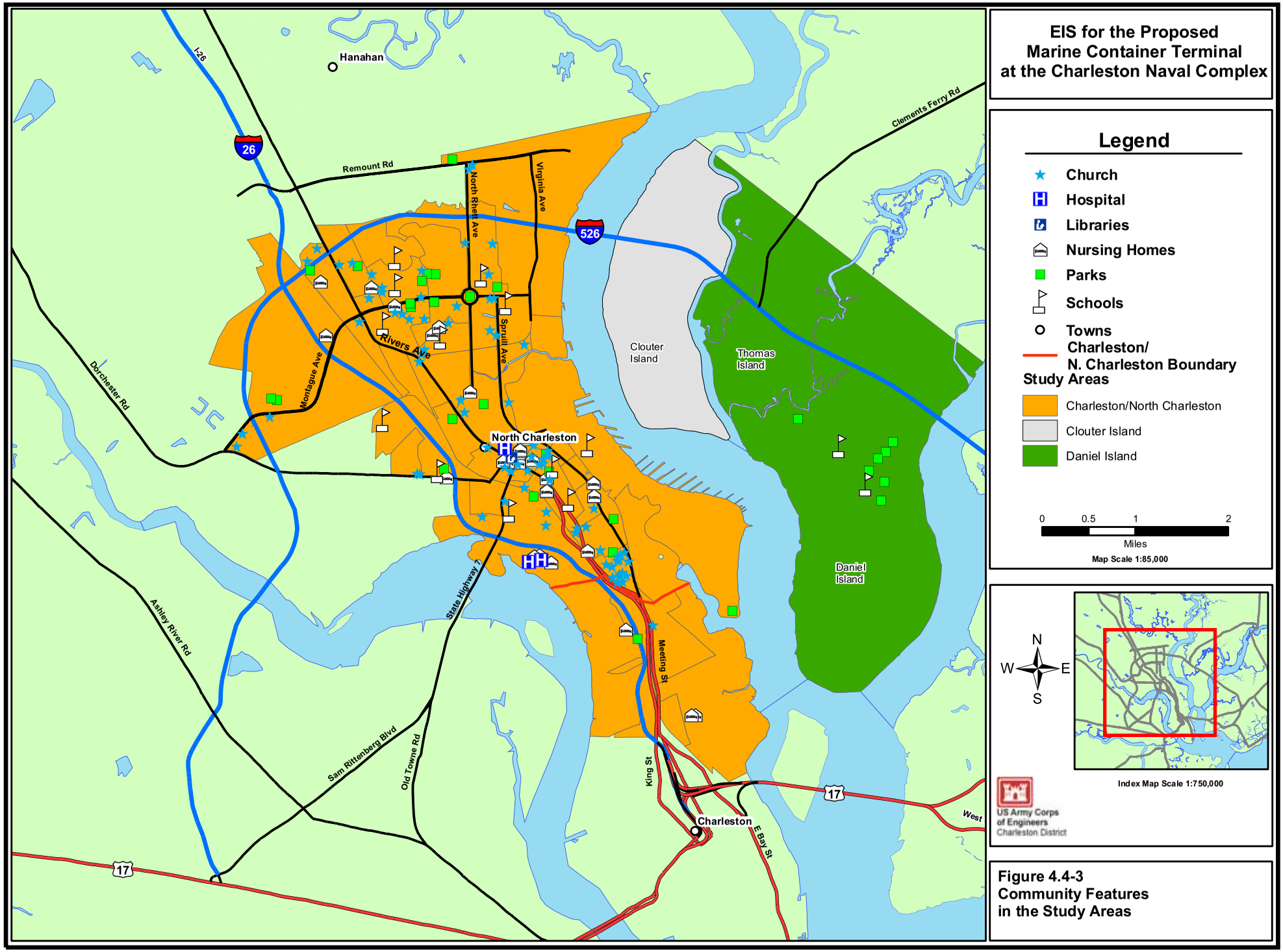
Table 4.4-16. Environmental Justice Analysis[1].

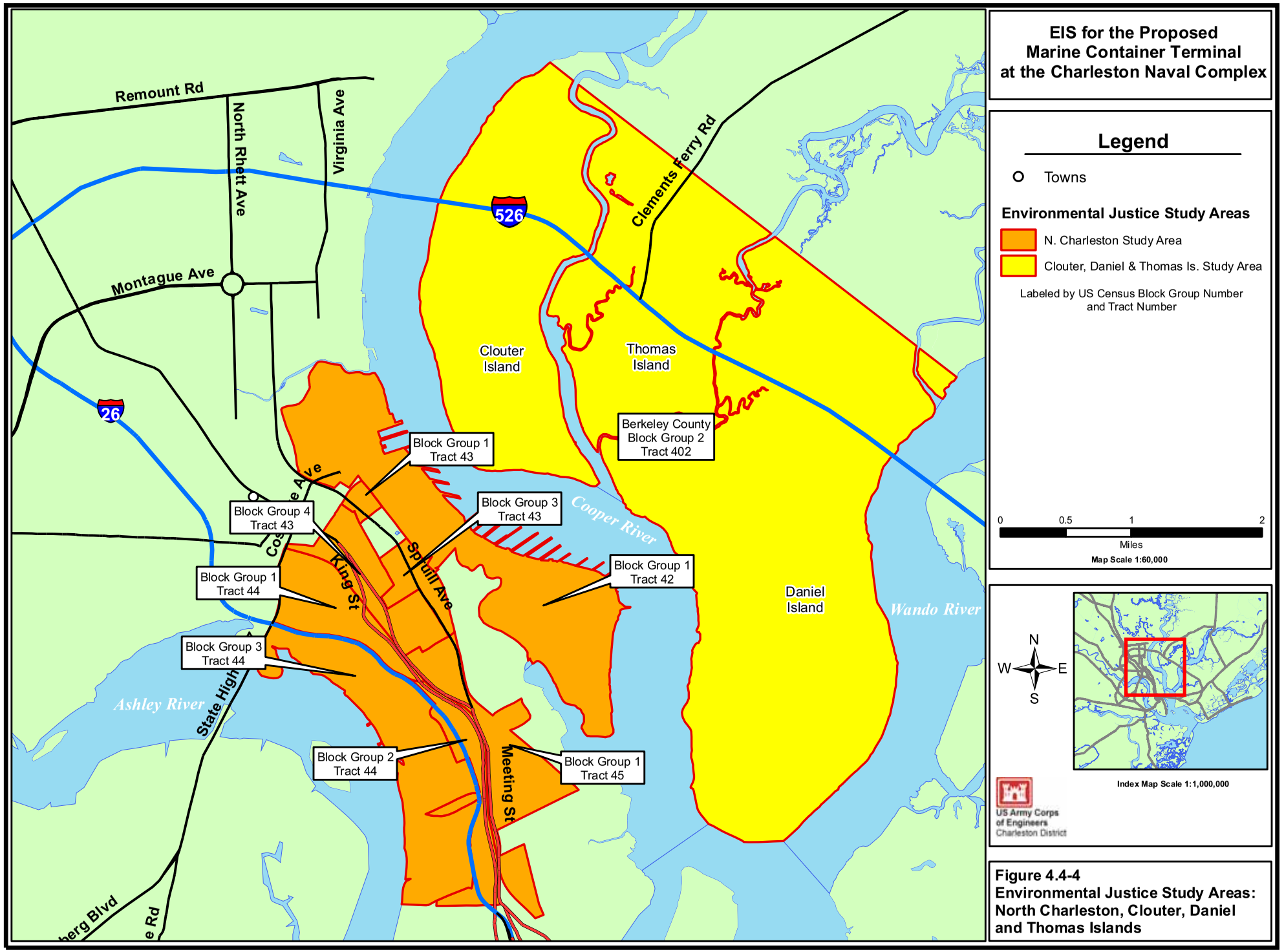
Study Area	Block Group	Total Population	Total Minority Population	Percentage Minority Population	Threshold for EJ status for Minority Population met?	Persons Below Poverty Level	Percentage of Persons Below Poverty Level[2]	Threshold for EJ status for poverty met?
North Charleston	Tract 42, Block Group 1	808	309	38%	No	154	63%	Yes
	Tract 43, Block Group 1	489	459	94%	Yes	252	52%	Yes
	Tract 43, Block Group 3	908	837	92%	Yes	370	41%	No
	Tract 43, Block Group 4	1,085	998	92%	Yes	447	41%	No
	Track 44, Block Group 1	937	857	91%	Yes	371	40%	No
	Track 44, Block Group 2	634	557	88%	Yes	329	52%	Yes
	Track 44, Block Group 3	486	383	79%	Yes	228	81%	Yes
	Track 45, Block Group 1	832	816	98%	Yes	228	29%	No
	TOTAL AREA	*5,094*	*4,218*	*83%*	*Yes*	*1,932*	*45%*	*Yes*
Clouter/Daniel/Thomas Islands	Track 204.02, Block Group 2	2,134	899	42%	No	202	9.5%	No
Berkeley County		142,651	47,337	33%		16,066	12%	
Charleston County		309,969	121,427	39%		49,330	16%	
South Carolina		4,012,012	1,359,721	34%		547,869	14%	

[1] *2000 Census data used.*
[2] *In some cases, the population for which poverty status was determined was different than the total population of the block group.*


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Major Roads
Major Road
Primary Hwy
Interstate Hwy
Study Area Boundaries
City of North Charleston Study Area
Clouter Island Study Area
Daniel Island Study Area
Labeled by US Census Block Group Number
0 0.5 1 2
Miles
Map Scale 1:75,000
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps of Engineers
Charleston District
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Clements Ferry Rd
Montague Ave
Clouter Island
04022
Thomas Island
Daniel Island
North Charleston
Cosgrove Ave
King St
Spruill Ave
Meeting St
State Highway 7
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
526
26
17
31111
33002
33003
33004
33005
35001
35002
35003
34001
36001
36002
36003
36004
37001
37002
37003
37004
38001
38002
40001
40002
41001
41002
43001
43002
43003
43004
42001
44001
44002
44003
45001
45002
Figure 4.4-1
Social Characteristics Study Areas:
North Charleston Daniel Island
and Clouter Island


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
N. Charleston Neighborhoods
Towns
Charleston/
N. Charleston Boundary
Major Roads
Major Road
Primary Hwy
Interstate Hwy
Neighborhoods
North Charleston Study Area
0
0.5
1
2
Miles
Map Scale 1:75,000
Index Map Scale 1:750,000
US Army Corps
of Engineers
Charleston District
Figure 4.4-2
Neighborhoods in the
North Charleston Study Area
Remount Rd
North Rhett Ave
Virginia Ave
Highland Terrace
Cameron Terrace West
Cameron Terrace
Century Oaks
Russelldale
Ferndale
Park Circle
Montague Ave
Liberty Hill
Palmetto Gardens
Morningside
Calhoun Homes
Sprull Ave
Rivers Ave
Deas Hill
Iron Dog
St. John's/O'Hear
Whipper Barony
North Park Village
River Place
Camps
Waylyn
North Charleston
Cherokee
Nafair
Nafair 2
Chicora
Dorchester Rd
Dorchester Terrace
Accabee
Howard Heights
Ashley Shores
Windsor
Union Heights
Rosemont
Ashley River Rd
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
King St
US Hwy. 17
Charleston
E Bay St
N
W
E
S


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Church
Hospital
Libraries
Nursing Homes
Parks
Schools
Towns
Charleston/
N. Charleston Boundary
Study Areas
Charleston/North Charleston
Clouter Island
Daniel Island
0
0.5
1
2
Miles
Map Scale 1:85,000
N
W
E
S
Index Map Scale 1:750,000
US Army Corps
of Engineers
Charleston District
Figure 4.4-3
Community Features
in the Study Areas
Hanahan
I-26
26
Remount Rd
North Rhett Ave
Virginia Ave
526
Clements Ferry Rd
Rivers Ave
Spruill Ave
Montague Ave
Dorchester Rd
Clouter
Island
Thomas
Island
North Charleston
Daniel
Island
State Highway 7
Ashley River Rd
Sam Rittenberg Blvd
Old Towne Rd
Meeting St
King St
17
Charleston
E Bay St
West


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Environmental Justice Study Areas
N. Charleston Study Area
Clouter, Daniel & Thomas Is. Study Area
Labeled by US Census Block Group Number
and Tract Number
0
0.5
1
2
Miles
Map Scale 1:60,000
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
526
26
Clements Ferry Rd
Clouter
Island
Thomas
Island
Daniel
Island
Berkeley County
Block Group 2
Tract 402
Block Group 1
Tract 43
Block Group 3
Tract 43
Block Group 4
Tract 43
Block Group 1
Tract 44
Block Group 3
Tract 44
Block Group 1
Tract 42
Block Group 2
Tract 44
Block Group 1
Tract 45
King St
Spruill Ave
Meeting St
State High
Cooper River
Wando River
Ashley River
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.4-4
Environmental Justice Study Areas:
North Charleston, Clouter, Daniel
and Thomas Islands

4.5. COMMUNITY INFRASTRUCTURE AND MUNICIPAL SERVICES

This section describes the existing conditions of the community infrastructure and municipal services within the study area. Infrastructure and services discussed in this section include water supply and wastewater treatment; solid waste generation and disposal facilities; utilities; fire protection, law enforcement, and emergency medical services; and schools. The study area for this section is shown in Figure 4.5-1.

4.5.1. Water Supply and Wastewater Treatment

Potable water is provided by several entities within the Tri-County region. The Charleston Water System (CWS), formerly known as the Charleston Commissioners of Public Works, provides drinking water to over 400,000 people within parts of Charleston, Berkeley, and Dorchester Counties. The Charleston Water System obtains its raw water supply from the Edisto River and the Bushy Park Reservoir. Raw water is treated at the Hanahan Water Treatment Plant to eliminate harmful bacteria and unpleasant coloration, taste, and odor. The Hanahan Water Treatment Plant currently processes an average of 50 million gallons per day (MGD); the plant's capacity is 118 MGD. The Charleston Water System has access to over one billion gallons per day of raw supply water.

The Lake Moultrie Water Agency provides water to over 100,000 people. It is composed of the Berkeley County Water and Sanitation Authority, the City of Goose Creek, the Moncks Corner Public Works Commission, and the Summerville Commissioners of Public Works. Santee Cooper owns the treatment plant, pump stations, administrative offices, 26 miles of pipeline, and a 1,000,000-gallon elevated water storage tank. The water treatment plant currently has a capacity of 36 MGD and can be expanded to 108 MGD.

The Charleston Water System also provides wastewater collection and treatment services to parts of Charleston and Berkeley Counties, including Daniel Island. The Charleston Water System currently operates two wastewater treatment plants and processes approximately 37 MGD. Table 4.5-1 summarizes information regarding the CWS wastewater treatment plants.

Table 4.5-1. Charleston Water System Wastewater Treatment Plant Data.

Facility	NPDES Number	Receiving Stream	Permitted Volume
Plum Island	0021229	Charleston Harbor	36.0 MGD
Daniel Island	0047074	Unnamed Tributary to Cooper River	1.0 MGD

Charleston Water System, 2006

The North Charleston Sewer District operates one wastewater treatment facility as summarized in Table 4.5-2.

Table 4.5-2. North Charleston Sewer District Wastewater Treatment Plant Data.

Facility	NPDES Number	Receiving Stream	Permitted Volume
Felix C. Davis Plant	0024783	Cooper River	27.0 MGD

Charleston Water System, 2006

The year 2000 service area population for the North Charleston Sewer District was 108,513 and service was provided to 25,000 households and 39 industrial facilities. The service area encompasses 59.3 square miles and the District owns almost 500 miles of sewer line, 47 pump

stations, and the Felix C. Davis Wastewater Treatment Plant. The average daily flow through the treatment plant is 17.0 MGD.

The Charleston Water System provides potable water service to the Charleston Metropolitan area including the CNC. The North Charleston Sewer District provides wastewater treatment service to customers within the North Charleston Sewer District limits and provides service under contracts with Charleston Air Force Base, CNC, Naval Weapons Station Annex and Naval Radar Station.

4.5.2. Fire, Law Enforcement, and Emergency Medical Services

4.5.2.1. Fire Protection

Berkeley County

There are 45 fire stations in Berkeley County, with an average response time from these stations of 3 to 4 minutes. Mutual fire agreements among these stations are in place when assistance is needed. Cainhoy Rural Fire Department has four pumper trucks and three tanker trucks. Goose Creek Rural Fire Department has a hazardous materials team.

There are two fire stations in the City of Hanahan, with an average response time from these stations of 4 to 6 minutes. The City of Hanahan does not have a hazardous materials team. As a standard, current stations are located within a 2.5-mile radius of residential areas.

Charleston County

There are 59 fire stations in Charleston County. The average response time from these stations is approximately 3 minutes.

Dorchester County

There are 20 fire stations in Dorchester County, with an average response time from these stations of 6 to 10 minutes in suburban areas and 10 to 20 minutes in rural areas.

City of Charleston

There are 18 fire stations in the City of Charleston. Average response time from these stations is 2 minutes. Mutual fire agreements are in place when assistance is needed. The City of Charleston's Fire Department has 16 engine/pumper trucks (4 reserve), 3 ladder trucks, 1 rescue truck, 1 confined space truck and 1 hazardous materials truck with a 25-member team. The location of the fire stations depends on the location of residents. Fire stations for the City of Charleston are located within a 2.5-mile radius of a residence. A new public safety building opened on Daniel Island in November 2004. This facility houses a City of Charleston Fire Department ladder and engine company, a Berkeley County Emergency Medical Services (EMS) ambulance, and a City of Charleston police substation.

The Town of Mount Pleasant has 5 fire stations. The average response time from these stations is 3 minutes. Three engines and one ladder truck respond to each call. Mount Pleasant has a hazardous materials trailer that can be attached to any engine for mobilization. Standards for a fire station location are within 2.5 miles of a residence.

City of North Charleston

There are 11 fire stations in the City of North Charleston. The City of North Charleston Fire Department provides fire protection onboard CNC. The South Battalion covers the entire southern part of the City of North Charleston including the CNC and surrounding areas. Station No. 2 is located onboard CNC at 1791 Hobson Avenue. Mutual agreements are in place with the City of North Charleston and surrounding areas. The North Charleston Terminal is served by Stations No. 1 and No. 3. The department has full hazardous materials capabilities and responds as a department, not as an independent hazardous materials team. The North Charleston Fire Department equipment includes 15 engines, 3 ladder trucks, 1 hazardous materials unit, and 1 rescue unit and trailer.

Shipboard Fire-fighting Capabilities

There are two main tugboat companies that offer service to marine cargo ships; McAllister Towing of Charleston and Moran Towing Corporation. McAllister has six tugboats with firefighting capabilities and pumping rates of 300 to 2,000 gallons per minute (gpm). Moran Towing Corporation's four tugboats each have firefighting capabilities and their pumping rates range from 1,500 to 2,000 gpm.

If tugboats are asked to assist with a fire onboard a vessel, the time the boats require to warm-up becomes important to the response time. The tugboats require at least one-hour of warm-up.

4.5.2.2. Law Enforcement

Berkeley County

The Berkeley County Sheriff's Department's average response time to an emergency call is approximately 19 minutes in most of the county and approximately 35 minutes to Daniel Island.

The Berkeley County Sheriff's Office in Goose Creek serves Daniel Island. On any given 12-hour patrol shift, there are no more than 10 sheriff deputies patrolling the county. Four deputies are assigned to patrol the northern portion of the county and six deputies are assigned to patrol the southern part of the county - primarily in Goose Creek and Summerville, which are the highest populated areas of the county. All deputies report to the Sheriff's office headquarters located in Moncks Corner. The Sheriff's office adds additional law enforcement personnel based on population, response times, coverage area and by approval of Berkeley County Council. In addition to the Sheriff's Department, which serves the entire county, there are city police departments in the county.

Charleston County

The Charleston County Sheriff's Department serves only unincorporated areas, but has countywide jurisdiction. In addition, there are three city police departments operating in the project study area: Charleston, North Charleston, and Mount Pleasant.

Dorchester County

Dorchester County Law Enforcement has about 135 sworn officers and 20 civilian employees. This department serves the entire county.

City of Charleston

The City of Charleston Police Department currently employs 369 sworn officers and 137 civilian employees. It also has 27 police officers on reserve. The City of Charleston Police Department is responsible for the city limits, which includes Daniel Island and northward through the Cainhoy Peninsula. The City of Charleston Police Department Patrol Team Ten, established in January 2002, serves Daniel Island as well as other nearby areas.

City of North Charleston

The North Charleston Police Department has about 270 officers and 95 civilian employees. North Charleston has about 4.0 law enforcement personnel for every 1,000 citizens. The City of North Charleston Police Department provides public safety services to the CNC through its South Precinct located at Cosgrove and Rivers Avenues.

Town of Mt. Pleasant

The Town of Mount Pleasant Police Department has approximately 78 officers and 37 civilian employees.

City of Hanahan

The City of Hanahan Police Department has about 21 officers and 7 civilian employees. Hanahan has a low crime rate; however, growth from the surrounding urban areas may require the police department to add officers. Generally, there are three patrol officers on the streets of Hanahan on any given patrol shift.

SCSPA

The SCSPA Police Department has approximately 52 law enforcement officers. Each terminal averages 13 officers and at least one officer at the gate and one patrol officer on the terminal facility 24 hours a day. The Chief of Port Police maintains a close working relationship with all surrounding law enforcement departments. Primary responsibilities of the Port Police are to protect lives and property, provide police services during all emergencies and accidents, monitor and assist traffic flow, investigate accidents and thefts, enforce all state laws, perform gate searches, provide fire watch, serve warrants, and provide stow-away/gangway watch on demand. The Chief, captain, sergeants, corporals, and patrolmen are all certified state constables and are equivalent to State Highway Patrol Troopers. Therefore, their jurisdiction is statewide, but for practical purposes, it is limited to SCSPA facilities. In addition, the Chief, captain, and senior sergeants are U.S. Marshals.

4.5.2.3. Emergency Medical Services

Berkeley County

There are 15 rescue squads in Berkeley County stationed in various locations covering Berkeley County. Berkeley County Emergency Medical Services (EMS) maintains nine ambulances, three quick response vehicles (one with heavy rescue capabilities), two spare Medic units, and one mass casualty unit. Medic No. 7 Cainhoy is the primary responder to Daniel Island, while Medic No. 11 Hanahan City provides secondary response. Berkeley County EMS will, as needed, request support from the Meducare Helicopter at the Medical University of South Carolina in Charleston. Meducare lands on-scene or at one of 70 designated landing zones within the county. There are designated landing zones at Amoco Chemical, Nucor, and at the EMS station on Cainhoy Road (Berkeley County Highway 98). East Cooper Hospital, the

Medical University of South Carolina, and Roper Hospital are the primary recipients of people involved in medical emergencies. These hospitals combined have over 1,100 beds for medical service. Eight secondary hospitals would be involved in overflow from a large incident. Standards for additional hospitals are based upon population growth. Berkeley County Fire Departments are also part of the EMS system. Both fire and EMS rescue squads are moving toward a dual roll of emergency medical services.

Charleston County

There are approximately 16 units of emergency squads in Charleston County. Average response time is typically 6 to 7 minutes. Four major hospitals concentrated in the medical district, Charleston Memorial, Roper, Veterans Administrative Medical Center, and the Medical University of South Carolina, receive the majority of patients.

Dorchester County

Dorchester County rescue squads are stationed in Oakbrook/Ladson, Summerville, Ridgeville, and St. George. Average response time is typically 10 minutes in suburban areas and 15 minutes in rural areas. Summerville Medical Center, Colleton Regional Medical Center, and Orangeburg Regional Medical Center are the primary recipients of people involved in medical emergencies in Dorchester County.

4.5.3. Schools

4.5.3.1. Public Primary and Secondary School Enrollment

Enrollment in Berkeley County public schools declined slightly from 26,766 during school year 1989-90 to 26,303 during school year 2002-03. This represents approximately a 1.7 percent decline in enrollment during the period of record.

Public school enrollment within the Charleston County School District (CCSD) declined by approximately 1 percent during the school year period from 1989-90 through 2002-03 (42,257 to 41,830). However, enrollment within CCSD District 4 (North Charleston) increased from 13,888 to 14,241 (approximately 2.5 percent) during the same period. The reported enrollment increase rate for CCSD District 4 may be somewhat inflated because of several magnet-type schools opened within the district during the mid to late 1990s (Academic Magnet High School, Horizon House Alternative School, and Charleston Discipline School).

Dorchester County public schools had the largest enrollment increase within the BCDCOG area during the period of record. During school year 1989-90, there were 13,911 students enrolled in Dorchester County public schools; by school year 2002-03, enrollment had increased to by almost 51 percent to 20,995.

Table 4.5-3 provides a comparison of public school enrollment for Berkeley, Charleston, and Dorchester Counties during the period 1989-90 through 2002-03.

Table 4.5-3 Historical Public School Enrollments for Charleston, Berkeley, and Dorchester Counties 1989-90 through 2002-03.

County	1989-90	1990-91	1991-02	1992-03	1993-04	1994-05	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03
Charleston	42,257	43,709	45,249	45,586	45,394	44,592	42,554	42,701	42,398	42,601	42,043	41,164	41,224	41,830
Berkeley	26,766	26,731	27,695	27,850	27,910	24,503	23,804	25,229	25,368	26,209	26,379	25,932	26,446	26,303
Dorchester	13,911	14,417	14,953	15,875	16,131	15,921	17,521	18,219	18,904	20.157	19,968	20,157	20,364	20,995

School enrollment data from BCDCOG.

There is one private high school (Bishop England High School) on Daniel Island. Children living on Daniel Island attending public school are currently bused to schools in the town of Hanahan, north of I-526 and east of Rivers Avenue. The Berkeley County School District is constructing a new elementary school on Daniel Island Drive that recently opened in August 2006. Middle and high school age children will likely continue to be bused to schools.

There are 11 public and two private schools within the area surrounding the CNC; five of which are elementary schools. Of the remaining schools, three are middle schools (including one that is sixth through tenth grade) and six are high schools (including magnet and technical schools). Schools within the project study areas are listed in Table 4.5-4 and shown in Figure 4.5-2.

Table 4.5-4. Primary and Secondary Schools within the Project Study Areas.

School	Location	Number of Students	Description of Location
Area Surrounding the CNC			
Edmund A. Burns Elementary School	3750 Dorchester Road (Charleston)	632	Happy Hill Neighborhood near I-26 Interchange
Mary Ford Elementary School	3130 Thomasina McPherson Blvd.	426	Accabee neighborhood near I-26 Interchange
Chicora Elementary School	1912 Success Street	375	Chicora neighborhood between Spruill and Rivers, and east of Reynolds
Ronald E. McNair Elementary School	3795 Spruill Avenue	281	River Place neighborhood north of McMillan (school to be closed in 2005/2006)
Malcolm C. Hursey Elementary School	4542 Simms Street	416	Park Circle neighborhood
North Charleston Elementary School	4921 Durant Avenue	425	Park Circle neighborhood (to be reopened in 2005/06). Now located on Spruill Avenue.
Brentwood Middle School	2685 Leeds Ave.	977	Brentwood neighborhood near rail yard
Morningside Middle School	1999 Singley Lane	832	Morningside neighborhood
Norman C. Toole Military Magnate Academy (6-10)	2959 Carner Avenue	416	Chicora neighborhood near intersection of Rivers Avenue and Carner Avenue
Charleston School of the Arts (6-12)	1600 Saranac Street	855	Century Oaks neighborhood
Garrett Academy of Technology (9-12)	2731 Gordon Street	800	Waylyn neighborhood near rail yard
Academic Magnet High School	1525 Avenue B South	515	Former Charleston Naval Complex site
North Charleston High School	1087 E. Montague Avenue	1,708	Park Circle neighborhood
St. John Catholic School (K-12)	3921 St. John Avenue	NA	St. John neighborhood north of Turnbull
Ferndale Baptist Church (K-12)	4870 Piedmont Avenue	NA	Ferndale neighborhood
Daniel Island and Clouter Island Area			
Bishop England High School	363 Seven Farms Drive	NA	Northeast of Daniel Island alternative terminal location
Daniel Island Elementary School	2365 Daniel Island Drive	NA	Scheduled to open in August 2006.
Daniel Island Academy	300 Seven Farms Drive	Unknown	Northeast of Daniel Island alternative terminal location

4.5.3.2. Private Primary and Secondary Schools

Information pertaining to private schools in the Tri-County region was obtained from Private School Review. There are six primary private schools and three secondary private schools in Berkeley County. The primary private school enrollment in Berkeley County is 883. Secondary private school enrollment in Berkeley County is 498. Charleston County has 38 primary private schools with an enrollment of 9,243 and 15 secondary private schools with an enrollment of 6,013. Dorchester County has eight primary schools with an enrollment of 937. There are six private secondary schools in Dorchester County; the enrollment was not reported.

4.5.3.3. Colleges, Universities, and Technical Schools

The Citadel is a public, coeducational college that offers degrees in a variety of programs. Established in 1842 and located along the Ashley River, the Citadel has an undergraduate student enrollment of approximately 1,800 to 2,000.

The Medical University of South Carolina (MUSC) was established in 1824 as a private school that has expanded to a medical center with six colleges for the education of a broad range of health professionals, biomedical students, and other health-related personnel. MUSC was one of the first medical schools in the U.S. to establish an infirmary specifically for teaching purposes. Student enrollments were approximately 2,300 students in the fall of 1994 (not including post doctoral residents in medicine, dental medicine, and pharmacy) with a full-time faculty of over 1,000.

The College of Charleston is a state-supported comprehensive institution providing education in the arts and sciences, education, and business. The College has two locations, one in Charleston and the other in North Charleston. The college has an enrollment of 8,000 to 9,000 undergraduate students and 2,000 graduate students.

Charleston Southern University is an independent liberal arts college offering undergraduate and graduate academic programs and is affiliated with the South Carolina Baptist Convention. Charleston Southern University has an enrollment of approximately 3,000 students.

Trident Technical College (TTC) is one of the largest technical colleges in South Carolina. TTC has an enrollment of 9,100 students at its three campuses. The main campus is located in North Charleston and the other two are located in downtown Charleston and Moncks Corner.

4.5.4. Solid Waste Generation and Disposal Facilities

4.5.4.1. SCDHEC Solid Waste Management Regulations

Over the past fifteen years, significant effort has been made at the state level to manage solid waste. The South Carolina Solid Waste Policy and Management Act of 1991 codified the regulatory framework for managing solid waste in South Carolina. The South Carolina Solid Waste Management Act is supported by regulations promulgated in South Carolina Regulations Chapter R.61-107. Chapter R.61-107 contains Sections R.61-107.1 through R.61-107.18, R.61-107.258, and R.61-107.279.

Table 4.5-5 summarizes the various SCDHEC solid waste regulations pertaining to solid waste.

Table 4.5-5. Summary of SCDHEC Solid Waste Management Regulations.

Act	Regulation	Effective Date	Summary
South Carolina Solid Waste Policy and Management Act	Section 44-96	1991	Article 1: Established Statewide solid waste policies. Article 2: Established solid waste management framework.
	R.61-107.1	April 23, 1993	Established solid waste management, recycling education, and waste tire management grants.
	R.61-107.2	April 23, 1993	Established requirements for full cost disclosure of municipal waste management services.
	R.61-107.3	April 23, 1993	Established waste tire management requirements.
	R.61-107.4	April 23, 1993	Established yard trash, land clearing debris, and compost management requirements.
	R.61-107.5	May 28, 1993	Established collection, temporary storage, and transportation of municipal solid waste requirements.
	R.61-107.6	June 23, 1995	Established solid waste processing facility requirements.
	R.61-107.7	May 28, 1993	Established requirements pertaining to transfer of solid waste.
	R.61-107.8	June 23, 1995	Established requirements for disposal of lead-acid batteries.
	R.61-107.9	June 25, 1993	Established requirements for disposal of white goods.
	R.61-107.10	June 25, 1993	Established research, development, and demonstration permit criteria.
	R.61-107.11	April 24, 1998	Established requirements for disposal of construction, demolition, and land-clearing debris.
	R.61-107.12	May 28, 1999	Established requirements for sold waste incineration and solid waste pryolysis facilities.
	R.61-107.13	May 27, 1994	Established requirements for municipal solid waste incinerator landfills.
	R.61-107.14	May 27, 1994	Established certification program for municipal sold waste operators.
	R.61-107.15	July 26, 1996	Established requirements for land application of solid waste.
	R.61-107.16	June 26, 1998	Established requirements for industrial solid waste landfills.
	R.61-107.17	June 23, 2000	Established demonstration of need for new municipal landfills and expansion of existing landfills.
	R.61-107.18	May 25, 2001	Established requirements for offsite treatment of contaminated soil.
	R.61-107.258	June 23, 1995	Established requirements for location, design, groundwater monitoring, closure, post-closure care, tonnage limits, financial assurance, operation, and financial assurance of municipal solid waste landfills.
	R.61-107.279	July 28, 1995	Established requirements for disposal of used lubrication oils.

4.5.4.2. Municipal Solid Waste Collection and Disposal Facilities

Charleston County

The County of Charleston Solid Waste and Recycling Department provides for incineration of garbage (at the Montenay Incinerator) collected by public and private waste haulers in the county and manages the Bees Ferry Municipal Solid Waste and Construction and Demolition (C&D) Landfills. The Charleston County Recycling Center is located at 13 Romney Street and the County provides curbside recyclables pickup for more than 90,000 single-family homes and more than 75 schools, as well as for apartment complexes and governmental agencies. In

addition to disposal facilities, Charleston County maintains seven convenience centers for rural solid waste collection throughout the County.

The Bees Ferry Municipal Solid Waste Landfill currently receives an average of 4,000 to 5,000 tons of household garbage per month plus 7,000 to 8,000 tons of bulk trash. Currently, this landfill is the only active SCDHEC-licensed landfill operated by the Charleston County. It receives dry trash and construction debris and is now the site of County compost and mulch production.

Ash from the Montenay Incinerator is disposed of at the Oak Ridge Landfill in Dorchester County, which is owned and operated by Waste Management of South Carolina.

Berkeley County

Berkeley County operates the Berkeley County Municipal Solid Waste Landfill and the Berkeley County C&D Landfill, which are located off U.S. Hwy 52 between Goose Creek and Moncks Corner. The Municipal Solid Waste Landfill reportedly has approximately 25 years of permitted air space available and the County is planning to expand the area to accommodate 80 years of air space in the near future. The Municipal Solid Waste Landfill receives approximately 65,000 tons of garbage per year.

The Berkeley County C&D Landfill has approximately 5 years of permitted air space remaining and the County has plans to expand the permitted volume of the C&D Landfill as well. The Berkeley County C&D Landfill receives approximately 30,000 tons of bulk trash per year. Berkeley County also maintains 21 recycling and/or convenience centers throughout the County.

Dorchester County

Dorchester County provides residential solid waste collection through the maintenance of 18 collection boxes throughout the county. Approximately 6,100 households are provided service through these collection boxes.

Chambers Oakridge is the only municipal solid waste facility in Dorchester County. A closure date of September 2010 is anticipated at the current use rate. During FY 97, this facility disposed of 391,068 tons of solid waste, a more than 10 percent increase from FY 96. There are several additional solid waste disposal and processing facilities in Dorchester County. Table 4.5-6 summarizes solid waste disposal facilities currently permitted by SCDHEC Bureau of Land and Waste Management – Division of Mining and Solid Waste Management in Berkeley, Charleston and Dorchester Counties.

Table 4.5-6. SCDHEC Permitted Solid Waste Disposal Facilities in Berkeley, Charleston and Dorchester Counties.

Facility Name	Facility ID	County	Category
Berkeley County C&D Landfill	081001-1201	Berkeley	Long-Term Construction & Demolition Debris Landfill
Berkeley County Composting Facility	081001-3001	Berkeley	Composting Facility
Berkeley County Municipal Solid Waste Land Fill	081001-1102	Berkeley	Municipal Solid Waste
Genco	083309-1601	Berkeley	Industrial Solid Waste Landfill
Georgia Pacific Corporation	083304-1601	Berkeley	Industrial Solid Waste Landfill
Rubber Recovery Inc.	082728-5201	Berkeley	Waste Tire Facility
S.C. Public Service Authority	083337-1601	Berkeley	Industrial Solid Waste Landfill
SCE&G Williams Station	083320-1601	Berkeley	Industrial Solid Waste Landfill
Westvaco Corporation Kraft Division	083339-1601	Berkeley	Industrial Solid Waste Landfill
4 B Composting	102641-3001	Charleston	Composting Facility
Banks Construction Co.	102707-7101	Charleston	Used Oil Facility
Banks Construction Co	102707-7301	Charleston	Used Oil Facility
Bees Ferry Municipal Solid Waste Land Fill	101001-1101	Charleston	Municipal Solid Waste
Burning Acres Composting and Shredding	102487-3001	Charleston	Composting Facility
Bees Ferry C&D and LCD Landfill	101001-1201	Charleston	Long-Term Construction & Demolition Debris Landfill
Charleston County Composting Facility	101001-3001	Charleston	Composting Facility
DiMare's Land Application of Culled Tomatoes and Cucumbers	102643-8001	Charleston	Land Application
Green Oasis Environmental Inc.	102619-7101	Charleston	Used Oil Facility
GS Roofing Products Company	102434-1601	Charleston	Industrial Solid Waste Landfill
Ladson Wood Recycling	102745-3001	Charleston	Composting Facility
Montenay Charleston Resource Recovery	102495-4001	Charleston	Solid Waste Incinerator
Spring Grove Environmental Inc.	102441-1601	Charleston	Composting Facility
Sunnyside Farms Composting	102646-3001	Charleston	Composting Facility
Tower Waste Tire Processing	102714-5201	Charleston	Waste Tire Facility
Town of Mt. Pleasant C&D Waste Transfer Station	101002-6001	Charleston	Solid Waste Transfer Station
Eagle Environmental Services	182628-2001	Dorchester	Solid Waste Processing
Hammond Wood Recycling Composting Site	182621-3001	Dorchester	Composting and Wood Grinding Facilities

Table 4.5-6. SCDHEC Permitted Solid Waste Disposal Facilities in Berkeley, Charleston and Dorchester Counties.

Facility Name	Facility ID	County	Category
Jenner Recycling Site	182717-3001	Dorchester	Composting and Wood Grinding Facilities
Oakridge Landfill	182400-1101	Dorchester	Municipal Solid Waste Landfills
Pepperhill Processing and Transfer Facility	182441-2001	Dorchester	Solid Waste Processing
Pepperhill Regional Industrial Solid Waste Landfill	182441-1601	Dorchester	Industrial Solid Waste Landfills
Town of Summerville C&D Solid Waste Transfer Station	181002-6001	Dorchester	Solid Waste Transfer Stations
Universal Environmental Services LLC	182744-7301	Dorchester	Used Oil Facilities
Universal Environmental Services LLC	182744-7101	Dorchester	Used Oil Facilities

SCDHEC Bureau of Land and Waste Management – Division of Mining and Solid Waste Management, 2005

City of North Charleston

The North Charleston Public Works Department is responsible for solid waste pickup and disposal within the North Charleston City limits. The Public Works department segregates its solid waste stream into residential and limited commercial bulk trash (yard waste, white goods, etc.) and household garbage. The bulk trash stream is disposed of at the Bees Ferry Municipal Solid Waste Landfill in Charleston County; the monthly bulk trash stream is about 2,250 tons/month. The household garbage waste stream is disposed of at the Montenay Incinerator (formerly Foster Wheeler, Inc.) which is a waste-to-energy plant located on Shipyard Creek Road (just off Spruill Avenue) in North Charleston. The City of North Charleston disposes of approximately 750 to 800 tons of household garbage per month at the Montenay Incinerator.

Goose Creek

The City of Goose Creek provides household refuse pick up only and disposes of approximately 750 to 765 tons/month of solid waste at the Berkeley County Municipal Solid Waste Landfill (off U.S. Hwy 52, between Goose Creek and Moncks Corner).

Hanahan

The City of Hanahan provides residential and light commercial curbside solid waste pickup services. Hanahan generates approximately 4,200 to 4,300 tons of solid waste per year, which is disposed of at the Berkeley County Municipal Solid Waste Landfill.

City of Charleston

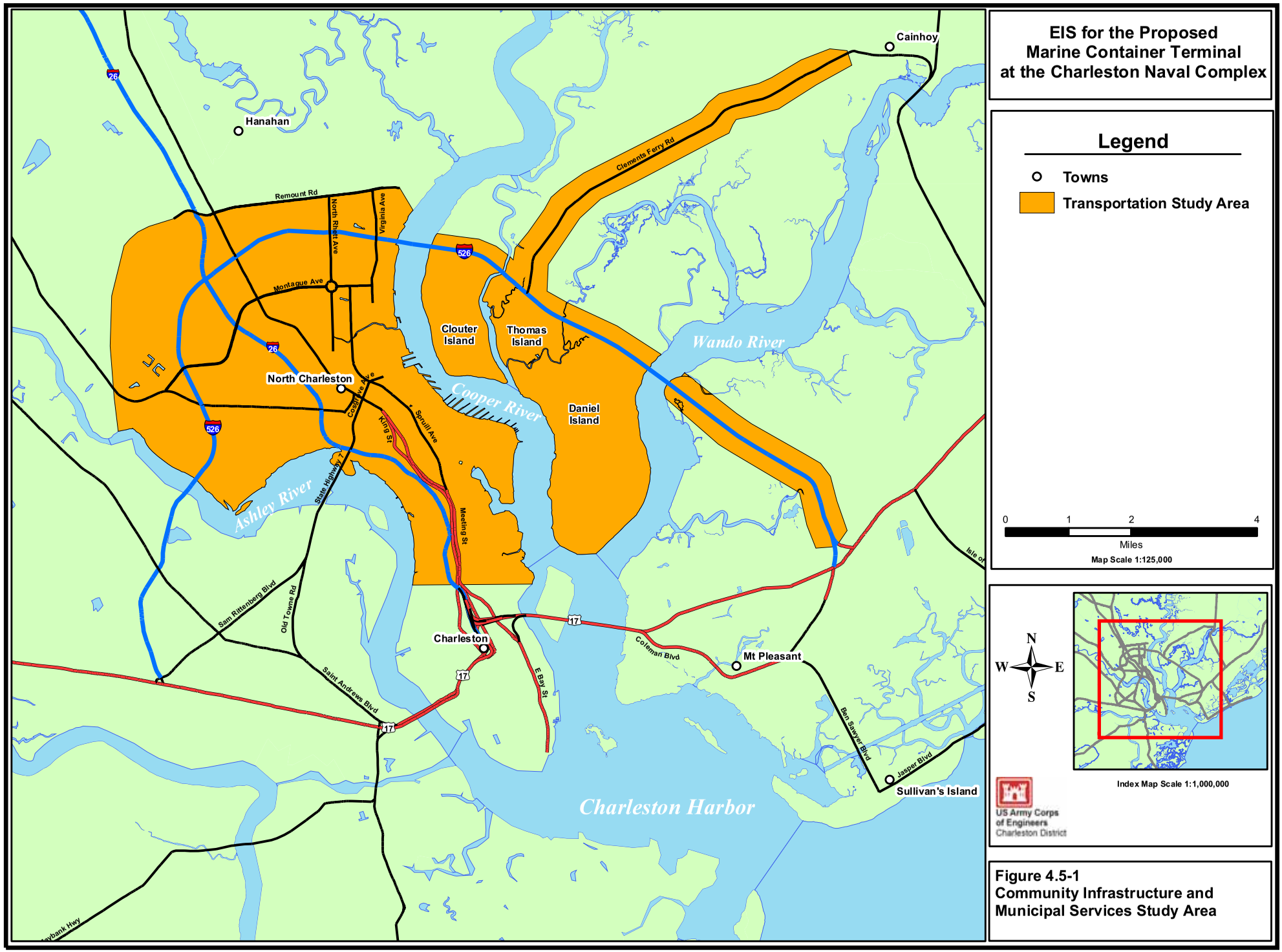
The City of Charleston provides curbside residential refuse pickup service and segregates its waste stream into household garbage and trash (yard waste, white goods, etc.). The household garbage waste stream is disposed of at the Montenay Incinerator and the trash stream is directed to the Charleston County C&D Landfill at 1344 Bees Ferry Road.

4.5.5. Utilities

Four electrical service providers serve parts of the study area: South Carolina Electric and Gas Company (SCE&G), Berkeley Electric Cooperative, Edisto Electric Cooperative, and Santee Cooper. Berkeley and Edisto Electric Cooperatives are members of Touchstone Energy Alliance.

SCE&G provides electrical service to approximately 571,000 retail and wholesale customers in an area covering more than 20,000 square miles in central, southern and southwestern parts of South Carolina, including the cities of North Charleston and Charleston. SCE&G also provides natural gas to approximately 276,000 customers throughout a 22,000 square mile service area in central and southern South Carolina, including sections of Charleston, Berkeley, and Dorchester Counties.

Berkeley Electric Cooperative provides electrical power to approximately 60,000 members throughout parts of Berkeley, Charleston, and Dorchester Counties. Berkeley Electric Cooperative primarily serves incorporated areas within the Tri-County. Edisto Electric Cooperative provides service to rural parts of Berkeley and Dorchester Counties that are, for the most part, outside of the study area. Santee Cooper serves approximately 110,000 retail customers throughout parts of Berkeley, Georgetown, and Horry Counties.


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Transportation Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.5-1
Community Infrastructure and
Municipal Services Study Area
Cainhoy
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Clements Ferry Rd
Clouter Island
Thomas Island
Wando River
Cooper River
Daniel Island
North Charleston
Cosgrove Ave
King St
Spruill Ave
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Saint Andrews Blvd
Charleston
E Bay St
Coleman Blvd
Mt Pleasant
Ben Sawyer Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Isle of
Bluffton Hwy
26
526
17

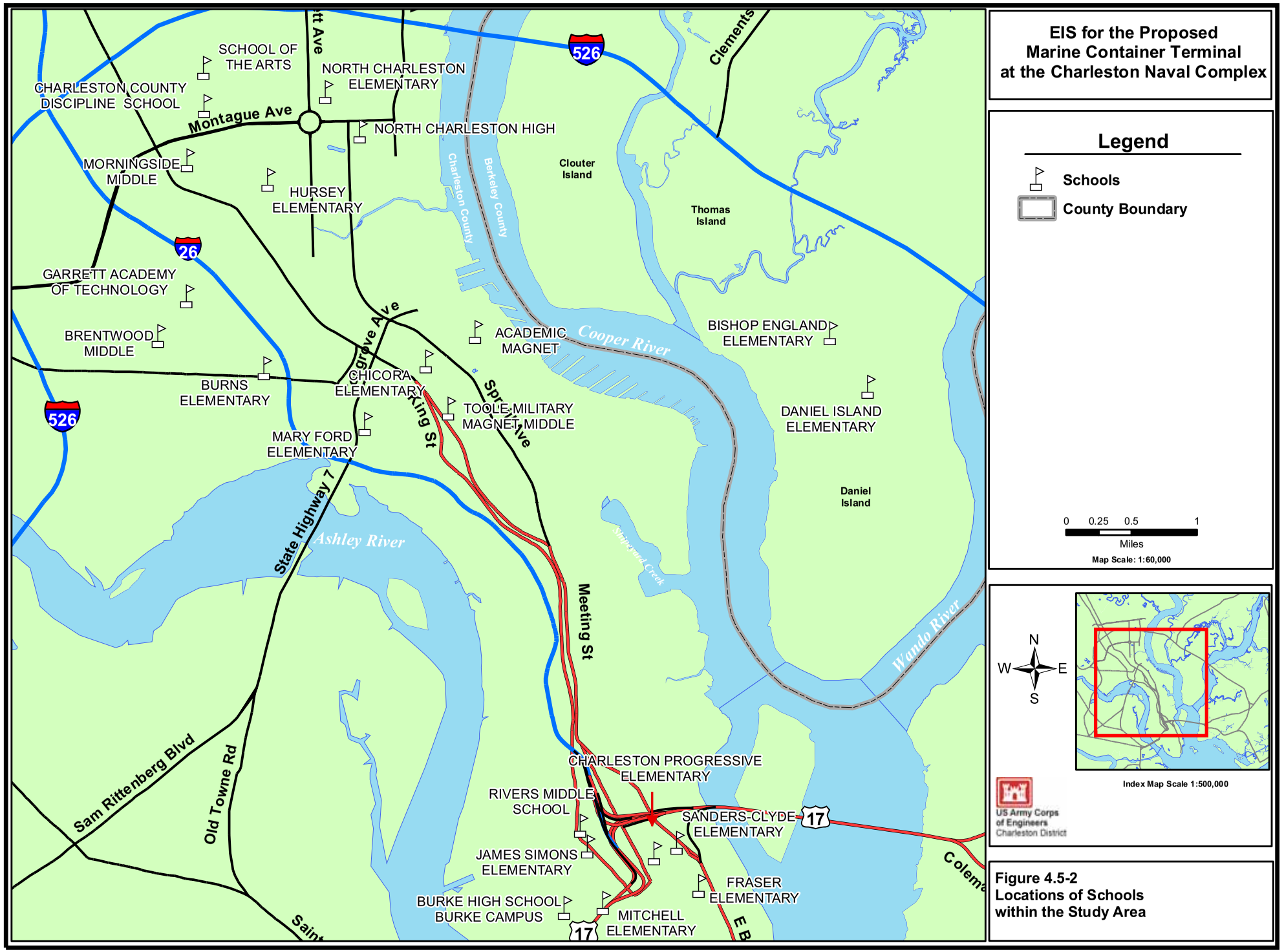


Figure 4.5-2
Locations of Schools within the Study Area

4.6. TRANSPORTATION

This section characterizes the existing conditions of roadways and railways that would most likely be used by traffic from a new marine container terminal. This section includes descriptions of existing roadways, traffic conditions, regional rail carriers, intermodal rail yards and rail crossings.

4.6.1. Roadways

This subsection describes the existing conditions of regional Interstates and primary highways in the Tri-County region, and then focuses on specific arterial roadways in the study area that would likely be used by traffic from a new marine container terminal. Arterial roads are defined as roads with high volumes of vehicle traffic at high speeds that serve travel between cities, large towns, and other transportation generators.

4.6.1.1. Regional Interstate and Primary Highways

Figure 4.6-1 shows the major roadway systems within the Tri-County region. The major roadways in the Charleston metropolitan area are briefly described in the following paragraphs.

I-95

Interstate Highway 95 (I-95) crosses the extreme western portion of Dorchester County from north to south. I-95 is a four-lane, major north-south thoroughfare along the east coast of the US providing a limited access, high-speed roadway to points north and south of the greater Charleston area.

I-26

I-26 crosses the Tri-County region in a northwesterly-southeasterly orientation. I-26 intersects I-95 approximately 50 miles northwest of Charleston and terminates at the interchange with US Highway 17 in Charleston. I-26 provides a high-speed connection to I-20 and I-77 in Columbia and continues to the west.

I-526 (Mark Clark Expressway)

I-526, also referred to as the Mark Clark Expressway, serves as a high-speed, limited access beltway around downtown Charleston, connecting with US Highway 17 North in Mt. Pleasant and US Highway 17 South in the West Ashley area and intersecting I-26 in North Charleston.

US Highway 17

US Highway 17 transects the Tri-County region along the coast from northeastern to southwestern Charleston County. Prior to the construction of the interstate highway system, US Highway 17 was a major north-south thoroughfare for the Atlantic seaboard in the southeastern United States. The Arthur Ravenel Bridge was opened July 16, 2005 to replace two older bridges crossing the Cooper River between the Town of Mount Pleasant and the Charleston Peninsula.

Rivers Avenue (US Highway 78 and US Highway 52)

Rivers Avenue (US Highway 78 and US Highway 52) is a major arterial roadway in a northwesterly-southeasterly orientation through the City of North Charleston. Prior to the construction of I-26, Rivers Avenue provided the primary road access for points west of Charleston.

4.6.1.2. North Charleston Study Area

Infrastructure

As shown in Figure 4.6-2, the transportation study area for this EIS includes Interstate Highway 26 (I-26) on the Charleston peninsula north of the intersection with the US Highway 17 Arthur Ravenel Bridge and south of Remount Road, Interstate Highway 526 (I-526) on the Charleston Peninsula to Mount Pleasant, and roadways that could be used by traffic from a new marine container terminal. The North Charleston study area includes the portion of the transportation study area (Figure 4.6-2) between the Ashley and Cooper Rivers on the Charleston peninsula. The arterial roadways in the North Charleston study area that would likely be impacted by traffic from a new container terminal are briefly described in the following paragraphs.

Dorchester Road

Dorchester Road (SC Highway 642) is an east-west arterial that connects North Charleston with Summerville. It runs parallel to the east side of the Ashley River. Dorchester Road is a four-lane roadway from North Charleston to Summerville and most land frontage is commercial, although there are some residential areas fronting on Dorchester Road as well. Dorchester Road has a full movement interchange with I-26 and I-526.

Spruill Avenue

Spruill Avenue is a four-lane arterial that splits off North Meeting Street and continues north to its intersection and terminus at Montague Avenue in North Charleston. Spruill Avenue provides local access to I-26 at its southern end and provides access to the CNC property via Viaduct Road and McMillan Avenue.

Remount Road

Remount Road is a four-lane east-west arterial that connects the existing SCSPA North Charleston terminal with Rivers Avenue, I-26, and Aviation Avenue. Properties fronting on Remount Road are primarily commercial. Remount Road also marks the northern boundary of the traffic study area within North Charleston. Remount Road has a westbound exit from I-26 (Exit 212) and an eastbound entrance ramp onto I-26.

Cosgrove Avenue

Cosgrove Avenue (SC Highway 7) connects Rivers Avenue and US Highway 17 South in the West Ashley area. Cosgrove Avenue is a four-lane roadway throughout its length, with a six-lane segment just west of Memorial Bridge over the Ashley River. Cosgrove Avenue has a full movement clover leaf interchange at I-26.

Montague Avenue

Montague Avenue is a four-lane arterial throughout its length from Virginia Avenue to Dorchester Road. Montague Avenue is the major east-west arterial that, in part, forms the heart of the old North Charleston business district. It has full movement interchanges with I-26 and I-526. Most of the land use fronting on Montague Avenue is commercial.

Virginia Avenue

Virginia Avenue is a four-lane north-south arterial roadway that passes underneath I-526, connecting Remount Road and the northern portion of the CNC. Access to the CNC from Virginia Avenue is provided through B gate. Virginia Avenue has a westbound entrance ramp

onto I-526 and there is an eastbound exit from I-526 onto Virginia Avenue. Virginia Avenue is primarily fronted by commercial/industrial land use.

North Rhett Avenue

North Rhett Avenue extends northward from Park Circle in North Charleston to Liberty Hall Road in Goose Creek. It intersects Remount Road in North Charleston and Red Bank Road in Goose Creek. North Rhett Avenue is a four-lane arterial roadway for its entire length and is fronted by commercial/industrial properties as well as residential areas. North Rhett Avenue has a full movement interchange with I-526.

Traffic

Existing Roadway Traffic Study for North Charleston Study Area

A traffic study was performed to evaluate the existing traffic conditions for the interstates, highways, arterial roadways and intersections in the North Charleston study area. This study, *Existing Roadway Traffic Study for North Charleston Study Area,* was prepared prior to the submittal of a permit application by SCDOT. Therefore, the study evaluated roadways and intersections that would likely be used by vehicles entering and leaving the proposed marine container terminal at the CNC. The traffic study, dated February 2005, is provided in Appendix T.

Detailed descriptions of the evaluations performed for the traffic study are included in the traffic study report in the appendices. Findings of the traffic study and descriptions of existing conditions are summarized in the following sections and Section 5.1.6 of this EIS. In Section 5.1.6, the descriptions of existing traffic conditions are compared to projected future conditions.

The traffic analysis for the *Existing Roadway Traffic Study for North Charleston Study Area* used several models commonly used in traffic engineering and impact studies. These models compute Level of Service (LOS), traffic delay, traffic saturation (i.e., volume-to-capacity ratios) and other performance measures based on traffic demand, lane capacities, truck percentages, signal timing, turning movement pattern and peaking characteristics. South Carolina Department of Transportation (SCDOT) Annual Average Daily Traffic (AADT) from 2003 was used as the basis for the traffic model to compute existing LOS and other performance measures presented in this EIS.

The LOS measure is based on a 6-point scale and varies from letter grade A, representing free flow of traffic, to letter grade F, representing congested stop-and-go conditions. A brief description for each LOS letter grade is provided below.

- Level of Service A describes a condition of free flow, with low volumes and high speeds.

- Level of Service B is the zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation.

- Level of Service C is the zone of mostly stable flow, but speeds and maneuverability are more closely constricted by the higher volumes.

- Level of Service D is a zone that approaches unstable flow, with tolerable operating

speeds; however, driving speed is greatly affected by changes in operating conditions.

- Level of Service E is a zone that cannot be described by speed alone. Operating speeds are lower than in Level D, with volume at or near the capacity of the highway.

- Level of Service F is a zone in which the operating speeds are controlled by stop-and-go mechanisms, such as traffic lights. This is called forced-flow operation. The stoppages disrupt the traffic flow so that the volume carried by the roadway falls below its capacity. Without the stoppages, the volume of traffic on the roadway would be higher; or in other words, it would reach capacity.

Capacity is defined as the volume of traffic a roadway or intersection can safely and efficiently handle during a specific time unit.

The analysis for the *Existing Roadway Traffic Study for North Charleston Study Area* indicate that several roadways in the North Charleston study area are currently operating at near capacity and many roadway segments evaluated in this study are already operating at LOS D or higher. The current level of traffic congestion is attributed to heavy traffic volume, inadequate turning lanes and geometry, lack of traffic signal coordination, and inadequate access management.

Recent Trends

Generally, the Tri-County region is experiencing rapid development. Local area traffic trends for the years 2000 through 2003 were assessed using SCDOT's annual average daily traffic (AADT) database. These traffic trends are presented and described in detail in the *Existing Roadway Traffic Study for North Charleston Study Area*. As discussed in this study, roadways are presently at or near capacity. Also, within the study area, I-526 has a consistent traffic volume growth pattern at an above-normal rate compared to I-26. Twelve arterial corridors within the study area were reported to have had declining traffic volume trends during the period of record. A comparison of 2000 to 2003 AADT roadway segment data for the North Charleston study area is presented in Table 4.6-1 (located at the end of Section 4.6).

Interstate Roadway Conditions

The *Existing Roadway Traffic Study for North Charleston Study Area* evaluated traffic conditions for eastbound and westbound lanes of I-26 and I-526 in the North Charleston study area. The traffic analysis reported estimated peak hour travel conditions based on 2003 AADT traffic data.

I-26

I-26 is the primary route for business travel from outside the Tri-County region and commuter traffic from the northwest parts of the Tri-County region to the greater Charleston area. I-26 is a six-lane roadway between US Highway 17 and Montague Avenue, not including auxiliary lanes. Northwest of the Montague Avenue interchange, I-26 becomes an eight-lane interstate. The interstate reduces back to four lanes a few miles northwest of the US Highway 17A interchange. The greatest reported AADT volume on I-26 in 2003 was 133,500 vehicles per day between Remount Road and the I-526 interchange. The lowest AADT volume on I-26 in 2003 was 63,100 vehicles per day, south of Mt. Pleasant Street.

Based on the findings for the *Existing Roadway Traffic Study for North Charleston Study Area*, a majority of the east and westbound I-26 segments in the North Charleston study area are

currently operating at LOS C or better during peak traffic hours. Two segments of I-26 eastbound are currently operating at LOS D: Aviation Avenue to Remount Road and Remount Road to the I-526 interchange. The low level of service indicates that traffic conditions are approaching unstable flow during peak traffic conditions. A summary of current LOS for each eastbound and westbound segment of I-26 evaluated for peak traffic hours in the transportation study area is provided in Table 5.1-10.

I-526

I-526 is the primary route for business and commuter traffic from high growth areas from east to west within the Tri-County region. I-526 is a six-lane roadway between Leeds Avenue and Rivers Avenue. I-526 becomes four lanes west of Leeds Avenue and east of Rivers Avenue. The greatest AADT volume on I-526 was 73,500 vehicles per day in 2003 between Montague Avenue and I-26. The lowest AADT volume on I-526 in 2003 was 65,300 vehicles per day between Leeds Avenue and Dorchester Road.

Based on the findings for the *Existing Roadway Traffic Study for North Charleston Study Area*, a majority of the eastbound I-526 is operating at a LOS D or better during peak traffic hours. A majority of westbound I-526 is currently operating at a LOS C or better during peak traffic hours. However, some of the I-526 eastbound lanes are operating at a LOS D or F. These low LOS ratings for I-526 westbound and specific segments of I-26 eastbound indicate that some segments of I-526 are currently operating at near capacity or capacity. Two primary impediments to freeway traffic are identified as contributing to the lower LOS for the westbound I-526 lanes: the I-26/I-526 interchange and the westbound lanes of the I-526 Cooper River Bridge (also referred to as the Don Holt Bridge). A summary of current LOS for each eastbound and westbound I-526 segment evaluated for peak traffic hours in the Transportation Study is provided in Table 5.1-11.

Arterial Roadway Conditions

The *Existing Roadway Traffic Study for North Charleston Study Area* evaluated existing conditions for 13 arterial roadway segments within the North Charleston study area using 2003 SCDOT AADT data. According to 2003 AADT data, Cosgrove Avenue from I-26 to Old Towne Road (SC Highway 171) had the greatest volume of the arterial roadways evaluated in the North Charleston study area with 43,300 vehicles per day, and 5 percent of the traffic volume was trucks. Rivers Avenue from I-526 to Daley Avenue had the greatest percentage of truck traffic, 17 percent, and the second greatest overall traffic volume with 30,000 vehicles per day.

Intersection Conditions

Twenty-eight intersections within the North Charleston study area were analyzed to determine existing traffic conditions. The evaluated intersections in the North Charleston study area were selected because traffic from a new container terminal could affect them. The locations of the 28 intersections evaluated in the North Charleston study area are shown in Figure 4.6-3.

In order to characterize existing conditions of the 28 intersections for the Existing Roadway Traffic Study for North Charleston study area, traffic counts were conducted in May 2004 and December 2004 during peak traffic hours for weekday morning and afternoon conditions. Peak AM conditions were observed from 7:00 to 9:00 and peak PM conditions were measured from 4:00 to 6:00.

Analysis of the traffic count data indicate that all intersections evaluated are currently operating at LOS C or better during AM peak traffic conditions and that most operate at acceptable LOS C

or better during PM peak traffic conditions. The intersections evaluated operating at LOS D during the PM peak traffic conditions are a result of intersection geometric constraints, heavy traffic volume, and turning movements. These intersections include Dorchester at Leeds Avenue, Dorchester at Meeting Street Road, Rivers at Cosgrove Avenue, Meeting Street Road at McMillan Avenue and Montague at International Boulevard.

4.6.1.3. Daniel Island Study Area

The Daniel Island study area includes Daniel and Thomas Islands south of I-526, the Cainhoy Peninsula north of I-526 and a segment of I-526 in Mount Pleasant east of the Wando River. As shown in Figure 4.6-2, Daniel and Thomas Islands are located between Clouter Creek to the west and the Wando River to the east.

Infrastructure

The Daniel Island study area includes segments of I-526 from the I-26 intersection in North Charleston to US Hwy 17 in Mount Pleasant. Two arterial roads and local access roadways are included in the Daniel Island study area. The two arterial roads are Clements Ferry Road and Long Point Road. A brief description of the roadways in the Daniel Island study area is provided in the following sections.

Clements Ferry Road

Clements Ferry Road is a north-south arterial with full movement interchange with I-526 on Thomas Island. Clements Ferry Road provides access to Thomas and Daniel Island residential areas to the south of the I-526 interchange and commercial/industrial areas to the north of the I-526 interchange. Clements Ferry Road intersects SC Highway 41 in the village of Cainhoy 8 miles north of the intersection with I-526. The segment of Clements Ferry Road between I-526 and SC Highway 41 is a 5-lane urban arterial with a two-way center and carries heavy truck traffic primarily with destinations to Cainhoy Business Park, Charleston Regional Business Center, and other manufacturing and distribution facilities along Clements Ferry Road and Cainhoy Road.

Clements Ferry Road transitions from to a 2-lane road less than 300 feet south of the I-526 interchange. The 2-lane road continues for approximately 350 feet south and eventually becomes a single-lane unpaved road with residences located nearby on either side. A majority of traffic traveling south on Clements Ferry Roadway from the I-526 interchange turns east onto St. Thomas Island Drive to access retail, business parks and residences on Daniel Island.

It should be noted that the Clements Ferry Road interchange with I-526 was designed to handle additional truck traffic from a SCSPA proposed marine container terminal on the southern portion of Daniel Island. The proposal for the Daniel Island Marine Container Terminal included a roadway that would access I-526 by extending Clements Ferry Road to the proposed terminal at the southern portion of Daniel Island. A draft EIS was published in September 1999 by the USACE evaluating the proposed Daniel Island marine container terminal. However, the permit application was withdrawn by SCSPA in April 2000 and the draft EIS was never finalized.

Long Point Road

Long Point Road is an east-west arterial with a full movement interchange with I-526 in Mt. Pleasant. Long Point Road provides access to residential areas, commercial areas and the SCSPA Wando Welch Terminal gate, west of the I-526 interchange. East of the I-526 interchange, Long Point Road provides access to residential and commercial areas and intersects US Highway 17 approximately 3 miles north of the I-526 interchange. Long Point

Road terminates at the entrance to the SCSPA Wando Welch Terminal west of the I-26 Interchange.

Long Point Road is a 5-lane urban arterial with a two-way center turn lane and carries a heavy volume of truck traffic between the SCSPA Wando Welch Terminal gate and the I-526 interchange. The road transitions into a 2-lane, undivided roadway from approximately 1 mile east of the I-526 interchange which continues to the intersection with US Highway 17 North.

Local Access Roads

Local access roadways provide access to residential and commercial areas in the Daniel Island Community from I-526. Two partial interchanges on Daniel Island provide full movement to I-526. The westbound exit to Daniel Island and entrance to I-526 is accessed from River Landing Drive. The eastbound exit to Daniel Island and entrance to I-526 is accessed from the intersection of Island Park Drive and Seven Farms Drive.

Traffic

A traffic study was performed to evaluate the existing traffic conditions for I-526, arterial roadways and intersections in the Daniel Island and Clouter Island study areas. The *Traffic Study for the Daniel Island and Clouter Island Study Areas* evaluated roadways and intersections that would likely be used by vehicles entering and leaving a new marine container terminal on either Daniel Island or Clouter Island. Similar to the *Existing Roadway Traffic Study for North Charleston Study Area*, LOS for the Daniel Island and Clouter Island study area was computed using traffic models. The traffic study, dated June 2005, is provided in Appendix T.

I-526

Existing LOS for segments of I-526 in the Daniel Island study area is summarized in Table 5.3-3 (located at the end of Section 5.3.6). According to 2003 AADT data, existing traffic volume over the I-526 Bridge to Clements Ferry Road is 54,500 vehicles per day. Existing traffic volume decreases to 45,600 vehicles per day east of Clements Ferry Road to the US Highway 17 northbound exit.

Clements Ferry Road

Table 5.3-4 lists 2003 AADT and existing LOS for segments of Clements Ferry Road in the Daniel Island study area. The I-526 westbound on-ramp at Clements Ferry Road currently handles 1,200 vehicles during both the AM and PM peak hours, of which 78 to 86 percent are coming from the Cainhoy Peninsula. The remaining westbound on-ramp traffic originates from retail, business parks and residences on Daniel Island and residences on Thomas Island. Similar traffic distributions exist on the eastbound loop off-ramp to northbound Clements Ferry Road that carries as many as 860 vehicles during the AM peak hour.

LOS ratings during the AM and PM weekday traffic conditions for the intersections evaluated in the Daniel Island study area are listed in Tables 5.3-5 and 5.3-6, respectively. Non-signalized intersections along Clements Ferry Road operate at similar LOS ratings as during the morning peak traffic hours. Poor LOS ratings at non-signalized intersections along Clements Ferry Road are indicative of side road or ramp delays rather than through-traffic delays. The high delays at side streets and roads along Clements Ferry Road suggest the need for signalization at these intersections.

Long Point Road

The Daniel Island study area includes the segment of I-526 in Mount Pleasant east of the Wando River to the intersection with US Highway 17 and the I-526 interchange at Long Point Road. Segments of Long Point Road are described in this section to characterize the traffic using the I-526 interchange. Table 5.3-4 lists 2003 AADT and existing LOS for segments of Long Point Road in the Daniel Island study area.

4.6.1.4. Clouter Island Study Area

The Clouter Island study area includes the CDF for dredged material on Clouter Island south of I-526. Additional description of the Clouter Island CDF is available in Section 4.16.1.3. As shown in Figure 4.6-2, Clouter Island is located between the Cooper River to the west and Clouter Creek to the east.

Infrastructure

The Clouter Island study area includes a segment of I-526 which crosses Clouter Island. However, this segment of I-526 is an elevated structure, and there is no access to Clouter Island from I-526. There are no permanent structures or public roadways that provide roadway access to Clouter Island. The only way to access Clouter Island is by boat.

4.6.2. Railroads

4.6.2.1. Regional Rail Carriers

Charleston and Berkeley Counties are served by CSX and Norfolk Southern (NS) railways for freight and AMTRAK for passenger service. Figure 4.6-4 shows the existing railway lines in the study area and the locations of existing facilities in the transportation study area.

As shown in Figure 4.6-4, both CSX and NS own railways in the transportation study area. The existing CSX and NS railway traffic in this study area primarily consists of bulk cargo and intermodal freight. Intermodal freight is the movement of goods in a single unit or container using a variety of modes of transportation, without handling of the goods themselves when changing mode of transportation. Containerized cargo, such as the cargo that the Proposed Project will be designed to accept, that is moved on trains is referred to as intermodal freight. CSX and NS also transport general freight such as durable goods (i.e. cars and heavy machinery), textiles and other bulk products (i.e. paper) on railways in the study.

For the purposes of this EIS, the construction of a new marine container terminal in Charleston Harbor would likely result in an increase in the number of containers, measured as twenty-foot equivalent units (TEUs) that would be transported by rail. Therefore, discussion of railways in this section will describe the overall railway traffic in the transportation study area, including intermodal and general freight, and the facilities that accept intermodal freight.

4.6.2.2. Rail Yards

As shown in Figure 4.6-4, CSX and NS have a total of four rail yards in the transportation study area. Bennett Yard, East Bennett Yard and Cooper Yard are operated by CSX. Seven-Mile Yard is operated by NS. East Bennett Yard and Seven-Mile Yard are the only two locations in the Tri-County region where intermodal freight is loaded onto specialized container rail cars. Each of these rail yards is described in the following paragraphs.

Bennett Yard (CSX)

Bennett Yard is a large rail yard where trains are assembled and linked with a locomotive. The rail yard is perpendicular to the CSX railway that travels down the Charleston Peninsula. Trains entering the Bennet Yard travel west underneath I-26 and use the same segment or railway to exit Bennett Yard passing under I-26 again. Rail cars are added and removed from locomotives in this yard and staged for transport to their next destination.

East Bennett Yard (CSX)

East Bennett Yard is located just east of I-26 and north of Dorchester Road. East Bennett Yard is primarily an intermodal yard that can also handle general cargo. Containerized cargo, such as the cargo that the Proposed Project is designed to accept from container ships, is delivered to the rail yard by trucks. Trucks enter the Upper Bennet Yard from Meeting Street. Equipment at the rail yard removes the containerized cargo from the truck. The containers are then stacked and staged in a container storage yard until the containers are loaded onto specialized container rail cars. The container rail cars are joined together, to other general freight rail cars and a locomotive to be transported out on the CSX railway.

CSX Intermodal, the division of CSX that moves intermodal freight, handles two trains per day inbound and two trains per day outbound plus one pick-up stop by a train originating in Jacksonville, Florida. Based on interviews with CSX personnel, none of the trains originating at or transiting through Bennett Yard are longer than 9,000 feet and most reportedly average 6,000 to 7,000 feet in length.

The CSX intermodal freight enters and exits to the west, using the existing CSX railway that crosses the Ashley River, using the existing railway to Florence, SC.

Cooper Yard (CSX)

Cooper Yard is located along Spruill Avenue between Shipyard Creek Road to the north and Tuxbury Lane to the south. Cooper Yard is currently used as a storage yard and has no intermodal capacity. Therefore, trains entering Cooper yard enter from the CSX railway and spur connecting the mainline and the rail yard.

Seven-Mile Yard (NS)

Seven-Mile Yard is located between Montague Avenue to the north and I-26 to the east. The NS railway is located east and parallel to the CSX railway. Seven-Mile Yard is both an intermodal and general freight rail yard. Trucks delivering containers to Seven-Mile Yard primarily use Goer Drive. Trucks delivering general freight to Seven-Mile Yard primarily use Piggly Wiggly Drive. Based on interviews with NS personnel, one inbound and one outbound intermodal train is handled daily at Seven-Mile Yard.

The NS intermodal freight enters and exits the Seven-Mile Yard using the NS railway to the north toward Columbia, SC.

4.6.2.3. Rail Crossings

Railroad crossings in the Tri-County region are summarized in Table 4.6-2. There are 283 railroad/highway crossings in Charleston County, 126 crossings in Berkeley County, and 96 crossings in Dorchester County, of which 111, 184 and 83 crossings were at grade, respectively.

Table 4.6-2. Railroad Crossing Characteristics.

County	Total Crossings	At Grade Crossings	Percent of State-Wide Railroad Crossings	Private Crossings	Public Crossings
Berkeley	126	111	2.6	39	72
Charleston	283	184	4.4	62	122
Dorchester	96	83	2.0	39	44

Federal Railroad Administration, 2005.

Two at-grade rail crossings in the transportation study area are presently affected by trains made up with intermodal freight: the NS railway at-grade crossings at Taylor Street and Remount Road. No CSX at-grade rail crossings for trains made with intermodal freight are located within the transportation study area. The CSX intermodal freight enters and exits the East Bennett Rail Yard to the west using the existing CSX railway that crosses the Ashley River.

There are at-grade crossings in the study area on the Charleston Peninsula, south of the four rail yards identified in this section; however, these at-grade crossings would be used by trains with general freight. For example, trains traveling on CSX railways south of Cooper Yard are transporting general and intermodal cargo to the SCSPA's Columbus Street and Union Pier Terminal. General freight being transported to the SCSPA Columbus Street and Union Pier Terminal include BMWs being shipped from the Greenville, SC assembly plant, heavy machinery and other bulk goods handled at the existing terminals.

The Memorandum of Understanding and Agreement (MOUA) between the City of North Charleston and SCSPA dated October 25, 2002, provided as Appendix B, refers to three rail overpasses within the City of North Charleston that would be in place before SCSPA starts container operations at the Proposed Project. The existing at-grade crossings referenced in the MOUA are Rivers Avenue just north of I-526, Rivers Avenue at Durant Avenue, and North Rhett Avenue. All three of the at-grade intersections described in the MOUA are within the transportation study area. However, according to interviews with CSX Intermodal and NS representatives, existing trains passing through these intersections are not originating from the local intermodal yards.

Traffic Delays from Rail Crossings

Assuming an average train length of 6,600 feet and average train speed of 10 mph within urban areas, it requires 7.5 minutes for an intermodal train to pass each at-grade railroad crossing. Assuming that the crossing control signal activates 60 seconds prior to the arrival of trains at the crossing and de-activates 30 seconds after passages, the total delay per intermodal train per crossing is estimated to be 9 minutes per train.

As reported by CSX Intermodal and NS personnel, an average of 7 intermodal train trips per day affect existing at-grade railroad crossings of rail lines into and out of the East Bennett and Seven-Mile intermodal yards. In addition to rail traffic from the intermodal yards, rail traffic is generated at local industries, bulk cargo terminals, and other general cargo in the area. These cargo services may not be as regular as the intermodal services, but generate additional traffic and use some of the same rail lines in the study area.

Rail Crossing Safety

According to data obtained from the Federal Railroad Administration Office of Safety Analysis, there were six railway accidents (not including highway/rail incidents) resulting in no injuries or

fatalities reported for Berkeley County during the period January 2000 through February 2005; reportable damages totaled $325,476. During the same period, there were 23 incidents reported in Charleston County, resulting in one fatality and $1,759,809 in damages. There were no reported incidents for Dorchester County during the period January 2000 through February 2005.

During the same period of January 2000 through February 2005 there were accidents at rail crossings. One fatality was reported on June 14, 2000 at a crossing of a private road, Black Bottom Road, in Charleston County and four accidents with injuries at other crossings. During the period, there were three reported crossing accidents with fatalities (one each in 2002, 2003, and 2004) and crossing accidents with injuries (two each in 2001, 2002, and 2003) in Berkeley County.

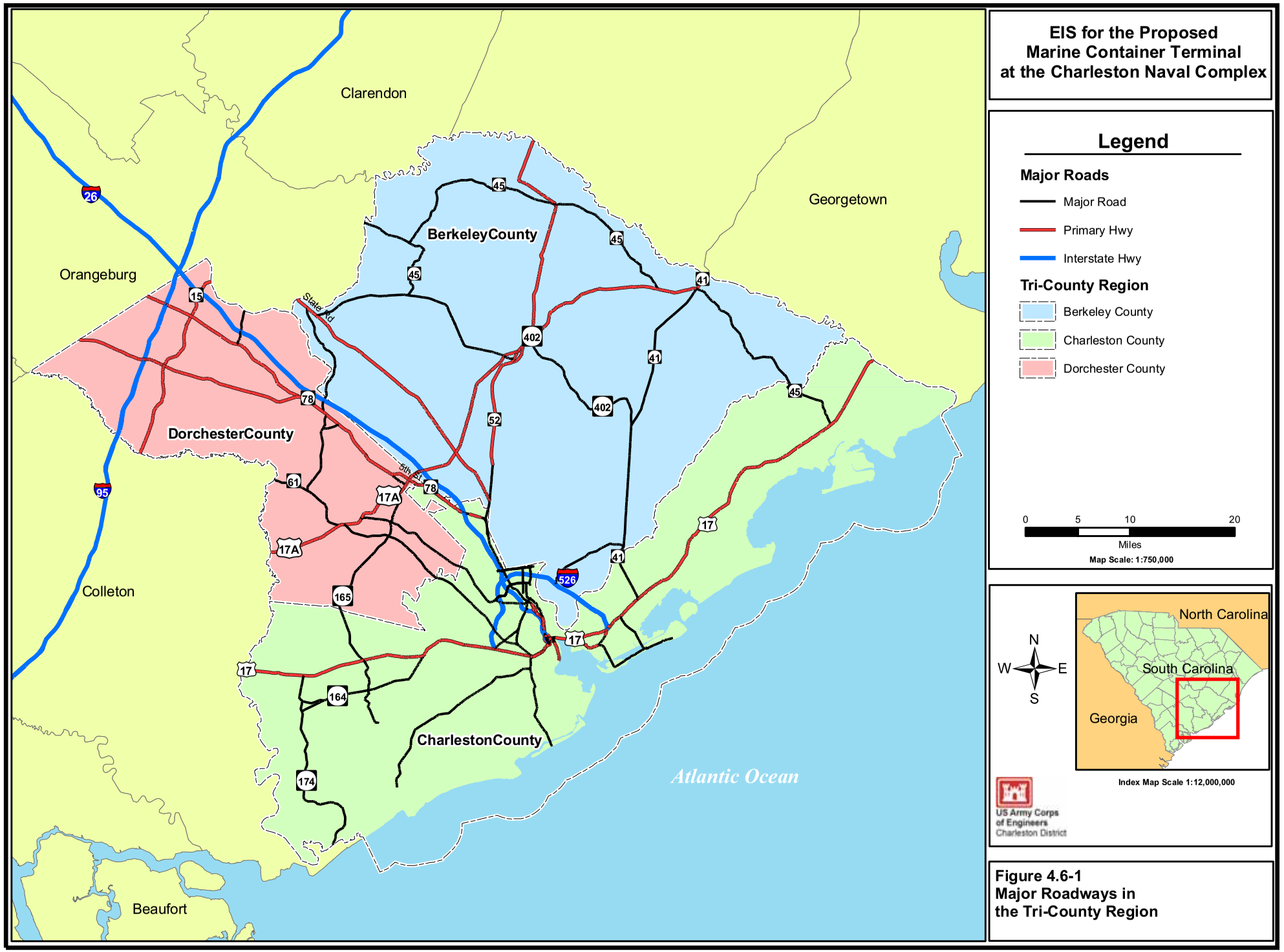
There were seven reported accidents involving railcars carrying hazardous materials, one of which resulted in a release of hazardous material during the period January 2000 through February 2005 in Charleston County. No accidents involving railcars carrying hazardous materials or releases of hazardous materials from railcars were reported for Berkeley County during the same period (Federal Railroad Administration Office of Safety Analysis, 2005).

Table 4.6-1. North Charleston Study Area Recent Traffic Trends, Years 2000-2003.

Roadway	Segment Location	Annual Average Daily Traffic				Percent Change (2000-2003)
		2000	2001	2002	2003	
I-26	US 52 Connector to Ashley Phosphate Road	100,700	100,400	101,800	108,800	8.04
I-26	Ashley Phosphate Road to Aviation Avenue	110,200	111,500	111,900	117,000	6.17
I-26	Aviation Avenue to Remount Road	114,700	115,700	116,400	121,300	5.75
I-26	Remount Road to I-526	126,500	126,900	128,200	133,500	5.53
I-26	I-526 to Montague Avenue	79,700	81,400	81,400	84,100	5.52
I-26	Montague Avenue to Dorchester Road	77,100	79,200	80,100	81,700	5.96
I-26	Dorchester Road to Cosgrove Avenue	78,600	79,100	80,500	81,700	3.94
I-26	Cosgrove Avenue to Spruill Avenue	71,900	71,900	72,800	74,300	3.33
I-26	Spruill Avenue to Heriot Street	72,100	69,800	69,600	71,800	-0.41
I-26	Heriot Street to Mt. Pleasant Street	64,000	61,900	61,200	63,100	-1.40
I-526	S.Rittenburg Boulevard to P. Cantrell Boulevard	25,600	27,300	26,700	29,400	14.84
I-526	Paul Cantrell Boulevard to Leeds Avenue	61,200	61,100	62,100	65,300	6.69
I-526	Leeds Avenue to Dorchester Road	59,600	59,600	61,500	65,300	9.56
I-526	Dorchester Road to Montague Avenue	60,200	60,700	63,400	66,900	11.12
I-526	Montague Avenue to I-26	68,200	67,100	70,500	73,500	7.77
I-526	I-26 to US 52 (Rivers Avenue)	64,200	63,200	67,800	70,700	10.12
I-526	US 52 (Rivers Avenue) to N. Rhett Avenue	58,000	59,900	65,200	68,400	17.93
I-526	North Rhett Avenue to Virginia Avenue	57,300	57,900	63,200	68,200	19.02
US 52 (Meeting Street)	Morrison Drive/Mt Pleasant Street to I-26	10,400	10,400	13,200	12,100	16.35
US 52 (Meeting Street)	I-26 to US Highway 78	2,700	2,700	2,700	2,500	-7.40
US 52 (Carner Avenue)	US Highway 78 to Dorchester Road	8,100	8,300	8,300	8,200	1.23
US 52/78 (Rivers Avenue)	Dorchester Road to Daly Avenue	16,700	17,800	20,100	17,500	4.79
US 52/78 (Rivers Avenue)	Daly Avenue to Taylor Street	29,200	26,200	30,800	30,000	2.74
US 52 /78 (Rivers Avenue)	Taylor Street to Remount Road	29,200	29,200	32,000	33,000	13.01
US 52/78 (Rivers Avenue)	Remount Road to Ashley Phosphate Road	42,800	41,800	47,200	47,600	11.21
US 52/78 (Rivers Avenue)	Ashley Phosphate Road to I-26 Connector.	38,800	40,600	40,400	40,700	4.90
US 78 (University Boulevard)	US Highway 52 to I-26	8,600	8,000	8,700	8,500	-1.16

Roadway	Segment Location	Annual Average Daily Traffic				Percent Change (2000-2003)
		2000	2001	2002	2003	
Dorchester Road	Dorchester Co to Andrews Street	35,800	34,600	35,900	38,100	6.42
Dorchester Road	Andrews Street to Montague Avenue	28,100	24,600	26,500	27,300	-2.85
Dorchester Road	Montague Avenue to I-26	20,100	18,900	21,700	21,300	5.97
Dorchester Road	I-26 to US Highway 52/78	6,800	7,200	7,200	7,300	7.35
Remount Road	East of Virginia Avenue	5,900	5,800	7,200	6,000	1.69
Remount Road	East of Virginia Avenue to Attaway Street	13,800	12,600	14,900	15,200	10.14
Remount Road	Attaway Street to Dutton Avenue	16,000	15,500	17,600	16,600	3.75
Remount Road	Dutton Avenue to Rivers Avenue	27,300	27,000	30,700	29,800	9.16
Remount Road	Rivers Avenue to Air Force Base	10,700	9,800	9,400	9,900	-7.47
SC Highway 7 (Cosgrove Avenue)	SC Highway 171 to I-26	43,800	45,100	46,400	43,300	1.14
SC Highway 7 (Cosgrove Avenue)	I-26 to Rivers Avenue	16,500	18,100	15,900	16,400	-0.61
SC Highway 7 (Cosgrove Avenue)	Spruill Avenue to Rivers Avenue	7,000	7,200	7,400	7,500	7.14
Montague Avenue	Rivers Avenue to Marriott Drive	13,600	13,000	13,300	13,400	-1.47
Montague Avenue	Marriott Drive to Blossom Street	20,700	21,500	22,800	23,700	14.49
Montague Avenue	Blossom Street to Dorchester Road	13,300	14,100	15,600	16,100	21.05
Virginia Avenue	Buist Avenue to I-526	4,700	4,000	3,700	4,800	2.13
Virginia Avenue	I-526 to Remount Road	7,300	7,550	6,000	6,200	-15.07
Mt. Pleasant Street	I-26 to US Highway 78	12,700	11,100	11,500	11,300	-11.02
Mt. Pleasant Street	US Highway 78 to US Highway 52	13,200	11,500	11,600	11,500	-12.88
Meeting Street Road	Dorchester Road to US Highway 52	6,800	7,200	6,400	6,400	-5.88
Morrison Drive (Highway 52)	US Highway 17 to US Highway 52/Mt. Pleasant Street	12,000	13,300	14,100	13,900	15.83
North Rhett Avenue	South Park Place to Berkeley County Line	29,900	26,700	32,600	31,500	5.35
Spruill Avenue	McMillan Avenue to US Highway 52	8,300	9,300	10,500	10,000	20.48

Parsons Brinckerhoff, 2005. Existing Roadway Traffic Study for the North Charleston Study Area (using 2000 to 2003 SCDOT AADT Data)


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Major Roads
Major Road
Primary Hwy
Interstate Hwy
Tri-County Region
Berkeley County
Charleston County
Dorchester County
0 5 10 20
Miles
Map Scale: 1:750,000
Clarendon
Georgetown
Orangeburg
Colleton
Beaufort
BerkeleyCounty
DorchesterCounty
CharlestonCounty
Atlantic Ocean
State Rd
5th Ave
North Carolina
South Carolina
Georgia
N
W
E
S
Index Map Scale 1:12,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.6-1
Major Roadways in
the Tri-County Region

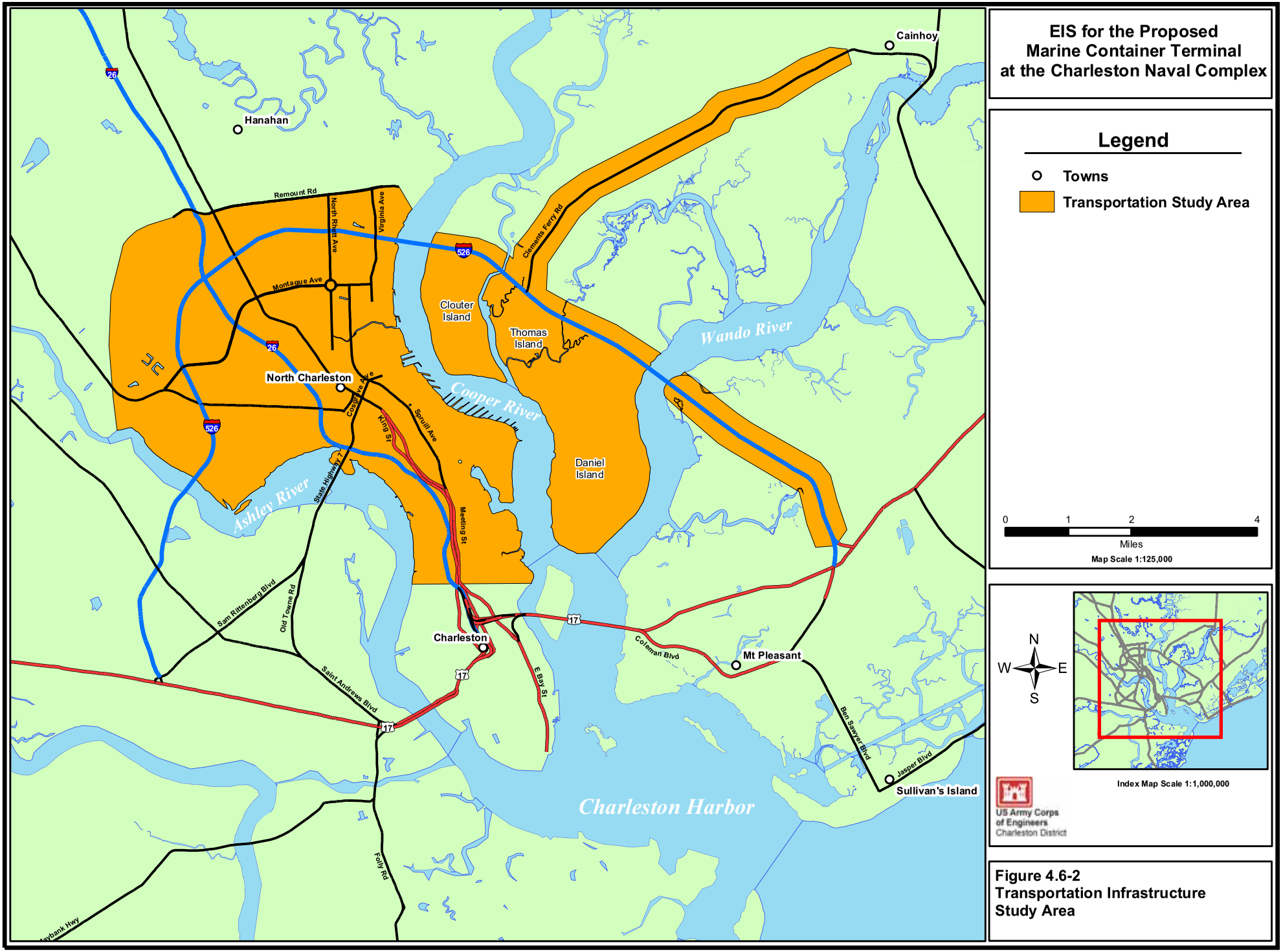


Figure 4.6-2
Transportation Infrastructure
Study Area

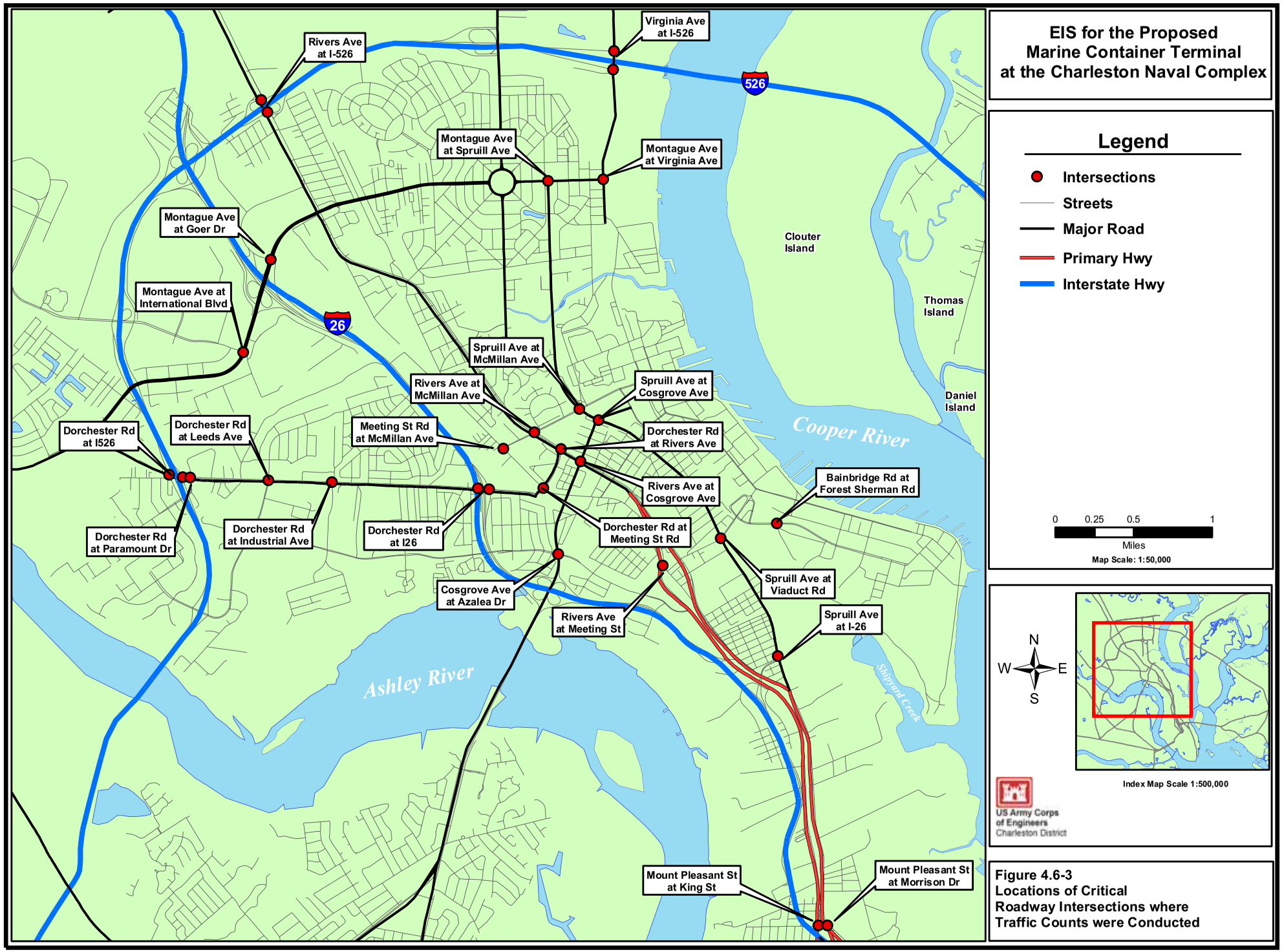
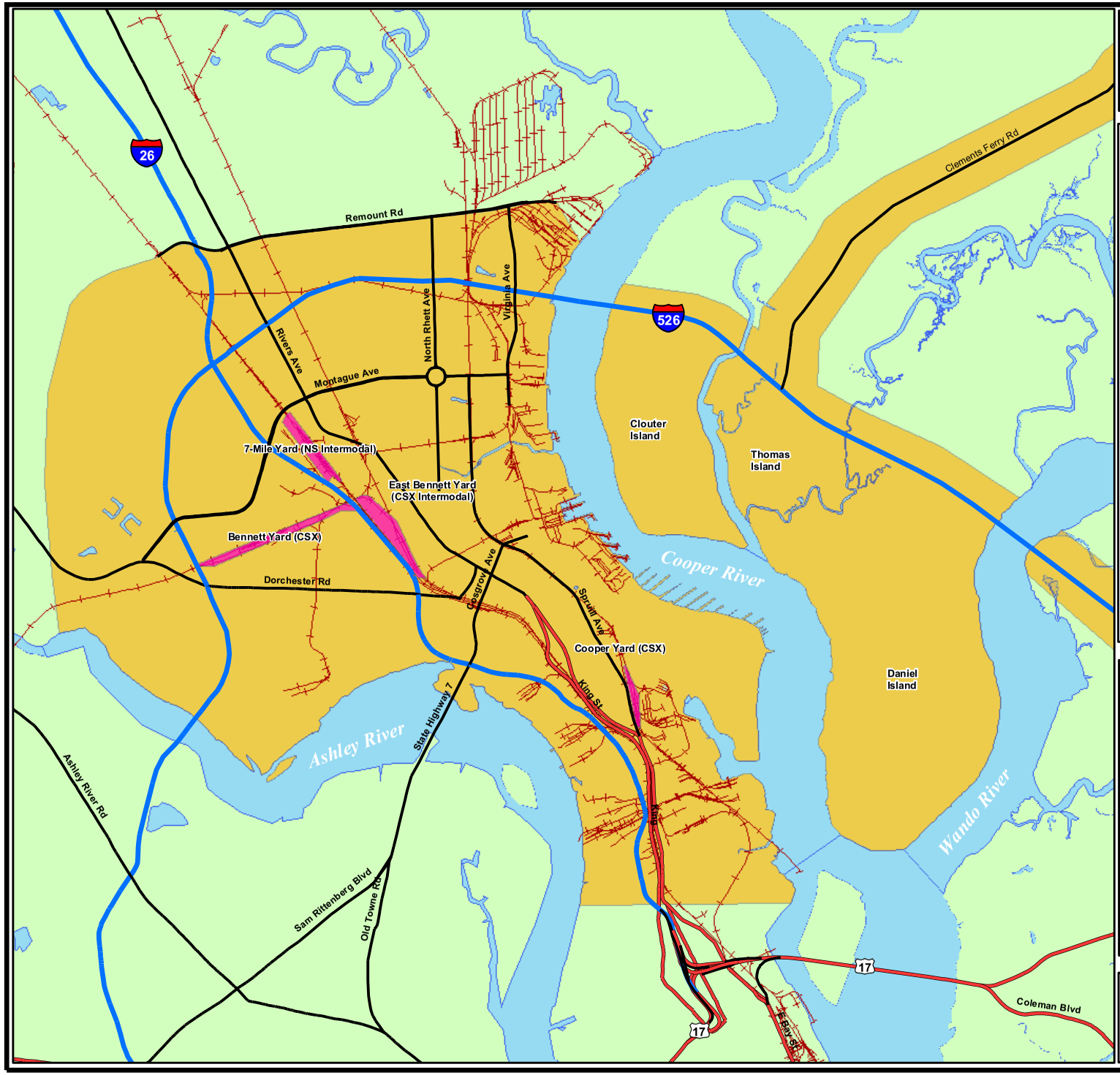


Figure 4.6-3
Locations of Critical
Roadway Intersections where
Traffic Counts were Conducted



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

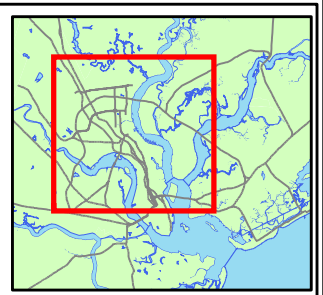
Legend

- Railways
- Rail Yards
- Transportation Study Area

0 0.5 1 2

Miles

Map Scale: 1:80,000



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 4.6-4
Locations of Railways & Railyards in the Study Area

4.7. NAVIGATION AND TERMINAL FACILITIES

This section describes the existing navigation features (i.e., Federal channels, turning basins, and anchorages) and terminal facilities in Charleston Harbor. The study area for this discussion is shown in Figure 4.7-1.

4.7.1. Federal Channels, Turning Basins, and Anchorages

4.7.1.1. Historical Development of Federal Navigation Features

The original authorization for Charleston Harbor was included in the Rivers and Harbors Act of 1852. The first components of the present harbor system were authorized by the Rivers and Harbors Act of 1878 and included a channel draft of 21 feet across the bar and two stone jetties. Additional studies and authorizations occurred in 1898, 1904, 1911, 1914, 1924, 1926, 1939, 1941, 1954, 1958, and 1986.

The project depths of -35 feet MLW and -40 feet MLW were achieved by 1942 and 1986, respectively. Authorization for the current project depth of -45 feet MLW occurred in 1996 and dredging to that depth was completed in 2004.

There are approximately 36.5 nautical miles of Federally maintained channels in the harbor. A map of the existing channel system is provided in Figure 4.7-2. The channel system is comprised of 35 reaches ranging from 0.15 to 9.0 nautical miles in length and from 400 to 1,400 feet in width.

4.7.1.2. Current Federal Navigation Features

The Fort Sumter Range has a current authorized depth of -47 feet MLW. The majority of the other ranges and reaches have an authorized and maintained depth of -45 feet MLW. Ranges A through G upriver of Ordnance Reach on the Cooper River are not included in the Federal Navigation Channel maintained by the USACE; however, they are maintained by the U.S. Navy to a depth of -35 feet MLW. The three ranges in Shipyard Creek vary in depth from -30 feet to -45 feet MLW. The channel system includes seven turning basins for the maneuvering of vessels. These basins are located at Custom House Reach, Town Creek Lower Reach, Shipyard Creek (2), Ordnance Reach, and Upper Wando Reach. An anchorage for vessels that cannot be placed at a berth is located southeast of Rebellion Reach. Maintenance of the authorized depths in the channels and turning basins requires annual maintenance dredging of approximately 1.9 million cubic yards of silt and sand. Sedimentation rates and maintenance dredging requirements are discussed in Section 4.16.

A turning basin in the Cooper River is authorized but is currently not constructed. The Daniel Island Reach turning basin was authorized by the U.S. Congress in the 1996 Water Resources Development Act (WRDA) to provide for future traffic that would result from additional vessel calls and maneuvering requirements from the operation of a marine container terminal on Daniel Island. This turning basin is considered an alternative for vessels traveling up the Cooper River 4.6 river miles to the Ordnance Reach turning basin located just upriver from the existing SPA North Charleston Terminal (NCT). Construction of the authorized turning basin was conditional on a marine container terminal being constructed on Daniel Island. However, as discussed in Section 1.2.3, in April 2000 the SPA elected to withdraw their permit application for the marine container terminal on Daniel Island. It is unlikely that the authorized Daniel Island Reach Turning Basin will be constructed as authorized given that the permit application for the marine container terminal on Daniel Island was withdrawn.

4.7.2. Terminal Facilities and Port Security

4.7.2.1. SCSPA Terminals

Union Pier

The Union Pier Terminal is located on the Cooper River side of the Charleston peninsula. The terminal is 14.2 nautical miles (nm) from the entrance of the channel system. The terminal covers a total area of 70 acres and has 2,470 feet of berth. The maintained depth at the berth is -32 feet MLW. The terminal includes 728,828 square feet of transit shed and is primarily used for automobile and breakbulk shipments. The terminal includes a cruise passenger facility adjacent to Berth 1. Access between the terminal and I-26 is provided by Concord and East Bay Streets. The terminal has existing rail access, which is operated by the Port Utilities Company and connects to the CSX and Norfolk Southern lines.

Columbus Street Terminal

The Columbus Street Terminal is located on the Cooper River side of the Charleston peninsula, downriver of the new US Highway 17 bridge. The terminal is 14.4 nm from the channel entrance. The terminal has 3,875 feet of berth and covers a total of 160 acres, including 78 acres of open container processing and storage area.

The berths at the terminal range in maintained depth from -38 feet MLW (Berths 4 and 5) to -45 feet MLW (Berths 1-3). The terminal is primarily used for container and breakbulk operations. The terminal includes six container cranes on two container berths and four breakbulk berths. Two of the container cranes are Super post-Panamax and therefore have the ability to load and unload vessels that can pass through the widened Panama Canal. The terminal includes 457,500 square feet of warehouses with covered rail access. Access from the terminal to I-26 is provided by Morrison Avenue and East Bay Street. There is existing rail access to this terminal, which includes an on-terminal intermodal rail yard. Switching on the terminal is done by the Port Utilities Company. Both the CSX and Norfolk Southern Lines pick up and deliver at the terminal.

North Charleston Terminal

The North Charleston Terminal is located on the Cooper River north of I-526, between to the Naval Weapons Station immediately upriver and the Meade Westvaco Paper Plant immediately downriver. This terminal is located 22 nautical miles from the channel entrance and has 2,500 feet of continuous berth. Berth depth at the terminal is -40 feet MLW at Berths 1 through 3 and -40 feet MLW at the grain elevator berth. Construction to repair existing piles at Berths 1 through 3 is projected to be completed by January 2007, at which time the berth will be deepened to a depth of -45 MLW.

There are six container cranes serving the berths. Three of the container cranes have the ability to load and unload post-Panamax vessels. The terminal covers an area of 201 acres, of which 123 acres are for container processing and storage. The primary uses of the terminal are container operations. A 1.5-million-bushel grain elevator is also located along the waterfront, however, is not presently contracted and the waterfront area is being considered for demolition and redevelopment to develop additional backland and linear feet of berth for container ships.

Access between the terminal and I-526 is provided by Remount Road, Virginia Avenue and North Rhett Avenue. Access between the terminal and I-26 is provided by Remount Road. The terminal has rail access and an on-terminal rail yard. Switching on the terminal is done by the Port Terminal Railroad. Both the CSX and Norfolk Southern Lines switch into and out of the yard.

Wando Welch Terminal

The Wando Welch Terminal is located on the east side of the Wando River north of the Town of Mount Pleasant. The terminal is 16.6 nm from the channel entrance and has 3,800 feet of continuous berth with a maintained depth of -45 feet MLW. The terminal site comprises 673 acres, of which 194 acres are used for container handling and storage. The terminal has 10 container cranes on four container ship berths. Four of the container cranes are Super post-Panamax, four are post-Panamax, and two are Panamax. The terminal includes a 200,000-square-foot container freight station for the stripping and stuffing of containers. Access between the terminal and I-526 is provided by Long Point Road. There is no rail access to this terminal.

Veteran's Terminal

The Veteran's Terminal is located on the Cooper River south of I-526, on the northern end of the CNC. The terminal is a 110-acre facility dedicated to bulk, breakbulk, and roll-on-roll-off (RO-RO) cargo. The terminal has four piers, originally constructed as part of the Charleston Naval Station, with a maintained depth of -35 feet MLW. The terminal includes 90,000 square feet of warehouse storage. Interstate freeway (I-26) access is approximately 1.5 miles from Veteran's Terminal. The facility also has rail service provided by Norfolk Southern and CSX, Corp.

4.7.2.2. Private Terminal Facilities

There are over 50 private terminal facilities on Charleston Harbor. These facilities include shipyards, oil terminals, chemical terminals, steel terminals, tug operations, mid-stream transfer stations, fisheries, scrap metal, wood products, and project cargo terminals. A majority of these facilities are located along the west shore of the Cooper River between the U.S. 17 Highway bridge and the North Charleston Terminal. This area includes those private facilities now occupying portions of the CNC. Private terminals at the CNC are located upriver of the Proposed Project. No existing terminal, private or public, is presently located at the Proposed Project.

4.7.3. Port Security

The Maritime Transportation Security Act of 2002 (MTSA) requires the USCG to develop national and regional area maritime transportation security plans. It also requires that seaports, waterfront terminals, and certain types of vessels develop and submit security and incident response plans to the Coast Guard for approval. The MTSA requires the Coast Guard to conduct antiterrorism assessments of certain foreign ports. The USCG issued final rules implementing MTSA on October 22, 2003 (68 Fed. Reg. 60448).

As of September 2006, the SCSPA has received over $20 Million from federal security grant funding. According to the SCSPA, the recent funding will be used for physical security enhancements, such as access control infrastructure, scanning equipment, surveillance systems and fencing.

The Charleston Harbor Operations Center (CHOC), also known as Project SeaHawk, was created as a unique, benchmark project to enhance the protection, security, and infrastructure of seaports nationally. Administered by the US Attorney's Office for the District of South Carolina, Project SeaHawk is focused on the Port of Charleston. Project SeaHawk has created a unified intelligence operations center that includes all federal, state, and local agencies having responsibility for any aspect of port security and protection. A combined task force will address all areas of security to include screening ships, crews, itineraries and manifests, as well as the

physical security aspects of daily port operations. The goal is an operational task force that will evolve systematically into a model that can be easily replicated at other ports throughout the nation. In October 2006, the U.S. Congress passed legislation, the SAFE Port Act, calling for the establishment of interagency port security centers modeled on Project Seahawk at every high-priority port in the United States within the next three years.

4.7.4. Navigation Operations

4.7.4.1. Cooper River Vessel Traffic

Annual vessel calls and total SCSPA TEU throughput for Charleston Harbor in calendar years 1995 through 2004 are shown in Table 4.7-1. Total vessel calls for Charleston Harbor were provided by the Charleston Branch Pilots' Association. Total TEU throughput was provided by SCSPA. Vessel calls are defined as the number of ships arriving in Charleston Harbor that require pilotage. From 2000 to 2005, approximately 76 percent of all vessels calling at the port were ships destined for SCSPA terminals.

Table 4.7-2 describes the existing types of self-propelled deep-draft vessel trips on the Upper Cooper River for calendar years 2002, 2003 and 2004. Vessel trips are defined as a one-way vessel movement that requires pilotage. Therefore, a round trip (e.g., ship arriving in Charleston Harbor, traveling up the Cooper River, berthing, and then traveling down the Cooper River to depart Charleston Harbor) on the Cooper River would count as two trips. The data presented in Table 4.7-2 is developed from pilotage records supplied by the Charleston Branch Pilots' Association for vessel trips on the Cooper River upriver of Shipyard Creek. Therefore, vessels that terminate or originate from Shipyard Creek and do not travel on the Cooper River upriver of Shipyard Creek are not included in the data presented in Table 4.7-2.

The largest number of deep-draft vessel trips is represented by container ships that are presently calling at North Charleston Container Terminal. Container vessels account for more than one-half of the total annual number of deep-draft vessel trips on the Upper Cooper River. The next largest category of vessels in terms of total annual number of trips is tankers, which are approximately 15 percent of all deep-draft vessel trips on the Upper Cooper River. Bulk cargo ships are the third largest category of vessel trips, representing approximately 10 percent of the total annual number of deep-draft vessel trips on the Upper Cooper River.

Although RO-RO vessels are frequently counted as similar to container vessels, their smaller size and variety of cargoes renders them more like breakbulk general cargo ships. The RO-RO and breakbulk vessel trips on the Upper Cooper River include both commercial and military vessels and cargoes. Collectively, the RO-RO and breakbulk vessel trips on the Upper Cooper River are about 12 percent of total deep-draft vessel trips for the last 2 and 3 years.

The data shown in Table 4.7-2 indicate that the total deep-draft vessel trips on the Upper Cooper River declined from 1582/1581 trips in 2002/2003, respectively, to 1354 trips in 2004. A 3-year average is a total of 1506 vessel trips. A 2-year average of 2002 and 2003 is a total of 1582 vessel trips. The largest change in the total number of vessel trips is for container vessels, which declined by nearly 100 trips between 2002 and 2003 and declined approximately 125 trips between 2003 and 2004. However, as the total number of vessel trips declined, the the container vessel sizes increased. Bulk vessel trips also declined in 2004 compared to 2002/2003. Breakbulk vessel trips declined substantially in 2004 (70 trips) compared to 2003 (143 trips) but were more similar to 2002 (95).

Some of the changes in vessel trips reflect the mobilization of armed forces associated with overseas military shipments in 2002 and 2003. The total number of vessel trips observed in 2004 is regarded as more typical of long-term trends as compared to 2003 and 2002.

4.7.4.2. Shipyard Creek

Vessel traffic in Shipyard Creek is focused on shallow-draft vessels and some deep-draft vessels. The shallow-draft vessels generally call on terminals in the upper reaches of the Shipyard Creek Channel while deep-draft vessels call on terminals in Shipyard Creek near the entrance from Cooper River. The shallow-draft vessels are generally domestic calls and do not require pilotage. Shallow-draft vessels are vessels that have a draft less than or equal to 18 feet. Table 4.7-3 summarizes the number of calls and types of vessels entering Shipyard Creek from 1999 to 2003. These data were obtained from the USACE Waterborne Commerce Center in New Orleans, LA and include vessel calls that would have required or used Charleston Branch Pilots. As shown in Table 4.7-3, the highest number of calls were the tug and barge category, which are included in the shallow-draft vessels. Data for 2004 was not available from the Waterborne Commerce Center as of July 2006.

4.7.4.3. Charleston Branch Pilots' Association

The Charleston Branch Pilots' Association provides marine pilotage for every seagoing merchant ship in the Port of Charleston. A marine pilot is a local navigational and ship-handling expert. Marine pilots are responsible for conducting the safe navigation of seagoing vessels while such vessels are underway on those waters designated as "pilot waters", which are those waters landward of the line between the Charleston Light on Sullivan's Island and the Folly Island Loran Tower. This direction and control of a vessel's transit are normally exercised by the marine pilot from the bridge or wheelhouse of a vessel.

Pilots typically board inbound ships at sea. Pilot boats transport the pilots to inbound ships. Pilots disembark outbound vessels onto their pilot boats after the vessels clear the channel. For vessels calling on Port Charleston, pilot transfers between ships and pilot boats usually take place about 10 miles out to sea.

The purpose for pilotage is navigational safety manifested by the prevention of maritime accidents that might otherwise be caused by navigational or shiphandling errors on the parts of persons not intimately familiar with the port's shipping channels, the port's environmental features and the dynamic and static hydraulic features of the waterways. Specific Federal and state regulations and guidelines assist in achieving a safe operation. When a safe operation is achieved, a smooth and efficient flow of maritime commerce also occurs.

The Charleston Branch Pilots' Association is a professional association of independently licensed pilots. Every pilot licensed for the Port of Charleston is a member. Pilots jointly provide their services through the Association. The Charleston Branch Pilots' Association provides a central location for communication, boat support, and billing. The association also assigns work schedules to the pilots to ensure pilot fatigue is not an issue.

Federal pilotage requirements (46 CFR 15.821) are administered and enforced by the U.S. Coast Guard (USCG). These regulations mandate that all self-propelled vessels 1,600 or more gross tons and seagoing tank barges over 10,000 gross tons entering, transiting or departing US waters between the sea and port must be directed by persons who hold a valid Federal First Class Pilot License for the routes to be transited. Charleston Branch Pilots' Association

estimate that no more than 15 percent of vessels calling on port in the state of South Carolina meet the Federal Pilotage categories.

State pilotage requirements (1976 SC Code 54-15-270, as amended) are mandated for all foreign flag vessels and for all U.S. vessels over 100 net registered tons. Registered tons is an international measure of vessel volume, not of weight. Charleston Branch Pilots' Association estimate that approximately 85 percent of vessels calling on port in the state of South Carolina meet the state pilotage statutes (1976 SC Code, Title 54, Chapter 15 as amended) and regulations (Code of SC Regulations, Chapter 136).

4.7.4.4. Docking Masters

Docking masters are employed by the tug companies. Docking masters are professional mariners who are especially competent in the handling of ships during docking and undocking maneuvers with tug assistance. Their role is to combine the propulsive and steering capabilities of ships along with tugs to safely dock and undock vessels. When docking and undocking, the pilot is in control of the vessel, but uses the docking master for assistance. There is no Federal or State requirement for docking masters but most of these individuals have Federal First Class Pilot licensure for the waters where they are performing docking services.

4.7.4.5. Vessel Safety

In Charleston Harbor, the USCG and the South Carolina Department of Natural Resources (SCDNR) provide recreational vessel safety regulations, enforcement, and training. In the navigation channel, large vessels have right-of-way over small craft because they are restricted to a narrow channel. To avoid collisions, small craft must stay clear of large vessels in the navigation channel because the larger vessels can not slow down and maintain control of the vessel. Occasional regattas in the harbor are typically coordinated with the USCG, and racing courses are outside the federal navigation channel.

Table 4.7-1. Total Vessel Calls and Total SCSPA TEU Throughput for Charleston Harbor.

Year	Total Vessel Calls[1]	Total SCSPA TEU Throughput [2]
1995	2,059	979,648
1996	2,195	1,052,142
1997	2,279	1,151,401
1998	2,401	1,259,259
1999	2,470	1,347,618
2000	2,499	1,574,467
2001	2,569	1,619,577
2002	2,401	1,509,381
2003	2,419	1,681,721
2004	2,513	1,863,902

[1] *Source: Charleston Branch Pilots' Association (Calendar Year)*

[2] *Source: SCSPA (Calendar Year)*

Table 4.7-2. Trips in Calendar Year on the Upper Cooper River, upriver of Shipyard Creek, by Vessel Type.

Vessel Type	2004	2003	2002	3 Yr Av	2 Yr. Av
Breakbulk	70	143	95	103	119
Bulk	118	159	161	146	160
Container	726	852	962	847	907
Ro-Ro	98	87	56	80	72
Tank	223	224	195	214	210
Tug/Barge	94	85	80	86	83
Other	25	31	33	30	32
Total	*1354*	*1581*	*1582*	*1506*	*1582*

Notes: vessel trips are counted as one-way passages.

Source: G.E.C., 2005 using data provided Charleston Branch Pilots' Association

Table 4.7-3. Vessel Calls in Calendar Year for Shipyard Creek, by Vessel Type.

Vessel Type	2003	2002	2001	2000	1999
Breakbulk	66	48	36	3	18
Tank	21	24	11	10	18
Tug/Barge	260	320	264	206	121
Total	*346*	*392*	*311*	*219*	*157*

Source: G.E.C., 2005 using data provided by USACE, Waterborne Commerce Statistics Center, New Orleans, LA

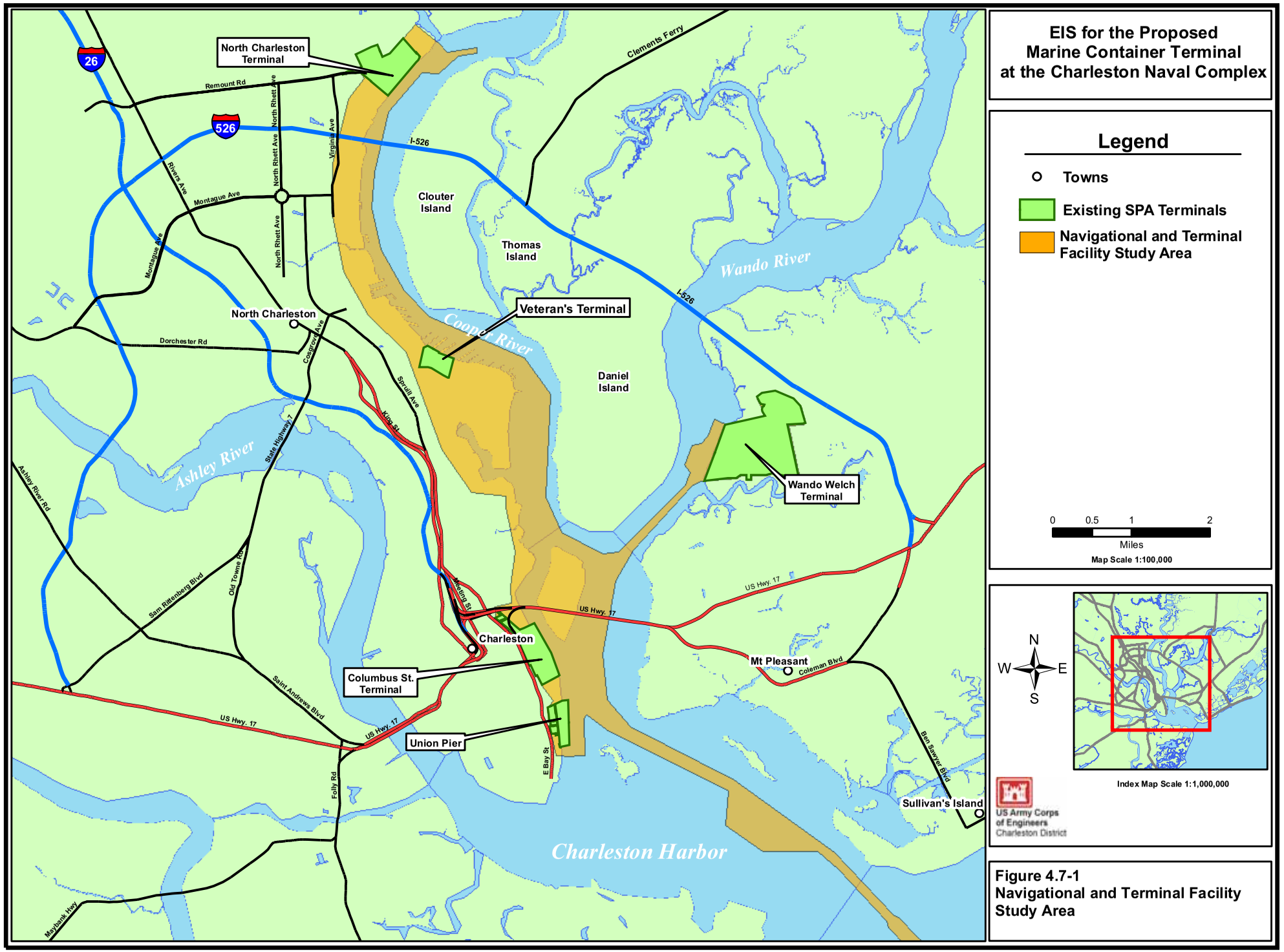


Figure 4.7-1
Navigational and Terminal Facility Study Area

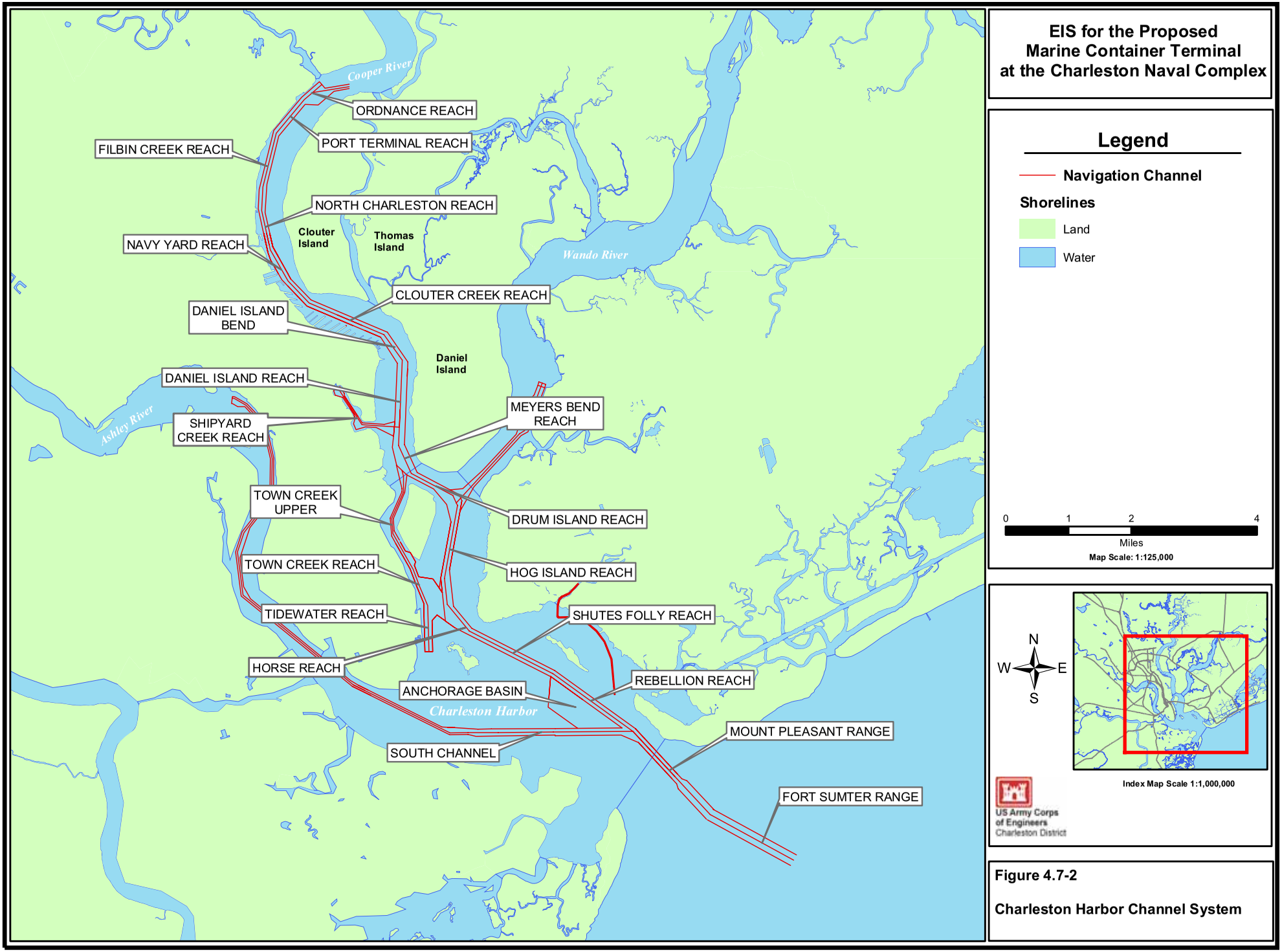


Figure 4.7-2

Charleston Harbor Channel System

4.8. NOISE

The purpose of this section is to characterize existing noise levels at various locations within the study area. This section includes the findings of a monitoring program that was undertaken primarily to establish ambient noise levels, that is, existing background sources and intensities of noise, within the study area (Figure 4.8-1). The various metrics that are used to quantify noise, the effects of noise, and the results of noise monitoring are discussed in the following sections.

4.8.1. Noise Characteristics

Community environmental noise varies over time as the characteristics of contributing noise sources characteristics change. Community noise is the combination of numerous distant noise sources that establish a relatively stable background or ambient noise exposure. Background noise exposures change during the course of the day, but do so in a gradual manner, reflecting the addition and subtraction of distant noise sources. The time-varying characteristic of environmental noise is described using statistical descriptors as discussed below:

- **Equivalent sound level (Leq)** describes noise over a specific period of time (usually 1 hour) in terms of a single numerical value. The Leq is the constant sound level that would contain the same acoustic energy as the varying sound level during the same time period, the average sound level over a specific time period. The Federal Highway Administration (FHWA) evaluates noise impacts on an equivalent sound level over a 1-hour time period, referred to as $Leq_{(h)}$.

- $\mathbf{L_{max}}$ is the instantaneous maximum sound level during a specific time period.

- **Community Noise Equivalent Level (CNEL)** is an Leq with a specified time period of 24 consecutive hours that adds a 5 A-weighted decibels (dBA) “penalty” for the evening hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA “penalty” for the nighttime and morning hours of 10:00 p.m. to 7:00 a.m. to account for increased sensitivity to noise during evening, nighttime, and early morning hours.

- **Day-Night Sound Level (DNL)** is a Leq with a specified time period of 24 hours that adds 10 dBA during the 10:00 p.m. to 7:00 a.m. period, but not a 5 dBA penalty during the 7:00 p.m. to 10:00 p.m. period. It is the same as the CNEL except that noise during the 7:00 p.m. to 10:00 p.m. period is grouped into the daytime period. The Federal Aviation Administration and U.S. Department of Housing and Urban Development use this noise metric for evaluating noise related impacts.

Ambient noise is the all-encompassing sound associated with a given environment at a specified time, being usually a composite of sound from many sources at many directions, near and far with no particular sound being dominant.

In humans, the span of sound audibility is about 140 dB, zero decibels being the lower limit and 140 dB typically being the level at which one’s perception changes from hearing to pain. The decibel scale is logarithmic in its representation of pressure wave changes. When the vibration energy level of a sound source is doubled, the sound response in humans is about 3-dB, barely perceptible to most people. Tripling the energy level would result in a 5-dB sound increase, which would be noticeable to most people without hearing impairment. An increase or decrease of 10 times the source energy level results in a 10-dB sound level change that would be perceived as doubling or halving the perceived sound loudness.

Electronic weighting scales are used to define the loudness of different sound frequencies because human hearing is non-linear in sensitivity to sound. The “A” weighting scale is commonly used in assessing environmental noise because this scale resembles the non-linear characteristic of human hearing. The unit of “A” weighted noise is dBA.

Noise can be defined in general terms as unwanted or intrusive sound. Noise impacts on the human environment range from intensity levels that interfere with speech and hearing and sleep (annoyance and nuisance effects) to those that can cause adverse health effects such as hearing loss and psychological effects. The human response to noise is subjective and typically varies substantially from individual to individual within a community. Noise intensity, frequency, distribution pattern, intensity of background noise prior to noise intrusion, and the characteristics of the work or activity exposed are all factors that may influence individual response to noise intrusion.

The general thresholds for indoor speech interference are approximately 45 dBA for continuous, non-fluctuating, noise levels and 55 dBA and above for fluctuating noise. In outdoor settings the speech interference thresholds are approximately 15 dBA higher than for indoor interference. Sleep disruption may occur with steady noise of intensities above 35 dBA and fluctuating intensity levels of 45 dBA and greater. Unwanted noise may also induce annoyance when speech, radio and television hearing and understanding, sleep and rest are disturbed. When the DNL is 60 dBA, about 10 percent of the population can be expected to be highly annoyed. With each decibel increase to 70 dBA, approximately 2 additional percent of the population become highly annoyed. Approximately 3 percent of the population additional per each decibel increase above 70 dBA may be expected to become highly annoyed.

Table 4.8-1 provides typical environmental noise sources, associated sound levels (dBA), and typical human reactions to these noises.

Noise levels naturally decrease as the receptor moves further away from a noise source. This is referred to as the geometric spreading loss. The rate at which attenuation from geometric spreading loss occurs is dependent on whether the noise source is a point or line source. A point source decreases at a rate of about 6 to 9 dBA with each doubling of distance from the source. Noise attenuation for line sources such as a highway or widely distributed source is about 3 to 4 dBA with each doubling of distance from the source. The following factors affect noise levels at distances of one-quarter to one-mile from a noise source.

- Divergence of sound waves as the distance between the source and receiver increases;
- Atmospheric absorption of sound waves;
- Ground attenuation;
- Buildings and other obstacles, and
- Sound wave refraction induced by wind and temperature gradients.

Table 4.8-1. Environmental Noise Sources, Intensity, and Human Responses.

Noise Source	Sound Level (dBA)	Reaction
Hearing Threshold	0	Sound Awareness
Rustling Leaves	10	Very Faint
Rural Area Nighttime	20	Faint
Whisper	30	Perceived as Very Quiet
Urban Nighttime	40	Moderate
Dishwasher in Adjacent Room	50	Acceptable Noise Level
Conversational Speech	60	Loudness Complaints Rare
Vacuum Cleaner	70	Complaints Possible
Noisy Restaurant	80	Complaints Likely
Electric Blender	90	Hearing Damage (8 Hour Exposure
Heavy Truck	100	Very Loud
Jet Flyover @ 1000’	110	Deafening
Rock Concert	130	Limits Amplified Speech
Jet Aircraft Take Off	140	Pain Threshold
Rocket Launch	180	Possible Short-term Hearing Damage

Salvato, 1992. Plog, 1996.

4.8.2. Noise Standards

Applicable local regulations, typically noise ordinances, are relied on to minimize adverse noise impacts to affected communities and to provide for reasonable and feasible noise control. South Carolina has based its noise control strategy and policies on existing State and Federal noise standards. These standards indicate that a DNL of 65 dB is the maximum exterior noise exposure conditions for noise-sensitive receptors.

Charleston County noise ordinance performance standards for the daily time period 7:00 am to 7:00 pm are summarized in Table 4.8-2; it should be noted that the permissible sound levels at residential district boundaries are 5 dB less than those shown in Table 4.8-2 during the daily time period of 7:00 pm to 7:00 am.

Table 4.8-2 Charleston County Noise Ordinance Maximum Permitted Sound Levels (in dBA) Using Preferred Frequency Octave Bands.

Preferred Center Frequency	Sound Level by Land Use Categories (dBA)[1]		
	A	B	C
31.5	83	86	88
63.0	71	75	79
125	59	64	69
250	52	57	62
500	47	53	58
1000	43	49	54
2000	40	46	51
4000	37	44	49
8000	35	41	47
Maximum Permitted Impact Noise Level	80	80	90

Charleston County Ordinance 1138 § II, 5-16-00 Table 3.
[1] Land Use Categories are descrbed in Table 4.8-3.

4.8.3. Sensitive Receptors

In order to evaluate potential project related noise impacts, noise-sensitive receptors must be identified, located, and described. Land uses such as health care facilities, libraries, schools, and parks are typically considered to be sensitive to noise. To determine the degree of impact of highway traffic noise on human activity, the FHWA established the noise abatement criteria (NAC) that are presented in Table 4.8-3. The NAC are given in terms of hourly, A-weighted, equivalent sound level in decibels (dBA). The A-weighted sound level is a single number measure of sound intensity with weighted frequency characteristics that corresponds to human subjective response to noise. For traffic noise, Leq is typically evaluated over a one-hour period and may be denoted as $Leq_{(h)}$.

Table 4.8-3. Federal Highway Administration Noise Abatement Criteria for Various Land Use Categories.

Land Use Category	Leq	Land Use Description
A	57 (Exterior)	Lands on 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 continue to serve its intended purpose.
B	67 (Exterior)	Residences, schools, churches, parks, picnic areas, recreation areas, playgrounds, active sports areas, motels, hotels, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B.
D	-	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, churches, libraries, hospitals, and auditoriums.

Noise-sensitive receptors were identified proximal (within 1,000 feet) to the Proposed Project, as well as to the alternative locations (Clouter Island and Daniel Island). Figures 4.8-2 and 4.8-3 show the noise-sensitive receptors associated with the Proposed Project and the project alternatives, respectively.

Noise-sensitive receptors located proximal to the Proposed Project are primarily Category B and C land uses (23 CFR 772, Table 1) and would be expected to currently be exposed to $Leq_{(h)}$ of 67 dBA and 72 dBA or less respectively. Noise-sensitive receptors proximal to the Clouter and Daniel Island Alternatives are Category B and D. No Category A noise-sensitive receptors are located proximal to the Proposed Project, and none are located proximal to the Clouter.

4.8.4. North Charleston Study Area

Data from 26 noise-monitoring stations were analyzed during a noise survey conducted within the North Charleston study area during February, April, and June 2005. A mix of land uses was monitored (industrial, residential, recreational, and institutional). Both the Leq and DNL parameters were recorded for each land use type. Two of the 26 sites were 24-hour monitoring stations (Department of Homeland Security dormitory and near the intersection of Spruill Avenue and Viaduct Road). Figure 4.8-4 shows the locations of the North Charleston study area noise monitoring locations.

Table 4.8-4 provides a summary of the ambient noise levels recorded within the North Charleston study area. The total average ambient Leq noise level of all 26 noise monitoring stations was 62.8 dBA. The average residential Leq was 63.5. The highest recorded residential Leq was 69.6, which was recorded in the Rosemont neighborhood at the intersection of Doscher Avenue and Delano Drive. Churches represented institutional land use and the average Leq for this land use was 61.0 dBA. Three industrial land use stations were monitored and the average Leq and DNL for these stations were 61.5 dBA and 63.0 dBA, respectively. Two recreational areas were monitored (Park South on Spruill Avenue and the Freddie Whaley, Sr. Community Center in Rosemont neighborhood). The average recreational Leq was 62.4 dBA.

The DNL values determined for 24-hour monitoring stations were 62 dBA and 72 dBA respectively. Tables 4.8-5 and 4.8-6 summarize the data for the two 24-hour noise monitoring stations.

Table 4.8-4 Ambient Noise Conditions within the North Charleston Study Area.

Station Number	Description	Land Use	Date	Time (hours)	Leq (dBA)	DNL (dBA)
1	Homeland Security Student Housing *	Institutional	2/15/05-2/16/05	1040-1040	50.3	62
2	Kossler Quarters	Institutional	2/15/05 & 4/20/05	1105 & 0914	54.2/50.2	57
3	Proposed Entrance Road on CNC (near Strong Street)	Industrial	2/15/05	1450	52.5	55
4	Accabee Neighborhood at St. Simmons Drive and Misroon Street	Residential	6/8/05	1440	59.3	N/A
5	Park South on Spruill Avenue	Recreational	4/21/05	1100	60.6	63
6	Dorchester Terrace Neighborhood at Matipan Avenue and Elegans Drive	Residential	6/8/05	1515	68.4	N/A
7	CNC South Access *	Industrial	4/21/05	1400	72.2 **	72
8	Windsor Neighborhood at Spruill Avenue and Hampton Avenue	Residential	4/20/05	1040	68.6	71
9	Charter Hospital of Charleston at Speissegger Drive	Institutional	6/8/05	1115	61.6	N/A
10	Baker Hospital at Saluda Street	Institutional	6/9/05	1045	59.9	N/A
11	Church at Meeting Street and Hampton Avenue	Institutional	4/20/05	1135	66.5	69
12	Union Heights Neighborhood at Beech Avenue and Cosmopolitan Street	Residential	2/16/05	950	55.5	58
13	Apartments at the end of Baker Hospital Boulevard	Residential	6/8/05	1015	61.7	N/A
14	Rhodia Entrance near Southbound I-26	Commercial	6/8/05	1420	69.1	N/A
15	Union Heights Neighborhood at Echo Avenue and Meeting Street	Residential	4/21/05	1405	67.3	69
16	Union Heights Neighborhood at Echo Avenue and Buchanan Street	Residential	4/21/05	1350	58.1	60
17	Evening Prayer Church of God in Christ	Institutional	4/21/05	1330	70.6	72
18	Pentecostal Church	Institutional	2/15/05	1520	73.2	75
19	Union Heights Neighborhood at Irving Avenue and Cosmopolitan Street	Residential	4/21/05	1435	62.8	65
20	Union Heights neighborhood at 1995 Kings Worth Avenue	Residential	4/21/05	1535	61.9	64
21	Austin Avenue near Southbound I-26	Commercial	6/8/05	1400	67.7	N/A
22	Commercial Area along Pittsburgh Avenue	Industrial	4/21/05	1500	59.7	62
23	Rosemont Neighborhood at Austin and Peace Street	Residential	6/8/05	1330	65.8	N/A
24	Rosemont Neighborhood at Doscher Avenue and Delano Drive	Residential	6/8/05	1310	69.6	N/A
25	Church at Austin Avenue and Odessa Street	Institutional	6/8/05	1235	62.6	N/A
26	Freddie Whaley, Sr. Community Center at the end of Doscher Avenue	Recreational	6/8/05	1215	64.2	N/A

* *DNL values for North Charleston Study Area Station Numbers 1 and 7 were calculated from hourly Leq values measured over a 24-hour period. Other DNL values were estimated from short-term Leq measurements.*

** *Highest hourly Leq measured at this monitoring site.*

Table 4.8-5. Twenty-Four Hour Continuous Noise Monitoring Data for Department of Homeland Security Dormitory.

Time	Leq (dBA)	L_{10} (dBA)
1200	55.6	57.7
1300	65.6	60.7
1400	57.8	59.2
1500	57.3	58.9
1600	56.0	58.6
1700	57.4	60.5
1800	54.0	55.7
1900	55.0	57.7
2000	57.0	57.0
2100	59.4	58.2
2200	53.2	53.7
2300	55.4	57.3
2400	50.0	50.4
0100	50.6	50.2
0200	51.2	51.0
0300	50.6	50.9
0400	52.0	51.4
0500	51.3	52.7
0600	56.7	56.9
0700	59.4	60.6
0800	57.6	60.5
0900	63.6	64.9
1000	64.3	69.8
1100	63.6	68.4
DNL	62.0	-

Table 4.8-6. Twenty-Four Hour Continuous Noise Monitoring Data at the CNC Access.

Time	Leq (dBA)	L10 (dBA)
1200	70.5	73.8
1300	71.4	73.9
1400	72.2	74.6
1500	71.9	74.8
1600	71.8	74.2
1700	71.0	74.0
1800	69.9	72.9
1900	69.2	72.0
2000	67.2	70.6
2100	64.4	69.2
2200	64.2	69.2
2300	64.1	68.7
2400	62.5	66.8
0100	60.3	64.1
0200	60.7	64.5
0300	60.5	62.1
0400	62.7	66.5
0500	66.6	70.2
0600	70.4	73.9
0700	71.6	74.9
0800	71.7	75.2
0900	70.1	73.7
1000	71.1	77.0
1100	70.9	74.0
DNL	**72.0**	**-**

4.8.5. Daniel Island Study Area

A single station was monitored to determine ambient noise conditions within the Daniel Island study area. The noise monitoring station was located in the Pierce Park neighborhood on Daniel Island. Pierce Park is located on the eastern side of Daniel Island, approximately 4,300 feet east of the Daniel Island Alternative site.

The Leq at this noise monitoring station was 42.0 dBA and the DNL was 44 dBA. Table 4.8-7 provides information about this monitoring station. Figure 4.8-5 shows the location of the Daniel Island noise monitoring station.

Table 4.8-7 Ambient Noise Conditions Within the Daniel Island Study Area.

Station Number	Description	Land Use	Date	Time	Leq (dBA)	DNL (dBA)
1	Pierce Park neighborhood	Residential	2/15/05	1705	42.0	44

DNL values were estimated from short-term Leq measurements.

4.8.6. Clouter Island Study Area

Five noise monitoring stations were located within the Clouter Island study area, four of which were located in residential land use areas and one was located in an institutional setting (Intercession Church, located on Clements Ferry Road approximately one-half mile south of I-526).

The average Leq for the residential areas was 46.4 dBA and the average DNL was 48.5 dBA. These average noise levels were somewhat higher than those levels recorded at the Daniel Island noise monitoring station. The Leq and DNL determined for the Intercession Church monitoring station were 63.3 dBA and 65 dBA, respectively. The primary noise source in the Clouter Island study area is roadway noise emanating from I-526. Table 4.8-8 summarizes the ambient noise condition in the Clouter Island study area. Figure 4.8-6 shows the locations of the Clouter Island study area noise monitoring stations.

Table 4.8-8 Ambient Noise Conditions Within the Clouter Island Study Area.

Station Number	Description	Land Use	Date	Time	Leq (dBA)	DNL (dBA)
1	Finley Drive	Residential	4/20/05	1320	45.5	48
2	Intercession Church	Institutional	4/20/05	1415	63.3	65
3	St Thomas Island Drive and Victoria Road	Residential	4/20/05	1350	55.0	57
4	Clements Ferry Road	Residential	2/15/05	1630	36.0	38
5	Beresford Creek Street and Currier Street	Residential	4/20/05	1445	49.1	51

DNL values were estimated from short-term Leq measurements.

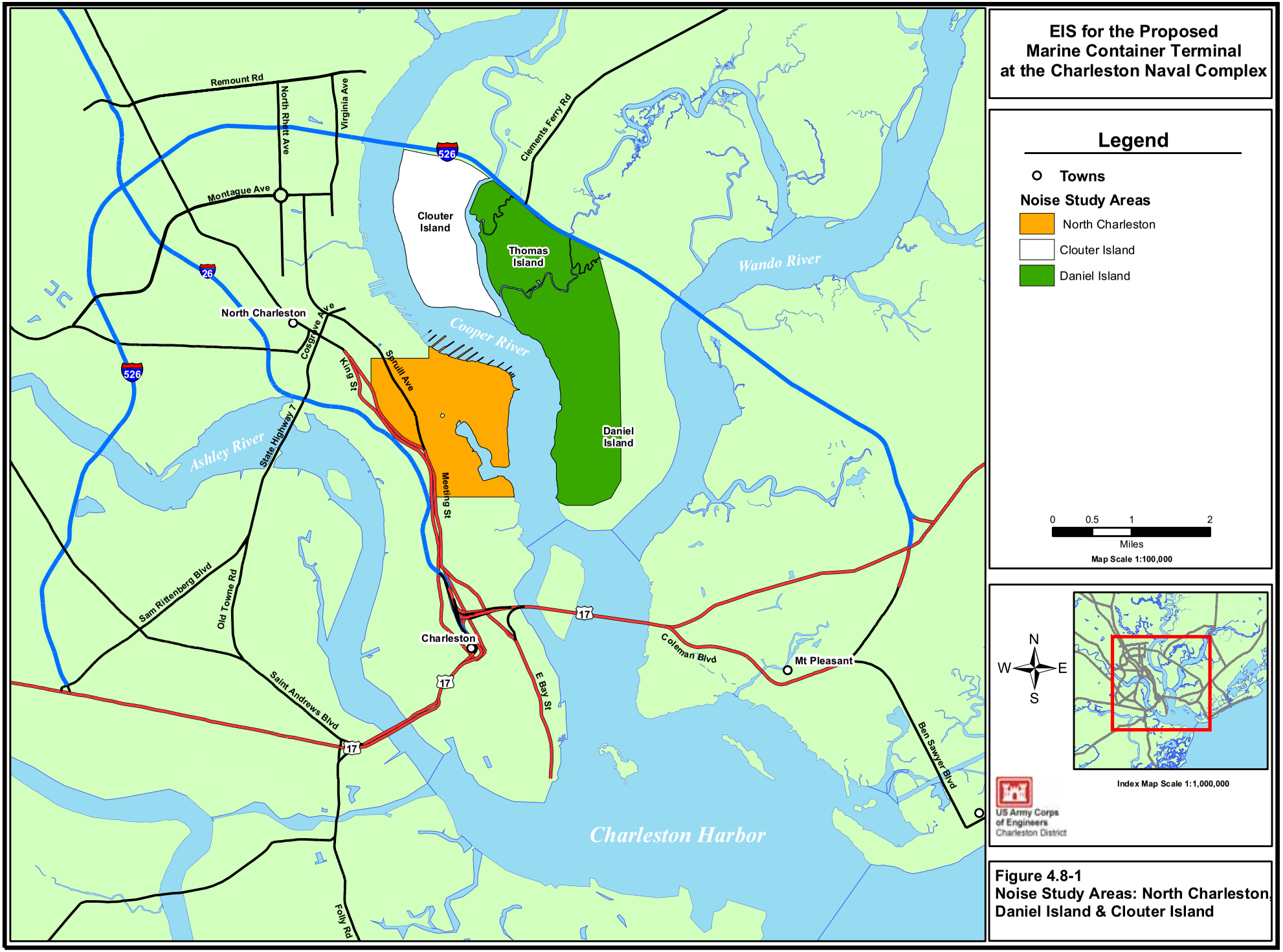
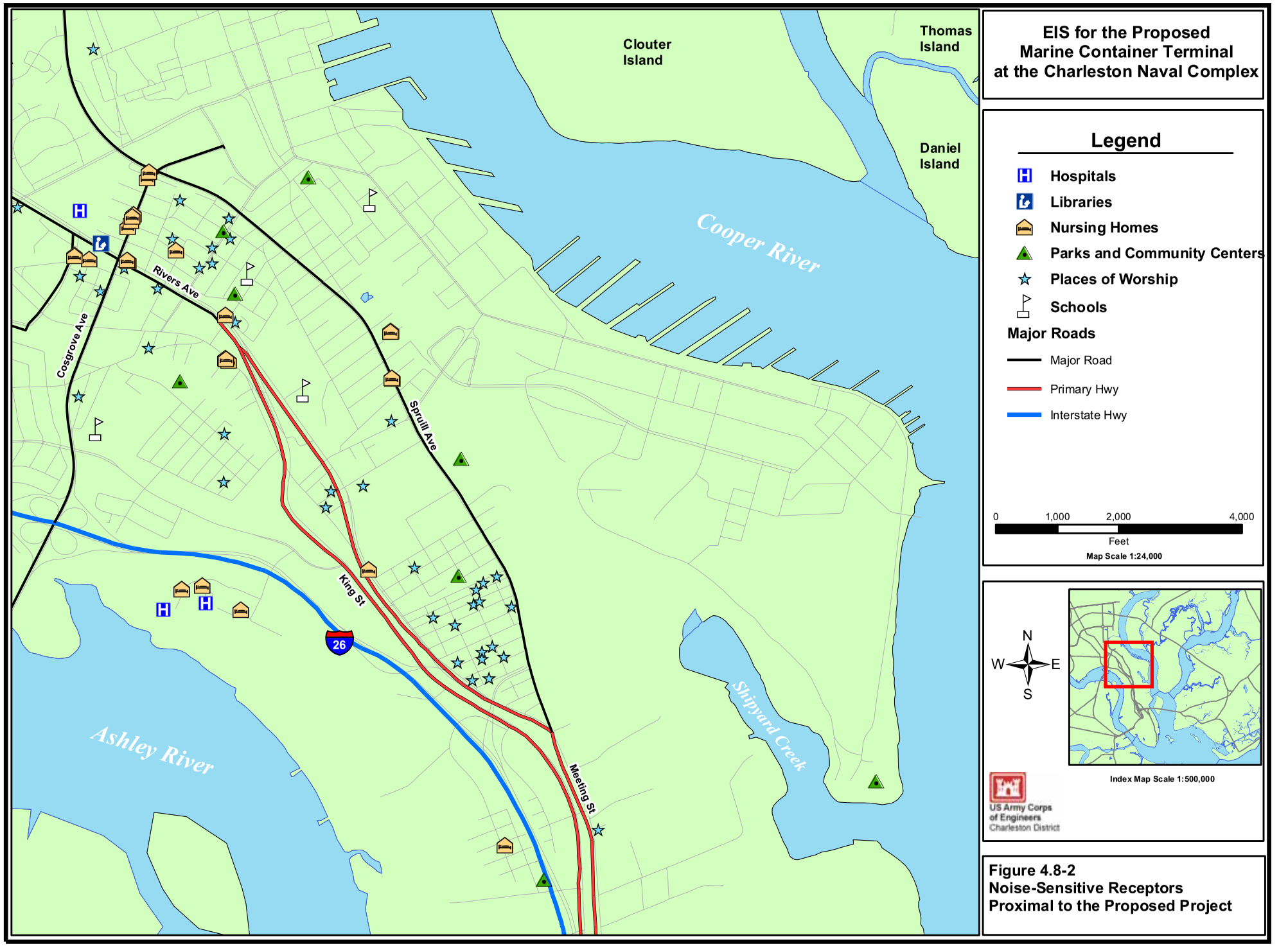
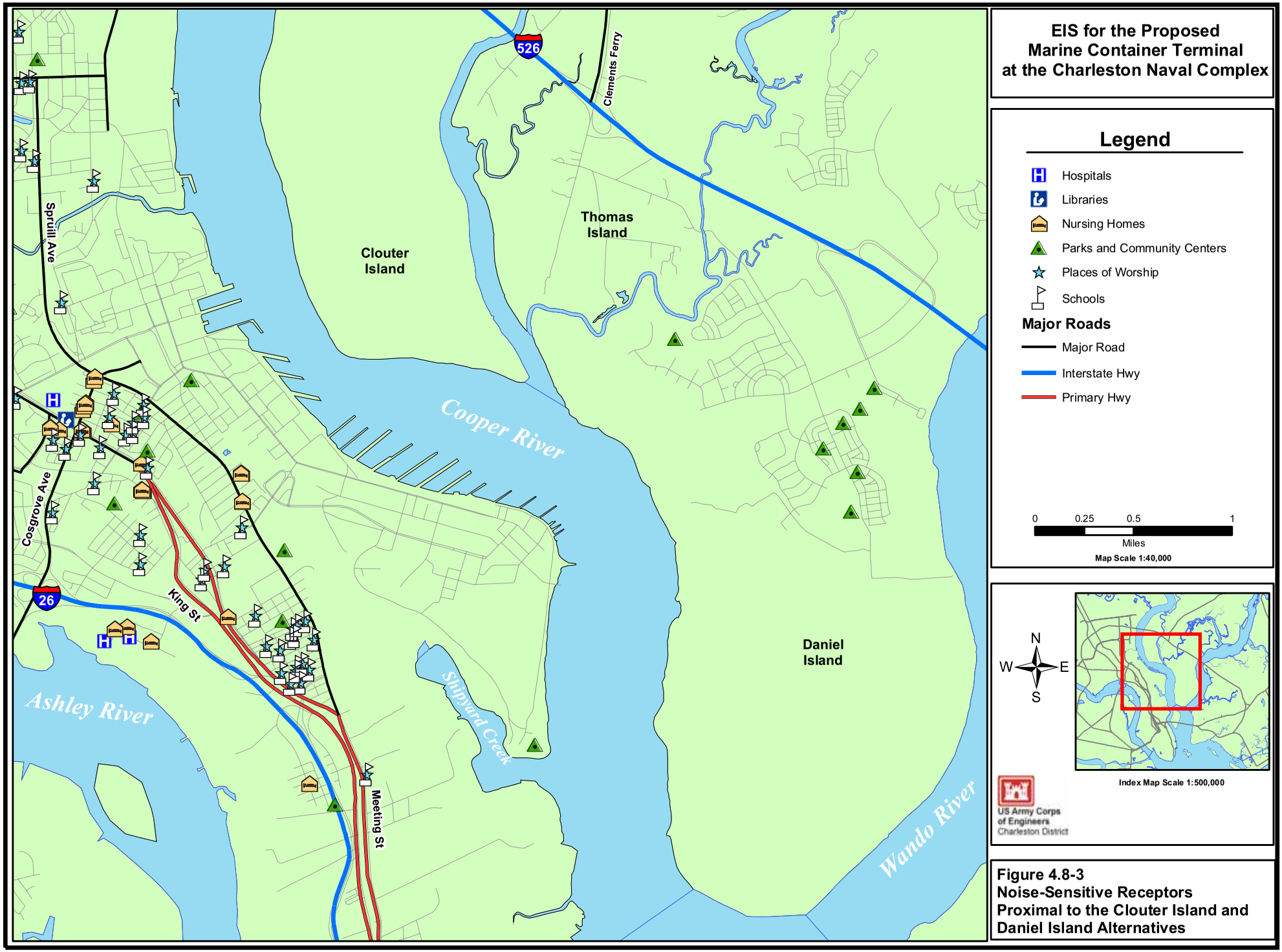
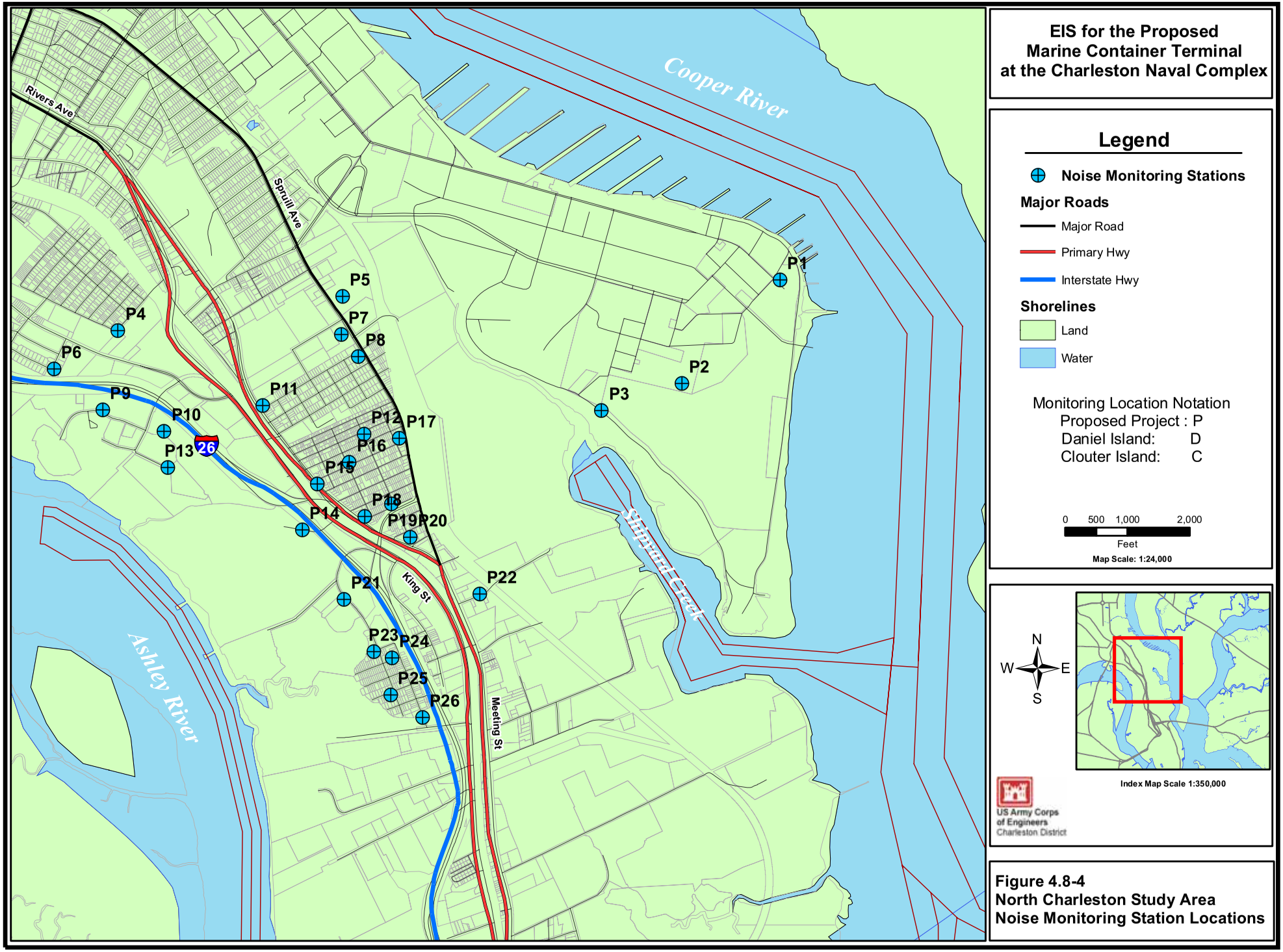
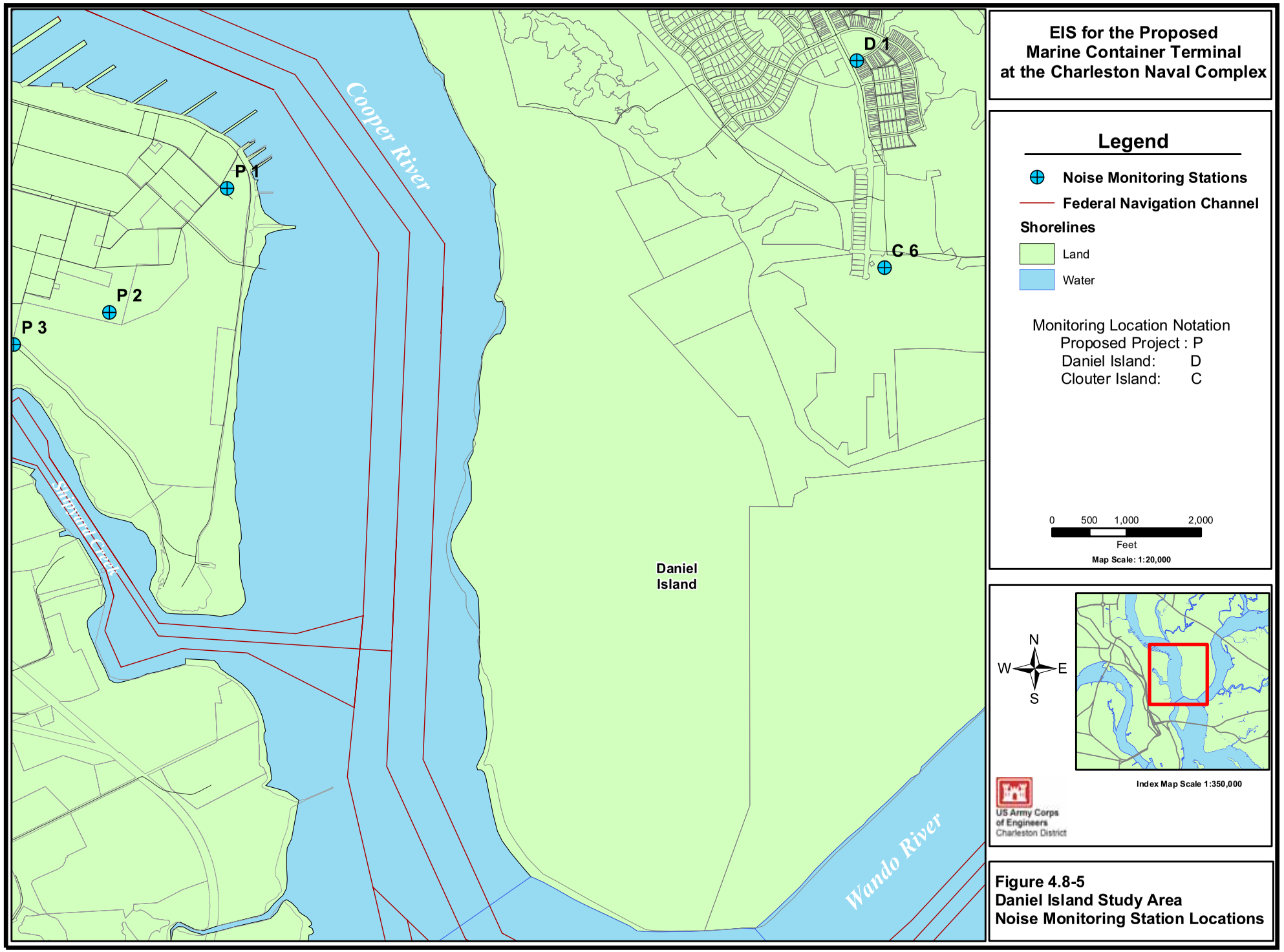


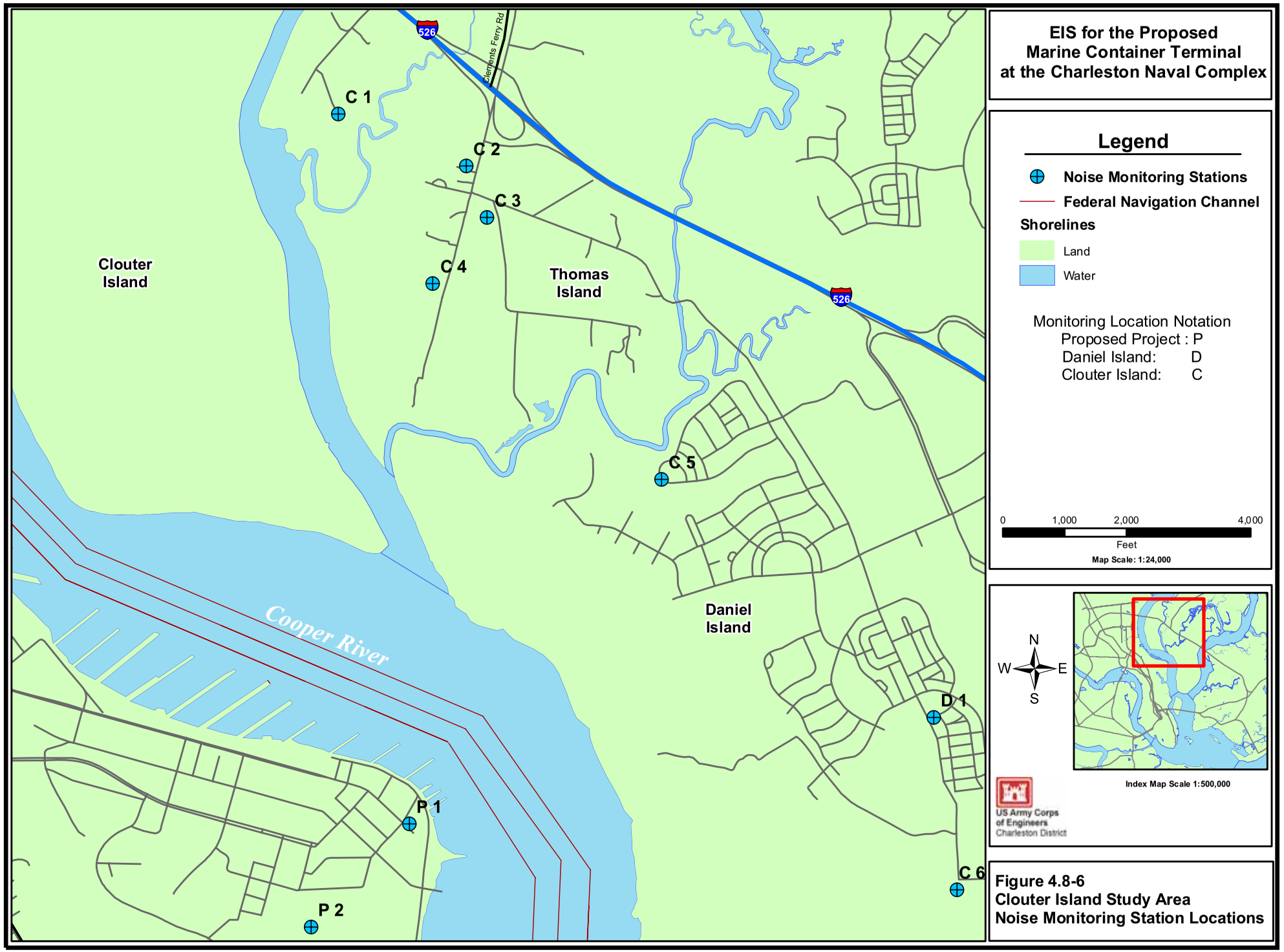
Figure 4.8-1
Noise Study Areas: North Charleston, Daniel Island & Clouter Island


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Hospitals
Libraries
Nursing Homes
Parks and Community Centers
Places of Worship
Schools
Major Roads
Major Road
Primary Hwy
Interstate Hwy
0
1,000
2,000
4,000
Feet
Map Scale 1:24,000
N
W
E
S
Index Map Scale 1:500,000
US Army Corps
of Engineers
Charleston District
Figure 4.8-2
Noise-Sensitive Receptors
Proximal to the Proposed Project
Clouter
Island
Thomas
Island
Daniel
Island
Cooper River
Ashley River
Shipyard Creek
Rivers Ave
Cosgrove Ave
Spruill Ave
King St
Meeting St
26


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Hospitals
Libraries
Nursing Homes
Parks and Community Centers
Places of Worship
Schools
Major Roads
Major Road
Interstate Hwy
Primary Hwy
0
0.25
0.5
1
Miles
Map Scale 1:40,000
N
W
E
S
Index Map Scale 1:500,000
US Army Corps
of Engineers
Charleston District
Figure 4.8-3
Noise-Sensitive Receptors
Proximal to the Clouter Island and
Daniel Island Alternatives
526
26
Spruill Ave
Cosgrove Ave
King St
Meeting St
Clements Ferry
Clouter
Island
Thomas
Island
Daniel
Island
Cooper River
Ashley River
Shipyard Creek
Wando River


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Noise Monitoring Stations
Major Roads
Major Road
Primary Hwy
Interstate Hwy
Shorelines
Land
Water
Monitoring Location Notation
Proposed Project : P
Daniel Island: D
Clouter Island: C
0 500 1,000 2,000
Feet
Map Scale: 1:24,000
N
W
E
S
Index Map Scale 1:350,000
US Army Corps
of Engineers
Charleston District
Figure 4.8-4
North Charleston Study Area
Noise Monitoring Station Locations
Cooper River
Ashley River
Shipyard Creek
Rivers Ave
Spruill Ave
King St
Meeting St
26
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P17
P18
P19
P20
P21
P22
P23
P24
P25
P26


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Noise Monitoring Stations
Federal Navigation Channel
Shorelines
Land
Water
Monitoring Location Notation
Proposed Project : P
Daniel Island: D
Clouter Island: C
0 500 1,000 2,000
Feet
Map Scale: 1:20,000
N
W
E
S
Index Map Scale 1:350,000
US Army Corps
of Engineers
Charleston District
Figure 4.8-5
Daniel Island Study Area
Noise Monitoring Station Locations
Cooper River
Shipyard Creek
Wando River
Daniel
Island
P 1
P 2
P 3
D 1
C 6


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Noise Monitoring Stations
Federal Navigation Channel
Shorelines
Land
Water
Monitoring Location Notation
Proposed Project : P
Daniel Island: D
Clouter Island: C
0
1,000
2,000
4,000
Feet
Map Scale: 1:24,000
N
W
E
S
Index Map Scale 1:500,000
US Army Corps
of Engineers
Charleston District
Figure 4.8-6
Clouter Island Study Area
Noise Monitoring Station Locations
C 1
C 2
C 3
C 4
C 5
C 6
D 1
P 1
P 2
Clouter
Island
Thomas
Island
Daniel
Island
Cooper River
526
526
Clements Ferry Rd

4.9. LIGHT

In addressing the issue of light, it is important to understand that the view of a lighted facility in the distance is very different from the issue of increased ambient light levels at an affected location. A brightly lighted facility viewed at a distance may be considered objectionable to some people from an aesthetic standpoint, but may have no measurable affect on ambient light levels at the point from which it is observed.

The existing nighttime outdoor light conditions for the North Charleston, Daniel Island, and Clouter Island study areas are discussed in this section. The study areas are shown in Figure 4.9-1.

4.9.1. Light Characteristics

On a national basis, light pollution has become a substantial concern as an environmental impact associated with transportation facilities, including port terminals and roadways. Between 35 and 50 percent of light pollution is produced by roadway lighting. There are three primary classes of unwanted light emissions: direct glare, light trespass, and sky glow. These characteristics are forms of obtrusive light.

Direct glare is an uncomfortable brightness of light as viewed against a dark background. There are three categories of glare:

- Blinding Glare – a glare so intense that for an appreciable time following removal of the light stimulus no objects may be seen or easily distinguished.

- Disability Glare – glare that causes reduced visual performance, referred to as "veiling luminance," and is caused by the effect of the luminance of a light source illuminating the inside of the eye and the light rays being scattered or reflected within the eye thereby reducing the contrast of images on the retina.

- Discomfort Glare – is glare that produces discomfort or annoyance without necessarily reducing visual performance. The EIS reports that discomfort glare can induce fatigue and may thus contribute to driver error.

Light trespass is the spilling of light beyond the property boundary on which the light source is located or that strays from its intended purpose. On roadways and large paved areas such as a container yard, it is desirable to direct all light onto the roadway or yard area and not onto adjacent areas. Non-cutoff type luminaries and/or poor lighting design employing an improper luminaire distribution may cause light trespass.

Sky glow is the unintended brightening of the nighttime sky over towns, cities, or other large lighted facilities through the scattering of stray light into the atmosphere. Sky glow is detrimental to astronomers and may be annoying to the general public. Street lighting may account for up to 50 percent of the urban sky glow due to 95 percent of the light that is directed downward being reflected upward at reflectance rates ranging from 6 percent for asphalt to 30 percent for concrete pavement. Urban sky glow is reported to be increasing at approximately 30 percent per year in some American cities.

Additional minor, but related fugitive light problems are confusion caused by the light source, adverse aesthetics, wasted energy, and annoyance. Light sources also can be disruptive to nighttime bird migration and can cause directional disorientation for hatchling sea turtles.

4.9.2. Light Standards

The lighting of marine terminal facilities increases the ambient light levels of the surrounding area and may be viewed as a potential impact. However, there are no Federal regulatory standards regarding the environmental impacts resulting from the illumination of transportation facilities such as port terminals. There do not appear to be any specific state or local regulations that would have a bearing on the Proposed Project.

The Occupation Safety and Health Administration (OSHA) has established requirements for illumination levels of work areas at marine terminal facilities. The roadways serving marine terminals would have the same lighting requirements as any other lighted roadway.

4.9.3. North Charleston Study Area

A substantial part of the area within the Proposed Project footprint consists of undeveloped land, so ambient nighttime light levels within the proposed project site are generally low. However, other areas onboard the CNC and adjacent to the Proposed Project site are lighted, such as the Cooper River Marina to the south and the FLETC complex to the north. Areas west of the CNC, along Spruill Avenue, are industrially, commercially and residentially developed and lighted during nighttime hours. Ambient nighttime light in these areas is relatively high.

Six areas (Points A through F) near and within the Proposed Project footprint were selected for measurement of ambient light conditions. Each point contained nine grid sub-points, and average light values were calculated for each point. The locations of these six areas are shown in Figure 4.9-2. The light measurements indicated that the Proposed Project site has generally low nighttime ambient lighting. Table 4.9-1 summarizes the ambient light measurements.

The access corridors for the Proposed Project cross through areas that are developed and, accordingly, have relatively high nighttime ambient light levels.

Table 4.9-1. Ambient Light at Stations Surrounding the Proposed Project Site.

Station	Station Location	Average Ambient Light Measured (Footcandles)
A	North side of Proposed Project site. U.S.C.G. training facilities located nearby, close to existing street lighting.	1.22
B	Northeast corner of Proposed Project site	0.018
C	Southeast corner of Proposed Project site	0.014
D	South side of Proposed Project site	0.013
E	Southwest corner of Proposed Project site	0.014
F	Northwest corner of Proposed Project site	0.014

Parsons Brinckerhoff, 2005.

4.9.4. Daniel Island Study Area

The Daniel Island alternative site is located within an undeveloped area and there are no light sources within its project footprint. I-526 crosses Daniel Island north of the Daniel Island alternative site and is, for the most part, an at-grade, well-lighted roadway along this segment. Daniel Island, north and northeast of the alternative site, is extensively developed and has several substantial nighttime light sources, such as Blackbaud soccer stadium, Daniel Island Tennis Center, and Bishop England High School athletic fields. There are lighted commercial centers within this area as well.

The access corridor for the Daniel Island alternative site transects areas having relatively low nighttime ambient light levels; however, the access corridor would use the existing I-526/ Clements Ferry Road interchange, which is well lighted and, accordingly, has high ambient nighttime light levels.

4.9.5. Clouter Island Study Area

The Clouter Island alternative site is located within an undeveloped area and there are no light sources within its project footprint. I-526 crosses Clouter Island north of the Clouter Island alternative site and is an elevated and well-lighted roadway along this segment.

The access corridor for the Clouter Island alternative site transects areas having relatively low nighttime ambient light levels; however the access corridor would use the existing I-526/ Clements Ferry Road interchange which is well lighted and accordingly has high ambient nighttime light levels.

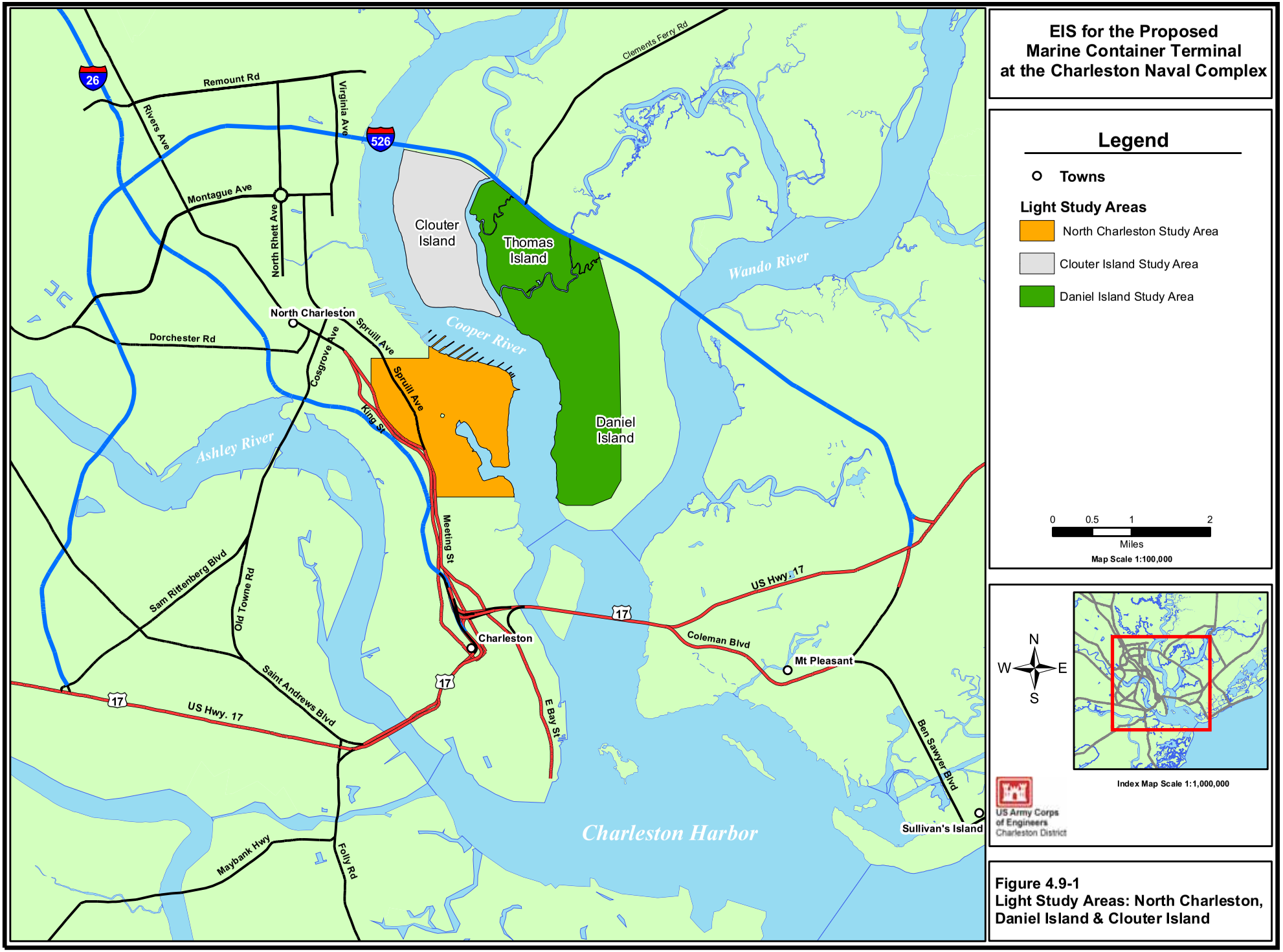


Figure 4.9-1
Light Study Areas: North Charleston, Daniel Island & Clouter Island



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

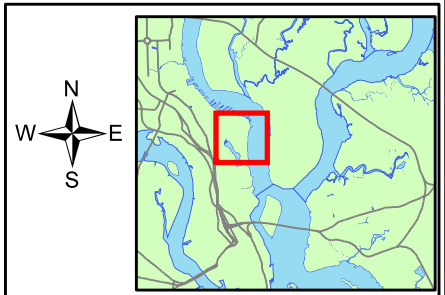
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⊗ Ambient Light Measurement Locations

0 500 1,000 2,000

Feet

Map Scale 1:12,000



Index Map Scale 1:350,000

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Charleston District

Figure 4.9-2
Locations of Ambient Light Measurements at the Proposed Project

4.10. AESTHETICS

In the context of developing large infrastructure facilities, the subject of aesthetics is generally one involving personal and subjective evaluations of the acceptability of visual scenes. The subject is often approached in terms of "viewsheds"—the scene of the proposed facility location as viewed from various locations. The public commonly describes such scenes in qualitative terms such as "beautiful," "ugly," "pastoral," or "striking," which do not lend themselves to quantitative evaluation and for which there are commonly no regulatory standards.

Figure 4.10-1 shows the North Charleston, Daniel Island, and Clouter Island study areas wherein the existing aesthetic characteristics are described.

4.10.1. North Charleston Study Area

The North Charleston study area is almost completely urbanized, with existing land uses consisting predominantly of residential, industrial and institutional areas. The existing visual character reflects these land uses with numerous active and abandoned industrial sites (Figure 4.10-2) and container storage yards (Figure 4.10-3) located in the area. There are several major waterways adjacent to and within the North Charleston study area: the Ashley River to the west, the Cooper River to the east, and Shipyard Creek that separates the southern end of the CNC from the Charleston peninsula. There are some locations within the study area that have views of these water bodies (Figure 4.10-4).

Several major visually obtrusive transportation corridors are located within the North Charleston study area. I-26 transects the area from northwest to southeast along the western side of the area, much of it on fill or elevated on structure. In addition, there are two CSX rail tracks parallel to the west side of Meeting Street Road, and multiple CSX rail tracks parallel to the east side of Spruill Avenue (Figure 4.10-5) that serve the Cooper Yard, which is located across Spruill Avenue from the Union Heights neighborhood.

4.10.1.1. Key Transportation Views

Spruill Avenue and I-26

Views from Joppa Street across Spruill Avenue to the east are of a large open space with sporadic tree cover. The adjacent rail line is visible from Spruill Avenue. At the perimeter of the green space and rail line, a tree buffer exists that prevents views of the Macalloy property. The I-26 ramps at Spruill Avenue have significant tree cover so that only predestrians can see the ramps of the interchange; the ramps are not visible from the residential areas fronting on Spruill Avenue. Commercial development fronts Spruill Avenue on the west side of the street with continued overhead utility lines throughout the corridor. Figure 4.10-6 illustrates the view from Spruill Avenue at the I-26 ramps looking west.

Stromboli Avenue and Spruill Avenue

The Stromboli Avenue corridor is home to a large industrial complex that houses the Maxim Crane Works facility and an adjacent container storage yard. The container storage yard is situated behind a deteriorating chain-link fence along Spruill Avenue. The west and east sides of Spruill Avenue have grassy easements with sidewalk in front of Maxim Crane Works and the container yard on the west side and Park South on the east side of the street just north of the Stromboli Avenue/Spruill Avenue intersection. The park is surrounded by industrial land uses, so users of the park primarily have views of industry beyond the park (Figure 4.10-7). Figure 4.10-8 presents a view at the Stromboli Avenue/Spruill Avenue intersection.

Meeting Street and Carver Avenue Intersection

The viewshed for this intersection is visible to the east and west on Stromboli Avenue and north and south on Meeting Street. The current views are of commercial and industrial land uses. Figure 4.10-9 shows a view looking north at the Carver Avenue/Meeting Street intersection.

Bainbridge Road and Viaduct Road Intersection

Figure 4.10-10 presents a view of the Bainbridge Avenue/Viaduct Road intersection. This area is mostly vacated due to the closure of the Naval Base.

Spruill Avenue, Meeting Street, and Surrounding Neighborhoods

The Union Heights, Windsor, and Howard Heights neighborhoods are completely surrounded by views of industrial areas east of Spruill Avenue, west of Meeting Street Road, south of the Spruill Avenue/Meeting Street Road intersection, and north of Hampton Avenue and Shipyard Creek Road. There is also some commercial development along Spruill Avenue and Meeting Street Road near the neighborhoods.

Rosemont Neighborhood

The Rosemont neighborhood is located immediately west of I-26. The Rosemont neighborhood is bordered by industrial areas to the east, south, and southwest (a SCE&G Power Plant is visible from the neighborhood to the southwest), but there is vacant land to the northwest. A buffer of trees between the eastern edges of Rosemont and I-26 limits views of the interstate from the neighborhood (Figure 4.10-11).

Carver Avenue, Spruill Avenue, Viaduct Road, and Chicora Neighborhood

The Chicora neighborhood is located north of Viaduct Road, between Carver Avenue and Spruill Avenue. The area to the south of these residential areas is industrial, and the CNC and more industrial land uses are located to the east. Residences located along Chicora Avenue in the southwestern part of the Chicora neighborhood have views of open space because of the vacant land south of the Military Magnet Academy. However, most of the other residences along the border of these neighborhoods have views primarily of the industrial land uses surroundiung the neighborhoods.

4.10.2. Daniel Island Study Area

The Master Plan for the Daniel Island planned community envisions 4,000 to 7,000 residences, 700 acres of parks and green spaces, a golf course, a town commercial center, and an office complex for the eastern part of the island. The recent development is primarily occurring near the I-526/Daniel Island Parkway interchange, both to the south and north of I-526. To the south of I-526, most of the recent development is occurring in the central and eastern part of the island. Residential development is continuing southward in the central and eastern parts of the island.

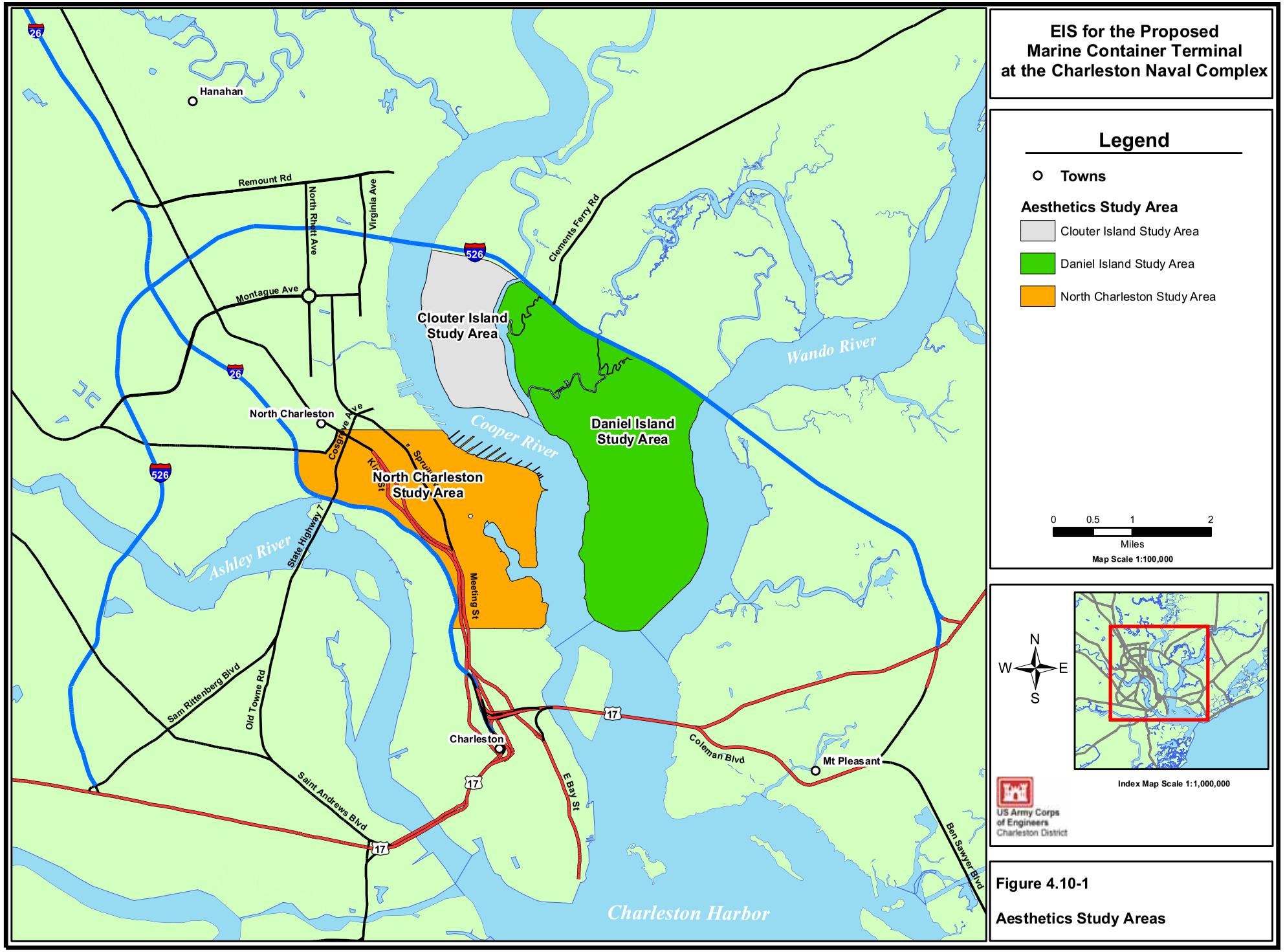
The setting of Daniel Island is, for the most part, residential with open land. The streets within residential neighborhoods on Daniel Island are relatively wide, so the majority of the homes have views in either direction. There are no locations with extended views in the interior of the community because of the flat topography of the island. However, there are a number of locations in the perimeter of the community with extended views of open spaces, parks and creeks. Figure 4.10-12 illustrates how locations on the perimeter of the development have extended views of the alternative project site.

Thomas Island has a very rural, forested residential setting. Because of the flat topography, homes on Thomas Island, with the exception of the homes along Beresford Creek and other creeks in the area, do not have extended views. Some of the homes on Clements Ferry Road and Pinefield Drive, however, currently have views of Clouter Creek with Clouter Island in the background. The industrial areas along the western bank of the Cooper River in North Charleston are also visible beyond Clouter Island. Figure 4.10-13 illustrates the setting of Thomas Island on Clements Ferry Road. Figure 4.10-14 illustrates the existing view of the southern end of Daniel Island from the eastern shore of the Cooper River (on the CNC).

4.10.3. Clouter Island Study Area

Clouter Island is undeveloped (other than as a CDF) and there is no road access to the island (Figure 4.10-15). The island is bounded by Clouter Creek to the east and the Cooper River to the north, south, and west. I-526 crosses over the center of the island completely on structure.

There is little, if any, residential development in North Charleston having views of Clouter Island. The land uses along the western bank of the Cooper River are industrial and institutional, with a small amount of vacant land along the south side of Noisette Creek. However, the Noisette Development has recently constructed Riverfront Park on this vacant land and is planning redevelopment of other property around the creek into a mixed-use development, including some high-rise and residential development. These areas would have views across the Cooper River of Clouter Island.


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Marine Container Terminal
at the Charleston Naval Complex
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Aesthetics Study Area
Clouter Island Study Area
Daniel Island Study Area
North Charleston Study Area
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US Army Corps of Engineers
Charleston District
Figure 4.10-1
Aesthetics Study Areas
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Clements Ferry Rd
Clouter Island Study Area
Wando River
Daniel Island Study Area
North Charleston
Cosgrove Ave
Cooper River
North Charleston Study Area
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
Saint Andrews Blvd
E Bay St
Ben Sawyer Blvd
Charleston Harbor
26
526
17



(2) View of the Montenay Incinerator east of Howard Heights neighborhood (from east end of Riverview Avenue).



(3) Container Storage Yard off of Shipyard Creek Road.

Figure 4.10-2 & 4.10-3
Visual Character of the Affected Area Reflecting Land Uses with (2) Industrial Sites and (3) Container Storage Yards.

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Charleston District



(4) View of Shipyard Creek (near headwater) with industry in background.



(5) CSX rail corridor looking north from Pittsburgh Avenue.

Figure 4.10-4 & 4.10-5
Visually Obtrusive (4) Industrial-related and (5) Transportation-related Land Uses near the Affected Area.

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Charleston District



View from Spruill Avenue at I-26 ramps looking west.

Figure 4.10-6
Visual Character of Key Transportation Corridors in the North Charleston Study Area: Spruill Avenue and I-26.

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Charleston District



(7) View facing west from Park South just north of the Spruill Avenue/Stromboli Road intersection.



(8) View of the Spruill Avenue/Stromboli Road intersection from Stromboli Road facing east.

Figure 4.10-7 & 4.10-8
Visual Character of Key Transportation Corridors in the North Charleston Study Area: Spruill Avenue and Stromboli Road.

US Army Corps of Engineers
Charleston District



(9) View facing north from the Meeting Street/Carner Avenue intersection



(10) View facing southwest at the Bainbridge Avenue/Viaduct Road intersection.

Figure 4.10-9 & 4.10-10
Visual Character of Key Transportation Corridors in the North Charleston Study Area: (9) Meeting Street/Carner Avenue and (10) Bainbridge Avenue/Viaduct Road).

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Charleston District



Looking east along Hagood Road at the I-26 overpass from the Freddie Whaley, Sr. Community Center in the Rosemont neighborhood.

Figure 4.10-11
Visual Character of Rosemont Neighborhood near I-26.

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Charleston District



(12) View of the Daniel Island Alternative site from closest existing development.



(13) View of Thomas Island along Clements Ferry Road.

Figure 4.10-12 & 4.10-13
Visual Character of the Daniel Island Study Area.

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of Engineers
Charleston District



(14) View of the Daniel Island Alternative site from the eastern shore of the Cooper River (at the CNC). The existing Wando Welch Terminal can be seen in the background.



(15) View of Clouter Island toward the southeast from I-526.

Figure 4.10-14 & 4.10-15
Visual Character of the Daniel Island Study Area (14) and the Clouter Island Study Area (15).

US Army Corps of Engineers
Charleston District

4.11. AIR QUALITY

Ambient air quality is directly related to emissions from anthropogenic sources; the aggregate of permitted sources such as from stationary point sources (stacks, vents, etc.); emissions from mobile sources such as vehicles, ships, train engines, aircraft, etc.; chemical reactions in the atmosphere such as the formation of ozone; and natural sources such as trees, fires, and wind-blown dust.

The following sections discuss the applicable regulatory framework and existing ambient air quality within the study area, which, due to the regional nature of air quality, consists of the Tri-County area, as shown in Figure 4.11-1. For more information about the existing air quality in the region, refer to the air quality technical report that is included as Appendix S.

4.11.1. Regulatory Framework

The Clean Air Act, which was last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards for principal pollutants, which are called "criteria" pollutants, as listed in Table 4.11-1. Units of measure for the standards are shown in parts per million (ppm) by volume or micrograms per cubic meter of air (μg/m3). The NAAQS are maximum concentrations measured in terms of local concentration of a pollutant in the atmosphere.

EPA, in Title 40 of the Code of Federal Regulations (CFR) Part 52.21(c), has also established increments for the Prevention of Significant Deterioration (PSD) of ambient air quality. These PSD increments represent the amount of pollution an area is allowed to increase. PSD increments prevent the air quality in clean areas from deteriorating to the level set by the NAAQS. Whereas the NAAQS is a maximum allowable concentration "ceiling," a PSD increment is the maximum increase in concentration that is allowed to occur above a baseline concentration for a pollutant. The baseline concentration is defined for each pollutant and, in general, is the ambient concentration existing at the time that the first complete PSD permit application affecting the area is submitted. Significant deterioration is said to occur when the amount of new pollution would exceed the applicable PSD increment. It is important to note, however, that the air quality must not be allowed to deteriorate beyond the concentration allowed by the applicable NAAQS, even if all of the PSD increment is not consumed.

EPA has defined different PSD increments based on land classification. Class I areas are those areas designated as pristine or wilderness areas and require more rigorous safeguards to prevent deterioration of the natural pristine air quality. The Cape Romain Wildlife Refuge is the only Class I area located within 200 km of the Proposed Alternative site. Class III areas are planning areas set aside for industrial growth. As such, increments are higher in Class III areas. Class II areas are essentially all other areas of the state that are not designated Class I or Class III. All planning areas were initially designated either Class I or Class II. States must request and receive EPA approval for Class III areas. No such Class III designations have been approved in South Carolina. The Class I and Class II increments are shown in Table 4.11-1.

The State of South Carolina has established Ambient Air Quality Standards (SCAAQS) and Ambient Air Increments similar to the NAAQS and PSD Increments; the main difference being that the SCAAQS include an annual standard for Total Suspended Particulates (TSP). These are listed in Table 4.11-1. The SCAAQS and Ambient Air Increments are defined by Standard No. 2 and Standard No. 7 in South Carolina Department of Health and Environmental Control (SCDHEC) Regulation 61-62.5.

Table 4.11-1. Ambient Air Quality Standards and PSD Increments.

Pollutant	Averaging Period	Standard		Basis	Standard Type
CO	1-hr	40,000	$\mu g/m^3$	(1)	NAAQS And SCAAQS
	8-hr	10,000	$\mu g/m^3$	(1)	
NO_2	Annual	100	$\mu g/m^3$	-	
Lead	Quarterly	1.5	$\mu g/m^3$	-	
O_3	8-hr	0.08	ppm	(2)	
PM_{10}	24-hr	150	$\mu g/m^3$	(3)	
	Annual	50	$\mu g/m^3$	(4)	
$PM_{2.5}$	24-hr	65	$\mu g/m^3$	(5)	
	Annual	15	$\mu g/m^3$	(6)	
SO_2	3-hr	1,300	$\mu g/m^3$	(1)	
	24-hr	365	$\mu g/m^3$	(1)	
	Annual	80	$\mu g/m^3$	-	
TSP	Annual	75	$\mu g/m^3$	-	SCAAQS only
NO_2	Annual	25	$\mu g/m^3$	-	PSD Increments for Class II Areas
PM_{10}	24-hr	30	$\mu g/m^3$	(1)	
	Annual	17	$\mu g/m^3$	(1)	
SO_2	3-hr	512	$\mu g/m^3$	(1)	
	24-hr	91	$\mu g/m^3$	(1)	
	Annual	20	$\mu g/m^3$	-	
NO_2	Annual	2.5	$\mu g/m^3$	-	PSD Increments for Class I Areas
PM_{10}	24-hr	8	$\mu g/m^3$	(1)	
	Annual	4	$\mu g/m^3$	(1)	
SO_2	3-hr	25	$\mu g/m^3$	(1)	
	24-hr	5	$\mu g/m^3$	(1)	
	Annual	2	$\mu g/m^3$	-	

(1) - Not to be exceeded more than once per year.
(2) - To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(3) - To attain this standard, the 3-year average of the 99th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 150 ug/m3.
(4) - To attain this standard, the 3-year average of the weighted annual mean PM10 concentration at each monitor within an area must not exceed 50 ug/m3.
(5) - To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 ug/m3.
(6) - To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 ug/m3.

When the Clean Air Act was originally developed, the criteria pollutants were identified and air quality standards were established for these pollutants. Under the Clean Air Act, individual states were required to develop a State Implementation Plan (SIP) to define the strategy for

assessing and maintaining these established air quality standards. There are many different sources of the criteria air pollutant emissions that contribute to regional air quality. These include man-made emissions from industrial sources, mobile sources, land clearing, and residential sources. These also include natural sources (e.g., trees). Since all these sources must be considered in an assessment of air quality, EPA has identified ambient air monitoring as the proper method for assessing air quality.

The Clean Air Act also requires that the results of the ambient air quality monitoring be used by EPA to assign a designation to each area of the United States regarding compliance with the NAAQS. Within the state of South Carolina, compliance designation areas are usually defined by individual counties. The level of compliance or noncompliance is categorized as follows:

- Attainment – Area currently meets the NAAQS.
- Maintenance – Area currently meets the NAAQS, but has previously been out of compliance.
- Nonattainment – Area currently does not meet the NAAQS

As part of the SIP to maintain acceptable air quality, SCDHEC maintains an ambient air monitoring network within the state of South Carolina. Monitoring sites are located in Charleston and Berkeley Counties and at the Cape Romain Wildlife Refuge. All of the criteria pollutants are monitored by at least one site in the area. As such, the regional air quality is well defined. Ambient Air Quality Data summaries from SCDHEC's monitoring network are available from SCDHEC for recent years. This information is used to designate the status of the regional air quality.

4.11.2. Tri-County Region

The Berkeley, Charleston, and Dorchester County region is currently in compliance with all air quality standards as prescribed by the Clean Air Act and amendments. Overall, air quality within the Tri-County region is good.

The baseline ambient air quality and emissions are discussed below.

Baseline ambient air concentrations for the criteria pollutants were identified from SCDHEC ambient monitoring network sites located in the Charleston area. This included the following monitor sites:

Site Name	County	City
Ashe Street	Charleston	Charleston
Charleston FAA Beacon	Charleston	Charleston
Charleston FAA Beacon (dup)	Charleston	Charleston
Charleston Public Works	Charleston	Charleston
Jenkins Ave Fire Station	Charleston	North Charleston
US Army Reserve	Charleston	North Charleston
U.S. Naval Base	Charleston	North Charleston
Cape Romain Wildlife Refuge	Charleston	(Rural)
Bushy Park Pump Station	Berkeley	(Rural)

Monitored ambient concentrations from three years of the most currently available data were used to establish a reasonable baseline for ambient concentrations. The data and methods used in determining baseline ambient air quality are described in the *Air Quality Report*

(Appendix S). Although the monitored ambient concentrations vary from year to year, currently available data were used to establish a reasonable baseline for ambient concentrations. These values, provided in Table 4.11-2, are below the respective air quality standards.

Table 4.11-2. Baseline Ambient Air Quality Data Summary.

Pollutant	Period	Units of Measure	Ambient Concentration		
			Charleston County	Cape Romain NWR	NAAQS and/or SDHEC Standard 2
SO_2	3-hour 24-hour Annual	$\mu g/m^3$ $\mu g/m^3$ $\mu g/m^3$	97.4 31.6 7.4	86.9 21.1 5.0	1,300 365 80
PM_{10}	24-hour Annual	$\mu g/m^3$ $\mu g/m^3$	41 19..5	40 16.2	150 50
$PM_{2.5}$	24-hour Annual	$\mu g/m^3$ $\mu g/m^3$	29.2 12.47	29.9 13.71	65 15.0
CO	1-hour 8-hour	$\mu g/m^3$ $\mu g/m^3$	5,267 3,220	2,405 1,380	40,000 10,000
NO_2	Annual	$\mu g/m^3$	19.1	7.52	100
Lead	Quarterly	$\mu g/m^3$	0.006	0.004	1.5
O_3	8-hour (1 yr max)	ppm	0.074	0.074	0.08
TSP	Annual	$\mu g/m^3$	32.2	20.7	75.0

Baseline ambient air quality as determined using monitored values from SCDHEC Ambient Air Quality Data Summary data for years 2002 through 2004 (see Appendix S). These years represent the available data at the time the air quality analysis for this EIS was performed.

Baseline emissions were determined based on the National Emissions Inventory (NEI) database. EPA prepares and maintains a NEI database of criteria air pollutant emissions using input from numerous State and local air agencies. This input is compiled and validated every three years. It is then added to the NEI database. Once in the database, the public can access it through the AirData website and database (www.epa.gov/oar/data/). These data are useful for various environmental studies including regional strategy development and tracking trends in emissions over time. At the time of this EIS, the last update to AirData included the 2001 NEI data, which made detailed county-by-county emissions data available for the period 1985 through 2001.

Annual regional emissions of criteria pollutants were obtained from the AirData database for the Berkeley, Charleston, and Dorchester Counties for the period 1985 through 2001. Data were obtained for all available source categories, which included the following:

- Fuel Combustion – Electric Utilities
- Fuel Combustion – Industrial
- Fuel Combustion – Other
- Chemical and Allied Products Manufacturing
- Metals Processing
- Petroleum and Related Industries
- Other Industrial Processes
- Solvent Utilization
- Storage and Transportation
- Waste Disposal and Recycling
- Highway Vehicles

- Off-Highway Vehicles
- Miscellaneous Sources

Data for these years and source categories were reviewed to establish baseline emission levels and to determine if any trends in emission increases or decreases could be identified. Figure 4.11-2 depicts the annual emissions of criteria pollutants for the Tri-County region for this period.

These data indicate that regional emissions for criteria pollutants remained relatively constant between 1985 and 2001. As discussed earlier in this section, emissions data were not available from EPA for the years 2002 through the present. Due to the lack of more recent data and the fact that no trend in annual air emission rates could be identified, the data for 2001 were used to represent baseline criteria air pollutant emissions.

Table 4.11-3 presents the total annual emissions of criteria air pollutants for each of the three counties and for the region as a whole for the year 2001. The emissions listed are in tons per year and do not represent airborne pollutant concentrations.

Table 4.11-3. Regional Emissions -2001 National Emissions Inventory Database.

Area	CO	NOx	PM10	PM2.5	SO2	VOC
2001 Berkeley County	65,833	35,970	12,387	5,990	58,326	10,138
2001 Charleston County	100,987	17,921	8,731	2,589	3,601	21,805
2001 Dorchester County	40,765	8,708	5,535	1,652	4,499	5,173
2001 Three County Total	207,585	62,599	26,653	10,231	66,426	37,116

Population data were also obtained for selected years within the same timeframe. A comparison of the graphs in Figures 4.11-2 and 4.11-3 shows that, while population is increasing over time in each of the three counties and for the region as a whole, there is no corresponding increase in air emissions. This is most likely due to advances in air pollution control technology. No reasonable trend could be identified and it is concluded that technology improvements and clean air initiatives have offset the effect of regional growth; therefore, the data suggest that the baseline permitted air emissions will likely remain relatively constant over the period of time being evaluated for this EIS.

4.11.2.1. Early Action Plan

The three counties of the Tri-County region, along with most of the other counties in South Carolina, have voluntarily agreed to enter into a statewide program, referred to as the Early Action Plan to proactively address air quality issues prior to their becoming problematic. The Early Action Plan is described below.

On July 18, 1997, EPA revised the NAAQS for ground-level ozone from 0.12 parts per million (ppm) 1-hour “peak” standard to 0.08 ppm 8-hour “average” standard. This new standard is commonly referred to as the 8-hour ozone standard. Using data from each state's ozone monitoring network and recommendations from the respective states, EPA determines if geographic areas of the state are attainment (meet the standard) or nonattainment (exceed the standard).

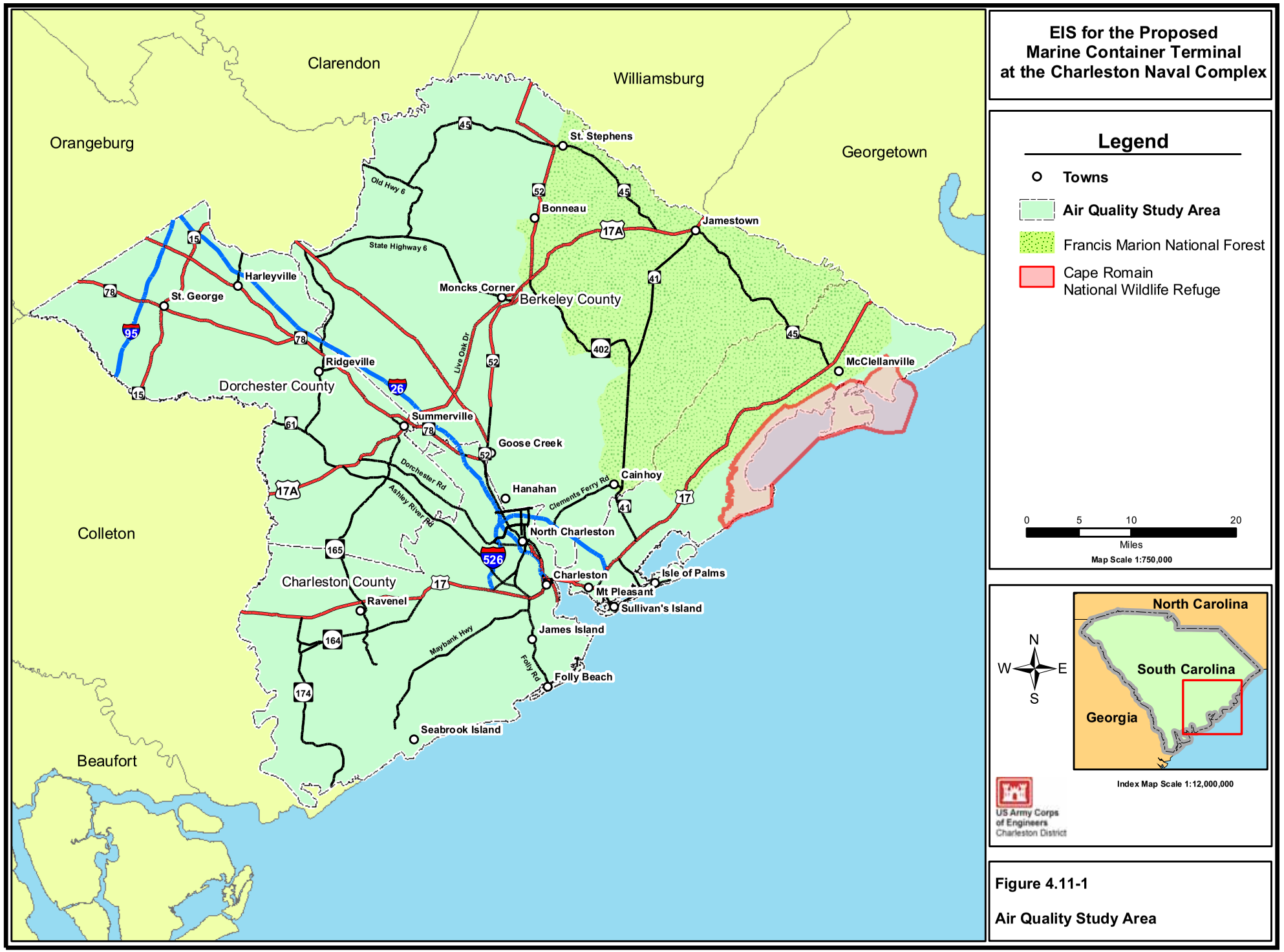
In the fall of 2002, EPA approved an option for areas meeting the 1-hour ozone standard, like those in South Carolina, to attain the 8-hour ozone standard by December 31, 2007, and obtain cleaner air sooner than federally mandated. This option, commonly referred to as the Early Action Process, requires an expeditious timeline for achieving emissions reductions sooner than required under the 8-hour ozone implementation rule, while providing “fail-safe” provisions for the area to revert to the traditional SIP process if specific milestones are not met.

Forty-five counties in South Carolina along with the Department and EPA Region 4, signed Early Action Compacts (EAC) in December 2002. By signing the EAC, EPA agreed to defer the effective date of any nonattainment designation for participating areas. However, areas participating in the EAC that do not meet all of the terms of the EAC, including established milestones, will forfeit participation and will be designated according to requirements within EPA's 8-hour ozone implementation rule, i.e., Transportation Conformity and non-attainment New Source Review.

SCDHEC has been working with EPA, state and local governments, industry, environmental groups, and other interested parties to develop a strategy to reduce the pollution that creates ground-level ozone. The most important reasons for moving forward in this proactive manner are the public health benefits realized by meeting the new standard sooner than required and also deferring the effective date of any nonattainment designation. In March 2004, participating EAC areas in South Carolina submitted local Early Action Plans to include emission reduction strategies.

4.11.2.2. Cape Romain National Wildlife Refuge

Cape Romain National Wildlife Refuge is a Class I Wilderness Area located approximately 20 miles northeast of Charleston. Under the Clean Air Act, Class I areas are afforded extra protection from deterioration of air quality from permitted stationary sources. Stationary sources include facilities such as power plants and industrial processing plants. As a participant in the Federal Interagency Monitoring of Protected Visual Environments (IMPROVE) project, monitoring of particulate matter (PM-10 and PM-2.5) has been conducted at Cape Romain since September 1994. The U.S. Fish and Wildlife Service, which manages the National Wildlife Refuge system, is part of this cooperative monitoring program, along with the National Park system, the U.S. Forest Service, and the Bureau of Land Management. IMPROVE was established to ascertain visibility in Class I areas, identify sources of anthropogenic impairments to visibility, and determine trends in order to gauge progress toward fulfilling the long-term goal of no anthropogenic impairment of visibility or air quality in protected areas. The ambient concentrations within the Cape Romain Wildlife Refuge are well below the NAAQS of 150 $\mu g/m^3$ and 65 g/m^3 for 24-hour average PM-10 and PM-2.5, respectively.


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Cape Romain
National Wildlife Refuge
0 5 10 20
Miles
Map Scale 1:750,000
North Carolina
South Carolina
Georgia
N
W
E
S
Index Map Scale 1:12,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.11-1
Air Quality Study Area
Clarendon
Williamsburg
Orangeburg
Georgetown
Colleton
Beaufort
Berkeley County
Dorchester County
Charleston County
St. Stephens
Bonneau
Jamestown
Moncks Corner
Harleyville
St. George
Ridgeville
Summerville
Goose Creek
Hanahan
Cainhoy
McClellanville
North Charleston
Charleston
Isle of Palms
Mt Pleasant
Sullivan's Island
James Island
Folly Beach
Ravenel
Seabrook Island
Old Hwy 6
State Highway 6
Live Oak Dr
Dorchester Rd
Ashley River Rd
Clements Ferry Rd
Maybank Hwy
Folly Rd
45
52
17A
41
15
78
95
26
61
402
17
165
526
164
174

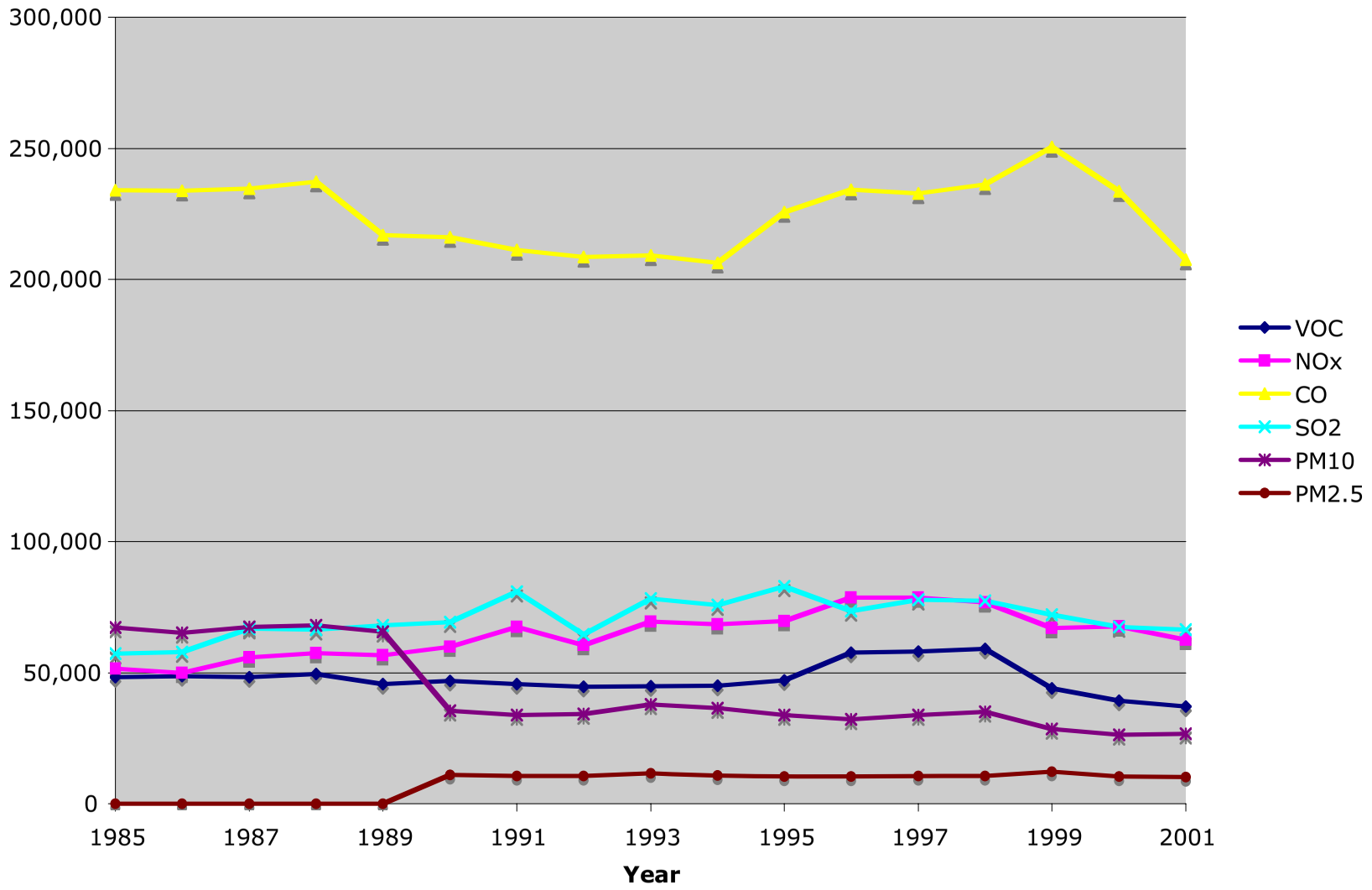


Figure 4.11-2.
Regional Criteria Pollutant Emissions, 1985 - 2001

U.S. Army Corps of Engineers
Charleston District

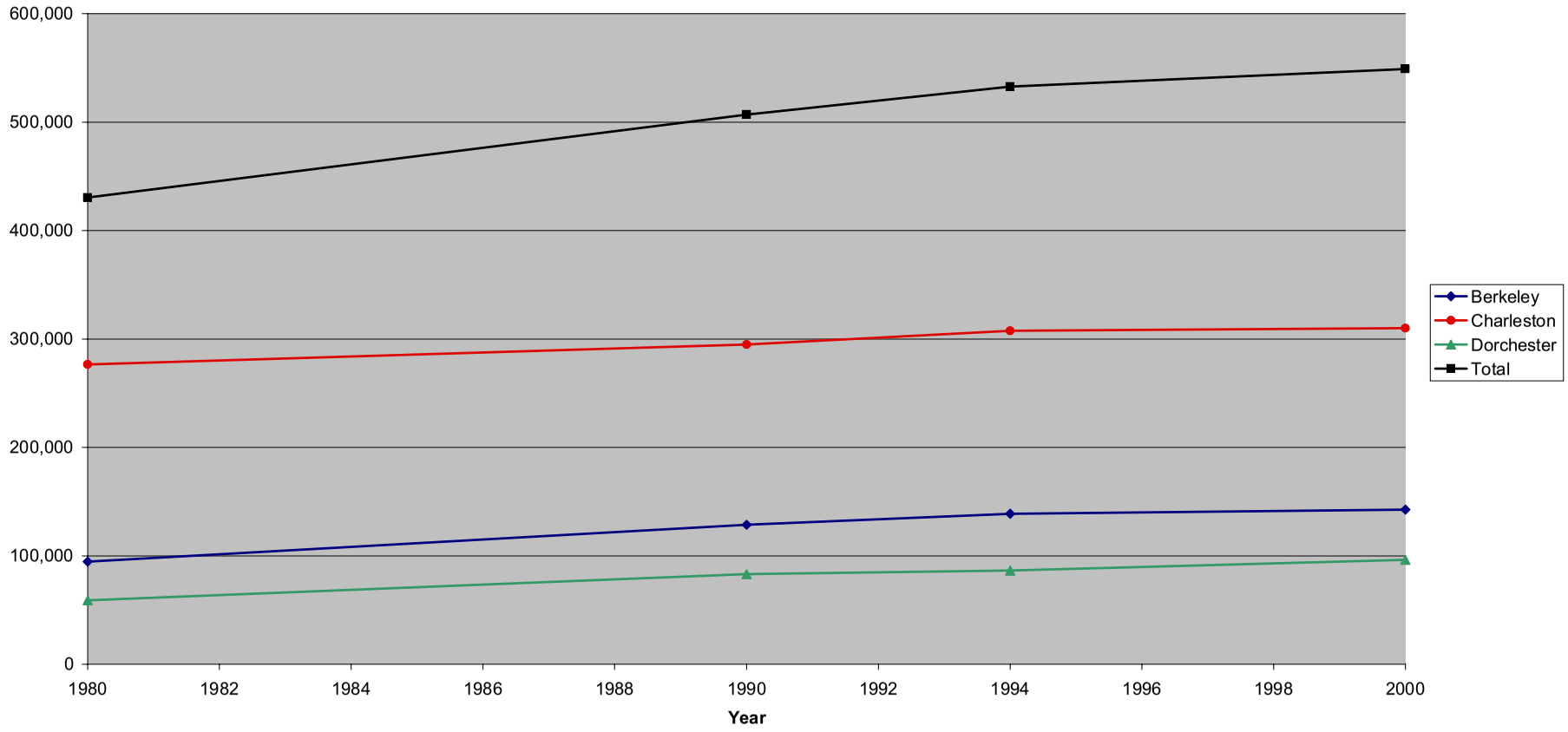


Figure 4.11-3.
Population Growth over Time for Berkeley, Charleston, and Dorchester Counties.

U.S. Army Corps of Engineers
Charleston District

4.12. CULTURAL RESOURCES

The purpose of this section is to characterize the existing condition of historic and archeological resources within the Area of Potential Effect (APE). The APE, as per 36 CFR 800.2(c), includes areas where changes in the character or use of historic or archeological properties may result from an undertaking. For this EIS, the APE includes those areas within 1 mile of the three alternative locations (including their access roadways) plus Charleston Harbor. Charleston Harbor includes the Cooper River and entrance channel to the shoreline to account for any location that may experience increased vessel wakes. Discussions of historic and archeological resources within the APE are separated into four regions: (1) Charleston Harbor study area, (2) North Charleston study area, (3) Daniel Island study area, and (4) Clouter Island study area. The APE and the four study areas are illustrated in Figure 4.12-1.

4.12.1. Regulatory Framework

Historic and archeological resources that are listed, eligible, or potentially eligible for listing in the National Register of Historic Places (NRHP), and which may be affected by an undertaking by a Federal agency, are given a measure of protection by Federal law. Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended and implemented through 36 CFR 800 and the USACE's implementing regulations for their responsibilities with respect to historic properties (33 CFR 325, Appendix C with interim guidance from Headquarters through 2005), requires Federal agencies such as the USACE to consider the effects of any funded, licensed, or permitted undertaking on historic properties. Changes in the character and use of historic properties that result from an undertaking may cause adverse effects. Undertakings should be designed and implemented in such a way that adverse effects to historic properties are avoided or minimized. Construction and operation of a new marine container terminal as proposed by the SCSPA requires a permit from the Department of the Army. Thus, this project is a Federal undertaking that must comply with Section 106 of the NHPA.

4.12.2. Historic and Archeological Resources

Historic resources include historic properties (buildings, structures, sites, objects, districts, or traditional cultural properties that are listed on or eligible for the NRHP) and potentially eligible historic properties (resources whose NRHP status has not been determined to date).

Archeological resources include any material remains of past human life or activity greater than 100 years old that are of archeological interest as defined by Section 4(a) of the Archeological Resources Protection Act and 43 CFR Part 7.3.

4.12.3. Cultural Resource Surveys

Numerous investigations of historic and archeological resources occurred within the APE during the last 20 years. Five of these investigations examined specific portions of the APE. These investigations include:

- Shmookler, 1995: An Archeological assessment of the CNC.
- Watts, 1986: A remote sensing reconnaissance survey of Charleston Harbor, which examined the channel of the Cooper River adjacent to each of the three alternative locations.
- Watts, 1989: Underwater investigation of portions of the Cooper River and Shipyard Creek adjacent to the CNC.

- Watts, 1995: Underwater investigation in the Cooper River along Daniel and Clouter Islands.

- Studies performed for the 1999 draft EIS for a proposed marine container terminal on Daniel Island.

- Wilbanks and Pecorelli, 2006: An Underwater Cultural Resources Survey of Selected Portions of the Proposed South Carolina State Ports Authority, Charleston Naval Center Marine Container Terminal.

- Poplin *et al.*, 2006: Architectural survey and archaeological assessment of the alternative access road corridors between I-26 and the CNC.

- Salo, 2006: NRHP evaluation of Cold War era Buildings 643 and 686 at the Charleston Naval Complex.

Two Department of Defense nationwide studies provide historic contexts for evaluating any historic architectural resources or archeological sites related to the pre-World War II and World War II eras that lie on the CNC. Both contain historic summaries of the development of the CNC during those eras. These studies include:

- Cannan et al., 1995: Nationwide Department of Defense context for evaluating the NRHP eligibility of pre-World War II era historic architectural resources.

- Whelan et al., 1997: Nationwide Department of Defense context for evaluating the NRHP eligibility of World War II era permanent construction.

The findings of these investigations that were relevant to the APE are discussed in the following sections, along with summaries of nearby investigations that identified historic properties or potentially eligible historic properties. Table 4.12-1 summarizes the cultural resources within the APE. Sections 4.12.3.1 through 4.12.3.4 discuss the resources in more detail within their respective study areas.

Table 4.12-1. Cultural Resources in the Area of Potential Effect (APE).

Cultural Resource	Resource Type	Location (Study Area)
Five Mile Viaduct	Historic Property	North Charleston (Upper Meeting Street)
Naval Shipyard District	Historic Property	North Charleston, Clouter Island (central CNC)
Naval Hospital District	Historic Property	North Charleston, Clouter Island (west central CNC)
Officer Housing District	Historic Property	North Charleston, Clouter Island (north CNC)
Building 1179 (WW II era chapel)	Historic Property	North Charleston, Clouter Island (central CNC)
Building 590-A (c. 1930s USCG BOQ)	Historic Property	North Charleston, Clouter Island (central CNC)
Building M-17 (WW I era USMC barracks)	Historic Property	North Charleston, Clouter Island (central CNC)

Cultural Resource	Resource Type	Location (Study Area)
38BK1627 (18th-19th c. plantation)	Archeological Resource	Daniel Island (south Daniel Island)
38BK1628 (early 18th c. plantation)	Archeological Resource	Daniel Island (west central Daniel Island)
38BK1629 (18th -19th c. plantation)	Archeological Resource	Daniel Island (southeast Daniel Island)
Fort Sumter National Monument	Historic Property	All (Charleston Harbor)
Fort Moultrie National Monument	Historic Property	All (Charleston Harbor)
Castle Pinckney	Historic Property	All (Charleston Harbor)
Old and Historic Charleston Historic District	Historic Property	All (Charleston Harbor)
Magnolia Cemetery	Historic Property	All (Charleston Harbor)
Mount Pleasant Historic District	Historic Property	All (Charleston Harbor)
USS Yorktown (CV-10)	Historic Property	All (Charleston Harbor)
USS Laffey (DD724)	Historic Property	All (Charleston Harbor)
USS Clamagore (SS-343)	Historic Property	All (Charleston Harbor)
USCGC Ingham (WHEC-35)	Historic Property	All (Charleston Harbor)
"Dead House" (18th c.? powder magazine)	Potentially Eligible Historic Property	North Charleston, Clouter Island (north CNC)
Building 1303 (Damage Control Mock-up)	Potentially Eligible Historic Property	North Charleston, Clouter Island (south CNC)
Building 1310 (Carrier Compartment Mock-up)	Potentially Eligible Historic Property	North Charleston, Clouter Island (south CNC)
38BK1496 (Mississippian camp)	Potentially Eligible Historic Property	Nnorth Charleston, Clouter Island (north CNC)
CL-7 (underwater remote sensing anomaly)	Potentially Eligible Archeological Resource	Clouter Island (Cooper River)
CL-12 (underwater remote sensing anomaly)	Potentially Eligible Archeological Resource	Clouter Island (Cooper River)
CL-15 (underwater remote sensing anomaly)	Potentially Eligible Archeological Resource	Clouter Island (Cooper River)
CL-17 (underwater remote sensing anomaly)	Potentially Eligible Archeological Resource	Clouter Island, Daniel Island (Cooper River)
DA-1 (underwater remote sensing anomaly)	Potentially Eligible Archeological Resource	Daniel Island (Cooper River)

4.12.3.1. Charleston Harbor Study Area

The historic properties located within the Charleston Harbor study area are shown in Figure 4.12-2 and discussed in the following sections.

Historic Properties

There are 10 historic properties in the APE that are located in the Charleston Harbor study area. These properties are listed on the NRHP and include Fort Sumter National Monument, Fort Moultrie National Monument, Castle Pinckney, Old and Historic Charleston Historic District,

Magnolia Cemetery, Mount Pleasant Historic District, *USS Yorktown (CV-10), USS Laffey (DD724), USS Clamagore (SS-343),* and *USCGC Ingham (WHEC-35)*.

The Fort Sumter National Monument was established in 1948 and listed on the NRHP in 1966. The remnants of this masonry fort, associated with the Civil War defense of Charleston, stand on the south side of the mouth of Charleston Harbor. Fort Sumter lies 6 to 9 miles southeast of the Proposed Project and the alternative locations. Fort Moultrie, fortifications on Sullivan's Island associated with the Revolutionary and Civil Wars as well as coastal defenses throughout the history of the United States, was added to the Fort Sumter National Monument in 1960 and listed on the NRHP in 1966. Fort Moultrie lies 6 to 8.9 miles southeast of the Proposed Project site and the alternative locations.

Castle Pinckey stands on Shutes Folly near the center of Charleston Harbor approximately 4 to 6.5 miles south of the Proposed Project and the alternatives. This brick fortification was built in 1808-1811 and listed on the NRHP in 1970.

The Charleston Historic District contains hundreds of eighteenth and nineteenth century buildings associated with the development of this historically important seaport since its founding in 1680. Listed on the NRHP in 1966, with a portion defined as a National Historic Landmark, the boundaries of the District were expanded in 1970 and 1978. Additional adjoining portions of the City are eligible for the NRHP as components of the District but have not been included within the current boundaries. The District contains most of peninsular Charleston south of US Highway 17, excluding recently constructed port facilities at its northeast corner. It lies 2.5 to 4.5 miles south of the Proposed Project and the alternatives.

The Mount Pleasant Historic District includes numerous eighteenth century to early-twentieth century houses and buildings associated with this early summer resort community. The District extends along the east side of Charleston Harbor opposite the City of Charleston and 3.7 to 5.6 miles southeast of the Proposed Project and the alternatives; Shem Creek forms the northern boundary of the District.

Magnolia Cemetery lies on the west bank of the Cooper River approximately 1.1 to 3 miles south of the Proposed Project and the alternatives. Extensive marshes lie between this nineteenth century cemetery and the river.

The four ships listed on the NRHP berth at the Patriots Point Maritime Museum on the east side of Charleston Harbor, approximately 3.5 miles along the Navigation Channel from the entrance to Charleston Harbor from the Atlantic Ocean. All four possess strong associations with World War II as well as continued service and associations with important historical events during the 1950s, 1960s, and 1970s. The aircraft carrier *USS Yorktown (CV-10)* served in all major conflicts of the 1940s through 1960s and recovered the crew of Apollo 8 space mission. Destroyer *USS Laffey (DD-724)* served in World War II and the Korean War. Submarine *USS Clamagore (SS-343)* saw action in World War II and was one of the last diesel-electric submarines in US Navy service. Coast Guard cutter *USCGC Ingham (WHEC-35)* sank a German submarine in World War II, participated in the Korean War, and then conducted drug interdiction activities during the 1960s and 1970s.

Archeological Resources

Numerous terrestrial and underwater archeological resources exist in the Charleston Harbor study area. None has been identified within the Federal Navigation Channel or that could be impacted by potential vessel wakes from container ships. Potential archeological resources

exist along the shores of the Harbor in the Charleston Harbor study area although most of the shore has been modified to accommodate residential lots, industrial facilities, the disposal of dredged material, and necessary infrastructure to serve the Cities of Charleston, North Charleston, and Mount Pleasant.

4.12.3.2. North Charleston Study Area

The historic properties and archeological resources located within the North Charleston study area are shown in Figure 4.12-3 and discussed in the following sections.

Historic Properties

Fick (1995) identified one historic property, the Five Mile Viaduct, near the CNC. This historic property is a bridge that carries upper King Street over Meeting Street.

There are 121 individual buildings or structures identified as historic properties on the CNC; 118 of these structures lie within three historic districts: Naval Shipyard District, Naval Hospital District, and Officer Housing District (Goodwin and Associates, Inc., 1995). These districts all lie to the north of the Proposed Project. The three historic properties that stand outside the districts include Building 1179 (a World War II era chapel), Building 590-A (a late-1930s U.S. Coast Guard bachelor officers' quarters), and Building M-17 (a World War I era Marine Barracks). All three of these buildings stand in the northern portion of the CNC, adjacent to the historic districts. Also, the presumed eighteenth century powder magazine (often called the "Dead House") is a potentially eligible historic property and is located within the Officer Housing District.

The USC Legacy Project (1995) identified 13 buildings and facilities as potential historic properties due to their possible associations with noteworthy events during the Cold War era (1946-1989). Four stand in the southern portion of the CNC near the Proposed Project. Building 686 (an Operational Trainer Facility built in 1983) stands just south of the intersection of South Hobson Street and Barracks Road and is adjacent to the footprint of the Proposed Project. Building 643 (a Fleet and Mine Warfare Training Center of unknown construction date) stands on the north side of Bainbridge Avenue and is adjacent to the Proposed Project. Building 1303 (a Damage Control Mock-up built in 1953) and Building 1310 (a Carrier Compartment Mock-up built in 1953) stand between Dyess and South Hobson Avenues and are located north of the Proposed Project. Subsequent evaluations of Buildings 686 and 643 by Salo (2006) determined that these buildings are not eligible for the NRHP. However, Buildings 1303 and 1310 remain potentially eligible historic properties.

Underwater surveys and assessments identified no potentially eligible historic properties in the portions of the Cooper River between the east ends of the existing wharfs at the CNC and the opposite edge of the main shipping channel of the Cooper River at the Proposed Project (Watts, 1989 and 1995; Wilbanks and Pecorelli, 2006).

Archeological Resources

With the entry of the U.S. into World War II, the Naval Station-Charleston began to expand into the southern end of the property. There were primarily marshlands or low wetlands in this portion of the CNC prior to World War II. Filling and construction continued in this area well into the late-twentieth century. Shmookler (1995) determined that it is highly unlikely that archeological resources would be present in these areas, given the recent construction of much of the land, and the activities associated with the filling and conditioning of the land to permit its use by the U.S. Navy. The only known archeological site in the North Charleston study area is

located within the Officer Housing District on the northern end of CNC. This site is identified as 38BK1496 and is a Mississippian campsite.

Watts (1986, 1989, and 1995) and Wilbanks and Pecorelli (2006) examined the portions of Cooper River from the main channel to the end of the existing wharfs at the CNC and the west bank of the Cooper downriver from the wharfs. These investigators found no remote-sensing anomalies of historic character in this portion of the Cooper River.

4.12.3.3. Daniel Island Study Area

The historic properties and archeological resources located within the Daniel island study area are shown in Figure 4.12-4 and discussed in the following sections.

Historic Properties

There are no historic properties listed on the NRHP within the Daniel Island study area.

Archeological Resources

There are three known archeological resources within the Daniel Island study area. These include Archeological sites 38BK1627 (an eighteenth-nineteenth century plantation site), 38BK1628 (an early-eighteenth century plantation site), and 38BK1629 (an eighteenth-nineteenth century plantation site). The Daniel Island Company currently is sponsoring data recovery investigations at 38BK1628 (Butler et al., 1994). Once these investigations are complete, this site will require no further management consideration.

Potential archeological resources within the Daniel Island study area include one underwater remote-sensing anomaly along the south edge of Clouter Island near the mouth of Clouter Creek (CL-17) and one underwater remote-sensing anomaly (DA-01) near the southern end of Daniel Island, all identified by Watts (1995). Watts' (1995) survey of the portions of the Cooper River between the Daniel Island alternative location and the opposite edge of the main ship channel identified no submerged cultural resources.

4.12.3.4. Clouter Island Study Area

The historic properties and archeological resources located within the Clouter Island study area are shown in Figure 4.12-5 and discussed in the following sections.

Historic Properties

There are no historic properties listed on the NRHP within the Clouter Island study area.

Archeological Resources

There is little potential for archeological sites to exist within the terrestrial portions of this study area. Dredged materials, taken from the nearby portions of the Cooper River cover this entire area to a depth of tens of feet. It is possible that archeological resources once existed in the marshes that were originally present at this locale. However, it is highly unlikely that any archeological resources survive intact beneath the tons of material that have been placed above the original marsh surface.

Potential archeological resources within underwater portions of the study area include four underwater remote-sensing anomalies (CL-7, CL-12, CL-15, and CL-17) along the south edge of Clouter Island near the mouth of Clouter Creek. Tidewater Atlantic Research, Inc. (1995)

indicates that the unsurveyed portions of the Cooper River between the Clouter Island alternative location and the main ship channel possess a moderate to high potential to contain submerged cultural resources such as shipwrecks.

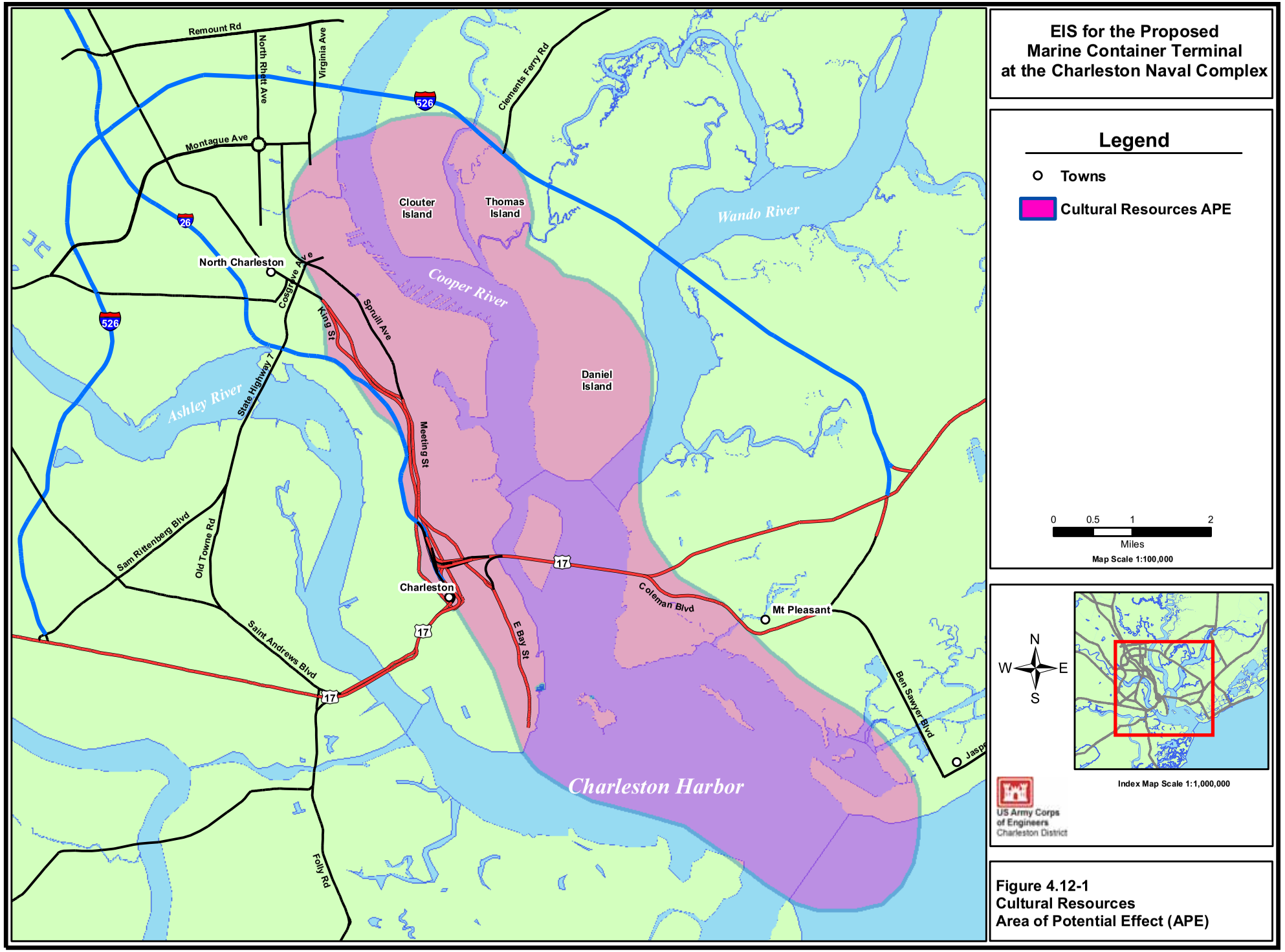
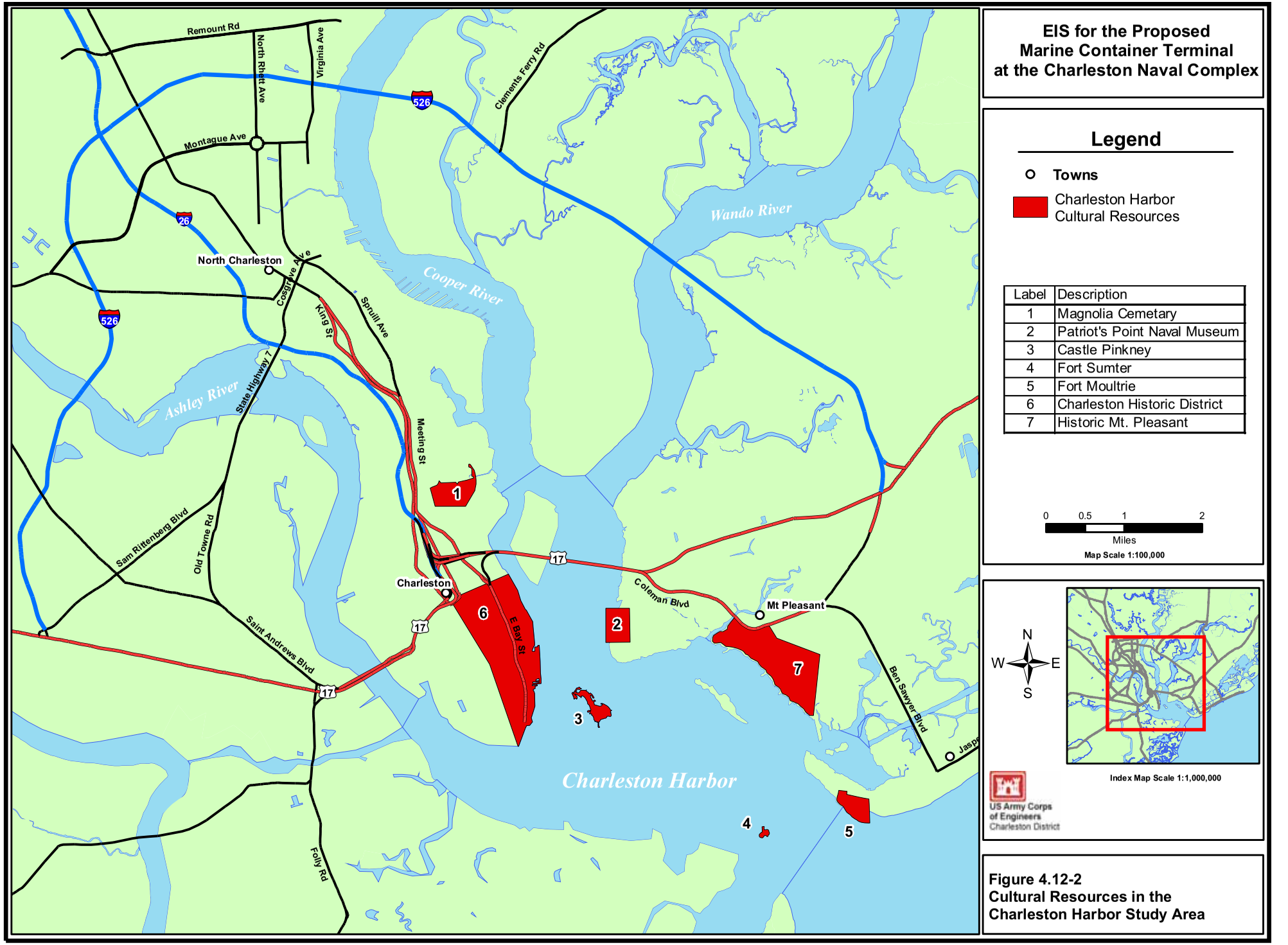
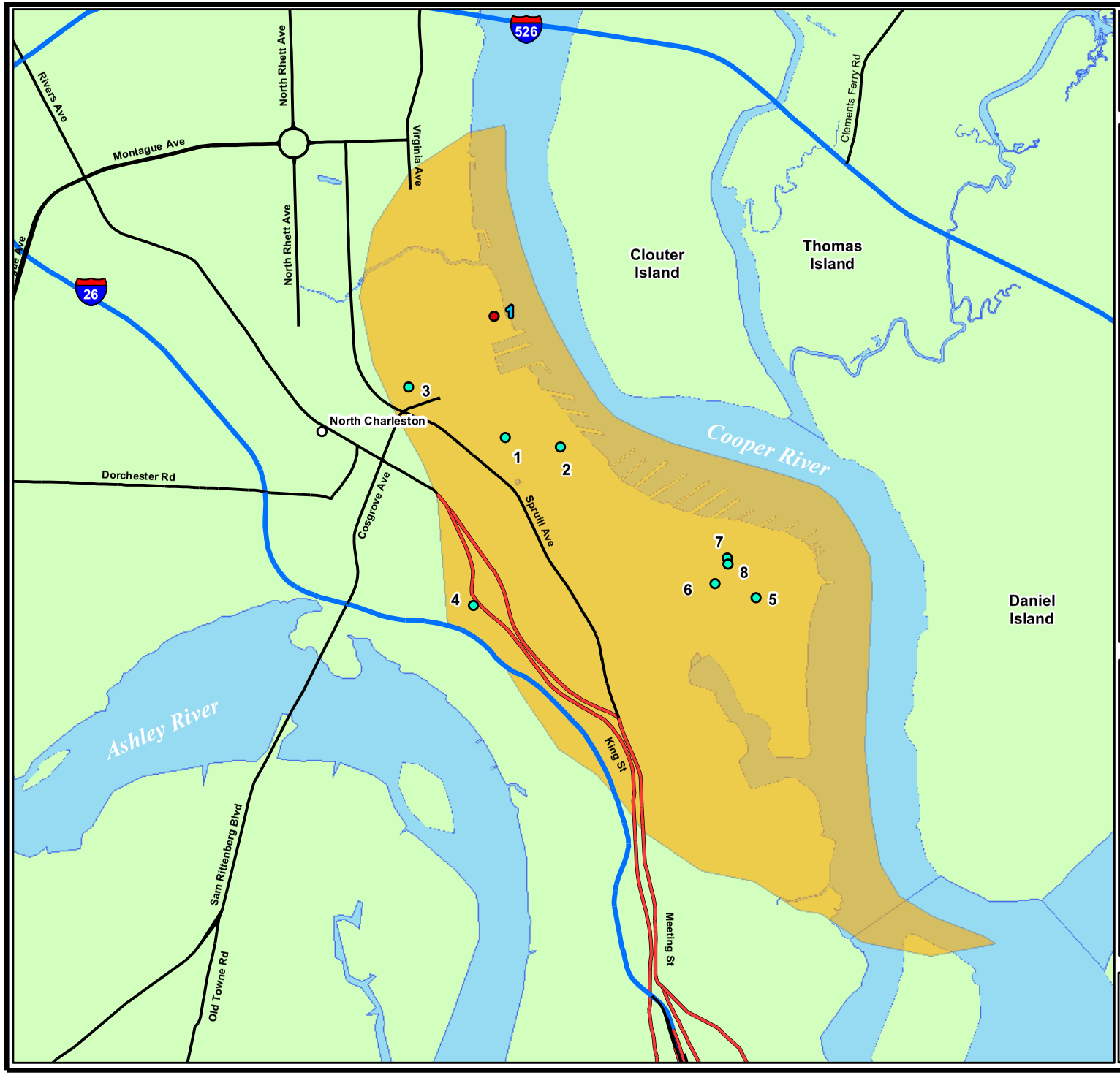


Figure 4.12-1
Cultural Resources
Area of Potential Effect (APE)


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Charleston Harbor
Cultural Resources
Label | Description
1 | Magnolia Cemetary
2 | Patriot's Point Naval Museum
3 | Castle Pinkney
4 | Fort Sumter
5 | Fort Moultrie
6 | Charleston Historic District
7 | Historic Mt. Pleasant
0 0.5 1 2
Miles
Map Scale 1:100,000
N
W E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.12-2
Cultural Resources in the
Charleston Harbor Study Area
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Clements Ferry Rd
526
26
North Charleston
Cosgrove Ave
King St
Spruill Ave
Wando River
Cooper River
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
17
Coleman Blvd
Mt Pleasant
Saint Andrews Blvd
E Bay St
Ben Sawyer Blvd
Charleston Harbor
Folly Rd



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

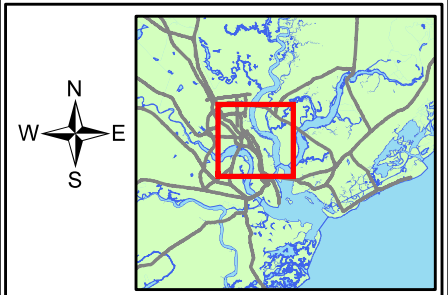
Legend

- Towns
- Historical Properties
- Archeological Resources
- North Charleston Study Area

Label	Description
1	WWII Chapel
2	USCG Bachelor Officer Quarters
3	WWI Marine Barracks
4	Five Mile Viaduct
5	Operational Trainer Facility
6	FLETC & Mine Warfare Training Facility
7	Damage Control Mock-up
8	Carrier Compartment Mock-up
1	Mississippian Camp Site

0 0.25 0.5 1
Miles

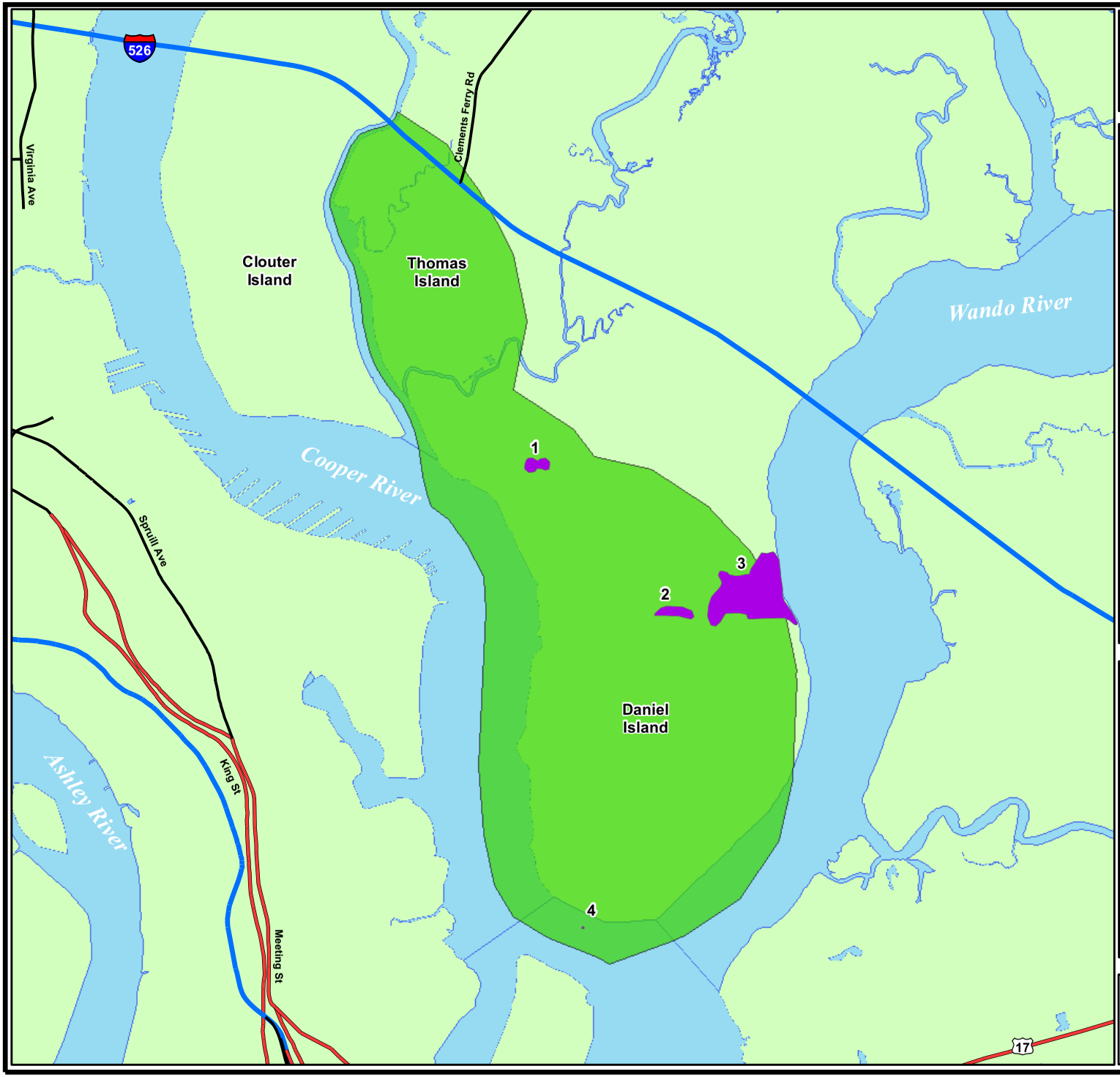
Map Scale 1:50,000



Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 4.12-3
Cultural Resources located within the North Charleston Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Towns
- Archeological Resources
- Daniel Island Study Area

Label	Description
1	19th Century Plantation Site
2	18th Century Plantation Site
3	18th Century Plantation Site
4	Underwater Anomaly

0 0.25 0.5 1
Miles

Map Scale 1:50,000

N
W E
S



Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 4.12-4
Cultural Resources located within the Daniel Island Study Area

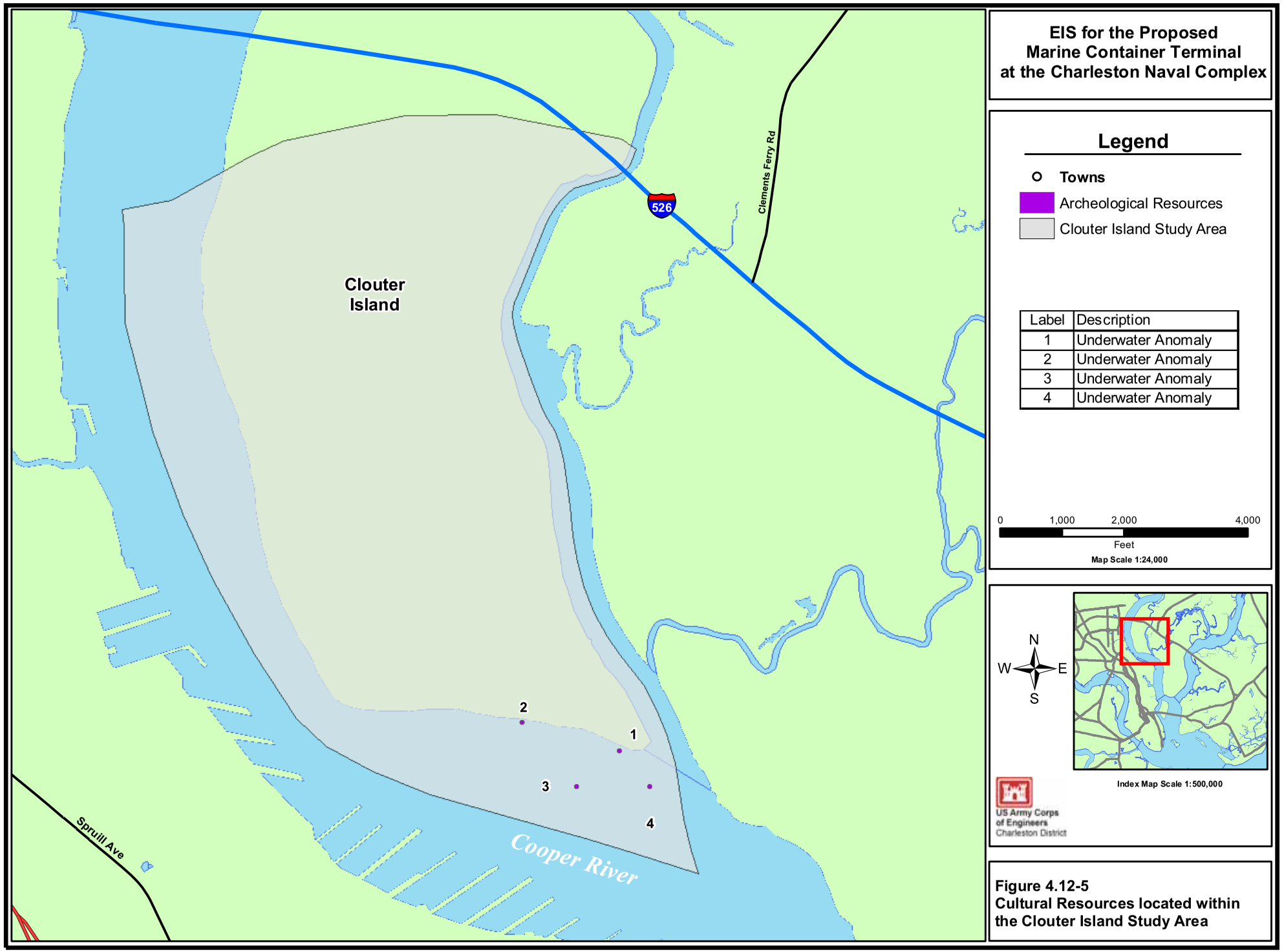


Figure 4.12-5
Cultural Resources located within the Clouter Island Study Area

4.13. SECTION 4(F) PROPERTIES, SECTION 6(F) PROPERTIES, AND OTHER RECREATIONAL FACILITIES

4.13.1. Regulatory Framework

In accordance with the Department of Transportation (DOT) Act of 1966, Title 23, U.S.C. Section 138, and 49 U.S.C Section 303, it is the policy of the United States government, "… that special effort be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." Section 4(f) has been part of Federal law since the DOT Act was enacted in 1966. In January 1983, as part of the recodification of the DOT Act, Section 4(f) was amended and codified in 49 U.S.C. of Section 303. Section 4(f) applies to all transportation agencies within the U.S. Department of Transportation, which includes Federal Highway Administration (FHWA), Federal Transit Administration, and the U.S. Coast Guard.

Section 4(f) applies to all publicly owned parks, recreational areas, and wildlife and waterfowl refuges. If owned by private institutions and individuals, even if the areas are open to the public, Section 4(f) does not apply. However, if a governmental body has a proprietary interest in the land for instance fee ownership, drainage easements or wetland easement, it can be considered "publicly owned" and thus Section 4(f) applies.

Under the auspices of this legislation, an inventory of potential properties within the study areas (Figure 4.13-1) was compiled and evaluated as part of the EIS. *S*ites were screened based on their proximity to the Proposed Project, project alternative locations, and access roadway alternatives. Screening criteria were defined as follows:

- Waterfront parks, including boat ramps and marinas within one-half mile of open water, and waterfront and/or historic parks adjacent to the Cooper River, Wando River or Charleston Harbor.

- Parks and recreation areas within a one-mile radius of the Proposed Project or the Daniel Island or Clouter Island alternative sites or within one-half mile of an access roadway corridor.

- Planned parks and recreation areas within a one-mile radius of the Proposed Project or alternative sites.

Using the above criteria, a total of 25 Section 4(f) properties were determined to be within reasonable proximity to the Proposed Project and/or the alternatives.

The following paragraphs provide a general description of the potential Section 4(f) sites including size, usage, ownership, available activities, and service area. Figure 4.13-2 shows the locations of the 25 properties. This section also describes other recreational facilties and opportunities in the Charleston area.

4.13.2. Section 4(f) Properties

4.13.2.1. West of the Cooper River

Ten of the properties are located west of the Cooper River. The area west of the Cooper River includes parts of North Charleston and Charleston. The potentially affected Section 4(f) properties are described in the following paragraphs.

Cooper River Marina

The Cooper River Marina is located at the southern terminus of Juneau Avenue onboard the CNC in North Charleston. The marina is operated by the Charleston County Parks and Recreation Commission and provides 166 slips available to the public. An additional 30 to 40 slips for transient vessels are planned for the near future. There are no boat ramps or other launching facilities at the marina. The Cooper River Marina is located approximately 1,350 feet south of the Proposed Project footprint.

Park South Recreation Center

Park South Recreation Center is located on the east side of Spruill Avenue just north of the intersection of Stromboli Avenue and Spruill Avenue. Park South Recreation Center consists of approximately 15 acres and has two basketball courts, one volleyball court, and various playground equipment. Park South Recreation Center is located adjacent to the alignment of a proposed local access roadway corridor for the Proposed Project.

Freddie Whaley Sr. Community Center

The Freddie Whaley Community Center is located at Hagood Avenue and Dosher Street in the Rosemont neighborhood of Charleston. The facility occupies approximately two-thirds of an acre and has a playground. It is located approximately 1,800 feet south of a potential access roadway corridor and interchange at I-26.

Gethsemani Community Center

Gethsemani Community Center is located at 2449 Beacon Street (at Boxwood Avenue) in the Windsor Place neighborhood of North Charleston. The facility has two basketball courts and two play areas with playground equipment. Gethsemani Community Center is located near a potential access roadway corridor.

Charleston Waterfront Park

Charleston Waterfront Park is located at Vendue Range and Prioleau Street in the City of Charleston. The park is owned and maintained by the City of Charleston. This 3.5-acre waterfront park provides an observation/fishing pier, open space, and fountains. Incorporated into the design of the pier are picnic and sitting areas for residents and tourists. Located immediately east of the core of the downtown historic district, this park provides a unique open-water setting for visitors to the downtown area.

White Point Gardens

White Point Gardens is located at the southeastern end of the Charleston peninsula and covers approximately 8 acres. The park fronts on both the Cooper and Ashley Rivers. The park includes a bandstand, benches, and walking pathways.

Charleston Maritime Center

The Charleston Maritime Center is located on Wharfside Street near the intersection of Calhoun and Concord Streets and fronts on the Cooper River. The facility was completed in October 1997 and was intended to bring the local community in touch with the waterfront and maritime history of Charleston.

The Maritime Center offers a deep water, full service marina and special events facility. The marina can accommodate vessels up to 180 feet in length. The special events facilities can accommodate up to 5,000 people.

South Carolina Aquarium

The South Carolina Aquarium is located at Concord and Charlotte Streets on the Cooper River waterfront in Charleston. The aquarium is sited on 1.5 acres that was formerly an electrical power plant. The facility provides various marine and ecologic exhibits and an IMAX theater.

The development of the South Carolina Aquarium facility was a brownfields rehabilitation project under the Superfund Accelerated Cleanup Model and was the 2002 Phoenix Award winner for community impact.

Riverfront Park

Riverfront Park is part of the Noisette Project and is intended to provide an opportunity for the people of North Charleston to have access to the Cooper River waterfront. The park opened on July 4, 2005, and is located on the south side of Noisette Creek, at its confluence with the Cooper River. Riverfront Park encompasses approximately 10 acres of property that was formerly part of the Charleston Naval Base golf course.

Fort Sumter National Monument

Fort Sumter National Monument is part of the National Park Service (U.S. Department of the Interior) and is located on the southwestern shore of Charleston Harbor overlooking the outer harbor. The bombardment of the Federal garrison at Fort Sumter from Fort Moultrie and the White Point Gardens area marked the outbreak of hostilities during the American Civil War.

4.13.2.2. Between the Cooper and Wando Rivers

This area consists of the Daniel Island Planned Community, the remainder of the Cainhoy Peninsula, and Berkeley County. The Villages of Cainhoy and Wando are not included due to their distance from the Proposed Project. Nine potentially affected Section 4(f) properties located between the Cooper and Wando Rivers were identified.

Center Park

Center Park is approximately 1 acre and consists of open area and playground equipment. It is located on Daniel Island Drive, east of Seven Farms Drive and south of I-526.

Barfield Park

Barfield Park consists of approximately 2 acres of wooded area with benches for seating and walking trails. It overlooks a salt marsh area and the Wando River and is located on Barfield Street, east of Seven Farms Drive and south of I-526.

Smythe Park

Smythe Park is a partially completed park that will consist of approximately 5 acres of open water and walking trails. It is located at the southern end of the Daniel Island development, bounded by Purcell Street to the north, Pierce Street to the east, Daniel Island Drive to the west, Smythe Street to the south, and is just north of the planned Charleston County Regional Park.

Charleston County Regional Park

This yet–to-be-named regional park is part of the Daniel Island Master Plan's minimum of 60 acres of regional parks. A regional park may provide facilities that include ball fields, basketball courts, tennis courts, and large open spaces. Specific facilities have not been defined for this park to date.

Daniel Island Community Dock

The Community Dock is located on Daniel Island on the Wando River at the eastern terminus of River Landing Drive. The dock consists of a walkway and two small floating docks.

Pierce Park

Pierce Park is located on Daniel Island on Pierce Street. It consists of a pavilion and neighborhood swimming pool.

Etiwan Park

Etiwan Park is located on Daniel Island near the Bishop England High School. Etiwan Park is part of the minimum 24 acres of neighborhood parks planned for the Daniel Island Planned Community. As with the other planned parks in the Daniel Island Community, no specific facilities have been defined, but may include playground equipment and open space.

Daniel Island Boat Ramp

The Daniel Island Boat Ramp is a single, small boat ramp and associated dock located on Daniel Island. This boat ramp provides access to Beresford Creek, Clouter Creek, and the Cooper River. Due to the ramp's upstream location, boats are limited to smaller draft size.

Bellinger Island

Bellinger Island is a 2-acre conservation area located along the south bank of Beresford Creek on Daniel Island. It is located approximately 2,500 feet north of the access corridor for the Daniel Island alternative.

4.13.2.3. East of the Wando River

Five of the identified properties are located east of the Wando River. This area includes the Town of Mount Pleasant and parts of Charleston County. The Towns of Sullivan's Island (except Fort Moultrie National Monument) and Isle of Palms are not included due to their distances from the Proposed Project.

Mt. Pleasant Memorial Park (Under Construction)

Although the final design has not been completed, the Mt. Pleasant Memorial Park will encompass approximately 20 acres of upland area and will include a 1,200-foot pier in the Cooper River. The pier will be constructed on pier caps left in place after the demolition of the Grace Bridge. The facility will be a passive park that will probably contain walking trails and parking areas, as well as the Mt. Pleasant Visitors Center. The park will be finished upon completion of the Grace and Pearman Bridges demolition and is expected to be open to the public in early 2007.

Remleys Point Boat Ramp

The Remleys Point Boat Ramp is located in Mt. Pleasant at the western terminus of 5th Avenue on the Wando River. The facility provides a 3-lane boat ramp, one associated pier, two breakwater structures, parking for approximately 50 vehicles plus trailers, and an information board. This property permits 24-hour access, and lighting is provided during night hours. Remleys Point provides boating and fishing opportunities primarily for the Town of Mt. Pleasant.

Charleston Harbor Marina

The Charleston Harbor Marina is located at Patriots Point in Mount Pleasant. The marina has 459 slips, over 17,000 linear feet of floating dock space and is the largest marina ever permitted in South Carolina. The marina can handle vessels of various sizes up to 200 feet in length.

Patriots Point Naval and Maritime Museum

Patriots Point Naval and Maritime Museum is located on a reclaimed CDF known as Hog Island on the eastern shore of Charleston Harbor, approximately 1.5 miles seaward of the confluence of the Cooper and Wando Rivers.

Several decommissioned Naval and Coast Guard vessels are permanently berthed as part of the museum; the USS Clamagore, USS Ingham, USS Laffey, and the USS Yorktown are each National Historic Landmarks.

Alhambra Hall

Alhambra Hall is owned and operated by the Mt. Pleasant Recreation Department and is located in Mt. Pleasant on the eastern shore on Charleston Harbor. The grounds encompass approximately 2.5 acres. The hall itself formerly served as a ferry terminal for the ferry service between downtown Charleston, Mt. Pleasant, and Sullivan's Island.

Fort Moultrie National Monument

Fort Moultrie National Monument is part of the National Park Service (U.S. Department of the Interior) and is located at the southwestern end of Sullivan's Island, overlooking the outer Charleston Harbor. Fort Moultrie's history includes more than 170 years of coastal defense, including the first decisive victory over the British during the American Revolution and the bombardment of Fort Sumter during the initial battle of the Civil War. The third Fort Moultrie was constructed in 1809 and stands today.

4.13.3. Section 6(f) Properties

Grants for improvements to parks and recreational facilities are available to state and local government agencies through the Land and Water Conservation Fund Act of 1965 (LWCFA). Section 6(f) of the LWCFA stipulates that properties acquired or improved through the use of such funding may not be converted to a non-recreational use without the approval of the Department of the Interior National Park Service.

Two properties that have utilized LWCF monies to improve their facilities are located within reasonable proximity of the Proposed Project and/or the alternatives: the Charleston Waterfront Park in the City of Charleston, and Remleys Point Boat Ramp in the Town of Mt. Pleasant. These properties are identified as Section 4(f) properties in the previous section and shown in Figure 4.13-2.

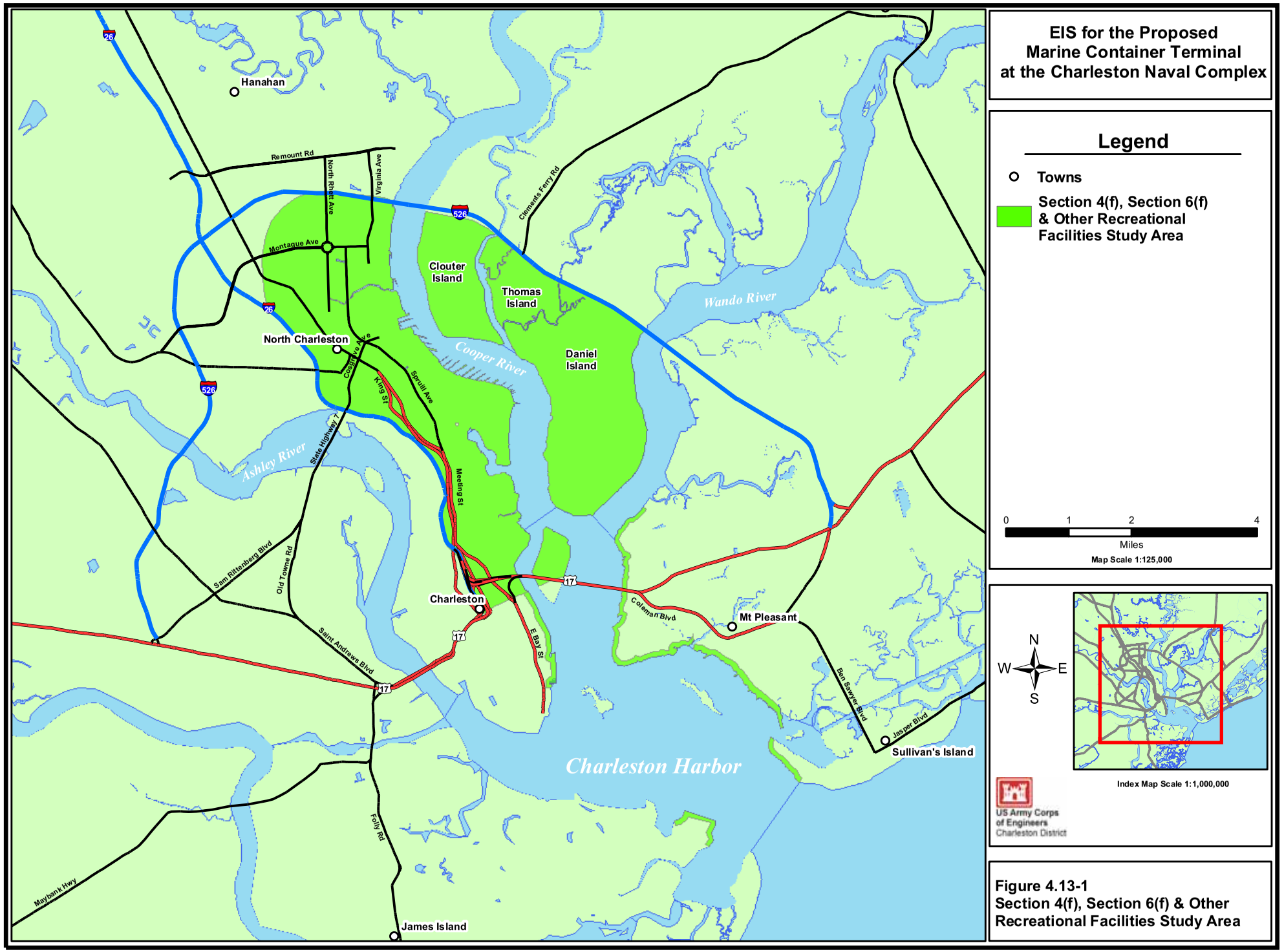
4.13.4. Other Recreational Facilities and Opportunities

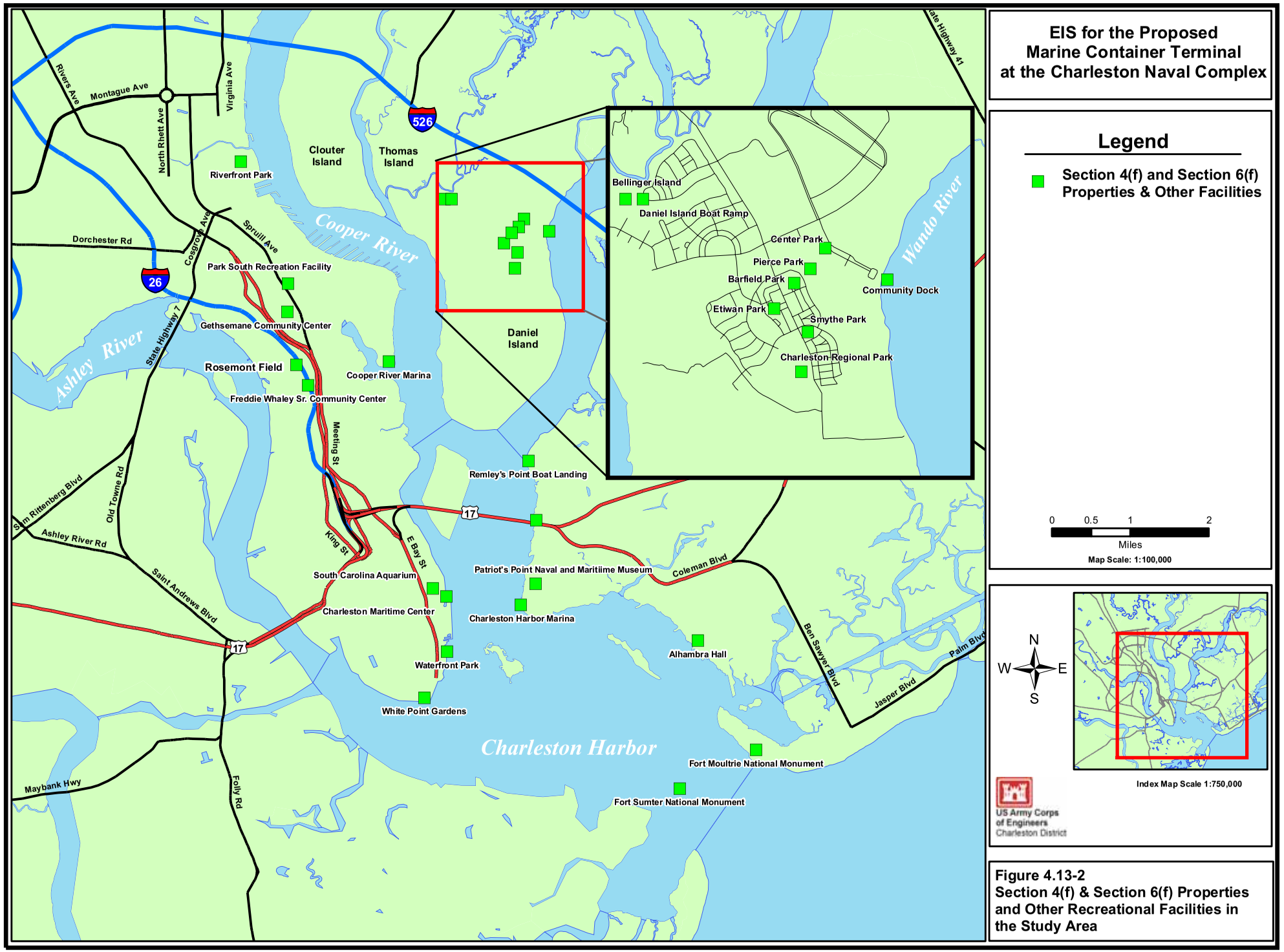
The greater Charleston Metropolitan area has a variety of natural and manmade facilities that offer numerous recreational opportunities. Local professional sports include baseball (Charleston Riverdogs), ice hockey (South Carolina Stingrays), soccer (Charleston Battery), and basketball (Charleston Lowgators) minor or developmental league teams. The area has an abundance of golf and tennis facilities and the Daniel Island Tennis Center hosts the Family Circle Cup women's professional tennis tournament.

Charleston Harbor has become an important recreational asset and is used extensively for recreational boating. There are several public and private marinas and boat ramps that afford access to the harbor and its associated waterways. The area's mild climate encourages outdoor recreational activities such as boating, angling, hunting, camping, birding, and hiking. Charleston area beaches (Isle of Palms, Sullivan's Island, Folly Beach, Kiawah Island, Seabrook Island, and Edisto Beach) are easily accessible and attract thousands of visitors annually. The Francis Marion National Forest is located nearby and comprises approximately 250,000 acres containing hiking trails, and archeological and historical sites. The Cape Romain Wildlife Refuge is also located nearby and contains about 60,000 acres of undeveloped barrier islands, tidal creeks, and Spartina marshes. The refuge is an important resting and foraging area for migratory shorebirds as well as passerine species. The ACE Basin National Wildlife Refuge is located southwest of Charleston and encompasses large areas of former rice field habitat, open water, Spartina marsh and freshwater marshes, and uplands.

In addition to sporting and recreational opportunities, there are also numerous cultural and historic attractions within the area. The Spoleto Arts Festival has been an annual event since the late 1970s and is attended by more than 100,000 people each year. Indeed, tourism within the area provides approximately $1 billion annually to the local economy and provides approximately 15,000 jobs. Tourist spending increased by 30 percent a year on average during the period 1980 to 1984 and has increased by 15 to 28 percent annually since then (USACE, 1999).

To meet the demands of a growing population, officials for the greater Charleston area are frequently planning and constructing new parks. One park that is being developed within the study area is one commonly called Rosemont Field. The proposed park site is located on the north end of the Rosemont neighborhood on a portion of the property known as the Old Rosemont School. The plan for this piece of property is a community ball field, and construction began by the City of Charleston in the early summer of 2006. The property is not classified under Section 4(f) because it is being leased under a relatively short-term agreement. The lease is for ten years and is renewable two times for 5-year extensions (a total possible duration of twenty years). The "tenant" is the City of Charleston.


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Section 4(f), Section 6(f)
& Other Recreational
Facilities Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.13-1
Section 4(f), Section 6(f) & Other
Recreational Facilities Study Area
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Clements Ferry Rd
Montague Ave
Clouter
Island
Thomas
Island
Wando River
North Charleston
Cooper River
Daniel
Island
Cosgrove Ave
King St
Spruill Ave
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
Saint Andrews Blvd
E Bay St
Bon Secours Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Folly Rd
Maybank Hwy
James Island
N
W
E
S



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Section 4(f) and Section 6(f) Properties & Other Facilities

0 0.5 1 2

Miles

Map Scale: 1:100,000

N W E S

Index Map Scale 1:750,000

US Army Corps of Engineers
Charleston District

Figure 4.13-2
Section 4(f) & Section 6(f) Properties and Other Recreational Facilities in the Study Area

4.14. HAZARDOUS WASTE AND MATERIALS

This section discusses site contamination within three study areas (North Charleston, Daniel Island, and Clouter Island) and the management and handling of hazardous materials within the Charleston Harbor area. The study areas are illustrated in Figure 4.14-1.

4.14.1. Site Contamination

In this discussion of site contamination, each study area is assessed for properties of known contamination. These properties are then described and evaluated in terms of size and location, type of contamination, and state of remediation.

4.14.1.1. North Charleston Study Area

The North Charleston study area focuses on sites within the Proposed Project (terminal and access roadway) footprint and those in proximity to the footprint (for the purposes of this EIS contaminated sites within 100 yards of the Proposed Project boundary are considered to be in proximity). The North Charleston study area is shown in Figure 4.14-1.

The sites discussed in the following paragraphs have been listed by SCDHEC as being potentially contaminated. Some sites have started remedial actions.

Van Ness Sign and Leasing Site

The Van Ness Sign and Leasing site is located on Austin Avenue in North Charleston (Rosemont Neighborhood) and is listed in the SCDHEC voluntary cleanup database (listed in 2003). The site consists of an approximately 5.7-acre undeveloped tract that has elevated arsenic and lead concentrations in soil and groundwater. No remedial actions have taken place as of May 5, 2006.

Swift Agri-Chem Corporation

The Swift Agri-chem site consists of approximately 43.7 acres located at 2750 Speissegger Drive North Charleston (between I-26 and the Ashley River). The site was formerly a fertilizer manufacturing plant that used phosphoric acid and other constituents to produce high-grade phosphate for agricultural applications. The company ceased operations at the site during the mid-1970s and the main manufacturing building was demolished in about 1978. The potential contaminants of concern in the soil, sediments, and groundwater of this site are arsenic and lead.

Hall Two Site

The Hall Two Site is a 26.6-acre tract of land located on Austin Avenue in North Charleston (Rosemont Neighborhood) and is listed in the SCDHEC voluntary cleanup database. No specific data regarding the nature and character of hazardous constituents (other than “hazardous substances”) are included in the database.

Core Sound Realty, Inc. Site

This site consists of approximately 10.0 acres located at Discher Street/1797 King Street Extension North Charleston. The SCDHEC Voluntary Cleanup Database provides no information regarding potential contaminants of concern other than “hazardous substances.”

Macalloy Property

The former Macalloy plant is located on approximately 147 acres fronting Shipyard Creek in an industrial and commercial section of the Charleston Peninsula. It is directly adjacent to a tidal marsh along Shipyard Creek.

The plant produced ferrochromium alloy by smelting chromium ore in both submerged and open arc furnaces. It was originally owned and operated by Pittsburgh Metallurgical Company from 1941 to 1966, Airco from 1966 to 1979, and Macalloy from 1979 to July 1998 when production ceased. At various times from 1942, the Department of Defense has owned, operated, or otherwise used portions of the site to produce and store ferrochromium alloy, chrome ore, and slag.

The manufacturing process involved the conversion of chromium-bearing ore to ferrochromium in a single submerged arc electric furnace. The alloy was then shipped offsite for production of high quality stainless steel. A second furnace on the property had been out of use for several years when manufacturing ceased in 1998. Open arc furnaces were operated from approximately 1946 to 1967. Submerged arc furnaces were used in subsequent years. Open arc furnaces generally produce more hexavalent chromium by-product than submerged arc furnaces. The submerged arc furnaces yielded approximately 180 tons of finished ferrochromium per day.

Raw materials and finished product were transported from the plant via rail, highways, and Shipyard Creek. Alloy manufacturing activities have resulted in the generation of slag, fine particulate matter, ashes and dust, gas conditioning tower sludge, associated wastewater, and air emissions control equipment dust.

During its final years of operation, the facility was regulated by several federal environmental statutes, primarily the Clean Water Act, the Clean Air Act, and the Resource Conservation and Recovery Act (RCRA). In 1992, the South Carolina Department of Health and Environmental Control (SCDHEC) issued Administrative Order 92-64-W requiring the Macalloy Corporation to remediate contaminated groundwater on the property. Pursuant to this order, a groundwater remediation system was installed around the unlined surface impoundment (USI) in 1994 and 1995. In 1996, Macalloy began the RCRA corrective action process.

In January 1997, pursuant to the terms of a consent order with SCDHC (No. 96-38-HW), Macalloy initiated offsite disposal of treated electrostatic precipitator dust from the USI. Macalloy also initiated a removal action in June 1998 under consent order with EPA (No. 98-18-C) to implement a surface water management system to mitigate transport of contaminants to Shipyard Creek.

Once production at the facility ceased in July 1998, EPA and SCDHEC agreed that the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) would be the regulatory mechanism for the site. The site was listed on the National Priorities List in February 2000 and Macalloy entered into an agreement with EPA on March 29, 2000 to perform a Remedial Investigation/Feasibility Study (RI/FS).

The primary hazardous constituents of concern associated with the site are heavy metals, primarily hexavalent chromium. Remediation of the site has been ongoing; the Pre-Final Construction Inspection was conducted on July 13, 2006 and, subsequently, a certification of completion of physical construction was granted.

Charleston Naval Complex

In 1980, the Department of Defense established the Installation Restoration Program (IRP) to investigate and clean up contamination that may have resulted from past operations, storage, and disposal practices at Federal facilities around the country. The Navy adopted this program, which has regulatory requirements similar to those developed under CERCLA.

In 1990, the CNC received a hazardous waste permit in accordance with this act, allowing the base to operate within these guidelines. Hazardous materials included substances such as chemicals, pesticides, petroleum products, paints, and cleaners identified by the EPA as being potentially harmful to human health or the environment.

In 1993, the CNC was added to the list of bases scheduled for closure under the Defense Base Realignment and Closure Act (BRAC), which regulates the closure and transition of property to the community. Since the April 1, 1996, closure operations have ceased and environmental cleanup has begun to make the property available for redevelopment.

Most environmental cleanup activities are being implemented under the Resource Conservation and Recovery Act (RCRA). There are no CERCLA sites within the Proposed Project footprint.

The CNC hazardous waste permit covers the investigation and cleanup of individual sites, referred to as solid waste management units (SWMUs) and areas of concern (AOCs), resulting from past hazardous waste releases. SWMUs and AOCs are defined in the RCRA Part B permit as follows:

- **SWMU** – "Any unit which has been used for the treatment, storage, or disposal of solid waste at any time, regardless of whether the unit is or ever was intended for the management of solid waste. RCRA-regulated hazardous waste management units are also solid waste management units. SWMUs include areas that have been contaminated by routine and systematic releases of hazardous constituents, excluding one-time accidental spills that are immediately remediated and cannot be linked to solid waste management activities (e.g., product or process spills)."

- **AOC** – "Any area having a probable release of a hazardous waste or a hazardous constituent which is not from a solid waste management unit and is determined by the Regional Administrator to pose a current or potential threat to human health or the environment. Such areas of concern may require investigations and remedial actions as required under Section 3005(c)(3) of the RCRA and 40 CFR §270.32(b)(2) in order to ensure adequate protection of human health and the environment."

The CNC currently encompasses 1,588 acres and is located along the Cooper River in Charleston County, South Carolina. The CNC is divided into 11 zones (alphabetically from Zone A to K, see Figure 4.14-2) to facilitate RCRA corrective action processes and for conveyance of the property for development. The CNC operated approximately 18 major industrial shops. Hazardous waste generated included paint waste, waste solvents, boiler cleaning solutions, acids, sludge from metal plating at the ship pretreatment facility, and small quantities of mixed waste (radiologically contaminated hazardous waste).

The CNC corrective action program is governed by a RCRA permit (SC0 170 022 650), which was issued by SCDHEC on August 17, 1998 and most recently modified in October 2004. A total of 198 SWMUs and 226 AOCs, in various stages of corrective actions, have been identified onboard the CNC and its associated properties, such as Clouter Island.

The CNC corrective action program is governed by a RCRA Permit (SC0 170 022 650), issued by SCDHEC on August 17, 1998. A total of 196 SWMUs and 209 AOCs, in various stages of corrective actions, have been identified onboard the CNC and its associated non-contiguous properties, such as Clouter Island.

EPA generated a National Corrective Action Priority System (NCAPS) ranking of high for the site in March 1992. RCRA Field Investigations (RFI) for the 11 Zones began in 1994. The broad range of contaminants detected during the RFI added to the complexity of the project.

The primary contaminants of concern were:

- Metals: lead, hexavalent chromium, arsenic
- Volatile organic compounds (VOCs): tetrachlorethene (PCE), trichlorethene (TCE), dichloroethene (DCE), vinyl chloride, benzene, toluene, ethylbenzene, and xylene (BTEX)
- Semi-volatile organic compounds (SVOCs): benzo(a)pyrene and benzo(a)pyrene equivalents
- Petroleum, oil, and lubricants including light non-aqueous-phase liquids
- Chlorinated pesticides/Polychlorinated Biphenyls (PCBs): DDT, chlordane
- Asbestos and lead-based paint
- Dioxins

The proposed terminal is located within Zones H & I on the CNC. Zone H is in the southern part of the peninsula formed by Shipyard Creek and the Cooper River. It is bounded by Hobson Avenue to the north; Shipyard Creek to the south; Osprey Street, C.B. Lane, and the spoil area to the east; and Halsey Street, Bainbridge Avenue, and property boundaries to the west. Zone I, in the southernmost portion of Naval Base Charleston, is bounded by the Cooper River to the north and east; Shipyard River to the south; and Hobson Avenue, Osprey Street, and C. B. Lane to the west. Most of the entire southern end of the base was filled (with a wide variety of known and unknown materials) to make the property suitable for development. The majority of the filling activity took place during 1930s and 1940s. Zone J consists of Noisette and Shipyard Creeks and the Cooper River.

According to the CNC RCRA permit, there are a combined 26 SWMUs and AOCs on or near to the Proposed Project footprint. Table 4.14-1 summarizes the current RCRA corrective action status of the SWMUs and AOCs.

Table 4.14-1. RCRA Permit Status for SWMUs/AOCs at the Proposed Project Site.

SWMU/AOC	Site Name	Document	RCRA Permit Status	Date of NFA
SWMU 9	Combined SWMU Landfill Area	CMS Report with Landuse Controls: groundwater use restrictions; enigineering controls, land use restirctions, dig restrictions	RFI complete; CMS report approved; Preparing CM Implementation Plan	10-Mar-04*
SWMU 12	Old Fire Fighter Training Area near Southern Tip of CNC	CMS Work Plan Zone I (R0) Para. 12.5	RFI complete; IM complete; CMS complete; NFA	28-Mar-02

SWMU/AOC	Site Name	Document	RCRA Permit Status	Date of NFA
SWMU 14	Chemical Disposal Area South of Building 1897	CMS Workplan/IM Completion Report (R1)	RFI complete; IM complete; CMS report submitted; NFA	25-Apr-03
SWMU 15	Incinerator South of Building 1843	CMS Workplan/IM Completion Report (R1)	RFI complete; IM complete; CMS report submitted; NFA	25-Apr-03
SWMU 16	Paint Storage Bunker West of Building X-55	CMS Work Plan Zone I (R0) Para. 9.5	RFI complete; CMS complete; NFA	28-Mar-02
SWMU 17	Oil Spill Area on North Side of Building 61		RFI complete; CMS stage	
SWMU 138	Building 1776 SAA	RFI Report Addendum Phase II (R0)	RFI stage	RFI Not Complete
SWMU 159	SAA, Building 665, SAA	CMS Investigation Report Addendum (R0)	RFI stage; CMS complete; NFA	18-Sep-02
AOC 501	UXO Site East of Bldg. X-54		CSI stage	
AOC 503	UXO Site South of Building 665		CSI stage	
AOC 654	Septic Tank and Drain Field near Building 661 Area	Zone H RFI Report	CSI complete; NFA	28-Aug-97
AOC 655	Oil Spill Area near Building 656	Zone H RFI Report	CSI complete; NFA	28-Aug-97
AOC 656	Petroleum Spill between Bldgs 602 and NS-71	Zone H RFI Report	CSI complete; NFA	28-Aug-97
AOC 661	Former Explosives Storage near South of Building 601	Zone H RFI Report	CSI complete; NFA	24-Nov-97
AOC 666	Fuel Storage near Building NS-45	Zone H RFI Report	CSI complete; NFA	20-Jun-02
AOC 667	CBU Vehicle Maintenance Area near Building 1776	RFI Report Addendum Phase II (R0)	RFI stage	RFI Not Complete
AOC 669	Indoor Pistol Range near Building 1888		NFA	
AOC 670	Former Skeet Range on the Field South of Bldg. 1897	CMS Workplan/IM Completion Report (R1)	RFI complete; IM complete; CMS complete; NFA	25-Apr-03
AOC 684	Former Outdoor Pistol Range at Bldg. 1888	CMS Workplan/IM Completion Report (R1)	RFI complete; IM complete; CMS complete; NFA	25-Apr-03
AOC 685	Former Smoke Drum West of Juneau Ave	CMS Work Plan Zone I (R0) Para. 8.5	RFI complete; CMS complete; NFA	28-Mar-02
AOC 687	Ammunition Storage at Building X-55	CMS Work Plan Zone I (R0) Para. 9.5	RFI complete; CMS complete; NFA	28-Mar-02
AOC 688	Ammunition Storage at Building X-56	CMS Work Plan Zone I (R0) Para. 10.5	RFI complete; CMS complete; NFA	28-Mar-02
AOC 689	Southern Tip of Base (Marina Parking Area)	CMS Work Plan Zone I (R0) Para. 11.5	RFI complete; CMS complete; NFA	28-Mar-02
AOC 690	Dredge Materials Area at Southern End of CNC	CMS Work Plan Zone I (R0) Para. 11.5	RFI complete; CMS complete; NFA	28-Mar-02

SWMU/AOC	Site Name	Document	RCRA Permit Status	Date of NFA
AOC 707	Diesel Fuel Oil Spill North of Building 1795	Interim Measures Completion Report	CSI complete; IM complete; NFA	14-Jun-02
AOC 708	Petroleum Release at Transformer Pad Near Bldg. NS-668		CSI complete; NFA	26-Feb-99
AOC 722	Zone I Grid Well # 11	RCRA Facility Assessment/RFI Workplan (R0)	RFI complete; CMS stage	In progress

"RFI" RCRA Facility Investigation, "IM" Interim Measures, "CMS" Corrective Measures Study, "NFA" No Further Action, "CSI" Confirmatory Sampling Investigation.
** Land use controls instead of NFA*

Although the majority of SWMU/AOCs have been designated as No Further Action required, there is a potential for contaminants to be encountered during site work and excavation within the Proposed Project footprint. Accordingly, descriptions of each SWMU/AOC within and near to the Proposed Project's boundaries are summarized in the following paragraphs. Figure 4.14-3 illustrates locations of SWMUs and AOCs within and adjacent to the Proposed Project's footprint.

SWMU 9

Combined SWMU 9 consists of 28 separate SWMUs and AOCs, including, but not limited to, SWMUs 9, 19, 20, 121 and AOCs 706, 637, 649, 650, 651, and 724. Combined SWMU 9 has several land use controls (LUCs) in place that consist of maintaining the existing soil cover, restriction of unauthorized digging (dig permit requirements), groundwater use restrictions, engineering controls, and maintaining industrial reuse.

There are several chemical compounds associated with SWMU 9 groundwater and soil media that require conditional remedies including: metals (antimony, arsenic, barium, cadmium, chromium VI, lead, mercury, thallium, zinc); volatile organic compounds (acetone, benzene and vinyl chloride); halogenated volatile organic compounds (1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloroethene (total), cis-1,2-dichloroethylene, 1,4-dichlorobenzene, chlorobenzene, chlorobenzene isomers, methylene chloride, trichloroethene, tetrachloroethylene, trichloroethylene); various unspecified chlorinated solvents; polynuclear aromatic hydrocarbons (benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, benzo(a)pyrene equivalence (BEQ), naphthalene, and 2-methylnaphthalene); phenols (2-chlorophenol, 2,4-dimetylphenol, and 4-methylphenol (p-cresol)); polychlorinated biphenyls (arochlor 1260, arochlor (unspecified)), PCBs (unspecified); and pesticides (unspecified).

SWMU 9 is located outside of the Proposed Project footprint; however, consideration of SWMU 9 is necessary as it relates to the alignment of the access roadway alternatives discussed in Sections 5.2.6.

SWMU 9 is a former landfill located on the southern portion of the Charleston Naval Complex (CNC) operating from the 1930s until the early 1970s and is generally bounded by Shipyard Creek to the southwest, Bainbridge Avenue to the northeast, and Holland Street to the southeast. Historic aerial photographs and geophysical surveys conducted in 1992 and 1999 have indicated a probable landfill boundary that encompasses approximately 120 acres.

Although SWMU 9 was a military–use landfill used for industrial and domestic solid waste, SWMU 9 is considered a low–level risk municipal–type landfill because it contains primarily

municipal–type wastes. In accordance with EPA guidance regarding presumptive remedies for landfills, this particular landfill is considered a low–level risk because it contains primarily municipal–type wastes (e.g., medical waste, empty oil containers, empty Freon tanks, cargo netting, gas masks, concrete, wood, and domestic refuse).

Samples collected from SWMU 9 and associated sites during the RCRA Facility Investigation (RFI) process identified several contaminants of potential concern, including pesticides, herbicides, VOCs and SVOCs, metals, petroleum hydrocarbons, and dioxins.

Seven additional sites were investigated concurrently with SWMU 9 (thus the term *Combined SWMU 9*) during the RFI because they were within the landfill's estimated perimeter south of Bainbridge Avenue. In January 1999, the Environmental Detachment Charleston (EDT) conducted an intrusive geophysical investigation to verify the northern boundary of the landfill. This investigation found that the landfill extended farther north than previously thought and included four additional sites that were investigated for the Zone G RFI, thus increasing the overall size of the landfill to approximately 120 acres.

Invasive investigations such as soil borings, ground water well installations, and trenching have produced sufficient evidence indicating the landfill lacks an appropriate cap to control/limit infiltration. The cap consisted of natural-soil-dredged-soil, primarily 1 to 3 feet of sand or sandy silt. A low-permeability cover material, natural or engineered, is not present at the landfill.

FLETC, a current tenant at the former naval base, frequently uses the running track onsite for physical conditioning. The balance of Combined SWMU 9 consists of grassed fields, wetlands, medium-sized brush and wooded areas, a transformer substation, and Buildings 161, 246, 641, 650, 672, 673, and 674.

SWMU 12

SWMU 12 is the former firefighter training area located in the southwestern portion of the southern peninsula. At this SWMU, flammable liquids were pumped into a shallow 30- to 50-foot-diameter pit, ignited, and then extinguished with water. Training occurred between 1966 and 1971; the frequency of training and types of flammable liquids used were not documented. A gravel road and clearing at the SWMU, used infrequently as a construction laydown yard, were reportedly near the former training area's location.

Materials of concern at SWMU 12 included petroleum hydrocarbons, coal ash, semi-volatile organic compounds (SVOCs), and metals. To fulfill RFI objectives, soil and groundwater were sampled in accordance with the approved final RFI work plan. Sampling was conducted to evaluate the presence of any contamination resulting from past activities at the site.

Approximately 24 sample locations associated with SWMU 12 were evaluated for the presence of contaminants between 1995 and 1999. Surface and subsurface soil samples as well as groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. No soil pathway COCs, based on human health risk assessments, were identified for SWMU 12. Arsenic, bis(2-ethylhexyl)phthalate, cadmium, nickel, thallium, and 2,3,7,8- tetrachloro-dibenzodioxin Toxicity Equivalent Factor (TEF) were identified as groundwater COCs.

SWMU 14/SWMU 15/AOC 670/AOC 684

SWMU 14 is an abandoned chemical disposal area where miscellaneous chemicals, warfare decontaminating agents, and possibly industrial wastes were buried. SWMU 14 area encompasses SWMU 15 and AOCs 670 and 684 and the combined area is referred to as Combined SWMU 14. SWMU 15 is the site of a former propane-fired incinerator reportedly used to destroy classified documents. Only the concrete slab and concrete propane tank saddles remain. AOC 670 is a former outdoor trap and skeet range operated from 1960 until the late 1970s. Lead shot and clay targets were not recovered during its operation. AOC 684 is a former outdoor pistol range in operation from early 1960s until 1981. Firearms were discharged into a soil berm, from which the spent ammunition was not recovered. A 1992 geophysical and soil-gas investigation investigated the presence of buried containers and/or contaminant plumes in the SWMU 14 area. Soil and groundwater were sampled during the most recent investigation to identify whether contamination resulted from chemicals and other waste disposal in the SWMU 14 area and whether residual contamination resulted from firearm discharge in the vicinity.

One hundred and seventy-six (99 upper interval and 77 lower interval) soil samples were collected during soil sampling at Combined SWMU 14. These locations were evaluated for the presence of contaminants in 1995. Surface and subsurface soil samples as well as surface water and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site.

SWMU 14 Soil Investigation

Approximately 35 sample locations were identified for the SWMU 14. Six COCs based on human health risk assessments were identified from the SWMU 14 portion of the Combined SWMU 14 sampling area: 1,2,3-trichloropropane, polynuclear aromatic hydrocarbons (PAHs), aluminum, arsenic, beryllium, and vanadium.

SWMU 15 Soil Investigation

Arsenic and PAHs were identified as soil COCs in the SWMU 15 portion of the Combined SWMU 14 sampling area.

SWMU 14 Groundwater

Due to analytical results, which detected BEHP and 2,3,7,8-TCDD equivalents in initial shallow groundwater sampling events, SWMU 14 shallow groundwater was recommended for inclusion in the CMS process on the basis of projected resident and worker risk, and potential resident child hazard. Based on detections of heptachlor epoxide, bis-2-Ethylhexylphalate (BEHP) and 2,3,7,8-TCDD equivalents in initial deep groundwater sampling events SWMU 14, deep groundwater was recommended for inclusion in the CMS process on the basis of projected resident and worker risk and hazard for all potential receptors.

AOC 670 and AOC 684 Soil Investigation

Aluminum, antimony, thallium, beryllium, arsenic, Aroclor-1254, Aroclor-1260, and BEQ were identified as COCs in the AOC 670 and 684 portion of the Combined SWMU 14 sampling area.

SWMU 16/AOC 687

SWMU 16 (the earthen roof of Building X-55) has been associated with AOC 687 due to prior unauthorized storage of potentially hazardous material (empty paint containers). This paint

container storage was identified as a one-time occurrence and is not thought to represent a historical problem. Minor spills associated with the storage of the paint containers were cleaned and the paint containers themselves were removed from the site at the time of discovery.

Materials of concern identified in the final RFI work plan include explosives, paint wastes, and paint thinner. Potential receptors include workers involved in invasive and noninvasive activities at these sites. The Cooper River and nearby wetlands are also potential ecological receptors.

AOC 687 consists of Building X-55, an earth-covered ammunition storage bunker constructed in 1942. The building appears to have been used for ammunition storage since construction of the bunker. Explosives were identified as materials of concern in the final RFI work plan.

Ten sample locations associated with SWMU 16 and AOC 687 were evaluated for the presence of contaminants between 1995 and 1998. Surface and subsurface soil samples and groundwater samples were collected and analyzed for various constituents in order to delineate the nature and extent of potential contamination at the site. Based on human health risk assessments arsenic and methylene chloride were identified as COCs in shallow groundwater and PAHs were identified as a COC in surface soil.

SWMU 138/AOC 667

AOC 667 and SWMU 138, because of their proximity, have been investigated together. AOC 667, the vehicle maintenance area, is a two-story brick structure (Building 1776) with an oil-water separator. The site was used for the routine maintenance of automobiles and heavy equipment, including oil changes and repairing hydraulic parts from the equipment. A 550-gallon portable storage tank holds waste oil. Numerous oil stains have been noted around the building. SWMU 138, the Satellite Accumulation Area (SAA) related to Building 1776, stored hazardous waste in 55-gallon drums, which were immediately transferred to a permitted hazardous waste storage facility.

Soil and groundwater were sampled at AOC 667 and SWMU 138 to determine if contamination resulted from petroleum product storage and dispensing at the storage tank or other releases at the sites.

Ten sample locations associated with AOC 667/SWMU 138 were evaluated for the presence of contaminants between 1995 and 2000. Based on human health risk assessments 1,1-dichloroethene and chloroethane were identified as COCs for the groundwater pathway.

SWMU 159

SWMU 159 is near Building 665 in the south-central portion of Zone H. The unit is a former SAA that temporarily accumulated and stored hazardous materials. Materials stored at the site included batteries, aerosol cans, and paint waste. An aboveground storage tank (AST) containing diesel fuel, a can crusher, and small debris piles were also at the SWMU.

Soil, sediment, and surface water were sampled to assess any residual contamination from the former storage area.

Twenty-two sample locations associated with SWMU 159 were evaluated for the presence of contaminants between 1995 and 2000. Based on human health risk assessments PAHs were identified as COCs for the surface soil pathway. There were no COCs identified for the sediment and surface water pathways.

AOC 503

AOC 503, a suspected unexploded ordnance (UXO) site south of Building 665, is at the southern boundary of Zone H in a wooded area approximately 300 feet from Shipyard Creek. Two Mark-17 depth bombs were reportedly jettisoned in this area from a seaplane on October 8, 1943. This area was a marsh at the time the ordnance was dropped and has been back filled with approximately 6 to 8 feet of dredge material since 1943. An Explosive Ordnance Disposal (EOD) survey of the AOC 503 area was previously conducted by the Environmental Detachment (Interim/Stabilization Measure for AOC 503 Completion Report, October 1997). A 9.85-acre search area was calculated by the Naval Explosive Ordnance Technology Division (NEODTD) and cleared of vegetation to allow for utilization of surveying equipment. An Ultrasonic Ranging and Data System positioning system utilizing a G-822 l magnetometer was used to locate the ordnance. For a controlled test, the Environmental Detachment buried three steel drums that would resonate a similar magnetic signature as the Mark 17 depth bombs.

The suspected depth bombs area was staked in a grid pattern and during surveying, activities anomalies were marked. Nine anomalies were identified and Tyndall Air Force Base performed excavations using an Automated Ordnance Excavator. None of the excavated areas produced any UXO.

To ensure proper interpretation of the data collected by the NEODTD, a third party, UXB International Inc. was contracted to evaluate the geophysical data and verify that all potential UXO targets were removed. The company suggested using an EM-61 metal detector survey and to resurvey the grid area. The EM-61 did not produce any anomalies that lead to the removal of UXO.

It was concluded that through the geophysical surveys in 1997, no potential UXOs exist within 15 feet of the surface of AOC 503 and that the ordnance was either removed or located at a safe distance below ground surface of the property.

AOC 655/AOC 656

AOC 655 is the site where approximately 300 gallons of No. 2 fuel oil spilled in 1985 when a fuel line in the Building 656 boiler room ruptured. The line supplied fuel oil to the boiler from a nearby 5,800-gallon underground storage tank (UST), which was located within the AOC 655 boundary. Approximately 150 gallons of the spilled fuel was reported to have escaped through a seam in the building's concrete floor to underlying soil.

A soil-gas investigation near Building 656 identified responses for acetone, benzene, toluene, ethylbenzene, and oil compounds. Air sampling within Building 656 detected anthropogenic compounds, but did not identify the source.

AOC 656 is the site of a 1974 oil spill between Buildings 602 and NS-71. This spill resulted from a ruptured underground line connecting an 8,000-gallon AST in Building 602 to a boiler in Building NS-71. Of the 285 gallons released during the spill, 275 gallons were reported to have been recovered.

Soil and groundwater were sampled at AOC 655 and AOC 656 to assess any residual contamination from the previous oil spill and other releases that may have occurred in the vicinity.

Approximately 40 sample locations associated with AOC 655 and 656 were evaluated for the presence of contaminants between 1995 and 1999. Based on human health risk assessments Aroclor-1254 and -1260, PAHs, and dieldrin were identified as COCs for the surface soil pathway.

AOC 661

AOC 661 is an area where explosives were stored during the 1950s in a now-demolished building. The area of AOC 661 was a grassy area south of Building 601 and north of Building 675.

AOC 661 is the site of a former shed reportedly used for the storage of explosives during the 1950s and was located at the southeast corner of the former seaplane runway. Little information exists regarding the historical operation of the site and no information was located suggesting a release or disposal had ever occurred at the site. The shed was identified as an area of concern during the RCRA Facility Assessment (RFA) process solely on the basis of the facility name as it appeared on the legend of a historic base map.

Three soil borings were sampled to determine whether a release occurred at the site in 1997. No explosive compounds were detected at any of the sample locations and a no further action (NFA) was recommended for AOC 661.

AOC 669

AOC 669, Indoor Pistol Range, had an initial status of NFA when the Combined SWMU 14 sites were investigated; therefore, an RFI was not conducted.

AOC 685

AOC 685 is a former smoke drum site located on the west side of Juneau Avenue. The facility was in operation from 1941 until 1953. The smoke drum area was reportedly used to burn classified documents and other materials, possibly paints, solvents, or waste oil. The area is now a grassy field with no visible evidence of the former site activities; no activities are currently associated with the site. Specific design features, dimensions, and operating practices of the smoke drum are unknown. Products of incomplete combustion were the materials of concern at AOC 685.

Thirty-six soil borings were sampled in 1995 through 1998 to determine whether a release occurred at the site. Based on human health risk assessments, aluminum, arsenic, chromium, and PAHs arsenic were identified as COCs for the surface soil pathway.

AOC 688

AOC 688, an earth-covered ammunition storage bunker identified as Building X-56, was constructed in 1942 as an ammunition storage magazine. The concrete walls and roof of the structure are 4 feet thick. The structure is completely covered by approximately 2 feet of soil. Immediately north of the magazine is a cement and soil containment berm designed to control the metal doors of the bunker in the event of an explosion. AOC 688 is located between Juneau Avenue and the Dredged Materials Area. The Cooper River and associated wetlands lie east of the site across Juneau Avenue.

AOC 688, which was used originally as an ammunition bunker for an unknown period of time, was used as a lawnmower maintenance shop until approximately 1989, when it was again used

for ammunition storage. A July 1989 environmental incident report documented the removal of five 55-gallon drums of paint-contaminated soil and rags from the entrance to the facility. During the 1993 RFA 16 pounds of nitrogen-based dynamite and 1,000 pounds of ammunition were stored in the bunker.

Materials of concern were explosives and paint waste. Activities associated with the site were limited to storage of ammunition and explosives, paint and paint related materials, and lawn equipment maintenance.

Two soil borings were sampled in 1998 to determine whether a release occurred at the site. No COCs were identified based on review of human health risk assessments for AOC 688.

AOC 689/AOC 690

AOC 689 is the marina parking area, a reported site of unauthorized disposal of unknown materials during filling activities. AOC 690 is the network of roads at the southern tip of the base and along Shipyard Creek, including the Lunsford Loop, a portion of Juneau Avenue, and West Road. This site extends along West Road on the boundary between Zones I and H and the Dredged Materials Area. The areas along these gravel roads, totaling approximately 4,500 feet, are reported locations of unauthorized hazardous materials dumping by Navy personnel.

Although the history of hazardous materials dumping is largely unknown, petroleum products were suspected materials of concern. Cooper River, Shipyard Creek, and their associated wetlands were potential ecological receptors of point and non-point source discharges.

Thirty soil borings were sampled in 1994 through 1998 to determine whether a release occurred at the site. Based on human health risk assessments arsenic, PAHs and 4-aminobiphenyl were identified as COCs for the surface soil pathway. No COCs were identified for the groundwater pathway.

AOC 708

AOC 708, located between Buildings NS-668 and NS-669, was reported to have a petroleum release at a transformer pad Near Bldg. NS-668. The area was a 2-foot by 3-foot soil-stained area containing stressed vegetation. Due to the presence of an electrical transformer near the vicinity, an IM was implemented in 1997 to determine if constituents of concern were present at the site. During the IM, three soil samples were collected for benzene, ethylbenzene, xylene, total petroleum hydrocarbons (TPH), PAHs, RCRA metals, and PCBs. Based on the analytical results of the soil samples, it was determined that no remedial action was required.

SWMU 17

SWMU 17 is a spill site near Building 61, the former Fleet Ballistic Missile Training Center that began service in 1962. The Navy's use of FBM 61 as a training facility ended in June 1996, after which it was acquired by the U.S. Border Patrol for use as a law enforcement training facility. In 1982, soil samples collected beneath the drains at transformer vault TV1 indicated PCB contamination. Recommendations were made by the Commanding Officer, Naval Regional Medical Center, that the oil-soaked soil be removed. Records do not exist that report if the PCB-contaminated soil at TV1 was removed. However, the PCB filled transformers at FBM 61 were reportedly removed in the early 1990s. A line-pole capacitor rupture in 1984 spilled PCB oils onto the underlying asphalt pavement at the north end of the paved courtyard. The PCB oils were excavated by Naval personnel.

Room 111 of FBM 61 contained two #5 diesel oil-fired boilers. Fuel for the boilers was supplied by a 30,000-gallon AST listed as facility NS 600. Piping for the boiler fuel runs underground and beneath the Storage Building/Pressurization Lab (Storage) addition on the north side of the building. The storage addition was built in the early 1960s after installation of the fuel pipeline. A leak in the boiler fuel oil line occurred beneath the storage addition on June 8, 1987, involving approximately 14,355 gallons of #5 diesel fuel oil.

Soil samples were collected and test pits were excavated to assess the impact of the spilled oil. The test pits were also used to recover spilled boiler fuel oil. Approximately 7,300 gallons of fuel oil were recovered during the June 1987 efforts by the Navy to clean up the spill. Three sumps were built along the outside wall of the storage addition to collect residual spilled oil. The three collection sumps consisted of two to three 55-gallon drums welded end to end and installed underground. PCBs were detected in soil samples of oil-contaminated soil analyzed during the 1987 spill cleanup.

An emergency electrical generator was also located in the boiler room of FBM 61. The #2 diesel fuel for this generator was stored in a 250-gallon steel UST (UST FBM 61-1), installed in 1961 in the paved courtyard next to the transformer vault (TV1). This UST was removed in September 1997 because the tank had developed pinholes and diesel fuel had leaked into the soil surrounding the UST. The excavation was backfilled with the same soil.

Thirty-four soil boring locations and 11 groundwater wells were sampled between 1994 and 1996 as part of the Zone H RFI Report. Based on previous RFI activities, light non-aqueous phase liquids (LNAPLs) and dense non-aqueous phase liquids (DNAPLs) were identified at SWMU 17 and additional sampling was necessary to determine nature and extent of contamination. RFI addendum activities were implemented in November 1999 and completed in January 2000 to address SWMU 17 data gaps in the Zone H RFI Report. During the supplemental RFI sampling activity 28 DPT soil borings, 27 temporary monitoring wells and the 11 permanent wells were sampled and analyzed for VOCs, SVOCs, and PCBs.

Based on human health risk assessments Aroclor-1260 and PAHs were identified as COCs for the surface soil pathway. 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; 1,2-dichloroethene; 1,2,4-trichlorobenzene; 2-chlorophenol; 2,4-dichlorophenol; 4,4'-DDT; acetone; Aroclor-1016; Aroclor-1260; benzene; benzidine; chlorobenzene; chromium; dichloroethane; dieldrin; heptachlor; heptachlor epoxide; iron; and methylene chloride were identified as COCs for the groundwater pathway.

AOC 501

AOC 501 is identified as an area expected to contain UXO. The affected area at AOC 501 consists of a 480,000-ft^2 area in the Cooper River west of the inner channel line. The ordnance suspected at AOC 501 consists of two Mark 47 Torpex loaded depth bombs, which were dropped on 20 November 1943.

An Interim Measure for AOC 501 was conducted in September 1998 and performed by Supervisor of Shipbuilding, Conversion and Repair, Portsmouth Va., Environmental Detachment Charleston (SPORTENVDETCHASN). The actions performed consisted of searching the 480,000-ft^2 area, which is approximately 1,200 feet from the shore. The depth of the area varies from 20 to 35 feet. Several instruments were used to perform the search: Datasonics CHIRP II acoustic sub-bottom profiler, DMG-50 Gradiometer, and the Surfmaster P.I. (pulse induction) underwater metal detector.

Seven anomalies were selected as targets based on the geophysical analyst's interpretation of the data collected. Three additional targets were reacquired by GPS and marked for quality assurance. Dives were made to each of the marked locations. No ordnance was discovered during the search of the 480,000-ft^2 area indicating that the ordnance was either previously removed or located at least 4 feet below the river bottom.

AOC 654

AOC 654 is an abandoned septic tank and associated drain field connected to Building 661. It was used from 1968 until 1978 and was known to back up during periods of high use, resulting in the release of raw sewage. Soil was sampled in 1995 to determine the presence of contamination associated with materials possibly disposed of in the septic system. Eleven soil samples were collected at AOC 654 during the primary sampling event and analyzed for VOCs, SVOCs, pesticide/PCBs, metals, and cyanide. Based on the analytical results of the soil samples, it was determined that no remedial action was required.

AOC 666

AOC 666 is the area where two former USTs were located adjacent to boiler house that supplied steam to ships and parts of CNC prior to base closure (Building NS 44). Presently, NS 44 supplies steam to the Border Patrol cafeteria. The 550-gallon UST NS 44A was a gravity-fed waste oil collection tank for an oil-water separator. The 25,000-gallon UST NS45 supplied No. 2 fuel oil for Building NS 44. Both USTs and associated fuel lines were removed by the Environmental Detachment in August and October 1996.

Thirteen soil samples were collected from seven locations and two monitoring wells were installed to sample the groundwater at AOC 666 to determine whether a release occurred at the site. Based on human health risk assessments, Aroclor-1260, PAHs, arsenic, n-nitroso-di-n-propylamine, and vanadium were identified as COCs for the surface soil pathway. Chloromethane and vinyl chloride were identified for the groundwater pathway. It was determined by the CNC project team that a supplemental RFI would be necessary to address the soil and groundwater issues at AOC 666. Additional soil samples were collected near the tank pits and analyzed for arsenic and groundwater was collected from wells 666001 and 666002 analyzed for VOCs. Based on the supplemental RFI data collected, no further action was recommended for AOC 666.

AOC 707

AOC 707, located adjacent to Building 1795, was a 5-foot by 15-foot strip of stained soil and stressed vegetation from a diesel spill that occurred north of Building 1795. An IM was conducted in 1997 (IM Completion Report Environmental Detachment August 1997) to determine the extent of contamination at the site and 5.6 cubic yards of non-hazardous soil waste was excavated and properly disposed due to TPH contamination. Upon completion of AOC 707 excavation, five confirmatory samples were collected and analyzed for benzene, toluene, ethylbenzene, xylenes, PAHs, TPHs, and RCRA metals. Analytical results showed no data exceeded EPA risk-based concentrations.

AOC 722

AOC 722 is a grid well in Zone I located next to Building 28, a dormitory for the Department of Homeland Security. During the RFI for Zone I, the well had several detections for trichloroethene and it was determined in 2002 that a RFI would be initiated for the area. A RFI has been completed on the site. The site is currently in the CMS stage.

Environmental Baseline Survey for Transfer

During the early stages of the RFI for SWMUs and AOCs (within the Proposed Project's boundary), 55 buildings needed to be evaluated for contamination prior to release of the property. During the assessment, an Environmental Baseline Survey for Transfer (EBST) documents the physical condition of the property resulting from the storage, use, and disposal of hazardous substances and petroleum products over the installation's history. The Environmental Baseline Survey (EBS) would compile into a single document all available information to establish a baseline for use by the Navy in documenting the environmental condition of the subject property.

No sampling of soil, groundwater, surface water, radon, lead, potable water, or asbestos was specifically conducted to support preparation of any of the EBSTs. The property/building assessments evaluated environmental incident records as well as personnel interviews to determine the likely presence or absence of polychlorinated biphenyls (PCBs), asbestos-containing materials (ACM), lead-based paint, and radon gas.

Upon completion of the EBST, a Finding of Suitability for Transfer (FOST) and a Finding of Suitability for Lease documents were completed by a Department of Defense official to document that the real property and improvements associated with a specific property is environmentally suitable for deed transfer to the local governing body for unrestricted use. Table 4.14-2 summarizes the findings of the EBST studies completed for buildings within the Proposed Project footprint.

Table 4.14-2. Summary of EBST Studies Completed for Buildings Within the Proposed Project Footprint.

Building Number	Building Use	PCBs	ACM	Lead-Based Paint	Radon
65	Barracks	None	Probable	Probable	No data
334	Seaplanes launching	None	Unlikely	None	No data
601	12,000-gallon AST (1)	None	Unlikely	Probable	No data
602	8,000-gallon AST	None	Unlikely	Probable	No data
623	NavEx Visual Merchdise Dept	None	Unlikely	Unlikely	No data
643	Mine Warfare Classroom	None	Confirmed	Probable	0.5-1.5 picocurie/L
645	Air compressor building	None	Confirmed	Probable	0.5-1.0 picocurie/L
647	Training center	None	Probable	Probable	0.5-1.0 picocurie/L
649	Warehouse	None	Unlikely	Probable	No data
653	Enlisted Barracks	None	Probable	Probable	No data
655	Commissary	Possible	Probable	Probable	No data
656	Unknown	Possible	Probable	Probable	No data
664	NCO Club	Remediated	Confirmed	Probable	No data
665	Unknown	None	Removed	Unknown	No data
666	Unknown	None	Possible	Probable	No data
668	Barracks	None	Probable	Probable	No data
669	Barracks	None	Probable	Probable	No data

Building Number	Building Use	PCBs	ACM	Lead-Based Paint	Radon
670	Racquetball complex	None	Possible	Unlikely	No data
675	Unknown	None	Possible	Probable	No data
676	Barracks	None	Unlikely	Unlikely	No data
677	Barracks	None	Unlikely	Unlikely	No data
686	Submarine warfare training	None	Possible	Probable	No data
1708	Generator house	None	Probable	Probable	No data
1722	Generator house	None	None	None	No data
1776	Office/mechanic shop	None	Probable	Probable	No data
1777	Unknown	None	Probable	Probable	No data
1778	Equipment shed/training/rec	None	Probable	Probable	No data
1790	Tennis court	None	Unlikely	Probable	No data
1815	Storage/water testing	None	Unlikely	None	No data
1879	Equipment storage	None	Unlikely	Unlikely	No data
1880	Storage shed	None	Possible	Probable	No data
1881	Storage shed	None	Probable	Probable	No data
1882	Storage shed	None	Probable	Probable	No data
1883	Tool storage shed	None	Probable	Probable	No data
1885	Unknown	None	Probable	Probable	No data
1886	Unknown	None	Probable	Probable	No data
1887	Storage	None	Probable	Probable	No data
1888	Pistol range	None	Possible	Probable	No data
1892	Unknown	None	Unlikely	Unlikely	No data
1893	Storage	None	Probable	Probable	No data
1894	Storage shed	None	Unlikely	Unlikely	No data
1896	Storage	None	Probable	Probable	No data
1898	Storage	None	Probable	Probable	No data
1899	Steel-working shop	None	Unlikely	Unlikely	No data
1984	Classrooms/offices	None	Unlikely	Unlikely	No data
FBM-61	Fleet Ballistic Missile Training	Confirmed	Confirmed	Likely	No data
NS-48	Tennis courts	None	Unlikely	Unknown	No data
NS-66	Barracks	None	Probable	Probable	No data
NS-67	Barracks	None	Probable	Probable	No data
NS-69	Boiler house	Possible	Confirmed	Probable	No data
NS-71	Galley	Confirmed	Probable	Probable	No data
NS-652	NCO quarters	None	Confirmed	Probable	No data
X-54	Ammunition bunker	None	Confirmed	Probable	No data
X-55	Ammunition bunker	None	Unlikely	Probable	No data
X-56	Ammunition bunker	None	Unlikely	Unlikely	No data

4.14.1.2. Daniel Island Study Area

The Daniel Island study area consists of former CDF sites used for the disposal of dredged material. The Daniel Island Alternative, including its access roadway, is located within this study area. Figure 4.14-1 shows the Daniel Island study area.

There are no documented contaminated sites located within the Daniel Island study area.

4.14.1.3. Clouter Island Study Area

The Clouter Island study area includes Clouter Island south of I-526 as shown in Figure 4.14-1.

Clouter Island consists of four active CDFs, three of which were formerly owned by the Department of the Navy. The SCSPA owns the northern part of Clouter Island (north of I-526). That part of Clouter Island, including facilities formerly owned by the Navy, was transferred to the USACE in 1996.

Clouter Island is included within the CNC RCRA permit and is within designated Study Zone K (non-contiguous CNC properties, meaning properties that are not immediately contiguous with the CNC). Preliminary environmental investigations of Zone K sites were conducted and documented in the *Final RCRA Facility Assessment* and the *Final Zone K RFI Report*. The U.S. Navy completed their investigation of Clouter Island and documented their findings in *Clouter Island RFI Report Addendum Charleston Naval Complex*.

Three AOCs were identified (AOCs 693, 694, and 695) on Clouter Island because of their past uses, primarily as part of an ammunition depot (Figure 4.14-4). These sites are known as the Fuse and Primer House (AOC 693), the Former Naval Ammunition Depot (AOC 694), and the Electric Locomotive Shed (AOC 695), and are desribed in the following paragraphs.

AOC 693

AOC 693 consists of a two-room fuse and primer house (Building 117) and was reportedly operational from 1930 to 1939. No visual evidence of former operations was reported during the RFI. Dredged material may have been placed within the area containing AOC 693 after its use was discontinued.

AOC 694

AOC 694, the former Naval Ammunition Depot, consists of the area around Building 117 (AOC 693). The location and dimensions of this former ammunition/explosives storage area are not precisely known. The remains of three other structures are also present within the former depot. The northernmost structure is the foundation of Building 106 (Fixed Ammunition Storehouse). The foundation of Building 102 (Shell House) is about 200 feet south of the remains of Building 106. The site of former Building 103 (Magazine) is located between the remains of Buildings 106 and 117. Dredged material may have been placed within the area containing AOC 694 after its use was discontinued.

AOC 695

AOC 695, a former locomotive shed, is submerged in the Cooper River and was investigated as part of the Zone J study.

The *Clouter Island RFI Report Addendum Charleston Naval Complex* concluded that No Further Actions (NFA) were warranted for AOCs 693 and 694. However, SCDHEC has indicated that NFA status will not be granted because of the potential presence of unexploded ordnance. It should be noted that several buried pieces of ordnance were reportedly discovered on Clouter Island and removed in 1985. As a result, it is expected that land use controls (LUCs) will be imposed on these AOCs.

4.14.2. Handling of Hazardous Materials

4.14.2.1. Regulatory Framework

The primary Federal Laws that address the management of hazardous materials are the Resource Conservation and Recovery Act (RCRA) and the Toxic Substances Control Act (TSCA). In addition to these acts there are several others that address other specific hazardous materials, such as the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA), Oil Pollution Act of 1990 (OPA 90), the Pollution Prevention Act (PPA), the Emergency Planning and Community Right to Know Act (EPCRA), and Occupational Safety and Health Act (OSHA). These laws are implemented on the Federal level through applicable parts of the Code of Federal Regulations (CFR).

4.14.2.2. Handling of Hazardous Materials

The Port of Charleston handled 1,402 containers that were classified as containing hazardous materials during July 2005. This number represented approximately 4.8 percent of the containers handled during that time period (1,402 of 29,237 containers). SCSPA does not retain information regarding containers with hazardous materials once the cargo has left its terminal facilities; however, SCSPA reported that the percentage of containers that are classified as having hazardous materials is fairly consistent from month to month. For the purpose of this EIS, it is assumed that approximately 5 percent of the containers handled per month at SCSPA port facilities contain materials that are classified as hazardous.

SCSPA is subject to the applicable Federal and State regulatory requirements relating to hazardous materials. Transportation companies are also responsible for complying with regulations governing the identification, handling, and transport of hazardous materials.

4.14.3. Oil and Hazardous Materials Spill Response

4.14.3.1. Regulatory Framework

The Federal laws that specifically pertain to spills of oil and hazardous materials are the Clean Water Act (CWA) and the Oil Pollution Act (OPA 90).

The Oil Pollution Act requires that an Area Committee be established to plan for a coordinated community response to an oil discharge or a hazardous substance release. This committee is required to have Federal, state, and local government agency representation. In addition, OPA 90 requires each owner or operator of a tank vessel or facility to submit a Spill Prevention Control and Countermeasures Plan. A number of industries located on the Cooper River have formed a cooperative partnership to provide training, drills, equipment, and on-call emergency response teams to prepare for potential hazardous spills.

The National Response System (NRS) was developed to coordinate all government agencies with the responsibility for environmental protection in a focused response strategy for the immediate and effective cleanup of an oil spill or hazardous substance release. Federal response is coordinated through a single, pre-designated agent, the Federal On-Scene

Coordinator (FOSC). The FOSC reports to, and receives advice from, the regional and district offices of the primary advisory agencies.

A Spill of National Significance (SONS) is that rare, catastrophic spill event that captures the nation's attention due to its actual damage or sizeable potential for adverse environmental impact. A SONS is a spill that greatly exceeds the response capability at the local and regional levels that, due to its size, location, and actual or potential for adverse impact on the environment is so complex, it requires extraordinary coordination of Federal, state, local, and private resources to contain and clean up. Only the Commandant of the Coast Guard or the Administrator of the EPA can declare a SONS. The response to a SONS event must be a coordinated response that fully integrates the FOSC's response organization with the SONS response organization.

SCDHEC is a designated natural resource trustee in the State of South Carolina under CERCLA. A State On-Scene Coordinator (SOSC) will be responsible for determining SCDHEC's level and method of response. SCDHEC maintains an Emergency Response Section (ERS) as the central point of reporting releases of oil and hazardous materials within the State.

When working under the Federal response plan, the SOSC assists the FOSC in responding to, and mitigating, spills and releases. The SOSC is normally vested with the authority to permit response activities and require certain precautions within the state's boundaries. The SOSC is critical to the success of any response action.

SCDHEC trains and maintains an emergency response team to provide assistance and guidance during spill incidents. Additionally, they provide monitoring for spill movement and technical advice on control, containment, clean up, and disposal of spilled material.

The South Carolina Emergency Powers Act empowers local fire departments to respond to oil spills and hazardous material releases regardless of whether a fire is involved. The Charleston County Hazardous Materials Division (CCHMD) imposes fees on businesses that are used to improve local response to hazardous materials incidents through training, equipment, and advice.

The main existing program for the Port of Charleston is the Captain of the Port (COTP) Charleston, South Carolina Area Contingency Plan. The geographic area covered by this plan includes the commercial ports of Charleston and Georgetown, and numerous harbors for fishing and recreational vessels. This Area Contingency Plan describes the strategy for a coordinated Federal, state, and local response to a discharge.

The Area Contingency Plan includes instructions on how the following operations will be performed:

- Environmental assessment
- Technical and scientific coordination
- Strategic planning
- Cleanup and protection of the environment
- Air operations
- Equipment staging
- Wildlife recovery and rehabilitation
- Communications

- Finances

The hazardous materials release response consists of the following:

- Discovery and notification
- Preliminary assessment and initiation of action
- Removal
- Site evaluation and National Priorities List determination
- Remedial action
- Cost recovery and documentation

The Area Committee reviews and updates Area Contingency Plans annually. Reviews include the following:

- Emergency notification list
- Response equipment type and amount
- Sensitive environmental areas
- Hazard/risk assessment of the area
- Response strategies
- Oil dispersant approval

4.14.3.2. Upland Spills History

The history of oil and hazardous material spills that occurred in upland areas of Charleston County from 2000 until 2004 is included in Table 4.14-3 (end of Section 4.14). This table includes spills that originated from storage tanks, pipelines, trucks, rail, and fixed sources (e.g., terminals, marinas, industrial plants, etc.). Generally, for these years, most spills originated from fixed sources and were some type of oil. On average, three spills were reported per month.

4.14.3.3. Aquatic Spills History

Oil and hazardous spills affecting waters of Charleston Harbor typically occur 1-3 times a month and involve small quantities of material (Table 4.14-3). The most notable hazardous materials releases in Charleston Harbor include the following:

- 12,500-gallon oil spill from the M/V Ever Reach in October 2002.
- 5-week response to 615 pounds of magnesium phosphide in the number 1 hold of the M/V Santa Clara (January 1992). Magnesium phosphide was deactivated, removed, and disposed. No magnesium phosphide was released into the Charleston Harbor.
- 36-hour response to a monchloroacetic acid release aboard the M/V Newark Bay in August of 1993.
- 3-month response to a cyanuric chloride release aboard the M/V Ever Royal in May 1996. Although the initial incident aboard the vessel was cleaned up within one week, neutralizing material onsite required another 2.5 months.
- A 10-month response to dioxin release near Charleston Harbor Entrance Channel. The release occurred as a result of the intentional grounding of a hopper barge, F/B Patricia Sheridan, containing approximately 12,500 tons of New York Harbor dredge spoils contaminated with elevated dioxin concentrations. The intentional grounding was

performed because the barge was taking on a heavy port list and the tug captain feared losing the barge in the navigation channel. After grounding, the barge took on a greater list and released approximately 2,500 tons of its cargo near the entrance channel.

4.14.3.4. Spill Prevention Plans

Federal regulations require that facilities having an aggregate storage capacity greater than 1,320 gallons or a completely buried storage capacity greater than 42,000 gallons that could reasonably be expected to discharge oil in quantities that may be harmful into or upon the navigable waters of the United States or adjoining shorelines must prepare, maintain, and periodically update SPCC plans.

Table 4.14-3. History of Upland Oil and Hazardous Materials Spills for Charleston County (2000 - 2004).

Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
23-Jan-00	X					Unknown Oil	N/A		No	J & D Paint And Body	Private Enterprise
11-Feb-00	X					Corrosive Cleaner	15	Gallon(s)	No	USN- Charleston Ship Yard	Federal Government
11-Feb-00	X					Unknown Material	N/A		No	Westvaco Paper And Pulp Mill	Private Enterprise
17-Feb-00		X				Jet Fuel: JP-8	2000	Gallon(s)	No	Piedmont Hawthorne Aviation Charleston	Private Enterprise
17-Feb-00		X				Jet Fuel: JP-4	N/A		Yes	N/A	N/A
17-Feb-00		X				Oil: Diesel	2000	Gallon(s)	Yes	Dentons Shipyard	Private Enterprise
25-Feb-00	X					Phosphoric Acid	N/A		No	N/A	N/A
29-Feb-00	X					Waste Oil	N/A		Yes	Walden Truck Repair And Service	Private Enterprise
9-Mar-00				X		Oil: Diesel	2500	Gallon(s)	Yes	Trident Hosp	Private Enterprise
17-Mar-00		X				Bilge Slops	30	Gallon(s)	Yes	Applied Cleaning Technologies	Private Enterprise
22-Mar-00		X				Waste Oil	7	Gallon(s)	Yes	Applied Cleaning Technologies	Private Enterprise
4-Apr-00	X					Jet Fuel: JP-8	200	Gallon(s)	Yes	N/A	N/A
11-Apr-00	X					API Oil	1000	Pound(s)	No	Westvaco Chemical Plant	Private Enterprise
19-Apr-00		X				Oil: Diesel	N/A		Yes	Mcclam And Assoc	Private Enterprise
27-Apr-00	X					Ammonia, Anhydrous	100	Pound(s)	No	Triangle Ice Company	Private Enterprise
25-May-00	X					Oil: Diesel	3	Gallon(s)	Yes	Allied Marine Terminal	Private Enterprise
4-Jun-00	X					Oil: Diesel	1	Gallon(s)	Yes	Tolers Cove Marina	Private Enterprise
28-Jun-00				X		Ammonia, Anhydrous	N/A		No	Piggly Wiggly	Private Enterprise
3-Aug-00				X		Chlorine	2.5	Pound(s)	No	Water Treatment Commisioner	Public Utility

Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
4-Aug-00	X					Gasoline: Automotive	N/A		No	Speed Way Inc.	Private Enterprise
11-Aug-00		X				Hydraulic Oil	5	Gallon(s)	Yes	SC State Port Authority	State Government
25-Aug-00		X				Unknown Oil	15	Gallon(s)	Yes	N/A	N/A
13-Sep-00	X					Unknown Material	N/A		Yes	N/A	N/A
20-Sep-00		X				Oil, Misc: Motor	1	Gallon(s)	Yes	N/A	N/A
26-Sep-00		X				Oil: Diesel	50	Gallon(s)	Yes	Sysco Food Services	Private Enterprise
3-Oct-00					X	Methyl Alcohol	1000	Gallon(s)	No	Allied Terminal Inc.	Private Enterprise
3-Oct-00	X					Oil, Fuel: No. 1-D	3	Gallon(s)	Yes	USNS Big Horn	Military
17-Oct-00	X					Oily Substance	N/A		Yes	N/A	N/A
17-Oct-00				X		Unknown Material	N/A		Yes	N/A	N/A
30-Oct-00	X					Chlorine	N/A		No	Sullivan's Isle Sewer And Water	Public Utility
13-Nov-00				X		Ethylene Glycol	100	Gallon(s)	Yes	Citadel College	Private Enterprise
24-Nov-00	X					Acetylene	200	Other	Yes	N/A	N/A
13-Dec-00	X					Unknown Material	N/A		No	Westvaco Papermill	Private Enterprise
25-Dec-00				X		Oil, Fuel: No. 2-D	150	Gallon(s)	No	S C E & G	Public Utility
11-Jan-01	X					Hydraulic Oil	1	Cup(s)	Yes	Hess Terminal	Private Enterprise
15-Feb-01	X					Oil, Misc: Transformer	5	Gallon(s)	Yes	SC Electric And Gas	Public Utility
18-Mar-01	X					No Chris Code Old Dumping Ground	N/A		Unknown	N/A	N/A
19-Mar-01		X				Gasoline: Automotive (Unleaded)	10	Gallon(s)	Yes	N/A	Private Citizen
30-Mar-01				X		Oil, Fuel: No. 6	50000	Gallon(s)	No	Amerada Hess Corp.	Private Enterprise

Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
25-Apr-01	X					Oil: Diesel	100	Gallon(s)	No	Medical University Of SC	State Government
23-May-01		X				2% Roundup Solution	150	Gallon(s)	No	USAF - Charleston AFB	Military
7-Jun-01				X		Oil, Misc: Transformer	N/A		No	N/A	N/A
2-Jul-01	X					Hydraulic Oil	300	Gallon(s)	Yes	South Carolina DOT	Private Enterprise
17-Jul-01		X				Oil, Fuel: No. 2-D	5	Gallon(s)	Yes	D&L Freight Services	Private Enterprise
13-Aug-01		X				Oil: Diesel	45	Gallon(s)	No	N/A	N/A
17-Aug-01			X			Acetone	1	Pint(s)	No	Rineco Chemicals	Private Enterprise
2-Oct-01	X					Ammonia, Anhydrous	10	Pound(s)	No	Triangle Ice Company	Private Enterprise
3-Oct-01				X		Unknown Material	N/A		Yes	N/A	N/A
16-Oct-01	X					Unknown Material	N/A		Yes	Westvaco	Private Enterprise
18-Oct-01			X			Oil: Diesel	3000	Gallon(s)	No	CSXTransportation	Private Enterprise
15-Nov-01	X					Oil: Diesel	2	Gallon(s)	Unknown	Amerada Hess Corp.	Private Enterprise
10-Dec-01		X				Vanadium Tentoxide Concentrate	0.5	Gallon(s)	No	N/A	N/A
24-Dec-01	X					Nitrogen Oxide	N/A		No	Westvaco	Private Enterprise
26-Dec-01	X					Nitrogen Oxide	N/A		No	Westvaco Chemical And Paper Mill	Private Enterprise
6-Feb-02		X				Slop Oil And Water	2	Gallon(s)	No	Sani-Tech Environment	Private Enterprise
7-Feb-02	X					Sulfur Dioxide	N/A		No	Westvaco Papermill And Chemical Plant	Private Enterprise
12-Feb-02	X					Sulfur Dioxide	N/A		No	Westvaco Paper And Chemical Plant	Private Enterprise
22-Feb-02	X					Unknown Oil	N/A		Yes	N/A	N/A
28-Feb-02	X					Unknown Material	N/A		No	Westvaco	N/A

Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
1-Mar-02				X		Oil, Misc: Motor Mixed With Water	200	Gallon(s)	No	Moore Durms Incorp.	Private Enterprise
4-Mar-02	X					Sulfur Dioxide	N/A		No	Westvaco	Private Enterprise
4-Mar-02				X		Oily Waste Water	500	Gallon(s)	No	Water Recovery System Inc	Private Enterprise
16-Mar-02	X					Therminol Heating Oil	10	Gallon(s)	Yes	Kinder Morgan Bulk Terminals	Private Enterprise
17-Mar-02	X					Unknown Material	N/A		Yes	Hess Oil Company	Private Enterprise
4-Apr-02	X					Hydraulic Oil	3	Gallon(s)	Yes	Jones Bros. Inc.	Private Enterprise
22-Apr-02	X					Oil: Crude	20	Gallon(s)	Yes	Cooper T Smith	Private Enterprise
24-Apr-02				X		Oil, Edible: Soya Bean	5000	Gallon(s)	Yes	APM Terminals	Private Enterprise
26-Apr-02	X					Ammonia, Anhydrous	N/A		No	Triangle Ice Company	Private Enterprise
10-May-02	X					Ammonia, Anhydrous	N/A		No	Triangle Ice Company	Private Enterprise
13-Jun-02	X					Paint	N/A		Yes	East Coast Painting	Private Enterprise
17-Jun-02	X					Hydraulic Oil	30	Gallon(s)	Yes	Case Atlantic	Private Enterprise
24-Jun-02				X		Unknown Material	N/A		Unknown	N/A	N/A
9-Jul-02				X		Sodium Hydroxide (50% Solution: Ph Of 14)	16	Gallon(s)	No	Old World Chemicals	Private Enterprise
10-Jul-02	X					Sulfur Dioxide	N/A		No	Westvaco Paper Mill	Private Enterprise
22-Jul-02				X		Waste Water With Small % Of Oil	400	Gallon(s)	Yes	Moore Durms Incorp.	Private Enterprise
31-Jul-02	X					Oil, Misc: Transformer	10	Gallon(s)	Yes	SC E & G	Public Utility
31-Jul-02	X					Oil, Misc: Transformer	8	Gallon(s)	Yes	SC E&G	Public Utility
4-Aug-02		X				Oil, Misc: Lubricating	N/A		Yes	Palmetto Bridge Constructors	Private Enterprise

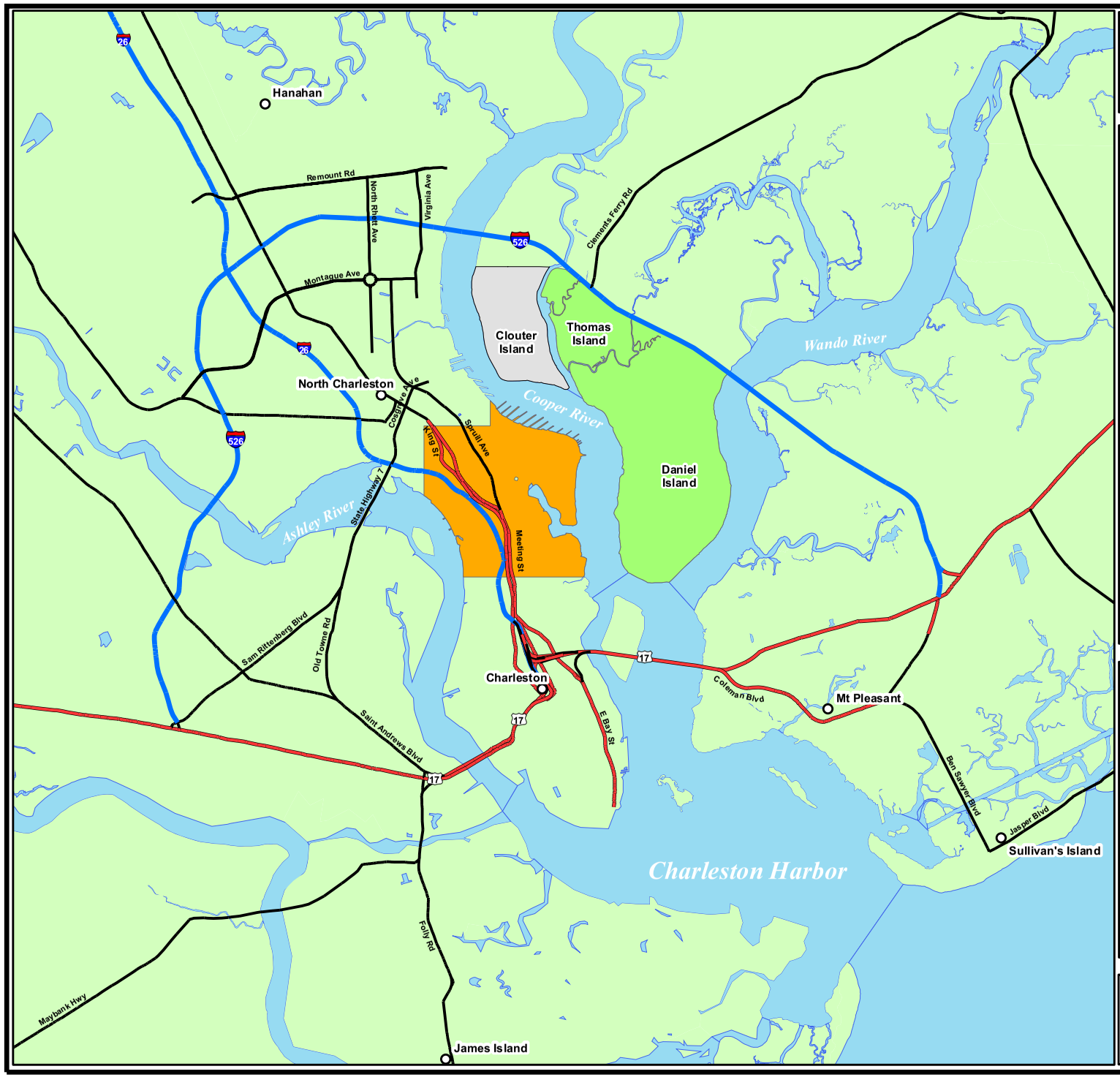
Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
27-Aug-02	X					Oil: Diesel	1	Gallon(s)	Yes	Case Atlantic	Private Enterprise
30-Aug-02				X		Diesel/Chemical Mix	168	Gallon(s)	No	Amerada Hess Corp.	Private Enterprise
31-Aug-02	X					Sulfur Dioxide	N/A		No	Mead Westvaco	Private Enterprise
1-Sep-02	X					Sulfur	N/A		No	Mead Westvaco	Private Enterprise
6-Sep-02	X					Oil: Diesel	0.5	Gallon(s)	Yes	Allied Marine Terminal	Private Enterprise
12-Sep-02	X					Oil: Diesel	N/A		Yes	N/A	N/A
20-Sep-02	X					Sulfur Dioxide	N/A		No	Mead-Westvaco Papermill & Chemical Plant	Private Enterprise
24-Sep-02					X	Gasoline: Automotive (Unleaded)	500	Gallon(s)	No	Allied Terminal Inc.	Private Enterprise
24-Sep-02					X	Gasoline: Automotive (Unleaded)	500	Gallon(s)	No	Allied Terminals	Private Enterprise
25-Sep-02	X					Unknown Oil	N/A		No	Meade Westvaco	Private Enterprise
2-Oct-02				X		Nndimethylaniline	20	Gallon(s)	No	Saia Motor Freight	Private Enterprise
6-Oct-02	X					Unknown Material	N/A		No	Westvaco	Private Enterprise
13-Oct-02	X					Unknown Material	N/A		No	Mead Westvaco	Private Enterprise
20-Oct-02	X					Unknown Material	N/A		No	Mead Westvaco	Private Enterprise
29-Oct-02	X					Oil, Fuel: No. 2-D	N/A		No	N/A	N/A
4-Nov-02		X				Hydraulic Oil	1	Gallon(s)	No	WSI of the Southeast LLC	Private Enterprise
5-Nov-02	X					Oil: Diesel	1	Pint(s)	Yes	Case Atlantic	Private Enterprise
26-Nov-02	X					Unknown Material	N/A		No	Mead Westvaco	Private Enterprise

Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
28-Nov-02	X					Unknown Material	N/A		No	Mead Wesvaco	Private Enterprise
5-Dec-02	X					Unknown Material	N/A		No	Mead Wesvaco	Private Enterprise
7-Dec-02	X					Sulfur Odor	N/A		No	Mead West Vaco	Private Enterprise
11-Dec-02	X					Sulfur Dioxide	N/A		No	Mead Wesvaco	Private Enterprise
17-Dec-02	X					Unknown Substance	20	Barrel(s)	Yes	N/A	N/A
28-Dec-02	X					Unknown Material (Black Smoke)	N/A		No	Mead Wesvaco	Private Enterprise
9-Jan-03	X					Unknown Material	N/A		Yes	N/A	N/A
15-Jan-03	X					Unknown Material	N/A		No	Mead Wesvaco	Private Enterprise
22-Jan-03	X					Sulfur Dioxide	N/A		No	Mead Wesvaco	Private Enterprise
23-Jan-03	X					Sulfur Dioxide	N/A		No	Mead Wesvaco	Private Enterprise
6-Feb-03	X					Sulfur Dioxide	N/A		No	Mead Wesvaco	Private Enterprise
20-Feb-03	X					Oil, Fuel: No. 2-D	N/A		Unknown	Hightower Construction	Private Enterprise
14-Mar-03	X					Gasoline: Automotive (Unleaded)	N/A		Yes	Amerda Hess	Private Enterprise
14-Mar-03	X					Sulfur Dioxide	N/A		No	Mead Wesvaco	Private Enterprise
29-Mar-03	X					Oil, Misc: Lubricating	5	Gallon(s)	Yes	Ship Tech America	Private Enterprise
29-Mar-03				X		Modified Pavement Sealer Base	600	Gallon(s)	No	Seal Master Industries	Private Enterprise
29-Mar-03				X		Coal Tar	600	Gallon(s)	No	N/A	N/A
3-Apr-03	X					Propylene Glycol	100	Gallon(s)	Yes	Medical University Of SC	State Government
7-Apr-03	X					Mineral Oil (Non-PCB)	300	Gallon(s)	No	SC Electric And Gas	Public Utility

Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
9-Apr-03	X					Bilge Water	1	Gallon(s)	Yes	Stevens Towing Co. Inc.	Private Enterprise
9-Apr-03		X				Hydraulic Oil	2	Gallon(s)	Yes	Pioneer Construction	Private Enterprise
18-Apr-03		X				Hydraulic Oil	2	Pint(s)	Yes	Palmetto Bridge Company	Private Enterprise
1-May-03	X					Oil, Misc: Mineral	10	Gallon(s)	Yes	SC Electric And Gas	Private Enterprise
11-May-03			X			Acetone Tolene	1	Quart(s)	No	N/A	N/A
19-May-03	X					Hydraulic Oil	16	Gallon(s)	Yes	South Carolina Dot Bridge Div	State Government
29-May-03	X					Hydraulic Oil	4	Ounce(s)	Yes	Palmetto Bridge Constructors	Private Enterprise
7-Jun-03	X					Oil, Misc: Mineral	2	Gallon(s)	No	SC Electric And Gas	Private Enterprise
27-Jun-03	X					Unknown Material	N/A		No	Mead Westvaco	Private Enterprise
28-Jun-03			X			Xylene Toluene	1	Pint(s)	No	Norfolk Southern Railroad	Private Enterprise
25-Jul-03		X				Oil, Fuel: No. 2-D	45	Gallon(s)	Yes	Detyens Shipyards Inc.	Private Enterprise
11-Aug-03				X		Sodium Hypochlorite (15% Or Less	295	Gallon(s)	No	Univar USA	Private Enterprise
22-Aug-03	X					Hydraulic Oil	1	Cup(s)	Yes	Palmetto Bridge Constructors	Private Enterprise
24-Aug-03		X				Latex Paint	3	Gallon(s)	Yes	N/A	N/A
26-Aug-03			X			Cresylic Acid	1	Gallon(s)	No	N/A	N/A
30-Aug-03	X					Formaldehyde Solution	112	Pound(s)	Yes	Mead Westvaco	Private Enterprise
8-Sep-03	X					Hydraulic Oil	N/A		Yes	Palmetto Bridge Constructors	Private Enterprise
8-Sep-03		X				Hydraulic Oil	5	Gallon(s)	Yes	Palmetto Bridge Constructors	Private Enterprise
10-Sep-03	X					Ammonia, Anhydrous	N/A		No	Triangle Ice Company	Private Enterprise

Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
10-Sep-03		X				Oil, Fuel: No. 2-D	1	Gallon(s)	Yes	Palmetto Bridge Constructors	Private Enterprise
26-Sep-03			X			Anti-Freeze	1	Gallon(s)	No	Norfolk Southern Railroad	Private Enterprise
5-Nov-03	X					Hydraulic Oil	7	Gallon(s)	Yes	Ray Contracting	Private Enterprise
19-Dec-03	X					Hydraulic Oil	10	Gallon(s)	Yes	Palmetto Bridge Constructors	Private Enterprise
7-Jan-04	X					Hydraulic Oil	1	Gallon(s)	Yes	Palmetto Bridge Constructors	Private Enterprise
23-Jan-04	X					Hydraulic Oil	5	Gallon(s)	No	Palmetto Bridge Constructors	Private Enterprise
17-Feb-04	X					Oil: Diesel	100		Yes	Amerada Hess Corp.	Private Enterprise
15-Mar-04	X					Oil, Misc: Transformer	30	Gallon(s)	Yes	SC Electric And Gas Co.	Public Utility
7-Jun-04				X		Unknown Oil	N/A		Yes	N/A	N/A
22-Jun-04		X				Oil, Misc: Lubricating	25	Gallon(s)	No	Dispatch Services Inc	Private Enterprise
6-Jul-04	X					Dye Liquid Corrosive	150	Gallon(s)	No	Tennessee Commercial Warehouse	Private Enterprise
9-Jul-04	X					Oil, Fuel: No. 2-D	7	Gallon(s)	Yes	Phillips Industrial	N/A
4-Aug-04	X					Hydraulic Oil	35	Gallon(s)	No	Ashmore Concrete Co.	Private Enterprise
15-Aug-04		X				Engine Oil	2	Gallon(s)	No	Thompson Construction	Private Enterprise
20-Aug-04			X			Unknown Material	N/A		No	Allied Terminal Inc.	Private Enterprise
20-Aug-04			X			Chlorine	N/A		No	N/A	N/A
30-Aug-04	X					Oil, Misc: Mineral, Non PCB	26	Gallon(s)	Yes	SC Electric And Gas	Public Utility
1-Sep-04			X			Oil: Diesel	10	Gallon(s)	No	Norfolk Southern Railroad	Private Enterprise
16-Sep-04				X		Oil: Diesel	10000	Gallon(s)	Yes	Mead Westvaco	Private Enterprise
29-Oct-04			X			Oil, Misc: Lubricating	15	Gallon(s)	No	Norfolk Southern Railroad	Private Enterprise

Date	Source					Spilled Material	Quantity of Spill	Unit Of Measure	Affected Water?	Responsible Organization	Organization Type
	Fixed	Mobile	Rail	Storage Tank	Pipeline						
16-Dec-04	X					Ammonia, Anhydrous	100	Pound(s)	No	Reddy Ice Corp.	Private Enterprise
23-Jan-00	X					Unknown Oil	N/A		No	J & D Paint And Body	Private Enterprise
11-Feb-00	X					Corrosive Cleaner	15	Gallon(s)	No	USN- Charleston Ship Yard	Federal Government
11-Feb-00	X					Unknown Material	N/A		No	Westvaco Paper And Pulp Mill	Private Enterprise
17-Feb-00		X				Jet Fuel: JP-8	2000	Gallon(s)	No	Piedmont Hawthorne Aviation Charleston	Private Enterprise
17-Feb-00		X				Jet Fuel: JP-4	N/A		Yes	N/A	N/A



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Towns

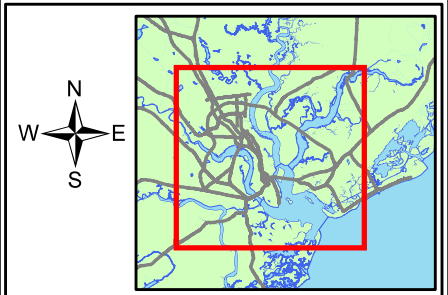
Hazardous Waste Study Areas

- Clouter Island
- Daniel Island
- North Charleston

0 0.5 1 2

Miles

Map Scale 1:125,000

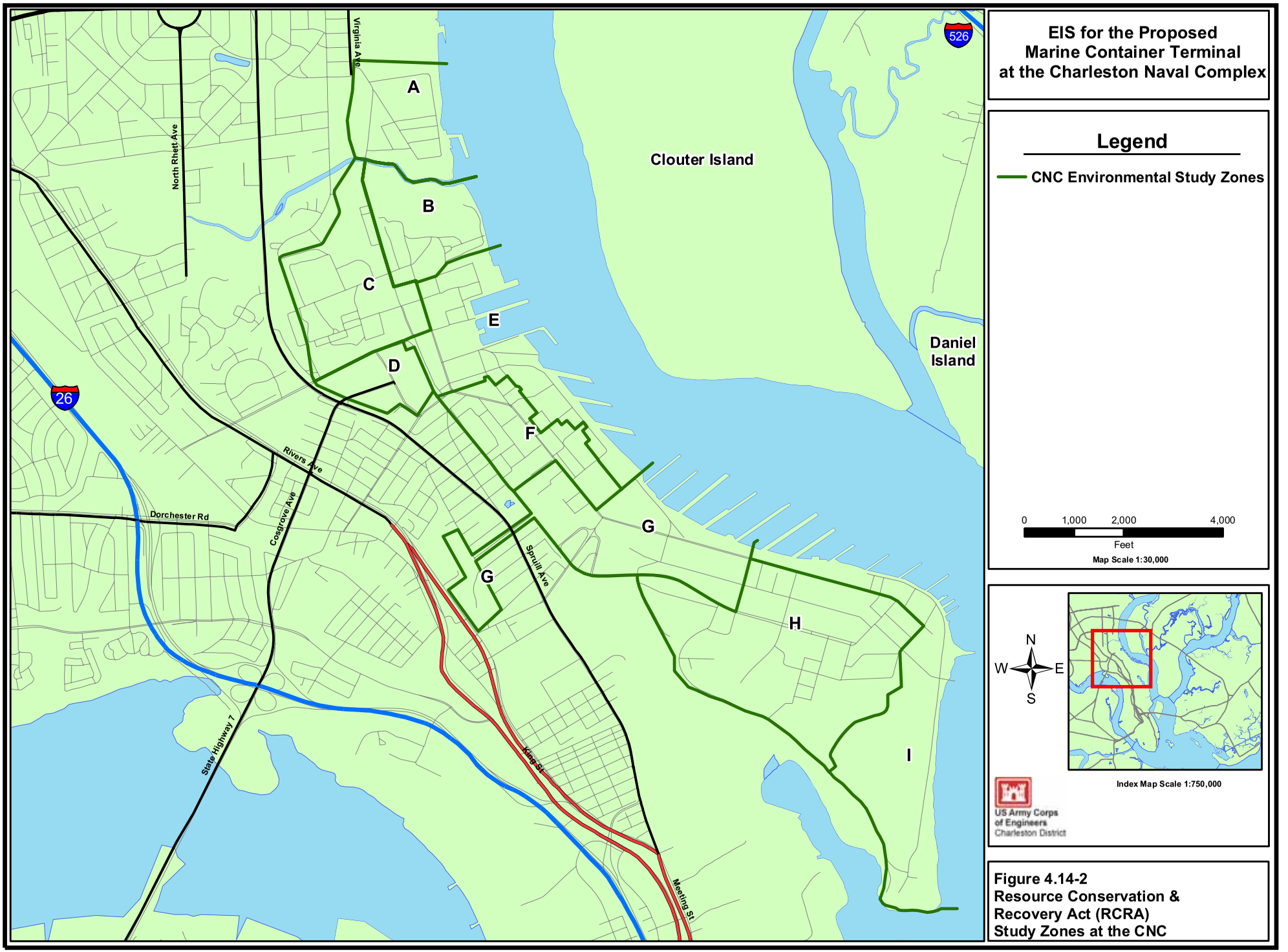


Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 4.14-1

Hazardous Materials Study Areas


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
CNC Environmental Study Zones
A
B
C
D
E
F
G
G
H
I
Clouter Island
Daniel Island
North Rhett Ave
Virginia Ave
Rivers Ave
Dorchester Rd
Cosgrove Ave
Spruill Ave
King St
Meeting St
State Highway 7
26
526
0
1,000
2,000
4,000
Feet
Map Scale 1:30,000
N
W
E
S
Index Map Scale 1:750,000
US Army Corps
of Engineers
Charleston District
Figure 4.14-2
Resource Conservation &
Recovery Act (RCRA)
Study Zones at the CNC



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

AOCs and SWMUs

- AOC
- SWMU
- **Proposed Project**
- **Federal Navigation Channel**

0 500 1,000 2,000

Feet

Map Scale: 1:12,000

N W E S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 4.14-3
Locations of AOCs and SWMUs at the Proposed Project Location



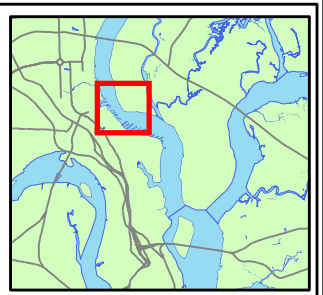
EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex

Legend

- Clouter Island AOCs
- Clouter Island Alternative
- Federal Navigation Channel

0 500 1,000 2,000
Feet
Map Scale: 1:6,000

N
W E
S



Index Map Scale 1:350,000

US Army Corps
of Engineers
Charleston District

Figure 4.14-4
Locations of AOCs at the
Clouter Island Alternative

4.15. WATER RESOURCES

This section characterizes the existing water resources environment. This includes groundwater resources, stormwater runoff, and surface waters (e.g., lakes, streams, etc.). As shown in Figure 4.15-1, the study area with respect to water resources includes the surface waters of the Charleston Harbor Estuary extending from the Atlantic Ocean through the harbor, up the Cooper River to the confluence with the Back River, as well as the groundwater resources underlying the Tri-County area.

4.15.1. Groundwater Resources

This section briefly describes the groundwater resources in the study area. See Section 4.2, Physical Setting, for a more detailed discussion of regional and local hydrogeology. Groundwater has historically been extensively used for raw water supply throughout the Tri-County area (Berkeley, Charleston, and Dorchester Counties). The City of Charleston drilled the first public supply well into the Middendorf aquifer in 1879. Since that time, increased pumping from the Middendorf and other aquifers has caused declines in groundwater levels within the deeper, confined aquifers.

Consequently, Mount Pleasant Waterworks (MPW) requested that SCDHEC designate the Tri-County area as a Capacity Use Area. Such a designation would require that all production water wells or wellfields withdrawing more than 3 million gallons per day (gpd) be permitted through the SCDHEC Bureau of Water. The Department completed a preliminary assessment of groundwater conditions within the proposed Capacity Use Area and released a report of findings and recommendations in July 2001. The report concurred with MPW's request and recommended that the Tri-County area be designated as a Capacity Use Area. The SCDHEC Bureau of Water designated the Tri-County area as the Trident Capacity Use Area in 2002.

The Charleston Commissioners of Public Works (CCPW), recently renamed as Charleston Water System (CWS) provides commercial and residential water service to customers in the cities of Charleston (including Daniel Island) and North Charleston (including the CNC). The Charleston Water System also provides wholesale water to municipalities in Mt. Pleasant (the MPW), Sullivan's Island, the Isle of Palms, and other nearby municipalities. The Charleston Water System obtains its raw water from the Edisto River and the headwaters of the Cooper River. Residents of many outlying areas still depend on private water wells for household use. As areas continue to develop, CWS or another entity is likely to supply water to these residents as well. Private household wells in this area are typically finished within the water table or surficial aquifer. Water quality is generally good; however, locally elevated concentrations of dissolved iron and sulfur are associated with these waters. Groundwater quality within the deeper aquifers, especially along the coast, is marginal due to the mineralized nature of the waters.

Groundwater within the surficial aquifer underlying the Proposed Project site has been affected by contaminants associated with anthropogenic activities on the project site. Groundwater conditions at the CNC are discussed in detail in the previous section (Section 4.14). The deeper aquifers underlying the Proposed Project are unlikely to have been affected by anthropogenic contaminants as the Cooper Formation serves as an effective confining unit below the surficial aquifer system and thereby affords protection to the deeper aquifers.

The Daniel Island and Clouter Island Alternative sites are both dredge disposal areas covering former tidal salt marsh areas. Therefore, ambient groundwater quality within the surficial

aquifers is likely to be poor due to elevated chloride and other naturally occurring dissolved salts.

4.15.2. Stormwater Runoff

Stormwater runoff from lands modified by human activities can affect surface water and, in turn, cause or contribute to exceeding water quality standards by changing natural hydrologic patterns, accelerating natural stream flows, destroying aquatic habitat, and elevating pollutant concentrations and loadings. Such runoff may contain high levels of contaminants, such as sediment, suspended solids, nutrients (phosphorus and nitrogen), heavy metals, pathogens, toxins, oxygen-demanding substances (organic material), and floating trash (EPA. 1992). After a rain event, stormwater runoff carries these pollutants into nearby streams, rivers, lakes, estuaries, wetlands, and oceans. Individually and combined, these pollutants may impair water quality, threatening designated beneficial uses and causing habitat alteration and destruction.

Because stormwater can potentially degrade surface waters, this section describes stormwater as it relates to water resource impacts. The following subsection describes the State and Federal regulations for managing stormwater discharges. In addition, the existing stormwater drainage patterns, stormwater management and stormwater quality are discussed.

4.15.2.1. Regulatory Framework

Stormwater management facilities such as retention ponds, detention ponds, open and closed storm sewer systems, wetland mitigation areas, drainage canals, oil-water separators, etc. may require permits or approvals from City, County, State and Federal regulatory agencies prior to construction. These agencies ensure that stormwater management facilities are designed to control flooding and protect water quality from the impacts of development.

Federal (EPA), State (SCDHEC), County (Berkeley and Charleston), and City (Charleston and North Charleston) agencies regulate stormwater discharges at Daniel Island, Clouter Island, and the CNC as shown in Table 4.15-1.

Table 4.15-1 Agency Jurisdictional Authority in Study Area.

	Federal	State	County		City	
Site Location	EPA	DHEC	Berkeley County	Charleston County	City of Charleston	City of North Charleston
Daniel Island	X	X	X		X	
Clouter Island	X	X	X			
Charleston Naval Complex	X	X		X		X

The Federal stormwater discharge regulations have been implemented in a phased method, referred to as Phase I and Phase II.

Phase I Program

The NPDES Stormwater Program was created by the October 1990 amendments to the Federal NPDES regulations (known as the Phase I Stormwater NPDES regulations). These regulations define certain stormwater discharges as point sources subject to the NPDES permit program. There are two broad areas of stormwater point sources as follows:

1. Stormwater Discharges Associated with Industrial Activity, and

2. Municipal Separate Storm Sewer Systems (MS4s).

The Stormwater Discharges Associated with Industrial Activity classification is divided into 11 categories of industrial activity. The 11 categories include industrial manufacturing facilities, landfills, transportation facilities, construction (land clearing on 5 or more acres), etc. without regard to type of owner. Based on population, MS4s are divided into three categories: large (250,000 or greater); medium (less than 250,000 but equal to or greater than 100,000); and small (less than 100,000).

The Phase I Stormwater NPDES regulations require large and medium MS4s and all categories of discharges associated with industrial activity to obtain stormwater NPDES permits. However, the Federal 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) temporarily exempted those industrial activities (except for power plants, airports, and uncontrolled sanitary landfills) operated by municipalities with a population of less than 100,000. The Phase II regulations (described below) now require the ISTEA facilities to have a stormwater NPDES permit.

In the State of South Carolina, the following programs have evolved from the two broad areas discussed above: the Industrial Program, the Construction Program, and the MS4 Program (SCDHEC, 2005c).

Phase II Program

The Federal NPDES regulations were amended in December 1999 (effective March 10, 2003). Small MS4s located in urbanized areas (typically areas with a population of 10,000 or more) must obtain an NPDES permit. These amendments also reduce the acreage minimum to 1 acre for requiring a permit for construction or land clearing. Further, in the Phase II Stormwater Program, the No Exposure[1] exemption of the program is expanded to all categories of industrial activity except construction. To qualify for this exemption, a No Exposure certification form must be submitted. Additionally, existing municipal-owned industrial activities that were exempted by the Federal 1991 ISTEA were required to submit an application by March 10, 2003. These requirements went into effect March 10, 2003 and are known as the Phase II Stormwater NPDES regulations.

South Carolina's Program

South Carolina, as a delegated NPDES state since 1975, administers the NPDES permit program on behalf of EPA. This delegation includes the NPDES Stormwater Program. The Bureau of Water's Industrial, Agricultural, and Stormwater Permitting Division administers this permitting program. South Carolina issues two general NPDES stormwater permits that cover all 11 categories of stormwater discharges associated with industrial activity. One general permit is for all industrial categories except construction and the other general permit covers construction. Since the construction activity and MS4 components of the NPDES Stormwater Program overlap with the State Sediment, Erosion, and Stormwater Management Program, these programs have been administratively merged to the extent allowed by law to minimize duplication (SCDHEC, 2005c).

[1] A condition of no exposure exists at an industrial facility when all industrial materials and activities are protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff.

South Carolina's Sediment, Erosion, and Stormwater Management Program has been in existence since 1983. Originally, only State-owned or State-managed lands were required to control sediment or erosion during construction. In 1991, the program was expanded to include most land disturbances greater than 2 acres. State law and regulation requires submission of site plans showing controls and, except for the SC Department of Transportation projects, a written approval on projects with more than 2-acre disturbances. This approval must be granted before land-disturbing activities may be initiated unless the site is exempt from regulation.

The Bureau of Water is responsible for administering the Sediment, Erosion, and Stormwater Management Program. The Bureau may delegate this program to a local entity upon their request. By regulation, SCDHEC's Office of Ocean and Coastal Resource Management (OCRM) implements this program in the eight coastal counties. Their responsibilities include plan reviews, site inspections and enforcement activities until a local entity is delegated.

The Industrial, Agricultural, and Stormwater Permitting Division is responsible for the permitting aspects of projects in all non-coastal areas of the State that are not delegated to a local entity. The EQC District Offices are responsible for the field work associated with the Sediment, Erosion, and Stormwater Management Program (including construction site inspections and complaint investigations to ensure all land-disturbing activities are performed according to the approved plans).

This program overlaps with the Stormwater NPDES Permit Program since most sites that disturb more than 2 acres must have permits under both programs. The Bureau of Water, the EQC District Offices, and OCRM coordinate both of these programs' activities (permitting, compliance, monitoring, and enforcement) to ensure overlapping responsibilities are minimized to the extent possible. The Sediment, Erosion, and Stormwater Management Program and the NPDES Stormwater Program (MS4s and the Stormwater Discharges Associated with Industrial Activity) are integrated into a comprehensive Stormwater Regulatory Program for the State of South Carolina. The Bureau of Water also administers the Nonpoint Source Control Program that is a voluntary program that deals with nonregulated stormwater runoff.

The SCDHEC regulations include:

- **R.72-101 - Erosion and Sediment Reduction and Stormwater Management** - these regulations apply to land disturbing activities on State-owned lands (land either owned by the State, a State agency or quasi-State agency under the management or control of such entities through right of way easements or other agreements between the entities and private landowners, except as exempted by these regulations);

- **R.72-300 - Standards for Stormwater Management and Sediment Reduction** - these regulations apply to land-disturbing activities on all other lands; and

- **R.72-405 - Standards for Stormwater Management and Sediment Reduction** - these regulations apply to land-disturbing activities conducted by the South Carolina Department of Transportation that relate either to highway construction, work done under an encroachment permit or easement, or work in a right-of-way which is under the jurisdiction of the Department of Transportation.

Regulation 72-101, Erosion and Sediment Reduction and Stormwater Management, is the regulation that would apply to this site and activity. However, through the Coastal Zone Consistency Certification or other State permits, conditions may be added to address

stormwater and sediment control issues for this activity. Before any state or federal permit can be issued for a project in the coastal zone, OCRM must review the project to make sure that it is consistent with the state coastal management policies. This process is called "Coastal Zone Consistency Certification." This certification is required of any project taking place in the eight coastal counties.

Stormwater Management Regulations for the Study Area

The City of Charleston, the City of North Charleston, Charleston County, Berkeley County and the SCDHEC regulate stormwater management facilities with regards to peak attenuation. Stormwater quality is regulated by the SCDHEC.

The SCDHEC requires detention ponds within 0.5 mile of a receiving water body in the coastal zone to store the first 0.5 inch of runoff from the entire site or store the first 1 inch of runoff from the built-upon portion of the property, whichever is greater (Environmental Quality Control Bureau of Water Pollution Control, September 1995). Water quality requirements are satisfied because the majority of pollutants coming off the site such as oils, greases, fertilizers and pesticides are contained in the first 0.5 to 1 inch of runoff. Many pollutants are removed from the stormwater as the stormwater percolates into the ground.

4.15.2.2. Drainage Patterns

This subsection describes the local drainage patterns and stormwater management in the study area that includes the CNC, Clouter Island and Daniel Island.

At the CNC, stormwater runoff is collected in closed storm sewer systems and open drainage ditches and transported either to the Cooper River, Noisette Creek or Shipyard Creek through 102 outfalls. The southern area near the Proposed Project site is sparsely developed and includes a large spoil area. The drainage system in the developed areas consists of closed storm sewer systems conveying runoff from west to east and discharges into the Cooper River through 28 outfalls. Runoff in the undeveloped portions at the southern end sheet flow to the south and discharge into the Cooper River through eight culverts. Water quality treatment facilities are limited in the CNC because it was developed prior to the current water quality regulations established by SCDHEC. No treatment facilities exist at the Proposed Project site. Some of the Proposed Project site includes buildings and roads, but a high percentage of the area at the site is open area and, as such, the runoff from the site has lower pollutant loads than more developed areas (e.g., residential, commercial or industrial areas) for pollutants such as oil, grease, metals and nutrients.

On Daniel Island, drainage on the southern third of the island is controlled by confined disposal facilities (CDFs) that are cells bordered by earthen dikes. The CDFs direct stormwater runoff to flash board risers discharging into the Cooper River and Wando River. The northern portion of the island has experienced intense development over recent years, and accordingly, the percentage of impervious areas has increased. The Daniel Island Residential/Commercial Community includes permitted wet detention ponds and wetlands stormwater facilities. Runoff drains to saltwater marshes by unnamed tributaries discharging into the Cooper River, Wando River and Beresford Creek. The Daniel Island Alternative site is located within the southern drainage basin on the island where CDFs control the stormwater drainage. The existing land use at the Daniel Island Alternative site is open CDF areas, and it has lower stormwater pollutant loads than developed areas (e.g., residential, commercial or industrial areas) for pollutants such as oil, grease, metals and nutrients. Additionally, the CDFs are designed as settling basins in order to minimize sediments discharged to surface waters.

Clouter Island consists of four CDF cells. Eight weir outfall structures discharge stormwater into the Cooper River on the west side of Clouter Island. Thirteen weir outfall structures are located on the east side of Clouter Island and discharge into Clouter Creek. The existing land use at the Clouter Island Alternative site is open CDF areas, and it has lower stormwater pollutant loads than developed areas.

4.15.3. Surface Waters

This subsection provides a general description of the Charleston Harbor Estuary as well as the tides, currents, and water quality in the study area.

The Charleston Harbor Estuary extends over approximately a 3,108 square kilometer (1,200 square mile) region and consists of three primary tributaries: the Ashley, Cooper, and Wando Rivers (Figure 4.15-1). The estuary includes fresh waters and estuarine salt waters located in the southern portion of the Catawba-Santee Watershed, as shown in Figure 4.15-2. The watershed is subdivided into hydrologic units that are named using the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) 11-digit hydrologic unit codes (HUCs), as shown in Figure 4.15-2. The Proposed Project site and the project alternative sites are all located within the 86.9-square mile Cooper River Sub-Basin (HUC 03050201-050) within the 830-square mile Cooper River Basin.

As shown in Figure 4.15-3, a portion of the Santee River water flows into the Cooper via Lake Moultrie. Flow from Lake Moultrie discharges through the Pinopolis Dam into the Tailrace Canal and the West Branch Cooper River. The East Branch Cooper River is a tidal slough throughout its 8-mile reach. The Cooper River is formed at the confluence of the West and East Branch Cooper rivers and drains into the Charleston Harbor and the Atlantic Ocean.

Another major modification of the Cooper River Basin was the creation of a freshwater reservoir by diking the mouth of a tidal slough (Back River) and connecting the upper portion of the slough to the freshwater portion of the West Branch of the Cooper River by construction of Durham Canal. The freshwater flow from the Pinopolis Dam is occasionally increased to ensure that salt from the ocean is not transported up the Cooper River far enough to affect the reservoir.

Industrial development extends along the west bank of the Cooper River, downstream from the confluence of the West Branch Cooper River and East Branch Cooper River. The east bank between the East Branch Cooper River and Flag Creek is dominated by extensive *Spartina alterniflora* salt marshes. Downstream of Flag Creek, the main channel in the Cooper River was dredged to a depth of 45 feet by the USACE for navigational purposes, and the east bank contains some industries and large dredge-material disposal areas on Daniel Island, near both Clouter Creek and Yellow House Creek east of the Naval Weapons Station.

Also included in the Cooper River Basin is the Wando River, a tidal slough that tapers in width from about 2,600 feet at its mouth to a narrow tidal creek near Ward Bridge approximately 22 miles upstream of its confluence with the Cooper River. The banks of the river are dominated by extensive *Spartina alterniflora* marshes. Detyen's Shipyard is located near the town of Cainhoy, and the SCSPA's Wando River Terminal is located in the lower part of the river. There is some residential development along the east bank of the Wando River. Residential development along the Wando River increased following the completion of the Mark Clark Expressway (I-526).

4.15.3.1. Tides, Currents and Flows

The tide is the primary mechanism that moves water through the Charleston Harbor Estuary. The inlet, which connects the Charleston Harbor to the Atlantic Ocean, is approximately 1.2 miles wide, and jetties extend 3 miles seaward from the inlet. Portions of the jetties are emergent at low tide and submerged at high tide, while the rest remain emergent throughout the tidal cycle. The tides at the entrance range from 5.09 feet mean low water (MLW) on average up to 5.90 feet MLW during spring tide conditions. These tides extend (and amplify) up the Wando and Ashley Rivers. On the Cooper River, the tides are felt as high as the Pinopolis Dam, but there is damping of the wave in the area of the Tee (located at the confluence of the East Branch and the West Branch of the Cooper River).

Historically, the Ashley, Wando, and Cooper Rivers were all tidal sloughs with limited freshwater inflow and extensive tidal marshes. The Ashley and Wando Rivers remain tidal sloughs with varying levels of urban development along their reaches. However, the Cooper River has undergone extensive anthropogenic changes. In the 18th and 19th centuries, rice plantations with extensive diked fields existed along the banks of the Cooper River. Remnants of these fields can be seen above the Tee where the Cooper River splits into the East and West Branches.

In 1941, the Works Progress Administration completed the Santee-Cooper Hydro-Electric Project. This environmental modification created two freshwater lakes by diverting the flows from the Santee River and using the naturally high topographic relief at the upper end of the Cooper River. Two dams that generated hydroelectric power were created: the Wilson Dam, which discharged to the Santee River, and the Pinopolis Dam, which discharged to the upper Cooper River (Figure 4.15-3). The flows that were diverted to the west branch of the Cooper River altered the Cooper River from a tidal slough with a net discharge of approximately 70 ft^3/s to a riverine system with an annual mean discharge of 15,000 ft^3/s.

In 1985, a re-diversion project was completed to increase vertical mixing (reduce stratification) in the estuary, and thereby attenuate the shoaling problem caused by the hydro-electric project. The re-diversion project entailed creating an 18 km (11 mile) re-diversion channel from Lake Moultrie to the Santee River. The Cooper River re-diversion project redirected approximately 70 percent of the Santee drainage water back into the Santee River. The mean Cooper River flow was reduced to approximately 4,500 ft^3/s.

Average peak ebb currents in the Lower Cooper River near Daniel Island Bend are around 3.6 ft/s, but peak currents can exceed 6 ft/s during spring tide conditions.

4.15.3.2. In-Stream Water Quality

This section characterizes the in-stream water quality in the study area. For water quality characterization, the study area (shown in Figure 4.15-1) is limited to the Cooper River below the confluence with the Back River because potential project impacts to water quality are limited to this area. The following sub-sections include: (1) a description of the SCDHEC waterbody classification for the Cooper River, (2) listed waterbody impairments in the Cooper River watershed, (3) total maximum daily loads (TMDLs), (4) fish consumption advisories, (5) a summary of important water quality variables such as dissolved oxygen, and (6) a summary of pollutant sources to the Cooper River (e.g., permitted discharges, non-point sources, ballast water discharges, etc.).

Water Quality Standards and Waterbody Classifications

Water quality standards for South Carolina are promulgated by the Department of Health and Environmental Control with approval by the SC General Assembly. They identify the uses for each waterbody [e.g., drinking water supply, contact recreation (swimming), and aquatic life support (fishing)] as well as the scientific water quality criteria to support these uses (e.g., minimum dissolved oxygen concentrations, maximum fecal coliform bacteria concentrations). Streams, lakes, and other waterbodies that do not meet the standards are impaired and are required by the Clean Water Act to be listed as such (the 303d list) (SCDHEC, 2005a). A site may be delisted if: (1) the most recent data show that water quality standards are being met, (2) a TMDL has been developed and approved, or (3) the analysis for the listed waterbody contained errors (SCDHEC, 2004a).

The Cooper River is classified by SCDHEC as “SB” for the portion between the harbor and 30 miles upriver from the harbor (SCDHEC, 2004b). Class SB comprises tidal saltwaters suitable for primary and secondary contact recreation, crabbing and fishing. These waters are not protected for harvesting of clams, mussels, or oysters for market purposes or human consumption. The waters are suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora.

Waterbody Impairments

SCDHEC developed a priority list of waterbodies pursuant to Section 303(d) of the Federal Clean Water Act (CWA) and Federal Regulation 40 CFR 130.7. The listing identifies South Carolina waterbodies that do not currently meet State water quality standards after application of required controls for point and nonpoint source pollutants. The most recent 303(d) list of impaired waters in the Lower Cooper River watershed (11 digit HUC 3050201-050) is presented in Table 4.15-2. This watershed includes the three alternative sites being evaluated in this EIS. The list of impaired waters includes Filbin Creek, which is listed for both impairments to aquatic life and recreational uses as a result of low DO and high fecal coliform concentrations. The location of Filbin Creek is shown in Figure 4.15-4.

Table 4.15-2. 303(D) List of Impaired Waters in the Lower Cooper River Watershed (11 digit HUC 3050201-050) in 2004.

11 Digit HUC	Location	Station	Use	Cause
3050201050	Filbin Creek at Virginia Ave, North Charleston	MD-249	Al	DO
3050201050	Filbin Creek at Virginia Ave, North Charleston	MD-249	Rec	FC

Note: Rec = recreational use, Al = aquatic life, CHLA = chlorophyll A, DO = dissolved oxygen, FC = fecal coliform,

Total Maximum Daily Loads

Section 303 of the Clean Water Act established the principle of the TMDL as a means of reducing water pollution in impaired waters. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. The calculation must consider all contributing point and non-point pollution sources, it must include a margin of safety, and it must consider seasonal variations. In addition, a TMDL contains reductions from the existing pollution loads needed to meet water quality standards, and it allocates the reductions among the sources in the watershed (SCDHEC, 2005a).

A TMDL was established for DO in the Cooper River, Wando River and Charleston Harbor System in 2002 (SCDHEC, 2002), and a separate TMDL was established for the Ashley River in 2003 (SCDHEC, 2003). Therefore, these water bodies are no longer included on the 303(d) list.

SCDHEC found that during the critical periods for which wasteload allocations are set, DO concentrations in much of the Charleston Harbor system are naturally low and would not meet applicable standards even without discharger input of oxygen demanding substances. Under such circumstances where DO concentrations are naturally low, State water quality standards allow a lowering of DO of no more than 0.1 mg/l (SCDHEC, 2002).

A two-dimensional hydrodynamic and water quality model was developed to predict the impact of point source discharges on DO concentrations in the system. The model incorporated appropriate critical conditions, instream processes, and decay rates. Results indicated the need for an overall reduction in discharge of oxygen-demanding substances to the system of approximately 70 percent in order to meet the 0.1 mg/l change criterion (SCDHEC, 2002). A phased approach to achieving the reductions was allowed with an initial Phase 1 reduction of approximately 60 percent. Final loadings, which would require an approximate 70 percent reduction from the 2002 permitted loadings, would be implemented in Phase 2.

In addition, the TMDL allows for additional study and modeling during Phase 1 to further refine the allowable load to the system prior to implementation of final limits. The BCDCOG is currently conducting a monitoring program and three-dimensional model study of the estuary system in order to more accurately represent the system and refine the allowable load calculations. SCDHEC is currently reviewing the three-dimensional model set-up and calibration, and the study is scheduled to be completed later in 2006.

Fish Consumption Advisories

Ongoing fish consumption advisories within the Cooper River wastershed have been issued anually for mercury and include the East Fork of the Cooper River, the West Fork of the Cooper River, the Tee to Bushy Park, and the Goose Creek Reservoir (SCDHEC, 2004d, SCDHEC, 2005b and SCDHEC, 2006). There are no restrictions in the Cooper River downstream from Bushy Park or in Charleston Harbor.

Summary of Water Quality Variables

The following subsections summarize the in-stream water quality by describing the water quality variables of concern in the Lower Cooper River. The variables discussed in the following sections include dissolved oxygen, biochemical oxygen demand, nutrients, fecal coliform bacteria, total suspended solids, heavy metals and salinity.

Dissolved Oxygen

Oxygen is essential for the survival and propagation of aquatic organisms. If the amount of oxygen dissolved in water falls below the minimum requirements for survival, aquatic organisms or their eggs and larvae may die.

In the Lower Cooper River, the DO concentrations are generally high during cool winter months and low during the warm summer months. The typical seasonal variation in DO is shown by the recent mid-depth DO concentrations observed at the USGS gauging station at the Highway 17 bridge (located about 2 miles downstream from the Proposed Project) in Figure 4.15-5. Surface and bottom measurements at Filbin Creek (located about 4 miles upstream from the Proposed Project) and at the Highway 17 bridge are shown for DO, temperature and salinity in Figures

4.15-6 and 4.15-7. The range of DO at these stations for the 2003-2004 water year is also summarized in Tables 4.15-3 and 4.15-4.

The DO concentration depends on temperature (an inverse relationship), salinity, wind, water turbulence, atmospheric pressure, the presence of oxygen-demanding compounds and organisms, and photosynthesis. The major sources of oxygen-demanding substances to the Lower Cooper River include stormwater runoff from the watershed, marshes along the river, point source pollution dischargers, river bottom sediments and the ocean.

Table 4.15-3. Summary Percentiles for USGS Monitoring Gage 021720677, Cooper River at Filbin Creek (2003-2004 Water Year).

Variable	Units	5th percentile	10th percentile	50th percentile	90th percentile	95th percentile
Temperature, mid-depth	deg C	9.7	10.0	21.4	28.6	29.8
Temperature, top	deg C	17.1	18.4	25.2	29.7	30.1
Temperature, bottom	deg C	17.1	18.4	25.3	29.8	30.1
DO, mid-depth	mg/l	3.8	4.3	5.8	8.9	9.2
DO, top	mg/l	4.2	4.5	5.6	7.2	7.5
Salinity, mid-depth	ppt	10.1	11.1	14.7	18.4	19.5
Salinity, top	ppt	8.6	9.9	13.8	17.2	18.2
Salinity, bottom	ppt	10.1	11.5	15.4	19.6	20.9

The estuary has a high ratio of intertidal marsh area to surface water area (>3:1) (SAMP, 2000), and the marsh system plays a large role in the DO dynamics of the estuary. The marshes remove DO and inorganic nitrogen from the water column and export oxygen-demanding materials (organic material and ammonia). The marshes and their effects on the DO dynamics of the estuary are the subject of ongoing research.

Table 4.15-4. Summary Percentiles for USGS Monitoring Gage 021720709, Cooper River at Hwy 17 Bridge (2003-2004 Water Year).

Variable	Units	5th percentile	10th percentile	50th percentile	90th percentile	95th percentile
Temperature, mid-depth	deg C	9.6	10	21.3	28.6	29.6
Temperature, top	deg C	17.1	18.4	25.5	29.6	29.9
Temperature, bottom	deg C	17.1	18.4	25.7	29.4	29.7
DO, mid-depth	mg/l	3.4	4	6.1	10	10.5
DO, top	mg/l	3.7	4	5.6	7.4	7.7
Salinity, mid-depth	ppt	20.7	21.7	24.8	27.8	28.7
Salinity, top	ppt	19.5	20.4	23.6	26.7	27.7
Salinity, bottom	ppt	21.0	21.9	25.2	28.7	29.6

As DO is consumed by oxygen-demanding substances and organisms, the DO concentrations in the water are replenished by reaeration at the water surface, which, in turn, is vertically mixed

down through the water column towards the bottom of the stream. Increased depths result in decreased vertical mixing and lower reaeration of the water at the river bottom. For this reason, the progressive increase in the depth of the Federal navigation channel in the Cooper River over the past century has decreased the river bottom DO concentrations. Additionally, the freshwater flow into the Cooper River from Lake Moultrie affects vertical mixing and DO in the Lower Cooper River. The diversion of freshwater into the Cooper River beginning in the 1940s caused the river to shift from vertically well mixed to a more stratified condition, which decreased DO concentrations along the bottom of the river and increased sedimentation. Following rediversion of flows and reduction of the freshwater flow into the Cooper River beginning in 1985, this stratification was greatly reduced. SCDHEC monitoring data in the Lower Cooper River (Station MD-045 at Daniel Island Bend near the Proposed Project) show a noteworthy decreasing trend in DO concentration prior to rediversion, but no substantial trend in DO concentration when only post-rediversion data (1986-1998) are considered (SCDHEC, 1999).

SCDHEC determined that low DO conditions violating the DO standard would occur in the river even in the absence of point source pollution dischargers. This low DO condition occurs naturally in many southeast rivers during the summer due to natural loading of organic matter from floodplain swamps and marshes and, hence, causes high rates of ecosystem respiration. Under such circumstances where DO concentrations are naturally low, State water quality standards allow a lowering of DO of no more than 0.1 mg/l (SCDHEC, 2002).

Because of the low DO conditions in the river, SCDHEC determined that much of the system does not meet the applicable water quality standard for dissolved oxygen for extended periods of time and, therefore, is considered water quality limited for the purposes of wasteload allocation (WLA) development (SCDHEC, 2002). While all WLAs for water quality limited segments are not developed through the TMDL process, SCDHEC, with EPA's concurrence, chose to use the TMDL process to develop wasteload allocations for dischargers to the Charleston Harbor system.

Biochemical Oxygen Demand

Biochemical oxygen demand (BOD) is an indirect measure of biodegradable organic compounds in water and is determined by measuring the DO decrease in a controlled water sample over time. During this time, aerobic (oxygen-consuming) bacteria decompose organic matter (carbonaceous and nitrogenous) in the sample and consume DO in proportion to the amount of organic material that is present. Sources of BOD in the Lower Cooper River include stormwater runoff, marshes along the river, the ocean and point source pollution dischargers (e.g., wastewater treatment plants). SCDHEC monitoring data in the Lower Cooper River (Station MD-045 at Daniel Island Bend near the Proposed Project) show a marked decreasing (i.e., improving) trend in BOD concentrations (SCDHEC, 1999). The quantity of BOD discharged by point sources is limited through the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. As discussed in the previous section, the 2002 TMDL for DO in the Lower Cooper River established reductions in the permitted BOD discharges of approximately 70 percent, with an initial Phase 1 reduction of approximately 60 percent.

Nutrients

Nutrient parameters include forms of nitrogen (ammonia, organic nitrogen, nitrate nitrogen) and phosphorus. High amounts of nutrients can cause eutrophication (potentially causing serious depletion of DO needed by marine organisms, loss of habitats, and algal blooms), while low

levels of nutrients can reduce plant growth and, for example, starve higher-level organisms that consume phytoplankton. Major sources of nutrient pollution to the estuary include point source discharges (e.g., wastewater treatment plants and the Westvaco paper plant) and stormwater runoff (e.g., fertilizers and other pollutants).

In the Lower Cooper River, nitrogen is generally considered to be the “limiting nutrient” (i.e., the most important nutrient that actually controls plant growth in the system) because of its relatively low concentrations compared to other nutrients. However, the system is also light-limited because of the low transparency of the waters. The lack of bottom plants is a result of light limitation and unsuitable substrate.

As discussed previously, the marsh system in the estuary plays an important role in the nutrient dynamics of the estuary. The marshes consume inorganic nitrogen while exporting organic material and ammonia.

Monitoring data collected by SCDHEC indicate a decreasing (i.e., improving) trend in total nitrogen and total phosphorus concentration in the Lower Cooper River at Daniel Island Bend (SCDHEC, 1999). However, the SAMP (2000) cautions that some zones in tributary subbasins still exhibit high nutrient concentrations and hypereutrophic conditions.

Fecal Coliform

Coliform bacteria are present in the digestive tract and feces of all warm-blooded animals, including humans, poultry, livestock, and wildlife. Fecal coliform bacteria are themselves generally not harmful, but their presence indicates that surface waters may contain pathogenic microbes. Diseases that can be transmitted to humans through water contaminated by improperly treated human or animal waste are the primary concern.

Public health studies have established correlations between fecal coliform numbers in recreational and drinking waters and the risk of adverse health effects. Based on these data, EPA and SCDHEC have developed enforceable fecal coliform standards to protect recreational and drinking water users from pathogens in surface waters. Proper waste disposal or sewage treatment prior to discharge to surface waters minimizes this type of pollution (SCDHEC, 1999). SCDHEC (1999) monitoring data indicate a decreasing trend in fecal coliform bacteria in the Lower Cooper River at Daniel Island Bend.

Total Suspended Solids

Total suspended solids (TSS) are the suspended organic and inorganic particulate matter in water. Although increasing TSS can also be an indication of increased runoff from land, TSS differs from turbidity in that it is a measure of the mass of material in, rather than light transmittance through, a water sample. High TSS can adversely impact fish and fish food populations and damage invertebrate populations. There are no explicit State standards for TSS (SCDHEC, 1999). SCDHEC monitoring data in the Lower Cooper River at Daniel Island Bend show an increasing trend in turbidity, but TSS was not monitored.

Heavy Metals

Concentrations of cadmium, chromium, copper, lead, mercury, and nickel in water are routinely measured by SCDHEC to compare to State standards intended to protect aquatic life and human health. These metals occur naturally in the environment, and many are essential trace elements for plants and animals. Human activities, such as land use changes and industrial and agricultural processes, also have resulted in an increased flux of metals from land to water.

Atmospheric inputs are recognized as important sources of metals to aquatic systems. Metals are released to the atmosphere from the burning of fossil fuels (coal, oil, gasoline), wastes (medical, industrial, municipal), and organic materials. The metals are then deposited on land and in waterways from the atmosphere via rainfall and particulates (dry deposition) (SCDHEC, 1999).

SCDHEC monitoring at Daniel Island Bend (MD-045) for 1994-1998 showed no water quality samples contravening the standard for lead, mercury, cadmium, nickel, zinc and chromium. One sample (out of a total of 19) exceeded the standard for copper. The monitoring station in Shipyard Creek (MD-243) showed no water quality samples contravening the standard for any of these metals. It should be noted, however, that the monitoring of the sediments in Shipyard Creek does show substantial heavy metals contamination of the bottom sediments.

Salinity

Salinity concentration in the river affects the estuarine habitat in many ways. Along with tidal inundation, salinity generally determines the marsh vegetation species; it directly affects the fish, crustacean and clam populations; and it influences the DO concentrations. Salinity in the river is also of concern from a water usage perspective. Bushy Park is a freshwater reservoir located in the upper reaches of the Cooper River and used by local industry for water supply. Salinity intrusion to the estuary can cause periodic increases in chloride concentration above acceptable limits at the reservoir. These events typically occur during periods of very high tides, sustained wind conditions or storm events. To counter salinity intrusion events, the freshwater discharge from Lake Moultrie is managed by increasing flow during these events to lower salinity concentrations in the upper Cooper River.

Monitoring data collected by the USGS during 2003-2004 indicate that the salinity at the Highway 17 bridge on the Cooper River and at the station near Filbin Creek on the Cooper River has a vertical gradient, with slightly higher bottom salinity than surface salinity. The salinity at these two stations, located downstream and upstream of the Proposed Project site, is summarized in Tables 4.15-2 and 4.15-3.

Point Source and Non-Point Source Surface Water Pollution

This section characterizes the various sources of pollution that affect the instream water quality in the Lower Cooper River. The sources include point source discharges (e.g., wastewater treatment plants, etc.) and nonpoint sources (e.g., stormwater, atmospheric deposition, etc.).

Point Source Discharges

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or manmade ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters (EPA, 2005a). In South Carolina, SCDHEC administers the NPDES permit program. The discharges in the Charleston Harbor Estuary greater than or equal to 1 percent of the total point source oxygen demanding load to the estuary are listed in Table 4.15-5, and the locations of the discharge outfalls are shown in Figure 4.15-8. This represents more than 95 percent of the permitted discharges in the estuary.

Table 4.15-5. List of Major NPDES Discharges to the Charleston Harbor Estuary.

Permit Name	NPDES Number	Receiving Stream	Flow (mgd)	CBODU (lbs/day)	NH3 (lbs/day)	UOD (lbs/day)	Percent of Total
MeadWestvaco	SC0001759	Cooper	25.6	58,620	335	60,152	31%
North Charleston Sewer District	SC0024783	Cooper	27	10,538	8,624	49,952	26%
Plum Island WWTP	SC0021229	Harbor	36	13,511	6,005	40,953	21%
Lower BCW&SA	SC0046060	Cooper	15	4,691	2,502	16,125	8%
Bayer	SC0003441	Cooper	5.65	5,787	384	7,542	4%
Mt Pleasant Rifle Range	SC0040771	Harbor	6	1,877	1,001	6,450	3%
Mt Pleasant Center Street	SC0040771	Harbor	3.7	1,157	617	3,978	2%
BP (Amoco)	SC0028584	Cooper	4.5	2,970	-	2,970	2%
Summerville	SC0037541	Ashley	10	1,564	167	2,326	1%
Monks Corner WWTF	SC0021598	West Cooper	1.6	600	267	1,820	1%

Nonpoint Sources

Nonpoint sources of pollution (both natural and anthropogenic) have an even greater effect on the Charleston Harbor Estuary water quality than the point source pollution discharges. A primary nonpoint source (NPS) of surface water pollution is stormwater runoff. Stormwater runoff pollution depends on how the land is used and can be caused by: (1) excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas; (2) oil, grease, and toxic chemicals from urban runoff and energy production; (3) sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks; (4) salt from irrigation practices and acid drainage from abandoned mines; and (5) bacteria and nutrients from livestock, pet wastes, and faulty septic systems (EPA, 2005b).

In addition, natural sources of oxygen-demanding loads affect the estuary water quality. The marshes export large quantities of nutrients and detritus to the estuary, and they also consume dissolved oxygen from waters that flood the marshes. Both the stormwater runoff pollution for the estuary watershed and the marsh loading are currently being studied as part of the ongoing Charleston Harbor system three-dimensional model study, conducted by the BCDCOG, that will be used to determine a new TMDL.

Marine Pollution from Ship Discharges and Container Operations

Marine pollution from ship discharges and container operations are a minor source of pollution, as compared to the point sources and other non-point sources discussed above. However, these sources of pollution are of concern in estuaries with port facilities. Potential pollution sources that are the direct outcome of shipping or the handling of containers at the port are identified and summarized in this section. These sources include ship bilge water, accidental spills from ships, and container wash wastewater.

Bilge Water

Bilge water is oily wastewater located in the bottom portion of a vessel's hold and originates from below-deck washdowns, cleanings, spills, leaks, condensation and storm spray. Pollutants that collect in bilge water include transitional heavy-metal traces, oils, fuels, hydraulic fluids, detergents, and polynuclear aromatic hydrocarbons (PAHs).

Federal law prohibits the intentional discharge of oil wastes in harmful quantities, defined as that amount which would cause a visible sheen. Specific legal requirements that govern how ships handle and treat oily bilge water are contained in the International Convention on the Prevention of Pollution from Ships (MARPOL). This is an international treaty ratified by the U.S. Senate and incorporated into Federal Law through the Act to Prevent Pollution from Ships (APPS). As a result of MARPOL regulations, container ships can only discharge treated bilge water into U.S. territorial waters except when the ship is proceeding en route and it is more than 12 nautical miles from the nearest land.

Charleston Harbor and its tributaries have been minimally affected by bilge water discharges because of the MARPOL regulations enacted by APPS and enforced by the U.S. Coast Guard (USCG). These regulations prohibit the discharge of untreated and treated bilge water into Charleston Harbor or its tributaries.

Accidental Spills

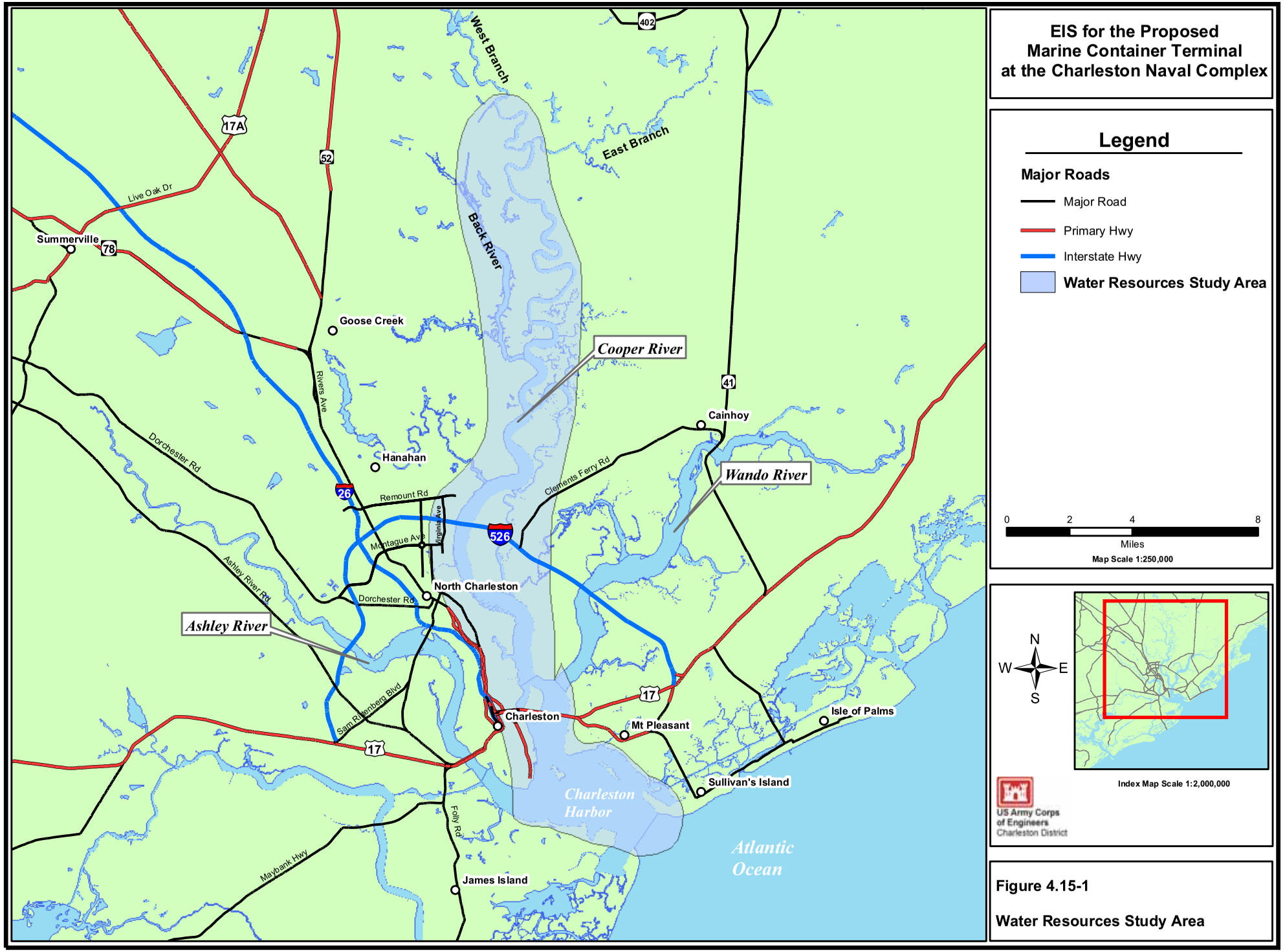
The presence of existing marine container terminals, oil and gas terminals, industrial facilities, and large and small vessel traffic can adversely affect surface waters by accidental spills of oil and other pollution. The National Response Center (NRC) and USCG Maritime Information Exchange Incident Investigation Reports indicate that most spills within the Charleston Harbor Estuary have been less than 50 gallons and were typically diesel fuels. Parties responsible for oil spills include private enterprises (i.e., shipping lines, towing services, etc.), fishing vessels, pleasure craft, and Federal government vessels (i.e., USCG). The spills made by fishing vessels and pleasure craft were generally between 1 and 50 gallons and consisted of diesel fuel or oily bilge water. These small spills are not usually contained or cleaned.

Approximately twice a year, larger spills have occurred due to sinkings, groundings, or fires. These are normally diesel fuel with a spill range of 75 to 2,000 gallons. Effective cleanups are possible for most of these incidents; however, the locations of the vessels or weather conditions may limit cleanup actions. Land-based spills include releases from construction sites and marinas. These spills are normally small spills of diesel fuel or hydraulic fluid.

Container Washwater

At this time, the SCSPA does not maintain or operate container washwater facilities at any of their terminals. Generally, the shipping lines subcontract the washing out of their containers to local maintenance and repair vendors. These vendors lease space from the SCSPA at each of the existing terminals.

The washout procedures used by the local vendors are either mobile or stationary services. A manual operation is the most common practice with wastewater collected in a holding tank that is later emptied by a contractor to a wastewater treatment plant. The washout of a single, standard-sized container uses less than 5 gallons of water (applied with high pressure) and only biodegradable soaps are used. Approximately 20 to 40 containers are serviced per day at each of the container washing facilities.


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Major Roads
Major Road
Primary Hwy
Interstate Hwy
Water Resources Study Area
0
2
4
8
Miles
Map Scale 1:250,000
N
W
E
S
Index Map Scale 1:2,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.15-1
Water Resources Study Area
West Branch
East Branch
Back River
Cooper River
Wando River
Ashley River
Charleston Harbor
Atlantic Ocean
Summerville
Goose Creek
Hanahan
North Charleston
Charleston
Mt Pleasant
Isle of Palms
Sullivan's Island
James Island
Cainhoy
Live Oak Dr
Dorchester Rd
Rivers Ave
Remount Rd
Montague Ave
Virginia Ave
Clements Ferry Rd
Ashley River Rd
Sam Rittenberg Blvd
Folly Rd
Maybank Hwy
17A
52
78
26
526
17
41
402

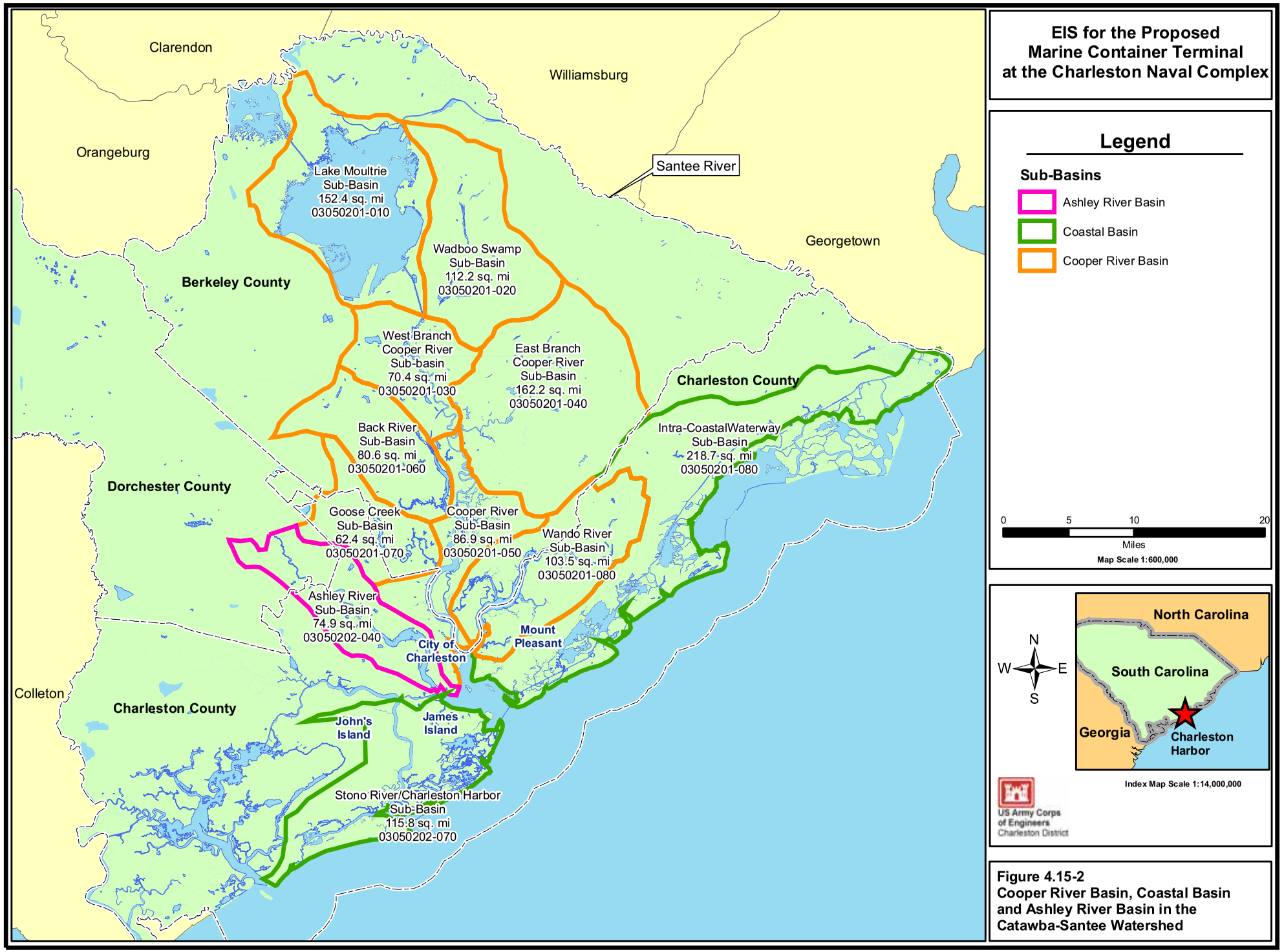
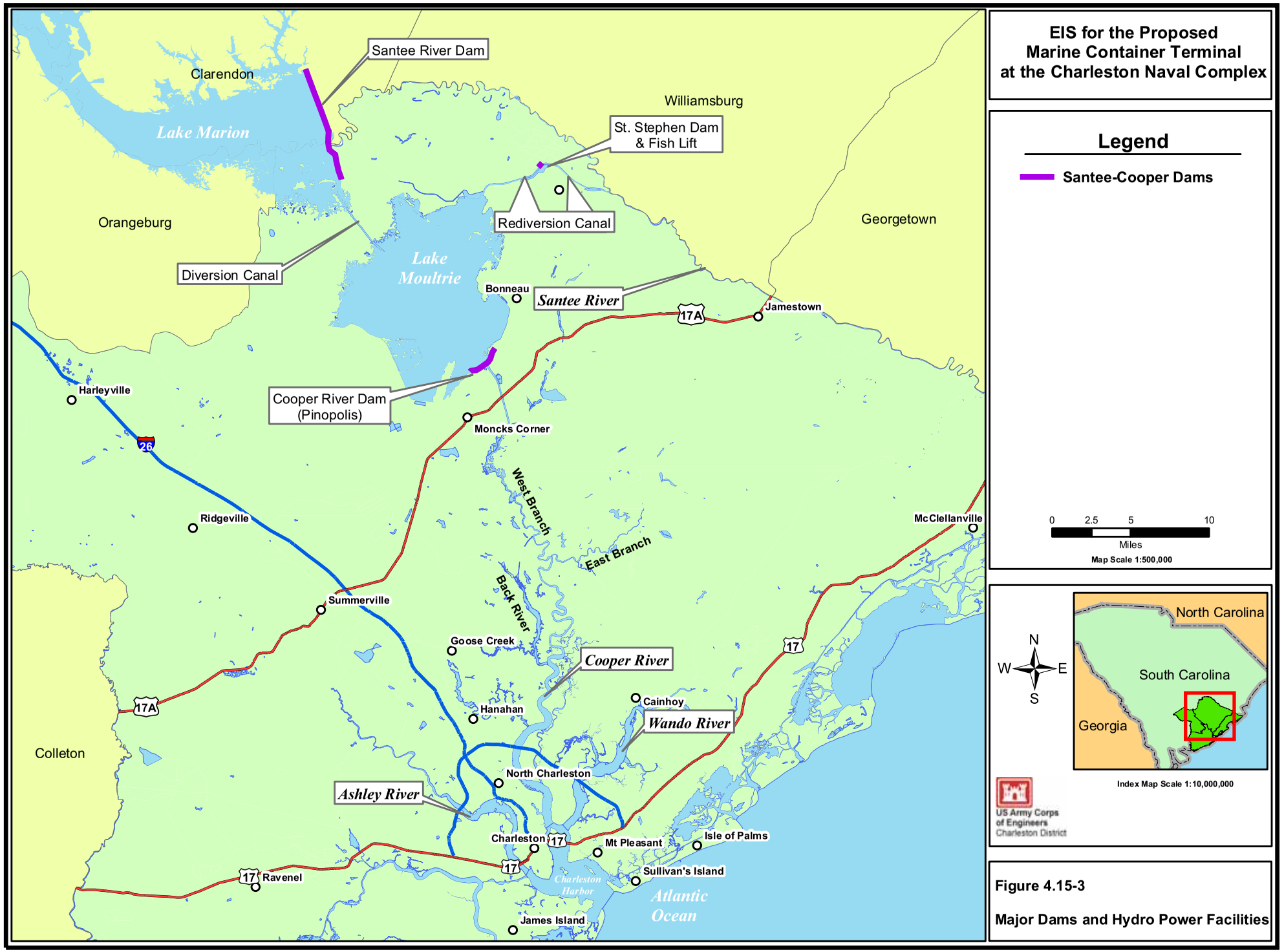


Figure 4.15-2
Cooper River Basin, Coastal Basin and Ashley River Basin in the Catawba-Santee Watershed


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Santee-Cooper Dams
0 2.5 5 10
Miles
Map Scale 1:500,000
Santee River Dam
Clarendon
Williamsburg
Lake Marion
St. Stephen Dam
& Fish Lift
Rediversion Canal
Orangeburg
Georgetown
Diversion Canal
Lake
Moultrie
Bonneau
Santee River
17A
Jamestown
Harleyville
Cooper River Dam
(Pinopolis)
Moncks Corner
26
West Branch
East Branch
Ridgeville
McClellanville
Back River
Summerville
Goose Creek
Cooper River
17
17A
Hanahan
Cainhoy
Wando River
Colleton
North Charleston
Ashley River
Charleston
17
Mt Pleasant
Isle of Palms
17
Ravenel
17
Charleston
Harbor
Sullivan's Island
Atlantic
Ocean
James Island
N
W
E
S
North Carolina
South Carolina
Georgia
Index Map Scale 1:10,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.15-3
Major Dams and Hydro Power Facilities

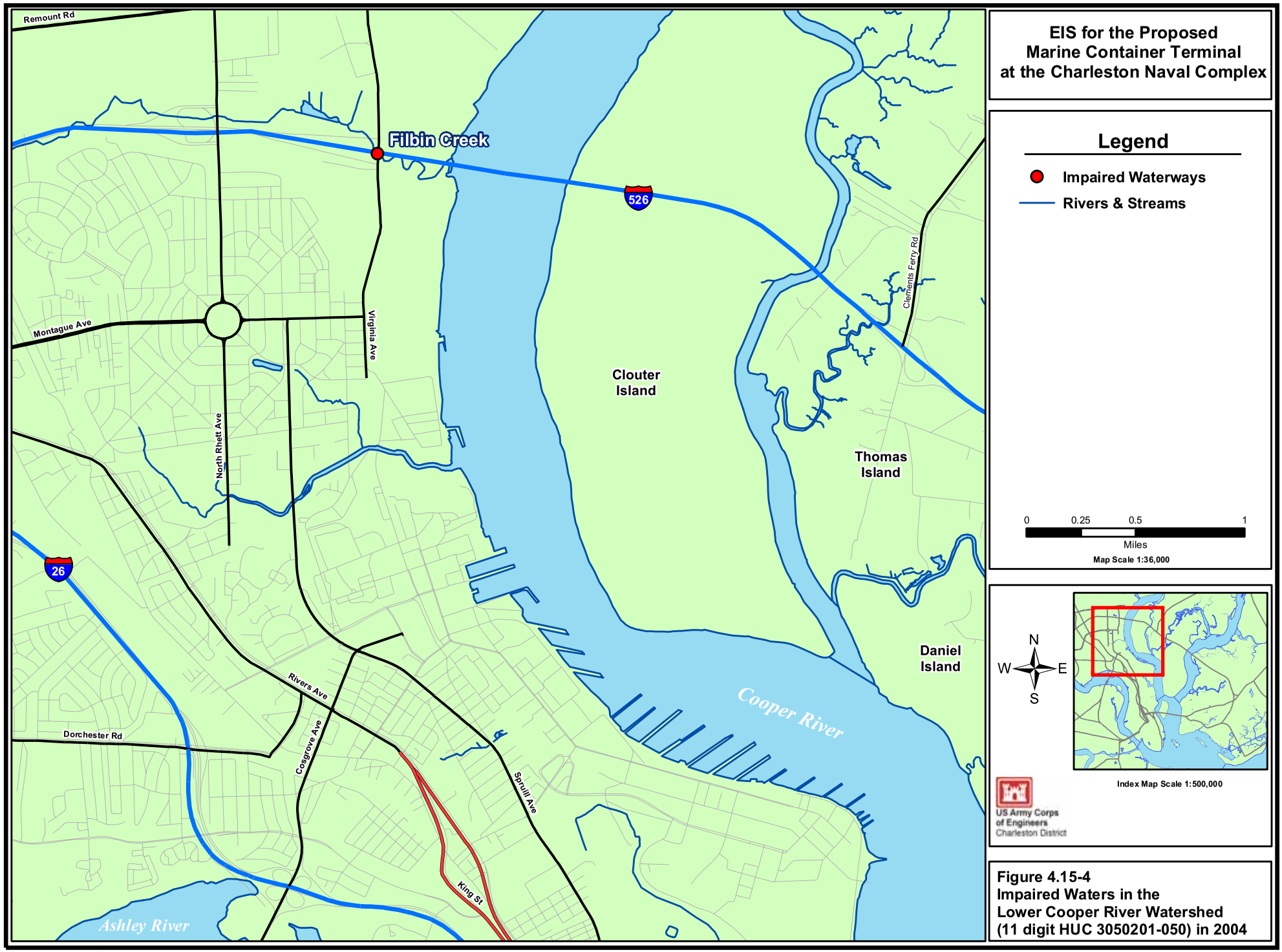


Figure 4.15-4
Impaired Waters in the
Lower Cooper River Watershed
(11 digit HUC 3050201-050) in 2004

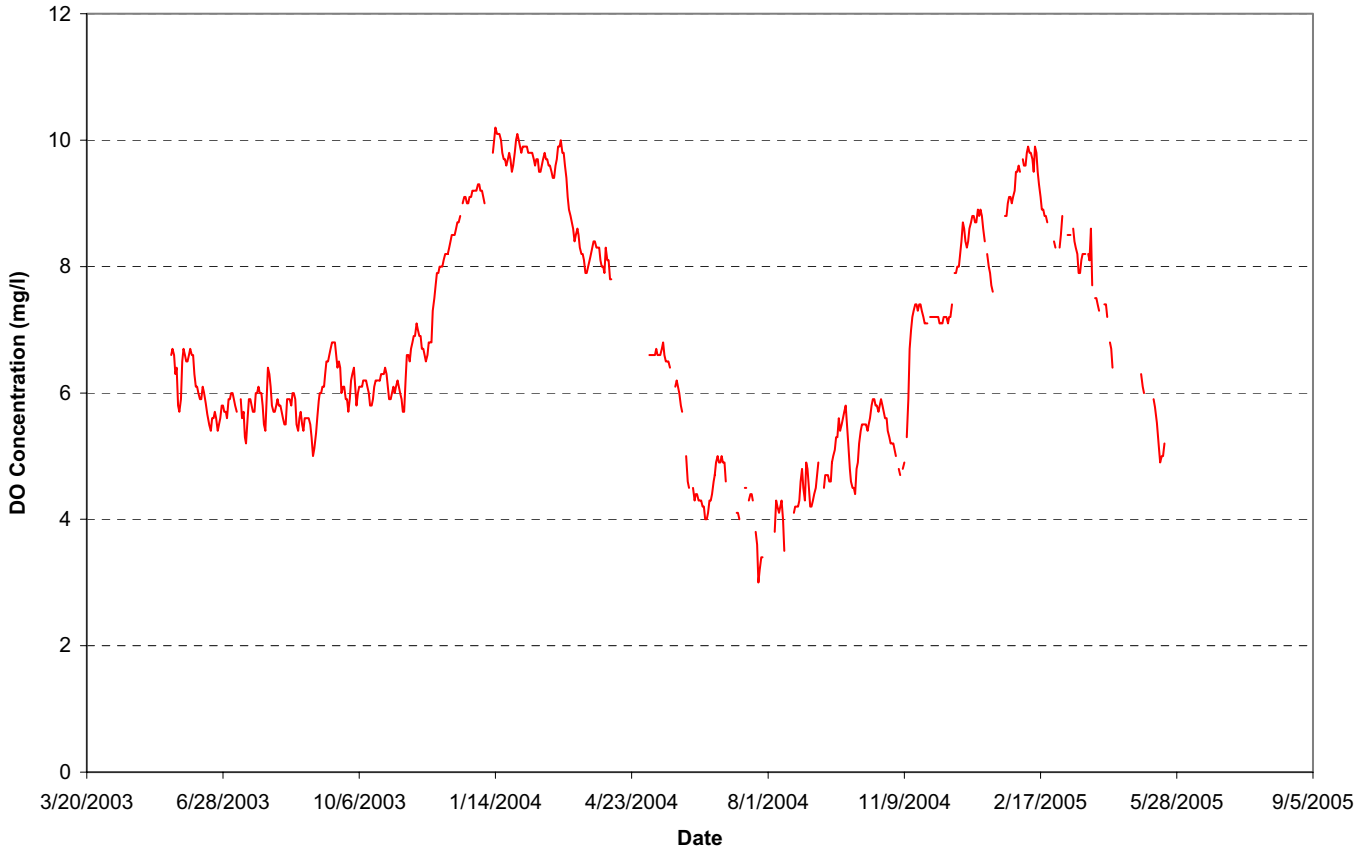


Figure 4.15-5
Measured Dissolved Oxygen in the Cooper River at the Highway 17 Bridge, 24 hour averaged, Oct 2003 – Sept 2004 (USGS monitoring gage 021720709 provisional data).

US Army Corps of Engineers
Charleston District

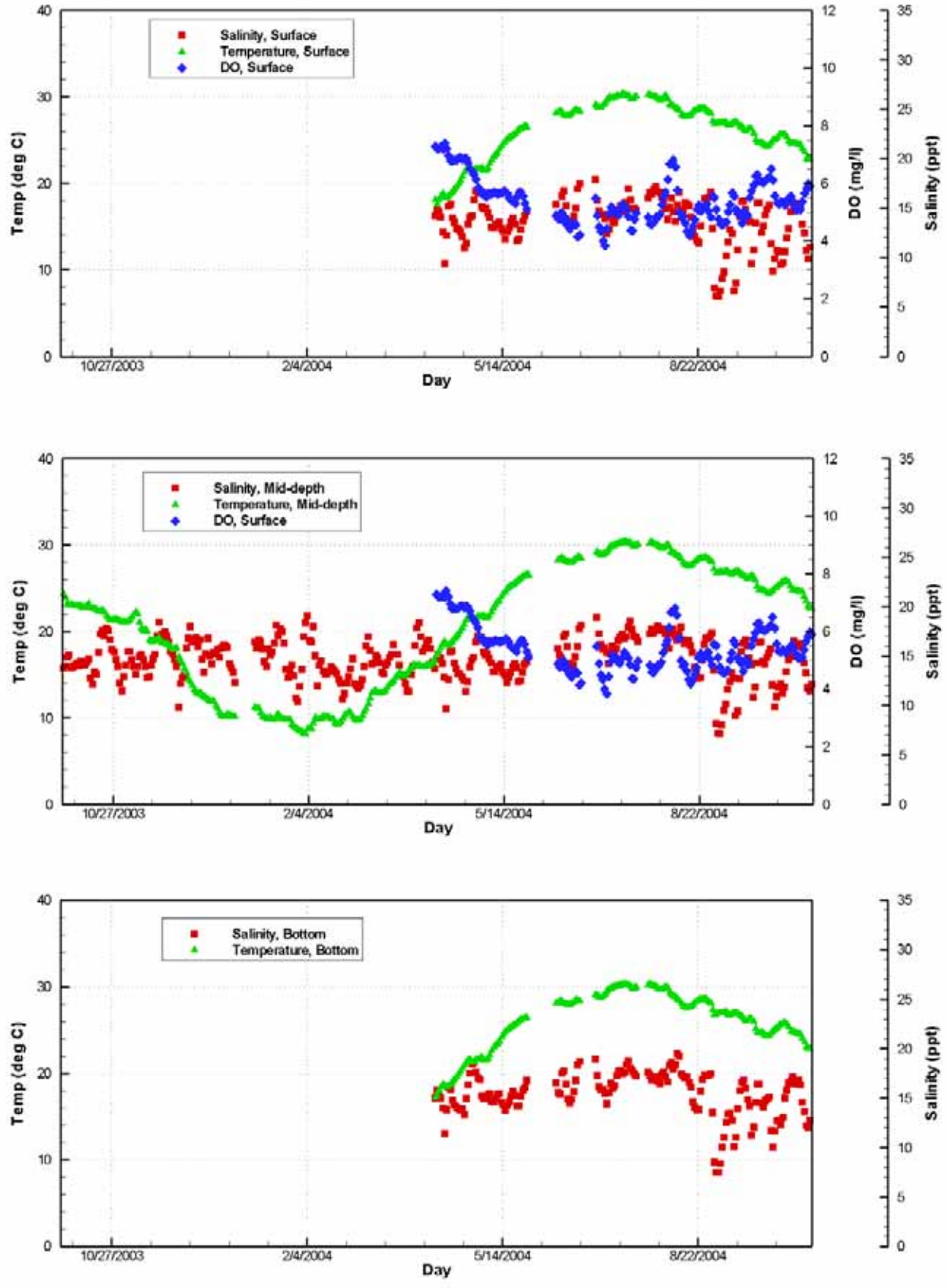


Figure 4.15-6
Measured Water Quality Variables in the Cooper River at Filbin Creek, 24 hour averaged, Oct 2003 – Sept 2004 (USGS monitoring gage 021720677).

US Army Corps of Engineers
Charleston District

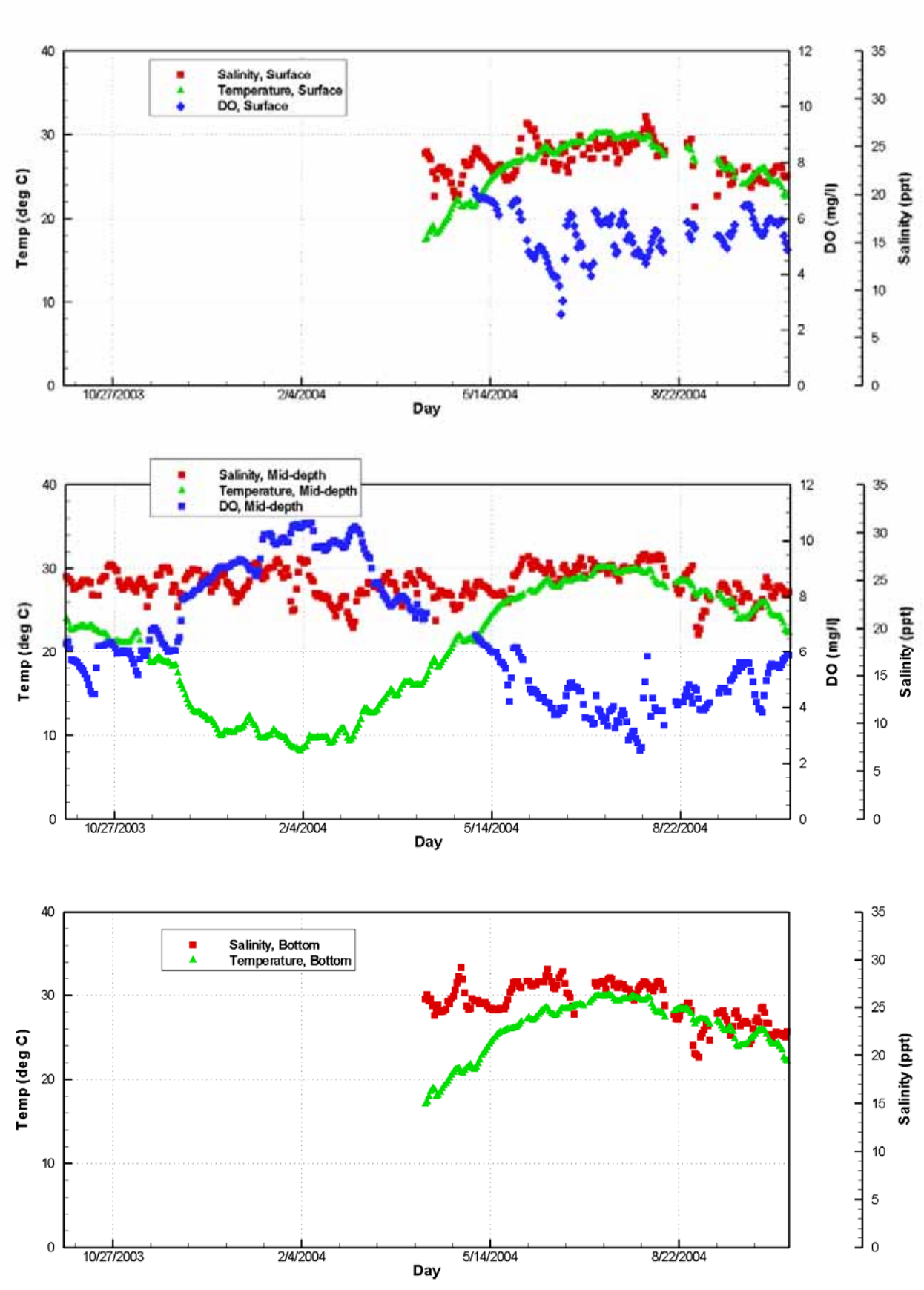


Figure 4.15-7
Measured Water Quality Variables in the Cooper River at the Highway 17 Bridge, 24 hour averaged, Oct 2003 – Sept 2004 (USGS monitoring gage 021720709).

US Army Corps of Engineers
Charleston District

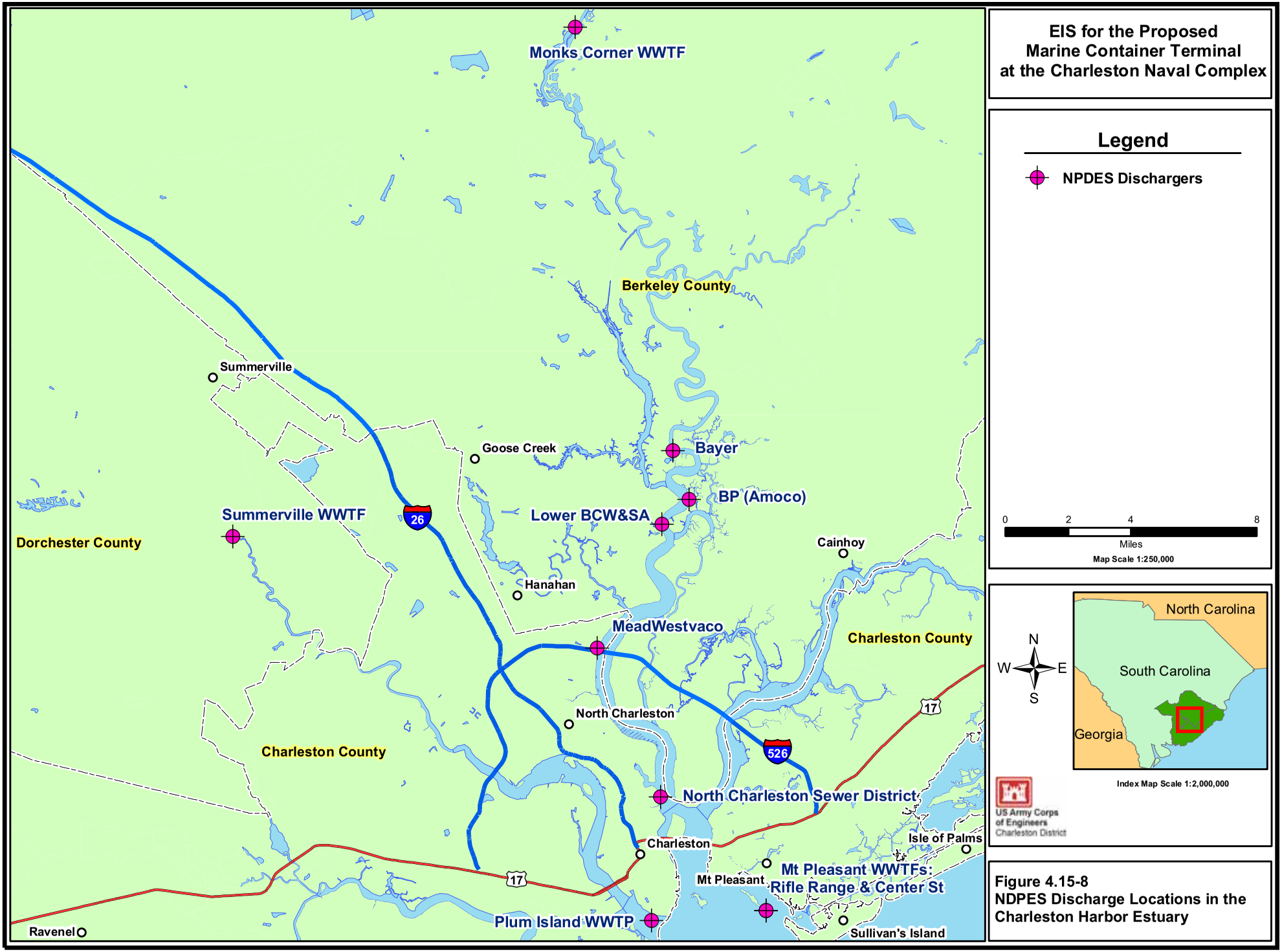


Figure 4.15-8
NDPES Discharge Locations in the Charleston Harbor Estuary

4.16. AQUATIC SEDIMENTS AND DREDGING

This section describes sedimentation and dredging in the Charleston Harbor Estuary. Also, this section describes the sediment quality of the aquatic sediments that could be affected by the construction and operation of proposed project and project alternatives. As shown in Figure 4.16-1, the study area includes the surface waters and bottom sediments of the Charleston Harbor Estuary extending along the Cooper River from Drum Island up I-526, including Shipyard Creek, as well as the upland areas affected by dredge disposal areas on Daniel Island and Clouter Island.

4.16.1. Federal Navigation Channel Dredging

The following subsections describe the dredging operations (rates and methods) in the Federal Navigation Channel. The existing channel is described in Section 4.7 and shown in Figure 4.7-2.

4.16.1.1. Dredging Rates

As described in Section 4.15.2.1, the 1941 construction of the Santee-Cooper Hydro-Electric Project diverted flows from the Santee River into the Cooper River. The diversion transformed Charleston Harbor from a well-mixed to a partially-mixed estuary, which created shoaling problems in the lower harbor by increasing the sediment load as well as reducing the ability of the estuary to flush sediments seaward (Teeter, 1989). Prior to the diversion, shoaling in Charleston Harbor was considered minor and required an annual removal of 110,000 cubic yards (cy) of material. Following the diversion project and channel deepening and widening, shoaling increased dramatically with an annual removal of 10 million cubic yards (Mcy) in the early 1960s. This was later reduced to 7.5 Mcy by 1982, due to improved dredging and disposal methods (USACE, 1998).

In 1985, a re-diversion project was completed to decrease freshwater flow into the Cooper River. This reduced stratification in the estuary, and thereby attenuated the shoaling problem. The Cooper River re-diversion project redirected approximately 70 percent of the Santee drainage water back into the Santee River; the mean Cooper River flow was reduced to approximately 4,500 ft3/s. Based on USACE, Navy and private records, this reduced maintenance dredging volumes to about 2.2 Mcy (during the period from 1987 to 1989) (USACE, 1998). However, it should be noted that this number does not include the 2 ft allowable overdredge depth incorporated in other dredging records.

Today, the USACE conducts periodic maintenance dredging of shoaling areas within the harbor channels on an as-needed basis. The primary shoal areas are designated by a number, as shown in Figure 4.16-2. The thickness of the shoal deposit dredged during maintenance projects varies across the length and width of the channel shoal area. Typically, 1 to 4 feet of sediment is removed on the average; however, at some points the depth of removal may be substantially greater.

Because shoaling rates vary from year to year and maintenance dredging intervals vary widely, a long-term average rate is the best method to characterize the annual average rate of shoaling. As shown by Figure 4.16-3, the 1998-2005 trend of the cumulative maintenance dredging volume for the Charleston Harbor, Cooper River, Wando River and Shipyard Creek is about 1.9 Mcy/yr.

Given that the most recent deepening and widening project was just completed in 2004, there is insufficient data available to quantify the change in maintenance dredging attributable to the

deepening project. Several additional years of data following the completion of the deepening project will allow quantification of the effects on long-term maintenance dredging rates.

4.16.1.2. Dredging Methods

In Charleston Harbor, hydraulic cutterhead dredges are primarily used where upland disposal facilities are available in the upper harbor reaches, Shipyard River to Ordnance Reach. Cutterhead dredging in Shem Creek and the lower Town Creek area was conducted during 2004 and dredged materials were placed on Morris Island. Hopper dredges are used in the entrance channel and bucket dredges are used for dredging in lower Charleston Harbor and Wando River because that material is taken to the ODMDS area off Folly Beach and south of the jetty.

In the upper harbor, hydraulic cutterhead dredges from 18 to 24 inches have been used, with the larger dredge better able to handle removal of Cooper Marl for new work dredging. An 18-inch dredge can handle the maintenance material that typically has been primarily fine-grained sediments with some fine sand.

4.16.1.3. Dredged Material Disposal

The USACE maintains the authorized navigation project by performing maintenance dredging as required. Disposal of dredge material is an important issue facing many deep draft navigation channels. USACE has developed and maintains several options to dispose of dredged material.

Confined Disposal Facilities

Confined Disposal Facilities (CDFs) are upland disposal areas lined by containment dikes into which dredged materials are placed. Water from the dredge effluent is typically discharged from the CDF into a nearby waterbody. CDFs are designed to maximize retention time of the dredge effluent such that suspended sediment concentrations discharged out of the CDF are minimized. Several CDFs are used in Charleston Harbor for the disposal of maintenance dredging materials, each of which are described in the following paragraphs.

Clouter Creek

The Clouter Creek CDF is owned by the USACE and the SCSPA, operated by the USACE, and located on the east side of the Cooper River near I-526. The CDF is across the Cooper River from the CNC, City of North Charleston, Filbin Creek, Port Terminal, and Ordnance Reaches of the harbor channel system. It is an island bounded by the Cooper River and Clouter Creek with an area of 1,502 acres. In 1993, the South Carolina Wildlife and Marine Resources Department developed an Environmental Assessment for Alternative Dredged Material Disposal Sites in Charleston Harbor (1993 Disposal Site EA) in an effort to identify alternatives to the Daniel Island disposal site. This report estimated that the Clouter Creek CDF has a capacity of 109 million cubic yards.

Morris Island

The Morris Island CDF, owned by the SCSPA, is located at the east end of Morris Island near the harbor entrance. This disposal site has an area of 558 acres. In the 1993 Disposal Site EA, the SCDNR estimated that the CDF had a capacity of 39 million cubic yards. The USACE estimates that this area has a useful life of 20 to 30 years. The dikes along the ocean side have been severely eroded in recent years and the south cell is currently not usable.

Yellow House Creek

The Yellow House Creek CDF, owned by SCSPA, is located on the east side of the Cooper River adjacent to Cooper River Ranges C, D, and E. This site has an area of 617 acres. In the 1993 Disposal Site EA, the SCDNR estimated that the area had a capacity of 52 million cubic yards. The USACE estimates that this area has a useful life of 20 to 30 years.

Naval Weapons Station

The Naval Weapons Station CDF is located on the western shore of the Cooper River just north of Goose Creek. This CDF encompasses 299 acres. In the 1993 Disposal Site EA, the SCDNR estimated that the area had a capacity of 20 million cubic yards. The USACE estimates that this area has a useful life of 20 to 30 years.

Drum Island

The Drum Island CDF is located between Town Creek and Cooper River under the U.S. 17 bridges. The Island is owned by SCSPA and the Corps maintains an easement to place dredged material in the disposal area through 2012. This CDF has an area of 220 acres. In the 1993 Disposal Site EA, the SCDNR estimated that the area had a capacity of 10 million cubic yards. The USACE estimates that this area has a useful life of 20 to 30 years.

Daniel Island

The Daniel Island CDF is located at the south end of Daniel Island between the Cooper River and the Wando River. The SCSPA owns and operates the disposal areas. USACE does not presently maintain an easement to dispose of dredged material into the Daniel Island CDF. SCSPA proposed to dispose of dredged material for the construction of the Proposed Project in the Daniel Island disposal area. The existing disposal area consists of three diked cells. The existing disposal area is 667 acres. In the 1993 Disposal Site EA, the SCDNR estimates that the capacity of the Daniel Island disposal area is approximately 55 million cubic yards.

Charleston Ocean Dredged Material Disposal Site

The Charleston Ocean Dredged Material Disposal Site (ODMDS) is located southeast of Morris Island in approximately 30 to 50 feet of water. The center of the site is approximately 7 miles from shore. The site has an area of 11 square miles. In 1993, the SCDNR estimated that the disposal capacity of the Charleston ODMDS was 100 million cubic yards.

4.16.2. Sediment Quality

This subsection characterizes the sediment quality of the aquatic sediments that could be affected by the development of a new port facility at each of the alternative sites evaluated in Section 5 of this EIS. The information presented is based on existing sediment quality data for Charleston Harbor.

Two types of aquatic sediments are considered in this section: maintenance material and new work material. Maintenance material refers to sediments that deposited in a channel since the last time the area was dredged. New work material refers to sediments deeper than previous dredging activities or areas not previously dredged.

Maintenance material is generally composed of recently deposited fine-grained sediment from the settlement of particles and colloids suspended in the water column or the typically coarser-grained bed load redistribution of sediment in the estuarine environment. Consequently,

maintenance sediments may contain contaminants of concern that have been introduced into the environment by human activity.

New work material is typically composed of sediments deposited prior to industrialization. Typically, these sediments are not enriched by anthropogenic activities, but may still contain concentrations of naturally occurring elements (such as metals) and organic compounds generated by forest fires and other natural events (such as dioxins).

The disturbance of aquatic sediments can create environmental problems if contaminants of concern are made available to receptor organisms through various pathways. Sediments that have accumulated on the bottom of the Cooper River may contain contaminants of potential concern at concentrations that could affect organisms in the aquatic sediments. Existing pathways to receptors include benthos living in or on the sediments and organisms feeding on the primary accumulators. Bed elevation sediments are resuspended into the water column several times daily by tidal currents where they may affect water column organisms chemically (if toxic) or physically (through increased suspended solids loading). Bioavailability for an organism may be through direct contact, ingestion, or through ingestion through the food web. Chemical contaminants (such as chlorinated pesticides, a few metallic elements, and organometallic complexes) that biomagnify up the food web are of particular concern.

Development of a new port facility may create new pathways of concern that must be evaluated for potential impact to receptor species. Activities such as fill placement, pile driving, and dredging all cause resuspension of bedded sediments to the water column. The management of the dredged material also creates new environmental pathways. Upland CDF placement pathways include the return water from dewatering activities, leaching to ground water or other surface waters, stormwater runoff, volatilization to the atmosphere, and direct uptake by flora and fauna in the CDF.

4.16.3. Regulatory Framework

The permit application for the proposed project states that dredged material will be placed in a CDF. Dredged material placed in a CDF may constitute any of three types of habitats: aquatic, wetland, and terrestrial. The three types of habitat are briefly described below:

- **Aquatic** - dredged material remains water-saturated, reduced, and anoxic: receptors are aquatic organisms and their predators.
- **Wetland** - dredged material remains water-saturated, reduced, and anoxic: receptors are wetland organisms and their predators.
- **Terrestrial** - dredged material dries and oxidizes over time: receptors are terrestrial organisms and their predators.

When there is a return water discharge, the placement of dredged material in a CDF is governed by the Federal Water Pollution Control Act Amendments of 1972, also called the Clean Water Act (CWA). The CWA regulates the discharge of dredged material in inland water, near coastal waters and surrounding environments. This activity is also subject to Coastal Zone Management Act (CZMA) consistency determination by the State of South Carolina.

Section 404 of the CWA establishes guidelines for use in evaluating dredged material to determine if the discharge of the dredged material will have adverse environmental impacts. To facilitate the implementation of the CWA, NEPA, and the requirements of various Executive

Orders and other policies, the USACE developed a guidance document entitled *Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities – Testing Manual*, typically referred to as the Upland Testing Manual (UTM) (USACE, 2003).

The UTM provides for a four-tiered evaluation process for each of five environmental pathways. The process begins at Tier I and proceeds to the next tier only as far as required until sufficient information is gathered to make determinations for management actions. The UTM evaluation process provides techniques for five CDF pathways: (1) effluent discharges to surface water during filling operations and subsequent settling and dewatering, (2) precipitation surface runoff, (3) leachate into groundwater, (4) volatilization to the atmosphere, and (5) direct uptake by plants and animals living on the dredged material and subsequent cycling through food webs. For evaluation in the UTM, the direct uptake pathway is subdivided into animal bioaccumulation and plant bioaccumulation. The first two tiers are described as follows:

- **Tier I** – Tier I uses readily available existing information. The Tier I evaluation should determine the need for evaluation of pathways, identify the pathways (if any) that should be evaluated further, and identify the receptors of concern and contaminants of concern (if any) for further evaluation.

- **Tier II** – If a decision cannot be made at Tier I, Tier II evaluations consist of determining the need for management actions derived from very conservative techniques that use chemical, physical, and biological characteristics of the dredged material and basic information about the CDF. Predictive techniques include modeling used to assess potential impacts to water quality from increased turbidity and increased bioavailability of contaminants of concern.

Typically, insufficient existing sediment chemistry data is available to perform the modeling. Therefore, additional chemistry testing of the sediment proposed for dredging is required and a Sampling and Analysis Plan (SAP) is prepared. Results of the testing and modeling are evaluated relative to screening values for water and sediment chemistry quality.

Based on a review of the existing sediment quality data and potential sources for contaminants of concern on the Cooper River, the Tier I analysis indicates that contaminants of potential concern may be present and that a Tier II analysis should be performed. The *Sediment Quality Evaluation Report* is included in Appendix X and is summarized in Section 4.16.3.2.

4.16.3.1. Tier I Sediment Quality Assessment

A Tier I Sediment Quality Assessment characterizes the existing sediment quality based on existing data and determines the need for contaminant evaluations based on the potential for the presence of contaminants of potential concern (CoPCs) in sediments. Tier I assessments review historical information from water column, sediment, and biological studies performed in the area of interest to determine the presence of CoPCs. Most anthropogenic contaminants found in estuarine sediments enter the system from permitted and unpermitted point and non-point source discharges to the system. Therefore, the evaluation of known discharges and ambient water quality data is an important source of information for determining a list of CoPCs. The studies evaluated in this Tier I assessment included water quality data collected by SCDHEC and other organizations; sediment data collected by State, Federal, and private organizations; and biological information collected by State and Federal organizations. For the purposes of this section of the EIS, only an evaluation of historical sediment quality data is

presented. For information regarding the existing conditions of water quality in Charleston Harbor, refer to section 4.15.2.

Sediment Quality Data

The most useful and important Tier I information can be found in existing studies where sediment chemistry and toxicity testing were conducted in the study area. Often, sediments in the proposed dredge area footprints have already been tested for a variety of analytes and have been used to conduct toxicity testing on test animals. In some cases, the data is useful because of its sampling proximity to the proposed dredging areas. In other cases, the data is useful because a smaller number of stations have been sampled for a variety of parameters for many years so that estuary-wide status and trends can be better tracked. Sediment quality data was gathered for the Tier I Sediment Quality Assessment from several sources including:

- *Draft Environmental Impact Statement for the Proposed Daniel Island Marine Cargo Terminal* (USACE, 1999);
- Sediment Borings and Sampling: Charleston Harbor, Cooper River, Charleston Carolina Analytical Results (GEC, Inc., 1994);
- Sediment Boring and Sediment Testing: Daniel Island Turning Basin, Charleston Harbor, South Carolina Data Summary Report (GEC, Inc., 1996);
- National Oceanic and Atmospheric Administration (NOAA), National Status and Trends (NS&T) Program's *Mussel Watch Project*;
- *Magnitude and Extent of Sediment Toxicity in Selected Estuaries of South Carolina and Georgia* (Long et al., 1998);
- *The Condition of South Carolina's Estuarine and Coastal Habitats* (SCECAP); and
- *Ecological Evaluation of Proposed Dredged Material from Charleston Harbor, South Carolina* (Ward, 1996).

The sampling locations for these studies are shown in Figure 4.16-4.

Contaminants of Potential Concern

Table 4.16-1 summarizes the potential CoPCs identified in the Tier I assessment. The CoPCs are organized by analyte class. The checked boxes designate the study or studies that identified if a specific analyte may be present in the material to be dredged at the proposed project. The data were then further scrutinized for quality, applicability, date of collection, and proximity to the alternative sites. From an evaluation of these data, the list of CoPCs was paired down for additional Tier II testing.

Table 4.16-1. Tier I Sediment Quality Assessment: Contaminants of Potential Concern (CoPCs).

Study	Nutrients	Non-Metals & Other	Metals	Phenols	Phthalate Esters	PAHs	PCBs	Butyltins	Dioxins and Furans	Pesticides
Watershed-Based Assessment (SCDHEC, 1999)	✔		✔		✔	✔	✔			✔
STORET	✔		✔		✔	✔	✔			✔
NPDES Dischargers	✔	✔	✔	✔	✔	✔		✔		✔
EnSafe Stormwater		✔	✔	✔	✔	✔				✔
Fish & Shellfish Advisories			✔							
Batelle		✔	✔			✔		✔		✔
GEC, 1994			✔							
DI-TB (GEC, 1996)		✔	✔			✔				
NS&T			✔			✔		✔		✔
Long et al., 1998			✔			✔	✔			✔
SCECAP			✔			✔				✔

ATM, 2005.

4.16.3.2. Tier II Sediment Quality Sampling and Assessment

For the Tier II Sediment Quality Sampling and Assessment, representative samples of the sediments proposed for dredging and reference sediment and soil samples were collected from the Proposed Project dredging prism as well as from the dredging prisms associated with the Daniel Island and Clouter Island alternative locations. Sample collection was done using strict observance of quality control protocol and analyzed according to approved laboratory methods as described in the Sediment Quality Sampling and Analysis Plan (SAP) prepared specifically for this sediment quality evaluation. The laboratory analysis of representative sediments is intended to provide sufficient information to make factual determinations under the CWA Section 404(b)(1) guidelines.

As part of the sampling effort, bulk sediment chemistry analyses were conducted for the following parameters:

- metals,
- organotins,
- polynuclear aromatic hydrocarbons (PAHs),
- polychlorinated biphenyls (PCBs),
- pesticides,
- dioxins and furans,
- cyanide,
- total organic carbon (TOC),
- acid volatile sulfide (AVS),
- nitrogen (ammonia),
- total phosphorus,
- total Kjeldahl nitrogen (TKN),
- total sulfide,
- geotechical parameters (i.e., grain-size distribution, Atterberg limits, total solids, soil classification), and
- column-settling rate (Proposed Project site sediment core samples only).

In addition to collecting sediment samples from the Proposed Project site and project alternative locations, sediment reference samples were collected in Foster Creek (a small tidal tributary to the Wando River) and a soil reference sample was collected from a site on Daniel Island.

A background water sample was collected from the Cooper River within the Proposed Project dredging area, and selected sediment samples from the proposed and alternative sites were elutriated and the resulting elutriate was analyzed for total and dissolved parameters as listed above (excepting that geotechnical parameters as well as acid volatile sulfide (AVS), nitrogen (ammonia), total phosphorus, total Kjeldahl nitrogen (TKN), and total sulfide were excluded).

A *Sediment Quality Evaluation Report* was prepared that provides a presentation and discussion of bulk sediment chemistry and comparison of sediment chemistry to screening values and reference sample data. Analysis and discussion of background water and elutriate data are also included in the Tier II report. An evaluation of contained disposal facility (CDF) effluent water quality associated with the Proposed Project dredging area sediments was also completed as part of the Tier II report. Appendix X of this volume contains the *Sediment Quality Evaluation*.

Bulk sediment chemistry data for each alternative were compared with sediment screening values routinely used by the USACE, EPA Region 4, and other regulatory and trust agencies for initial screening purposes. The sediment screening values used in this evaluation are the EPA Region 4 Waste Mangement Division for hazardous waste sites, the effects range – low (ER-L) and effects range – median (ER-M) developed by Long et al. (1995) and Long and Morgan (1990, revised 1995). It should be noted that many chemical parameters have no established sediment screening values to use for screening purposes; in the absence of widely used and accepted sediment screening values, threshold effects concentration (TEC) and probable effects concentration (PEC) values were used for screening purposes.

The TEC and PEC values are not recognized or otherwise sanctioned by any governmental or trust agency and were used only when no other sediment screening values were available.

TEC/PEC values were used for screening purposes only in the absence of EPA Region 4 screening values, ER-L or ER-M values. The use of these TEC/PEC values herein is not intended to be precedent setting by the USACE or any other regulatory or trust agency.

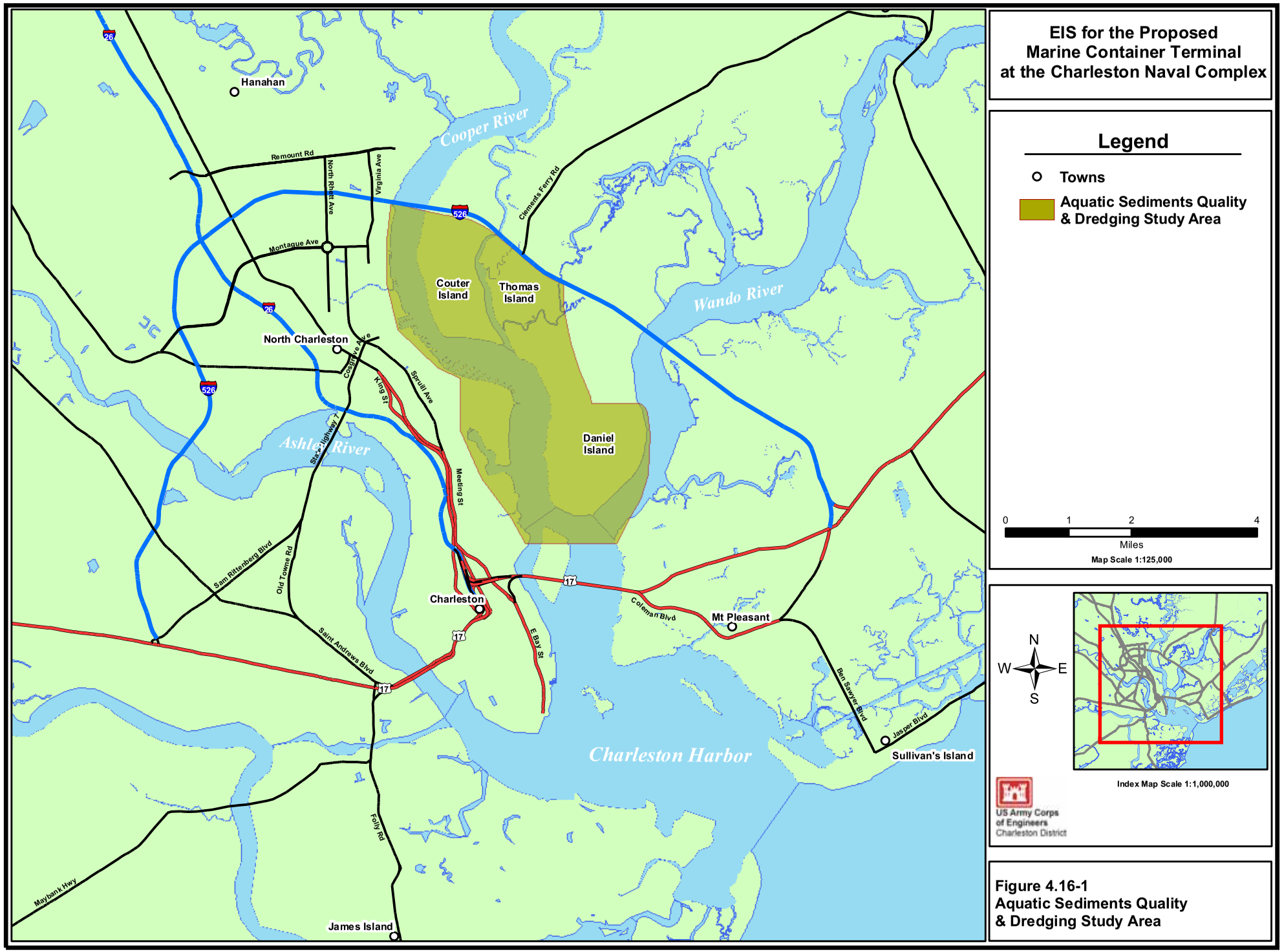
Table 4.16-2 provides a summary of analytical results as percentages of sample concentrations less than and greater than applicable sediment screening values. As shown in Table 4.16-2, the quality of “maintenance” and “new work” sediments in the CNC proposed dredging area are comparable for metals, tri-n-butyltin, PAH compounds, dioxin/furans, and total PCB. Pesticide concentrations in “maintanence” sediments were somewhat lower compared to “new work” sediments. Both “new work’ and “maintanence” sediment concentrations were comparable to the sediment reference for metals, tri-n-butyltin, and PAH compounds; the CNC area sediment concentrations, as a group, were elevated compared to the sediment reference for pesticides, dioxins/furans, and total PCBs.

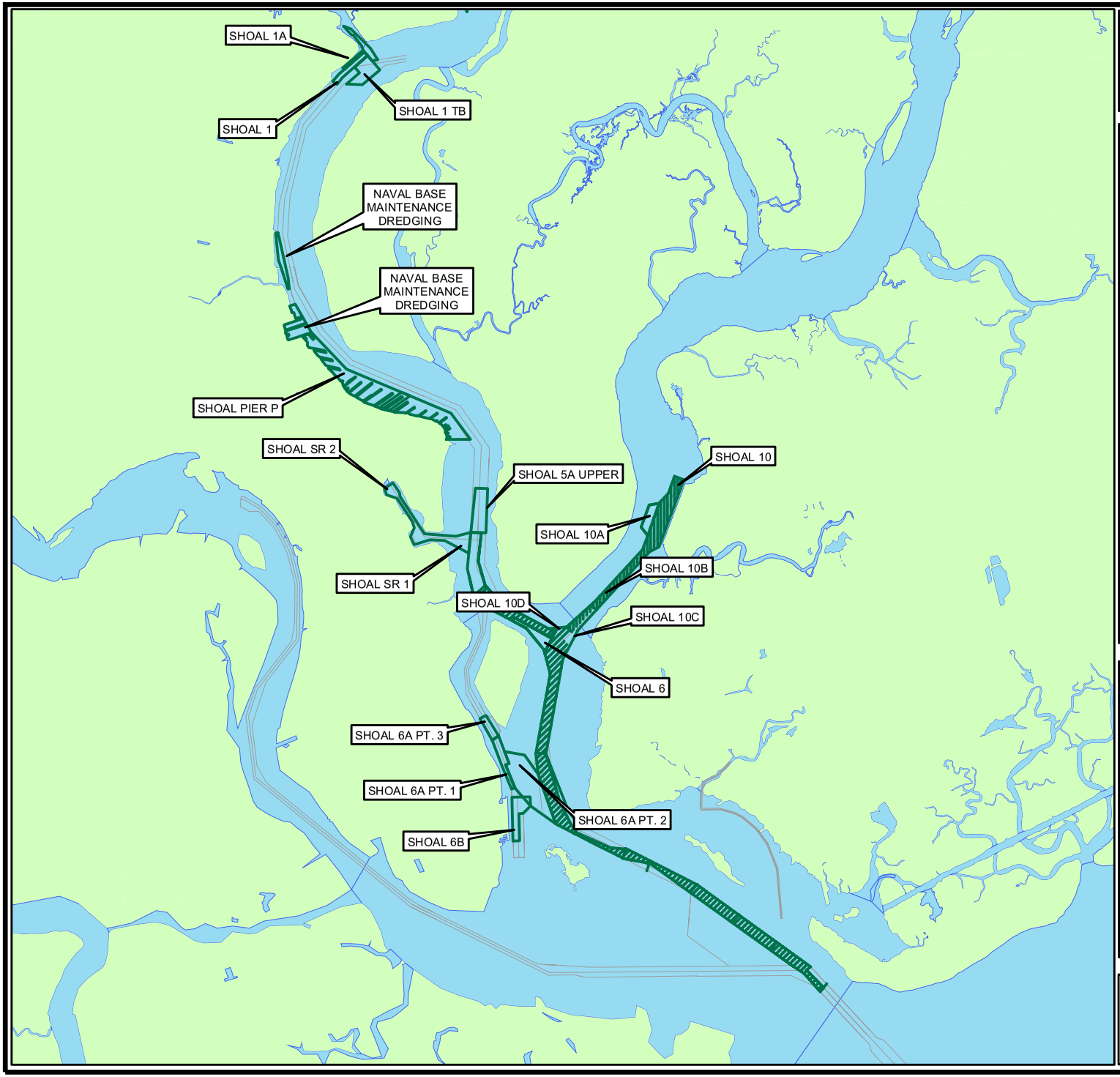
It should be noted that a substantial number of sample concentrations exceeding sediment screening values occurred as a result of that assumption that sediment concentrations are equal to the laboratory method detection limit (MDL) when the analyte was not detected in the sample. Elevated MDLs in solid matrix samples are a common occurrence and typically are caused by matrix interferences.

The evaluation of CDF effluent water quality indicated that the CNC dredging area sediments would not cause degradation of the Cooper River.

Table 4.16-2. Summary of Sediment Sample Concentration Percentages in Relation to Sediment Screening Values.

Analtye Group	Sediment Reference	CNC Sediment Core Samples (geometric mean)	CNC Sediment Grab Samples (geometric mean)	Clouter Island Sediment Core Samples (geometric mean)	Daniel Island Sediment Core Sample (single sample)	Daniel Island Sediment Grab Samples (geometric mean)
Metals						
Samples less than EPA Region 4 screening values or ER-L (%)	46.6	53.3	53.3	60.0	60.0	40.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	40.0	46.6	40.0	40.0	40.0	46.6
Samples exceeding ER-M (%)	13.3	0.0	6.6	0.0	0.0	13.3
Organotins (Tri-n-butyltin only)						
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	100.0	100.0	100.0	100.0	100.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	0.0	0.0	0.0	0.0	0.0
Samples exceeding ER-M (%)	0.0	0.0	0.0	0.0	0.0	0.0
Polynuclear Aromatic Hydrocarbons (C1-C4 compounds not included)						
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	94.5	94.5	100.0	100.0	100.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	5.5	5.5	0.0	0.0	0.0
Samples exceeding ER-M (%)	0.0	0.0	0.0	0.0	0.0	0.0
Pesticides						
Samples less than EPA Region 4 screening values or ER-L (%)	48.4	77.4	51.6	80.6	93.5	45.2
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	38.7	19.4	35.5	12.9	6.5	41.9
Samples exceeding ER-M (%)	12.9	3.2	12.9	6.5	0.0	12.9
Dioxins/Furans						
Samples less than EPA Region 4 screening values or ER-L (%)	47.0	64.7	64.7	82.4	82.4	29.4
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	52.9	35.3	35.3	17.6	17.6	70.6
Samples exceeding ER-M (%)	0.0	0.0	0.0	0.0	0.0	0.0
Polychlorinated Biphenyls (Total PCBs Only)						
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	0.0	0.0	100.0	100.0	0.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	100.0	100.0	0.0	0.0	100.0
Samples exceeding ER-M (%)	0.0	0.0	0.0	0.0	0.0	0.0


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Aquatic Sediments Quality
& Dredging Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 4.16-1
Aquatic Sediments Quality
& Dredging Study Area
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Cooper River
Clements Ferry Rd
Couter
Island
Thomas
Island
Wando River
North Charleston
Cosgrove Ave
King St
Spruill Ave
Ashley River
State Highway 7
Daniel
Island
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
Saint Andrews Blvd
E Bay St
Ben Sawyer Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Folly Rd
Maybank Hwy
James Island
N
W
E
S



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

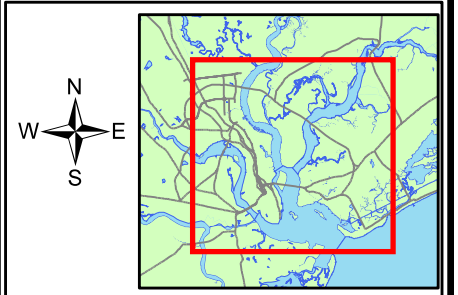
Legend

- Shoals
- Federal Navigation Channel

0 0.5 1 2

Miles

Map Scale 1:100,000



Index Map Scale 1:750,000

US Army Corps of Engineers
Charleston District

Figure 4.16-2
Known Shoals within the Charleston Harbor Channel System

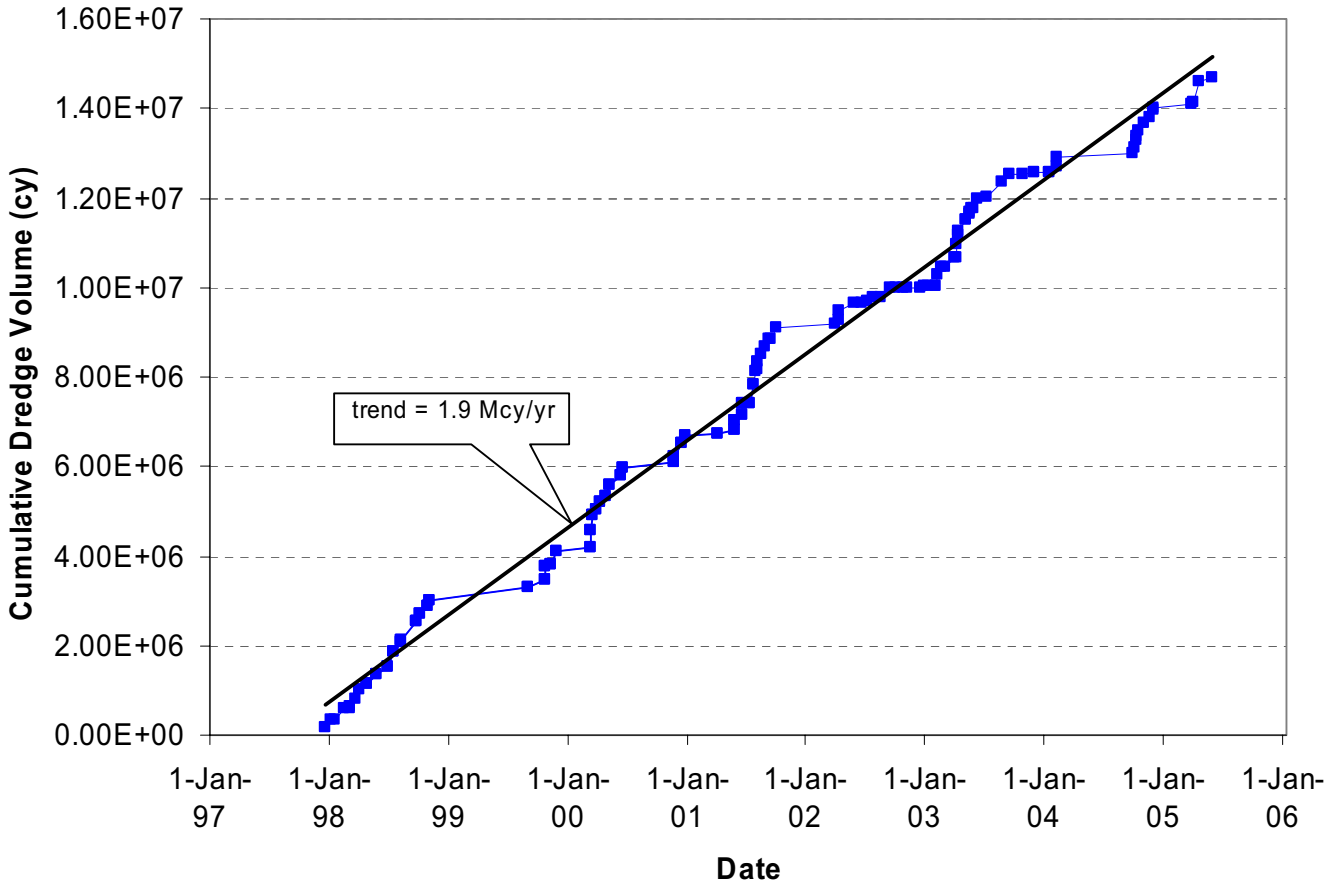
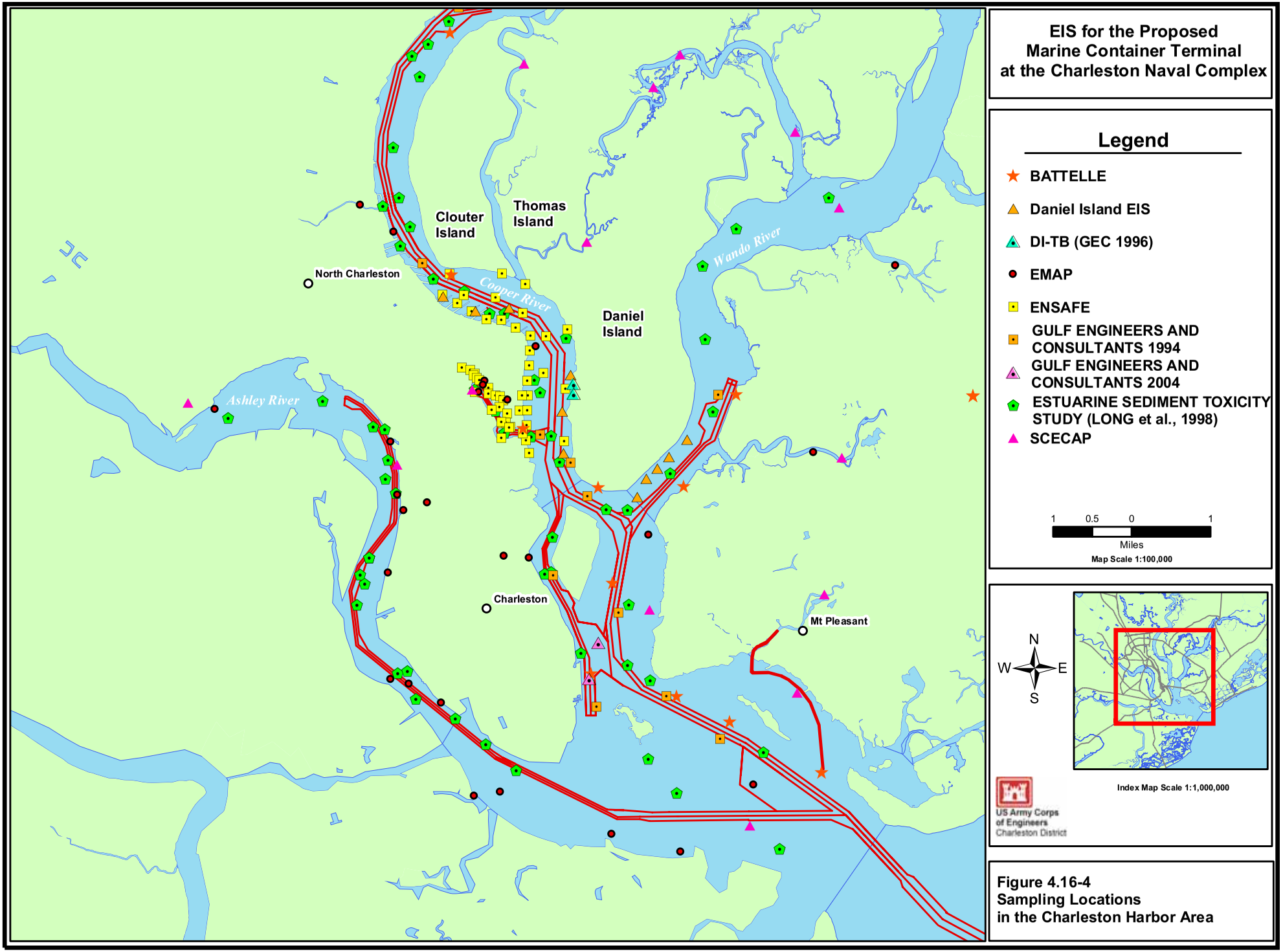


Figure 4.16-3
Charleston Harbor, Cooper River, Wando River and Shipyard Creek
Cumulative USACE Maintenance Dredging Volume (1998 to 2005) and
Linear Best-Fit Trend (shown as solid black line).

US Army Corps
of Engineers
Charleston District


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
BATTELLE
Daniel Island EIS
DI-TB (GEC 1996)
EMAP
ENSAFE
GULF ENGINEERS AND CONSULTANTS 1994
GULF ENGINEERS AND CONSULTANTS 2004
ESTUARINE SEDIMENT TOXICITY STUDY (LONG et al., 1998)
SCECAP
1 0.5 0 1
Miles
Map Scale 1:100,000
Clouter Island
Thomas Island
Wando River
North Charleston
Cooper River
Daniel Island
Ashley River
Charleston
Mt Pleasant
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps of Engineers
Charleston District
Figure 4.16-4
Sampling Locations
in the Charleston Harbor Area

4.17. NATURAL RESOURCES

This section characterizes natural resources in the study area (Figure 4.17-1), with a focus on areas surrounding the Proposed Project (i.e. proposed terminal and proposed access roadway) and alternative terminals and associated roadways. Field surveys, aerial photographs, soil surveys, topographic maps, National Wetland Inventory (NWI), communications with researchers and resource managers, and previous research and environmental impact statements contributed to the following descriptions. This section describes habitats and wildlife associated with upland forests, developed areas, freshwater and tidal wetland communities, and Essential Fish Habitat (EFH) types, as well as a brief discussion of invasive species. Federal and state protected species are discussed in the following section, 4.18.

4.17.1. Upland Communities

All project alternative sites contain dredged material disposal areas, with varying proportions of maintained grass or other cultivated/landscaped areas and scrub shrub maritime forests. Maps of land cover or community types in the study area on Figure 4.17-2 are based on aerial photographs and ground-truthed surveys. They provide a way of classifying the habitats and communities found within, as well as suggesting their natural resource value.

Disturbed uplands at the proposed terminal site are dominated by forested dredged material disposal areas, former military facilities, government training centers and support buildings, and derelict buildings such as the dog kennels. The proposed roadway corridor includes a small area of forested habitat, but is dominated by industrial areas and existing road right of ways.

The Clouter Island site is an active dredged material disposal area and the berm surrounding the confined disposal area provides the main upland vegetated habitat. The Daniel Island site is an inactive dredged material disposal area with established pioneer plant communities. Representative photographs of upland communities are shown in Figure 4.17-3. Abundant plant species are listed in Table 4.17-1.

Table 4.17-1. Common plant species in the study area and stratum level.

Common name	Latin name	Stratum
Japanese privet	*Ligustrum japonicum*	T
sugarberry or hackberry	*Celtis laevigata*	T
red mulberry	*Morus rubra*	T
southern redcedar	*Juniperus virginiana v. silicicola*	T/S
groundsel tree or silverling	*Baccharis halimifolia*	S
southern wax myrtle	*Myrica cerifera*	S
water oak	*Quercus nigra*	T
Live oak	*Quercus virginiana*	T
Bay	*Persea borbonia*	T
yaupon holly	*Ilex vomitoria*	T/S
Japanese honeysuckle	*Lonicera japonic*a	V
grapes	*Vitis* spp.	V
greenbriar	*Smilax* spp.	V
Virginia creeper	*Parthenocissus quinquefolia*	V
pepper vine	*Ampelopsis arborea*	V

Common name	Latin name	Stratum
poison ivy	*Toxicodendron radicans*	V
Spanish bayonet	*Yucca aloifolia*	S
cabbage palm	*Sabal palmetto*	S/T
scrub palm	*Serenoa repens*	S/T
black cherry	*Prunus cerratus*	T
pampas grass	*Cortaderia selloana*	S
Carolina laurel cherry	*Prunus caroliniana*	T
magnolia	*Magnolia grandiflora*	T
Bradford pear	*Pyrus calleryana*	T
rattlebox	*Crotalaria spectabilis*	H
Verbena	*Verbena bonariensis*	H

H- herbaceous, S- shrub, and T for tree.

Terrestrial forests in most areas consist of species capable of establishing on developed/disturbed lands including maintained grass, pioneer forests, roadsides, and cleared areas. At the proposed terminal site, forests have grown over previously disturbed upland fill soils. After World War II, this area was used for disposal, primarily of dredged material, but it also contains building materials, military waste, and hazardous materials. The forests are dominated by Japanese privet, sugarberry or hackberry, Chinese tallow, red mulberry, southern redcedar, groundsel tree, southern wax myrtle, water oak, and yaupon holly.

In the understory and along forest edges, Japanese honeysuckle with grapes, greenbriar, Virginia creeper, pepper vine, and poison ivy are present. Less abundant forest species noted include Spanish bayonet, cabbage palm, scrub palm, black cherry, pampas grass, Carolina laurel cherry, magnolia, Bradford pear, and roadside weeds such as rattlebox. Within the proposed roadway corridor, relatively undisturbed upland habitats on the west side of upper Shipyard Creek support live oak, water oak, wax myrtle, yaupon holly, bay, and Carolina laurel cherry. Forests at the two alternative sites are limited to the berms surrounding the CDFs which support southern hackberry, wax myrtle, Chinese tallow, and in the transition to tidal scrub shrub, red cedar, groundsel tree, and salt marsh elder.

Developed and otherwise disturbed lands include residential, commercial, industrial, extractive (mines, borrow pits), transportation corridor, and other developed areas. At the Proposed Project site, disturbed/developed land includes impervious areas such as parking lots, warehouses, office buildings, and other impervious construction, as well as landscaped or mown grassy areas. In contrast, the Clouter and Daniel Island sites have very little development and no infrastructure, with the exception of the unpaved access roads and the CDFs.

Wildlife biodiversity in the study area is typical of disturbed sites. Common animals in the forested community at the proposed terminal site include mammals such as raccoon, gray fox, whitetail deer, and small rodents. Upland communities at the proposed terminal site and other alternative sites include animals that can tolerate urban/suburban levels of human disturbance.

The Clouter and Daniel Island CDF berms and dredged material disposal areas provide habitat with access to adjacent forests and wetlands. Scat of rabbits and canids were noted along the berms of the Daniel Island and Clouter Island Alternative sites, and an American kestrel was

spotted in a tree on the Clouter Island berm. Table 4.17-2 shows the wildlife seen during surveys and the habitat type and/or location where they were observed.

Table 4.17-2. Wildlife in upland habitats during surveys from October 12, 2004 to April 5, 2005.

Common name	Latin name	Habitat Type or Location Observed
Raccoon	*Procyon lotor*	All
Eastern Cottontail Rabbit	*Sivilagus floridanus*	Clouter Island, all upland areas
Eastern Gray Squirrel	*Sciurus carolinensis*	Grass
Gray Fox	*Urocyon cinereoargenteus*	Dredged material disposal area, warehouse 56, all upland areas
Whitetail Deer	*Odocoileus virginianus*	Dredged material disposal areas
Carolina anole	*Anolis carolinensis*	Forest edges
Southeastern five lined skink	*Eumeces inexpectatus*	Forest edges
Ornate chorus frog	*Pseudacris ornata*	Forest edge
Mourning Dove	*Zenaida macroura*	Grass
Rock Dove	*Columba livia*	Grass
Red-tailed Hawk	*Buteo jamaicensis*	Grass
American Kestrel	*Falco sparverius*	Only on Clouter Island
Osprey	*Pandion haliaetus*	River, Shore, Forest
Turkey Vulture	*Cathartes aura*	Forest, shore
Black Vulture	*Coragyps atratus*	River, Forest, Shore
American Robin	*Turdus migratorius*	Grass
Carolina Wren	*Thryothorus ludovicianus*	Grass
Blue Jay	*Cyanocitta cristata*	Grass
Brown Thrasher	*Toxostomia rufum*	Grass
Cardinal	*Cardinalis cardinalis*	Grass, Forest
Carolina Chickadee	*Poecile carolinensis*	Grass, Forest
Cedar Waxwing	*Bombycilla cedrorum*	Grass
Common Grackle	*Quiscalus quiscula*	All
Eastern Meadowlark	*Sturnella magna*	Grass
Northern Mockingbird	*Mimus polyglottos*	All
Red-Winged Blackbird	*Agelaius phoeniceus*	Shore, Grass
Yellow-rumped Warbler	*Dendroica coronata*	Forest
Yellow bellied Sapsucker	*Sphyrapicus varius*	Grass
Barn Swallow	*Hirundo rustica*	Grass
Painted Bunting	*Passerina cirus*	Grass

Raccoon tracks were present in all areas. Fox scat and tracks were most frequently sighted along the berm that borders the CDF, as well as around the warehouses. Deer tracks were seen along the CDF berms at all sites. Gray squirrels were more common in the grassy maintained areas than in the forests, likely because the pioneer forests are dominated by trees which do not provide acorns or nuts as a food source. Nocturnal surveys were not conducted for bats; however, the availability of roosting space in abandoned buildings indicates that bats

could occupy the proposed terminal site. Potential common bats include the big brown bat (*Eptesicus fuscus),* red bat (*Lasiurus borealis),* and evening bat (*Nycticeius humeralis).*

Reptiles and amphibians included Carolina anoles, southeastern five lined skinks, and ornate chorus frogs, as well as unidentified snakes and turtles seen crossing roads. Thirty-four bird species were noted during surveys. All habitats on the site were utilized, with lower diversity at bare storage areas and highest diversity in marsh and river habitats. All species listed are protected under the Migratory Bird Treaty Act. The most common raptors in the upland habitats were turkey and black vultures, which were sighted over the Proposed Project and alternative sites. Osprey, red-tailed and unidentified hawks were also sighted at the Proposed Project site.

4.17.2. Essential Fish Habitat (EFH)

In the following sections that characterize aquatic communities, including freshwater wetlands that drain to tidal wetlands, EFH considerations are included as appropriate. EFH is defined in the act as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The definition for EFH may include habitat for an individual species or an assemblage of species, whichever is appropriate within each Fisheries Management Plan (FMP). Table 4.17-3 lists all recognized EFHs noting which occur in the study area.

Table 4.17-3. Essential Fish Habitat List and Study Area Occurrence.

Habitat Type	Habitat Name	Study Area Occurrence
Estuarine	Estuarine emergent wetlands (tidal marsh)	Yes
	Estuarine scrub/shrub mangroves	No
	Sea grass	No
	Oyster reefs and shell banks	Yes
	Intertidal flats	Yes
	Palustrine emergent and forested wetlands	Yes
	Aquatic beds	No
	Estuarine water column	Yes
Marine	Live/hard bottoms	No
	Coral and coral reefs	No
	Artificial/manmade reefs	No
	Sargassum	No
	Marine water column	Yes

The following describes the types of wetlands and EFH found in the study area, with particular emphasis on the project areas and the managed species and habitats.

4.17.3. Freshwater Wetland Communities

Freshwater wetlands in the Proposed Project area are shown in Figure 4.17-2 for the terminal site and Figure 4.17-4 for the road corridor. The largest freshwater wetland in the affected area is between the marsh and estuarine scrub shrub community and uplands on the terminal site. It includes forested, scrub shrub, and herbaceous wetlands, representatives of which are shown in photographs in Figure 4.17-5. Forested areas are dominated by Chinese tallow, sugarberry, elderberry, and coastal plain willow. Shrub areas are dominated by wax myrtle and groundsel

tree, and herbaceous areas are dominated by narrow leafed cattail, bulrush, soft rush, sedges, and bushy bluestem.

Along the proposed access road, there is a small (less than an acre) isolated freshwater herbaceous wetland dominated by cattail, with the same types of vegetation listed above as subdominant. Figure 4.17-5 includes representative photographs of this site and Table 4.17-4 describes its vegetation.

Table 4.17-4. Dominant Species in Freshwater Wetlands

Scientific Name	Common Name	Stratum
Typha latifolia	Narrow leafed cattail	H
Carex spp.	Sedge	H
Juncus effuses	Soft rush	H
Scirpus spp.	Bulrush	H
Andropogon glomeratus	Bushy bluestem	H
Myrica cerifera	Wax myrtle	S
Baccharis halimifolia	Groundsel tree	S
Salix caroliniana	Coastal plain willow	S
Sambucus canadensis	elderberry	S
Sapium sebiferum	Chinese tallow	T
Celtis laevigata	Sugarberry	T

H- herbaceous, S- shrub, and T or C for tree or canopy.

Freshwater wetland wildlife included a snapping turtle (*Chelydra serpentina*) and other unidentified turtles. The freshwater wetlands in the Proposed Project site were documented in the Navy EIS (1995) to host a waterbird colony in the early 1990s and pre-Hurricane Hugo (1989); however, since then, Dodd (1994, 1998) and the surveys for this study have not observed any colonial waterbird nesting. While migratory and wading birds occasionally utilize this habitat for foraging, the lack of permanent standing water and the healthy population of raccoons are thought to make this an unfavorable habitat for colonial waterbird nesting (U.S. Dept. of Navy, 1995).

4.17.4. Tidal Wetland Communities

Tidal wetlands in the Proposed Project and alternative sites range from emergent tidal marshes dominated by cordgrass species and black rush with large high marsh areas of sea oxeye daisy, salt grass and salt hay, to scrub shrub wetlands dominated by wax myrtle, salt marsh elder, and groundsel tree (Table 4.17-5). Common reed is also found along the fringe marsh. Tidal wetlands are shown in Figure 4.17-2 for the proposed terminal site, and Figure 4.17-6 for the proposed roadway corridor.

Many tidal wetlands found on the site are unvegetated or sparsely vegetated ditches and drainage areas that connected to the marsh via culverts under Tidewater or Juneau Roads. Such wetlands provide limited habitat for fiddler crabs, foraging for raccoons, and occasional use by small fish.

Table 4.17-5. Dominant Plant Species in Tidal Wetlands.

Common Name	Scientific Name	Stratum
Smooth Cordgrass	*Spartina alterniflora*	H
Big Cordgrass	*Spartina cynosuroides*	H
Sand Cordgrass	*Spartina bakeri*	H
Black Rush	*Juncus roeamerianus*	H
Common Reed	*Phragmites australis*	H
Salt Grass	*Distichlis spicata*	H
Cordgrass	*Spartina patens*	H
Narrow Leafed Cattail	*Typha latifolia*	H
glass wort	*Salicornia bigelovii*	H
turtleweed	*Batis maritime*	H
Groundsel Tree	*Baccharis halimifolia*	S
Salt Marsh Elder	*Iva frutescens*	S
Sea Oxeye Daisy	*Borrichia frutescens*	S
Wax Myrtle	*Myrica cerifera*	S

H- herbaceous, S- shrub, and T or C for tree or canopy.

The estuarine scrub-shrub community consists of stunted red cedar trees and shrubs such as wax myrtle, groundsel tree or silverling, and marsh elder or high tide bush. The adjacent uplands are dominated by yaupon holly and southern red cedar, with poison ivy common in the upland understory.

The false willow and silverling community transitions to the high marsh as elevation decreases, which is dominated by sea oxeye, with salt grass and sand cordgrass, as well as bushy bluestem present.

Bare salt flats found on the site were sparsely vegetated by saltgrass, glass wort, and turtlegrass (*Batis maritime*). Dead trees in sparsely vegetated areas were common on the Proposed Project site, as shown in the photographs representing tidal wetlands on Figure 4.17-7. At the elevations that allow daily tidal inundation, the low marsh is dominated by smooth cordgrass with black needlerush, big cordgrass, and cordgrass intermixed.

The proposed roadway corridor may shade a small area of tidal marsh along the Ashley River as well as along upper Shipyard Creek. Emergent vegetation in the Ashley River wetland varies from cordgrass to black needlerush, with large high marsh areas of salt grass and salt hay, as well as areas dominated by cattail. Shrub areas at the edges are dominated by salt marsh elder, sea oxeye daisy, and groundsel tree. The northern end of the tidal wetland is dominated by a dense stand of common reed.

Tidal wetlands along upper Shipyard Creek range from extensive marsh meadows at the upper reaches of Shipyard Creek, fringe marsh along the steep, filled banks of the creek, and wide meadows east of the former Macalloy site. Dominant species in the tidal wetlands of Shipyard Creek vary depending on the width of the creekbed and the elevation of the bank, as well as adjacent land uses.

The marshes along Daniel Island are similar, with an estuarine emergent marsh dominated by smooth cordgrass with black needlerush at higher elevations. At higher marsh elevations, a

fringe of sea oxeye, salt marsh elder, and groundsel tree gives way to an upland community dominated by red cedar and sugarberry on the berm. Clouter Island's marshes differ slightly because instead of a silt substrate, the substrate is dominated by sand and the marsh community is less developed. Emergent marshes were dominated by cordgrass and black needlerush, as with other sites.

Tidal wetland wildlife includes both terrestrial and aquatic animals such as fiddler crabs, periwinkle snails, raccoons, mink, river otters, and many species of birds listed in Table 4.17-6. Raccoon tracks were omnipresent in tidal areas. Wading birds congregate along the contraction dike north of the proposed terminal site, along the salt marshes, and at the marsh just north of the Cooper River Marina. The most commonly sighted birds include turkey vulture, black vulture, brown pelican, cormorant, snowy egret, and red winged blackbird. While no live animals were seen, a diamondback terrapin turtle carapace was found in a tidal wetland.

Table 4.17-6. Wildlife Sighted in Tidal Wetland Habitats.

Common name	Latin name	Habitat Type or Location Observed
Eastern oyster	*Crassostrea virginica*	On rip rap, in tidal creek
Marsh snail	*Littorina irrorata*	On marsh grasses
Fiddler crab	*Uca spp.*	Tidal channels, marshes, mudflats
diamondback terrapin turtle	*Malaclemys terrapin*	Mudflat (carapace)
Brown Pelican	*Pelecanus occidentalis*	River
Laughing Gull	*Larus atricilla*	River
Ring-billed Gull	*Larus delawarensis*	River
Herring Gull	*Larus argentatus*	River
American Coot	*Fulica americana*	River
Kingfisher	*Ceryle alcion*	River
Hooded Merganser	*Lophodytes cucullatus*	River
Double-breasted Cormorant	*Phalocrocorax auritus*	River
Anhinga	*Anhinga anhinga*	River
Great Blue Heron	*Ardea herodias*	Shore
Great Egret	*Ardea alba*	Shore
Little Blue Heron	*Egretta caerulea*	Shore
Snowy Egret	*Egretta thula*	Shore
Killdeer	*Charadrius ociferous*	Shore
Osprey	*Pandion haliaetus*	River, Shore, Forest
Bald Eagle	*Haliaeetus leucocephalus*	River
Turkey Vulture	*Cathartes aura*	Forest, shore
Black Vulture	*Coragyps atratus*	River, Forest, Shore
Red-Winged Blackbird	*Agelaius phoeniceus*	Shore, Grass

Migrant or nonresidential terrestrial animals primarily consist of the birds that fly into the marsh to forage, particularly several species of heron, egret, and ibis. A bald eagle was seen flying over the marshes and tidal creeks, but the osprey was more common. Ospreys nest at the

Cooper River Marina, just south of the proposed terminal site. They are tolerant of human activity and will build nests on pilings, docks, and buoys over water.

The aquatic species that frequent intertidal marshes during inundation include the red drum, mummichog, Atlantic croaker, striped mullet, Atlantic menhaden, southern flounder, Atlantic silversides and brown shrimp. Small killifish and grass shrimp are abundant in most marshes, and, during high tide, the marsh is often host to juvenile white shrimp and blue crabs.

Estuarine marshes and tidal wetlands constitute a complex ecosystem that serves as EFH but is also vital to many other wildlife species. Salt marshes have low species diversity of higher vertebrates, but high species diversity of invertebrates, including shellfishes. In South Carolina, the salt marsh systems are of principal importance as nursery areas. Estuarine wetlands are found along much of the shorelines in the study area.

Tidal flats are critical structural components of coastal systems that serve as benthic nursery areas, refuges, and feeding grounds for a variety of animals and thus provide EFH. Factors that affect the regional character of tidal flats include tidal range, prevailing weather patterns, currents, and coastal geography and geology. In South Carolina, mesotidal (6.5- to 10.8-foot tide range) coasts with short barrier islands and numerous tidal inlets result in strong tidal currents that are the predominant influence on tidal flats. There are an estimated 1 million acres of tidal flats along the South Atlantic coast. Tidal flats are not as predominant within Charleston Harbor as in other regions; however, within the study area, tidal flats occasionally occur in shallow areas as a narrow margin between the open waters of the Cooper River and the adjacent salt marshes.

Tidal freshwater marshes are EFH because they provide nursery habitat for Council-managed species (red drum and shrimp). Palustrine emergent and forested wetlands support EFH and the managed species dependant on that habitat through two primary avenues: (1) provision of functional attributes that maintain downstream EFH value by binding substrates, encouraging sediment deposition, nutrient uptake, and generation of detritus; and (2) provision of shelter, spawning habitats, and prey for species that serve as important prey for Council-managed species.

4.17.5. Oyster Reefs and Shell Banks

Oysters encrusted rip rap along the shore, but were limited to occasional clusters in the area of the proposed terminal. In the upper reaches of Shipyard Creek, however, along the proposed roadway corridor, oyster banks were noted in the creekbed.

Oyster and shell bank EFH in the South Atlantic can be defined as the natural structures found in the intertidal zone or just below the intertidal zone that are composed of oyster shell, live oysters and other organisms that are discrete, contiguous and clearly distinguishable from scattered oysters in marshes and mudflats, and from wave-formed shell windrows. The most extensive contiguous intertidal oyster reefs in the South Atlantic region occur in the South Carolina coastal zone. These reefs diminish in size and significance south of Georgia and north of South Carolina. In South Carolina, oysters are predominantly intertidal.

The ecological role of the oyster reef as structure, providing food and protection, contributes to its value as a critical fisheries habitat. The three-dimensional oyster reef provides more area for attachment of oysters and other sessile (permanently attached) organisms and creates more habitat niches than occur on the surrounding flat or soft bottom habitats.

In 1980, the SCDNR began conducting an extensive survey of intertidal oyster resources and maintains the data in its Geographic Information System. Results of this 1982 survey show large numbers of oyster beds in the Charleston Harbor Estuary, especially along the east bank of the Wando River. No oyster beds are documented within the study area on the Cooper River,,although there are oysters scattered along the intertidal area. Figure 4.17-8 presents the 1982 survey results. None of the oyster beds within the study area are designated for human intake because of marinas, urban/suburban stormwater runoff, wastewater treatment discharge, industrial discharge, and other anthropogenic factors.

4.17.6. Open Water Communities

The aquatic communities within the study area include open water areas of the Cooper River and Charleston Harbor, as well as the tidal creeks. The open water depth bathymetry in the study area is depicted in Figure 4.17-9, with the water depths shown in feet mean lower low water (MLLW). Submerged vegetation in the rivers and creeks is limited to macroalgae. The Charleston Harbor Estuary does not support subtidal seagrass beds or benthic algae communities, except in the upper Cooper River where the freshwater algae, *Egeria densa*, is abundant (SAMP, 2000). This lack of benthic plants is related to the low transparency of the estuarine waters combined with a lack of suitable substrate. A few species of coastal/estuarine algae (*Porphyra* sp. and *Ulva* sp.) are found in the intertidal areas of the lower harbor basin (SAMP, 2000).

Open water wildlife include aquatic mammals, marine mammals, fishes, and invertebrates. Fish in open water communities were not sampled for this project; rather, existing information was compiled to describe the affected communities, including interviews of recreational fishers and review of previous studies. A study of the Charleston Harbor by Van Dolah et al. (1990) identified many important finfish species within the lower Cooper River, including Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy (*Anchoa mitchilli*), silver perch (*Bairdiella chrysoura*), weakfish (*Cynoscion regalis*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulates*), and star drum (*Stellifer lanceolatus*) in large numbers. Summer flounder (*Paralichtys dentatus*) and southern flounder (*P. lethostigma*), two important recreational species, were caught in low numbers throughout the year. Sharks, skates and rays can all potentially be found in the project area. Schwartz (2003) reported that six species of sharks can pup their young in Carolinian waters during warm summer months: smooth dogfish, spiny dogfish, blacknose, Atlantic sharpnose, tiger, and dusky sharks.

Numerically dominant species include mollusks, polychaetes, oligochaetes, nematodes, and amphipods (SAMP, 2000). The harbor system supports large populations of white shrimp, brown shrimp, and blue crab which are harvested both commercially and recreationally. Although none of the finfish species are commercially harvested within the estuary, many are recreationally important, such as red drum, spotted sea trout, flounder, spot, Atlantic croaker, and catfish.

Tidal creeks in the area include Clouter Creek, Beresford Creek and Shipyard Creek. Penaeid shrimp and blue crab were the most common large invertebrates in the creeks of Charleston Harbor during the reviewed studies. Dominant finfish species included spot (*Leiostomus xanthurus*), Atlantic menhaden (*Brevoortia tyrannus*), Atlantic croaker (*Micropogonias undulates*), southern flounder (*Paralichthys lethostigma*), and bay anchovy (*Anchoa mitchilli*) (Wenner, 1997).

Other conspicuous wildlife which occur in the open waters of the affected area include the river otter **(***Lontra Canadensis)* and bottlenose dolphin (*Tursiops truncatus*), both of which are

common in Charleston Harbor and sighted in the Cooper River at the Proposed Project site. River otter scat was common in the shore areas and on docks and piers at the Cooper River Marina, which is adjacent to the Proposed Project. While river otters spend most of their time in the water and along the shore, they den in uplands and require upland habitat for rearing young. They feed opportunistically on aquatic animals.

Marine mammals may be present in open waters, although with the exception of bottlenose dolphin, they would be rare. The Federal Marine Mammal Protection Act provides that agencies implement measures to conserve marine mammals and prevent their population declines. In addition to Federally endangered or threatened species discussed in the next section, pygmy sperm whales, spotted dolphins, dwarf sperm whales, pilot whales, dense-beaked whales, Gervais' beaked whales, Cuvier's beaked whales, and to a lesser extent striped dolphins and rough-toothed dolphins may also occur (McFee, pers. comm., 2005).

The bottlenose dolphin, *Tursiops truncatus*, frequents the study area. The coastal South Carolina population is estimated at 3,513 (Palka et al., 2001). The coastal migratory stock is designated as depleted under the MMPA. From 1995-2001, NMFS recognized only a single migratory stock of coastal bottlenose dolphins in the western North Atlantic and, therefore, the entire stock was listed as depleted. There is insufficient data to determine the population trend for the South Carolina stock. Site-specific, year-round residents have been reported only in the southern part of the range, including Charleston, SC (Zolman, 1996). All of the boat strikes of bottlenose dolphins in the State have been from small recreational boats, which can be determined by the size of the propeller wounds left on the carcasses (McFee, pers. comm., 2005).

4.17.7. Federally Managed Fish Species

Table 4.17-7 lists the species for which the South Atlantic Fishery Management Council (SAFMC) manages or has developed fishery management plans that may occur in the study area. The following paragraphs discuss these species' potential to occur in EFH within the study area.

Table 4.17-7. Fishery Management Plans (FMPS) and Managed Species for the South Atlantic Region that may occur in the Study Area.

Common Name	Species
Shrimp Fishery Management Plan	
brown shrimp	*Penaeus aztecus*
pink shrimp	*P. duorarum*
rock shrimp	*Sicyonia brevirostris*
royal red shrimp	*Pleoticus robustus*
white shrimp	*Penaeus setiferus*
Red Drum Fishery Management Plan	
red drum	*Sciaenops ocellatus*
Snapper Grouper Fishery Management Plan (73 species total)	
Jack crevalle	*Caranx hippos*
gag grouper	*Mycteroperca microlepis*
black sea bass	*Centropristis striata*
mutton snapper	*Lutjanus analis*
red snapper	*Lutjanus campechanus*
lane snapper	*Lutjanus synagris*
gray snapper	*Lutjanus griseus*

Common Name	Species
yellowtail snapper	*Ocyurus chrysurus*
spadefish	*Chaetodipterus faber*
white grunt	*Haemulon plumieri*
sheepshead	*Archosargus probatocephalus*
hogfish	*Lachnolaimus maximus*
Mid-Atlantic FMP species which occur in South Atlantic	
bluefish	*Pomatomus saltatrix*
summer flounder	*Paralichthys dentatus*
Federally Implemented Fishery Management Plan	
lemon shark	*Negaprion brevirostris*
bull shark	*Carcharinus leucas*
blacknose shark	*Carcharinus acronotus*
finetooth shark	*Aprionodon isodon*
dusky shark	*Carcharinus obscurus*
bonnethead shark	*Spyrna tiburo*
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*
shortnose sturgeon	*Acipenser brevirostrum*

Shrimp

In the southeastern United States, the shrimp industry is based on the white shrimp (*Penaeus setiferus*), brown shrimp (*P. aztecus*), pink shrimp (*P. duorarum*), and the deeper water rock shrimp (*Sicyonia brevirostri*). The royal red shrimp (*Pleoticus robustus*) also occurs in deeper water and sustains a limited harvest.

For peneaid shrimp, EFH within the study area includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies. Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes), and subtidal and intertidal non-vegetated flats. The oceanic waters serve as habitat for large, mature shrimp that spawn offshore. Brown and pink shrimp apparently move to relatively deep continental shelf water while white shrimp appear to remain nearshore in shallower water. After entering the estuaries, post-larval shrimp occupy nursery areas that offer abundant food, suitable substrate, and shelter from predators.

The white shrimp and other penaeids have an important role in material and energy cycles within South Carolina's estuaries. White shrimp are abundant in nearshore and estuarine waters throughout the Southeast and occur over a wide range of estuarine sediment types, salinity zones, depth strata, and wetland types.

White shrimp postlarvae consume decaying organic matter, mainly marsh grasses, and microorganisms in the sediments. Adults and juveniles are omnivorous. Juvenile shrimp are most abundant in lower salinity habitats at the marsh/tidal creek interface. Therefore, the area of particular concern for early growth and development encompasses the entire estuarine system from the lower salinity portions of the river systems through the inlet mouths. For the Proposed Project, this includes all of the estuarine wetland and open water areas within the study area. EFH for rock shrimp and royal red shrimp occurs in deeper offshore waters. None of these areas occur within the study area.

Red Drum

Red drum juveniles and sub-adults occur within the estuary while adult spawning populations almost exclusively inhabit nearshore waters. In South Carolina, they spawn from mid-July through September. The eggs and larvae are carried by tidal and wind currents into estuarine systems. Shallow brackish marsh areas of the upper estuarine reaches are the primary nursery habitat for juvenile red drum. Larvae and juveniles enter these areas from August through October. After maturation, adult red drum spend less time in the estuaries and more time in the ocean, where they migrate seasonally along the coast, inshore and/or north in spring and offshore and/or south in fall. The estimated maximum age of red drum is about 50 years.

Red drum are predatory fish and their dietary preferences change as they develop and grow. Prey preferences include mysids and copepods during early stages, and grass shrimp, crabs and fishes for juveniles and adults.

Red drum EFH includes all of the following habitats to a depth of 164 feet offshore: tidal freshwater, estuarine emergent vegetated wetlands (flooded salt marshes, brackish marsh, and tidal creeks), estuarine scrub/shrub (mangrove fringe), submerged rooted vascular plants (sea grasses), oyster reefs and shell banks, unconsolidated bottom (soft sediments), ocean high salinity surf zones, and artificial reefs. In South Carolina, all of these habitats occur except mangroves and sea grasses. Within the study area, EFH for the red drum is found within all estuarine waters and wetlands and the nearshore marine waters at the mouth of Charleston Harbor.

Snapper Grouper Complex

Ten families of fishes containing 73 species are managed by the SAFMC. There is variation in specific life history patterns and habitat use among the snapper grouper species complex. EFH for the snapper grouper complex includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on the shelf break zone from shore to at least 600 feet (2,000 feet for wreckfish) where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for larval survival and growth up to and including settlement. In addition, the Gulf Stream is an essential habitat because it provides a mechanism to disperse snapper grouper larvae.

For specific life stages of estuarine dependent and nearshore snapper grouper species, EFH includes areas inshore of the 100-foot contour, such as the salt and brackish marshes, tidal creeks, and soft sediments found in the project areas.

Bluefish and Summer Flounder

Bluefish and summer flounder are two species listed in the Mid-Atlantic FMP that occur in the South Atlantic. Bluefish juveniles and adults are listed as using estuaries from North Carolina to Florida. Summer flounder juveniles and adults are listed as using estuaries from North Carolina to Georgia.

<u>Federally Implemented Fishery Management Plan</u>

The sharks listed in Table 4.17-7 are included in the Highly Migratory Species FMP, and are relatively common in the Charleston Harbor. The shortnose sturgeon's range (Canada to Florida) also makes it a candidate for Federal, not just south Atlantic management, although it is

not highly migratory. The shortnose sturgeon is discussed in more detail in section 4.18. Other diadromous (freshwater and saltwater life stages) fish that use the Cooper River and are discussed in the EFH species management plans include the American shad (*Alosa sapidissima*), hickory shad (*Alosa mediocris*), blueback herring (*Alosa aestivalis*), Atlantic sturgeon (*Acipenser oxyrhynchus*) and American eel (*Anguilla rostrata*).

4.17.8. Invasive Species

Exotic species are considered invasive when they are likely to cause harm to the ecosystem through aggressive spread and/or competitive dominance over native species. Most introduced species fail to survive or spread and not all that become established pose a threat. However, invasive species have the potential for serious disruption of local ecosystems, fisheries, and human infrastructure, as has been documented with the zebra mussel. Concerns about the proliferation of invasive species stem from both the presence of such species at the proposed terminal site, and the potential for increased introduction through port-related ballast water, hull fouling, and cargo containers.

Ruiz et al. (2000) analyzed the likely sources and pathways for North American marine invasions and concluded that most invasive species are associated with shipping. They estimated that 60 percent of all invasive marine species on the Atlantic coast and 48 percent and 64 percent on the Pacific and Gulf coasts, respectively, could be attributed to some aspect of the shipping industry. On the Atlantic coast, 33 percent were of Indo-Pacific origin, and 19 percent came from the Eastern Atlantic. Despite the successes of invasive species along the Atlantic coast, the Charleston Harbor has been relatively unaffected; however, several invasive animal and plant species do inhabit this region.

Studies of four shipping hubs (Wilmington, Charleston, Savannah, and Jacksonville) collected a total of 221 species, including 36 mollusks, 122 crustaceans, and 63 polychaetes. Five of these were non-indigenous marine species and present in Charleston, including two barnacles (*Balanus trigonus* and *B. amphitrite*), an isopod nicknamed the 'wharf roach' (*Ligia exotica),* an amphipod *(Apocorophium lacustre),* and the green porcelain crab (*Petrolisthes armatus*) (Power et al. 2006). The Asian green mussel (*Perna viridis*) has also been found in Charleston Harbor.

The green porcelain crab is a South American and Caribbean filter feeding species that until recently was found occasionally in the Gulf of Mexico. Sometime after 1977, it was noticed in increasing numbers and further north (Knott et al. 1999). It is now distributed as far north as Georgia and South Carolina in rocky intertidal and tidal creek oyster bar habitats. Lohrer (2001) has reported concentrations of 10,000/square mile from South Carolina salt marshes. At this point, it is unclear whether this species is simply undergoing a natural range expansion or has been inadvertently introduced outside its normal range. Hartman et al. (2001) suggest that the abundance of *P. armatus* may indirectly damage oysters by providing an alternative prey for predators of xanthid crabs. Xanthids feed on oyster spat; therefore, anything that reduces predation pressure upon them may increase xanthid populations and lead to increased predation on spat, which in turn reduces oyster populations. In an area known for this shellfish, the resulting economic impacts on fishery resources prompt attention to controlling green porcelain crabs.

To combat the introduction of invasive marine species, the International Maritime Organization (IMO) has developed guidelines for the control and management of ships' ballast water to minimize the transfer of harmful aquatic organisms and pathogens. At the local level, the Coast Guard enforces these guidelines through the Nonindigenous Aquatic Nuisance Prevention and

Control Act (NANPCA). Management and control measures recommended by the guidelines include:

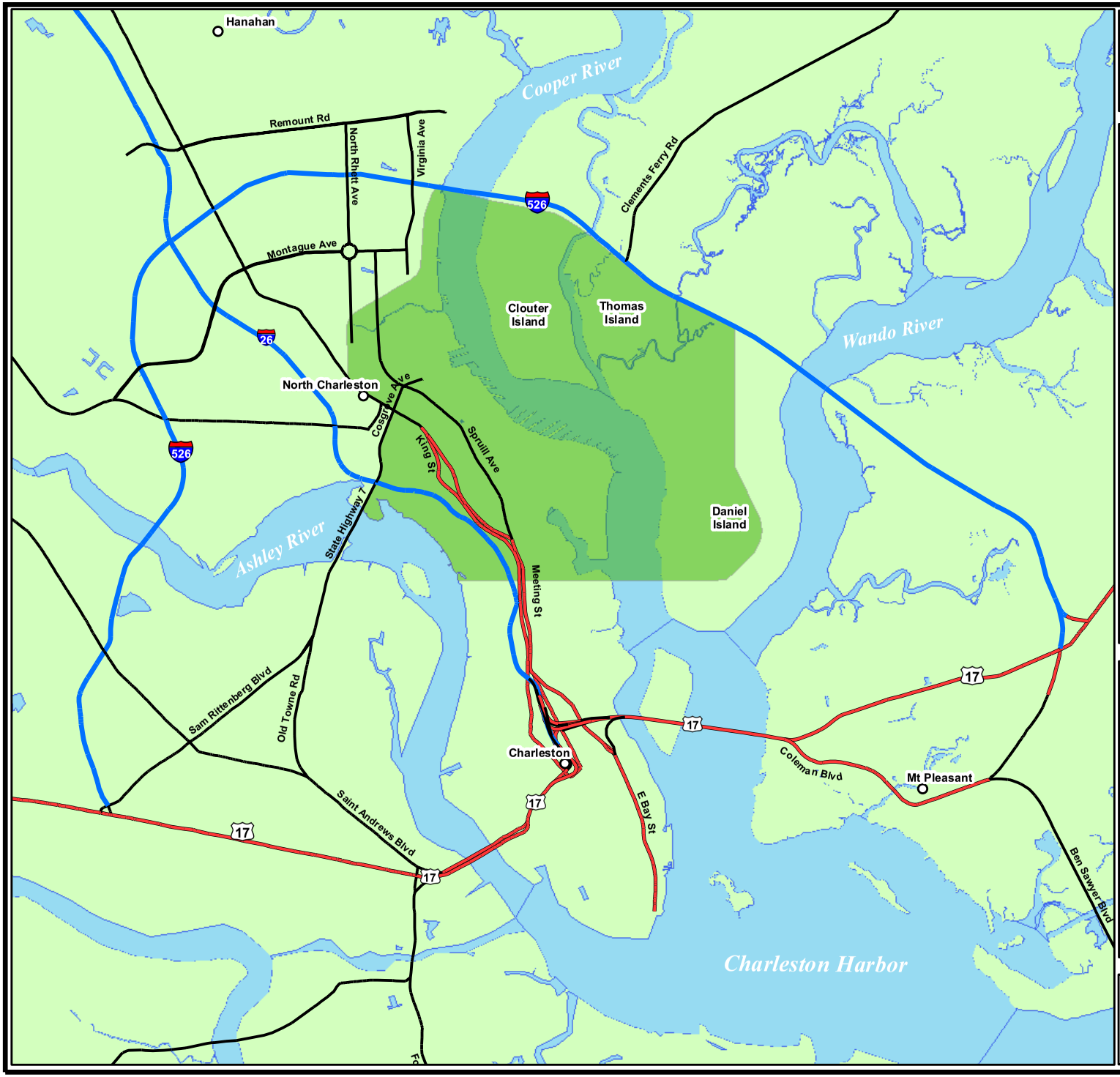
- Avoiding ballast uptake in shallow water and in darkness, when bottom-dwelling organisms may rise in the water column;
- Cleaning ballast tanks on a regular basis;
- Avoiding unnecessary discharge of ballast and exchanging ballast water at sea;
- Discharge to onshore reception and treatment facilities.

All of the approaches recommended under the IMO guidelines are subject to limitations. Reballasting at sea currently provides the best-available risk minimization measure, but is subject to serious ship-safety limits. Even when it is able to be fully implemented, this technique is less than 100 percent effective in removing organisms from ballast water. Refer to Appendix F for more information on ballast water regulations.

Invasive species living in ballast water or on ship's hulls are not the only invasive species problem associated with international cargo traffic. Two other invertebrates may have been introduced by cargo ships from Asia and South America and are present at the Proposed Project site: the invasive red fire ant, *Solenopsis wagneri* (also known as *S. invicta*), and the Asian long horned beetle (*Anoplophora glabripennis*). Fire ant colonies are ubiquitous in the dry berms and CDF habitats of the proposed terminal site, and long horned beetles were seen in the forested areas. Once the invasive species have become established, controlling their populations becomes difficult. Therefore, policies aimed at reducing this risk focus on prevention.

Plants released as ornamentals and released aquarium fish are also a problem in South Carolina. Non-native plants have thrived and developed to nuisance levels in some areas of South Carolina due to the favorable climate and the presence of numerous shallow, nutrient-rich water bodies. While aquatic weeds occur throughout South Carolina, nuisance plant populations and associated water use problems have been most prevalent in the coastal plain region, including the Cooper River. Some of the most troublesome aquatic species have been alligatorweed (*Alternanthera philoxeroides*), water primrose (*Ludwigia uruguayensis*), Brazilian elodea (*Egeria densa*) and common reed (*Phragmites australis*) (SCDNR, 2005).

Three of the most prominent upland species at the Proposed Project site are invasive species designated as severe threats by the South Carolina Pest Plant Council: popcorn tree or Chinese tallow, Japanese privet and Japanese honeysuckle. Other species that are common, but not dominant include Bradford pear, paper mulberry and the common reed.



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

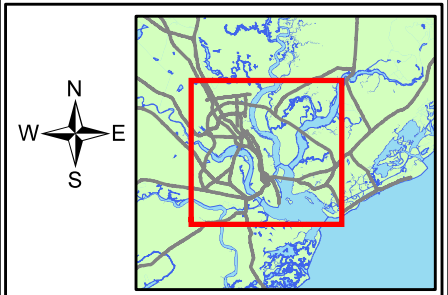
Legend

- Towns
- Natural Resources Study Area

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Miles

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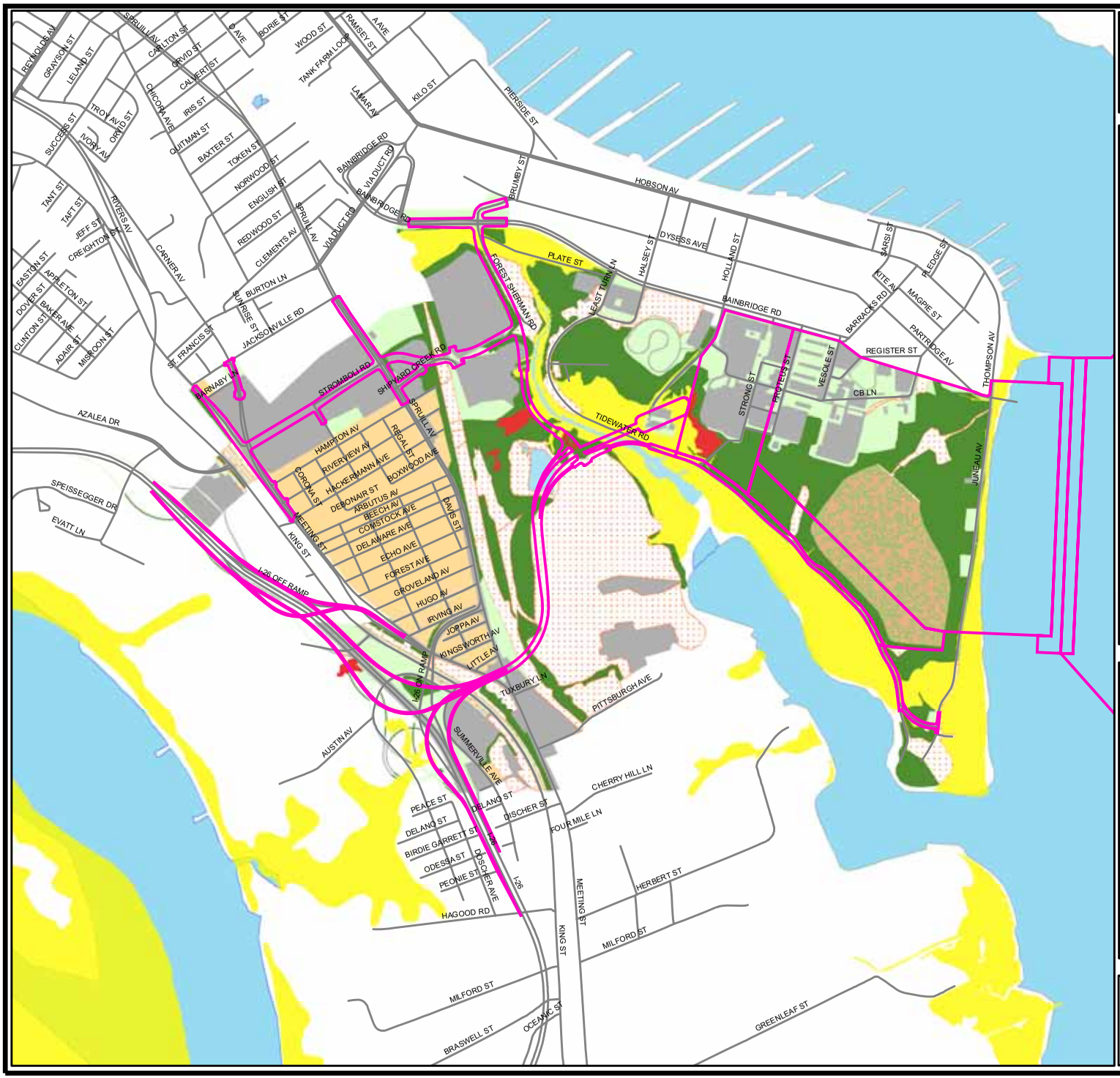


Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 4.17-1

Natural Resources Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Proposed Project

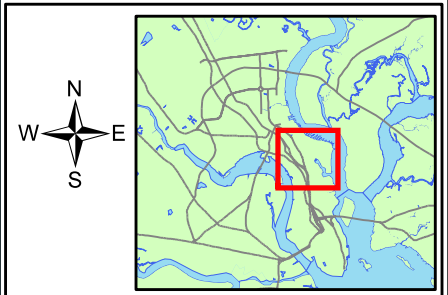
Land Cover Types

- Barren
- Freshwater Wetlands
- Impervious
- Landscaped; Maintained Grass
- Open Water
- Residential
- Revegetated CDF
- Tidal Wetlands
- Upland Forest/Scrub

White areas are outside the projected Project Impact Area and were not digitized from the 2001 aerial photos.
Tidal Wetlands outisde of the immediate project area are from NWI Wetland data.

0 500 1,000 2,000
Feet

Map Scale 1:20,000



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 4.17-2
Land Cover Types in the Area Surrounding the Proposed Project



Forested Habitat



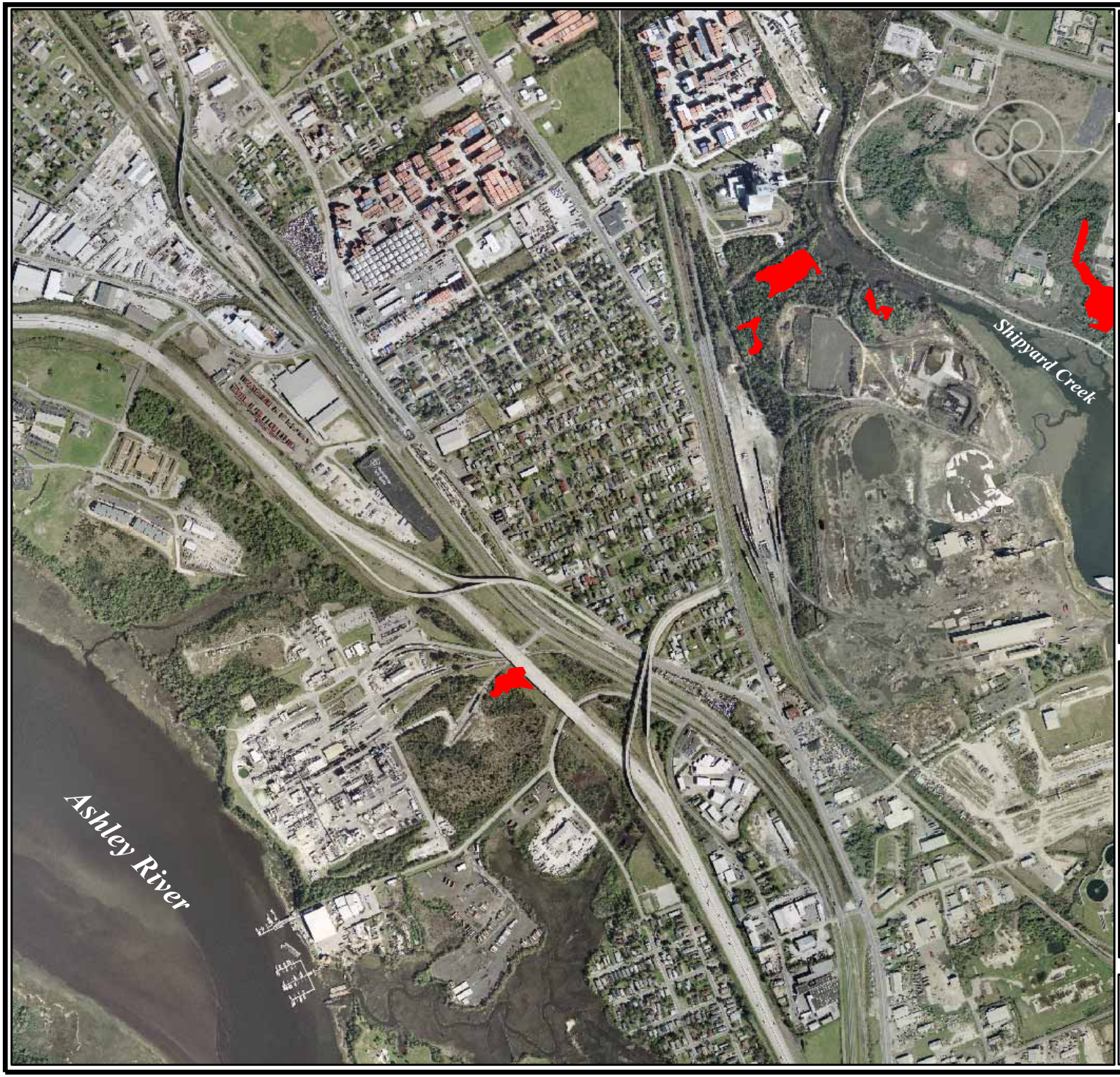
Maintaned Grass/Landscaped Habitat



Revegetated CDF Habitat

Figure 4.17-3.
Typical upland habitat types at the Proposed Project site.

US Army Corps
of Engineers
Charleston District



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Freshwater Wetlands

0 500 1,000 2,000

Feet

Map Scale 1:12,000

N
W E
S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 4.17-4
Freshwater Wetlands in the Proposed Access Roadway Corridor



At terminal site (Tidewater Road /Strong St.)



At roadway site near Austin Avenue.



At terminal site from Strong Street.

Figure 4.17-5.
Typical photographs of freshwater wetlands at the Proposed Project site.

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of Engineers
Charleston District



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Tidal Wetlands

0 500 1,000 2,000

Feet

Map Scale 1:12,000

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W E
S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 4.17-6
Tidal Wetlands in the Proposed Access Roadway Corridor



Looking south from Juneau Avenue



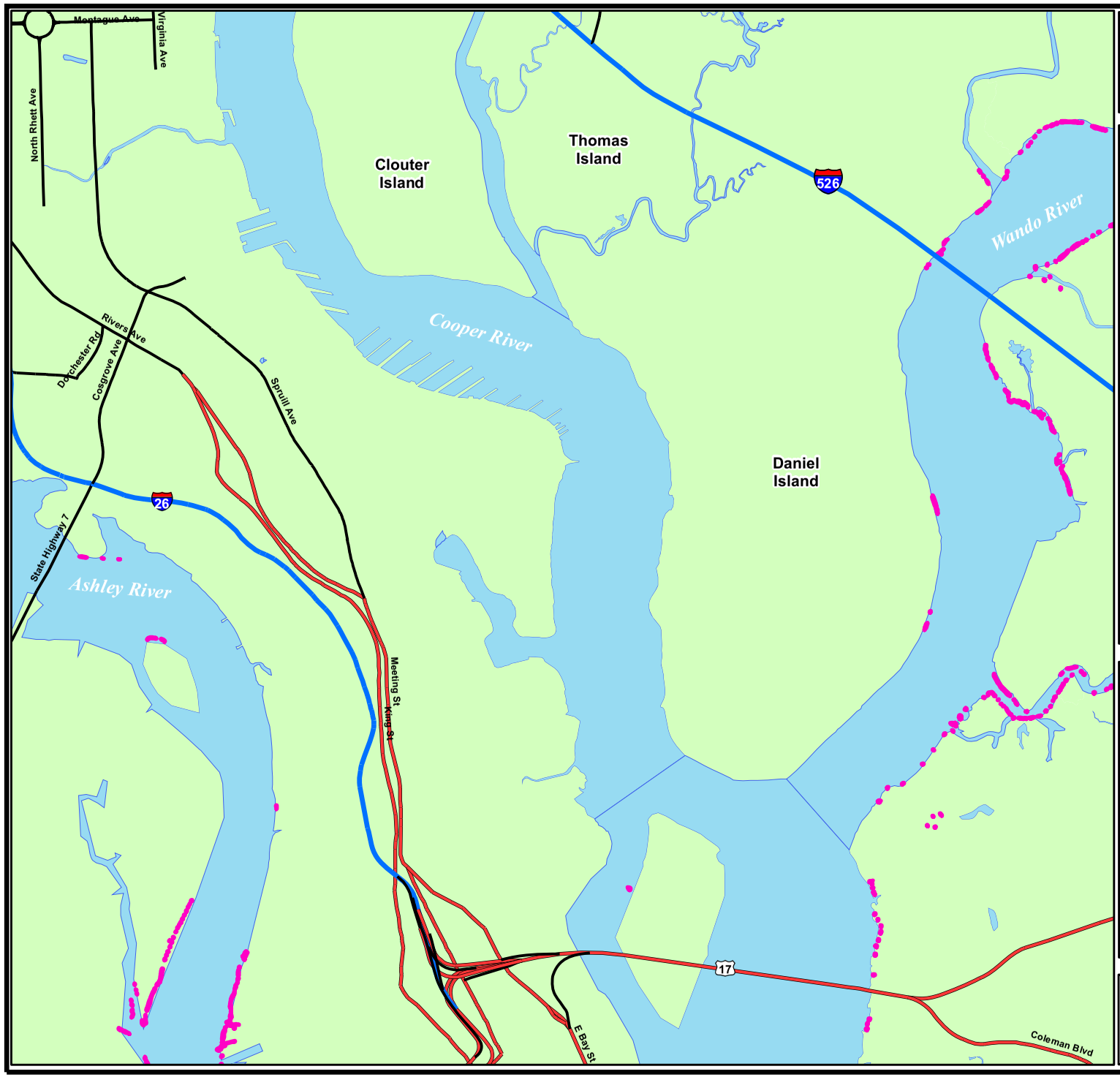
Looking north from Tidewater Road



Looking south from Juneau Avenue.

Figure 4.17-7.
Typical photographs of tidal wetlands at the Proposed Project site.

US Army Corps
of Engineers
Charleston District



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Historic Oyster Beds

0 0.25 0.5 1

Miles

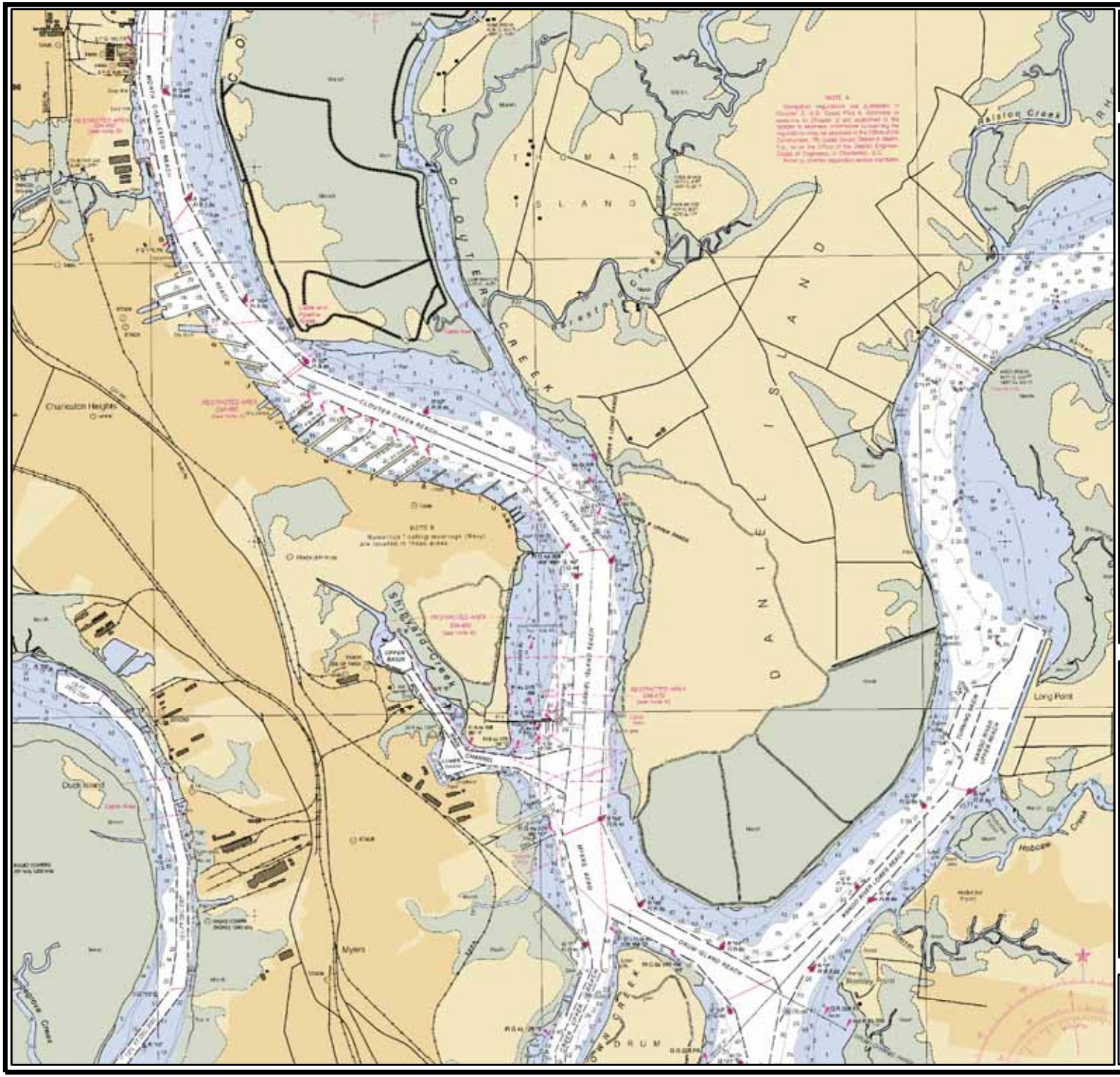
Map Scale 1:50,000



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 4.17-8
Known Historic Locations of Oyster Beds



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

0 0.25 0.5 1

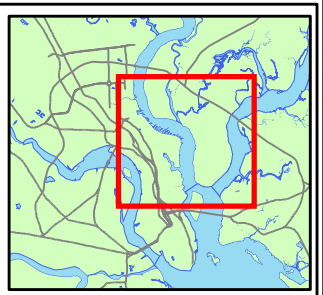
Miles

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W E

S



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 4.17-9
Bathymetry in the Lower Cooper River

4.18. THREATENED AND ENDANGERED SPECIES

This section addresses species that have been placed on the Federal or State list of endangered and threatened wildlife and plants, including candidate species and any species of concern that may be found within the study area shown in Figure 4.18-1. It is important to note that while Section 4.17 (i.e., Natural Resources) describes habitats and species observed in the study area, this section focuses on the potential for threatened, endangered, and rare species of concern to inhabit areas within or near the Proposed Project site.

4.18.1. Federal and State Authority

Under the Endangered Species Act (ESA) of 1973, all Federal agencies are required to undertake programs for the conservation of threatened and endangered species and are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or modify its critical habitat.

A species may be classified for protection as endangered when it is in danger of extinction within the foreseeable future throughout all or a substantial portion of its range. A *threatened* classification is provided to those animals and plants likely to become endangered within the foreseeable future throughout all or a substantial portion of their ranges.

The United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) share responsibility for administration of the ESA. Generally, NMFS deals with those species occurring in marine environments and anadromous fish, while the USFWS is responsible for terrestrial and freshwater species and migratory birds.

South Carolina also maintains a State list of endangered, threatened, and species of concern. Threatened and endangered species on the State list include Federally-listed species as well as species facing possible local extirpation. An example is the least tern, which the State ranks as threatened although it is considered 'apparently secure globally' (SCDNR National Heritage Inventory, 2005). A *species of concern* is a species that, although possibly relatively abundant and widespread in the state, is especially vulnerable to certain types of exploitation or environmental changes and has experienced long-term population declines. NMFS and USFWS also maintain species of concern lists.

For this EIS, the USFWS, the NMFS, and the SC Department of Natural Resources (SCDNR) were contacted for information on known populations of Federal and State endangered or threatened species and other sensitive species in the project area. Site surveys included searching for protected species and their habitats. The following subsections describe Federal and State listed species potentially occurring in the study area (Figure 4.18-1) and the field survey results.

4.18.2. Federal Listed Plants

South Carolina hosts 19 species of Federally-threatened or endangered plants, none of which occur in the study area. Biologists determined which species could occur in the study area by searching the South Carolina Rare, Threatened and Endangered Species Inventory for occurrences in Berkeley and Charleston County (SCDNR 2006). The inventory listed four species as occurring in Berkeley and Charleston County, as shown on Table 4.18-1.

Table 4.18-1. Federally Protected Plant Species in South Carolina that occur in Charleston or Berkeley County

Common Name	Scientific Name	Status	Occurrence in Study Area
Amaranth, seabeach	*Amaranthus pumilus*	T	Potential Suitable Habitat
Amphianthus, little	*Amphianthus pusillus*	T	No
Coneflower, smooth	*Echinacea laevigata*	E	No
American chaffseed	*Schwalbea americana*	E	Potential Suitable Habitat
Black-spored quillwort	*Isoetes melanospora*	E	No
Bunched arrowhead	*Sagittaria fasciculata*	E	No
Canby's dropwort	*Oxypolis canbyi*	E	Potential Suitable Habitat
Dwarf-flowered heartleaf	*Hexastylis naniflora*	T	No
Harperella	*Ptilimnium nodosum*	E	No
Miccosukee gooseberry	*Ribes echinellum*	T	No
Michaux's sumac	*Rhus michauxii*	E	No
Persistent trillium	*Trillium persistens*	E	No
Pitcher plant, mountain sweet	*Sarracenia rubra jonesii*	E	No
Pondberry	*Lindera melissifolia*	E	Potential Suitable Habitat
Relict trillium	*Trillium reliquum*	E	No
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	No
Schweinitz's sunflower	*Helianthus schweinitzii*	E	No
Small whorled pogonia	*Isotria medeoloides*	T	No
Swamp pink	*Helonias bullata*	T	No
White irisette	*Sisyrinchium dichotumum*	E	No

Source: US Fish and Wildlife Service Threatened and Endangered Species System Website, 2006 and SCDNR Natural Heritage Inventory January 2006.

[1] *T=Threatened, E=Endangered.*

Three plants occurring in South Carolina that are candidates for Federal listing include bog asphodel (*Narthecium americanum*), Georgia aster (*Symphyotrichum georgianum*), and white fringeless orchid (*Platanthera integrilabia*). None of these species are known to occur in Charleston or Berkeley County. For those species that occur in Charleston or Berkeley County, the following section describes suitable habitat and results of surveys to determine if they are present in the study area.

Seabeach Amaranth (*Amaranthus pumilus)*

Seabeach amaranth lives in barrier beaches along the coast, with known populations along the less-developed beaches of Charleston County. None of the habitats in the study area are suitable for this species.

American Chaffseed (*Schwalbea americana*)

American chaffseed is a coastal plain species with known populations in Berkeley and Charleston Counties; most of which are within the Francis Marion National Forest. It requires habitat with an open canopy, such as moist pine flatwoods and savannas, which are periodically cleared by fire, mowing, or fluctuating water tables. None of the habitats in the study area are suitable for American chaffseed.

Canby's Dropwort (*Oxypolis canbyi*)

Canby's dropwort occupies pond cypress savannas, the shallows and edges of cypress/pond-pine ponds, sloughs, and wet pine savannas (USFWS, 1990). The species has never been documented as occurring within the study area and the nearest known suitable habitat for the species is in the Francis Marion National Forest. No Canby's dropwort was found in the Proposed Project area during surveys.

Pondberry (*Lindera melissifolia*)

Pondberry inhabits pond margins, swampy depressions, sandy sinks, and seasonally flooded wetlands. The plant also inhabits pinelands and recently burned open areas. Several populations of pondberry occur in the Francis Marion National Forest in Berkeley County (USACE, 1999) (Porcher et al., 1995). However, no populations of pondberry were found in surveys of the study area.

4.18.3. Plant Species of Concern

The State keeps a list of species of concern. Plants of state, national (NC), or regional concern (RC) that have been recorded in Charleston or Berkeley County are shown in Table 4.18-2. None of the species of concern were found within the study area.

Table 4.18-2. Plant Species of Concern that Occur in Charleston or Berkeley County.

Common name	Scientific name	Habitat Type
Coastal plain false-foxglove	*Agalinis aphylla*	Longleaf pine-wiregrass savannahs and flatwoods
Incised groovebur (NC)	*Agrimonia incisa*	Mixed oak hickory forest, pine savannahs, mesic hardwood forests
Blue maiden-cane	*Amphicarpum muehlenbergianum*	Pine flatwoods
Purple silkyscale	*Anthaenantia rufa*	Pine flatwoods
Broomsedge	*Andropogon mohrii*	Wet savannahs
Narrow leaved bluestem	*Andropogon perangustatus*	Clay-based Carolina bays and upland depressions
Beyrich's three-awn	*Aristida beyrichiana*	Wiregrass community
Savannah milkweed (RC)	*Asclepias pedicellata*	Longleaf pine flatwoods, sandy pinelands
Black-stem spleenwort	*Asplenium resiliens*	Limestone and marl outcrops
Coastal-plain water-hyssop	*Bacopa cyclophylla*	Bottomland hardwoods
Winter grape-fern	*Botrychium lunarioides*	Old fields and pastures
Northern burmannia	*Burmannia biflora*	Pond cypress savannah
Bearded grass-pink	*Calopogon barbatus*	Hillside bog
Many-flower grass-pink	*Calopogon multiflorus*	Savannahs
Bandana-of-the-everglades	*Canna flaccida*	Wetlands
Willdenow's sedge	*Carex basiantha*	Moist lime or alkaline forests
Cherokee sedge	*Carex cherokeensis*	floodplains
Ravenfoot sedge	*Carex crus-corvi*	Swamp forests
Cypress-knee sedge	*Carex decomposita*	Swamps and lake margins on floating logs
Elliott's sedge	*Carex elliottii*	Bogs
Meadow sedge	*Carex granularis*	Coastal plain marl forests

Common name	Scientific name	Habitat Type
Leatherleaf	*Chamaedaphne calyculata*	bogs
Shiny spikegrass	*Chasmanthium nitidum*	Blackwater bottomlands
Southeastern tickseed	*Coreopsis gladiata*	Bogs
Ciliate-leaf tickseed	*Coreopsis integrifolia*	Bogs
Piedmont flatsedge	*Cyperus tetragonus*	Maritime forests and barrier island grasslands
Venus' fly-trap (RC)	*Dionaea muscipula*	Bogs and savannahs
Robbins spikerush	*Eleocharis robbinsii*	Limestone ponds, Carolina bays
Three-angle spikerush	*Eleocharis tricostata*	Bogs and savannahs
Viviparous spike-rush	*Eleocharis vivipara*	Bogs and pools
Green-fly orchid	*Epidendrum conopseum*	On limbs of evergreen hardwoods
Marsh eryngo	*Eryngium aquaticum*	Wet pine flatwoods and savannahs
Florida thorough-wort	*Eupatorium anomalum*	Wet savannahs
Hollow joe-pye weed	*Eupatorium fistulosum*	Wet savannahs
Coastal-plain thorough-wort	*Eupatorium recurvans*	Wet savannahs
Godfrey’s privet	*Forestiera godfreyi*	Marsh hammocks
Elliott's milkpea	*Galactia elliottii*	Low moist areas
Long-horn orchid	*Habenaria quinqueseta*	Wet pinelands and forests
Southeastern sneezeweed	*Helenium pinnatifidum*	Savannahs and open wet muck
Carolina St. John's-wort	*Hypericum nitidum*	Pinelands
Large-stem morning-glory	*Ipomoea macrorhiza*	Exposed sandy soils
Beach morning-glory	*Ipomoea stolonifera*	Sandy dunes
Walter's iris	*Iris hexagona*	Open freshwater swamps
Small's bog button	*Lachnocaulon minus*	flatwoods
Southern lepuropetalon	*Lepuropetalon spathulatum*	Rock outcrops
Southern twayblade	*Listera australis*	Poorly drained circumneutral soils
Pondspice	*Litsea aestivalis*	Cypress ponds, swamp margins
Boykin's lobelia	*Lobelia boykinii*	Cypress ponds and wet savannahs
Lance-leaf seedbox	*Ludwigia lanceolata*	Interdune ponds
Lance-leaf loosestrife	*Lysimachia hybrida*	Bottomlands, shores, swamps
Virginia bunchflower	*Melanthium virginicum*	Lowland prairies, moist open woods
Canada moonseed	*Menispermum canadense*	Moist open woods near streams
Bentgrass; hairgrass	*Muhlenbergia filipes*	Dunes, wet savannahs
Longstem adder's-tongue fern	*Ophioglossum petiolatum*	Maritime wet grasslands, grassy roadside flats
One-flowered broomrape	*Orobanche uniflora*	Wooded slopes, rocky open woods
Bead-grass	*Paspalum bifidum*	Sandhills and savannahs
Spoon-flower	*Peltandra sagittifolia*	Swamps, wet hammocks on pristine sphagnum mats
Slender-leaved dragon-head	*Physostegia leptophylla*	Freshwater tidal marshes
Climbing fetter-bush	*Pieris phillyreifolia*	Cypress ponds
Springs clearweed	*Pilea fontana*	Wet forests, floodplains
Pineland plantain	*Plantago sparsiflora*	Open wet pine savannahs

Common name	Scientific name	Habitat Type
Yellow fringeless orchid	*Platanthera integra*	Wet savannahs and pitcherplant bogs
Green-fringe orchid	*Platanthera lacera*	Bogs and moist forests
Shadow-witch orchid	*Ponthieva racemosa*	Calcareous swamps and marl outcrops
Whisk fern	*Psilotum nudum*	Swamp forests and hammocks
Crestless plume orchid	*Pteroglossaspis ecristata*	Grassy saw palmetto barrens, longleaf pine grasslands
Bluff oak	*Quercus austrina*	Bluff forests, floodplain hammocks
Bottom-land post oak	*Quercus similis*	Moist bottomlands
Awned meadowbeauty	*Rhexia aristosa*	Clay based Carolina bays and limesink ponds
Short-bristle baldrush	*Rhynchospora breviseta*	Bogs, flatwoods
Horned beakrush	*Rhynchospora careyana*	Cypress ponds, pine flatwoods
Bunched beaksedge	*Rhynchospora cephalantha var attenuata*	Boggy openings in streamhead pocosins
Harper beakrush	*Rhynchospora harperi*	Limesink ponds and cypress savannahs
Drowned hornedrush	*Rhynchospora inundata*	Limesink ponds and clay-based Carolina bays
Few-flowered beaked-rush	*Rhynchospora oligantha*	Bogs, fens, wet savannahs
Brown beaked-rush	*Rhynchospora pleiantha*	Margins of limesink depressional ponds
Chapman beakrush	*Rhynchospora stenophylla*	Wet, sandy peaty depressions
Tracy beakrush	*Rhynchospora tracyi*	Limesink ponds and clay-based Carolina bays
Tiny-leaved buckthorn	*Sageretia minutiflora*	Shell middens
Sweet pitcher-plant	*Sarracenia rubra*	Wet savannahs, pitcherplant bogs
Baldwin nutrush	*Scleria baldwinii*	Wet savannahs
Biltmore greenbrier	*Smilax biltmoreana*	Dry to mesic forests over basalt, granite, or gabbro rocks
Lace-lip ladies'-tresses	*Spiranthes laciniata*	Wet pinelands and prairies
Pineland dropseed	*Sporobolus curtissii*	Pine flatwoods
Carolina dropseed	*Sporobolus pinetorum*	Wet savannahs with wiregrass
Reclined meadow-rue	*Thalictrum subrotundum*	Swamp edges, streamsides
Carolina fluff grass	*Tridens carolinianus*	Sandhills and pine flatlands
Chapman's redtop	*Tridens chapmanii*	Dry pine and oak woods
Least trillium (NC)	*Trillium pusillum var pusillum*	Between savannahs and wet hardwood forests, over marl
Nodding pogonia	*Triphora trianthophora*	Moist forests
Greater bladderwort	*Utricularia macrorhiza*	Pools and ponds
Short-leaved yellow-eyed grass	*Xyris brevifolia*	Savannahs
Florida yellow-eyed grass	*Xyris difformis var floridana*	Savannahs
Elliott yellow-eyed grass	*Xyris elliottii*	Wet pine flatwoods and savannahs
Pineland yellow-eyed grass	*Xyris stricta*	Savannahs
Savannah yellow-eyed grass	*Xyris flabelliformis*	Savannahs

Source: SCDNR Natural Heritage Inventory January 2006, with habitat information also from Georgia Natural Heritage Program, the Native Plant Society, North Carolina Natural Heritage Program, and Natural Communities of South Carolina (Nelson 1986).

[1] *Plants with potential habitat in the study area are indicated in bold.*

Out of the 95 plants of concern above, many are associated with habitats not found in the study area, such as pine flatwoods, savannahs, bogs, undisturbed wetlands, and Carolina bays. Most of the habitats within the study area have been disturbed by previous development, as well as use for dredged material disposal. No plant species of concern were found during field surveys and none are known to occur within the study area.

4.18.4. Federally Listed Animals

South Carolina waters support the Federally-listed animals shown in Table 4.18-3, five of which are known to transit the project area.

Table 4.18-3. Federally Protected Animal Species in South Carolina.and their Potential Occurrence in the Project Area.

Common Nam	Scientific Name	Status [1]	Known to Occur in Study or Project Area
Alligator	*Alligator mississippiensis*	T(SA)	Project area potential
Bat, Indiana	*Myotis sodalis*	E	No
American burying beetle	*Nicrophorus americanus*	E	No
Eskimo curlew	*Numenius borealis*	E	No
Eagle, bald	*Haliaeetus leucocephalus*	T	Project area in winter
Heelsplitter, Carolina	*Lasmigona decorata*	E	No
Manatee, West Indian	*Trichecus manatus*	E	Project area in summer
Plover, piping	*Charadrius melodus*	T	Study area
Florida panther	*Puma concolor coryi*	E	No
Puma, eastern	*Puma concolor couguar*	E	No
Salamander, flatwoods	*Ambystoma cingulatum*	T	Study area
Sea turtle, green	*Chelonia mydas*	T	Potentially in shipping channel
Sea turtle, hawksbill	*Eretmochelys imbricata*	E	Potentially in shipping channel
Sea turtle, Kemp's Ridley	*Lepidochelys kempii*	E	Potentially in shipping channel
Sea turtle, leatherback	*Dermochelys coriacea*	E	Potentially in shipping channel
Sea turtle, loggerhead	*Caretta caretta*	T	Project area in summer
Snake, eastern indigo	*Drymarchon corais couperii*	T	No
Stork, wood	*Mycteria Americana*	E	Study area
Sturgeon, shortnose	*Acipenser brevirostrum*	E	Project area in all seasons
Tern, roseate	*Sterna dougallii*	T	No
Warbler, Bachmann's	*Vermivora bachmanii*	E	No (last sighting in 1961)
Whale, finback	*Balaenoptera physalus*	E	Potentially in shipping channel
Whale, humpback	*Megaptera novaeanglidae*	E	Potentially in shipping channel
Whale, sei	*Balaenoptera borealis*	E	Potentially in shipping channel
Whale, sperm	*Physeter catodon*	E	Potentially in shipping channel
Whale, right	*Balaena glacialis*	E	Potentially in shipping channel
Wolf, red	*Canis rufus*	E	No
Woodpecker, red-cockaded	*Picoides borealis*	E	Study area

Source: US Fish and Wildlife Service Threatened and Endangered Species System Website, 2006
[1] T=Threatened, E=Endangered, SA=Similar Appearance to Threatened or Endangered Species

While several species have been recorded by the Natural Heritage Database or US Fish and Wildlife Service as occurring in Charleston and Berkeley Counties, the only species known to transit the Proposed Project area are the American alligator, bald eagle, West Indian manatee, loggerhead turtle, and shortnose sturgeon. These five are discussed below, followed by a discussion of species which are unlikely to occur at the Proposed Project and alternative terminal sites, but could potentially occur in the broader study area (Figure 4.18-1).

American Alligator (*Alligator mississippiensis*)

Although population levels have risen substantially since its initial listing, the American alligator continues to be listed as threatened due to its similarity in appearance to the endangered American crocodile. Similarity of appearance to a listed species is a regulatory designation to facilitate the enforcement and further the policy of the Endangered Species Act. It is used when a species is so closely similar to a listed species that enforcement personnel would have substantial difficulty in attempting to differentiate between the listed and unlisted species (USFWS, 1998).

The alligator can be found in the river swamps, lakes, bayous, marshes, and other water bodies of the Gulf States and lower Atlantic coastal plains. Although no alligators were observed in the project area during field activities, the species could potentially be found passing through this area in search of suitable freshwater habitat in an effort to expand their range.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is listed as threatened in the lower 48 states, but it is a candidate for delisting due to its recovery status. No bald eagles are known to nest near the project alternative sites, although one bald eagle was seen at the Proposed Project site over Shipyard Creek, being harassed by an osprey pair. No bald eagle nests were observed during field surveys.

West Indian Manatee (*Trichechus manatus*)

Manatees inhabit both salt and fresh water of sufficient depth (5 feet to usually less than 20 feet) throughout their range. They may be encountered in canals, rivers, estuarine habitats, saltwater bays, and on occasion have been observed as much as 3.7 miles off the Florida Gulf coast. Manatees are known to visit the Charleston Harbor area in the summer months (April through November) as they migrate up and down the coast. According to the SCDNR, 18 manatee sightings were reported in the Cooper River between May and September 2004 (Griffin, personal comm., 2005).

Loggerhead Turtle (*Caretta caretta*)

Loggerhead turtles are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. South Carolina's shoreline is a migration path for loggerheads at all times of the year. Loggerhead turtles sporadically occur in the Charleston Harbor estuarine system, except in the entrance channel where they consistently occur during spring, summer, and fall (Van Dolah et al., 1992).

Shortnose Sturgeon (*Acipenser brevirostrum*)

The shortnose sturgeon spawns in the coastal rivers along the east coast of North America from the St. John River in Canada to the St. Johns River in Florida. Unlike Atlantic sturgeon that may migrate more freely between freshwater, estuarine, and marine waters, the shortnose spends most of its adult life in fresh and brackish water. However, it does venture into the lower coastal reaches and ocean on rare occasions (Cooke, personal communication).

In South Carolina, shortnose sturgeon are known from the river systems that empty into Winyah Bay and the Santee/Cooper River complex that forms Lake Marion, as well as the Great and Little Pee Dee, Congaree, Wateree, Ashepoo, Edisto, Black, and Waccamaw River systems in South Carolina (Bolden, personal communication). One landlocked group may exist in Lake Marion on the Santee River in South Carolina.

Recent research on the Cooper River indicates that shortnose sturgeon habitat is several miles north of the study area (Palmer et al, 2001). Shortnose sturgeon are known to spawn directly below Pinopolis Dam (Collins, pers. comm., 2005), which is over 40 miles upriver. Shortnose sturgeon are found the farthest downstream in winter in salinities as high as 10.5 ppt (Palmer et al., 2001). Median salinities at Filbin Creek (just upstream from Clouter Island) are approximately 15.4 ppt near the bottom and 13.8 ppt near the surface (Table 4.15-3).

Species Potentially Occurring in the Study Area:

Previous studies have suggested that the following species may potentially occur in the study area, which encompasses a more broad area than the Proposed Project and alternatives. These species include the flatwoods salamander and several sea turtle, whale, and bird species. These species are discussed below. None were observed at the Proposed Project site.

Flatwoods Salamander (*Ambystoma cingulatum*)

The flatwoods salamander is found primarily in pine-wiregrass flatwood habitats, breeding in shallow cypress swamps, roadside ditches, ponds and swamps dominated by sweet gum and black gum trees, and open, marshy pasture ponds.

Historically, the flatwoods salamander has been found at several sites in the Cainhoy area of the Francis Marion National Forest. A sampling effort of 65 aquatic sites was performed for the proposed Daniel Island DEIS during April and May 1998 (Moulis and Williamson). The study concentrated in the northern portion of the Daniel Island project area because extensive saltwater marshlands (an environment not recognized as suitable flatwoods salamander habitat) occupy a majority of the Daniel Island project area. A single flatwoods salamander was found during the survey in the Francis Marion National Forest (Moulis and Williamson, 1998). None were found in the study area.

Green Sea Turtle (*Chelonia mydas*)

The green turtle is found in tropical and temperate seas and oceans. The North American distribution is from Massachusetts to Mexico and from British Columbia to Baja California. In the southeast, green turtles also occur in Puerto Rico and the Virgin Islands. Green turtles are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The turtles are attracted to lagoons and shoals with an abundance of marine grass and algae.

The benthic diet is herbivorous; therefore, the Charleston Harbor would not be expected to be a good habitat for them. Charleston Harbor is located within the green turtle's migrating and foraging range, although they have not been documented.

Leatherback Turtle (*Dermochelys coriacea*)

The leatherback is the most pelagic (open ocean) of the sea turtles and is often seen near the edge of the continental shelf; however, they have also been observed just offshore of the surf line. Critical habitat for the leatherback includes the waters adjacent to Sandy Point, St. Croix,

U.S. Virgin Islands. The major nesting beaches are located in Malaya, Surinam, French Guiana, Mexico, Costa Rica, and St. Croix, U.S. Virgin Islands. Regular nesting in the United States is restricted to Florida; Culebra, Puerto Rico; and St. Croix, U.S. Virgin Islands.

Outside of a remote occurrence, leatherback turtles are not expected within the study area. While there is a potential for leatherbacks to be present off the coast of South Carolina during migration, no nesting beaches are known within South Carolina.

Kemp's (Atlantic) Ridley Sea Turtle (*Lepidochelys kempii*)

Adult Kemp's Ridley sea turtles are restricted to the Gulf of Mexico, but immatures have been observed along the Atlantic coast as far north as Massachusetts. Outside of nesting, the major habitat for Kemp's Ridleys is the nearshore and inshore waters of the northern Gulf of Mexico, especially Louisiana waters. Kemp's Ridleys are often found in salt marsh habitats.

Kemp's Ridleys are not common off the coast of South Carolina; however, immature individuals are encountered in the near-shore and coastal waters of South Carolina (USFWS, 1998).

Wood Stork (*Mycteria americana*)

Wood storks primarily inhabit freshwater and brackish wetlands, feeding in freshwater marshes, narrow tidal creeks, flooded tidal pools, and roadside ditches. Nests are commonly located in the upper branches of large cypress trees or in mangroves on islands. They are also known to nest in manmade structures. Breeding within the United States is limited to Florida, Georgia, and South Carolina. After breeding, birds along the east coast migrate as far north as North Carolina.

No wood stork nesting or roosting colonies are known within the study area. A rookery is located on the Santee Coastal Reserve approximately 28 miles northeast of the project area. The only wood storks observed during field observations were well outside of the project area: one wood stork was observed foraging in a freshwater wetland along Spruill Avenue in March 2006, and a group of approximately eight individuals was noted foraging in an Ashley River tidal marsh in downtown Charleston in May 2006.

While salt marsh habitats and ephemeral freshwater wetlands ponds do exist at the Proposed Project site, they are not the type that allow water to pool, trapping fish that the wood storks then stalk and eat. Wood storks require shallow pools that trap and concentrate fish as the tide drops, or as the pond dries. The ponded wetlands in the project site are deep excavated cuts, and the tidal marsh in the Proposed Project area is evenly flooded and is not suitable foraging habitat.

Red-Cockaded Woodpecker (*Picoides borealis*)

The red-cockaded woodpecker typically makes its home in mature pine forests; specifically, those with long-leaf pines averaging 80 to 120 years old and loblolly pines averaging 70 to 100 years old (USFWS, 1998).

Several red-cockaded woodpecker clusters are known to exist in the Francis Marion National Forest. Field surveys were conducted in August and September of 1998 for the USACE Daniel Island DEIS to assess the presence, distribution, and foraging habitat of red-cockaded woodpeckers in the study area (Sabine and Waters, 1998). These surveys followed the methodology recommended in Guidelines for Preparation of Biological Assessments and

Evaluations for the Red-Cockaded Woodpecker (USFWS, 1989). Figure 4.18-2 presents known habitat for this species in the Charleston Harbor region.

A total of 24 active red-cockaded woodpecker clusters were identified within the Daniel Island DEIS biotics study; however, none were located south of I-526 and therefore, are not in the study area for this EIS.

There is no suitable habitat for this species within the project area, and no known colony of these woodpeckers is located along the Charleston Harbor or on adjacent properties.

Bachman's Warbler (*Vermivora bachmanii*)

Records indicate the Bachman's Warbler breeds in the southeastern U.S. and winters in western Cuba and the Isle of Pines. The only confirmed nest observations were recorded during the period from 1897 to 1937. Of these, 26 were from the I'On Swamp area in Francis Marion National Forest. No confirmed breeding records have been reported from the United States since the mid-1960s.

Historic records indicate the Bachman's warbler nested in low, wet forested areas containing variable amounts of water, but usually with some water that was permanent. These areas were described in general as being forested with sweet gum, oaks, black gum, and other hardwoods; and where there was an opening in the forest canopy, the ground being covered with dense thickets of cane, palmetto, blackberry, gallberry, and other shrubs and vines.

If the Bachman's warbler still exists it is most likely in the I'On Swamp area in Charleston and Berkeley Counties, or in the Congaree National Park, near Columbia. Both these areas are outside the study area.

Piping plover (*Charadrus melodus*)

Piping plovers are small, stocky shorebirds that resemble sandpipers. This coastal beach/dune species would not likely occur in the project area because it does not contain their preferred feeding, resting, or other critical habitats. Their preferred habitats are sandy beaches along the ocean and inland lakes, and alluvial bars and islands in rivers. They do use dredge disposal sites; however, none have been observed at the CDFs proposed to accommodate the dredged material for this project.

This plover does not nest in the Proposed Project area, nor does the area possess their preferred feeding, resting, or other critical habitats.

Whales

Increased container vessel traffic related to the port expansion may increase the risk for encounters with whales transiting the Charleston Harbor approaches and offshore areas. As a result, more detailed information on ship traffic, ship strikes, and potentially affected whale species is provided in the following sections.

Eleven whale species have been confirmed victims of ship strikes: blue, Bryde's, fin, gray, humpback, killer, minke, North Atlantic right, sei, southern right, and sperm whales. Table 4.18-4 presents a breakdown by species.

Table 4.18-4. Recorded Whale Ship Strikes by Species.

Whale Species	Recorded Strikes
Fin	75
Humpback	44
North Atlantic right	38
Gray	24
Minke	19
Southern right	15
Sperm	17
Blue	8
Bryde's	3
Sei	3
Orca	1

Jensen and Silber, 2003

The Jensen and Silber (2003) study also noted that coastal species (e.g., right and humpback whales) may be overrepresented in the data base due to a greater likelihood of near-shore detection of a ship struck carcass than individuals that may have died at great distances from shore. Collisions between ships and whales are associated with a wide variety of vessel types and the134 cases of known vessel type are presented in Table 4.18-5.

Table 4.18-5. Recorded Whale Ship Strikes by Vessel Type.

Vessel Type	Whale Strikes	Percent
Navy	23	17.1 %
Container/cargo/freighter	20	14.9 %
Whale-watching	19	14.2 %
Cruise liners	17	12.7 %
Ferries	16	11.9 %
Coast Guard	9	6.7 %
Tankers	8	6.0 %
Recreational	7	5.2 %
Steamship	7	5.2 %
Commercial fishing	4	3.0 %
Dredge	1	0.75 %
Research	1	0.75 %
Harbor pilot	1	0.75 %
Whaling catcher boat	1	0.75 %

Jensen and Silber, 2003

Jensen and Silber (2003) also note that, for a variety of reasons, certain vessel classes are likely over-represented in the data. As noted, Federal vessels are more likely to report a strike than commercial vessels due to their standardized reporting practice. Jensen and Silber also postulate that numbers of ship strike reports that appear high for Navy and Coast Guard vessels may also be a factor of size and vessel configuration. Navy and Coast Guard vessels are

typically capable of relatively high speeds. Potential impacts to each species of whale listed as threatened or endangered in South Carolina is discussed below.

Northern Right Whale (*Balaena glacialis*)

The North Atlantic right whale is considered one of the most critically endangered whales in the world. By the 1800's the animal had been hunted almost to extinction and their numbers remain very low (the eastern American population is estimated at approximately 300). Since they move slowly, swimming and feeding at or near the surface of the water, they are very susceptible to collisions with ships.

Northern right whales are found in the North Atlantic Ocean from west of Greenland to Florida and Texas on the western brim and to Madeira on the eastern brim. In summer, they are found in the northern portion of this range as they feed in the plankton-rich colder water. From February to April, mating and calving occur in the warmer southern waters. The occurrence of northern right whales off the coast of South Carolina would be expected during their seasonal migrations.

There are five habitats used annually by western North Atlantic right whales: 1) coastal Florida and Georgia, 2) the Great South Channel, east of Cape Cod, 3) Cape Cod and Massachusetts Bays, 4) the Bay of Fundy, and 5) Browns and Baccaro Banks, south of Nova Scotia (see Figure 4.18-3). The first three areas occur in U.S. waters and were designated by NMFS as critical habitat in June 1994 (59 FR 28793). South Carolina is not a critical habitat.

The coastal areas from Sebastian Inlet, Florida to the Altamaha River, Georgia have been designated as Critical Habitat as shown in Figure 4.18-4. Known wintering areas for this population are along the southeastern United States coast, where calving occurs from December through March (Winn 1984; Kraus et al., 1986; International Whaling Commission 1986).

Charleston is within the Mid-Atlantic region, for the purposes of right whale management. As seen in Figure 4.18-5, South Carolina did not record any ship strikes from 1990 to 2000. Wieting and Jensen (2004) describe the Mid-Atlantic region as follows: The Mid-Atlantic Region *includes* south and east of Block Island Sound, Rhode Island to Port of Savannah, Georgia. It is Located between known high use areas in the northeast and winter calving areas in the southeast. The *Mid-Atlantic Region is a* migratory corridor for pregnant females moving from NE to SE in fall (September to November), with likely December to March resident use by calving females from Cape Fear, North Carolina to South Carolina. There may be seasonal use as a migratory corridor by other population segments, and it is a known migratory corridor for mother/calf pairs departing winter calving area in the southeast headed for the northeastern United States in March through May. The pairs stay close to shore, with 94 percent of sightings within 30 nautical miles of shore, and as a result, they are seen in shallow water, with 80 percent of sightings in depths less than 90 feet.

The Mid-Atlantic United States (MAUS) recorded 5 ship strike mortalities from 1991-2002 (see Figure 4.18-6). During the same 1991-2002 period, 3 ship strike mortalities were documented in the SEUS critical habitat area while 6 strikes occurred in the NEUS (including Canada). All documented ship strike mortalities within the MAUS were north of North Carolina.

Humpback Whale (*Megaptera novaeangliae*)

The humpback whale is found in all oceans and has a seasonal north-south migration pattern. The species prefers coastal areas more than most other whales, especially when feeding and calving/breeding.

In North America, humpbacks winter in the Caribbean and migrate to off the New England coast in the summer. Although they typically migrate via Bermuda, there is the potential for occurrence anywhere along the east coast of the U.S., including South Carolina, during their spring and fall migrations. There have also been a number of wintertime humpback sightings in coastal waters off the southeastern U.S. (NMFS unpublished data; New England Aquarium unpublished data; Florida DEP unpublished data). The expected life span for the humpback whale is 40-50 years, perhaps longer.

A population estimate of 11,570 is regarded as the best available estimate for the North Atlantic (NMFS, 2005). The major threats to the humpbacks are entanglement in fishing gear, collision with ocean-going vessels, and disturbance by whale watchers. A humpback whale recently washed ashore in Charleston County due to a ship strike in January, 2006. In 2001, a humpback whale washed ashore in Myrtle Beach that was tangled in fishing gear and had prop scars, although the fishing gear was assigned the primary cause for mortality.

Blue Whale *(Balaenoptera musculus)*

The distribution of the blue whale in the western North Atlantic generally extends from the Arctic to at least mid-latitude waters. Blue whales are most frequently sighted in the waters off eastern Canada, with the majority of recent records from the Gulf of St. Lawrence (Sears et al. 1987).

The blue whale is best considered as an occasional visitor in US Atlantic Exclusive Economic Zone (EEZ) waters, which may represent the current southern limit of its feeding range (CETAP 1982; Wenzel et al. 1988). Five sightings that occurred in August by Yochem and Leatherwood (1985) suggest an occurrence of this species south to Florida and the Gulf of Mexico, although the actual southern limit of the species' range is unknown. The 308 recognizable individuals from the Gulf of St. Lawrence area which were catalogued by Sears et al. (1987) are considered to be a minimum population estimate for the western North Atlantic stock.

There are no confirmed records of mortality or serious injury to blue whales in the US Atlantic EEZ. However, in March 1998 a dead 20 m (66ft) male blue whale was brought into Rhode Island waters on the bow of a tanker. The cause of death was determined to be a ship strike. Although it appears likely that the vessel concerned was responsible, the necropsy revealed some injuries that were difficult to explain in this context. The location of the strike was not determined; given the known rarity of blue whales in US Atlantic waters, and the vessel's port of origin (Antwerp), it seems reasonable to suppose that the whale died somewhere to the north of the US Atlantic EEZ.

Sei Whale (*Balaenoptera borealis*)

The southern portion of the species' range during spring and summer includes the northern portions of the U.S. Atlantic Exclusive Economic Zone (EEZ) in the Gulf of Maine and Georges Bank. There are few if any data on fishery interactions or human impacts. There was no reported fishery-related mortality or serious injury to sei whales in fisheries observed by NMFS during 1991-1997. There are no reports of mortality, entanglement, or injury in the NEFSC or NE Regional Office databases; however, there is a report of a ship strike. The New England Aquarium documented a sei whale carcass hung on the bow of a container ship as it docked in

Boston in 1994. The crew estimated that the whale had been hung on the bow for approximately four days prior to the ship's arriving in port. This is a strategic stock because the sei whale is listed as an endangered species under the ESA.

Fin Whale (*Balaenoptera physalus*)

Fin whales are common in waters of the U.S. Atlantic Exclusive Economic Zone (EEZ: within 200 miles of coastline), principally from Cape Hatteras northward (NMFS, 2005). Fin whales accounted for 46 percent of the large whales and 24 percent of all cetaceans sighted over the continental shelf during aerial surveys (CETAP 1982) between Cape Hatteras and Nova Scotia during 1978-82. A documented large ship strike occurred to a fin whale in 1995 that was probably hit at sea and carried on the bow of a large ship into the Charleston Harbor and rolled off when the ship stopped or turned around (McFee, pers. comm., 2005).

A more recent estimate of 2,814 fin whales was derived from a 28 July to 31 August 1999 line-transect sighting survey conducted by a ship and airplane covering waters from Georges Bank to the mouth of the Gulf of St. Lawrence.

Sperm Whale (*Physeter macrocephalus*)

Total numbers of sperm whales off the U.S. or Canadian Atlantic coast are unknown, although several estimates from selected regions of the habitat do exist for select time periods. The best 1998 abundance estimate for sperm whales is the sum of the estimates from the two U.S. Atlantic surveys, 4,029, where the estimate from the northern U.S. Atlantic is 2,848 and from the southern U.S. Atlantic is 1,181. This joint estimate is considered best because together these two surveys have the most complete coverage of the species' habitat.

During 1994-2000, eighteen sperm whale strandings have been documented along the U.S. Atlantic coast between Maine and Miami, Florida (NMFS, 2005). One 1998 and one 2000 stranding off Florida showed signs of human interactions. In October 1999, a live sperm whale calf stranded on eastern Long Island and was subsequently euthanized. Also, a dead calf was found in the surf off Florida in 2000.

During 2001 to 2003, ten sperm whale strandings were documented along the U.S. Atlantic coast according to strandings databases. Except for the sperm whale struck by a naval vessel in the EEZ in 2001, there were no confirmed documented signs of human interactions on the other nine animals.

Total fishery-related mortality and serious injury for this stock is less than 10 percent of the calculated PBR, and therefore can be considered to be insignificant and approaching a zero mortality and serious injury rate. This is a strategic stock because the species is listed as endangered under the ESA.

4.18.5. State-Listed Animals and Animals of Conservation Concern

South Carolina DNR lists thirty species as occurring in Charleston County that are state endangered, threatened, or of concern, as shown in Table 4.18-6. Two of these species were found in the study area.

Table 4.18-6. Animals Listed as State Endangered, Threatened or Species of Concern in Berkeley and Charleston County and their Habitats.

Common name	Scientific name	Habitat
Cooper's hawk	*Accipiter cooperii*	Woods with water nearby
Northern cricket frog	*Acris crepitans crepitans*	Wetlands and small streams
Bachman's sparrow	*Aimophila aestivalis*	Open pine or oak woods, brushy areas
Eastern tiger salamander	*Ambystoma tigrinum tigrinum*	Pine woodlands
Wilson's plover (ST)	*Charadrius wilsonia*	Barrier island beaches and tidal flats
Spotted turtle (ST)	*Clemmys guttata*	Wetlands and small streams
Star-nosed mole	*Condylura cristata*	Moist meadows, woods, swamps
Rafinesque's big-eared bat (SE)	*Corynorhinus rafinesquii*	Caves, trees, derelict buildings in mature forests
Timber rattlesnake	*Crotalus horridus*	Forests
Black-throated green warbler	*Dendroica virens*	Non-alluvial forested wetlands
Swallow-tailed kite (SE)	*Elanoides forficatus*	Rivers, swamps, and marshes
Southern hognose snake	*Helenium pinnatifidum*	Open sandy woods, fields, floodplains, longleaf pine forests
Mississippi kite	*Ictinia mississippiensis*	mature bottomland forests
Hoary bat	*Lasiurus cinereus*	Forests with dead hollow trees
Swainson's warbler	*Limnothlypis swainsonii*	Forests with dense understory
Red-headed woodpecker	*Melanerpes erythrocephalus*	Forests
Meadow vole	*Microtus pennsylvanicus*	Fields, grassy marshes
Eastern coral snake	*Micrurus fulvius*	Longleaf pine forests
Southeastern myotis	*Myotis austroriparius*	Caves and hollow trees near water
Eastern woodrat	*Neotoma floridana*	Woodlands
Green water snake	*Nerodia cyclopion*	Wetlands
Florida green water snake	*Nerodia floridana*	Wetlands
Island glass lizard	*Ophisaurus compressus*	Sandy coastal areas and islands, pine flatwoods
Brown pelican	*Pelecanus occidentalis*	Coastal areas
Harbor seal	*Phoca vitulina*	Coastal waters
Pine or gopher snake	*Pituophis melanoleucus*	Longleaf pine woods
Glossy ibis	*Plegadis falcinellus*	Freshwater marshes, salt marshes, flooded fields
Dwarf siren (ST)	*Pseudobranchus striatus*	Swamps, bays, marshes, limesink ponds, shallow water with dense vegetation
Gopher frog (SE)	*Rana capito*	Floodplains, wet meadows, pastures, ponds, longleaf pine forests
Eastern fox squirrel	*Sciurus niger*	Longleaf pine and bottomlands
Black swamp snake	*Seminatrix pygaea*	Wetlands
Least tern (ST)	*Sterna antillarum*	Barrier beaches and pea gravel rooftops
Barn owl	*Tyto alba*	Fields, fresh and saltwater marshes
Black bear	*Ursus americanus*	Forests

While several species have been recorded by the Natural Heritage Database or US Fish and Wildlife Service as occurring in Charleston and Berkeley Counties, the only species from the table above known to transit the Proposed Project area are the brown pelican and the least tern. They are discussed below, followed by a discussion of species which are less likely to occur, but for whom potential habitat exists in the study area.

Brown Pelican (*Pelecanus occidentalis*)

In addition to being listed as a State Species of Concern, the brown pelican has also been identified as a high priority in the South Atlantic Bird Conservation Plan due primarily to reduced nesting habitat. The brown pelican has a large range, extending from North America to South America. Most U.S. populations have been stable or increasing in recent years, but the species may be moderately to highly threatened throughout much of the range and subject to unexplained population fluctuations even where doing well overall.

Brown pelicans were commonly seen aloft during field surveys in the study area. Brown pelicans nest on remote natural and dredged-material islands along the coast. Nests are built on the ground, in grasses or marsh, and occasionally in small shrubs or trees. Nesting colonies of pelicans at Crab Bank and Castle Pinkney are within the study area.

Least Tern (*Sterna antillarum*)

The least tern is the smallest of the North American terns and is currently listed as threatened in South Carolina. These birds tend to construct their nests in low-lying sandbars that are sometimes flooded by very high tides. Least terns, as well as black skimmers, can now be found nesting on graveled rooftops in lieu of beaches.

Nest surveys in 2004 showed no active nesting on or near the Proposed Project site (SCDNR National Heritage Inventory, 2005). However, nesting has occurred sporadically at this region dating back to 1978 and has occurred as recently as 2003 (SCDNR National Heritage Inventory, 2005). At the CNC, least terns have been documented nesting at the Enlisted Club from 1989 to 2001, Warehouse 669 from 1995 to 1998, and the commissary from 1976 to 1978. Figure 4.18-7 depicts historic nesting of least terns and colonial water birds in the area, dating back to 1976.

Rafinesque's Big-Eared Bat (*Plecotus rafinesquii*)

Rafinesque's big-eared bat occurs in the southeastern U.S. from Texas and Oklahoma to the east coast and north to Illinois, Indiana, Ohio, West Virginia, and Virginia. Their range in the southeast most closely approximates the historical range of great cypress swamps, indicating that they may have formed a traditional reliance on these areas as roosting and/or foraging sites. Sites along permanent water bodies, especially rivers, are preferred (Clark, 1987). It has been suggested that the species began using manmade structures in the coastal plain region only after large old hollow trees became scarce. Rafinesque's big-eared bat is listed as endangered by the State of South Carolina and the U.S. Forest Service. The species is under review for possible Federal listing by the U.S. Fish and Wildlife Service.

Rafinesque's big-eared bats are very intolerant of disturbance (natural or human). In forested habitats, even the presence of human use trails through recreational areas will prompt desertion of a maternal colony. Therefore, vacant warehouses at the proposed terminal site may support bat colonies. However, these colonies are unlikely to consist of Rafinesque's big eared bats.

Southeastern Myotis Bat (*Myotis austroriparius*)

The southeastern myotis is fairly widespread in the southeastern U.S. A large portion of the population apparently occurs in northern Florida in caves, and outside of this region, maternity colonies tend to be smaller and located in hollow trees and other noncave sites (Patterson et al., 2005). A decline has occurred over the past 30-40 years in both numbers of bats and number of major maternity roosts, though population estimates are of uncertain accuracy. The bat is possibly threatened throughout its southeast range by bottomland hardwood harvesting.

American Swallow-Tailed Kite (*Elandoides forficatus*)

The swallow-tailed kite inhabits wooded river swamps, cypress swamps, marshes, pine flatwoods, and agricultural environments. Within the U.S., the bird is restricted to the southeastern coastal states. Most of the population migrates to the tropics in the winter. Due to declining populations, the swallow-tailed kite is listed as endangered by the State of South Carolina and is considered a sensitive species by the U.S. Forest Service. This species is known to nest within the Francis Marion National Forest, outside of the study area. This species has the potential to occur in the pine flatwoods, marshes, and swamp systems throughout the study area.

Bachman's Sparrow (*Aimphila aestivalis*)

The Bachman's sparrow is found in dry, open pine flatwoods of the southeast. Due to declining populations, the Bachman's sparrow is also considered a sensitive species by the U.S. Forest Service. The Bachman's sparrow potentially occurs north of the study area in the pine flatwoods of the Cainhoy Plantation and Francis Marion National Forest.

Wilson's Plover (*Charadrius wilsonia*)

Although a high priority species, Wilson's Plovers are more secure than either piping or snowy plovers. Wilson's plovers breed in appropriate habitat on most barrier and sea islands. Nesting birds face disturbance from both natural predators and recreationists (e.g., ATVs) on heavily used beaches. The study area is not preferential habitat for Wilson's plover; however, it could potentially occur.

Glossy Ibis (*Plegadis falcinellus*)

Glossy Ibis nest primarily on estuarine and barrier islands, usually in association with other wading birds. Nests are usually elevated in shrubs, trees or marsh grasses, or they may be on the ground. Glossy ibis are not uncommon in the area, although they are typically found in low abundance (Dodd, 1994). There are no wading bird nesting areas in the Proposed Project area.

Atlantic Sturgeon (*Acipenser oxyrhynchus*)

The Atlantic sturgeon is a subtropical, anadromous species. Spawning adults migrate upriver in spring, beginning in February-March in the south, April-May in the mid-Atlantic, and May-June in Canadian waters.

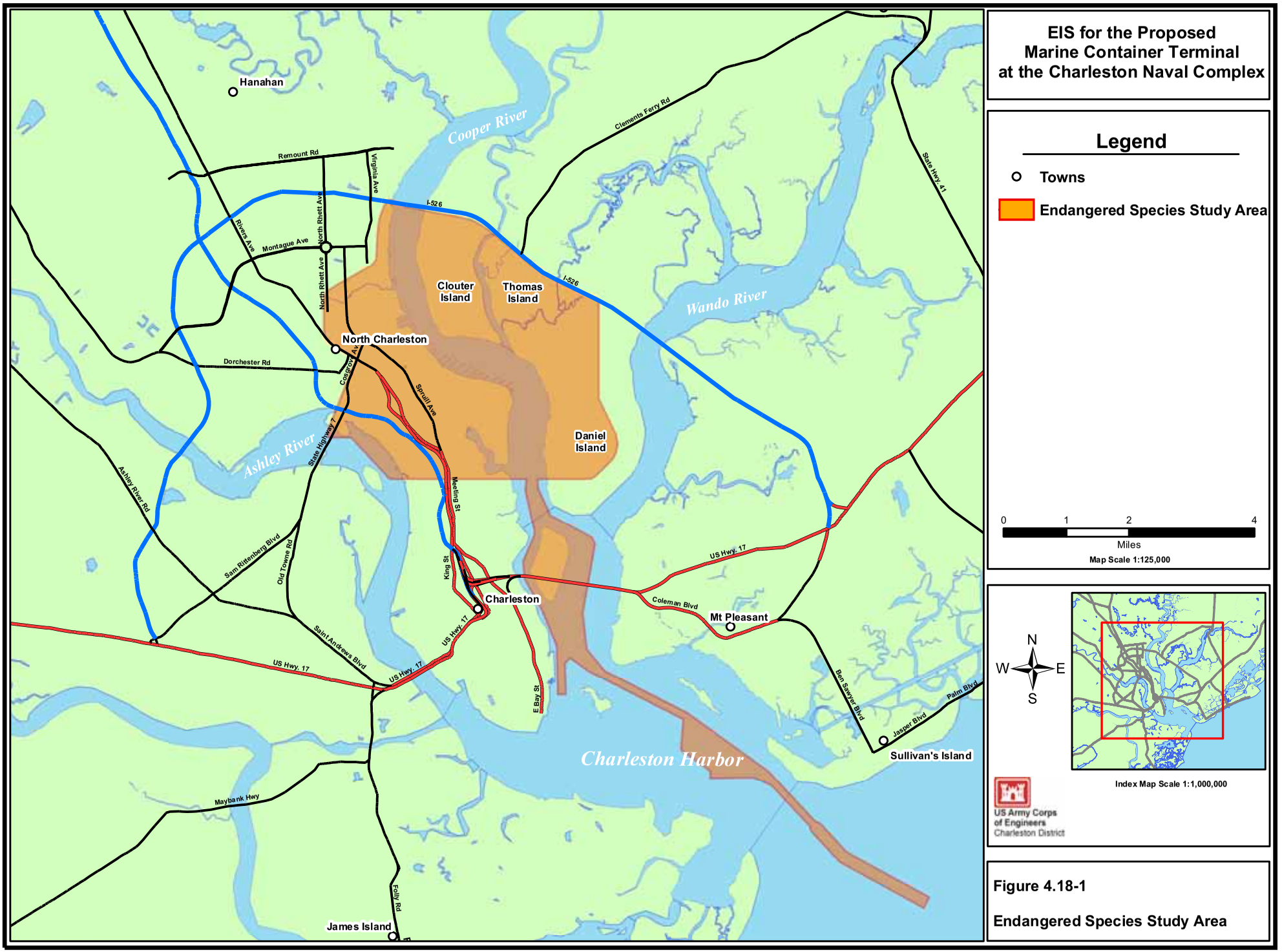
The Atlantic sturgeon is managed under a Fishery Management Plan implemented by the Atlantic States Marine Fisheries Commission. A coast-wide moratorium on the harvest of wild Atlantic sturgeon was implemented in late-1997/early-1998. This moratorium is to remain in effect until there are at least 20 protected year classes in each spawning stock (anticipated to take up to 40 or more years). Most of the population data available before the moratorium were fishery-dependent. Since the moratorium, there have been few surveys to assess status and

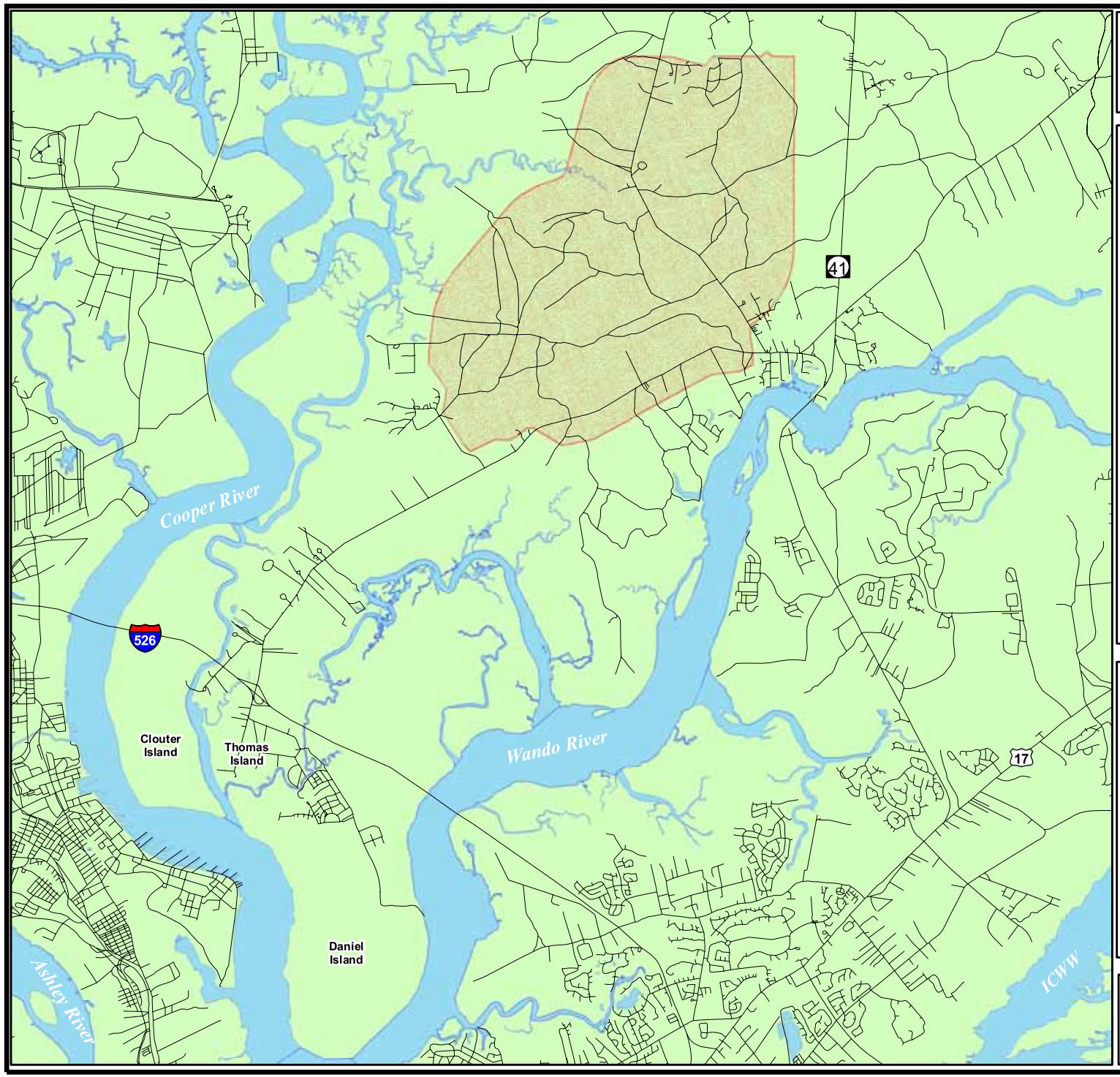
abundance. Cultured Atlantic sturgeon continue to be a valued commercial fish for both its flesh and their eggs (roe). Furthermore, because the sturgeon is dependent on the estuarine and freshwater habitat, habitat degradation continues to be a threat.

Historically, Atlantic sturgeons were likely present in many South Carolina river/estuary systems, including the Cooper River, but it is not known where spawning occurred. A reproducing population of Atlantic sturgeon is suspected in the Cooper River, but this has not been verified (Collins and Smith, 1997). Limited sampling at the base of the Pinopolis dam and certain locations downriver in 1997-1998 produced large numbers of mature shortnose sturgeon (spawning confirmed at the dam) and a subadult Atlantic sturgeon, but no mature adult Atlantic sturgeon and none less than 1 year of age. In a personal communication (2004), Collins stated that some juvenile Atlantic sturgeon have been documented in the Charleston Harbor and are not uncommon.

Eastern Tiger Salamander (*Ambystoma tigrinum tigrinum*)

In other parts of its extensive range, the tiger salamander may be the most frequently encountered salamander. In the Southeast, however, it is less common. Tiger salamanders are usually found as eggs or larvae instead of adults, in temporary and permanent ponds that are open and grassy. Mitochondrial DNA data indicate that subspecies of tiger salamanders can be separated by the east and west of the Apalachicola River (Church et al., 2003). East of the Appalachians, there appear to be multiple subspecies and populations along the Atlantic coastal plain that likely were isolated in a coastal plain refugium in the Carolinas (Church et al., 2003). Distribution data for the eastern tiger salamander is incomplete. The eastern tiger salamander has not been documented in the study area.


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Endangered Species Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Hanahan
Cooper River
Remount Rd
Virginia Ave
Clements Ferry Rd
State Hwy 41
I-526
Rivers Ave
Montague Ave
North Rhett Ave
Clouter
Island
Thomas
Island
Wando River
North Charleston
Dorchester Rd
Cosgrove Ave
Spruill Ave
Daniel
Island
Ashley River
State Highway 7
Ashley River Rd
Meeting St
San Rittenberg Blvd
Old Towne Rd
King St
US Hwy. 17
Coleman Blvd
Mt Pleasant
Charleston
Saint Andrews Blvd
E Bay St
Ben Sawyer Blvd
Palm Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Maybank Hwy
Folly Rd
James Island
N
W
E
S
Figure 4.18-1
Endangered Species Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Red-Cockaded Woodpecker Habitat

0 0.5 1 2

Miles

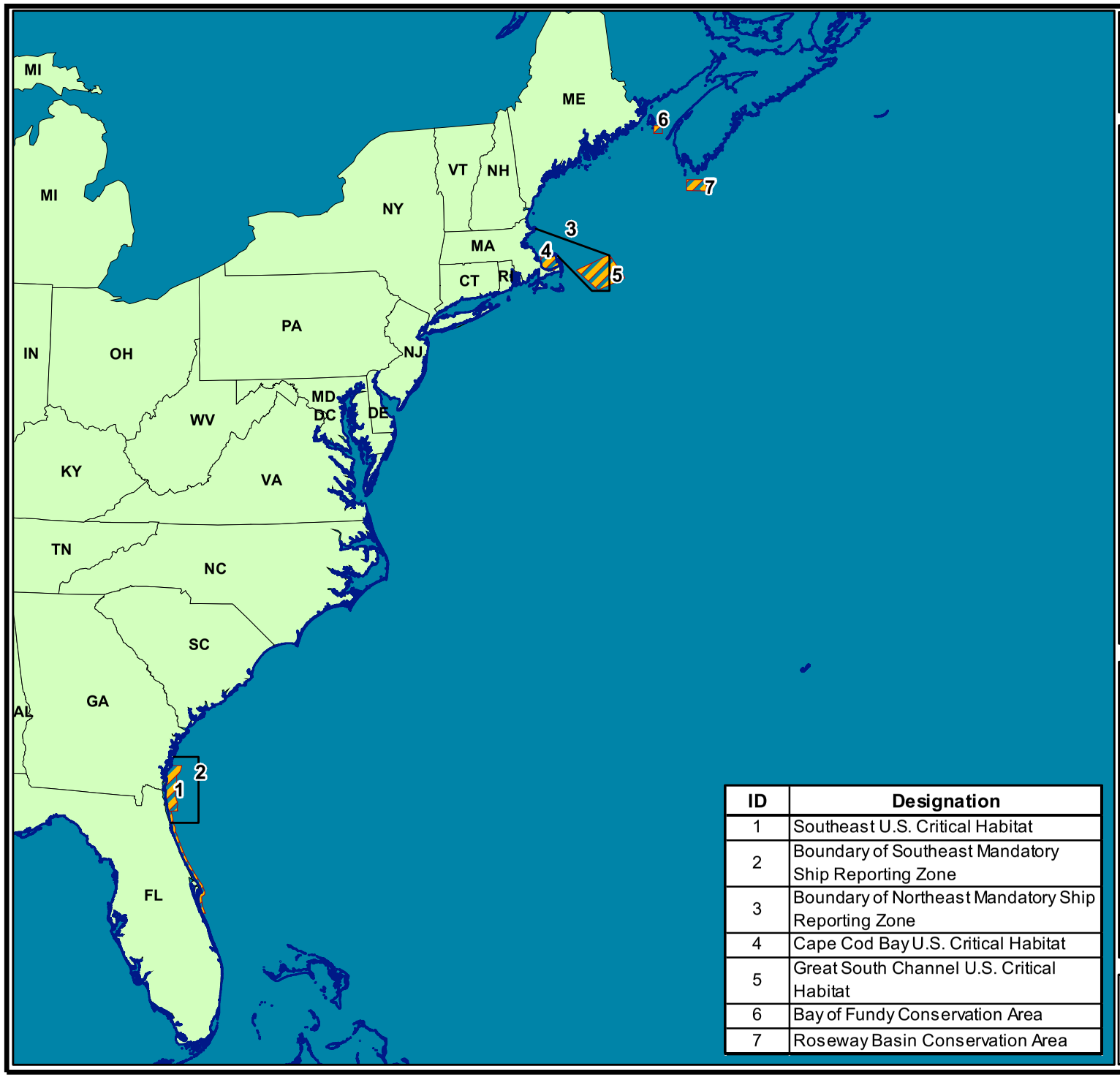
Map Scale 1:100,000

N W E S

Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 4.18-2
Red-Cockaded Woodpecker Habitat in the Region



ID	Designation
1	Southeast U.S. Critical Habitat
2	Boundary of Southeast Mandatory Ship Reporting Zone
3	Boundary of Northeast Mandatory Ship Reporting Zone
4	Cape Cod Bay U.S. Critical Habitat
5	Great South Channel U.S. Critical Habitat
6	Bay of Fundy Conservation Area
7	Roseway Basin Conservation Area

EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

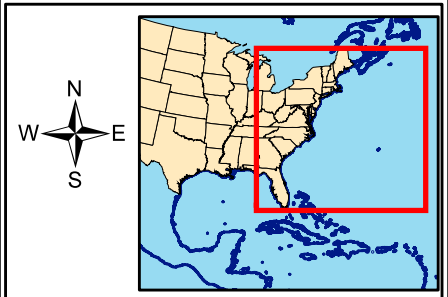
Legend

Northern Right Whale Critical Habitat

0 100 200 400

Miles

Map Scale 1:13,500,000



Index Map Scale 1:120,000,000

US Army Corps of Engineers
Charleston District

Figure 4.18-3
Designated Critical Habitat; Conservation Areas; and Mandatory Shipping Reporting Areas

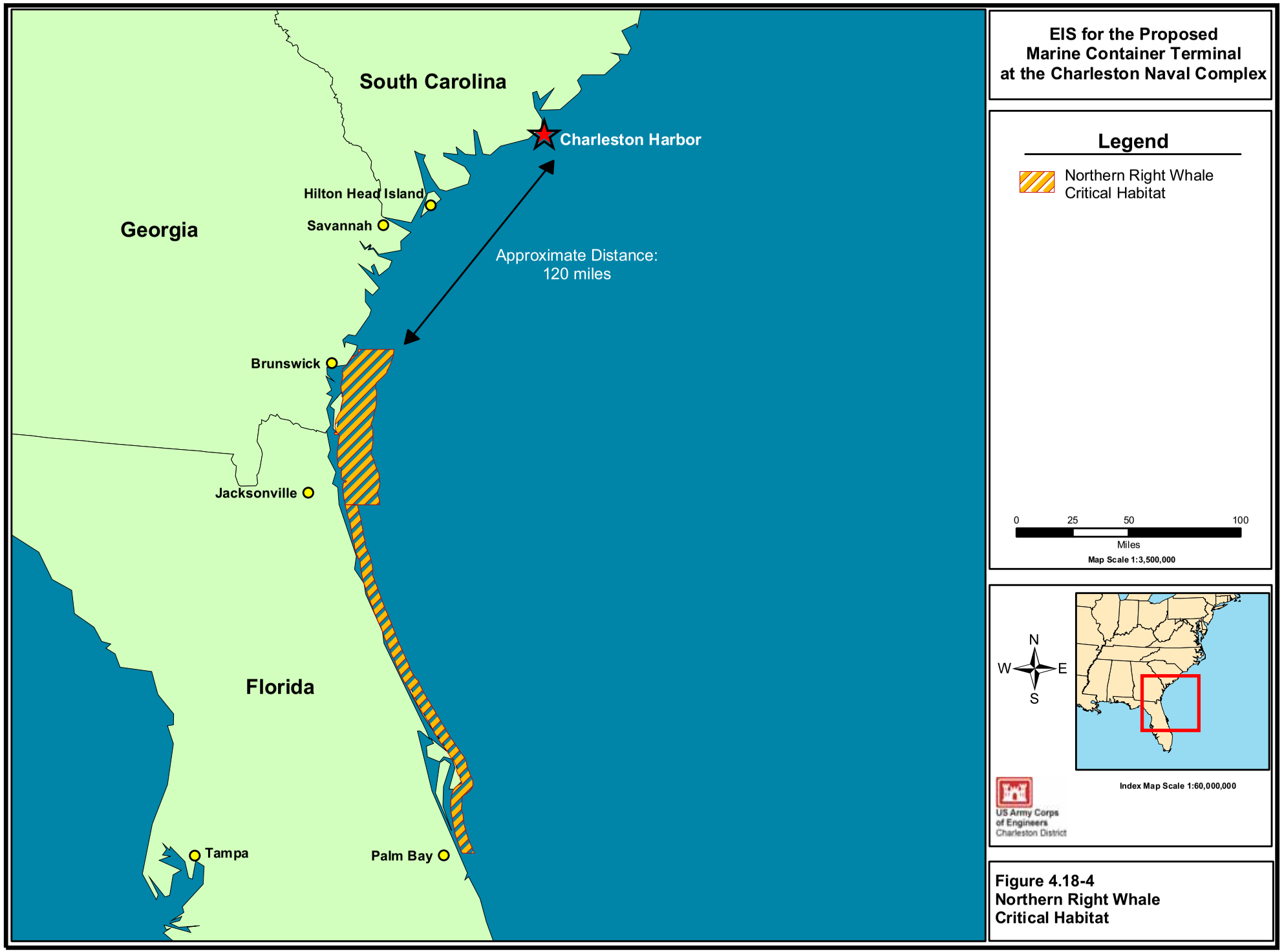


Figure 4.18-4
Northern Right Whale
Critical Habitat

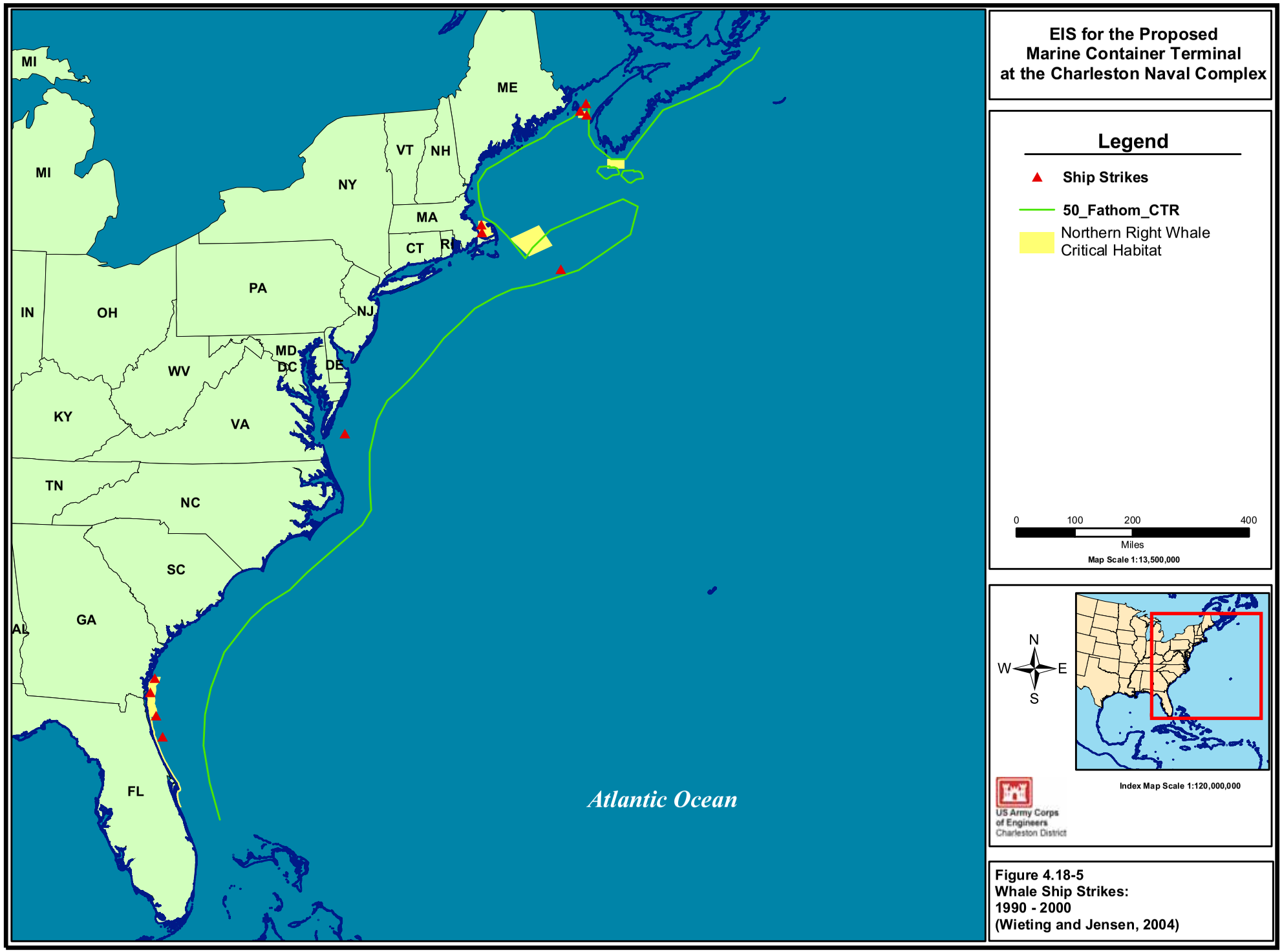
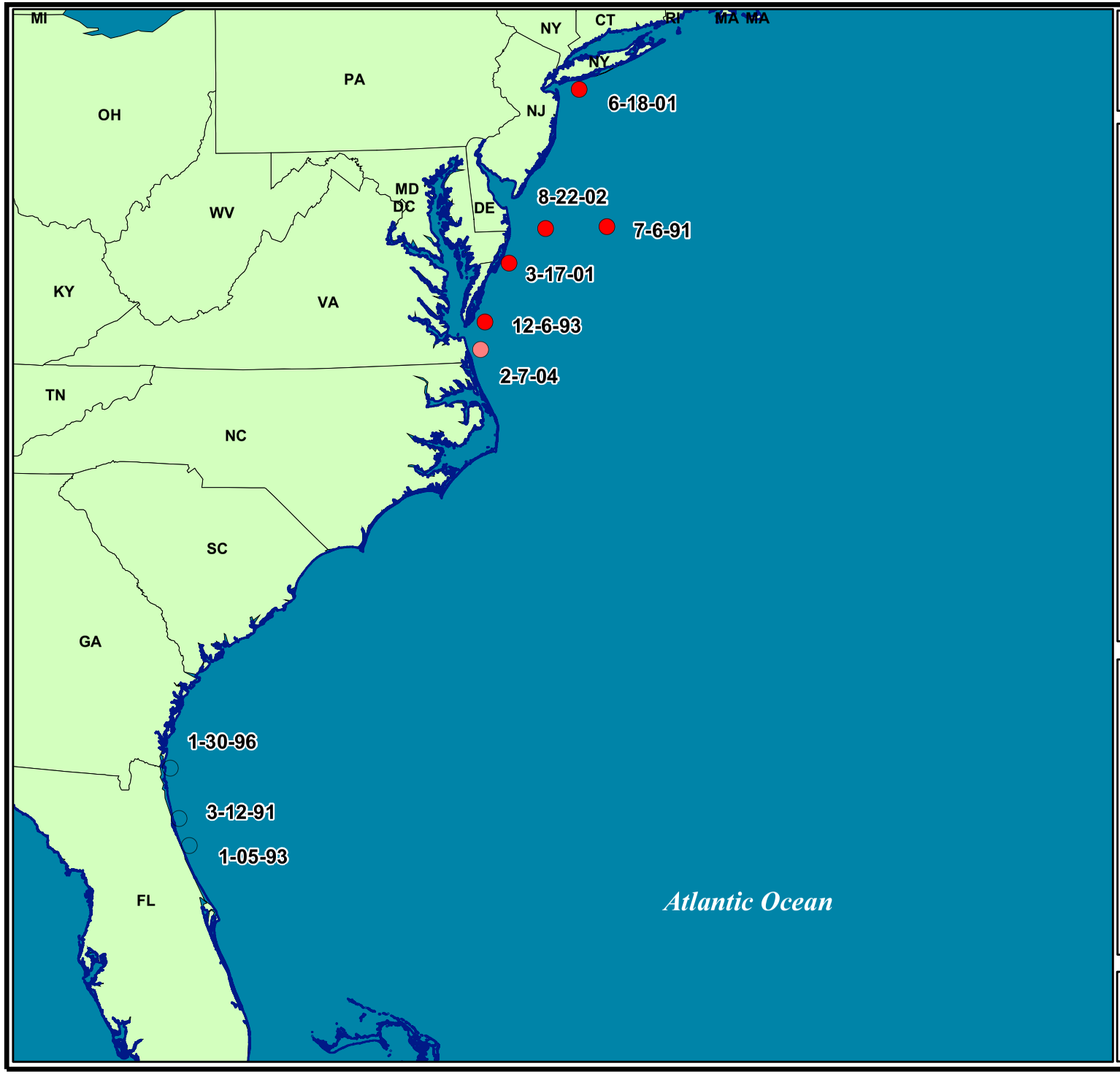


Figure 4.18-5
Whale Ship Strikes:
1990 - 2000
(Wieting and Jensen, 2004)



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

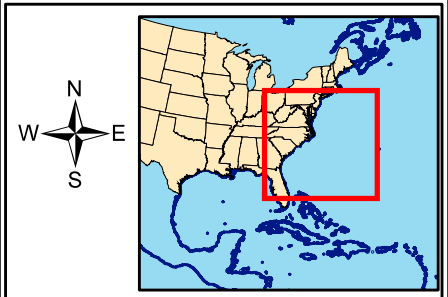
Mid-Atlantic Ship Strike Mortalities

- Confirmed Mortality - Mid-Atlantic
- Unconfirmed Mortality - Mid-Atlantic
- Confirmed Mortality - Southeast Region

0 50 100 200

Miles

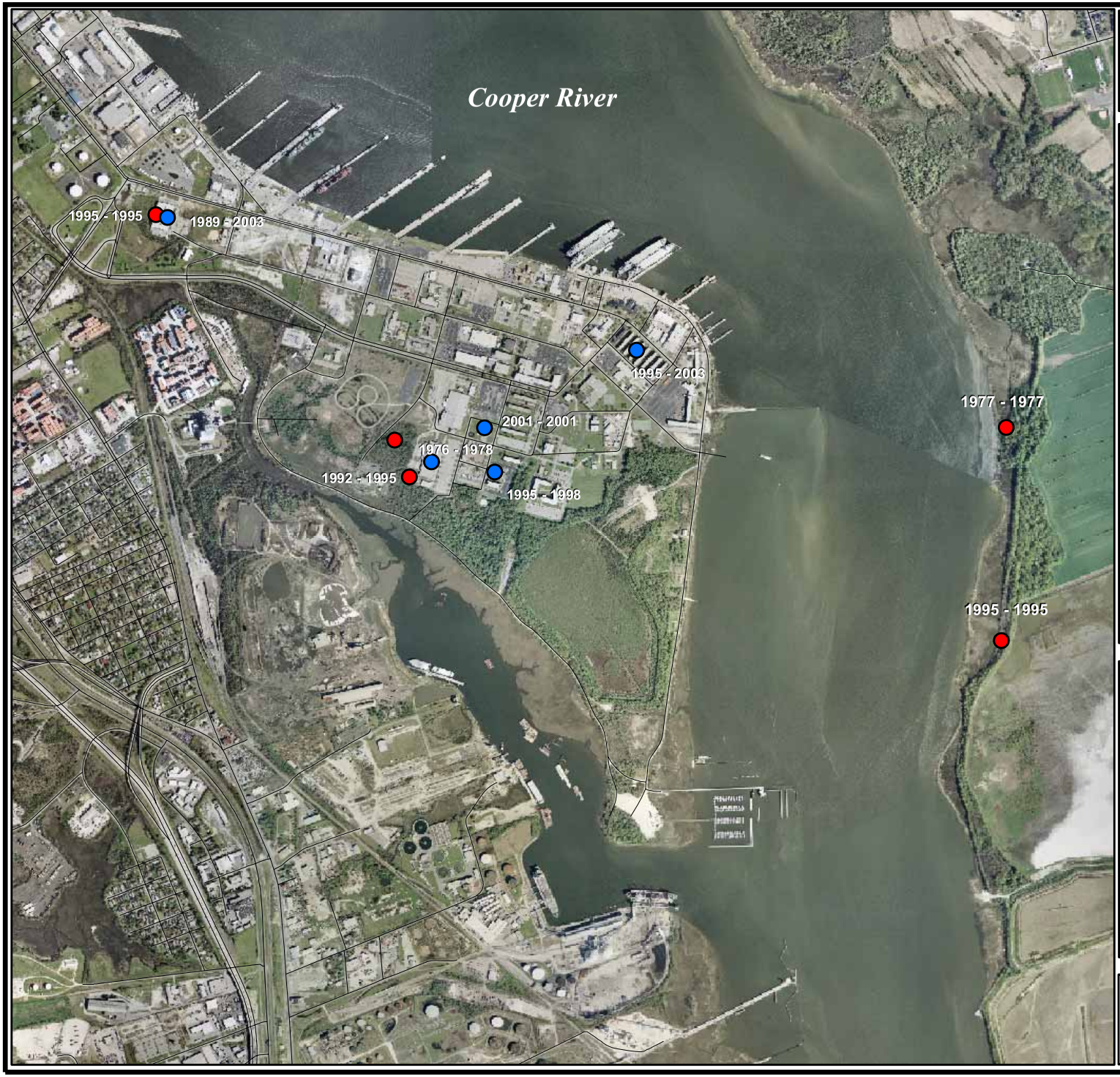
Map Scale 1:9,000,000



Index Map Scale 1:120,000,000

US Army Corps of Engineers
Charleston District

Figure 4.18-6
Whale Ship Strike Mortalities: 1991 - 2002
(Wieting and Jensen, 2004)



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Nesting Sites

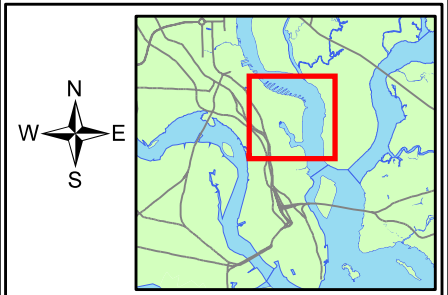
- Colonial Waterbird
- Least Tern

Roads

0 750 1,500 3,000

Feet

Map Scale 1:20,000



Index Map Scale 1:350,000

US Army Corps of Engineers
Charleston District

Figure 4.18-7
Least Tern and Colonial Waterbird Historic Nesting Sites at the CNC

4.19. SHORELINES

This section characterizes the existing shoreline environment. As shown by Figure 4.19-1, the study area includes the shorelines of the Charleston Harbor Estuary extending from the Atlantic Ocean through the harbor, up the Cooper River to Clouter Island.

4.19.1. Charleston Harbor

The Charleston Harbor shorelines were characterized by analyzing aerial photographs, followed by verification and corrections based on field observations. As shown by Figure 4.19-2, the study area includes numerous natural (i.e., marshes, beaches and intertidal flats) and armored shorelines (i.e., bulkheads and revetments).

Analysis of historical aerial photographs and shoreline position comparisons between 1994, 1999, and 2001 were completed to determine the shoreline stability in the study area (shown by Figure 4.19-3). Overall, the harbor shorelines are extremely stable with the exception of some segments containing beaches or transient marsh/intertidal flat features. Bulkheads and revetments protect many segments of the harbor shoreline that would otherwise be vulnerable to erosion and storm damage.

Marshes are common throughout the coastal region of Charleston County and dominate the harbor shoreline. The marshes are predominantly composed of dense growths of cordgrass. Intertidal flats, like those at Crab Bank, contain sparse incipient marsh features.

The beach shorelines include fine and coarse grain sands and shell fragments. The beaches comprise predominantly unconsolidated fine sands and variable amounts of shell fragments depending on the location. Fine grain beaches with well-sorted sands are found along Morris Island and Sullivan's Island. Coarse grain beaches containing shell fragments are found at the southern end of Daniel Island and at other small segments of shoreline inside the harbor (see Figure 4.19-2).

As shown in Figure 4.19-2, over half of the study area shoreline is marsh (57 percent). Approximately 15 percent of the shoreline is beach and 21 percent is protected by bulkhead or stone structures. Only a few segments along James Island, Fort Johnson, Morris Island, Sullivan's Island, Castle Pinckney, and Crab Bank have shown any appreciable erosion or shoreline change between 1994 and 2001 (see Figure 4.19-3). These dynamic segments of the harbor shoreline account for 31 percent of the harbor shoreline.

Shutes Folly Island is well known because of a historic fortress, Castle Pinckney, located on the southern end of the island. The historical aerial photographs show that portions of the island have been eroded. To protect the remnants of Castle Pinckney against erosion, the southern shoreline has been armored. The marsh shoreline along the western side of the island facing Charleston has been very stable, and the northern tip of the island is an unstable intertidal flat.

Crab Bank (located in the eastern portion of the harbor) shorelines are highly unstable, especially the harbor side beach and east end intertidal flats, which have consistently been eroding and changing since 1994. Despite the dynamic nature of this island, the surrounding shallow bathymetry protects Crab Bank from large damaging waves, which tend to shoal and break during their approach to Crab Bank.

The southern jetty of Charleston Harbor extends from Morris Island. The northern end of Morris Island in the study area is a beach composed of fine-grained sands. Historically, this island has

been eroding since the late 1800s (Edge and Dean, 1990; USACE, 1987). The recent aerial photography shows that shoreline has continued to recede.

The southern end of Sullivan's Island included in the study area is a fine-grained beach that has been eroding. The southern tip is exposed to large tidal currents and waves in the harbor inlet. Bulkheads and rock groins have been constructed along the southern end of the island to help stabilize this shoreline. The north jetty of Charleston Harbor intersects this end of Sullivan's Island, and it also influences the erosion of this part of the Sullivan's Island shoreline that lies south of the jetty.

The historic Fort Sumter fortification, one of the most important landmarks in Charleston, is an island located close to the navigation channel inside the harbor entrance. Approximately 95 percent of the shoreline surrounding Fort Sumter is armored and, therefore, very stable. A small marsh shoreline segment is located on the shallow southwest side and is protected from the brunt of wave and tidal currents affecting the fort.

4.19.2. Ship Wake Erosion

Ship wakes are one of many factors that can affect the harbor shorelines. Wind waves, ship wakes, and rising sea level all contribute a part in the erosion of shorelines of the Charleston Harbor. In addition, diking, construction of the Wando Channel, channel deepening, and rediversion of the Cooper River have each affected channel cross-sections, and may continue to do so for years before an equilibrium is established.

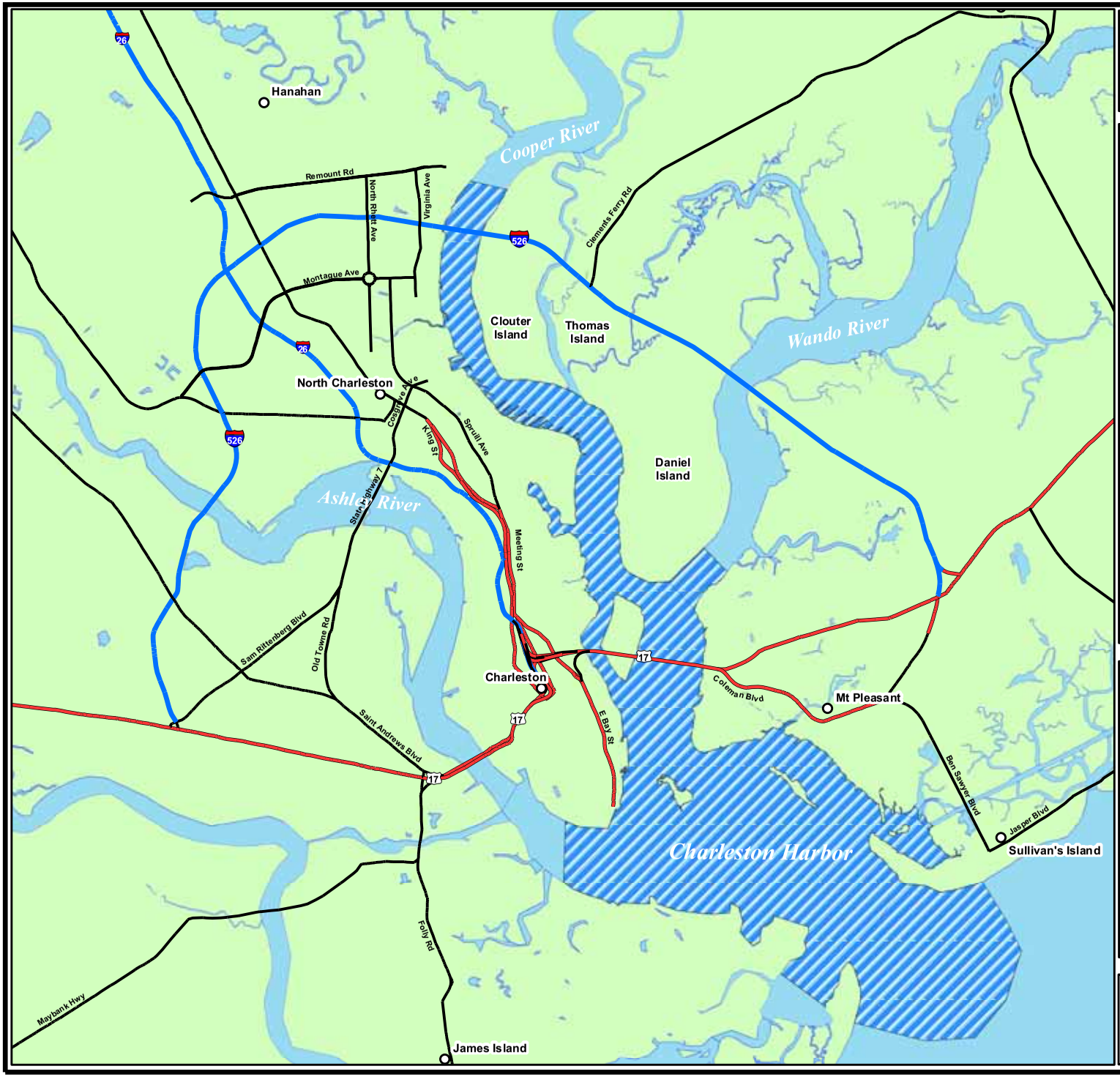
Teeter et al. (1997) assessed the effects of the channel and vessels traversing the channel on the shoreline and near-shore sediment conditions near Hobcaw Point. Procedures used include reconnaissance of sediment conditions in 1992 and 1997, measuring of water depths, bed sediments, shoreline areas, collection of water samples, wave height data, and observations of large cargo ships both inbound and outbound. The most severe vessel waves observed were generated by passing tug boats and service craft. While no erosion was observed, it is possible that some vessel passages might produce erosion. Based on calculations of the relative shear stresses developed by observed vessel and wind waves, Teeter et al. concluded that wind wave erosion was the most likely process involved in potential shoreline erosion in Charleston Harbor.

For this EIS, the typical ship wakes along the shorelines on the study area were estimated using simplified wake equations given by Weggel (1986). These estimates produced reasonable results that generally agree with ship wakes observed during the shoreline assessment field investigation. Observations included wakes generated by several container ships that were observed from vantage points close to the shorelines along Sullivan's Island, Daniel Island, and Drum Island, and tug wakes were observed near Daniel Island and Drum Island. The wake wave heights diminished as they propagated away from the vessels, and the waves incident to the shorelines were not large enough to cause appreciable erosion. It was noted that the container ships are required to move slowly up the channel north of the US Highway 17 Cooper River bridge, and lower vessel speeds limit the wake heights. The container ships generate larger wake heights south of the bridge, where they move at higher speeds.

Based on wake equation estimates and observations, estimated ranges of wake heights that could impact study area shorelines are shown in Figure 4.19-4. The largest wake heights were estimated to occur along the Sullivan's Island reach of the navigation channel and ranged from 2 to 3 ft in height with wave periods from 2 to 3 s. However, there are relatively few of these waves (typically a set of 4 or 5 waves per vessel). In contrast, wind-generated waves in the harbor can exceed the heights generated by ship wakes, and the frequency of wind waves is

much greater than that for ship wakes. In comparison to natural wind waves and tidal currents impacting this area, the contribution of cargo related vessel wakes to shoreline erosion is small. Wind waves along this section of the shoreline can be comparable in magnitude, but are much higher in terms of their frequency of occurrence.

Overall, erosion of Charleston Harbor shorelines is controlled predominately by wind waves and tidal currents. The relative infrequency of cargo vessel waves compared with wind waves means that they are only a minor factor contributing to shoreline changes and erosion.



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

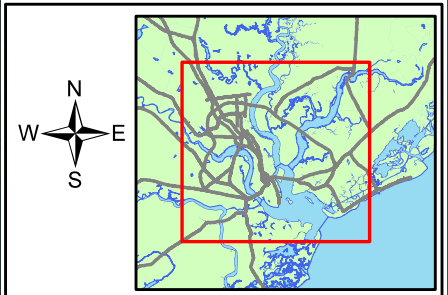
Legend

- Towns
- Shoreline Study Area

0 1 2 4

Miles

Map Scale 1:250,000



Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 4.19-1

Shoreline Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Federal Navigation Channel

Shoreline Classification

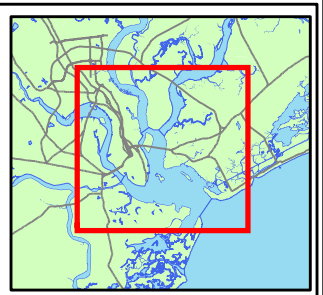
- Beach (Coarse)
- Beach (Fine)
- Dike
- Intertidal Flat
- Marsh
- Structure (Bulkhead)
- Structure (Stone)

0 0.5 1 2

Miles

Map Scale 1:85,000

N
W E
S

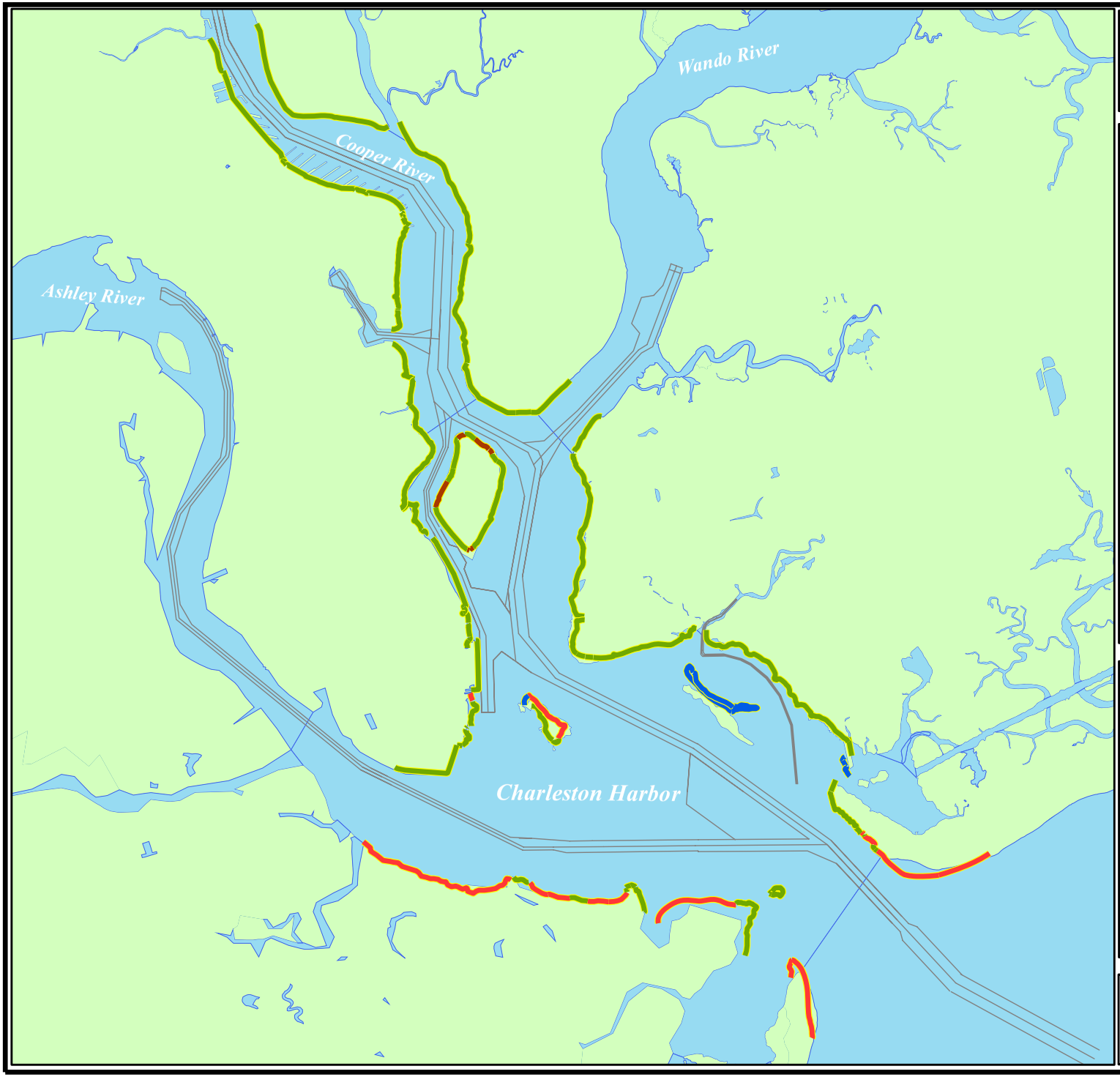


Index Map Scale 1:750,000

US Army Corps of Engineers
Charleston District

Figure 4.19-2

Shoreline Classification



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

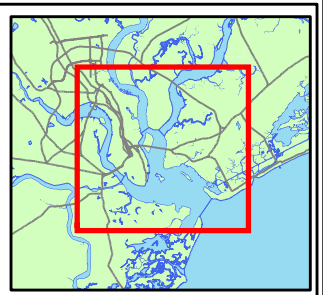
Relative Stability

- Erosional
- Unstable
- Stable
- Stable (w/scarp)
- Federal Navigation Channel

0 0.5 1 2

Miles

Map Scale 1:85,000

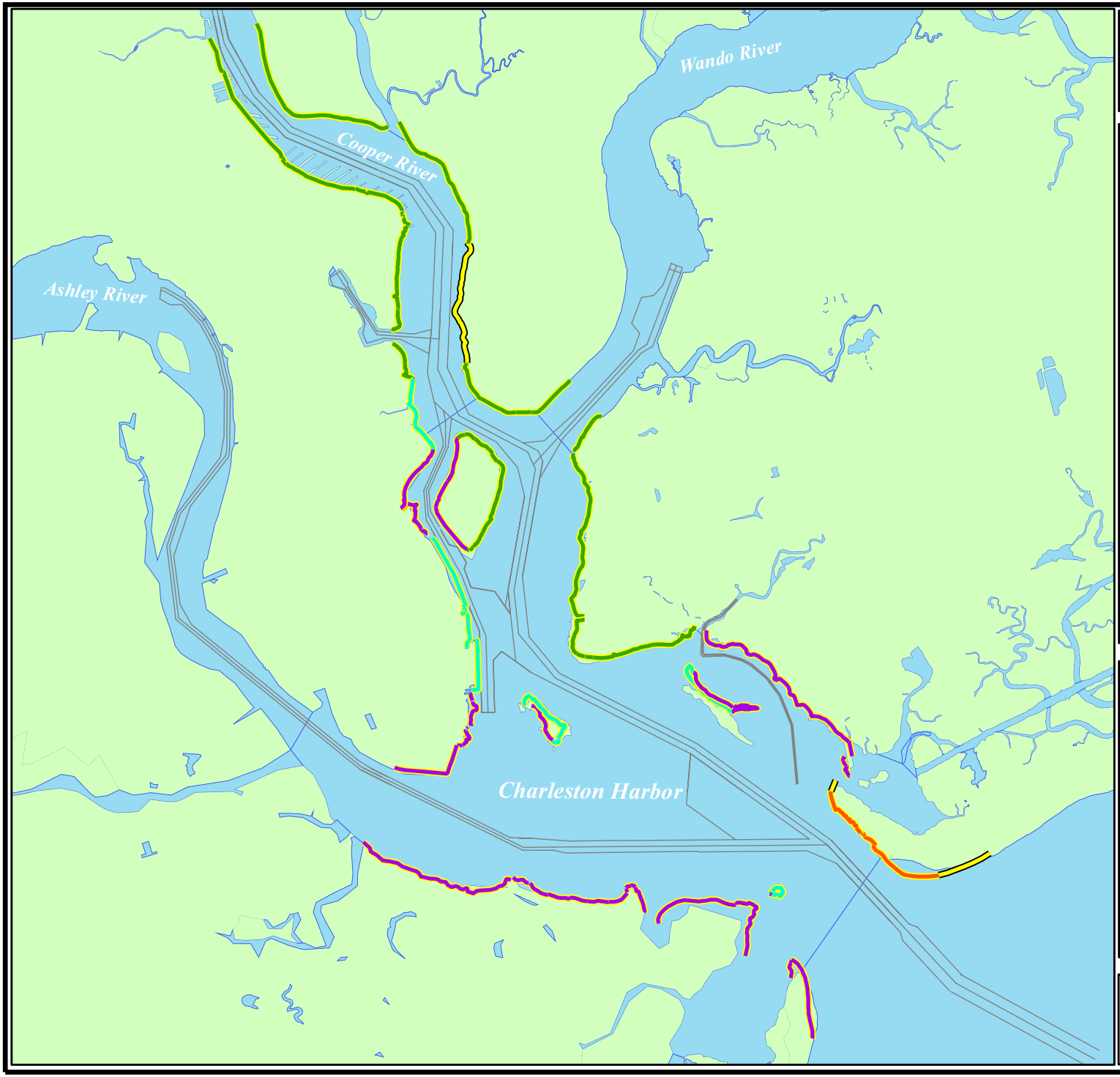


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US Army Corps of Engineers
Charleston District

Figure 4.19-3

Shoreline Relative Stability



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

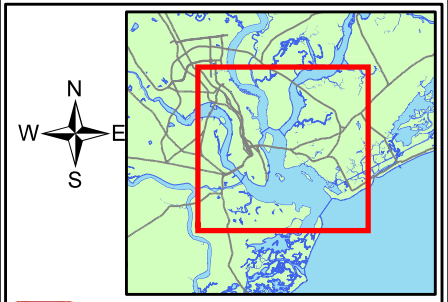
Typical Wake Heights (ft)

- 0
- 0.5
- 0.5-1
- 1-2
- 2-3
- Federal Navigation Channel

0 0.5 1 2

Miles

Map Scale 1:85,000



Index Map Scale 1:750,000

US Army Corps of Engineers
Charleston District

Figure 4.19-4
Typical Ship Wake Heights Along Shorelines

4.20. FLOODPLAINS

Floodplains are defined as the lowland and relatively flat areas adjoining inland and coastal waters, including flood prone areas of offshore islands, and at a minimum, those that are subject to a 1 percent or greater chance of flooding in any given year (i.e., the area inundated by a 100-year flood). This section characterizes the existing floodplains environment in the study area. As shown in Figure 4.20-1, the study area with respect to floodplains includes areas of North Charleston, Daniel Island and Clouter Island, which are located in the floodplains of the Cooper River.

4.20.1. Charleston Harbor

Inundation of floodplains in the Charleston Harbor area is the result of both riverine flooding from rainfall runoff and coastal flooding from tropical storm surge. Riverine flooding in the floodplains of the Ashley, Cooper, and Wando rivers and their tributaries is associated with slow-moving frontal systems, thunderstorms, and tropical storms causing sheetflow, overflow of streams, and ponding. Riverine flooding is prevalent in many areas of Berkeley, Charleston, and Dorchester counties due to small natural channels, flat stream slopes, wide heavily vegetated floodplains in undeveloped areas, and inland tidal effects. Flooding in urban areas such as the City of Charleston and City of North Charleston typically results from less infiltration, quicker runoff response, and decreased storage.

Coastal flooding is caused by extremely high tides and storm surges resulting from hurricanes or intense coastal storms such as nor'easters. Flooding along the Atlantic Coastline and floodplains of the Cooper, Wando, and Ashley rivers is primarily from coastal flooding because of their proximity to Charleston Harbor and the Atlantic Ocean. The primary factors contributing to coastal flooding are the openness to Atlantic Ocean storm surges through Charleston Harbor and the wide entrances to the Cooper, Wando, and Ashley rivers. In addition, the terrain is generally too low to provide an effective barrier to storm surge flooding. Although many segments of the Charleston Harbor are armored to prevent erosion, there are essentially no flood control structures in the low-lying topography surrounding the harbor to defend against major storm surge flooding.

FEMA summarizes historical flood events impacting the Charleston area in the current Flood Insurance Study (FIS) for Charleston County (November 7, 2004, pps. 7-10). An example of historical hurricane related flooding is Hurricane Hugo in 1989, which caused flood waters to rise over 5 ft above normal conditions in Charleston Harbor.

The results of the FIS are presented on a map, referred to as a Flood Insurance Rate Map (FIRM), and presented in the FIS report in a narrative and graphically as flood profiles. The 100-year floodplain is referred to as the Special Flood Hazard Area (SFHA). FEMA determines the SFHA, shown on the FIRMs as A Zones or V Zones, from information obtained through consultation with the community, and from floodplain topographic surveys, detailed hydrologic and hydraulic analyses, and historic records. FEMA uses commonly accepted computer models and engineering methods that estimate hydrologic and hydraulic conditions to determine the 1-percent-annual-chance flood, to determine Base Flood Elevations (BFEs), and to designate flood-risk zones.

Along rivers, streams, and lakes within the United States, FEMA computes flood elevations using computer models, statistical techniques, or both. These elevations are a function of the amount of water expected to enter a particular system by means of precipitation and runoff. The SFHAs in riverine areas are primarily identified as "A Zones" on the FIRM.

Along the coast, FEMA determines SFHAs by an analysis of storm surge, wind direction and speed, wave heights, and other factors. FEMA designates these areas along the coast as both V Zones and A Zones on the FIRM. V Zones are the more hazardous coastal flood zones because they are subject to high velocity wave action. FEMA applies the V Zone designation to those areas along the coast where water depth and other conditions would support at least a 3-foot wave height. FEMA also considers other factors in identifying V Zones, such as wave run-up. FEMA usually designates A Zones in coastal areas landward of the V Zone. Coastal flood hazard areas mapped as A Zones can be subject to storm surge and damaging waves; however, the waves are less than 3 feet in height.

Figure 4.20-2 shows the regional floodplains in the Charleston Harbor area. The floodplain boundaries for the 100- and 500-year storm events were obtained from Federal Emergency Management Agency (FEMA) Q3 Flood Data for Georgia and South Carolina in digital format, and verified with Federal Insurance Rate Maps (FIRMs) for Berkeley County, Charleston County, Dorchester County, and the incorporated towns and cities in the three counties, published by FEMA. Definitions for zones shown in Figure 4.20-2 are as follows:

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplain that is determined in the FIS by detailed methods[2]. In most instances, BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. A BFE is the height of the base flood, usually in feet, in relation to the National Geodetic Vertical Datum of 1929 (NGVD29), the North American Vertical Datum of 1988 (NAVD88), other datum referenced in the FIS report, or average depth of the base flood, usually in feet, above the ground surface.

Zone VE

VE Zones are coastal high hazard areas where wave action and/or high-velocity water can cause structural damage during the 100-year flood. VE Zones are identified using one or more of the following criteria for the 100-year flood conditions:

a. The wave runup zone occurs where the (eroded) ground profile is 3.0 feet or more below the total water level (TWL).

b. The wave overtopping splash zone is the area landward of the crest of an overtopped barrier, in cases where the potential wave runup exceeds the barrier crest elevation by 3.0 feet or more.

c. The high-velocity flow zone is landward of the overtopping splash zone (or area on a sloping beach or other shore type), where the product of depth of flow times the flow velocity squared is greater than or equal to 200 ft^3/sec^2.

d. The breaking wave height zone occurs where 3-foot or greater wave heights could occur (this is the area where the wave crest profile is 2.1 feet or more above the static water elevation).

[2] In producing and updating FISs, FEMA typically uses a combination of two study approaches (approximate and detailed) in identifying a community's flood hazards. Detailed study methods typically employ the use of engineering models and, at a minimum, result in the determination of BFEs or flood depths and floodways that will be displayed on the FIRM. In general, the decision whether to use the approximate method or detailed method is based on existing and anticipated development in and near the floodplain.

e. The primary frontal dune zone, as defined in 44 CFR Section 59.1 of the National Flood Insurance Program (NFIP) regulations.

BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplains.

For the Charleston and Berkeley FISs, water surface elevations for the 100-yr flood were computed from numerical models that simulate storm surge coupled with statistical analyses of the probable chance of occurrence. Water surface elevations in V zones include the effects of increases in the water surface elevation due to wave setup and propagation computed along near-perpendicular transects over the terrain. Summaries of the hydraulic analyses conducted for Charleston and Berkeley County are provided in their respective FIS. Final flood zone boundary determinations and delineations are typically rounded to the nearest foot published on the FIRM.

4.20.2. North Charleston

North Charleston has floodplains along the Ashley River, the Cooper River and the creeks that flow into the rivers. As shown by Figure 4.20-2, a large fraction of North Charleston is within the 100-year floodplain. The Proposed Project site is located in three FEMA flood zones, AE, VE, and X, as shown in Figure 4.20-3. Table 4.20-1 summarizes the percent area of each flood zone at the site. Approximately 46.6 percent of the site is located in flood zone AE with a BFE from 13 ft to 14 ft, NGVD29. Approximately 29.1 percent is in a VE zone with a BFE of 14 ft, NGVD29. The remaining 24.6 percent is in an X zone with no BFE (i.e., it is outside above the 100-yr flood plain).

Table 4.20-1. FEMA Flood Zones at the Proposed Project Site.

Flood Zone	Base Flood Elevation (ft, NAVD88)	Area (acres)	Percent Area
AE	13-14	130.9	46.3%
VE	14	82.3	29.1%
X	N/A	69.4	24.6%

4.20.3. Daniel Island

The Daniel Island Alternative site is located in three FEMA flood zones: AE, VE, and X, as shown on Figure 4.20-4. Table 4.20-2 summarizes the percent area of each flood zone within the footprint. Approximately 79.6 percent of the footprint is located in flood zone AE with a BFE from 12 ft to 13 ft, NGVD29. Approximately 16.0 percent is in a VE zone with a BFE from 14 ft to 16 ft, NGVD29. Zone X areas comprise approximately 4.4 percent.

Table 4.20-2. FEMA Flood Zones at the Daniel Island Alternative Site.

Flood Zone	Base Flood Elevation (ft, NAVD88)	Area (acres)	Percent Area
AE	12-13	215.5	79.6%
VE	14-16	43.3	16.0%
X	N/A	12.0	4.4%

4.20.4. Clouter Island

The Clouter Island Alternative site is located in three FEMA flood zones, AE, VE, and X, as shown on Figure 4.20-5. Table 4.20-3 summarizes the percent area of each flood zone within the footprint. Approximately 86.3 percent of the footprint is located in flood zone AE with a BFE of 12 ft, NGVD29. Approximately 13.7 percent is in a VE zone with a BFE of 14 ft, NGVD29.

Table 4.20-3. FEMA Flood Zones at the Clouter Island Alternative Site.

Flood Zone	Base Flood Elevation (ft, NAVD88)	Area (acres)	Percent Area
AE	12	240.7	86.3%
VE	14	38.1	13.7%



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

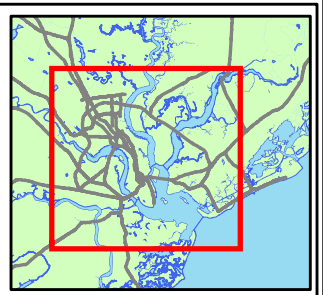
Legend

- Towns
- Floodplains Study Area

0 1 2 4

Miles

Map Scale 1:125,000

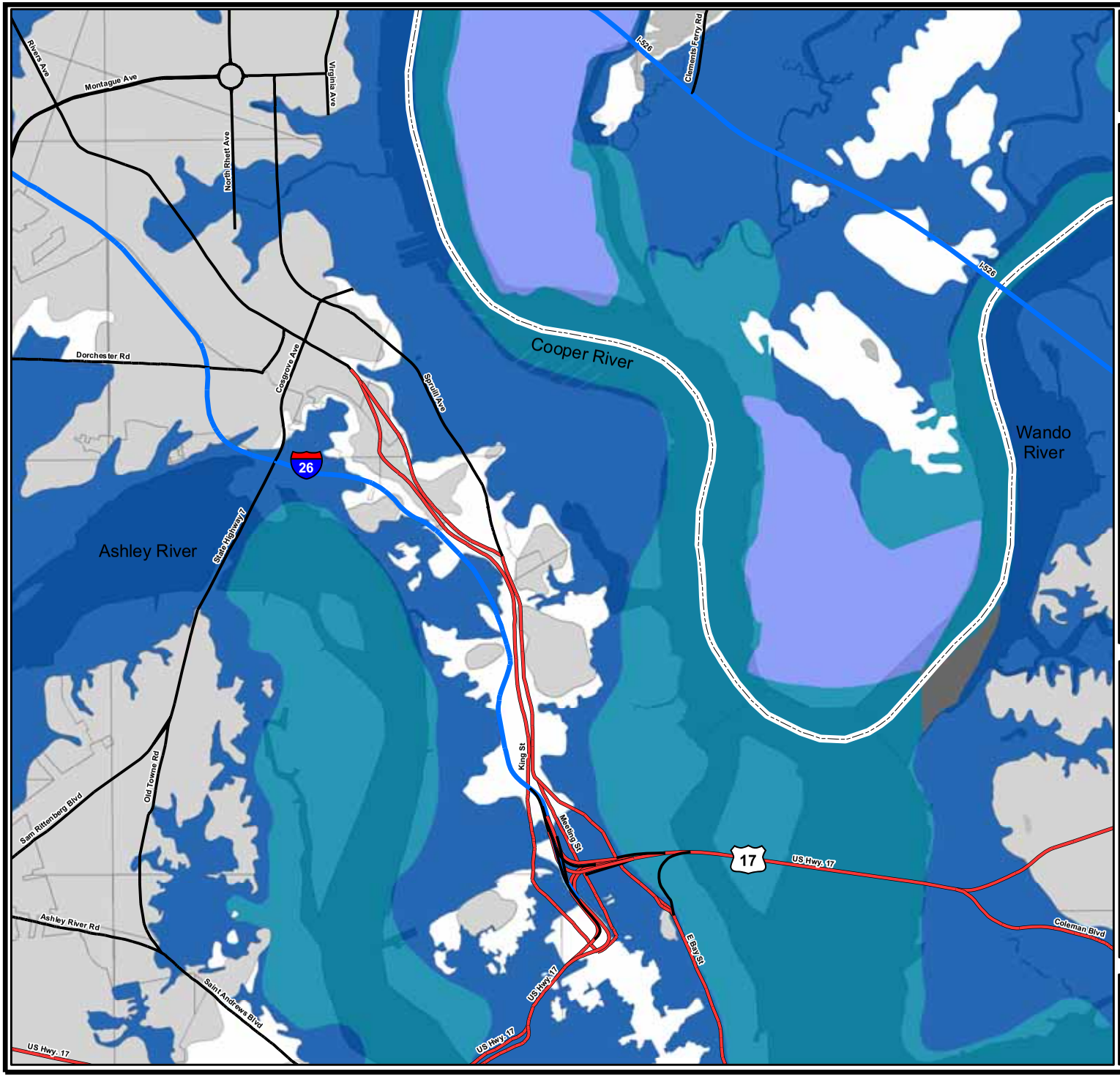


Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 4.20-1

Floodplains Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

County Boundary

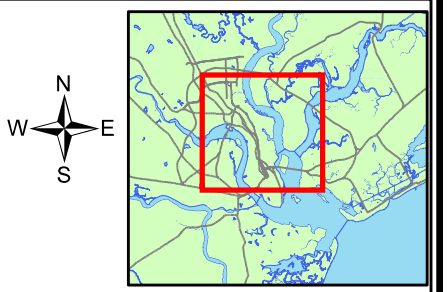
FEMA Floodplains

- A
- AE
- VE
- X (100 to 500 year floodplain)
- X (Outside 500 year floodplain)

0 0.5 1 2

Miles

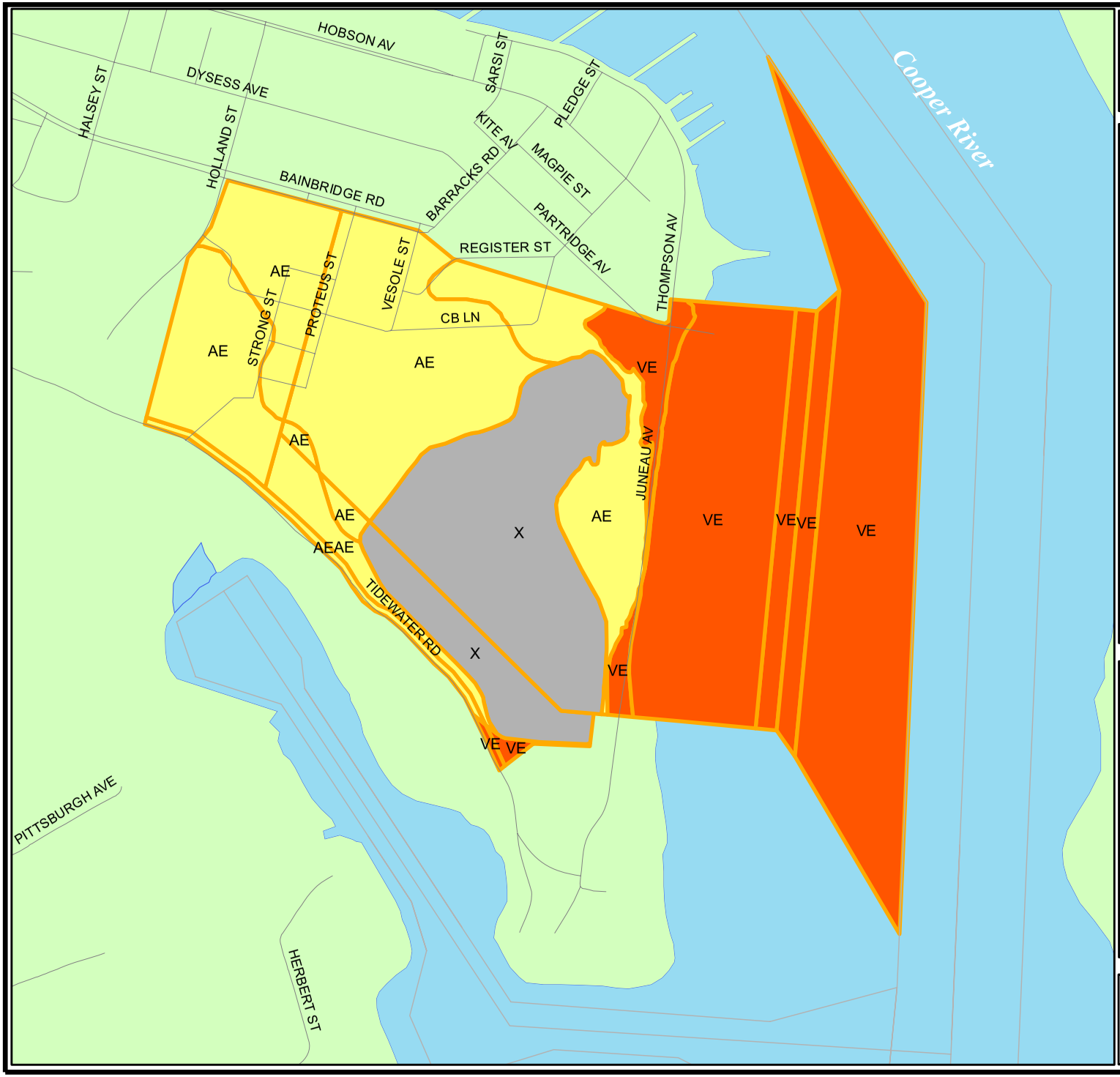
Map Scale 1:60,000



Index Map Scale 1:750,000

US Army Corps of Engineers
Charleston District

Figure 4.20-2
FEMA Floodplains in the Charleston Harbor Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

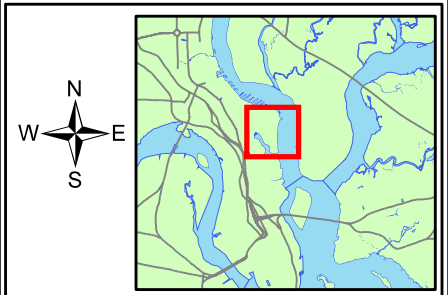
CNC Floodzones

- 100 - year flood hazard. Base Elevations Determined
- 100 - year flood hazard. Coastal Flood with Velocity Hazard; Base Elevations Determined
- Areas between 100 & 500 - year Flood Zone with Flood Depths < 1 ft.

Federal Navigation Channel

0 500 1,000 2,000
Feet

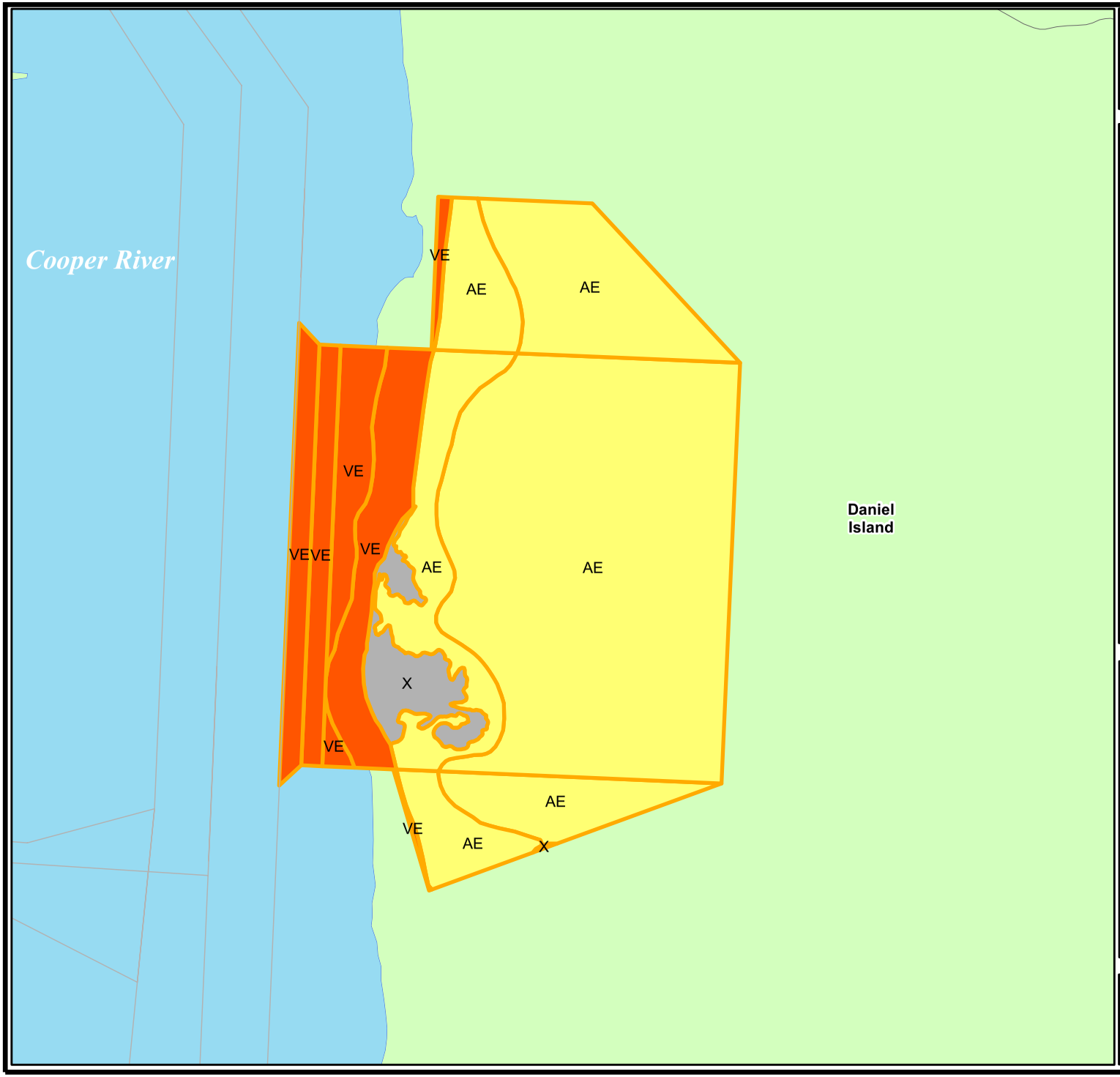
Map Scale: 1:12,000



Index Map Scale 1:350,000

US Army Corps of Engineers
Charleston District

Figure 4.20-3
Floodzones at the Proposed Project Site



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Daniel Island Floodzones

- 100 - year flood hazard. Base Elevations Determined
- 100 - year flood hazard. Coastal Flood with Velocity Hazard; Base Elevations Determined
- Areas between 100 & 500 - year Flood Zone with Flood Depths < 1 ft.

Federal Navigation Channel

0 500 1,000 2,000
Feet

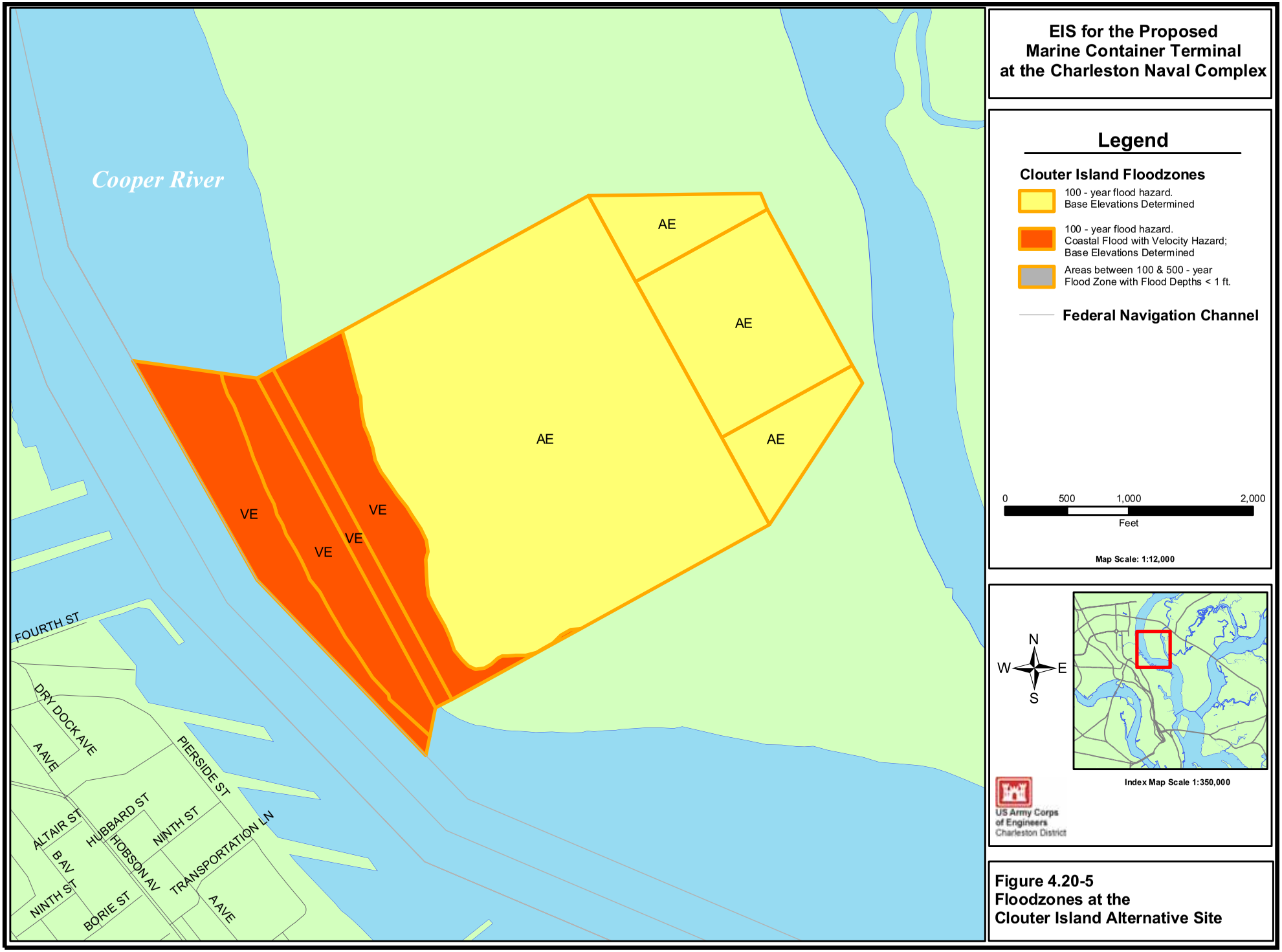
Map Scale: 1:12,000

N W E S

Index Map Scale 1:350,000

US Army Corps of Engineers
Charleston District

Figure 4.20-4
Floodzones at the Daniel Island Alternative Site


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Clouter Island Floodzones
100 - year flood hazard.
Base Elevations Determined
100 - year flood hazard.
Coastal Flood with Velocity Hazard;
Base Elevations Determined
Areas between 100 & 500 - year
Flood Zone with Flood Depths < 1 ft.
Federal Navigation Channel
0
500
1,000
2,000
Feet
Map Scale: 1:12,000
Cooper River
AE
AE
AE
AE
VE
VE
VE
VE
FOURTH ST
DRY DOCK AVE
A AVE
PIERSIDE ST
ALTAIR ST
HUBBARD ST
NINTH ST
B AV
HOBSON AV
TRANSPORTATION LN
NINTH ST
BORIE ST
A AVE
N
W
E
S
Index Map Scale 1:350,000
US Army Corps
of Engineers
Charleston District
Figure 4.20-5
Floodzones at the
Clouter Island Alternative Site

5.0 ENVIRONMENTAL CONSEQUENCES

Environmental consequences associated with the project alternatives considered in detail in this EIS are described for each of the potentially affected resources identified in Section 4.0, Affected Environment. When impacts could not be quantified based on published standards or accepted regulatory thresholds, they have been characterized using available information based on the type, intensity, and duration of the impact.

A summary of unavoidable adverse effects, irreversible and irretrievable commitments of resources, and the relationship of short-term uses of the environment to the maintenance of long-term productivity and cumulative impacts are presented in Sections 5.5, 5.6, 5.7 and 5.8.

5.1. NO-ACTION ALTERNATIVE

The No-Action Alternative assumes that the Proposed Project is not constructed (i.e., a container terminal would not be built at the southern end of the CNC with a roadway providing access to Interstate 26). It assumes that ongoing and reasonably foreseeable future land uses and development trends not associated with the Proposed Project within the study area continue as projected by regional planning studies without changes induced by the Proposed Project. This scenario is used to establish the conditions which would be likely to exist if the Proposed Project is not constructed and to which the projected impacts of the Proposed Project are compared.

It is expected that the market for containerized cargo in this region will rise steadily over the foreseeable future. To meet this demand, planned improvements at existing SCSPA terminals will enable the SCSPA to expand throughput volumes at existing facilities and provide the necessary capacity to meet the projected growth through the year 2014. Potential improvements to existing terminals include denser stacking of containers, redevelopment of available area, and efficiency improvements.

The State of South Carolina, through the CNC Redevelopment Authority (RDA), is the owner of the site of the Proposed Project after acquiring it from the U.S. Navy, which operated a military base there until 1994. For the past few years, the State's expressed purpose for this site has been the construction, operation, and expansion of the SCSPA facilities. With the No-Action Alternative, the CNC RDA would continue to seek opportunities to develop the site for industries, especially of a water-dependent nature. Such industries would likely have an element requiring either the deep-water channel (45 feet) of the Cooper River or other maritime use. The facilities would likely be similar to those already located on the Cooper River, i.e., dry bulk, liquid bulk, petrochemical, etc. In the interim, until compatible industrial tenants are located on the site, the current condition would continue with limited economic benefit to the region or State.

5.1.1. Land Use

Impacts to land use from the No-Action Alternative will be those changes that will likely occur within the study area if the Proposed Project is not constructed and operated. The following subsections provide: (1) a characterization of the future growth of the Tri-County region, and (2) an estimation of the changes in developed land and open space in the land use study area. The land use study area is depicted in Figure 5.1-1.

5.1.1.1. Tri-County Region

For the No-Action Alternative, the land use in the region is expected to experience dramatic changes as a result of urban growth. For example, South Carolina is one of the top 10 states

most desired for retired living in the United States, and the Charleston metropolitan area is one of most popular regions in the state (Strom Thurmond Institute, 2006). Within the entire Tri-County region, residential and commercial development is expected to continue to grow at a rapid pace.

Figure 5.1-2 illustrates the predicted urban growth pattern in the Tri-County region in the year 2030. This urban growth estimate is the result of a growth projection model study conducted by Allen and Lu (2003) at the Clemson University Strom Thurmond Institute. The population is predicted to increase to 795,800 in 2030, a net increase of 49 percent from 1994 (Allen and Lu, 2003). Charleston County is first among the Tri-County area in terms of net population increase, percentage increase, and annual growth rate. During the same period, urbanized land use is predicted to increase from 398 square miles in 2005 to 868 square miles in 2030, a 118 percent increase. By year 2030, approximately 65 percent of the Tri-County region's land will be urbanized (Allen and Lu, 2003). Predicted urban growth for the period 1994 to 2030 by county and in aggregate are summarized in Table 5.1-1. It is important to note that these estimates do not assume any future changes in zoning practices.

Table 5.1-1. Predicted Regional Urban Growth (1994 to 2030).

Item	Berkeley	Charleston	Dorchester	BCD COG Region
Population Growth				
Population 1994	138,776	307,468	86,444	532,688
Population 2030	200,000	469,346	126,533	795,879
Net Growth	61,224	161,878	40,089	263,191
Change	+44.12%	+52.65%	+46.38%	+49.41%
Annual Growth Rate	+1.23%	+1.46%	+1.29%	+1.37%
Urban Area Growth				
Urban Area 1994 (mi^2)	81.61	126.50	41.96	250.07
Urban Area 2030 (mi^2)	306.41	361.33	199.86	867.60
Net Growth	224.80	234.83	157.90	617.53
Change	+275.46%	+185.64%	+376.31%	+246.94%
Annual Growth Rate	+7.65	+5.16%	+10.45%	+6.86%
Population vs. Urban Area				
Population Density 1994 (persons/$mile^2$)	1700	2431	2060	2030
Population Density 2030 (persons/$mile^2$)	652	1299	633	917
Change	-61.65%	-46.57%	-69.27%	-54.83%
Per Capita Urban Area 1994 (acres)	0.38	0.26	0.31	0.30
Per Capita Urban Area 2030 (acres)	0.98	0.49	1.01	0.70
Change	+157.89	+88.46%	+225.81%	+133.33%
Sprawl Index (growth ratio)	6.24:1	3.53:1	8.11:1	5:1

Allen and Lu, 2003.

Agricultural Land

For the No-Action Alternative, the small percentage of agriculture land uses in the study area may be further diminished as the land may be developed for residential or other uses.

Francis Marion National Forest

Under the No-Action Alternative, the Francis Marion National Forest would continue to provide forest diversity, protect unique areas, provide for high-quality recreational use, and contribute to the local community and social considerations. The US Forest Service would continue to consolidate ownership and acquire unique areas, establish and manage areas to provide a sustainable supply of timber products, protect and manage habitat for sustainable populations of native wildlife, and incorporate an ecological approach in management of the forest.

5.1.1.2. Greater Charleston Area

Descriptions of developed land and open space throughout this section will be divided into six generalized categories:

Residential Land Uses – land used for single- and multi-family residential uses as well as mobile homes and trailers.

Commercial Land Uses – land used for business activities such as restaurants, offices, small repair shops, food stores, and gas stations.

Industrial Land Uses – land used for industrial plants, marine terminals, airports, and warehouses.

Institutional Land Uses – land used for churches, schools, cemeteries, and hospitals. Land used for confined disposal facilities (CDFs) for dredged material disposal is included in this category.

Community Features – land used for civic centers, civic buildings, fire stations, and police stations.

Open Spaces – land designated conservation areas, mitigation sites, parks, and recreational facilities.

In the following paragraphs, impacts to these land use categories are described for three regions of the greater Charleston area, i.e., west of the Ashley River, between the Ashley and Cooper Rivers, and east of the Cooper River.

West of the Ashley River

This area includes those portions of the cities/areas of James Island, portions of the City of Charleston, and Folly Beach in Charleston and Dorchester Counties as shown in Figure 5.1-1. Most new growth west of the Ashley River will occur west of the study area (i.e., west of the Stono River and north of Bees Ferry Road). The proposed extension of the Mark Clark Expressway (I-526) from Highway 17 to Folly Road would increase the rate of development on Johns Island. Also, the extension would affect James Island, which is mostly built out, to a lesser extent by spurring redevelopment at higher densities to capitalize on improved interstate access (EDAW AECOM, 2006). The State Infrastructure Bank committed $420 million to the project, although the project is not yet permitted.

The areas west of the Ashley River and east of the Stono River in the study area shown in Figure 5.1-1 are already developed and changes will be mostly in terms of redevelopment of these areas. Descriptions of the growth expected for developed land and open space in the area are as follows:

a. **Residential Land Uses**:

   Residential growth, or the reuse and redevelopment of older neighborhoods, will continue in this area.

b. **Commercial Land Uses**:

   Commercial redevelopment and development opportunities will continue.

c. **Industrial Land Uses/Institutional Land Uses**:

   This land use represents a small fraction (less than 1 percent) of land use in this area and is expected to remain a small portion of the land use.

d. **Community Features**:

   Existing development patterns are expected to continue.

e. **Open Spaces**:

   Due to the developed nature of this area, opportunities for new conservation areas are expected in the near future.

Between the Ashley and Cooper Rivers

Areas within the limits of the cities of Charleston and North Charleston are nearly built out. However, substantial development and revitalization potential is available within the cities of Charleston and North Charleston. Most of the new residential and commercial growth in this area is occurring along I-26 to the north of Ashley Phosphate Road.

There are also a few notable planned and/or ongoing redevelopment projects occurring in the area surrounding the CNC. These developments have the potential to change land use within the study area. The developments are discussed in the following paragraphs.

Noisette Project

The Noisette Project involves the rehabilitation and revitalization of approximately 3,000 acres within the City of North Charleston (Figure 5.1-3). The project has initially focused on redevelopment of the northern part of the CNC, including a waterfront park just downstream of the confluence of Noisette Creek and the Cooper River. The Noisette Project is expected to be an integrated restoration of a part of North Charleston as a sustainable community.

The project seeks to improve and preserve areas along and adjacent to Noisette Creek as the Noisette Preserve. The remaining Noisette redevelopment focuses on a mix of residential, commercial, industrial, and park and recreational uses. The project approximately encompasses that part of North Charleston that existed at the time of its incorporation as a city in 1973. The neighborhoods of Century Oaks, Cameron Terrace, Oak Park, Liberty Hill, Palmetto Gardens, Park Circle, Calhoun Homes, South Park Circle, Garco, Old Village, North Park Village, and St. Charles Place are included within the project footprint.

Magnolia Project

The Magnolia Project is the collective name of two mixed-use developments underway in the Charleston Neck area: the 200-acre Magnolia development and 120-acre Ashley River Center. The approximate locations of these two developments are shown in Figure 5.1-3. The southern land parcel (Magnolia) encompasses areas along the east bank of the Ashley River north of Wagner Terrace to just downriver of the Rhodia Plant. The northern land parcel (Ashley River

Center) extends from just upstream of the Rhodia Plant to Cosgrove Avenue. Both project areas extend from the Ashley River towards the east to King Street (U.S. Highway 78).

Discussions with planners and developers indicate that the Magnolia Project consists of plans to redevelop the area with multi-family homes, hotels, retail, and office space. There will also likely be public recreation areas developed along the Ashley River.

The long-range plan for the Magnolia re-vitalization includes relocating part of I-26 to the east to connect residential areas to the City of Charleston, but this will require additional studies prior to Federal and State decisions on any future change to I-26 in this area. The BCDCOG has initiated a study to assess the potential for the I-26 relocation project. The Magnolia Project largely focuses on underused and/or abandoned properties, many of which have a legacy of industrial contamination. The southern-most land parcel includes the former Koppers Wood Treating facility, which is a CERCLA (Superfund) site. The Koppers site has been undergoing active soil and groundwater remediation for a number of years.

Macalloy Property

The Macalloy property is a CERCLA site that is undergoing active remediation with plans of being redeveloped. The developers of the Magnolia Project acquired the 144-acre property mostly as a means of relocating businesses that were within the Magnolia development footprint. The end use of the Macalloy site will differ from the Magnolia Project in that it will be redeveloped for light and heavy industrial land uses, particularly those that utilize marine terminals on Shipyard Creek. For instance, the inland port developer, Carolina Linkages (CaroLinks), plans to develop an 80-acre parcel of land on the Macalloy property. This development is part of CaroLinks' $250 million plan to create a stand-alone integrated intermodal transportation and distribution network serving the Port of Charleston.

Descriptions of the growth expected and/or changes for developed land and open space in the area between the Ashley and Cooper Rivers are as follows.

a. **Residential Land Uses**:

   Residential in-fill and the reuse and redevelopment of older neighborhoods (such as the aforementioned Magnolia Project and Noisette Project) will continue within the City of Charleston and the City of North Charleston. Some industrial or commercial areas are expected to become new residential areas as part of the Magnolia Project or Noisette Project. New residential development is expected at the northern edges of North Charleston. As described in Section 4.1, a Port Overlay District extends from Pittsburgh Avenue to the south to approximately Jacksonville Road to the north along the east side of Spruill Avenue and extending eastward to the CNC property. For the No-Action Alternative, it is uncertain if this would remain a Port Overlay District, because the proposed port terminal would not be built. However, the City of North Charleston would continue to zone primarily industrial and commercial uses east of Spruil Avenue, and it is reasonable to assume that there will not be any new residential land uses within the overlay area. Existing residential land uses in the overlay area (i.e., Howard Heights) may remain as residential areas (Gore, 2006).

b. **Commercial Land Uses**:

   Commercial redevelopment and development opportunities will continue and expand in Charleston and North Charleston. In North Charleston, both the Magnolia and Noisette

Projects will include commercial redevelopment. Some industrial areas may become new commercial areas as part of these redevelopment projects.

c. **Industrial Land Uses**:

Continued redevelopment of existing port facilities and waterfront industries in Charleston and North Charleston is expected to continue. In the absence of the Proposed Project, the CNC South site is expected to be redeveloped for industrial or institutional uses. In addition, the Macalloy Property is expected to be redeveloped for industrial use.

d. **Institutional Land Uses**:

FLETC is developing new training facilities on the CNC. Institutional development associated with existing colleges, universities, and governmental facilities is also expected. For instance, the City of North Charleston gave Clemson University approximately 82 acres on the CNC (branching out from the Warren Lasch Conservation Center) to develop the Clemson University Restoration Institute.

e. **Community Features**:

The amount of land used for the development of community features (i.e., civic centers, fire stations, police stations, etc.) will increase commensurately with population growth. Detailed information about any changes in land use is unknown at this time.

f. **Open Spaces**:

The Magnolia and Noisette Projects include plans for additional parks and greenspaces in North Charleston and the Charleston Neck area.

East of the Cooper River

Extensive commercial, industrial, and residential development will continue within the Cainhoy Peninsula, Daniel Island, the Town of Wando, the Town of Cainhoy, and the Town of Mount Pleasant. Sullivan's Island; however, is not expected to experience substantial changes in land use.

Descriptions of the growth expected and/or changes for developed land and open space in the area east of the Cooper Rivers are as follows.

a. **Residential Land Uses**:

New residential development is expected in many areas east of the Cooper River, particularly on the Cainhoy Peninsula and Daniel Island. It is projected that there will be more than 5,000 single and multi-family housing units on Daniel Island at build-out, which is estimated to be in 20 years (the build-out is presently about 50 percent complete). There will likely be growth of residential areas at the northern end of Clements Ferry Road near Highway 41. Single and multi-family residential infill development will also continue south of I-526 and U.S. 17.

Recently, the SCSPA began the process of offering for sale and development its 1,300+ acres of property on the southern and western portions of Daniel Island, the majority of which is an inactive CDF. This land is contiguous to land presently being developed by the Daniel Island Development Company. The SCSPA is seeking developers who will

incorporate New Urban Planning Principles in their development plans. Consequently, there will likely be considerably more residential land available on Daniel Island.

b. **Commercial Land Uses**:

Business and commercial development is expected to continue on Daniel Island and north along Clements Ferry Road. Infill will occur where land and redevelopment opportunities exist.

The SCSPA's recent decision to offer for development their land on the southern and western portions of Daniel Island will likely include commercial land use opportunities.

c. **Industrial**:

Future growth in light industrial and warehouse land uses is anticipated to be the most active development activity in the Cainhoy Peninsula. An area of particularly rapid development will be from Yellow House Road north to Jack Primus Road along the west side of Clements Ferry Road.

d. **Institutional Land Uses**:

Institutional development such as civic centers, schools, and churches will follow residential development patterns.

The CDF on Clouter Island will likely remain active in the future. However, the SCSPA is offering for sale and development its land on the southern and western portions of Daniel Island. The majority of this land is classified as an inactive CDF; however, approximately 650 acres is still active. The mixed-use development that the SCSPA plans will change the current land use/zoning of this area.

e. **Community Features**:

Community features such as police, fire, and emergency facilities are developed in response to growth patterns and, therefore, are reactive developments. Considering the current trends of growth in the region east of the Cooper River, it is likely that more of these features will be added in the future.

f. **Open Spaces**:

Several parks and conservation areas are planned by the Town of Mount Pleasant and Charleston County. The sale and development of the aforementioned SCSPA land on Daniel Island will likely include parks and conservation areas.

5.1.1.3. Summary of Land Use Impacts

In summary, for the No-Action Alternative, the land use in the region is expected to experience dramatic changes as a result of urban growth. Particular changes in the study area in close proximity to the Proposed Project and project alternative sites that will affect future development include: relocation of commercial or industrial properties to the Macalloy property; continued development of Daniel Island and the property along Clements Ferry Road; and the possible sale of SCSPA land on Daniel Island for mixed use development.

5.1.2. Physical Setting

This section discusses the potential impacts of the No-Action Alternative on the physical setting of the Tri-County region and the Proposed Project area (Figure 5.1-4). The physical setting is described by the parameters of climate, topography, and geology.

5.1.2.1. Climate

The No-Action Alternative will include rapid growth and urbanization of the region. Ambient temperatures of urbanized areas are typically somewhat warmer than those of rural areas (urban heat island effect). A study of the urban heat island effect (Australian Bureau of Meteorology) indicated that just prior to sunrise, urbanized areas average 4.0 °C (7.2 °F) warmer during the summer months and 3.2 °C (5.8 °F) warmer during the winter months than surrounding non-urbanized areas. Therefore, the future expansion of existing development and development of new areas is expected to cause localized increases in temperature.

The regional climate may also be affected by small changes in temperature associated with global climate change. Greenhouse gas emissions from human activities are expected to continue, mostly in the form of carbon dioxide emissions from burning fossil fuels. According to the EPA (2006), climate models predict that as greenhouse gas concentrations continue to increase in the atmosphere, the Earth's temperature will continue to rise. However, there is uncertainty as to how much it will change, at what rate it will change, or what the exact effects will be.

5.1.2.2. Topography

For the No-Action Alternative, no widespread changes to topography are expected. Future development within the region is expected to result in localized small-scale changes to existing topography. At the Proposed Project site, localized small-scale changes would be expected to accommodate other development at the site.

5.1.2.3. Geology

For the No-Action Alternative, no widespread changes to geology are expected. Existing mines in the region will continue to operate, and additional mines may be permitted. Future development within the region is expected to result in localized small-scale changes to existing surficial geology and soil profile. Other future development at the Proposed Project site would also be expected to cause small-scale localized changes.

Hydrogeology

For the No-Action Alternative, adverse impacts to regional or local hydrogeologic conditions are not expected. Ongoing remediation efforts at properties such as the CNC and Macalloy property will likely improve site-specific groundwater quality over time. The No-Action Alternative is not likely to adversely impact regional or local hydrogeologic conditions.

Seismotectonics

Seismotectonic conditions in the region are not expected to change for the No-Action Alternative. It is likely that earthquakes will continue to occur in the Charleston region, as discussed in Section 4.2.3.2. New development in the region would need to be designed in accordance with applicable South Carolina seismic building standards.

5.1.2.4. Summary of Physical Setting Impacts

In summary, other than small changes in temperature associated with global climate change, no regional impacts to climate, geology, or topography would be expected. Future development within the region is expected to result in localized small-scale changes to existing topography and surficial geology. At the Proposed Project site, localized small-scale changes to topography would be expected to accommodate other development at the site.

5.1.3. Socioeconomic Environment

The socioeconomics of the Tri-county region and the community study areas (shown in Figure 5.1-5 and described in detail in Section 4.3) for the No-Action Alternative are summarized in this section. The parameters used to describe the socioeconomic environment include economic sectors, employment, income, poverty, and housing characteristics.

5.1.3.1. Tri-County Region

Economic Sectors and Employment

The future socioeconomic conditions of the No-Action Alternative were assessed by examining the current strength of the regional economy and some future predicted trends. According to the Charleston Regional Development Alliance (2005), the Charleston-area economy offers a combination of factors needed for business success, which includes a plentiful supply of technically skilled workers, efficient access to the global marketplace, and a diverse portfolio of location opportunities. Employment in every employment sector, excluding information, rose solidly in 2004 from the previous year; this is a trend that is expected to continue for the foreseeable future. The employment sectors of particular strength included wholesale trade, finance, and professional business services.

Given the local market's current ability to create new jobs, the regional labor force is growing at a rapid pace. Table 5.1-2 summarizes historic and projected data about economic indicators for the Charleston region from 1998 through 2009. As shown in this table, total employment in the area has increased 17.2 percent from approximately 241,500 workers in 1998 to approximately 283,000 workers in 2005. By the year 2009, total employment in the area is expected to reach 310,900, which is a 9.9 percent increase from 2005. However, the unemployment rate in the Charleston region has increased slightly, but steadily, in the years from 1998 (2.8 percent) through 2005 (4.7 percent). Nevertheless, projections estimate that this rate will slowly decrease again starting in 2006.

In all, it is projected that a continued growth in tourism, a strong net migration of residents, future development plans, and ongoing business expansions and relocations will ensure a continued strong growth in the economy of the Charleston region over the next few years.

Economic Impact to the SCSPA

For the No-Action Alternative, the Proposed Project would not be developed. The SCSPA would continue to operate its existing Charleston facilities, but would have limited growth opportunities. Under the No-Action Alternative conditions, the SCSPA may try to build a new facility at another site in Charleston or elsewhere in the state of South Carolina.

The Center for Economic Forecasting at Charleston Southern University conducted an analysis of the economic impact of SCSPA operations on a statewide basis using the REMI model code for direct, indirect and induced impacts. The results indicated that SCSPA operations are not only central to the continued growth and strength of the Charleston region economy but are also a statewide economic driver contributing to trade flows to and from South Carolina. The SCSPA is responsible for approximately 281,000 jobs and handles trade that introduces an estimated $23 billion into the state's economy. In 2004, the Port of Charleston generated approximately $116.5 million in revenue, which is a 6 percent increase from the previous year. An increase in exports and imports, particularly from China, is an important contributor to the growth. Indeed, of the total $13.4 billion exported from the Port of Charleston last year, $468 million went to China, which was a 68 percent increase from 2003 (Economy.com, 2005). For the No-Action

Table 5.1-2 Summary of Historic and Forecast Economic Indicators for the Tri-County Region, 1998 – 2009.

Indicator	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total Employment (Thousands)	241.5	251.6	259.1	255.4	259.4	263.5	272.5	283.0	290.6	296.2	303.0	310.9
Percent Change	5.7%	4.2%	3.0%	-1.4%	1.6%	1.6%	3.4%	3.8%	2.7%	1.9%	2.3%	2.6%
Personal Income Growth	8.7%	7.9%	8.3%	3.5%	5.2%	3.2%	6.4%	5.7%	5.4%	5.3%	5.4%	5.5%
Unemployment Rate	2.8%	3.1%	2.8%	3.7%	4.0%	4.5%	4.6%	4.7%	4.6%	4.5%	4.3%	4.2%
Single-Family Home Building Permits	3,298	4,324	3,906	3,916	4,985	5,384	7,316	4,940	4,022	3,804	3,838	3,809
Multifamily Building Permits	1,976	1,530	1,481	768	997	2,010	951	972	900	1,046	1,124	1,119
Existing Home Price ($ Thousands)	119.6	132.0	138.0	150.2	159.4	168.5	183.3	186.1	184.7	185.9	190.6	192.2
Mortgage Originations ($ Millions)	3,207	2,810	2,611	4,718	5,245	6,808	6,551	5,175	4,265	4,378	4,607	4,599
Net Migration (Thousands)	3.9	6.9	0.7	1.0	4.7	5.5	1.5	2.7	3.9	4.7	3.2	4.0

Economy.com, 2005

Alternative, the global and regional demand for containerized cargo will likely continue to increase, but throughput capacity may be limited at existing terminals

In the event the SCSPA does not develop the Proposed Project, it is thought that the SCSPA will remain an important player in the economy of the Tri-County region and the state of South Carolina. However, the Mercer Report (1998) indicated that the SCSPA, the State, and other South Carolina businesses could sustain substantial loss of market share in the event that the SCSPA were unable to develop additional port terminal capacity. The predicted losses are summarized in Table 5.1-3.

Table 5.1-3. Predicted SCSPA, State, and Business Losses.

SCSPA	State of South Carolina	South Carolina Businesses
Strategic • Inability to sustain market leadership position • Potential relegation to secondary port of call or feeder port • Loss of global carrier customers *Tactical and Economic* • Reduced carriers, geographic coverage, and service frequency • Throughput capped at MPC for existing facilities (2.0 million TEU) • Long-term erosion of economies of scale	• Loss of revenues to state businesses • Loss of wages to state citizens • Loss of taxes to State and local governments • Loss of jobs • Loss of additional economic development opportunities due to less attractive international business climate	• Higher transport costs to ship goods • Reduction in competitive access to international markets • Lost sales

Source: Mercer, 1998.

Income and Poverty

Both the cost of doing business and cost of living in the Tri-County region were ranked at 99 percent (U.S. ranked at 100 percent). As shown in Table 5.1-2, in 2004, a person's income was estimated to have increased by 6.4 percent from the previous year's income. Personal income growth is projected to stay well above 5 percent through the year 2009.

Housing Characteristics

The average home price is another socioeconomic indicator. Table 5.1-2 shows that the average home price in 1998 was $119,600 and 5 years later (i.e., 2003) the average home price was $168,500, which was almost a 50 percent increase in price. The average home price in 2008 is projected to be approximately $190,600, which is a 13 percent increase from 2003. These values illustrate the financial growth of the Tri-County region and are in accordance with the increases in personal income residents are experiencing.

5.1.3.2. North Charleston Community Study Area

Specific socioeconomic projections of the North Charleston community study area are not available. However, by using information gathered to describe trends and the existing socioeconomic conditions of the study area (Section 4.3.2) it is possible to make inferences about what the socioeconomic environment would be in 20 years.

Economic Sectors and Employment

Economic growth and development in the North Charleston study area are creating new businesses and jobs, particularly those in construction and industry. In the area surrounding the CNC, redevelopment projects such as the Noisette and Magnolia Projects will continue to attract more residents and businesses. Within the CNC and along Shipyard Creek, it is likely that industrial businesses – especially those that are marine-oriented and rely on waterfront property – and government facilities will continue to locate and develop on this land. For instance, there are currently two maritime industries (i.e., Kinder Morgan and CaroLinks) that are planning redevelopment and/or expansion plans within this area.

Kinder Morgan has an existing break bulk terminal located on Shipyard Creek and is applying to the USACE for a permit to redevelop and expand its facilities. The proposed plans include a projected capital investment of more than $70 million (virtually all of which will be invested locally) and more than 100 new, high-paying jobs.

CaroLinks is an inland port developer that announced plans to develop an 80-acre parcel of land on the Macalloy property on Shipyard Creek, but has not exercised an option to purchase the property and, subsequently, put their plans on hold for this site. The development is part of an overall plan to create a stand-alone integrated intermodal transportation and distribution network serving the Port of Charleston. CaroLinks is also evaluating options at other sites in South Carolina, including 800 acres in Orangeburg. The company estimates that up to 200 new jobs will be created across the state due to the development, as well as strategic linkages to other intermodal sites in the Midwest and southeast United States.

Income and Poverty

The anticipated growth in businesses and jobs in the North Charleston study area, as well as the influx of residents attracted by redevelopment projects such as the Noisette and Magnolia Projects, would likely improve income and poverty figures within the study area. However, at this time, the magnitude of this improvement is uncertain.

Housing Characteristics

The housing characteristics of the North Charleston study area 20 years into the future are likely to vary widely within the area. In the areas impacted by redevelopment projects such as the Noisette and Magnolia Projects, the housing values are expected to increase as new housing and amenities are added. However, these redevelopment projects may not affect other neighborhoods immediately surrounding the CNC. Due to the uncertainty of future conditions, it is assumed that the average housing values in this area will increase from their current values, in addition to adjustments for inflation.

5.1.3.3. Daniel Island Community Study Area

Specific socioeconomic projections of the Daniel Island community study area are not available. However, by using information gathered to describe trends and the existing socioeconomic conditions of the study area (Section 4.3.3) it is possible to make inferences about what the socioeconomic environment would be in 20 years.

Economic Sectors and Employment

It is likely that the Daniel Island study area will continue its transition from the relatively undeveloped area that existed prior to the opening of I-526 to a number of high-value, mixed-use communities, as described in the PUD. Thomas Island, included in the Daniel Island study

area, is still mostly rural; however, this area is also experiencing development pressure that could result in a transition from rural to urban. Moreover, many local, national, and international businesses have invested in the area and have offices on Daniel Island. As a result, several economic sectors are expanding in the area and are providing jobs to the new residents as well as to workers from outside the area.

Income and Poverty

The current economic growth that the Daniel Island study area is experiencing was discussed in Section 4.3.3. According to the 2000 U.S. Census, the median household income for this study area is $64,117, which is considerably higher than the median household incomes for either Berkeley County or the entire Tri-County region. It is expected that the predicted economic strength of the study area will continue to be reflected in high income figures as well as in low poverty levels.

Housing Characteristics

As described in Section 4.3.3.3, the median value of homes in 2000 was reported to be $250,300, which was well over the median value of homes of any of the three counties within the region. Accordingly, it is predicted that the homes in the study area will continue to be of high value well into the future. It is also expected that the new construction as part of the Daniel Island community development will continue to expand throughout the island; other new mixed-use development is also expected to take place on Thomas Island.

5.1.3.4. Clouter Island Community Study Area

The Clouter Island study area consists of a CDF. There are currently no residents, houses, or buildings on the island. Furthermore, it is unlikely that any development will take place for the No-Action Alternative (i.e., 20 years in the future).

5.1.3.5. Summary of Socioeconomic Impacts

The No-Action Alternative will have minimal immediate impacts to the socioeconomic conditions in the vicinity of the CNC. Redevelopment of the CNC and surrounding areas will likely continue as planned. It is likely that the south end of the CNC would be further developed for some industrial use and have a minimal increase in employment in the area. It is uncertain whether any further development of the Port Overlay District as described in the MOUA between the SCSPA and the City of North Charleston would occur.

Under the No-Action Alternative, the regional socioeconomic conditions will likely continue as projected. Although port-related growth and development will be limited in the future, other economic sectors in the region and State of South Carolina are not considered dependent on the continued growth of the port.

5.1.4. Social Characteristics and Environmental Justice

The social characteristics during No-Action conditions for the Tri-County region and community study areas are considered in this section. The community study areas are described in Section 5.1.3 and illustrated in Figure 5.1-6. In addition to discussing changes in social characteristics (including population, racial composition, age distribution, educational attainment, and income), other topics discussed in this section include the acquisition or relocation of properties and environmental justice.

5.1.4.1. Social Characteristics

Tri-County Region

Population Trends

According to local planners, the local populations of all three counties and the Tri-County region as a whole are anticipated to grow through 2025. The BCDCOG attributes in-migration and economic diversification as the primary responsible factors spurring growth. Natural increases (i.e., local births exceeding deaths) are other contributors to growth. The No-Action Alternative baseline projections of population by five-year increments for each county and the Tri-County region are presented in Table 5.1-4. By 2025, the Tri-County region is expected to have approximately 698,050 residents.

Table 5.1-4. Tri-County Population Growth Estimates and Projections, 2005-2025.

County/Region	2005	2010	2015	2020	2025
Berkeley County	151,860	162,440	173,010	183,590	194,160
Charleston County	325,120	333,740	342,370	351,000	359,630
Dorchester County	108,300	117,290	126,280	135,270	144,260
Tri-County Region	585,280	613,470	641,660	669,860	698,050

Source: BCD Council of Governments

Racial Composition

For the No-Action Alternative, it is likely that any change would be minimal and that the past trends and racial composition of the region described in Section 4.4.1.1 will be similar in the future. The Tri-County region and the State of South Carolina experienced a minimal increase of less than 10 percent of minority populations between 1990 and 2000.

Age Distribution

The baby boom generation is a demographic term for the population born between 1946 and 1964. Data from the 2000 U.S. Census estimates that the group that holds the “baby boomers” is made up of approximately 83 million individuals. The members of this group currently range in age from 41 to 59 years, which means they will likely start retiring from the workforce in approximately six years.

In Section 4.1, it was stated that the Charleston Regional Development Alliance identified South Carolina as one of the top 10 states most desired for retired living in the United States, and that the Charleston metropolitan area is one of most popular regions in the state for retirement. Therefore, it can be expected that, for the No-Action Alternative, the age distribution in the Charleston Metropolitan area will be more heavily represented by persons 65 or older than it is now.

Income Distribution

For the No-Action Alternative, it is reasonable to expect that median household incomes will rise along with the growing regional economy. According to the socioeconomic data shown in Table 5.1-2, personal income growth is projected to stay well above 5 percent through the year 2009. A similar trend in personal income growth is anticipated through 2025.

Educational Attainment

For the No-Action Alternative, it is likely that any change to the educational attainment of the population living within the Tri-County region would be minimal and that the educational attainment trend of the region described in Section 4.4.1.1 will continue in the future.

North Charleston Community Study Area

The North Charleston community study area is described in Section 5.1.3 and illustrated in Figure 5.1-6.

Population Trends

The majority of the North Charleston community study area is within Planning Area I as designated for the North Charleston Comprehensive Plan; a small portion is also within Planning Area II. According to the City of North Charleston Comprehensive Plan, Planning Area I had a 32 percent population decrease between 1970 and 1995, primarily as a result of the closing of the Charleston Naval Base (City of North Charleston Planning Department, 1996). This area continued to lose population through 2000 despite some limited institutional, commercial, and industrial reuse of the Charleston Naval Base.

For the No-Action Alternative, it is assumed that the decreasing population trend in this area may continue for the short term. However, the planned redevelopment projects (i.e., the Noisette and Magnolia Projects) will likely attract new residents to the area and, over time, increase the population in the areas affected by these projects. It should be noted, though, that ongoing industrial and commercial developments occurring east of I-26 may adversely affect existing residential developments in adjacent areas. As a result, some of these residents may choose to relocate.

Racial Composition

Presently, this area's population is approximately 74 percent minority. It is expected that the planned development and revitalization projects referenced above would impact the racial composition of the North Charleston study area to some degree. Generally, the end result of urban neighborhood development and/or revitalization projects (e.g., the Noisette and Magnolia Projects) are more racially mixed neighborhoods. Therefore, it is expected that more residents will move into the North Charleston study area in the No-Action Alternative and that the percent of minority residents will decrease. This is particularly true for those areas being redeveloped by the Noisette and Magnolia Projects.

Age Distribution

It is likely that any change would be minimal and that the existing age distribution of the area described in Section 4.4.1.1 is representative of future conditions. The future influx of retired baby boomers to the Tri-County region is not likely to change the age distribution in this area.

Income Distribution

The anticipated growth in businesses and jobs in the North Charleston study area, as well as the new residents attracted by redevelopment projects (e.g., the Noisette and Magnolia Projects) will likely improve income and poverty figures within the study area. At this time, the North Charleston study area has a median household income that is much lower than that of either Charleston County or the Tri-County region, i.e., $21,134 compared to $37,810 and

$40,345, respectively. This difference is an indicator of the potential for future increases in the study area.

Educational Attainment

The influx of new residents attracted by the revitalization efforts in the North Charleston study area will likely increase the educational attainment statistics of the area. Also, the Charleston County School District describes a number of new schools and/or education programs being created in the study area in an effort to raise educational attainment.

Clouter Island and Daniel Island Community Study Area

As mentioned in Section 4.4, the Daniel Island Alternative and the Clouter Island Alternative share the same census block group. There are currently no residents living on Clouter Island as the area is being used as a CDF. It is unlikely that any other development will take place on Clouter Island for the No-Action Alternative in the foreseeable future.

The development of Daniel Island is still ongoing, and is likely to expand throughout the Cainhoy Peninsula, it is expected that the population growth in this area will continue for the No-Action Alternative.

Racial Composition

The Daniel Island community development is currently an upscale and predominantly white urban area, and the demographics for this area are not likely to change for the No-Action Alternative. In contrast, Thomas Island, which has historically supported a predominantly minority population, is expected to undergo changes similar to those of Daniel Island with new development and an increase in the percentage of white residents.

Age Distribution

The statistics described in Section 4.4.1.3 indicate that the Clouter Island and Daniel Island community study area currently is experiencing an influx of young families migrating into the area, particularly onto Daniel Island. This trend is expected to continue into the future for the No-Action Alternative. Moreover, in addition to young families, retiring baby boomers will also likely find the planned community on Daniel Island to be attractive for retirement.

Income Distribution

The current average income of the Daniel Island study area reflects the high-value communities developing on Daniel Island. The economic growth of the study area is expected to continue into the future and be reflected in income statistics.

Educational Attainment

It is uncertain how the educational attainment of the population living within the Daniel Island study area will change under the No-Action Alternative. However, it is likely that any change would be minimal and that the existing educational attainment trend of the area described in Section 4.4.1.3 is representative of future conditions.

5.1.4.2. Acquisition/Relocation of Residences and Businesses

It is uncertain how many, if any, residences and/or businesses will be acquired or relocated as a result of future development in the No-Action Alternative. As mentioned in Section 5.1.1, the

developers of the Magnolia Project, a development project in North Charleston, acquired the 144-acre Macalloy site mostly as a means of relocating businesses. Therefore, it can be expected that there will be a number of businesses relocating from the Magonolia Project footprint to the Macalloy site in the foreseeable future.

In regard to Daniel Island, prior to the current mixed-use communities on Daniel Island, the island was historically undeveloped land. Therefore, it is unlikely that any residences or businesses will need to be acquired or relocated for the current development plans. In contrast, Thomas Island, while rural in nature, does have a history of residential use. As a result, it is possible that future development plans in this area could include the acquisition or relocation of businesses and/or residences. However, at this time, there are no known development plans for this area and the likelihood of residences or businesses being disrupted in the No-Action Alternative (i.e., 20 years into the future) is minimal.

5.1.4.3. Environmental Justice

Regulatory Requirements and Methodology

Refer to Section 4.4.2 for information about the regulatory requirements of environmental justice evaluations, as well as the methodology for identifying populations that meet the environmental justice threshold.

Environmental Justice Impacts

The map in Figure 4.4-4 illustrates two study areas used in the environmental justice (EJ) determination: (1) North Charleston study area and (2) Clouter, Daniel, and Thomas Islands study area. The following paragraphs provide a brief summary of the determinations (provided in more detail in Section 4.4) and a discussion of potential EJ impacts occurring in the No-Action Alternative (i.e., 20 years into the future without the Proposed Project).

As discussed in Section 4.4 and illustrated in Figure 4.4-4, the North Charleston EJ study area is comprised of eight Census block groups. All eight block groups in this study area met either the minority or poverty threshold for EJ status. Seven out of the eight block groups met the minority threshold and four out of eight block groups met the poverty threshold. Therefore, it has been determined that the North Charleston study area does contain an EJ population.

In contrast, the Census block group comprising the Clouter, Daniel, and Thomas Islands (also shown in Figure 4.4-4) does not meet the EJ threshold for minority or low-income residents. It should be noted, however, that a review of historical records of residential areas along the access roadway corridor considered for the Daniel and Clouter Island Alternatives, (i.e., Clements Ferry Road on Thomas Island) indicates that the immediate area is primarily made up of minority populations.

For the No-Action Alternative, it is likely that ongoing industrial and commercial developments east of I-26 may adversely affect existing residential developments in the North Charleston study area. As a result, some of the residents may choose to relocate. However, despite the decrease in the number of residents, it is expected that the remaining population in the study area will remain an EJ population well into the future. Impacts to this population for the No-Action Alternative are difficult to predict, but most likely include those impacts commonly associated with commercial and industrial developments. Most notably, increases in noise, light, and traffic are expected to affect this EJ population in the No-Action Alternative.

The aforementioned (Section 5.1.4.1) development pressure expected to be exerted on Thomas Island in the future will most likely result in an increase of white residents similar to that of Daniel Island. This change will likely result in a shift in racial composition which may affect the EJ determination for this portion of the Clouter, Daniel, and Thomas Islands EJ study area.

5.1.4.4. Summary of Social Characteristics and Environmental Justice Impacts

In summary, for the No-Action Alternative, the population in the North Charleston study area is not expected to grow at the same rate as that of the Clouter Island and Daniel Island study area. It is assumed that the decreasing population trend for the North Charleston study area will continue for the short-term until new residents are attracted to the area as a result of ongoing development and revitalization projects nearby. Presently, the North Charleston study area's population is approximately 74 percent minority. It is likely that the ongoing development and revitalization projects will result in more racially mixed neighborhoods.

The Clouter Island and Daniel Island study area is expected to continue to experience an influx of residents as the area, particularly Daniel Island, is developed. Thomas Island, which has historically supported a predominantly minority population, is expected to undergo changes similar to those of Daniel Island with new development and an increase in the percentage of white residents.

With the potential change in the number of residents and racial mix, it is uncertain whether the population in the North Charleston EJ study area will remain an EJ population. Potential impacts to this population are difficult to predict, but will likely include those impacts commonly associated with commercial and industrial developments, most notably, increases in noise, light, and traffic.

5.1.5. Community Infrastructure and Municipal Services

This section discusses potential impacts from the No-Action Alternative on community infrastructure and municipal services within the study area depicted in Figure 5.1-7. Topics discussed in this section include water supply; wastewater treatment; fire, law enforcement, and emergency medical services; schools; solid waste generation and disposal; and utilities.

5.1.5.1. Water Supply and Wastewater Treatment

Capacity demands on water supply and wastewater treatment will likely increase commensurate with the anticipated growth and development of the Tri-County region. According to the companies providing potable water and wastewater treatment to the Tri-County region (see Section 4.5), the available capacity is expected to be adequate to support the anticipated regional growth.

5.1.5.2. Fire, Law Enforcement, and Emergency Medical Services

Under the No-Action Alternative, the Tri-County region's population will continue to increase and fire, law enforcement and emergency medical service will need to expand capacity accordingly.

Fire Protection

Additional fire protection service providers were projected (including both paid and volunteer firefighters) for the Tri-County region through 2020 under the No-Action scenario. The average ratios of fire protection service providers to population were estimated as follows: Berkeley County 1:250, Charleston County 1:350, and Dorchester County 1:310. Table 5.1-6 summarizes

the total projected future background fire protection personnel (firefighters) requirements, by county, required to maintain these ratios.

Without the Proposed Project, it is estimated that Berkeley County will need a total of 776 fire protection personnel in 2025, an increase of 169 personnel over 2005 requirements (27.8% increase). Charleston County is estimated to need 1027 personnel in 2025 compared with 929 in 2005, a 10.5 percent increase. Dorchester County is estimated to require 465 fire protection personnel in 2025, a 33.2 percent increase over 2005 requirements.

Table 5.1-6. Projected Background Fire Protection Personnel Requirements for the Tri-County Region.

County	2005	2010	2015	2020	2025	Percent Increase 2005 to 2025
Berkeley	607	649	692	734	776	27.8%
Charleston	929	953	978	1003	1027	10.5%
Dorchester	349	378	407	436	465	33.2%

Population projections from South Carolina Budget and Control Board – Office of Research and Statistics.

Law Enforcement

Using the same approach as described in the preceding paragraph, future law enforcement officer requirements for the No-Action Alternative were estimated by county. Table 5.1-7 summarizes the total estimated future background law enforcement officer requirements by county. Berkeley County is projected to require 36 additional law enforcement officers in 2025 compared to 2005 requirements; Charleston County is estimated to need an additional 93 law enforcement officers over the 2005 level; and Dorchester County is estimated to need an additional 51 law enforcement officers in 2025.

Table 5.1-7. Projected Background Law Enforcement Officer Requirements for the Tri-County Region.

County	2005	2010	2015	2020	2025	Percent Increase 2005 to 2025
Berkeley	126	135	144	153	162	28.6%
Charleston	879	902	925	949	972	10.6%
Dorchester	154	166	179	192	205	33.1%

Population projections from South Carolina Budget and Control Board – Office of Research and Statistics.

Emergency Medical Services (EMS)

Estimated EMS personnel requirements for the No-Action Alternative will increase throughout the Tri-County region. Table 5.1-8 summarizes the estimated additional EMS personnel requirements by county to 2025 as well as the estimated percent increase over the duration of the study period.

Table 5.1-8. Projected Background EMS Requirements for the Tri-County Region.

County	2005	2010	2015	2020	2025	Percent Increase 2005 to 2025
Berkeley	71	76	81	86	91	28.1%
Charleston	153	157	161	165	169	10.4%
Dorchester	50	54	58	63	67	34.0%

Population projections from South Carolina Budget and Control Board – Office of Research and Statistics.

5.1.5.3. Schools

Using the data and estimated public school student enrollment percent increases or decreases described in Section 4.5.3.1, future No-Action Alternative student enrollment was estimated in five-year increments to 2025.

Berkeley County School District enrollment is estimated to decline from approximately 26,240 students to 25,617 students during the study period (a decline of approximately 2.4 percent).

Charleston County School District 4 (North Charleston) is estimated to experience an increase of approximately 494 students between 2005 and 2025 under No-Action Alternative conditions, an increase of approximately 3.5 percent during the study period. Conversely, Charleston County School District enrollment as a whole, including District 4, is estimated to decrease by approximately 581 students during the study period, a decline of approximately 1.4 percent.

Dorchester County School District student enrollment is projected to increase from 22,523 to 46,044 during the study period under the No-Action Alternative (an increase of approximately 104 percent).

Table 5.1-9 provides projected public school enrollment by county in five-year increments to 2025 using the annualized percent increase or decrease estimated during the period of record.

Table 5.1-9. Projected Public School Enrollment for CCSD District 4, Berkeley, Charleston, and Dorchester Counties 2005-2025.

School District	2005	2010	2015	2020	2025	Estimated Percent Change 2005 to 2025
Charleston District 4 (North Charleston)	14,291	14,413	14,536	14,660	14,785	3.5%
Charleston County (including CCSD District 4)	41,770	41,624	41,478	41,333	41,189	-1.4%
Berkeley County	26,240	26,083	25,927	25,772	25,617	-2.4%
Dorchester County	22,523	26,939	32,203	38,507	46,044	104.4%

Note: Projected school enrollment based on enrollment data provided by BCDCOG for the period 1989-2003.

It is likely that the predicted change in attendance at private schools resulting from the No-Action Alternative for the next 20 years will be similar to the change in attendance at public schools.

Although attendance may change at local colleges and technical schools, the No-Action Alternative will not immediately affect future development plans.

5.1.5.4. Solid Waste Generation and Disposal

Under the No-Action Alternative, solid waste generation is expected to increase as population growth occurs. However, it has been concluded that the existing solid waste management facilities within the Tri-County region have adequate capacity to handle the anticipated increase.

Solid Waste Management Practices and Procedures

Solid waste management will continue to be regulated by SCDHEC. As older landfills are closed out, newer landfills with more environmental protection requirements and monitoring will replace them. Recycling and reduction of waste from residences, businesses, and industries will likely continue in the future.

Municipal Solid Waste Collection and Disposal Facilities

Municipal solid waste facilities and services are likely to expand as a result of regional growth for the No-Action Alternative to meet the growth demand.

5.1.5.5. Utilities

Future utility expansions will likely accommodate the projected population increase within the Tri-County region.

5.1.5.6. Summary of Impacts to Community Infrastructure and Municipal Services

In summary, the available capacity at facilities providing solid waste management and potable water and wastewater treatment is expected to be adequate to support the anticipated regional population growth. Other municipal provisions such as fire, law enforcement, and emergency medical services will need to expand to meet the demand of the growing population.

5.1.6. Transportation

For the No-Action Alternative, the Tri-County region is anticipated to experience large population increases and attendant demands upon the existing ground transportation system. The following subsections discuss the future roadway, traffic, and railroad conditions that are estimated to occur without the Proposed Project in the Tri-County region and in the study areas. The transportation study areas include the North Charleston study area, the Clouter Island study area, and the Daniel Island study area as shown in Figure 5.1-8.

5.1.6.1. Roadways

Projections of No-Action Alternative future infrastructure and traffic conditions are provided in the following subsections. The projections of future traffic were obtained by analyzing traffic, population, and employment growth rates computed for each major roadway corridor within the study areas. The growth rate analysis involved reviewing (1) observed traffic trends within the study areas between 2000 and 2003 and (2) the projected household and employment growth estimates for the area (BCDCOG travel demand model, September 2004 data).

Tri-County Region

Infrastructure

There are a number of recently completed or nearly completed transportation improvement program projects that will improve traffic flow within the area, such as the Arthur Ravenel Bridge (US Highway 17 between Mt. Pleasant and Charleston), widening of I-26 between Ashley

Phosphate Road and US Highway 17A, widening of US Highway 17A from I-26 to Cypress Gardens Road, I-26 and Ashley Phosphate Road interchange, I-26 and US Highway 78 interchange, and I-26 and US Highway 17A interchange.

The Charleston Area Transportation Study (CHATS) covers approximately 800 square miles within the Tri-County region and generally includes all lands that are expected to become urbanized during the next 20 years. A recent version of the CHATS Long Range Transportation Plan, dated April 2005, describes current and projected transportation conditions in the region, outlines priorities and parameters for project selection, and identifies specific transportation improvement projects that need to be completed (e.g., interchange improvements, intersection improvements, roadway improvements, roadway widening, and new roadway locations). Projects that are not identified within the Long Range Transportation Plan are not eligible for Federal funding through the Metropolitan Planning Organization. The Long Range Transportation Plan is updated periodically according to Federal regulations. The Long Range Transportation Plan does not include maintenance and repair projects or improvements of rural transportation infrastructure outside of the urbanized area.

Transportation improvement projects in the Long Range Transportation Plan are prioritized through quantitative analysis using road traffic volume, accident rate, travel pattern, and other statistical data regarding the functionality of existing transportation system. These data are then input to transportation computer models that project future traffic volumes on urbanized area roadways and analyze impacts of future improvements. The Long Range Transportation Plan is fiscally constrained, meaning that a project cannot be included within the plan unless a means to fund it has been identified. The primary funding source for transportation improvements within South Carolina are State and Federal gasoline taxes. Other financing means are potentially available, but may require special actions by local or State level decision makers. The annual funding program, known as the Transportation Improvement Program (TIP), provides the current funding allocation for projects identified within the Long Range Transportation Plan. In addition to roadway improvements, the Long Range Transportation Plan also includes walking trails and bikeways along major arterials throughout the area.

The CHATS-recommended long-term roadway improvements are shown in Figures 5.1-9 and 5.1-10 and are summarized in Table 5.1-12. The CHATS recommended roadway improvements include projects that have been identified by BCDCOG, SCDOT, and other transportation planners. The CHATS status report as of June 20, 2005 for projects underway or recently completed is summarized in Table 5.1-14.

In addition to the CHATS Long Range Transportation Plan, SCDOT has a number of planned roadway projects within the Tri-County region as summarized in Table 5.1-12.

Traffic

The roadway system within the Tri-County region is expected to become increasingly congested as the population continues to grow. Berkeley and Dorchester Counties are projected to experience population increases of 27.9 and 33.2 percent, respectively, during the period of 2005 to 2025. Charleston County is projected to have an increase of 8 percent over the same period. As a result, daily commute times for those residents living in outlying areas can be expected to increase in the future.

Presently 29,372 members of the work force residing in Berkeley County (44.5 percent) work in Charleston County and 19,480 (44.0 percent) of those living in Dorchester County work in Charleston County. Assuming that the labor force grows at approximately the same rate as the

overall population, 37,566 workers from Berkeley County and 25,908 from Dorchester County will be commuting into Charleston County by 2025.

Many commuters coming from Berkeley County will use US Highway 52 and I-26, and commuters coming from Dorchester County will likely rely on I-26 to access employment and services in Charleston County. Most of the heavy truck traffic leaving the study area will use I-26 to access I-95, I-20, I-77 and other points west of the Tri-County region. Some of the heavy truck traffic leaving the study area will utilize US Highway 52 and US Highway 17.

North Charleston Study Area

Infrastructure

The CHATS Long Range Transportation Plan includes three projects in the North Charleston study area: (1) the widening of Mall Drive, which is identified as project number 8 in Figure 5.1-9, (2) the port access road, identified as number 33, and (3) the I-26 realignment, identified as number 44. The port access road way is expected to serve the proposed terminal facility. Therefore, it is unlikely that this roadway would be constructed in the No-Action Alternative. Industrial development of the Proposed Project site would likely use existing roads to accommodate traffic from any future development.

Traffic: Forecasting Methodology

The *Existing Roadway Traffic Study for the North Charleston Study Area* projected future traffic growth for the next 20 years though 2025. A comparison of the existing conditions to the projected 2025 conditions is presented in that report. The traffic study considered population growth in the Tri-County region to compute Level of Service (LOS) using a traffic model. The traffic study, dated February 2005, is provided in Appendix T.

Several public and agency comments received on the draft EIS requested a review of the adequacy of the future traffic forecasts in light of recent publicity of anticipated development plans in the North Charleston area. Therefore, key traffic forecasting assumptions utilized in the Existing Roadway Traffic Study for North Charleston Study Area and the Access Road Feasibility Study were reviewed. Based on the review, the traffic forecasts utilized in the Access Road Feasibility Study are considered to be reasonable.

Public and agency comments on the draft EIS requested clarification on the traffic forecasts utilized in the CNC Terminal EIS study and made assertions that traffic forecasts may have been understated due to non-consideration of recent development plans in the study area. To assess this issue, information on new development plans brought forth during the production of the Access Roadway Feasibility Study was compared to BCDCOG model assumptions used in the feasibility study to identify potential gaps in the traffic forecast. As a result, some of the information on new development plans was included in subsequent projections of future traffic conditions.

The development plans included in traffic forecast are presented in Table 5.1-13. These plans include those that are part of the adopted land use plan and included in the BCDCOG model (Noisette, Magnolia, and the Proposed Project) as well as projected growth of Veteran's Terminal and FLETC / DHS traffic. Development plans not included in traffic forecast are shown in Table 5.1-14. These plans (including Ashley River Center, Clemson Research Campus, Kinder-Morgan Expansion, The Promenade, and the Macalloy site) are not part of the adopted land use plan, and they are not included in the BCDCOG model.

A review of the recently announced development plans along with the assumption that each development would ultimately be put in place would reveal that the growth curve for North Charleston could potentially be steeper than what was anticipated in the Access Roadway Feasibility Study. Under these circumstances, the type and location of these recent development plans would appear to have small influence on the study area 2025 peak hour traffic forecasts, except in the case of the Ashley River Center (ARC). In the event ARC was to be added to the traffic forecast, build year rush hour traffic along I-26 north of Cosgrove Avenue and south of Heriot Street would likely be worse than what has been reported in the Access Roadway Feasibility Study. Additionally, impacts on King Street and Azalea Drive would require local road improvements.

For traffic impact analysis, the standard practice is to have a narrow focus and only consider a region's adopted land use and transportation plans to define a future background scenario against which alternative proposals are evaluated. The purpose of this EIS traffic forecasting is to evaluate the merits of a project alternative against a reasonable future backdrop. From these perspectives, the year 2025 No-Build traffic forecasts utilized in the EIS provided a reasonable basis for alternatives evaluation assessing impacts from the Proposed Project, including the roadway improvements.

Following the standard practice of using the region's adopted land use plan for traffic forecasting is reasonable. Otherwise, the following complexities or difficulties can arise:

- Drawing the distinctions between planned/pipeline growth and development/zoning plans that are still in design and subject to market conditions

- Applying trip generation models to development plans that lack estimates on quantities such as commercial square footage, residential units, or number of new jobs

- Determining site build-out year and phasing

Traffic studies as part of the development of the EIS may have lacked details on local redevelopment plans, but utilized a reasonable baseline forecast for the roadway corridors within the study area. The 2025 No-Build baseline forecast was prepared based on the latest adopted plans in the region and with considerations to current capacity-constraints of the study area roadways.

A set of traffic growth rates was developed for the *Existing Roadway Traffic Study* (Table 5.1-15). These growth rates took into consideration the land use forecasts adopted for the 2030 BCDCOG travel demand model; the observed traffic trends in the area between 2000 and 2003, and the general peak hour capacity constraints observed along the study area roadways.

Traffic: Forecasting Results

Some of the primary roadways in the North Charleston traffic study area are presently approaching capacity and operate at LOS D for a majority of the segments. The main reasons for the congestion are heavy traffic volume, inadequate turn lanes and geometry, lack of signal coordination and inadequate access management. The study area has a number of industrial and freight activities, resulting in moderate truck traffic volumes.

Interstate 26:

I-26 is projected to have moderate growth in traffic demand that would cause a number of segments to operate at LOS E and F by 2025 due to inadequate number of lanes. As shown in Table 5.1-17, traffic analyses predict that the segment of I-26 between Dorchester Road and Montague Avenue will reach a failing level of service in 2012/2013 as a result of background traffic growth. Other segments will also fail by 2025, including the segment from Cosgrove Avenue to Dorchester Road, and the segment from I-526 to Remount Road. The remaining segments between Mt Pleasant Street and I-526 would not reach failure by 2025.

Interstate 526:

In contrast with I-26, I-526 is projected to have a high rate of growth in traffic demand in the future due to expected employment and housing growth in the Greater Charleston area. The 2025 traffic on I-526 is projected to almost double as compared to current traffic volume. This growth in traffic would create traffic problems on I-526 and 23 out of 26 of the segments would be at capacity, and are projected to operate at LOS E and F in 2025 under the No-Action Alternative. Table 5.1-18 summarizes the projected LOS for I-526 in year 2025 under the No-Action Alternative.

Arterial Roads:

Several arterial corridors, including Rivers Avenue and Dorchester Road, carry heavy traffic volume and are projected to operate at or over capacity condition in 2025 due to general growth in the area's traffic. Projected year 2025 traffic conditions for arterials in North Charleston under the No-Action Alternative conditions are summarized in the *Existing Roadway Traffic Study for North Charleston Study Area*.

Intersections:

Several intersections within the North Charleston study area are projected to operate at LOS F because of future traffic growth and existing roadway geometry. The analyses of future intersection conditions for the No-Action Alternative were conducted for morning and afternoon peak traffic conditions and are summarized in the *Existing Roadway Traffic Study for North Charleston Study Area*.

Daniel Island Study Area

The Daniel Island study area includes Daniel and Thomas Islands south of I-526, the Cainhoy Peninsula north of I-526 and a segment of I-526 in Mount Pleasant east of the Wando River.

Infrastructure

The CHATS Long Range Transportation Plan includes one project in the Daniel Island study area, the widening of Clements Ferry Road, which is identified as project number 25 in Figure 5.1-9.

Traffic

As discussed in Section 4.6, a traffic study was performed to evaluate the existing traffic conditions for I-526, arterial roadways and intersections in the Daniel Island and Clouter Island study areas. The *Traffic Study for the Daniel Island and Clouter Island Study Areas* evaluated existing roadways and intersections that would likely be used by vehicles entering and leaving a new marine container terminal on either Daniel Island or Clouter Island. A comparison of the existing conditions to the projected 2025 conditions is presented in the *Traffic Study for the*

Daniel and Clouter Island Study Areas. The traffic study considered population growth in the Tri-County region to compute LOS using a traffic model. The traffic study, dated June 2005, is provided in Appendix U.

Interstate 526:

Future No-Action Alternative traffic conditions on I-526 eastbound (North Rhett Avenue eastward to US Hwy 17) within the Daniel Island study area are projected to cause some degradation of LOS, with four of nine segments analyzed operating at LOS E and one segment operating at LOS F. The projected 2025 traffic conditions for the I-526 westbound segments within the Daniel Island study areas indicate that all segments analyzed will be operating at LOS F conditions. Table 5.3-3 (located in Section 5.3.6) provides a summary of projected LOS conditions by I-526 segment within the Daniel Island study area as well as comparisons to existing (2003) LOS conditions.

Arterial Roads:

Many of the arterial roadways within the Daniel Island traffic study area are projected to operate at LOS E and F conditions in 2025, reflecting local roadway capacity constraints to accommodate future traffic demand. Table 5.3-4 summarizes the estimated No-Action Alternative future traffic conditions of specific arterial segments within the Daniel Island study area, as well as providing comparisons to existing (2003) daily traffic volumes.

Intersections:

Several intersections within the Daniel Island study area are projected to operate at failing conditions (LOS F) as a result of a higher traffic volume using existing intersection geometry. The traffic analysis indicates that the Clements Ferry Road interchange with I-526 will have congestion issues. As described in the CHATS Long Range Plan, high growth rates on Daniel Island and within the Clements Ferry Road corridor north of I-526 are projected in the future. Signalization of the I-526/Clements Ferry Road interchange ramps could improve future traffic flow at this interchange. Table 5.3-5 summarizes the projected AM peak hour intersection conditions and Table 5.3-6 summarizes the projected PM peak hour intersection conditions as well as comparisons to existing (2004) LOS conditions for the No-Action Alternative within the Daniel Island study area.

Clouter Island Traffic Study Area

The Clouter Island study area includes the Confined Disposal Facility (CDF) for dredged material on Clouter Island south of I-526. The Clouter Island CDF is presently used by the USACE for maintenance dredging of the Federal Navigation Channel. It is expected to be used in this capacity for more than 20 years into the future.

Presently, there are no existing public roadways on Clouter Island. Any future development of Clouter Island would likely require construction of a bridge over Clouter Creek and a roadway connection to Clements Ferry Road. However, no construction of public roads to Clouter Island is expected, nor is development of Clouter Island expected to occur during the planning period for the No-Action Alternative.

5.1.6.2. Railroads

Regional Rail Carriers

The Charleston Area Transportation Study (CHATS) does not include any improvements or expansion of the rail network in the foreseeable future. It is reasonable to assume that regional rail traffic will increase as growth of existing industries and port container traffic at the existing port terminals increases.

The Magnolia redevelopment project is planning to remove some abandoned feeder rail lines to former industries west of I-26 in the Charleston Neck area. This will not likely affect the amount of rail traffic on the main rail lines.

It is unlikely that rail service will be provided to Daniel Island or Clouter Island in the foreseeable future.

Rail Yards

It is reasonable to assume that rail traffic to and from the East Bennett Yard and Seven-Mile Yard will increase as port container traffic at the existing SCSPA terminals increases. Among other industries in the Charleston area projecting an increase in rail traffic is Kinder Morgan, Inc., which has a break bulk terminal located on Shipyard Creek. According to expansion plans at this facility, capacity is projected to increase train trips from 1 unit train per day to 2.6 unit trains per day.

It is reasonable to assume that the Cooper Yard will continue to be used for rail car holding and may be used more frequently in the future.

An announced redevelopment of the MacAlloy property as an intermodal transfer facility (i.e., CaroLinks), located at the terminus of the Shipyard River Navigation Channel, could also result in additional rail traffic in the area. CaroLinks, a unit of Charleston-based maritime consultant Safe Ports Inc., announced plans to barge containers from the Wando Welch Terminal to its new facilities at Shipyard Creek and to various inland distribution centers. CaroLinks had a contract to buy 80 acres on Shipyard Creek, including part of the former Macalloy industrial site, but put its plans for that site on hold. Although speculative at this time, CaroLinks has announced that it could handle up to 1 million TEUs out of this facility in the future, which would be significant considering the entire Port of Charleston currently handles approximately 2 million TEUs annually. However, it is uncertain which rail lines would be used, whether new rail improvements would be constructed and how the implementation would be scheduled.

Rail Crossings

It is reasonable to assume that rail crossing delays to roadway traffic will increase under the No-Action Alternative scenario as traffic volumes increase and railway shipping increases.

Kinder Morgan proposes to increase the average number of unit trains served by the Shipyard River site in a day from 1 to 2.6 unit trains. This increase in total number of trains coming and going from that bulk terminal site would increase the *aggregate* daily traffic delay to approximately 15.6 minutes per at-grade rail crossing.

The trains from Kinder Morgan will be leaving the Shipyard River Terminal via either NS and CSX rail lines and will be destined for points outside of the Charleston area (towards Columbia) to serve power plants in South Carolina, Georgia and North Carolina. It is estimated that

approximately 60 percent of trains will be serviced by CSX and 40 percent serviced by NS. Table 5.1-18 provides the sequence of at-grade rail crossings for each rail line.

5.1.6.3. Summary of Impacts to Transportation

The traffic analysis for current conditions within the study area near the Proposed Project shows that several roadway segments are currently operating at or near capacity at compromised Levels of Service (LOS). The current level of traffic congestion is primarily caused by periods of heavy traffic, configuration and number of intersections and interchanges, and inadequate traffic signals and controls. Presently, several arterial corridors, including Rivers Avenue and Dorchester Road, carry heavy traffic volumes and are projected to operate at or over capacity in 2025 solely due to future projected regional growth. Furthermore, the traffic study projects that there will likely be a traffic bottleneck in the area surrounding the I-26/I-526 interchange and including segments of I-26 and I-526. Potential future transportation improvements have been identified by the CHATS for the Tri-County area. However, few major roadway improvement projects have been planned within the study area.

I-526 is projected to have high traffic demand in the future due to expected employment and housing growth in the BCDCOG planning area, especially east of the Cooper River. The I-526 traffic volume in 2025 is expected to be double the current traffic volume. This estimated growth in traffic will likely create substantial traffic problems on I-526 and a majority of the Interstate segments would fail or be over capacity.

In comparison, I-26 is projected to have moderate growth in traffic demand by 2025, which would cause some Interstate segments to fail, but not on as system-wide or severe a basis as I-526. Traffic analyses predict that the segment of I-26 between Dorchester Road and Montague Avenue will reach a failing level of service in 2012/2013 as a result of background traffic growth. Other segments will also fail by 2025, including the segment from Cosgrove Avenue to Dorchester Road, and the segment from I-526 to Remount Road. The remaining segments between Mt Pleasant Street and I-526 would not reach failure by 2025.

Several arterial roadway segments within the North Charleston study area are projected to operate at LOS E or F (at capacity and over capacity respectively) in 2025, and most of the arterial segments within the Daniel Island and Clouter Island study areas are projected to operate at LOS E or F.

Traffic delays at railroad crossings will increase with an increase in rail traffic. As the vehicular traffic volume within the North Charleston study area increases, it is reasonable to assume that some increase in traffic delays at crossings can be expected (there are no rail crossings within the Daniel Island and Clouter Island study areas).

Table 5.1-10 CHATS Long Range Transportation Plan Roadway Improvements.

Map ID	Roadway	Description	Relief of Existing Congestion	Relief of Future Congestion	Promotes Connectivity	Total Project Ranking (0-100)
Recommended by CHATS Study Team for Funding in Long Range Plan						
20	Dorchester Road.	Trolley Road to US Highway 17A – Widen to Multi-Lanes	Moderate	High	No	73
28	Patriots Boulevard.	Appian Way to Wescott Boulevard. – New Location 2 Lanes	Low	Moderate	Yes	70
42	Dorchester Road.	Trolley Road to Ashley Phosphate Road – Widen to 6 Lanes	Low	High	No	69
31	Harborview Road.	Add Turn Lanes and Other Improvements	Low	Moderate	N/A	69
21	Bacons Bridge Road.	From Existing 4-Lane to Ashley River Road – Widen to Multi-Lanes	Low	Moderate	No	68
1	Bees Ferry Road.	U.S. Highway 17 South to Ashley River Road – Widen to Multi-Lanes	Low	Moderate	No	68
34	McLeod/Sanders/Mary Ader	Glenn McConnell Parkway to US Highway 17 South – New 2-Lane Connector	Low	Low	Yes	67
40	College Park Road.	Crowfield Boulevard. To U.S. Highway 17A – Widen to 4 Lanes	Low	High	No	66
24	Future Drive/Palmetto Commerce Parkway Center	Otranto Road to Dorchester Road – New Location 4 Lanes w/ I-26 Interchange	Low	Low	Yes	65
23	Maple Street. Extension/Berlin Myers Parkway north extension	Maple Street to Berlin Myers Parkway – new location 2 Lanes	None	Moderate	Yes	64
11	Berlin Myers Parkway. Phase III	Bacons Bridge Road to U.S. Highway 17A – New Location Multi-Lanes	Low	Moderate	Yes	63
32	U.S. Highway 17 North	IOP Connector to SC Highway 41 – Widen to 6 Lanes	Low	High	No	63
6	SC Highway 41	U.S. Highway 17 North to Berkeley County Line – Widen to Multi-Lanes	Low	Moderate	No	60
4	North Rhett Boulevard Extension (Alternative 2)	Red Bank Road to Goose Creek Boulevard. – Partial New Location	Low	Moderate	Yes	60
38	Lincoln Boulevard	Dorchester Road to Ashley Phosphate Road – Widen to 4 Lanes	Low	Low	Yes	60
5	Maybank Highway	Bohicket Road to East of Stono River – Widen to Multi-Lanes	Low	Moderate	No	59
3	North Rhett Boulevard Extension (Alternative 1)	Liberty Hall Road to Goose Creek Boulevard – Two Lanes on New Location	Low	Low	Yes	58
41	Liberty Hall Road.	U.S. Highway 52 to U.S. Highway 176 – Widen to 4 Lanes	Low	Low	No	58
46	Ashley Phosphate Road Extension	U.S. Highway 52 to North Rhett Avenue – New Alignment	None	Moderate	Yes	58
27	Hungryneck Connector	IOP Connector to Six Mile Road – New Location Multi-Lanes	Low	Moderate	Yes	57
47	Railroad Avenue Extension	Mabeline Road to Eagle Landing Boulevard. – New Location 2 Lanes	None	Low	Yes	57
8	Mall Drive	U.S. Highway 52 to Lacross Road – Widen to Multi-Lanes	Low	Low	No	57
14	U.S. Highway 78	Jedburg Road to 0.75 Miles South of Berlin Myers Parkway – Widen to Multi-Lanes	Low	Moderate	No	56

Map ID	Roadway	Description	Relief of Existing Congestion	Relief of Future Congestion	Promotes Connectivity	Total Project Ranking (0-100)
25	Clements Ferry Road	I-526 to SC Highway 41 – Widen to 4 Lanes	Low	Moderate	No	55
Recommended by CHATS Study Team for Inclusion in Long Range Plan Under "Innovative Financing"						
12	SC Highway 61 Expressway	Bees Ferry Road to Dorchester Road – New Location Multi-Lanes	Low	Moderate	Yes	65
15	Mark Clark Expressway (I-526)	West Ashley to Folly Road – New Location 4-Lane Freeway	Low	Moderate	Yes	55
48	Old Orangeburg Road	Dorchester Road to Mallard Road – Widen to 4 Lanes	Low	Moderate	No	53
Other Projects for Consideration Under Innovative Financing						
44	I-26 Realignment	Realign I-26 From U.S. Highway 17 to Meeting Street Road	None	None	N/A	24
33	I-26 Port Access Road	I-26 to New Port Terminal – New Limited Access Alignment	-	-	-	-

Source: BCDCOG, 2005

Table 5.1-11. CHATS Long Range Transportation Plan Status as of June 20, 2005.

CHATS Bonded Projects	Priority	Description	Status
North Rhett Avenue from Remount Road to Red Bank Road	1	Part 1: Roadway from Yeamans Hall Road to just beyond Foster Creek Road. Part 2: Remaining roadway from Remount Road to Red Bank Road.	Construction 100% complete
U.S. Highway 78 from Charleston Southern University to US Highway 52 and US Highway 52 Otranto Road to Goose Creek	2	Widening of US Highway 78 from Charleston Southern University to US Highway 52 and US Highway 52 from Otranto Road to Goose Creek	Construction approximately 99% complete
Trolley Road from SC Highway 165 Travelers Boulevard	3	Widening of Trolley Road	Construction 100% complete
Mark Clark Expressway from US Highway 17 South to SC Highway 171	4	Part 1: Phase I interchange at US Highway 17/SC highway 7. Part 2: Ultimate interchange at US Highway 17/SC Highway 7. Part 3: Entire project from US Highway 17/SC Highway interchange to SC Highway 171.	Part 1: Construction 100% complete. Part 2: Project development 65% complete, construction (Arlington Drive) 100% complete. Part 3: Project Development approximately 55% complete.
SC Highway 700 (Maybank Highway)	5	Replace bridge over Stono River and new intersection to access marinas and Headquarters Island	Construction approximately 99% complete
US Highway 17A from I-26 to US Highway 176	6	Road widening from Sangaree Parkway to US Highway 176	Construction 100% complete
Ashley Phosphate Road	7	Roadway widening and realignment of Collins Road	Construction approximately 89% complete
Ladson Road	8	Widening roadway from US Highway 78 to Dorchester Road	Construction approximately 98% complete
Virginia Avenue	9	Roadway widening from Mark Clark Expressway to Buist Avenue	Construction approximately 99% complete
Long Point Road	10	Roadway widening from Whipple Road to Wando Welch Terminal	Construction 100% complete
SC Highway 61 Expressway	11	New roadway project from Bees Ferry Road northwest for approximately 2.4 miles	Project development approximately 25% complete
US Highway 17 North	12	Widening 1.4 miles of roadway from I-526 to IOP Connector	Construction approximately 3% complete
Berlin Myers Parkway Phase III	13	2.2 miles of roadway construction	Project development approximately 60% complete
US Highway 78	14	Intersection improvements at Deming Way, Richardson Avenue, and re-surfacing and re-stripping of US Highway 78 between Berlin Myers Parkway and US Highway 17A	Project Development approximately 35% complete
Non-Bonded Projects			
US Highway 17 Bridge Replacement over Cooper River	N/A	Construction of 8-lane replacement bridge over Cooper River from Mt. Pleasant to Charleston	Bridge opened to traffic July 16, 2005

CHATS Bonded Projects	Priority	Description	Status
College Park Road	N/A	Roadway widening from I-26 to past Crowfield Boulevard	All lanes open to traffic
Non-Bonded Projects			
Antler Drive	N/A	Construction of new location 2-lane roadway from near Otranto Boulevard to Greenridge Road	Construction complete and all lanes open to traffic
Railroad Avenue Extension	N/A	Construction of new location 2-lane roadway between Mabeline Road and Eagle Landing Boulevard	Project Development approximately 80% complete
BCDCOG Projects			
US Highway 17A	N/A	Roadway widening from US Highway 176 to Cypress Garden Road	Construction complete and all lanes open to traffic
US Highway 17A	N/A	Roadway widening from 2 to 5 lanes from Cypress Gardens Road to Moncks Corner	Project Development approximately 45% complete
Interstate Interchange Improvement Projects			
I-26 at US Highway 78 (Exit 205)	N/A	Interchange improvements	Construction 100% complete
I-26 at US Highway 17A (Exit 199)	N/A	Interchange improvements	Construction 100% complete
I-26 at Ashley Phosphate Road (Exit 209)	N/A	Interchange improvements	Construction approximately 89% complete
I-26 at Aviation Avenue (Exits 211 and 212)	N/A	Interchange improvements	Project development approximately 90% complete

BCDCOG, 2005

Table 5.1-12. SCDOT Planned Roadway Projects in Berkeley, Charleston, and Dorchester Counties as of February 1, 2005.

Roadway	Description	County
Cainhoy Road	Replace bridges over French Quarter Creek and Quinby Creek	Berkeley
SC Highway 6	Intersection improvements	Berkeley
US Highway 17A	Intersection improvements	Berkeley
Murray Avenue	Replace bridge over Turkey Creek in Hanahan	Berkeley
I-26	Interchange rehabilitation	Berkeley
SC Highway 41	Bridge replacement over Wando River	Berkeley
US 17A	Phase III Cypress Gardens Road to Goose Creek	Berkeley
SC Highway 6	Reconstruct intersection	Berkeley
SC Highway 9	Improve intersection and add turn lane	Berkeley
SC Highway 6	Reconstruct intersection	Berkeley
Railroad Avenue Extension	Roadway widening	Berkeley
County Road 133	Improvements and re-surfacing	Berkeley
County Road 1092	Safety Improvements	Berkeley
SC Highway 6	Construct sidewalk	Berkeley
Amy Drive	Construction and replace sidewalk	Berkeley
County Road 45	Roadway re-surfacing	Berkeley
County Road 405	Not indicated	Charleston
SC Highway 162	Roadway widening	Charleston
Bohicket Road	Intersection improvement and bridge replacements	Charleston
US highway 17 South	Replace bridges over Rantowles Creek and Wallace River	Charleston
Folly Road	Replace bridge over James Island Creek	Charleston
SC Highway 61	New construction from Bees Ferry Road to I-26	Charleston
County Road 1632	Replace bridge over Simons Creek	Charleston
County Road 1308 (Pine Landing Road)	Improve curve on roadway	Charleston
Various	Maintenance re-surfacing	Charleston
I-526	Roadway widening from SC Highway 7 to SC Highway 171, bridge over Stono River	Charleston
US Highway 78	Interchange improvements and bridge removal	Charleston
I-26	Remount Road interchange improvements	Charleston

Roadway	Description	County
Bees Ferry Road	Bridge replacement	Charleston
County Road 1032	Improve safety and replace bridges	Charleston
SC Highway 165	Bridge replacement	Charleston
Riverland Drive	Intersection with Grimball Road improvement	Charleston
Orleans Road	Roadway widening	Charleston
US Highway 17	Intersection improvements	Charleston
US Highway 17	Replace southbound bridges over North and South Santee Rivers	Charleston
US Highway 78	Intersection improvements at Richardson Avenue and Deming Way	Dorchester
US Highway 78	Add turn lanes at maple Street	Dorchester
Parlor Drive	Sidewalk construction	Dorchester
US Highway 78	Add turn lanes at County Road 22 intersection	Dorchester
US Highway 15	Bridge replacements	Dorchester
SC Highway 61	Widen roadway and provide left-turn lanes onto SC Highway 165	Dorchester
US Highway 78	Realign roadway at SC Highway 27 intersection	Dorchester
County Road 174	Bridge replacement at Captains Creek	Dorchester
I-95	Construct new interchange with US Highway 178	Dorchester
Berlin Myers Parkway	Phase 3	Dorchester
Old Orangeburg Road	Intersection improvements at Embassy Drive	Dorchester
US Highway 78	Intersection improvements at County Road 58	Dorchester
Dorchester Road	Intersection improvements at SC Highway 165	Dorchester
County Road 13	Intersection improvements at County Road 59	Dorchester
Dorchester Road	Left-turn lanes into White Church Place	Dorchester
US Highway 78	Roadway resurfacing west of SC Highway 27	Dorchester
County Road 37	Bridge replacement over Indian Field Swamp	Dorchester

SCDOT, 2005. Includes data from BCDCOG; some projects may be included in the CHATS Long Range Transportation Plan.

Table 5.1-13. Study Area Development Plans Included in the Traffic Forecast.

Development Plan	*Description*	Estimated Traffic Volume (Build Year 2025)	*Comments*
Noisette	Residential redevelopment master plan along Noisette Creek in North Charleston; 800 new households; located east of the Spruill Ave and north of McMillan Ave	3,800 daily vehicle trips	Part of adopted land use plan; included in the BCDCOG model; considered in the CNC Terminal EIS to derive traffic forecasts along Spruill Avenue and Rivers Avenue
Magnolia	Master plan community of 4,000+ housing units and 1 million square feet of commercial space located west of I-26 off of Hagood St	39,600 daily vehicle trips	Part of adopted land use plan; included in the BCDCOG model; considered in the CNC Terminal EIS to derive traffic forecasts along King Street, Cosgove Ave and Dorchester Rd
Veteran's Terminal	Existing break bulk terminal located within CNC site at the end of Viaduct Avenue	2,500 daily vehicle trips	Traffic volume based on traffic counts taken at terminal gate. Assumes additional future traffic similar to that from Union Pier operations will be generated by this terminal.
FLETC / DHS	Existing federal property along Cooper River within CNC site. Accommodates several different departments. Master plan for expansion under development	11,200 daily vehicle trips	Traffic volume based on traffic counts taken along Bainbridge Road. Traffic volume includes anticipated growth at FLETC/DHS compound based on master plan.

Table 5.1-14. Study Area Development Plans Not Included in the Traffic Forecast.

Development Plan	*Description*	Estimated Traffic Volume	*Comments*
Ashley River Center	Master plan community of 3,500+ housing units and 0.7 million square feet of commercial space located west of I-26 off of Baker Hospital Blvd	34,100 daily vehicle trips	Not part of adopted land use plan; not included in the BCDCOG model; not considered in the CNC Terminal EIS; standard practice is to consider pipeline growth that is part of the region's land use plan;
Clemson Research Campus	65-acre Clemson University campus for the Restoration Institute to conduct research in health, hydrology, materials engineering, and urban design; off of Virginia Ave south of Montague Ave in North Charleston	Not available	Not part of adopted land use plan; not included in the BCDCOG model; not considered in the CNC Terminal EIS; a significant portion of this site traffic is expected to be outside the primary study area corridors during peak rush hour
Kinder Morgan Expansion	154 acre site with an energy storage and distribution facility off of Meeting St south of Pittsburgh Ave along the CSX railroad; handles dry-bulk materials such as coal and cement; has a capacity to store 1.2 million barrels of petroleum/chemical products	Not available. Expansion would cause an increase in rail traffic in lieu of vehicular traffic.	Not part of adopted land use plan; not included in the BCDCOG model; not considered in the CNC Terminal EIS; truck traffic volume during peak rush hour is expected to be very small as the site is expected to generate mostly rail traffic
The Promenade	186 acres of residential development off of Morrison Dr south of Mt. Pleasant St in Charleston; 2200+ housing units	10,000 daily vehicle trips*	Not part of adopted land use plan; not included in the BCDCOG model; not considered in the CNC Terminal EIS; traffic volume from this site during peak rush hour is expected to be outside the primary study area
Macalloy Site	125 acre superfund site off of Meeting St north of Pittsburgh Ave and south of the Foster Wheeler energy plant; design underway for remedial action and development of light-industrial uses	500 daily vehicle trips*	Not part of adopted land use plan; not included in the BCDCOG model; not considered in the CNC Terminal EIS; truck traffic volume during peak rush hour is expected to be very small, less than 50 vehicles

** Order-of-magnitude estimates based on limited data*

Table 5.1-15. Peak Hour Traffic Growth Rates.

Roadway Corridor	Annual Traffic Growth Rate (%)
I-26	1.17
Rivers Ave (US 52/78)	2.25
Dorchester Road (SC 642)	2.15
Cosgrove Ave (SC 7)	2.63
Meeting Street Road	1.54
King St (US 78)	1.54
Mount Pleasant Street	1.99
Spruill Avenue	3.20
Viaduct Road	1.54

Table 5.1-16. Sequence of Rail Crossings from Kinder Morgan Trains.

Norfolk Southern	CSX
Meeting Street	Meeting Street
King Street Extension	King Street Expansion
Avon	Aicla
Unnamed	Unnamed
Dorchester Road	Dorchester Road
Remount Road	Montague Avenue
Aviation Road	Remount Road
Jet Park	
Ashley Phosphate Road	

Table 5.1-17. No-Action Alternative Predicted Year of Failure for I-26 Segments.

I-26 West Segment	Year of Failure	I-26 East Segment	Year of Failure
Mt. Pleasant St to Heriot St	Post 2025	Heriot St to Mt. Pleasant St	Post 2025
Heriot St to Spruill Ave	Post 2025	Spruill Ave to Heriot St	Post 2025
Meeting St to Cosgrove Ave	Post 2025	Cosgrove Ave to Meeting St	Post 2025
Cosgrove Ave to Dorchester Rd	2019	Dorchester Rd to Cosgrove Ave	2021
Dorchester Rd to Montague Ave	2013	Montague Ave to Dorchester Rd	2018
Montague Ave to I-526	Post 2025	I-526 to Montague Ave	Post 2025
I-526 to Remount Rd	2023	Remount Rd to I-526	2025

Source: Parsons Brinckerhoff, 2006.,Access Roadway Feasibility Study.

Table 5.1-18. No-Action Alternative Impacts to I-526 Level of Service (LOS).

I-526 Segment	2003 Level of Service[1]	2025 Level of Service[1]
I-526 Eastbound		
Ashley River to Leeds Avenue	D	F
Leeds Avenue Interchange	C	D
Leeds Avenue to Dorchester Road	C	D
Dorchester Road Interchange	C	F
Dorchester Road to Montague Avenue	D	F
Montague Avenue Interchange	D	F
Montague Avenue Interchange to I-26 Interchange	C	F
I-26 Interchange	D	F
I-26 to Rivers Avenue	D	F
Rivers Avenue Interchange	D	F
Rivers Avenue to North Rhett Avenue	D	E
North Rhett Avenue Interchange	C	D
Virginia Avenue Interchange	D	E
I-526 Westbound		
Virginia Avenue Interchange	C	F
North Rhett Avenue Interchange	C	F
North Rhett Avenue to Rivers Avenue	D	F
Rivers Avenue Interchange	D	E
Rivers Avenue to I-26	E	E
I-26 Interchange	C	E
I-26 Interchange to Montague Avenue Interchange	C	E
Montague Avenue Interchange	C	F
Montague Avenue to Dorchester Avenue	D	F
Dorchester Road Interchange	C	F
Dorchester Road to Leeds Avenue	C	F
Leeds Avenue Interchange	C	F
Leeds Avenue to Ashley River	D	F

Parsons Brinckerhoff, 2005. Existing Roadway Traffic Study for North Charleston Study Area, and 2006, Access Roadway Feasibility Study.

[1] *LOS represents average conditions for mainline traffic with existing lane configuration. Individual ramps, ramp merges, and diverge areas may have greater degree of congestion than reflected in this summary table.*

5.1.7. Navigation and Terminal Facilities

This section discusses potential impacts from the No-Action Alternative on navigation and terminal facilities. The study area that was used for this evaluation is shown in Figure 5.1-11. The No-Action Alternative assumes that the Proposed Project will not be constructed and that existing and future vessel traffic would continue to use the Federal navigation channel.

Future vessel traffic was determined by evaluating the number and type vessels trips on the Cooper River then applying an annual growth rate to the existing vessel traffic through 2025.

The projections for each year presented in this section describe the future conditions without the Proposed Project.

5.1.7.1. Federal Navigation Channel

Potential improvements to the navigation project in Charleston Harbor, which may be constructed or may be investigated by the USACE through 2025 include widening and deepening projects for the Federal navigation channel, such as improvements to the Hog Island Reach underneath the new Cooper River Bridge, Daniel Island Reach, Drum Island Reach and Wando River Lower Reach. A deepening project would likely entail deepening the channel from -45 feet MLW to -50 feet MLW, which would require a feasibility study to be completed by the USACE Charleston District and authorization by the US Congress.

The navigation project includes a turning basin on the Daniel Island Range that is contingent on a new marine container terminal being constructed on the Cooper River. However, it has not been constructed, and it is unlikely that it would be constructed for the No-Action Alternative.

Section 5.1.7.3 discusses the projected increase in deep draft vessel traffic on the Cooper River without the Proposed Project. The aforementioned potential improvements to the navigation channel could be constructed to improve navigation safety for projected maritime traffic.

5.1.7.2. Terminal Facilities

SCSPA Terminals

For the No-Action Alternative, the SCSPA would continue to develop additional TEU capacity at existing terminals by implementing improvements in technology to increase operational efficiency. Additionally, the SCSPA would either propose another marine container terminal project or expand their existing facilities in order to meet growing container throughput demand. If no new terminals are constructed, then the growth of SCSPA container throughput capacity will be limited to about 2.6 million TEU annual throughput (based on the SCSPA Need Statement, included as Appendix K). Additionally, the SCSPA has informed the USACE that they will consider a Jasper County terminal in their long range planning. However, the property being considered for potential development is being used for dredge material disposal under Federal easements as part of the maintenance of the Savannah Harbor Federal Navigation Project

Private Terminal Facilities

In addition to the existing SPA terminals, there are a number of private terminals. Existing vessel traffic is expected to continue to call on private terminals on the Cooper River through 2025. Based on interviews with private terminal facility managers, growth in the number of vessel calls at their facilities is likely; however, the growth would not be a major percentage increase from existing vessel calls. Most managers said the growth in the number of calls per year would be less than 1 percent of their existing vessel traffic. Therefore, the increase in vessel trips as a result of the small increase in the number of calls is assumed to be 1 percent. The following subsection describes how future vessel trips to private terminals on the Cooper River were determined through 2025 using a 1 percent increase in vessel trips per year.

Potential waterfront facility redevelopment projects in Shipyard Creek may increase the number of shallow and deep draft vessels trips in Shipyard Creek. Two waterfront areas that are likely to be redeveloped are the Kinder Morgan Terminal and former Macalloy Property. Kinder Morgan submitted a permit application to expand an existing breakbulk terminal on the south

shore of Shipyard Creek in September 2005. Redevelopment of the Macalloy property, located at the terminus of the Shipyard Creek Navigation Channel, as a waterfront industrial facility could also bring additional shallow draft and deep draft vessels into Shipyard Creek. If these two waterfront areas are not developed, the No-Action Alternative vessel traffic in Shipyard Creek would be expected to be similar to existing vessel traffic.

Port Security

The USCG will continue to regulate maritime transportation security as required by the Maritime Transportation Security Act of 2002 (MTSA). Future terminals in the harbor will be required to develop and submit security and incident response plans to the Coast Guard for approval.

The SCSPA will continue to improve port security at their existing facilities. The SCSPA plans to spend recently awarded federal security grant funds for physical security enhancements, such as access control infrastructure, scanning equipment, surveillance systems and fencing.

The Charleston Harbor Operations Center (CHOC), also known as Project SeaHawk, recently received funding to continue operations for the next year. Given that the U.S. Congress passed the SAFE Port Act in October 2006 calling for the establishment of interagency port security centers modeled on Project Seahawk at every high-priority port in the United States within the next three years, it is reasonable to assume that the Project SeaHawk operation will continue to operate in the foreseeable future.

The future growth in vessel traffic for the No-Action Alternative will result in an incremental increase in the risk of a terrorist attack via port-related activities. However, the future improvements in port security will likely diminish the risk of a successful terrorist attack. Given the focus on continued improvement to port security, it is reasonable to assume that future port security will be improved sufficiently to more than offset the increased risk associated with increased vessel traffic, and overall port security risks will be reduced for the No-Action Alternative condition.

5.1.7.3. Navigation Operations

Cooper River Vessel Traffic

Projected future ship traffic by vessel type on the Upper Cooper River, the segment upriver of Shipyard Creek, is shown in the Table 5.1-19. As shown by the table, the total number of vessel trips is projected to increase by about 41 percent between 2004 and 2025. Future vessel traffic was determined by adding a potential annual growth rate to the previous year's number of vessels trips, starting in 2004 and ending in 2025. Growth rates for each type of vessel are based on interviews conducted with waterfront facility operators, Charleston Branch Pilots Association pilots, and tug operators. Based on the results of the interviews, the annual number of vessel trips for all vessels other than container ships is projected to grow at 1 percent through 2025. Container vessel trips to the North Charleston Container Terminal (NCT) are projected to grow at a consistent rate of 4 percent per year.

The TEU capacity of vessels calling on NCT is limited by the 161 feet of air draft under the I-526 Bridge over the Cooper River which limits the size and therefore TEU capacity of a container ship calling on NCT. It is reasonable to assume that vessels calling on NCT will not be substantially larger and therefore increased container vessel trips will be required to increase TEU throughput capacity planned for NCT. Projections of increased container vessel trips on the Upper Cooper River to NCT were capped in year 2011 at 1,132 vessel trips. This number of

vessel trips is regarded to be the likely practical capacity of the NCT with the potential improvements discussed in the previous section to increase TEU throughput.

Table 5.1-19. No-Action Projected Upper Cooper River Vessel Trips by Vessel Type (2004-2025).

			Vessel Type					
Year	Break-bulk	Bulk	Container	Ro-Ro	Tank	Tug / Barge	Other	Total
2004	70	150	726	70	230	94	25	1,365
2005	71	152	784	71	232	95	25	1,430
2006	71	153	843	71	235	96	26	1,495
2007	72	155	907	72	237	97	26	1,566
2008	73	156	973	73	239	98	26	1,638
2009	74	158	1,043	74	242	99	26	1,716
2010	74	159	1,087	74	244	100	27	1,765
2011	75	161	1,132	75	247	101	27	1,818
2012	76	162	1,132	76	249	102	27	1,824
2013	77	164	1,132	77	252	103	27	1,832
2014	77	166	1,132	77	254	104	28	1,838
2015	78	167	1,132	78	257	105	28	1,845
2016	79	169	1,132	79	259	106	28	1,852
2017	80	171	1,132	80	262	107	28	1,860
2018	80	172	1,132	80	264	108	29	1,865
2019	81	174	1,132	81	267	109	29	1,873
2020	82	176	1,132	82	270	110	29	1,881
2021	83	178	1,132	83	272	111	30	1,889
2022	84	179	1,132	84	275	112	30	1,896
2023	85	181	1,132	85	278	114	30	1,905
2024	85	183	1,132	85	281	115	31	1,912
2025	86	185	1,132	86	283	116	31	1,919

Notes: vessel trips are counted as one-way passages.
Source: G.E.C., Inc.

Shipyard Creek

Shallow-draft vessels will likely continue to call on terminals in the upper reaches of the Shipyard Creek Channel, depending on the future redevelopment of the properties in this area. Deep-draft vessels will continue to call on terminals in Shipyard Creek near the entrance from Cooper River.

Charleston Branch Pilots' Association

The Charleston Branch Pilots' Association will continue to provide marine pilotage for every seagoing merchant ship in the Port of Charleston. Additional pilots will be hired and trained as necessary to meet the expected demand caused by growth in vessel traffic.

Docking Masters

Docking masters will continue to be employed by tug companies to assist vessel navigation and docking in the harbor. Additional docking masters will be hired and trained as necessary to meet the expected demand caused by growth in vessel traffic.

Vessel Safety

The USCG and the South Carolina Department of Natural Resources (SCDNR) will continue to provide recreational vessel safety regulations, enforcement, and training. Regattas will continue to be held in areas outside of the federal navigation channel, and they will continue to be coordinated with the USCG. Although the chance for a collision between a large ship and a smaller vessel will remain small, the future growth in vessel traffic (both deep draft and recreational) will result in an incremental increase in the possibility for a collision.

5.1.7.4. Summary of Impacts to Navigation and Terminal Facilities

Overall, the No-Action Alternative will include growth in vessel traffic and possible changes to the navigation channel. Changes will likely include construction of future navigation channel and marine terminal improvement projects. The SCSPA will expand existing terminals and improve technology to obtain a maximum throughput capacity of 2.6 million TEU. Given that the Proposed Project is not constructed for the No-Action Alternative, demand will exceed maximum SCSPA terminal throughput capacity by about 2014. Redevelopment of waterfront facilities in Shipyard Creek are likely and may increase shallow and deep draft vessel trips to the Cooper River and Shipyard Creek. Vessel calls on waterfront facilities on the Cooper River are expected to increase approximately 1 percent per year except for container vessels calling on North Charleston Terminal which are expected to increase 4 percent per year until the planned maximum throughput capacity for North Charleston Terminal is reached in 2011. The total number of deep-draft vessel trips on the Upper Cooper River above Shipyard Creek is projected to increase by about 41 percent between 2004 and 2025.

5.1.8. Noise

This section discusses noise conditions for the No-Action Alternative within the study areas of North Charleston, Daniel Island, and Clouter Island (Figure 5.1-12).

5.1.8.1. North Charleston Study Area

The No-Action Alternative assumes that the Proposed Project will not be constructed or operated. However, there will be a number of other development projects in the future that will likely increase noise levels in the North Charleston study area, including those projects discussed in Section 5.1.1.2. It is also reasonable to assume that some other compatible industrial use of the Proposed Project site would occur under the No-Action Alternative. These other development projects will likely create noise in the form of construction, roadway traffic, train traffic, and other related operations.

As discussed in Section 5.1.6, traffic for the No-Action Alternative is expected to increase as a result of regional growth. Interstate-26 is expected to experience a moderate growth in traffic demand by 2025 with five out of 30 roadway segments projected to operate at LOS E or F (eighteen are expected to operate at LOS D). On local roads within the North Charleston study area, several arterial roads, including Rivers Avenue and Dorchester Road, are projected to operate at or over capacity. Several intersections are also expected to operate at a LOS of F.

With the projected increase in traffic volume, noise levels will increase commensurately in the North Charleston study area. Existing noise conditions in the North Charleston study area are already approaching the noise abatement criteria (NAC) set by the FHWA. The NAC for Category B land uses (i.e., residences, schools, churches, parks, hospitals, etc.) is 67 Leq. Of the 26 monitored stations, the average commercial Leq is currently 67.7 and the average residential Leq is 63.5 (Section 4.8). Therefore, considering the projected increase in regional growth and development in the North Charleston study area and its related traffic increase, it is likely that the noise conditions for the No-Action Alternative will be closer to the NAC for all land uses, including residential, institutional, and recreational.

5.1.8.2. Daniel Island Study Area

Daniel Island will expand its planned urban development with more residences, businesses, institutions, etc. Thomas Island will also continue to develop, especially the commercial development off Clements Ferry Road and near the I-26 interchange. There will likely be some noise increase associated with this continued development. However, given the relatively low density of the development, the impacts are expected to minimal.

As mentioned in the previous section, it is likely that the Proposed Project site would be developed into some type of industrial land use that would potentially generate noise that could be heard by receptors on Daniel Island. However, the exact nature of this noise cannot be described as there are no plans at this time for the Proposed Project site if the terminal is not built.

5.1.8.3. Clouter Island Study Area

The CDFs on Clouter Island, particularly those situated south of I-526, are critical components of the USACE Charleston Harbor maintenance program. These are expected to be used as CDFs for more than 20 years in the future. Hence, it is unlikely that development will take place on Clouter Island in the No-Action Alternative and, consequently, there will be no new noise sources in this study area in the foreseeable future.

5.1.8.4. Summary of Noise Impacts

For the No-Action Alternative, the ongoing development projects in North Charleston and Daniel Island will likely create noise in the form of one or more of the following: construction, roadway traffic, train traffic, and operations. It should be noted that the south end of the CNC will likely be developed for some other industrial land use. However, it is expected that these development projects will continue to comply with applicable noise ordinance requirements and will have negligible impacts on noise levels at sensitive receptors.

5.1.9. Light

This section discusses potential impacts from the No-Action Alternative on light levels within the study areas of North Charleston, Daniel Island, and Clouter Island (Figure 5.1-13).

5.1.9.1. North Charleston Study Area

Should the Proposed Project not be developed, it is reasonable to assume that the property would be used for some other compatible industrial development. Such industrial use would likely require nighttime lighting.

The Proposed Project site currently has relatively low nighttime light levels as discussed in Section 4.9. Consequently, it is reasonable to assume that future development of this property

may result in some minimal impacts to neighboring communities from new lighting sources. Given the overall urban setting of the area, contribution to nighttime sky glow would likely be nominal. The magnitude and intensity of light trespass and glare concerns associated with the lighting of a conceptual future industrial development on the property would be uncertain. However, future development of adjacent and nearby properties, including those areas associated with the Noisette Project, Magnolia Project, and redevelopment of the Macalloy property, will likely add new lighting sources and impact surrounding communities. These new lighting sources would also be noticeable from Daniel Island communities located directly across the Cooper River from the CNC.

5.1.9.2. Daniel Island Study Area

As discussed in Section 5.1.1, the future land use on the south end of Daniel Island will largely be determined by the capacity of the SCSPA CDFs and any future development plans for that area. The lighting impacts from additional residential and commercial development within the Daniel Island Planned Unit Development would likely be minimal and occur slowly over time.

5.1.9.3. Clouter Island Study Area

The CDFs on Clouter Island, particularly those situated south of I-526, are critical components of the USACE Charleston Harbor maintenance program. These are expected to be used as CDFs for more than 20 years in the future. Hence, it is unlikely that any new development will take place on Clouter Island in the No-Action Alternative and there will be no new light sources in this study area in the foreseeable future.

5.1.9.4. Summary of Light Impacts

For the No-Action Alternative, the ongoing and future development projects in North Charleston (including some other industrial development at the south end of the CNC) and Daniel Island will likely contribute to future nighttime sky glow. However, it is expected that these future lighting impacts will be negligible and occur slowly over time.

5.1.10. Aesthetics

The aesthetic impacts of the No-Action Alternative to the study areas of North Charleston, Daniel Island, and Clouter Island (see Figure 5.1-14) are discussed in this section. As indicated in Section 4.10, the subject of aesthetics is generally one involving personal and subjective evaluations of the acceptability of visual scenes that do not lend themselves to quantitative evaluation and for which there are commonly no regulatory standards. Therefore, the treatment of this topic in this EIS will not speculate on the future aesthetic qualities of the area. Instead, this discussion is limited to describing likely changes in the existing viewsheds in the vicinity of the proposed facility sites in the absence of the Proposed Project.

5.1.10.1. North Charleston Study Area

For the No-Action Alternative, redevelopment of the southern part of the CNC would likely proceed as managed by the CNC Redevelopment Authority. Under this scenario, new industrial and commercial land uses would continue to be developed in the southern part of the CNC, and accordingly, the Proposed Project site and nearby properties would likely retain their current industrial and institutional appearance. Any development of this area would also be noticeable to future residents and business on Daniel Island located directly across the Cooper River.

The Macalloy property will likely be redeveloped in the future for industrial and maritime uses. However, the specific future uses of this property are unknown at this time.

5.1.10.2. Daniel Island Study Area

Daniel Island will likely continue to develop as a mixed residential, commercial, and institutional Planned Unit Development.

5.1.10.3. Clouter Island Study Area

The CDFs on Clouter Island, particularly those situated south of I-526, are critical components of the USACE Charleston Harbor maintenance program. These are expected to be used as CDFs for more than 20 years in the future. Hence, it is unlikely that development will take place on Clouter Island in the No-Action Alternative and, consequently, there will be no change to the visual character of this study area in the foreseeable future.

5.1.10.4. Summary of Aesthetics Impacts

For the No-Action Alternative, the ongoing and future development projects in North Charleston (including some other industrial development at the south end of the CNC) and Daniel Island will likely have only a negligible affect on the aesthetic quality of the study area.

5.1.11. Air Quality

5.1.11.1. Tri-County Region

Under the No-Action Alternative, it is expected that air quality in the Tri-County region (Figure 5.1-15) will be affected by numerous factors, including regional growth, technology improvements, and regulatory programs and initiatives. This section discusses the anticipated changes in pollution emissions (permitted emissions and mobile emissions), and the anticipated overall change in air quality in the region, including impacts to ozone.

Permitted Emissions

Existing industrial facilities would continue to operate and expand operations in keeping with their current permit limits. Future air quality impacts associated with additional industrial expansion and new development in the region are uncertain. However, analysis of recent growth and emissions data can be evaluated to provide a reasonable estimate of future permitted emissions based on recent trends.

The A*ir Quality Report* (provided in Appendix S) evaluated the EPA National Emissions Inventory (NEI) database of criteria air pollutant emissions for the Tri-County region to assess the recent trends in emissions in order to estimate the future trends in air quality. These data show that the population increased between the period from 1985 to 2001 in each of the three counties and for the region as a whole, but there is no corresponding increase in regional air emissions. This is most likely due to advances in air pollution control technology. Because no upward trend could be identified, it is concluded that technology improvements and clean air initiatives have offset the effect of regional growth. Therefore, the data suggest that the future air emissions will remain relatively constant over the next 20 years despite the anticipated population growth in the region.

Mobile Emissions

Highway traffic and vessel traffic in the region are expected to increase substantially in the next 20 years. As a result, the number of mobile emission sources is expected to increase. Although the number of emission sources will increase, EPA standards for cleaner burning engines and cleaner fuel sources will reduce emissions.

EPA standards are becoming more stringent for diesel trucks and diesel fuels, forcing truck manufacturers and diesel fuel to have emissions comparable to light duty gasoline cars by the year 2020. These stringent standards are expected to reduce the toxic emissions of dioxins, cyclic benzene, and poly-aromatic hydrocarbons emitted from diesel fuels.

In May 2004, as part of the Clean Air Nonroad Diesel Rule, EPA finalized new requirements for nonroad diesel fuel that will decrease the allowable levels of sulfur in fuel used in marine vessels and locomotives by 99 percent. These fuel improvements will create immediate and significant environmental and public health benefits by reducing PM and SO_2 emissions from existing engines.

At the same time, in a separate action, EPA announced its intent to propose more stringent emission standards for locomotives and all new commercial, recreational, and auxiliary marine diesel engines except the very large engines used for propulsion on deep-sea vessels. EPA estimates that NOx and PM emissions could be reduced by 90 percent by requiring advanced emission-control technologies for these locomotive and marine diesel engines.

In regard to large engines on deep-draft vessels, EPA has promulgated NOx and PM emission standards that apply to new marine engines on US-flagged vessels. Although EPA standards may reduce emissions from the future U.S.-flagged vessel fleet, emissions from international marine vessels are difficult to regulate at this time. Furthermore, additional future controls for air emissions from these vessels are uncertain and would likely require new international agreements. Because most of the large deep-draft vessels calling on the Port of Charleston are foreign flagged, it is reasonable to assume that the growth in deep-draft vessel traffic will cause a minor adverse impact to regional air quality.

Overall, the number of mobile emission sources is expected to increase. For mobile sources other than foreign-flagged vessels, this will tend to be offset by EPA standards for cleaner burning engines and cleaner fuel sources, and it is reasonable to assume that there will be no net impact to air quality from these sources. However, the future growth of foreign-flagged deep-draft vessel traffic will cause a minor adverse impact to regional air quality.

Ozone

Future levels of ozone have been estimated by SCDHEC as part of the Early Action Process (described in Section 4.11.2.1). The *8-Hour Ozone Modeling Analysis and Attainment Demonstration For South Carolina's Early Action Compact – Technical Support Document Executive Summary* provides a reference for future ozone levels in the Charleston and Cape Romain Wildlife Refuge area. The South Carolina 8-hour ozone modeling study was initiated in January 2000 and was designed to provide technical information relevant to attainment of an 8-hour NAAQS for ozone in South Carolina, with emphasis on the Anderson/Greenville/ Spartanburg, Aiken/Augusta, Columbia, Florence/ Darlington, and Rock Hill areas.

The report summarizes the methods and results of the ozone photochemical modeling performed for South Carolina. The modeling effort included the application of the variable-grid Urban Airshed Model (UAM-V) photochemical modeling system for one multi-day simulation period, evaluation of model performance, and use of the modeling system to estimate ozone concentrations for 2007, 2012, and 2017. Results of this ozone modeling analysis were obtained from SCDHEC (*ACCESS Database for Visualizing and Investigating Strategies for Ozone Reduction (ADVISOR)*), which included predictions of 8-hour ozone levels for three locations within Charleston and Cape Romain Wildlife Refuge areas which are presented in Table 5.1-20.

The results for these three sites indicate a continuing reduction in ozone levels through year 2017. The 2007, 2012, and 2017 future-year simulations incorporate the effects of population and industry growth, technology changes, and national or statewide control measures that are expected to be in place. These controls include VOC content limits for consumer solvents, Title III MACT assumptions, Title I RACT assumptions, VOC and CO reductions from residential wood combustion, onboard vapor recovery, Stage II controls at gas stations, the NOx SIP call, and Tier 2 low sulfur fuels.

Table 5.1-20. SCDHEC Early Action Compact 8-Hour Ozone Predictions.

Ozone Model Year	Predicted 8-Hour Ozone Level for SCDHEC Early Action Compact Modeling Study [1] (ppm)		
	Bushy Park Pump Station	US Army Reserve	Cape Romain
1998	0.07733	0.07706	0.08428
2007	0.06951	0.07323	0.07159
2012	0.06773	0.07151	0.06976
2017r	0.06696	0.07063	0.06905

[1] *As compared to the 8-hour ozone standard of 0.084 ppm.*

[2] *UAM-V ozone modeling results from 1998 base study year.*

5.1.11.2. North Charleston Study Area

The redevelopment projects occurring within the North Charleston study area (including the Noisette Project, Magnolia Project, and the Macalloy property) as well as development expected to take place within the Port Overlay District will likely add future sources of emissions. As discussed above, recent growth in the region has not caused discernable changes in air quality, and therefore, it is expected that the future redevelopment in the North Charleston area will likely have a minimal adverse impact to air quality.

The No-Action Alternative would likely include some type of industrial development of the project site in lieu of the Proposed Project. It is also likely that with whatever type of industrial use occurs, state-of-the-art emissions control technology would be employed and no contravention of air quality standards would likely occur.

5.1.11.3. Daniel Island Study Area

For the No-Action Alternative, this area will experience population and traffic growth associated with the residential and commercial development occurring as part of the Daniel Island planned urban development. However, based on recent trends as discussed above, the anticipated population growth is expected to cause minimal increases in emissions that will have minimal adverse impacts to air quality. For the No-Action Alternative, the residential and commercial development occurring as part of the Daniel Island planned urban development will likely increase mobile sources of emissions.

5.1.11.4. Clouter Island Study Area

For the No-Action Alternative, no new sources of air emissions are expected on Clouter Island.

5.1.11.5. Summary of Air Quality Impacts

In summary, the No-Action Alternative air quality in the Tri-County region will be affected by numerous factors, including regional growth, technology improvements, and regulatory programs and initiatives. Anticipated increases in the regional number of emission sources associated with the expected regional growth will also be accompanied by more stringent EPA

emission standards and cleaner fuels. It is expected that air quality conditions in the Tri-County region air would remain at or near its current levels (except ozone, which should improve), and the region will continue to be designated an attainment area for meeting the National Ambient Air Quality Standards (NAAQS).

For the No-Action Alternative, no new sources of air emissions are expected in the Clouter Island study area.

The No-Action Alternative would likely include some type of industrial development of the project site in lieu of the Proposed Project. It is also likely that whatever type of industrial use was to occur, state of the art emissions control technology would be employed and no contravention of air quality standards would likely occur.

5.1.12. Cultural Resources

This section discusses potential No-Action conditions of the existing cultural resources identified in Section 4.12. As discussed in the earlier section, surveys were conducted to identify terrestrial and submerged resources. The Area of Potential Effect (APE) is shown in Figure 5.1-16.

5.1.12.1. Charleston Harbor Region

Historic Properties

For the No-Action Alternative, there are no proposed plans which would impact historic or potential historic properties within the Charleston Harbor region. As explained in Section 4.12.2, historic properties are building, structures, sites, objects, districts, or traditional cultural properties that are listed on, or eligible for, the National Register of Historic Places (NRHP). Potential historic properties are those resources for which NRHP status has not yet been determined.

Archaeological Resources

As discussed in Section 4.12.3.1, numerous known and unknown terrestrial and underwater archaeological resources exist in the Charleston Harbor study area. At this time, there are no known projects that may affect the identified underwater and archaeological resources in the No-Action Alternative conditions. Therefore, there would be no affect to archaeological resources within the Charleston Harbor study area.

5.1.12.2. North Charleston Study Area

Historic Properties

For the No-Action Alternative, there are no known plans occurring within the study area that would impact historic or potential historic properties. However, in the event the Proposed Project is not developed, it is likely that the CNC property would be developed for some other light or heavy industrial use. The extent of the impacts from a potential development on historic properties is uncertain since there are no development plans for the site other than the Proposed Project.

Archaeological Resources

The impacts from the No-Action Alternative on the one known archaeological resource located within the North Charleston study area would be the same as those impacts described above for

historic properties (Section 5.1.12.2). Potential redevelopment of the CNC property may impact the one archaeological resource in the North Charleston study area.

5.1.12.3. Daniel Island Study Area

Historic Properties

As discussed in Section 4.12.3.3, there are no historic properties listed on, or eligible for, the NRHP within the Daniel Island study area. Therefore, the No-Action Alternative would not affect known historic properties within this area.

Archaeological Resources

For the No-Action Alternative, the ongoing expansion of the Daniel Island planned urban development (PUD) is the only likely cause for impact to archaeological resources in this study area. A Memorandum of Agreement and approved recovery plan exists if potential archaeological resources are found at the site. Therefore, any potential for adverse impact to archaeological resources in the No-Action Alternative is minimal.

5.1.12.4. Clouter Island Study Area

Historic Properties

As discussed in Section 4.12.3.4, there are no historic properties listed on, or eligible for, the NRHP within the Clouter Island study area. Therefore, the No-Action Alternative would not affect historic properties within this area.

Archaeological Resources

Because the resources within the Clouter Island study area are underwater remote-sensing anomalies, these structures would need to be further evaluated before any activity (i.e., construction, dredging, or filling) disturbs the river bottom. At this time, however, there are no plans that would disturb these potential archaeological resources.

5.1.12.5. Summary of Cultural Resources Impacts

For the No-Action Alternative, there are no proposed plans that would affect historic or potentially historic properties or archaeological resources within the Area of Potential Effect.

5.1.13. Section 4(f) Properties, Section (6f) Properties, and Other Recreational Facilities

This section discusses the No-Action Alternative conditions of potential Section 4(f) Properties, Section 6(f) Lands, and other recreational facilities within the study areas shown in Figure 5.1-17.

5.1.13.1. Section 4(f) Properties

For the No-Action Alternative, there will be no adverse direct or indirect impacts on any existing or planned Section 4(f) property within the study areas as there are no other known planned projects that would impact the properties identified in Section 4.13. However, it is reasonable to assume that the Proposed Project site would be industrially or commercially developed if the Proposed Project is not constructed. Future development of the site could potentially impact the Cooper River Marina to some degree.

5.1.13.2. Section 6(f) Lands

Two Section 6(f) lands were identified as indicated in Section 4.13.3 (Remleys Point boat ramp and the Charleston Waterfront Park). It is unlikely that these properties would be adversely impacted in the conditions of the No-Action Alternative.

5.1.13.3. Other Recreational Facilities

Regionally, the need for upland recreational facilities and opportunities would continue to increase as the population of the Tri-County area expands. Parks and other recreational activities are in the planning stages on Daniel Island to support these increases. As development continues in the region, additional recreational facilities and opportunities, including swimming, tennis, golf, greenspaces, and common areas, will likely be developed. In addition, the need for water recreation facilities and opportunities will likely continue to increase as there will likely be an increase in commercial and recreational boaters using area waterways. Additional public boat ramps and/or improvements to existing ramps will be necessary to meet the future boating demand.

Near the CNC, there are currently sidewalks along Meeting Street and Spruill Avenue, but interior neighborhood streets do not have sidewalks. Bicyclists were observed during site visits throughout the Union Heights, Windsor Subdivision, and Rosemont neighborhoods. However, there are no formal bicycle pathways within the study area. Meeting Street and Spruill Avenue are “recommended, but unfunded bikeways” in the current LRTP. It is anticipated that bike pathways for these streets will become funded in the future fulfilling the current need.

5.1.13.4. Summary of Impacts to Section 4(f) Properties, Section (6f) Properties, and Other Recreational Facilities

For the No-Action Alternative, it unlikely that any Section (f) or Section 6(f) properties or other recreational facilities would be directly impacted. Indirect impacts include minor increases in noise and light.

5.1.14. Hazardous Waste and Materials

This section discusses the potential impacts that may occur in the No-Action Alternative to sites identified to contain contamination (see Section 4.14.1), as well as potential impacts to the management and handling of hazardous materials in the Charleston Harbor area. The three study areas (North Charleston, Daniel Island, and Clouter Island) are illustrated in Figure 5.1-18.

5.1.14.1. Site Contamination

In this section, potential impacts to remediation activites planned for the contaminated sites described in Section 4.14.1 are assessed for the No-Action Alternative. Also discussed in this section is the potential for the disturbance of hazardous waste on sites that might not yet have remediation plans.

Remediation

North Charleston Study Area

The current and ongoing redevelopment projects within the North Charleston study area include sites having varying degrees of anthropogenic contamination. For example, the Macalloy site is undergoing active remediation and will likely be redeveloped as an industrial and/or commercial park. Likewise, remediation of SWMUs and AOCs on board the CNC property will continue as deemed necessary by SCDHEC with the concurrence of EPA.

Other contaminant sources, such as leaking underground storage tanks and solvent releases from dry cleaning sites, will continue to be identified and remediated as prescribed by applicable SCDHEC programs.

Most of the SWMUs/AOCs located within the Proposed Project boundary and immediately adjacent to it have NFA status except for SWMU 17, which will require remediation of soil and groundwater contamination. The Corrective Measures Study for this site is ongoing and a remedial action plan has not yet been approved by SCDHEC. However, it is anticipated that there will be a remedial action plan developed, approved, and implemented for SWMU 17 in the near future.

Daniel Island Study Area

There are no known contaminated sites within the Daniel Island study area. Therefore, future development activities that may occur would not result in adverse impacts to contaminated sites. Future contaminated sites have the potential to result from unintended and inadvertent releases of hazardous and/or toxic materials during the development and operation of future facilities within the study area. It should be noted, however, that regulatory management of hazardous constituents will reduce the likelihood of a spill occurring, or in the event of a spill, reduce the severity of the release.

Clouter Island Study Area

There are three AOCs located on Clouter Island. Continued placement of fill and use as a CDF will further sequester any contaminants within these areas.

Land Disturbance

It is not likely that No-Action Alternative land disturbance activities will adversely affect the current remediation of known contaminated sites. However, future development may impact previously identified contaminated sites that might not yet have remediation plans. The appropriate measures would need to be implemented on a case-by-case basis at the direction of the responsible Federal or state agency. In some cases, future development may facilitate cleanup in areas that are not considered a threat to human health or the environment (and are, therefore, not a current priority).

5.1.14.2. Handling of Hazardous Materials

Although the SCSPA facilities handle a relatively small volume of containerized hazardous materials cargo (typically less than five percent in a given month), other terminals within Charleston Harbor handle large volumes of petroleum products and other hazardous materials. Although there are no known plans for such terminal facilities to expand or change their hazardous materials throughput, it is reasonable to assume that there will be future increases in volume and improvements in handling and management of hazardous materials. Therefore, the risk of damage caused by spills or other inadvertent releases of hazardous materials would increase or decrease beyond the existing risk level based on future projects.

It is also reasonable to assume that industrial or commercial facilities that are developed may store, handle, or generate hazardous materials or hazardous waste in the future. However, future management practices would reduce the number and severity of any hazardous materials releases.

5.1.14.3. Oil and Hazardous Material Spill Response

Under the No-Action Alternative, it is assumed that a marine container terminal would not be constructed at the Proposed Project site; however, some other industrial development of the site is a reasonable assumption. Accordingly, there would be an increased potential for oil and hazardous materials spills and releases to occur from such industrial users compared to the existing condition.

The existing Charleston Harbor spill response cooperative and the United States Coast Guard would continue to be responsible for responding to spill incidents within Charleston Harbor under the No-Action Alternative.

5.1.14.4. Summary of Hazardous Waste and Materials Impacts

For the No-Action Alternative, any future development at the south end of the CNC would have to take the identified SWMUs and AOCs into consideration during design and construction phases. Remediation efforts at contaminated sites will continue into the future, although there will still be an ongoing risk of hazardous materials spills.

5.1.15. Water Resources

This section discusses potential impacts from the No-Action Alternative on the water resources environment. This includes groundwater resources, stormwater runoff, and surface waters (e.g., lakes, streams, etc.). As shown in Figure 5.1-19, the study area with respect to water resources includes the surface waters of the Charleston Harbor Estuary extending from the Atlantic Ocean through the harbor, and up the Cooper River to the confluence with the Back River, as well as the groundwater resources underlying the Tri-County area.

5.1.15.1. Groundwater Resources

Future regional growth will create additional demand for potable water. The CWS and Lake Moultrie Water Agency use surface water (i.e., the Edisto River and Lake Moultrie) for raw water supply, and therefore, growth in these service areas will not create additional impacts to groundwater resources. In addition to purchases from CWS, the MPW uses groundwater resources for raw water supply, and therefore, growth east of the Wando River will cause additional demand on groundwater resources. According to the 2007 MPW business plan, a 10 percent increase in Reverse Osmosis (RO) water from groundwater wells, and a 100 percent increase in water retrieved through Aquifer Storage and Recovery (ASR) are anticipated through the year 2020. SDCHEC has designated the Tri-County area as a Capacity Use Area, which requires a SCDHEC permit for wells drawing more than 3 MGD. This will minimize impacts to groundwater resources from other potential future demands.

Future redevelopment of the CNC site would likely utilize municipal surface water resources from the CWS and therefore would not create increased demands on groundwater resources. Therefore, the No-Action Alternative will have minimal impact to groundwater resources.

5.1.15.2. Stormwater Runoff

Within the Cooper River watershed, future stormwater impacts are largely dependent on growth that will occur whether or not the Proposed Project is constructed. As urban development continues, stormwater runoff pollution will likely increase as open areas are replaced with residential, commercial and industrial land uses. However, stormwater will continue to be regulated by SCDHEC, and these impacts can be avoided or minimized with the appropriate use and maintenance of stormwater BMPs.

Future redevelopment of the CNC site, a relatively small area within the Cooper River watershed, will likely affect stormwater runoff pollution from the site. For the No-Action Alternative, stormwater impacts from the site are contingent upon the redevelopment that will take place at the site. These impacts can be minimized with the appropriate use and maintenance of stormwater BMPs.

Future development of Daniel Island will affect stormwater runoff pollution. However, these impacts can be minimized with the appropriate use and maintenance of BMPs. Continued use of the Daniel Island CDFs will not change stormwater runoff from these areas.

Clouter Island will continue to be used as a CDF, and the volume of stormwater runoff from the island is not expected to change.

5.1.15.3. Surface Waters

Tides, Currents and Flows

The tides, currents and flows in the Lower Cooper River are not expected to change over the next 20 years.

In-Stream Water Quality

As urban development continues, the relative contribution of water quality impacts generated from non-point source (NPS) stormwater runoff pollution will likely increase. However, these impacts can be avoided or minimized with the appropriate use and maintenance of stormwater BMPs.

As described in Section 4.15, the Total Maximum Daily Load (TMDL) for dissolved oxygen in the Cooper River is likely to be adjusted following the completion of ongoing model studies of the harbor conducted by the BCDCOG and SCDHEC. Because the Cooper River dissolved oxygen naturally goes below the water quality standard, the TMDL sets a point source pollution waste load allocation (WLA) based on an allowable 0.1 mg/l dissolved oxygen impact under the critical conditions. This WLA may be refined over time as the water quality impact calculation methods are improved or better data become available. As a result, this may cause an increase or a decrease in the total WLA or the WLA for specific point source discharges.

Water quality impacts from dredging, accidental spills, and bilge wastes will likely continue in the future from the existing port facilities and shipping traffic. Impacts to water quality from maintenance dredging in Charleston Harbor will continue. These impacts are already minimized due to strict enforcement and adherence to Federal, state, and local water quality regulations as well as the use of BMPs.

5.1.15.4. Summary of Water Resource Impacts

It is reasonable to assume that water resources 20 years in the future will be similar to present day conditions (including hydrology, groundwater resources, water quality, stormwater runoff pollution, ballast water pollution, and wastewater pollution). Overall, future water quality impacts from pollution related to the increase in developed lands and impervious areas in the watershed will tend to be offset by an increase in stormwater controls, management practices, and other regulatory programs affecting discharges into Charleston Harbor. Predicting specific changes to the future water resources environment would be uncertain and speculative (e.g., changes to NPDES permits may occur). Therefore, it is assumed that the continued management of this resource will reduce the potential for impacts to water resources in the future.

5.1.16. Aquatic Sediments and Dredging

This section describes anticipated impacts to sedimentation and dredging in the Charleston Harbor Estuary for the No-Action Alternative. Also, this section describes impacts to the sediment quality of the aquatic sediments for No-Action Alternative. As shown in Figure 5.1-20, the study area includes surface waters and bottom sediments extending from the Atlantic Ocean through the Charleston Harbor and up the Cooper River to the confluence with Goose Creek.

5.1.16.1. Federal Navigation Channel Dredging

It is reasonable to assume that the No-Action Alternative for sedimentation and maintenance dredging volumes 20 years in the future will be similar to present conditions. Maintenance dredging will continue to affect suspended sediment concentrations in the study area. Also, maintenance dredging will continue to dispose of dredged material into CDFs in the harbor area and at the ODMDS.

It is expected that there will be some variability in annual maintenance dredging volumes because sedimentation rates are the result of a variety of environmental factors, including the freshwater release from the Pinopolis Dam, the depth of the navigation channel, the number of storms per year and the annual rainfall.

Future growth and development in Berkeley, Charleston and Dorchester Counties will likely result in an increase in impervious area and stormwater discharges may increase the sediment load reaching the Cooper River. The increased sediment load could potentially increase the existing sedimentation rates.

Future navigation project improvements may also cause changes in the sedimentation rates. Potential improvements that USACE may consider include widening and deepening projects along the existing Federal navigational channel, such as the Hog Island Reach underneath the new Cooper River Bridge, Daniel Island Reach, Drum Island Reach and Wando River Lower Reach. These potential changes could alter the sedimentation patterns and rates.

5.1.16.2. Sediment Quality

The existing contamination of aquatic sediments in the study area (described in Section 4.16.2) will still be present for the No-Action Alternative and will likely remain undisturbed. However, potential future dredging to construct improvements to the Charleston Harbor navigation project or dredging to construct a waterfront facility in Charleston Harbor could disturb sedments.

The sediment quality evaluations completed as part of the EIS indicated that adverse environmental impacts associated with dredging and dredged material disposal would be minimal. Total and dissolved phase elutriate analytical data indicated that saltwater quality standards would not be exceeded during dredging or resulting from discharge from a CDF. In the event that dredging within the dredging prisms evaluated during the Tier II sediment quality evaluation occurred at some future time under the No-Action Alternative, minimal adverse impacts would be expected.

5.1.16.3. Summary of Impacts to Aquatic Sediments and Dredging

In summary, for the No-Action Alternative, it is reasonable to assume that future sedimentation and maintenance dredging rates will be similar to present conditions. However, environmental factors and changes to the navigation channel geometry may affect future maintenance

dredging rates. Maintenance dredging will continue to dispose of dredged material into CDFs in the harbor area and at the ODMDS.

The existing contamination of aquatic sediments in the study area will likely remain undisturbed. However, if the sediments are disturbed by a construction project, the results of the sediment quality evaluation indicate that it would cause minimal adverse impacts.

5.1.17. Natural Resources

It is reasonable to assume that the No-Action Alternative condition for natural resources in the study area (Figure 5.1-22) will be affected by urban growth and development projects; however, predicting changes 20 years in the future to local natural resources would be uncertain and speculative. Therefore the No-Action Alternative involves extrapolating current species population trends (increasing/stable/decreasing), current natural resource management plans and increased anthropogenic pressures in the study area. Normal shipping, maintenance dredging and the use of CDFs and ODMDS facilities would likely continue. The upland area is generally fragmented and disturbed and inhabited by plant and animal species that are adapted to these conditions. Additional upland fragmentation is likely to continue.

5.1.17.1. Upland Communities

The upland communities on the Proposed Project and Daniel and Clouter Island Alternative sites are disturbed by previous uses and, as a result, mainly consist of nuisance, pioneer, and other low value plant species. However, forested areas have recovered at the Proposed Project site to the extent that they provide suitable habitat for many common species. The Daniel and Clouter Island Alternative sites also have some forested areas that can be considered suitable habitat for certain species. Without any development plans, the No-Action Alternative would assume these areas to be unchanged. However, the study area CDFs will eventually reach capacity and would presumably be developed according to their zoning and intended land uses.

Mammals would most likely remain unchanged as a result of the No-Action Alternative. Possibly more species will be accommodated with the maturation of the CDFs. Existing reptiles and amphibians are common species and their abundance does not threaten their population or their predators. Amphibians are not well adapted to disturbed conditions, and they are not good at dispersing. Therefore the Proposed Project site and the Daniel and Clouter Alternative project sites provide only marginal habitat requirements. However, ephemeral ponds created by uneven CDF consolidation in the study area could be breeding sites for common amphibians.

Wading birds known to use the study area have generally seen a decline in nesting, especially for the Proposed Project area. It appears that the former wading bird colony located in that area is no longer active (Dodd, 1998). Wading birds do congregate along the contraction dike to the north of the Proposed Project site, along the salt marshes, and at the marsh between the Proposed Project site and the Cooper River Marina.

Ospreys are tolerant of human activity and build nests on pilings, docks, and buoys over water. The osprey has been rebounding from a DDT-induced population decline and the population should remain stable in response to the No-Action Alternative.

The least tern has nested sporadically within the Proposed Project area and the future of this species in the project area is dependent on many other factors.

According to the Southeastern Coastal Plain research, the Eastern painted bunting and common ground-dove breeding populations are of greatest concern when considering maritime forest/shrub-scrub habitat. Southeastern Coastal Plain research also found estuarine emergent wetlands particularly important to sharp-tailed and seaside sparrows and all rail species. Estuarine mudflats are important for migratory shorebirds, especially the red knot (Hunter et al., 2001).

5.1.17.2. Freshwater Wetland Communities

The larger freshwater wetland communities at the Proposed Project site would likely remain unchanged for the No-Action Alternative; however, areas along the road corridor are in private ownership and have already been altered by ongoing and existing industrial activities and infrastructure improvements, and will likely be impacted by future developments.

5.1.17.3. Tidal Wetland Communities

South Carolina has more salt marsh acreage than any other state and, combined with Georgia, the two states contain 43% of the salt marsh acreage on the east coast of the United States. The marshes support the shrimp, crab, and other important fisheries and are threatened by numerous anthropogenic impacts.

Many marsh areas occurring along the Charleston Harbor, including the lower Cooper, Wando and Ashley Rivers were filled in decades, even centuries, ago. Much of the shoreline along the Proposed Project and Daniel and Clouter Island Alternative project sites has been previously lined with rock, leaving only a thin strip of marsh grass along the outside of the rip rap.

No loss of wetland habitat would occur on the Cooper River as a result of the No-Action Alternative. Wetland plant and animal communities have been relatively stable and healthy and would presumably remain unchanged.

5.1.17.4. Open Water River and Creek Communities

The Cooper River is classified as SB by the SCDHEC. This is a term for tidal saltwaters suitable for swimming and boating, crabbing, and fishing, except for harvesting of filter feeders such as oysters and clams for human consumption. This class also supports aquatic communities of marine fauna and flora; however, it is recognized as having limited water quality due in part to upstream and adjacent industrial activities. The No-Action Alternative would do nothing to change water quality; therefore, aquatic communities should remain similar.

Estuarine plant and animal communities would also remain similar with the No-Action Alternative. As previously discussed, the Charleston Harbor Project Special Area Management Plan team found that there has been a recent increase in the use of this estuary by more species as a nursery area, especially in the main channels of the rivers (SAMP, 2000). As for plants, little to no submerged aquatic vegetation is present within the study area.

Finfish have been the focus of many studies within the Charleston Harbor (Van Dolah et al., 1990) (SCDNR's South Carolina Estuarine and Coastal Assessment Program, SCECAP, 1999-Present). Similar findings have occurred in each study, indicating no overwhelming positive or negative trends.

Blue crab and shrimp were also a focus of SCDNR sampling studies, ranging from the 1980s to present. Population problems have been observed in blue crabs (*Callinectes sapidus*) in the state of South Carolina and along the eastern seaboard (Eggleston, 2003). White and brown

shrimp were two of the more plentiful species documented in recent studies and should continue to thrive with effective resource management.

Impacts to diamondback terrapins with the No-Action Alternative are the continued predation of eggs and hatchlings, although no nesting has been documented within the study area. Current causes of adult mortality that will continue include entrapment and subsequent drowning in crab pots, and fatal encounters with motorized vehicles (cars, boats).

The benthic communities will also remain similar, due to similar dredging schedules and water quality conditions.

Two important conclusions were reached concerning the Charleston Harbor Project SAMP and tidal creek habitats (2000). First, tidal creeks are the most critical habitat in the watershed because they serve as important nurseries for estuarine-dependent plants and animals. These same creeks, due to their size and location, are greatly affected by stormwater runoff and adjacent land use decisions. Secondly, local governments, through their land use decisions, play a crucial role in maintaining the health of these habitats. Shipyard Creek, Clouter Creek, and Beresford Creek are very important when considering impacts. No impacts are predicted for the No-Action Alternative, although increased development could potentially impact these areas.

For river otters, current populations are threatened by pollution (including pesticide poisoning), acid rain, habitat loss, and illegal hunting. The No-Action Alternative will not change this.

5.1.17.5. Essential Fish Habitat (EFH)

No changes to EFH will occur with the No-Action Alternative. Estuarine emergent wetlands, oyster reefs and shell banks, intertidal flats, and estuarine water column are the potential EFH habitats within the study area.

No changes to EFH species will occur with the No-Action Alternative. Shrimp, red drum, snapper group species, coastal migratory pelagic species, sharks, and sturgeon comprise many of the South Atlantic or Federally managed species plans for the Charleston Harbor. Population assessments and trends of EFH species are evaluated annually and their response to management plans varies widely.

5.1.17.6. Invasive Species

Introduced, invasive plant and animal species will continue to be a concern within the study area by taking over native ecosystems. Existing invasive species, such as fire ants and Japanese honeysuckle, will continue to impact the study area uplands, and the five invasive aquatic species, including the porcelain crab and Asian green mussel, will continue to affect the estuarine environment.

5.1.17.7. Summary of Impacts to Natural Resources

In summary, impacts to Natural Resources for the No-Action Alternative are as follows:

- Upland communities are expected to be negligibly impacted. The future of the least tern population that has sporadically nested within the Proposed Project area is dependent on many variables, including the future light industrial development likely to take place on the south end of the CNC.
- Freshwater wetland communities will remain mostly unchanged.

- There will not likely be any loss of wetland habitat on the Cooper River. Wetland plant and animal communities would remain relatively stable.
- No changes to EFH are expected. Population assessments and trends of EFH species will continue to be evaluated for their respective management plans.
- Introduced, invasive species will continue to be a concern within the study area.

5.1.18. Threatened and Endangered Species

It is reasonable to assume that the No-Action Alternative condition for threatened and endangered species in the study area (Figure 5.1-23) will be similar to present day conditions. The natural resources throughout the region will likely change as a result of urban growth and development projects. However, predicting changes 20 years in the future to threatened and endangered species would be uncertain and speculative. Some of the species have experienced a recovery over the years, while others have not rebounded from the protection and management afforded to them. The anticipated conditions of Federally listed threatened and endangered species identified in Section 4.18 to potentially inhabit or transit the study area are described as follows for the No-Action Alternative:

- **Bald Eagle** – The bald eagle has been rebounding from a DDT-induced population decline and the population should remain stable in the No-Action Alternative.

- **Shortnose Sturgeon** –The shortnose sturgeon can potentially travel through the study area in the winter, and this possibility will not change in the No-Action Alternative. Historically, the population of shortnose sturgeon declined because of pollution, overfishing, shad gillnets, dam construction (substantially reducing suitable habitat), habitat alterations from discharges, dredging and disposal of material into rivers, and development activities involving estuarine/riverine mudflats and marshes.

- **American Alligator** – The No-Action Alternative will not affect the population of the American alligator.

- **Manatee** – The increased ship traffic associated with the No-Action Alternative may affect, but is not likely to adversely affect, the manatee population.

- **Sea Turtles** – The increased ship traffic associated with the No-Action Alternative may affect, but is not likely to adversely affect, sea turtles, including loggerhead turtles, green turtles, Kemp's Ridley turtles, and leatherback turtles. The loggerhead sea turtle is the species most likely to be found in the study area.

- **Whales** – Ship strikes and underwater noise remain a concern for right whales, in particular. The increased ocean-going ship traffic associated with the No-Action Alternative may affect, but is not likely to adversely affect, the right whale, humpback whale, sperm whale, blue whale, fin whale and Sei whale.

- **Other Species** - The surveys discussed in Section 4.18 concluded that the flatwoods salamander, wood stork, red-cockaded woodpecker, Bachman's warbler, piping plover, and roseate tern are not expected to occur in the study area. Therefore, their status is not expected to be affected in the No-Action Alternative.

State listed species such as the least tern have nested sporadically within the Proposed Project area and the future of this species in the project area is highly dependent on many other factors. Other State-listed species such as the American swallow-tailed kite, Rafinesque's big-eared bat, gopher frog, spotted turtle, and dwarf siren will not be affected by the No-Action Alternative.

Atlantic sturgeon, like all anadromous fish, are vulnerable to a variety of habitat impacts because they use rivers, estuaries, bays, and the ocean at various points of their life. Habitat alterations can be problematic for Atlantic sturgeon due to their long life span, age at maturing, and reliance on multiple habitats. Habitat alterations potentially affecting sturgeon include dam construction and operation, dredging and disposal, and water quality modifications such as changes in levels of dissolved oxygen, water temperature, and contaminants. The Cooper River is closed to the shad gillnet fishery, and shrimp trawling is not allowed in Charleston Harbor, so bycatch is not a concern.

5.1.19. Shorelines

This section discusses potential impacts from the No-Action Alternative on the shoreline environment. As shown by Figure 5.1-23, the study area includes the shorelines of the Charleston Harbor Estuary extending from the Atlantic Ocean through the harbor, up the Cooper River to Clouter Island.

It is reasonable to assume that the No-Action Alternative shorelines will continue present day trends. Any potential changes to shoreline trends cannot be quantified with any certainty and would be speculative. Therefore, the No-Action Alternative condition is characterized by the best available data describing the existing shoreline trends, and is assumed to be similar to existing trends determined by aerial photograph analysis and described in Section 4.19 and shown in Figure 4.19-3.

Overall, the harbor shorelines would continue to be extremely stable with the exception of some segments containing beaches or transient marsh/intertidal flat features. Due to the developed nature of many of the shorelines, bulkheads and revetments would continue to protect many segments of the harbor shoreline that would otherwise be vulnerable to erosion and storm damage.

The harbor and rivers would continue to be used for commercial shipping and recreational boat traffic, so vessel wakes would continue to affect the study area shorelines. However, the currents and wind waves would continue to be the dominant forces affecting shoreline stability in the study area. Therefore, vessel wakes would continue to be only a minor factor contributing to shoreline changes and erosion. Impacts to shorelines near important cultural resources such as Fort Sumter and Castle Pinckney and eroding areas such as the southern end of Sullivan's Island caused by vessel wakes would be minimal.

Sea level will continue to rise in the future. The local sea level rise will result in a slow, gradual recession of natural unprotected shorelines.

In summary, for the No-Action Alternative, the shorelines will continue present day trends. Most shorelines have been previously armored or are relatively stable. Those areas that are unstable will likely continue to be subject to erosive forces in the future. Likewise, areas that are developed may be armored or protected in the future. Ship wakes would likely continue to have a lesser impact on shorelines than natural forces such as wind waves and storm action.

5.1.20. Floodplains

This section discusses potential impacts from the No-Action Alternative on floodplains. As shown in Figure 5.1-24, the study area with respect to floodplains includes areas of North Charleston, Daniel Island and Clouter Island, which are located in the floodplains of the Cooper River.

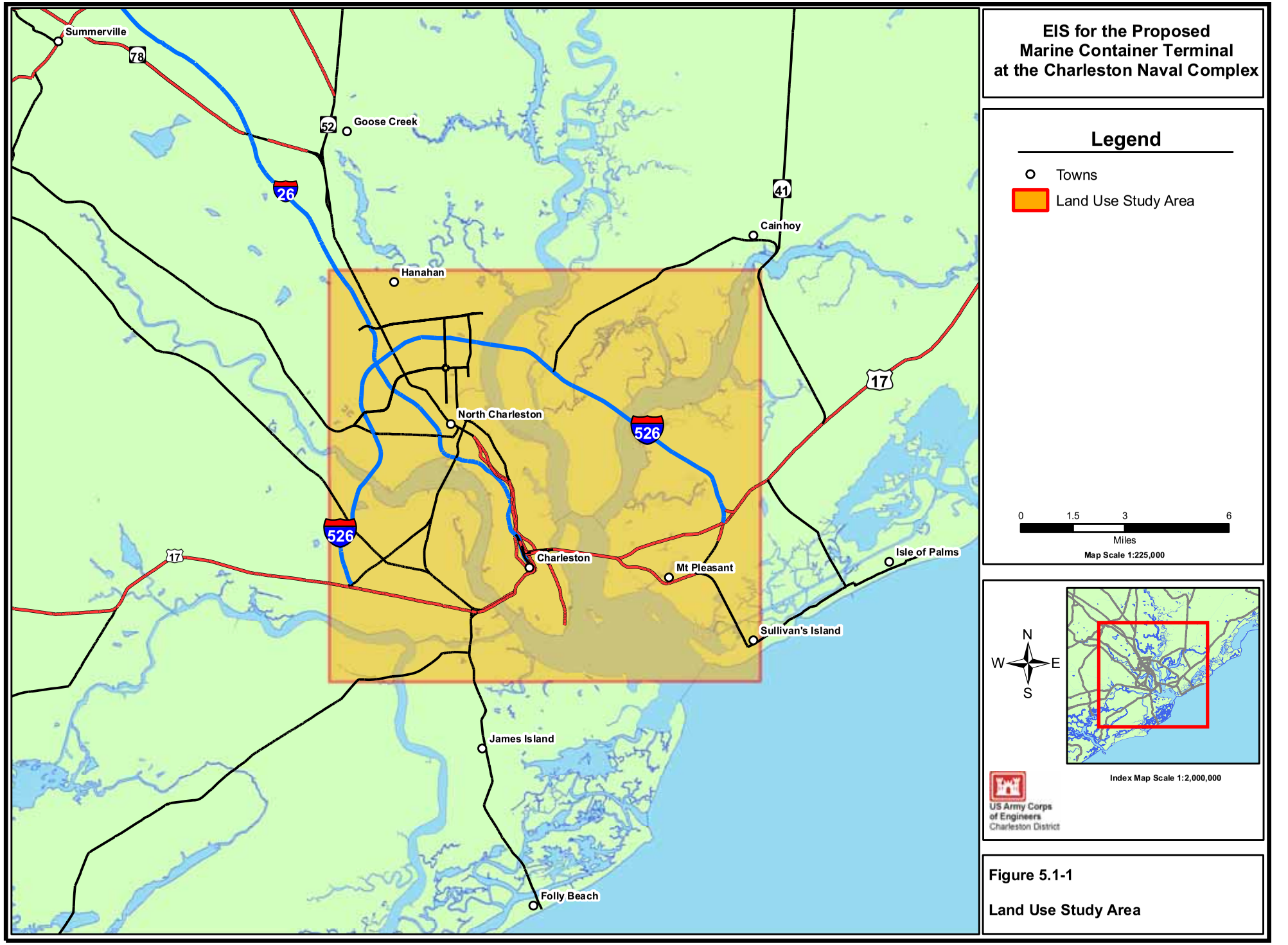
Any potential changes to the floodplain environment during that time cannot be quantified with any certainty and would be speculative. It is reasonable to assume that the floodplain environment for the No-Action Alternative would be similar to the existing conditions described in Section 4.20 of this report. Low-lying areas of the floodplains will occasionally flood, and storm surge will occasionally impact properties within the study area.

Development will continue to occur in floodplains in the Charleston Region, and FEMA flood zones will continue to be used to regulate development within their boundaries with the objective of reducing damages caused by flood. For example, through local flood ordinances (based on the National Flood Insurance Program (NFIP) regulations), new construction or substantially improved or substantially damaged existing buildings in A Zones must have their lowest floor (including basement) elevated to or above the 100-yr flood elevation. Non-residential structures in A Zones can be either elevated or dry-floodproofed. In V Zones, the building must be elevated on piles and columns and the bottom of the lowest horizontal structural member of the lowest floor of all new construction or substantially improved existing buildings must be elevated to or above the Base Flood Elevation (BFE). The NFIP regulations prohibit developments planned within a floodplain that cause a rise in the 100-yr flood elevation.

Although the NFIP maps and Flood Information Study (FIS) reports are prepared according to rigorous technical standards, FEMA recognizes that changes to the maps and reports may be necessary. Some reasons for the changes are due to improvements in the techniques used in assessing flood risks, changes in physical conditions in the floodplains or watersheds, and the availability of new scientific or technical data. Flood zones may be revised in the future.

Sea level will continue to rise in the future. The local sea level rise will result in a slow, gradual widening of floodplain areas.

In summary, for the No-Action Alternative, floodplains will be similar to existing conditions. Future development will result in the construction of buildings and structures in the floodplains in accordance with the applicable guidelines.


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Land Use Study Area
0
1.5
3
6
Miles
Map Scale 1:225,000
N
W
E
S
Index Map Scale 1:2,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-1
Land Use Study Area
Summerville
78
52
Goose Creek
26
41
Cainhoy
Hanahan
North Charleston
526
17
526
17
Charleston
Mt Pleasant
Isle of Palms
Sullivan's Island
James Island
Folly Beach

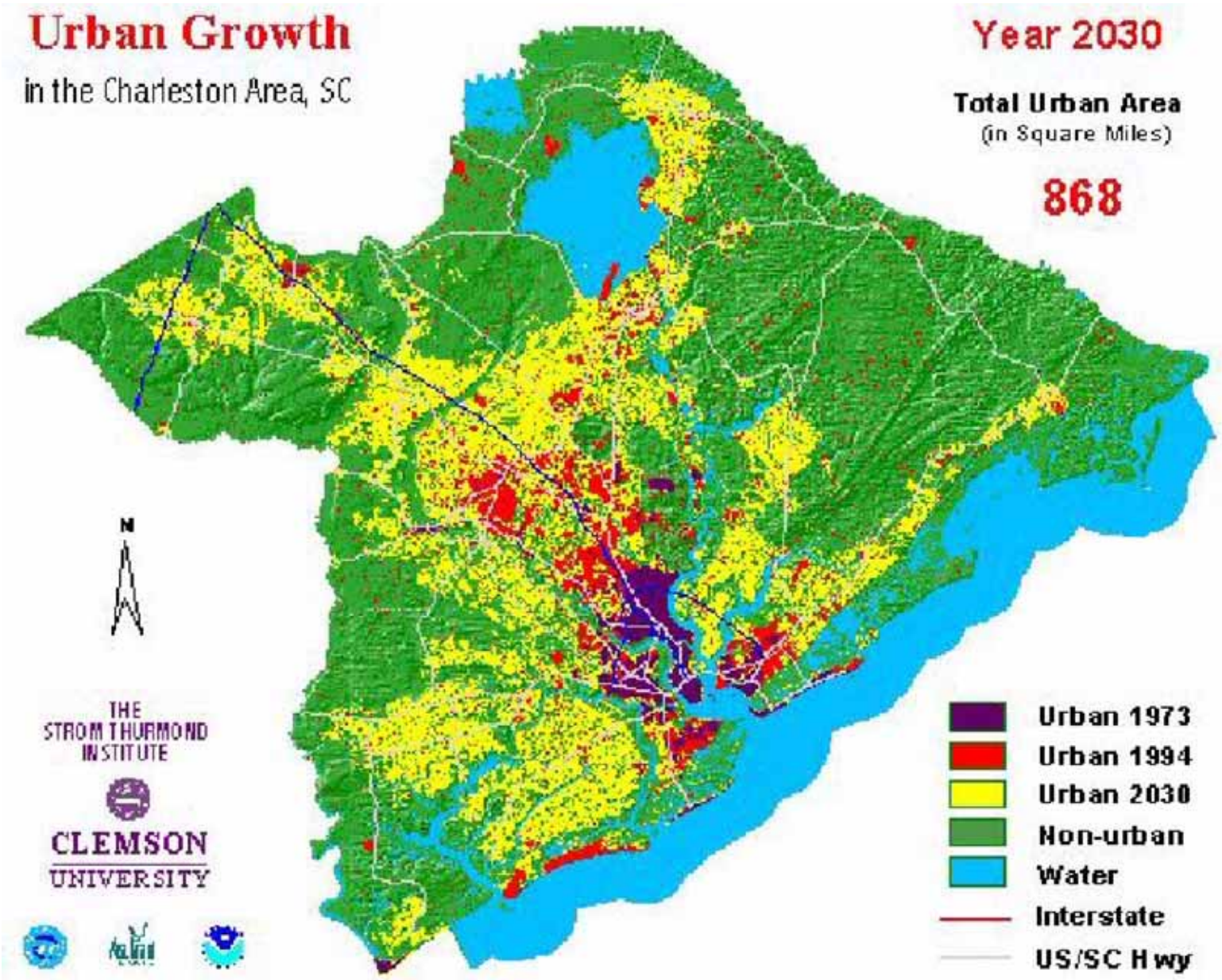
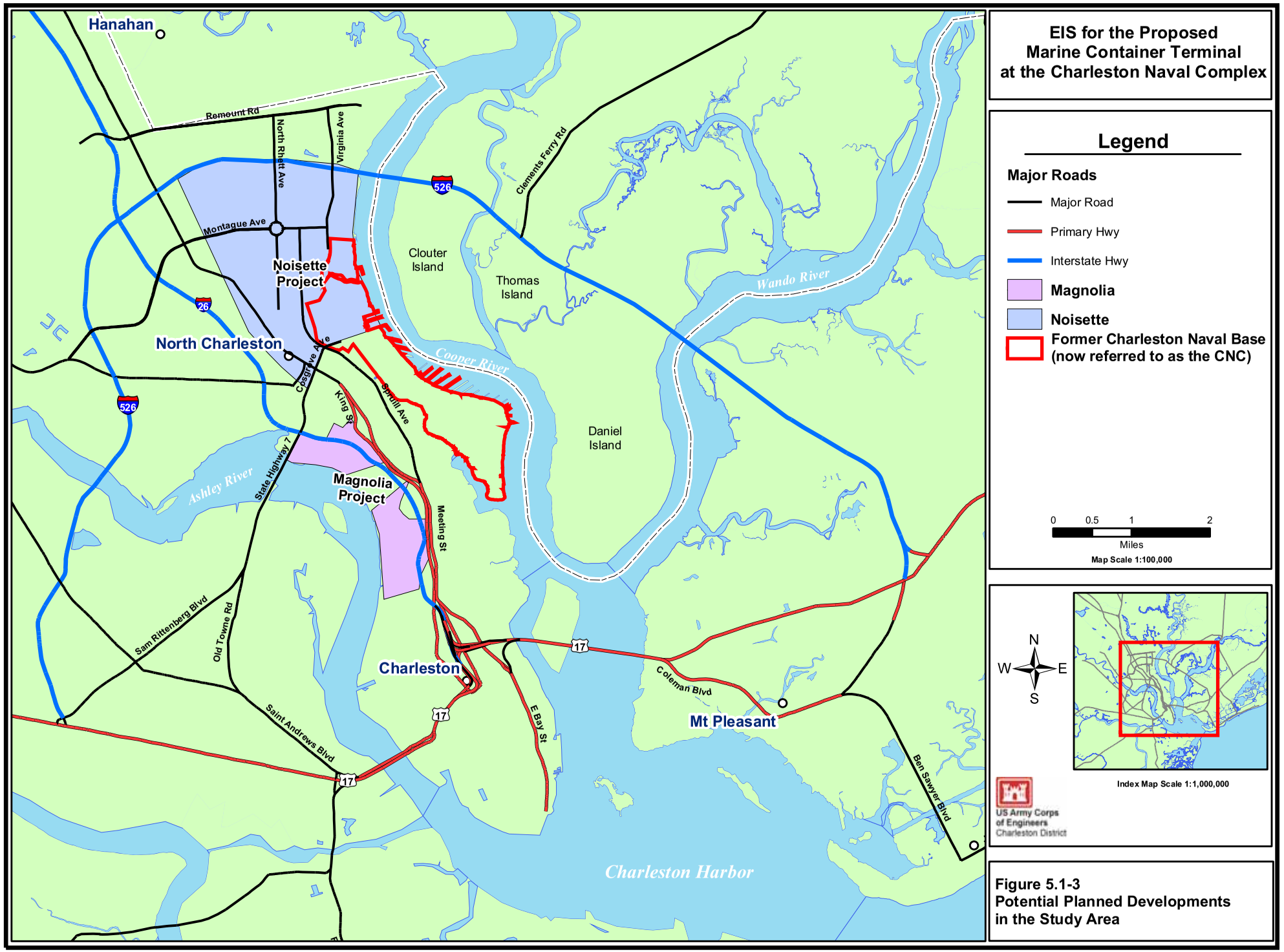


Figure 5.1-2

Predicted 2030 Urban Land Use

US Army Corps
of Engineers
Charleston District


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Major Roads
Major Road
Primary Hwy
Interstate Hwy
Magnolia
Noisette
Former Charleston Naval Base
(now referred to as the CNC)
0 0.5 1 2
Miles
Map Scale 1:100,000
N
W E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Clements Ferry Rd
526
Montague Ave
Noisette
Project
Clouter
Island
Thomas
Island
Wando River
26
North Charleston
Cosgrove Ave
Cooper River
King St
Spruill Ave
526
Daniel
Island
Ashley River
State Highway 7
Magnolia
Project
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
17
Coleman Blvd
Mt Pleasant
E Bay St
Saint Andrews Blvd
17
Ben Sawyer Blvd
Charleston Harbor
Figure 5.1-3
Potential Planned Developments
in the Study Area

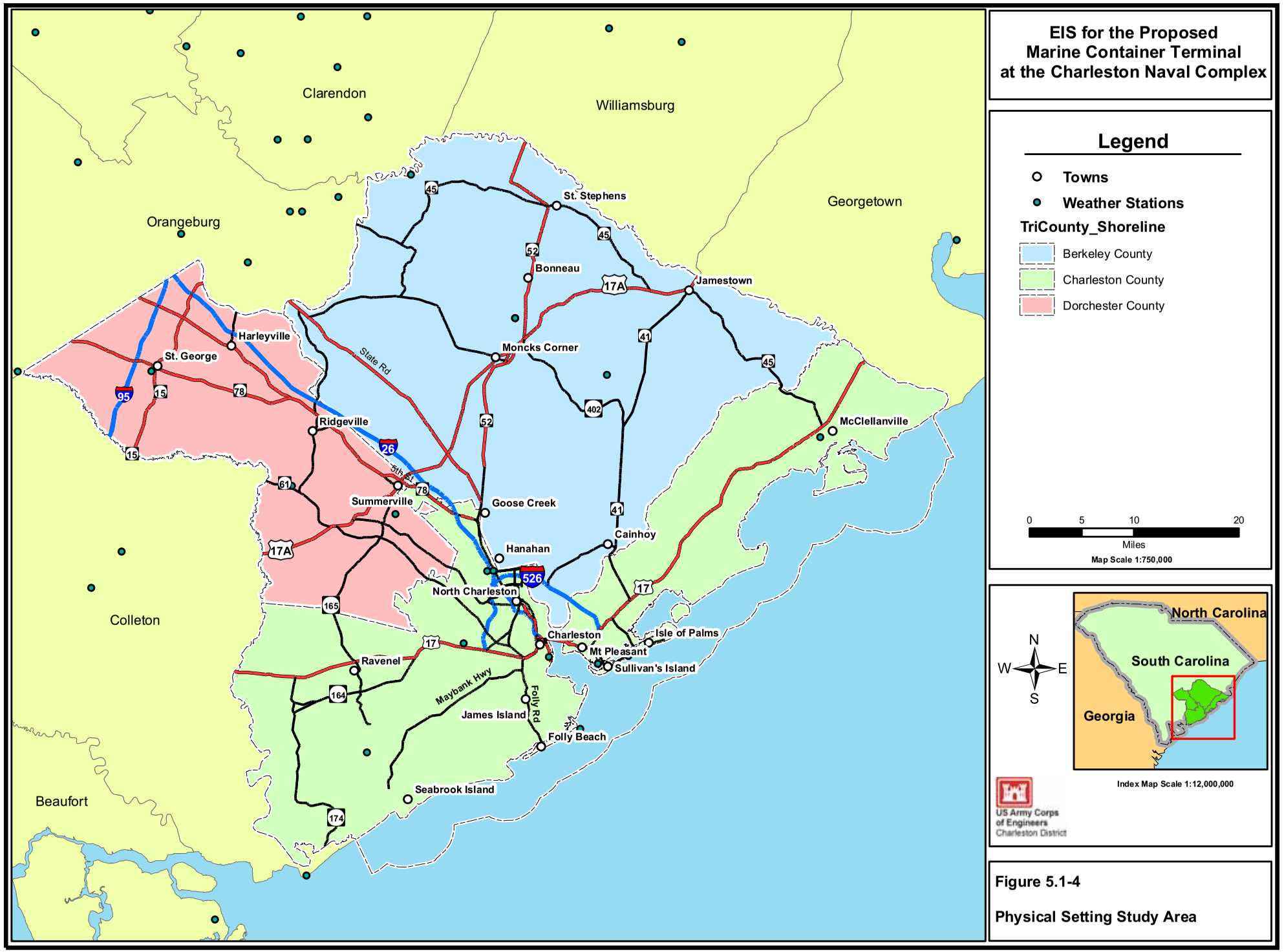
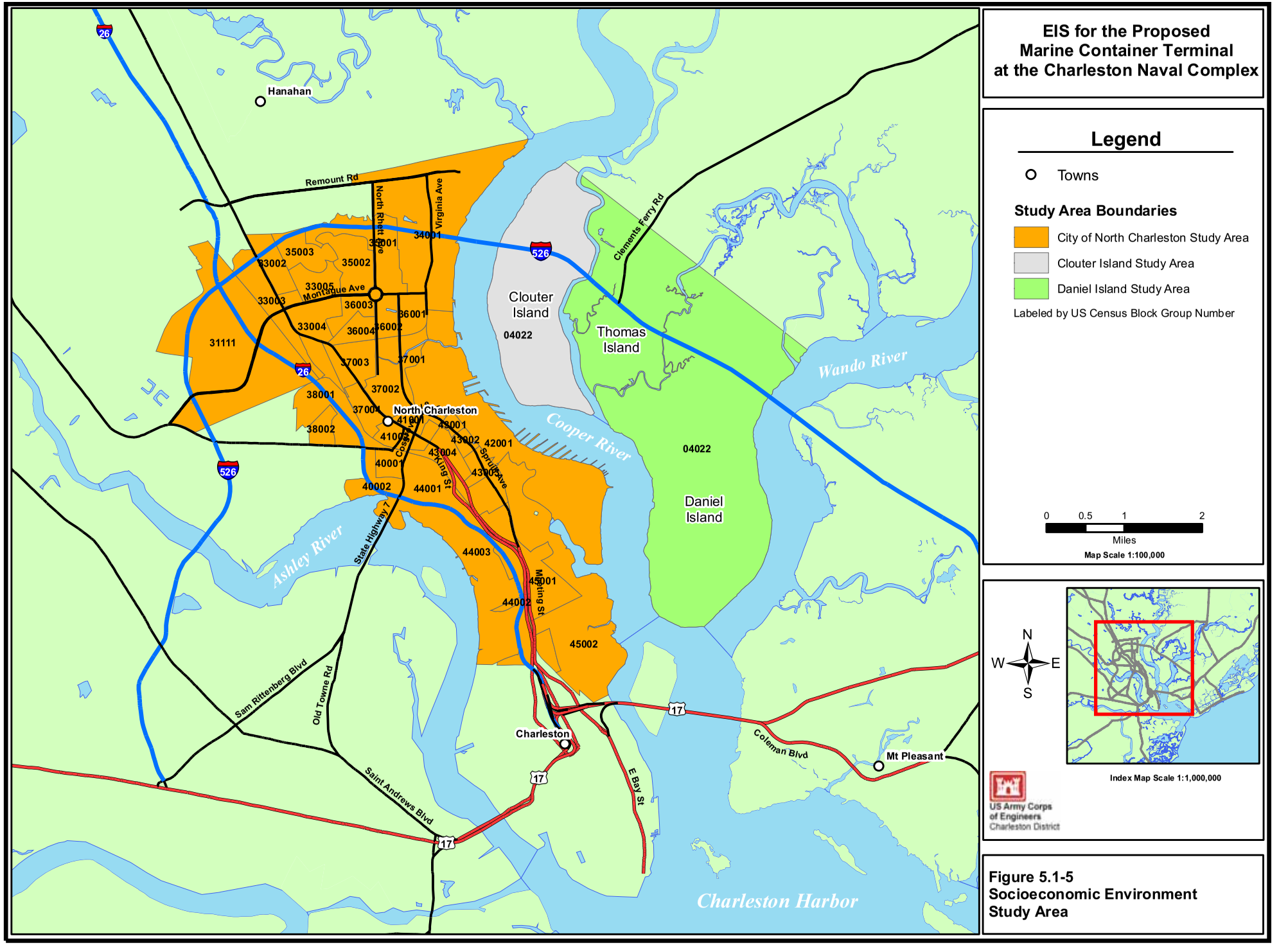
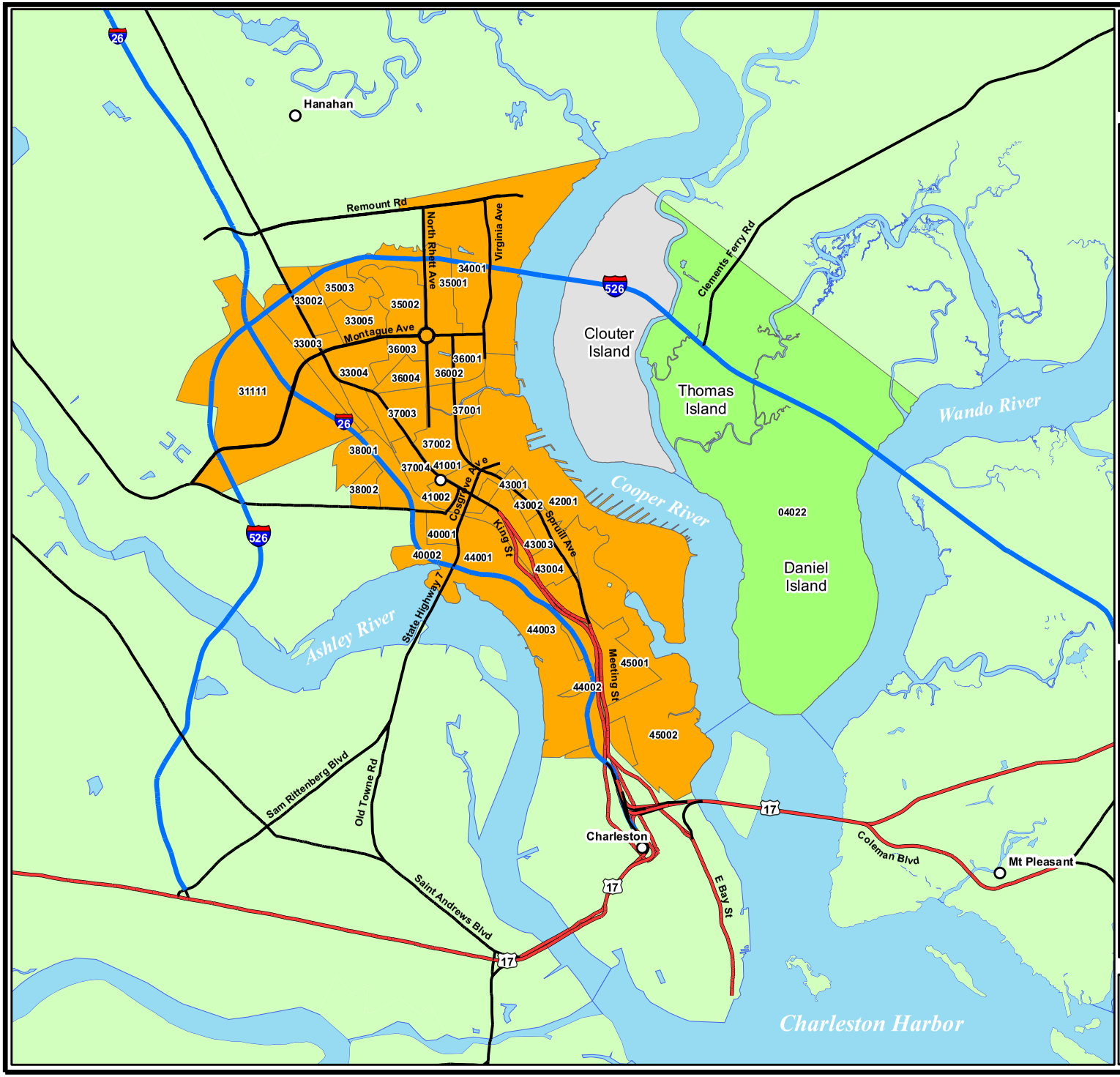


Figure 5.1-4

Physical Setting Study Area


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Study Area Boundaries
City of North Charleston Study Area
Clouter Island Study Area
Daniel Island Study Area
Labeled by US Census Block Group Number
0 0.5 1 2
Miles
Map Scale 1:100,000
Index Map Scale 1:1,000,000
US Army Corps of Engineers
Charleston District
Figure 5.1-5
Socioeconomic Environment
Study Area
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Clouter Island
Thomas Island
Daniel Island
Clements Ferry Rd
Wando River
Cooper River
Ashley River
North Charleston
State Highway 7
Sam Rittenberg Blvd
Old Towne Rd
Saint Andrews Blvd
Charleston
Coleman Blvd
Mt Pleasant
E Bay St
Meeting St
King St
Spruill Ave
Charleston Harbor
04022
31111
33002
33003
33004
33005
35002
35003
34001
35001
36001
36002
36003
36004
37001
37002
37003
38001
38002
40001
40002
41001
41002
42001
43001
43002
43003
43004
44001
44002
44003
45001
45002
N
W
E
S



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Towns

Study Area Boundaries

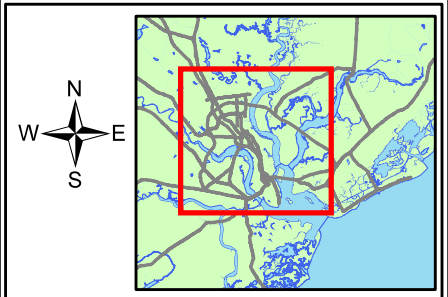
- City of North Charleston Study Area
- Clouter Island Study Area
- Daniel Island Study Area

Labeled by US Census Block Group Number

0 0.5 1 2

Miles

Map Scale 1:100,000

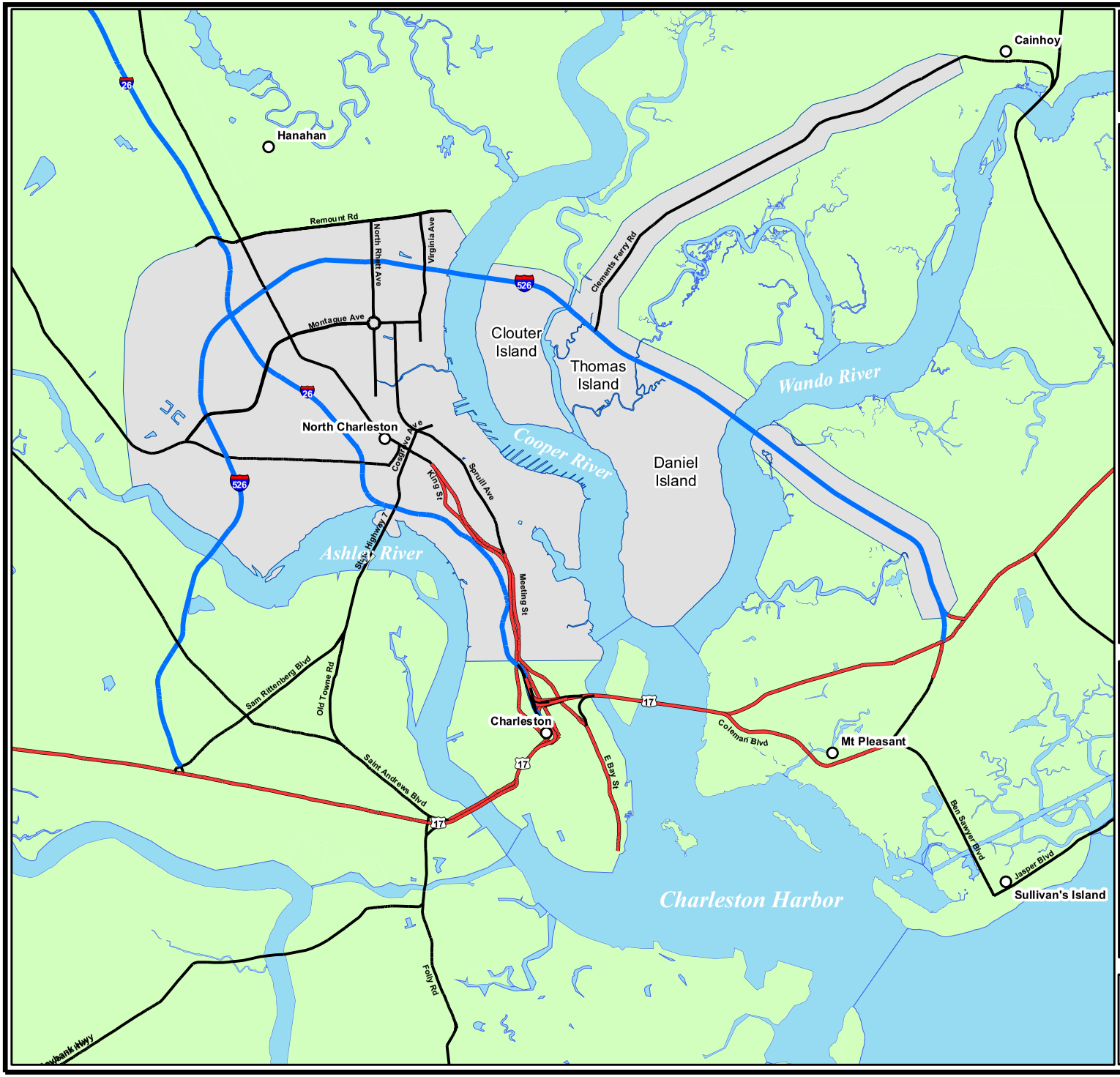


Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 5.1-6

Social Characteristics Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

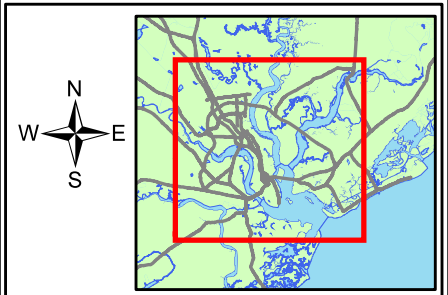
Legend

- Towns
- Community Infrastructure Study Area

0 1 2 4

Miles

Map Scale 1:125,000



Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 5.1-7

Community Infrastructure Study Area

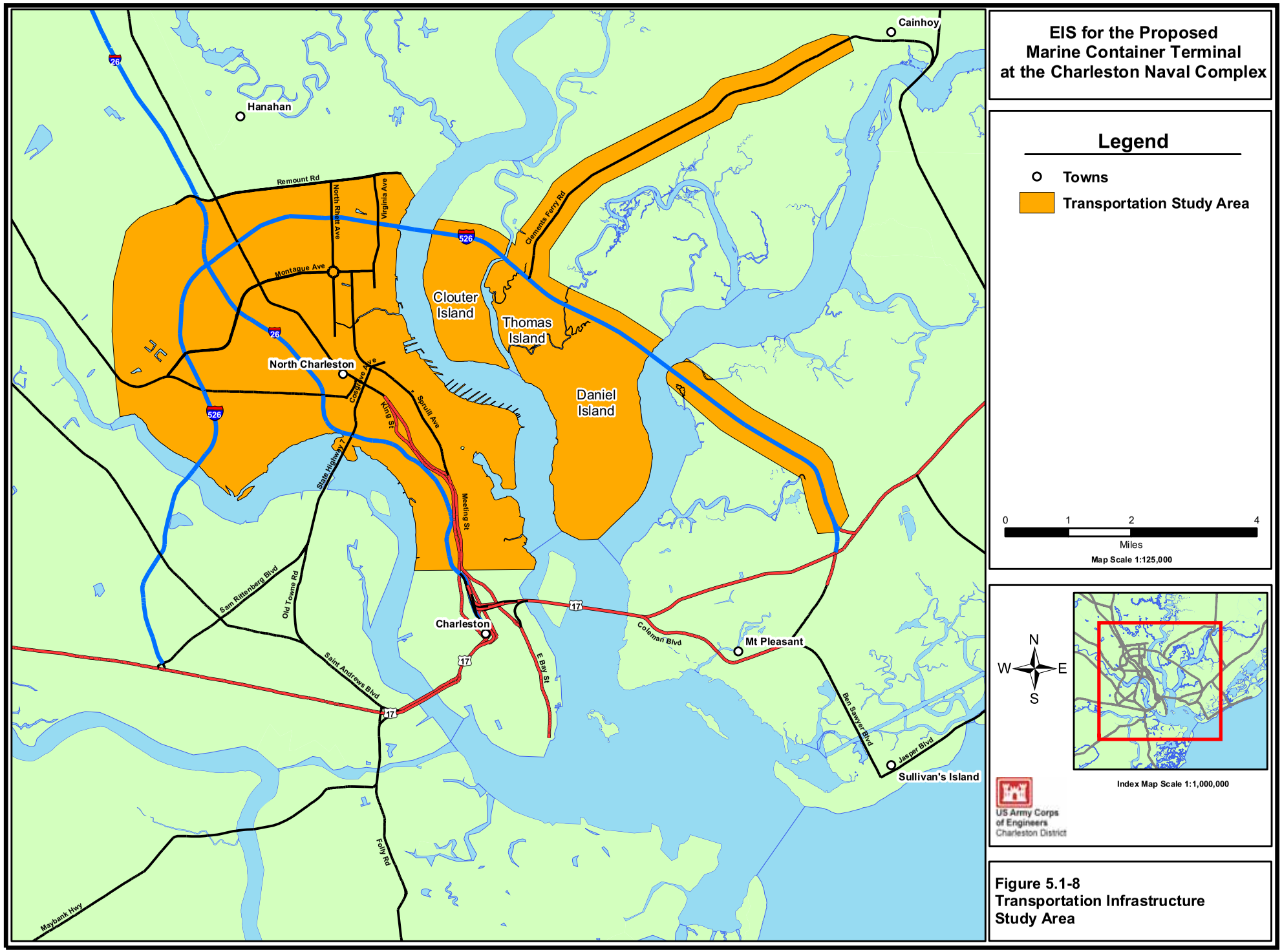


Figure 5.1-8
Transportation Infrastructure Study Area

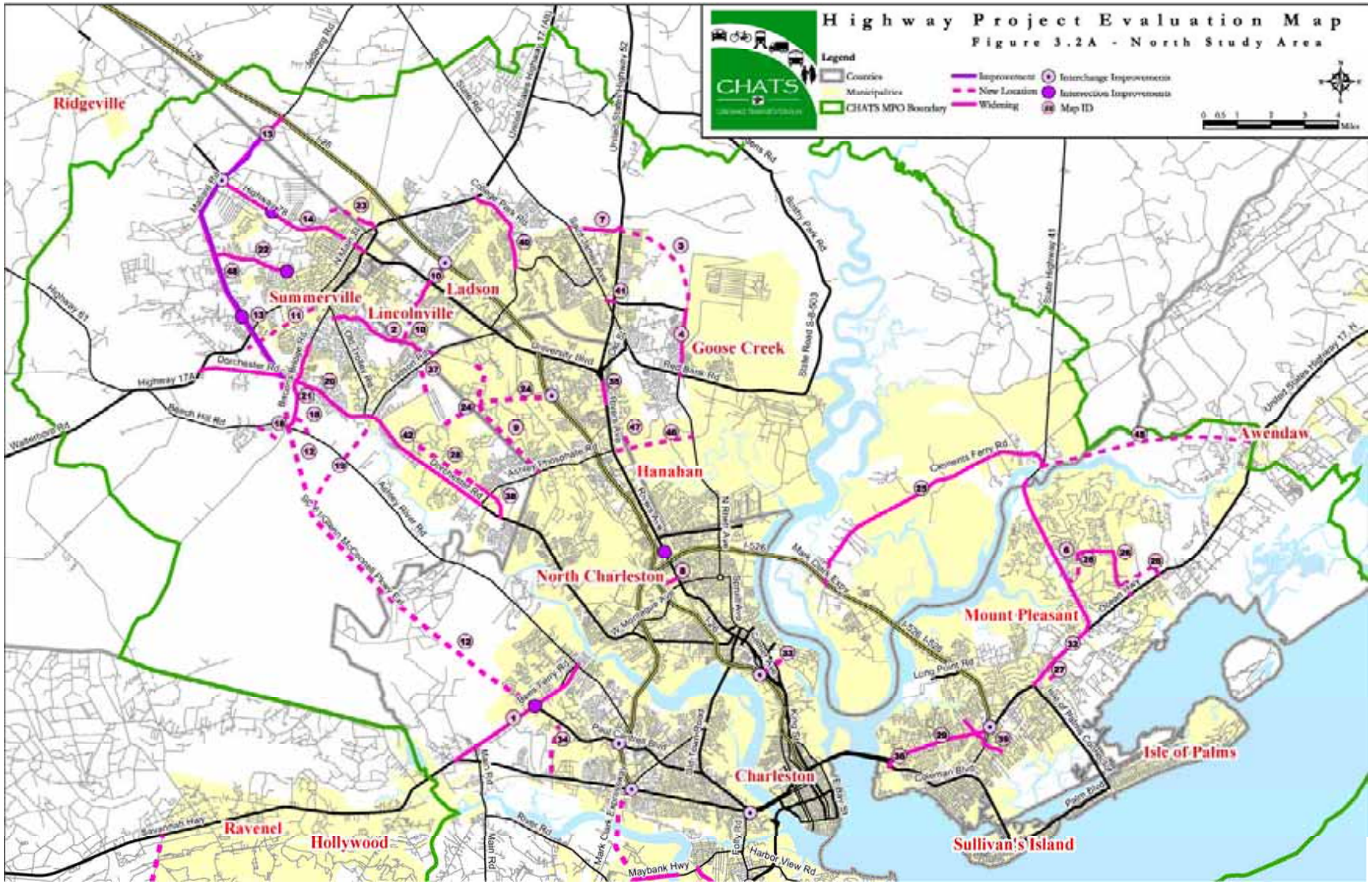


Figure 5.1-9
CHATS Highway Project Evaluation Map – North Study Area

U.S Army Corps of Engineers Charleston District

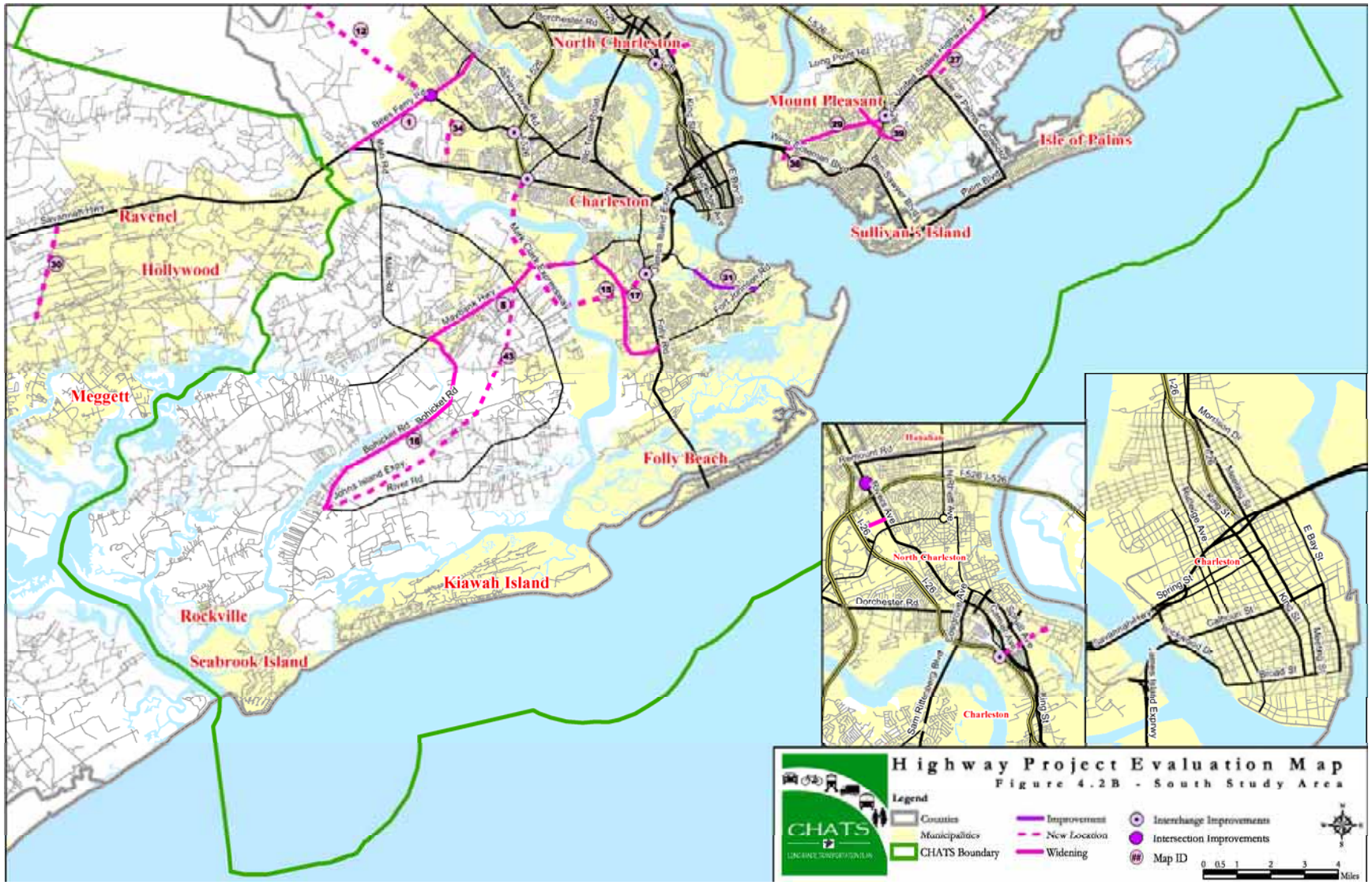
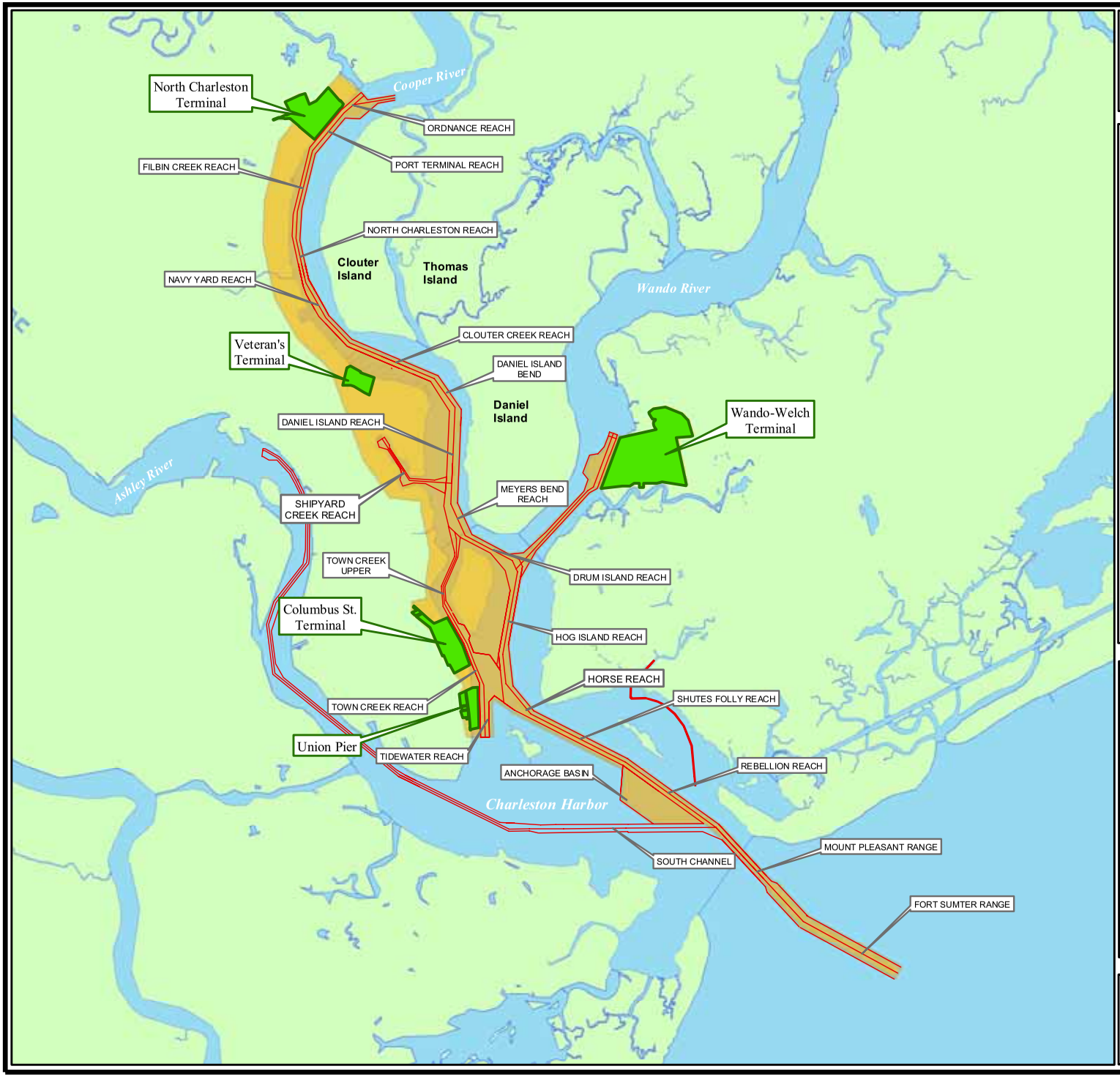


Figure 5.1-10
CHATS Highway Project Evaluation Map – South Study Area

US Army Corps of Engineers Charleston District



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

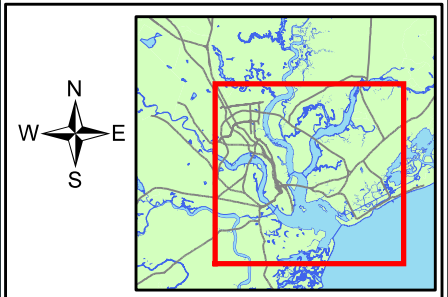
Legend

- Navigation Channel
- Existing Terminals
- Navigational and Terminal Facilities Study Area

0 1 2 4

Miles

Map Scale: 1:125,000



Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 5.1-11
Navigational and Terminal Facility Study Area

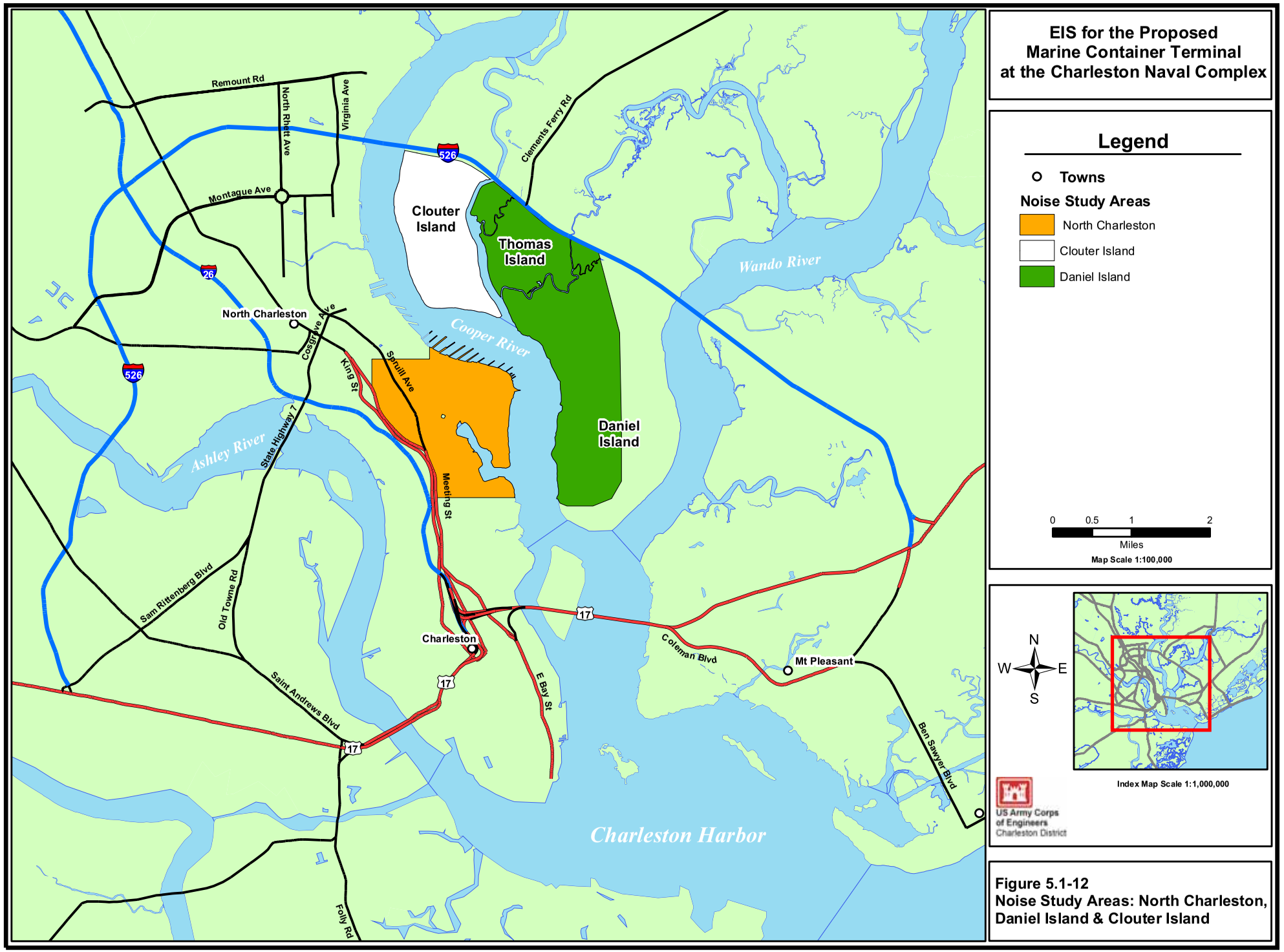
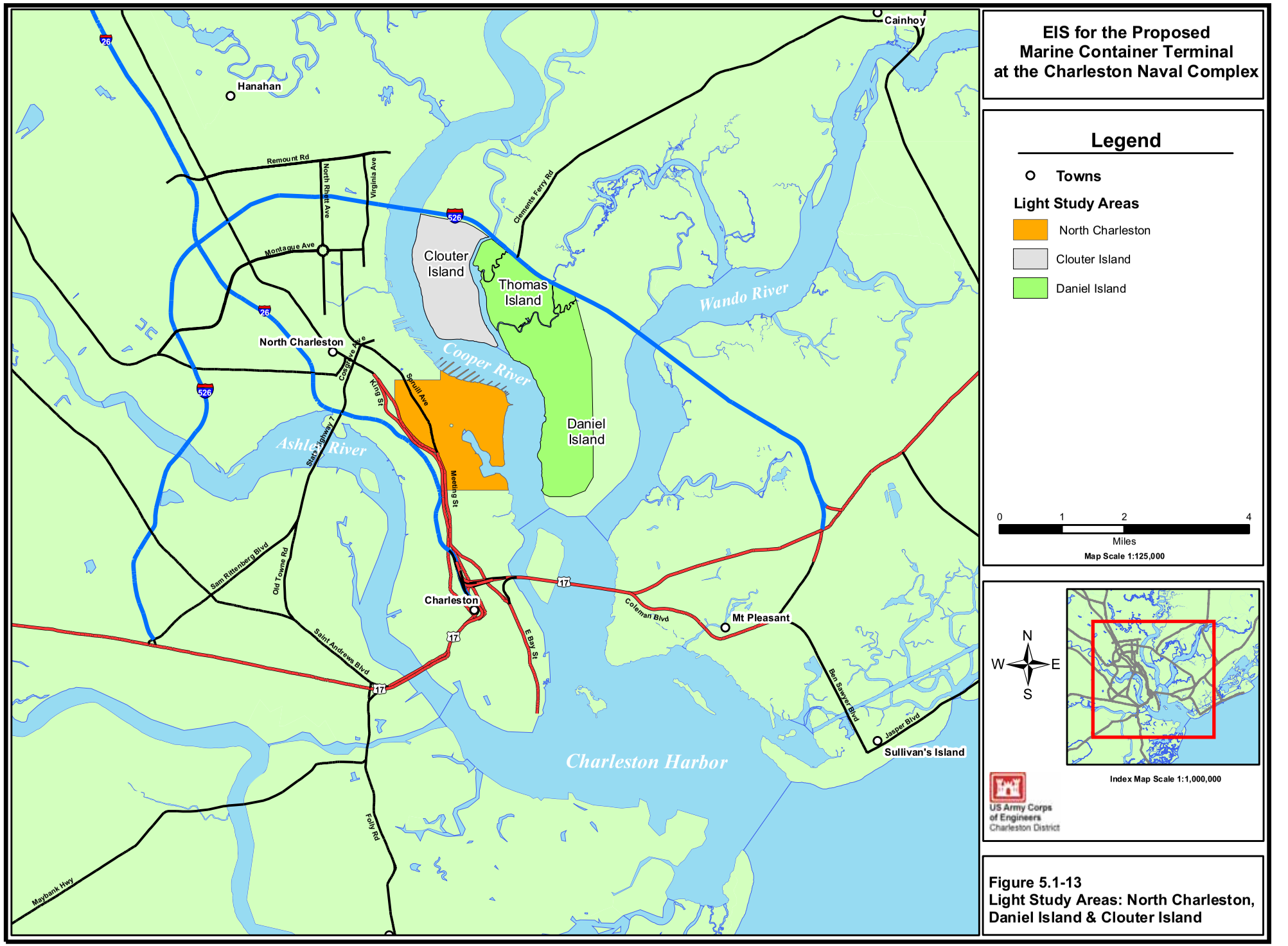
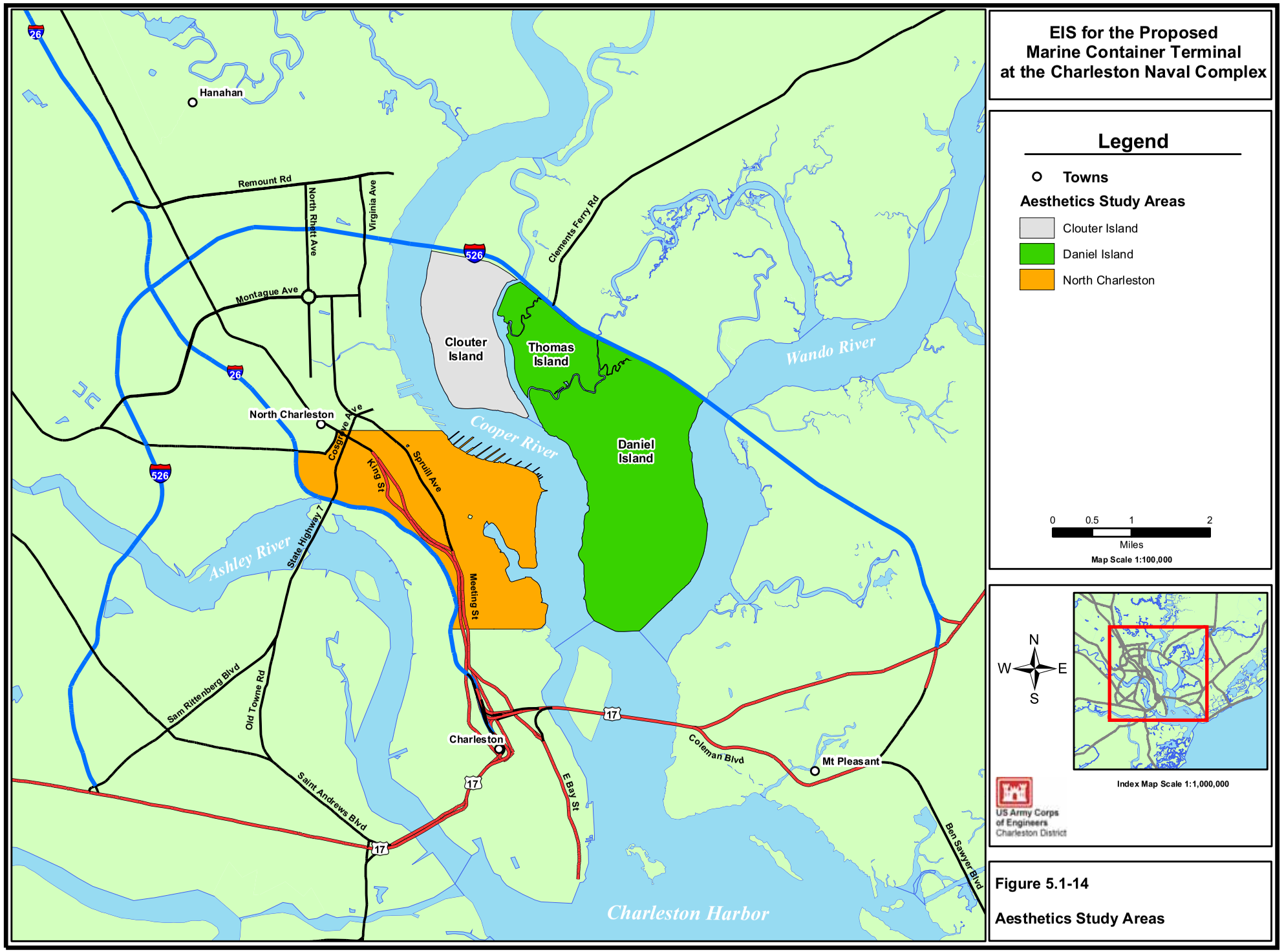
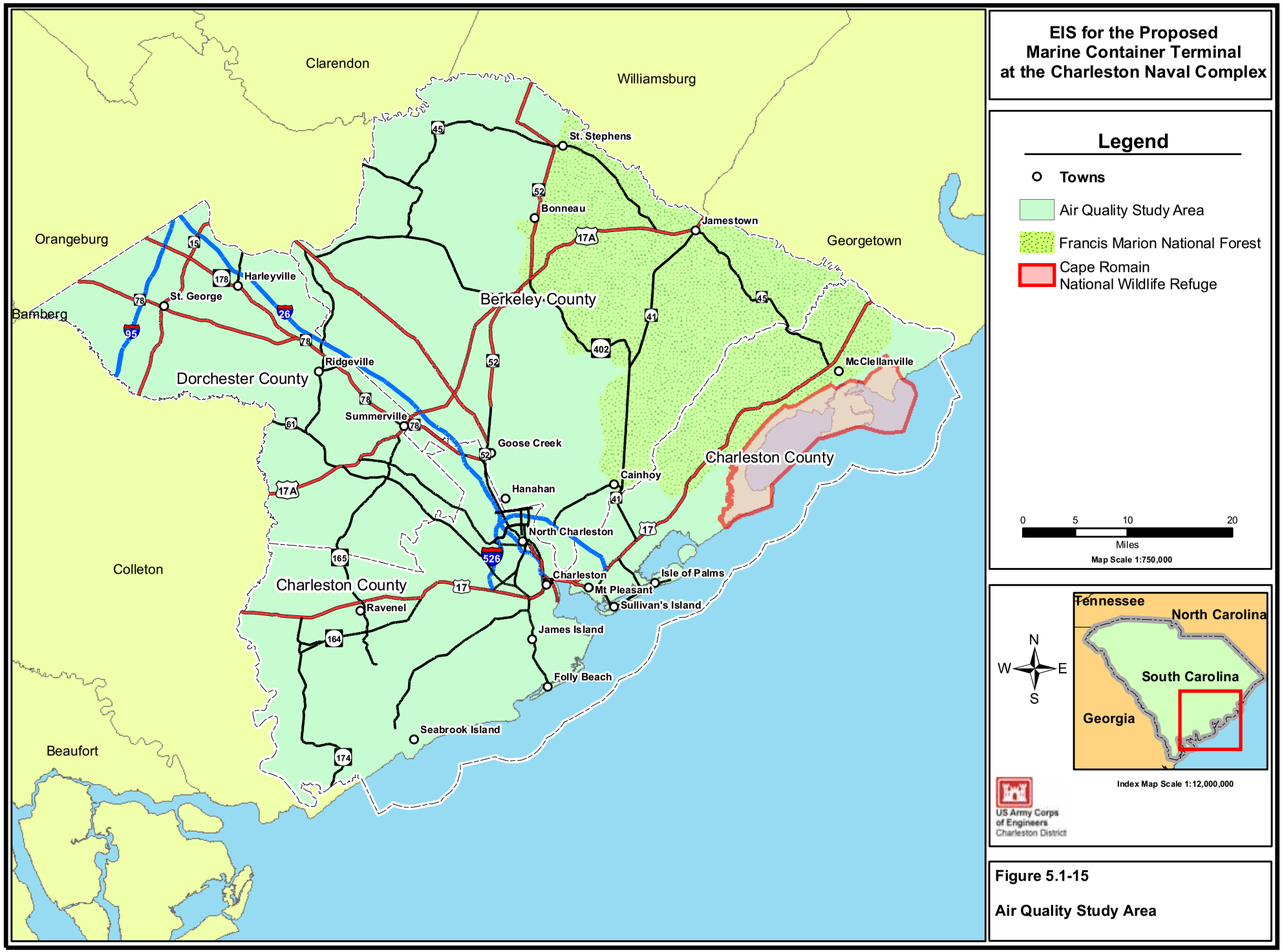


Figure 5.1-12
Noise Study Areas: North Charleston, Daniel Island & Clouter Island


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Light Study Areas
North Charleston
Clouter Island
Daniel Island
0
1
2
4
Miles
Map Scale 1:125,000
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Cainhoy
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Clements Ferry Rd
Clouter Island
Thomas Island
Wando River
North Charleston
Cooper River
Daniel Island
Spruill Ave
King St
Ashley River
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
E Bay St
Saint Andrews Blvd
Ben Sawyer Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Folly Rd
Maybank Hwy
Figure 5.1-13
Light Study Areas: North Charleston,
Daniel Island & Clouter Island


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Aesthetics Study Areas
Clouter Island
Daniel Island
North Charleston
0 0.5 1 2
Miles
Map Scale 1:100,000
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-14
Aesthetics Study Areas
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Clements Ferry Rd
Clouter Island
Thomas Island
Wando River
Daniel Island
North Charleston
Cooper River
Cosgrove Ave
King St
Sprtill Ave
Meeting St
Ashley River
State Highway 7
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Saint Andrews Blvd
E Bay St
Coleman Blvd
Mt Pleasant
Ben Sawyer Blvd
Charleston Harbor
26
526
17


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Air Quality Study Area
Francis Marion National Forest
Cape Romain
National Wildlife Refuge
0 5 10 20
Miles
Map Scale 1:750,000
Clarendon
Williamsburg
Orangeburg
Georgetown
Bamberg
Colleton
Beaufort
Berkeley County
Dorchester County
Charleston County
Charleston County
St. Stephens
Bonneau
Jamestown
Harleyville
St. George
Ridgeville
Summerville
Goose Creek
Hanahan
North Charleston
Cainhoy
McClellanville
Charleston
Mt Pleasant
Isle of Palms
Sullivan's Island
Ravenel
James Island
Folly Beach
Seabrook Island
45
52
17A
15
178
78
26
95
61
165
526
17
164
174
402
41
Tennessee
North Carolina
South Carolina
Georgia
N
W
E
S
Index Map Scale 1:12,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-15
Air Quality Study Area

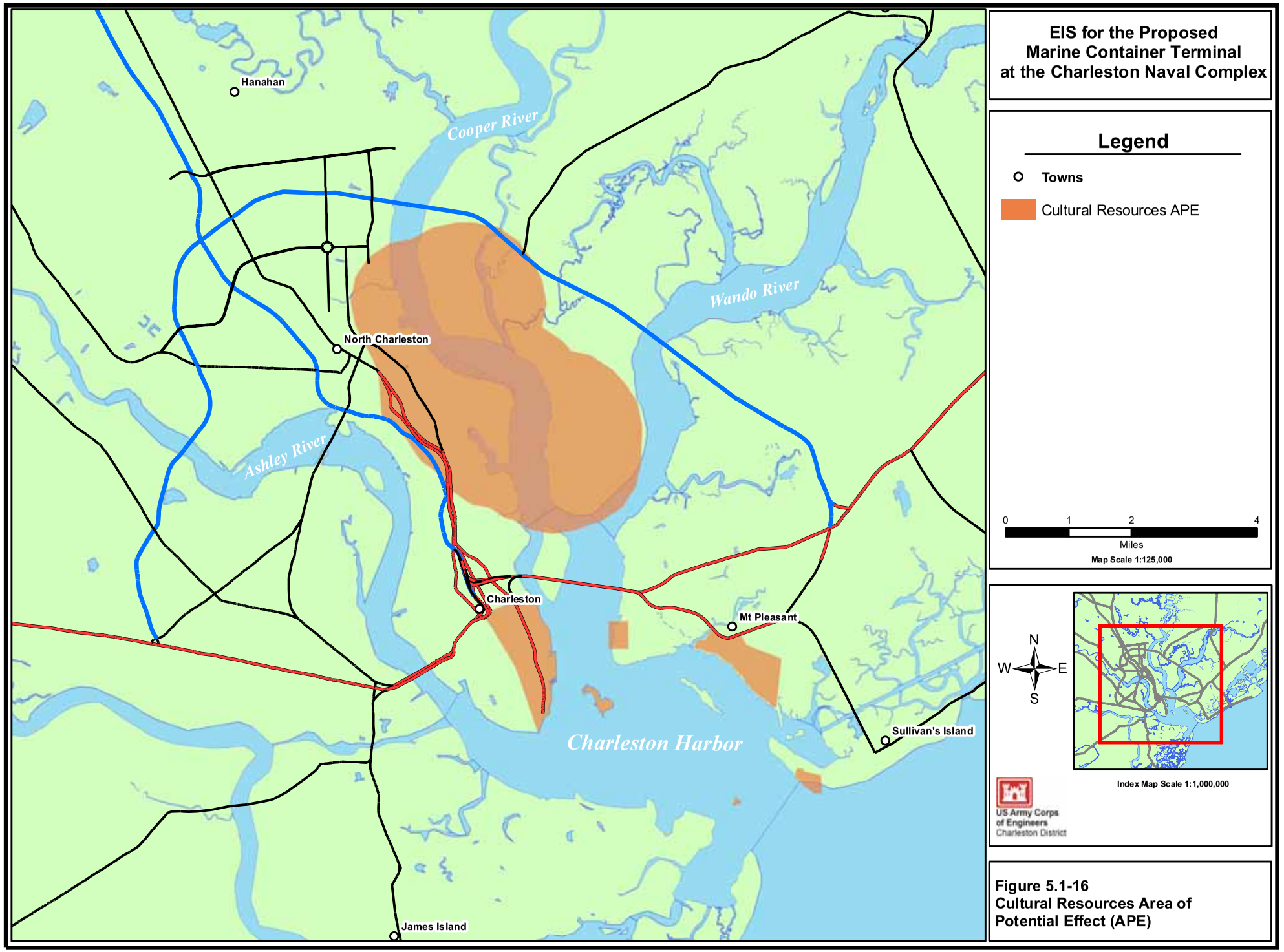
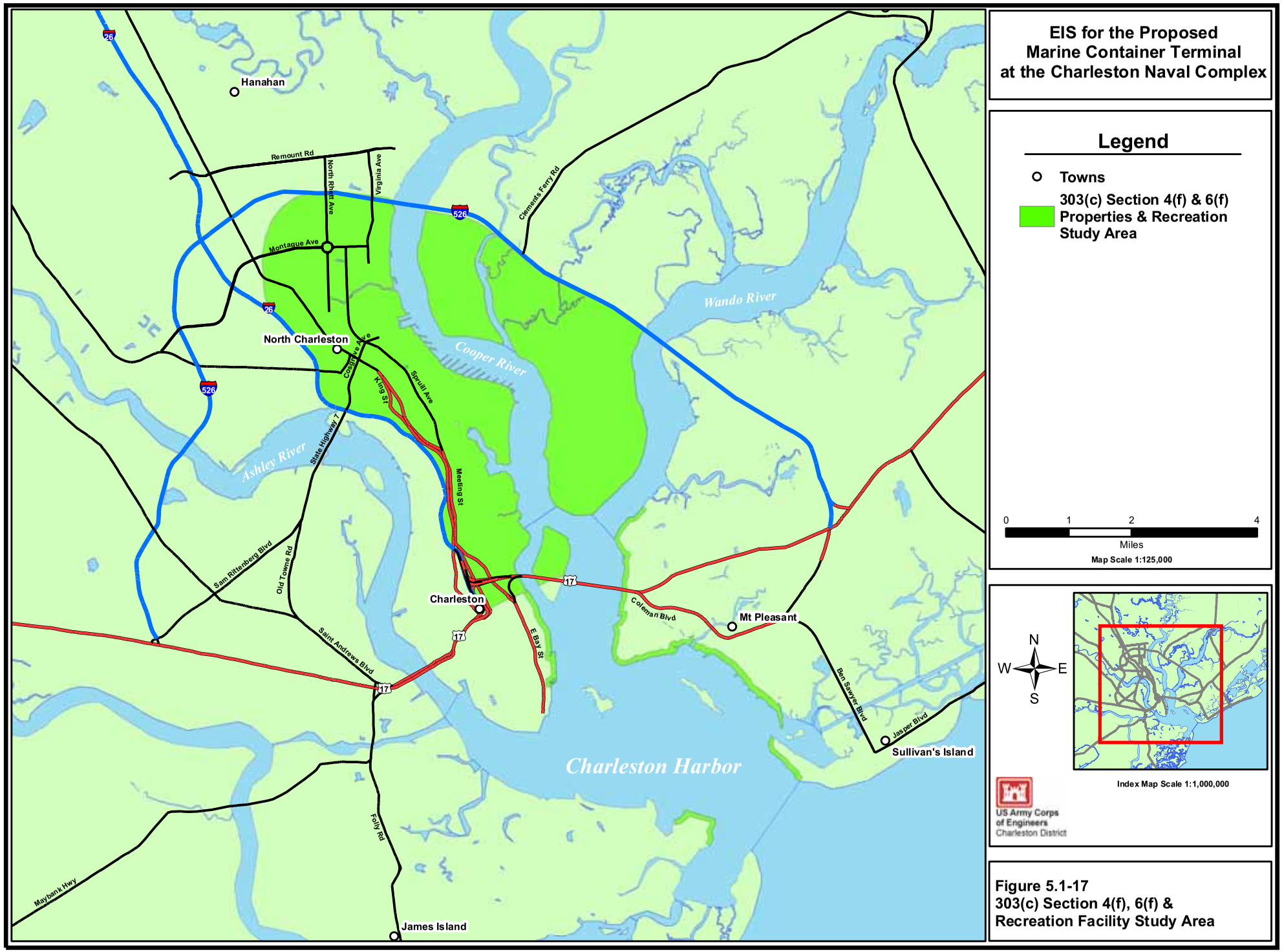
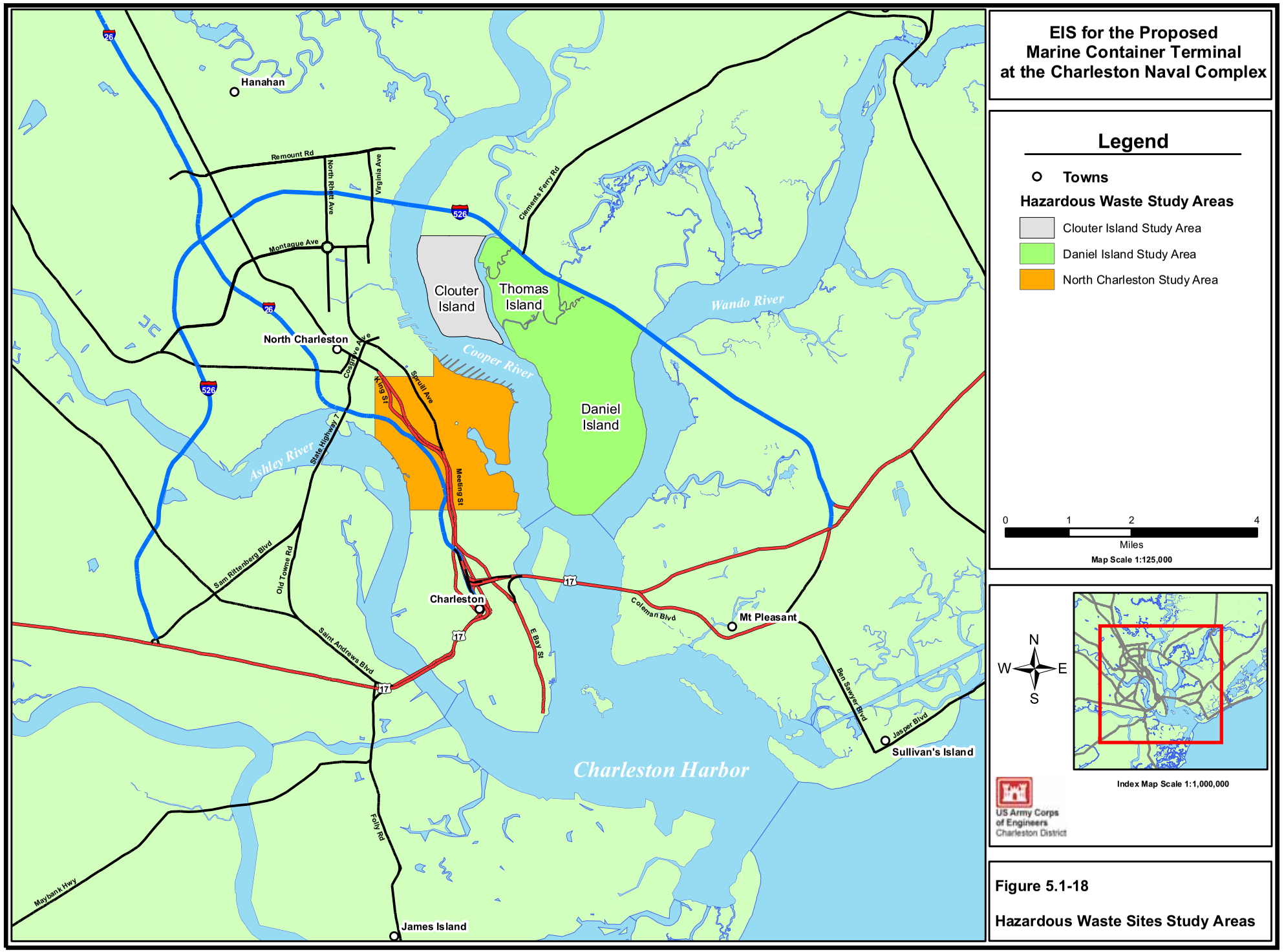
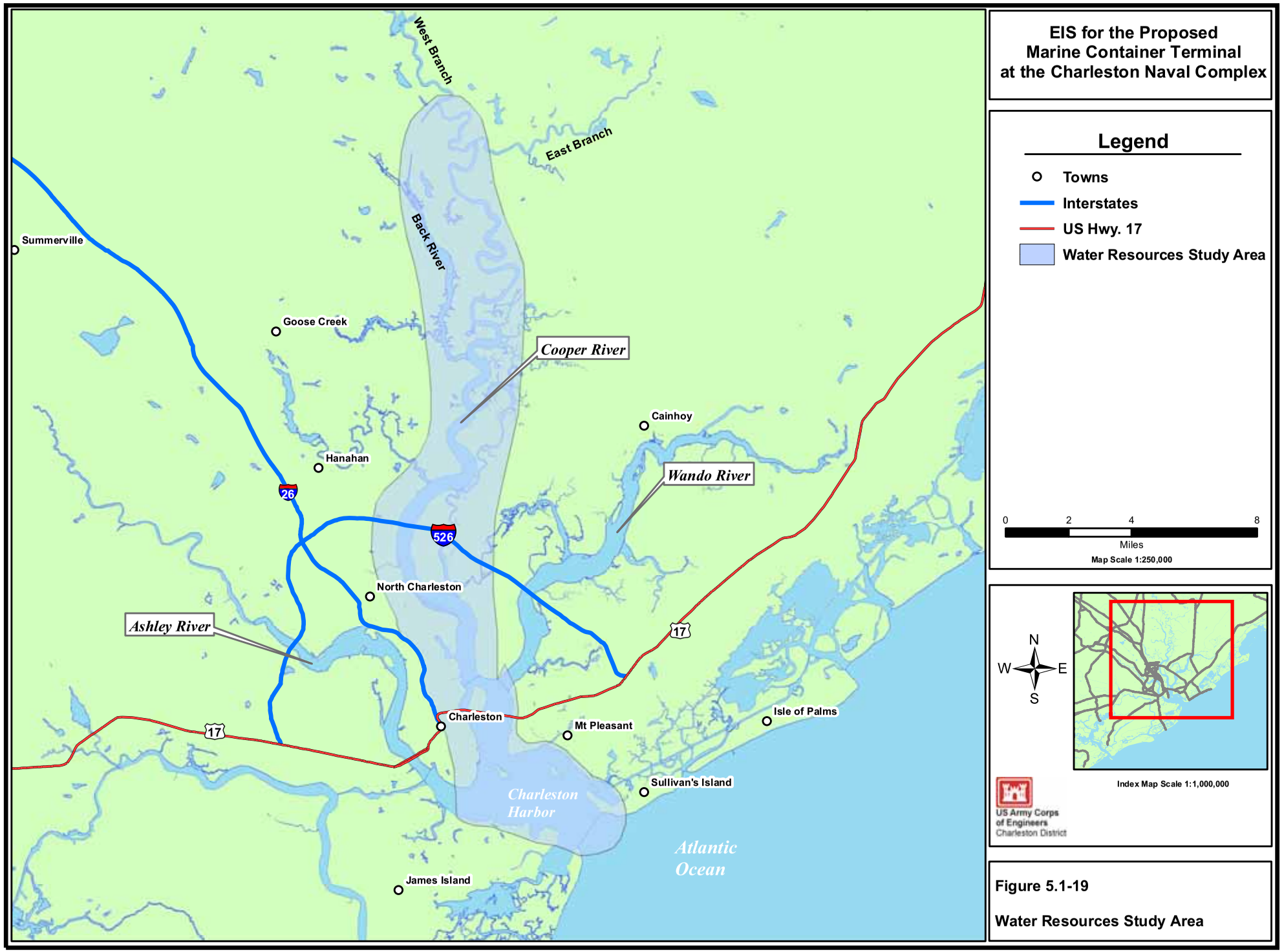


Figure 5.1-16
Cultural Resources Area of Potential Effect (APE)


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
303(c) Section 4(f) & 6(f)
Properties & Recreation
Study Area
0 1 2 4
Miles
Map Scale 1:125,000
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Clements Ferry Rd
Wando River
North Charleston
Cosgrove Ave
King St
Spruill Ave
Cooper River
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
Saint Andrews Blvd
E Bay St
Ben Sawyer Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Folly Rd
Maybank Hwy
James Island
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-17
303(c) Section 4(f), 6(f) &
Recreation Facility Study Area


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Hazardous Waste Study Areas
Clouter Island Study Area
Daniel Island Study Area
North Charleston Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Hanahan
Remount Rd
North Rhett Ave
Virginia Ave
Montague Ave
Clements Ferry Rd
Clouter Island
Thomas Island
Wando River
North Charleston
Cosgrove Ave
Cooper River
Spruill Ave
King St
Daniel Island
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
E Bay St
Saint Andrews Blvd
Bon Secours Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Folly Rd
Maybank Hwy
James Island
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-18
Hazardous Waste Sites Study Areas



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Towns
- Interstates
- US Hwy. 17
- Water Resources Study Area

0 2 4 8

Miles

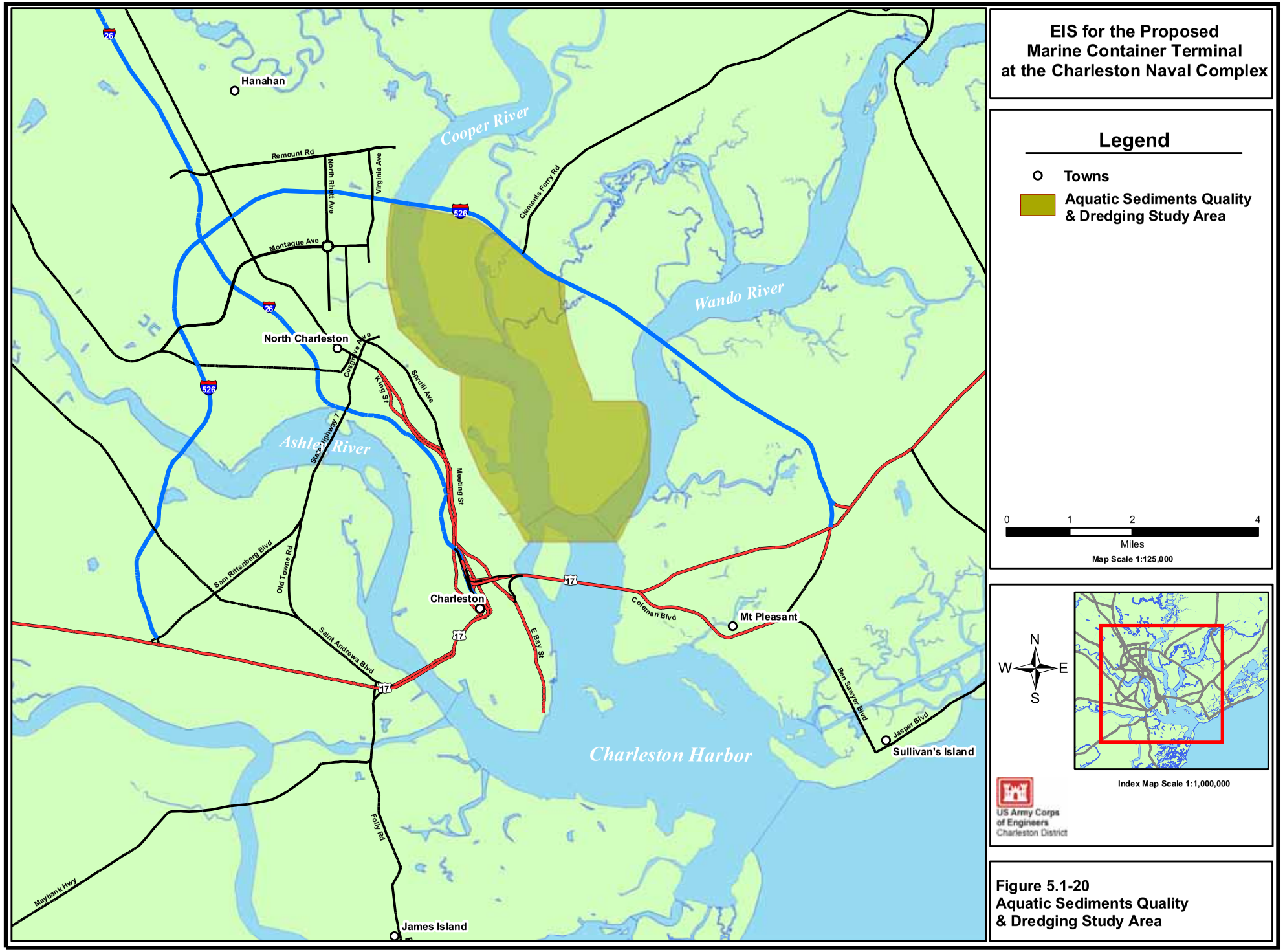
Map Scale 1:250,000

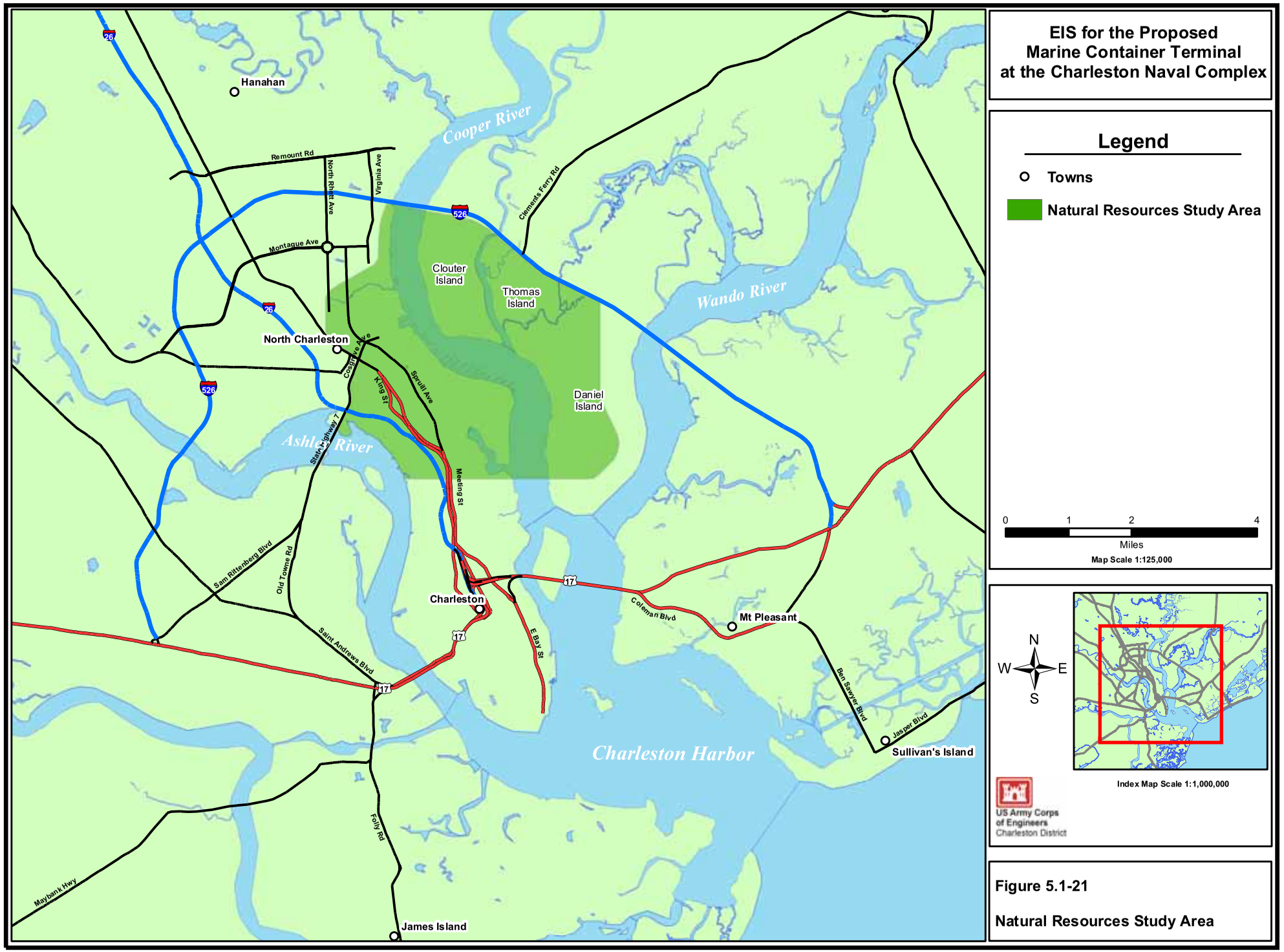
Index Map Scale 1:1,000,000

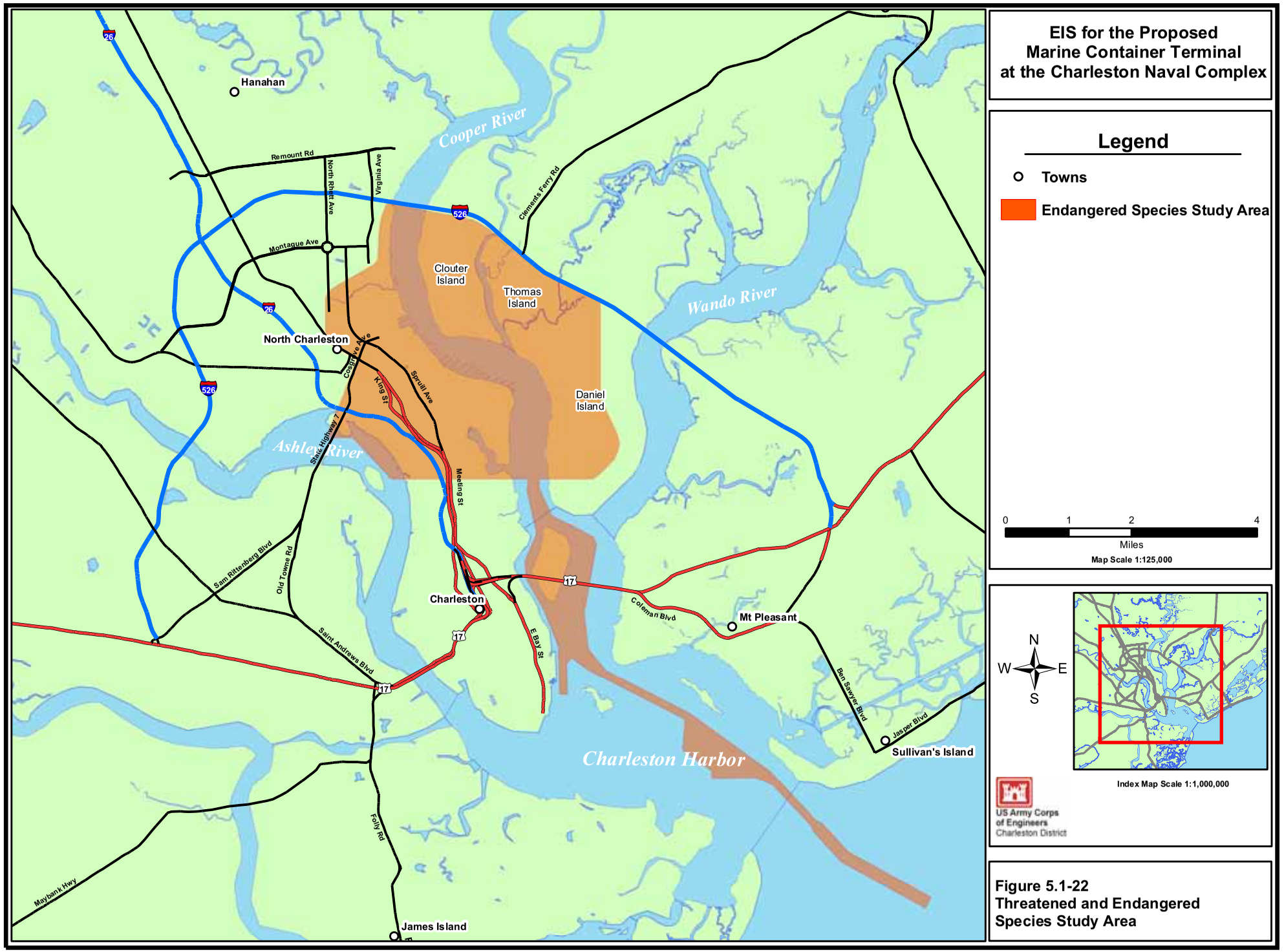
US Army Corps of Engineers
Charleston District

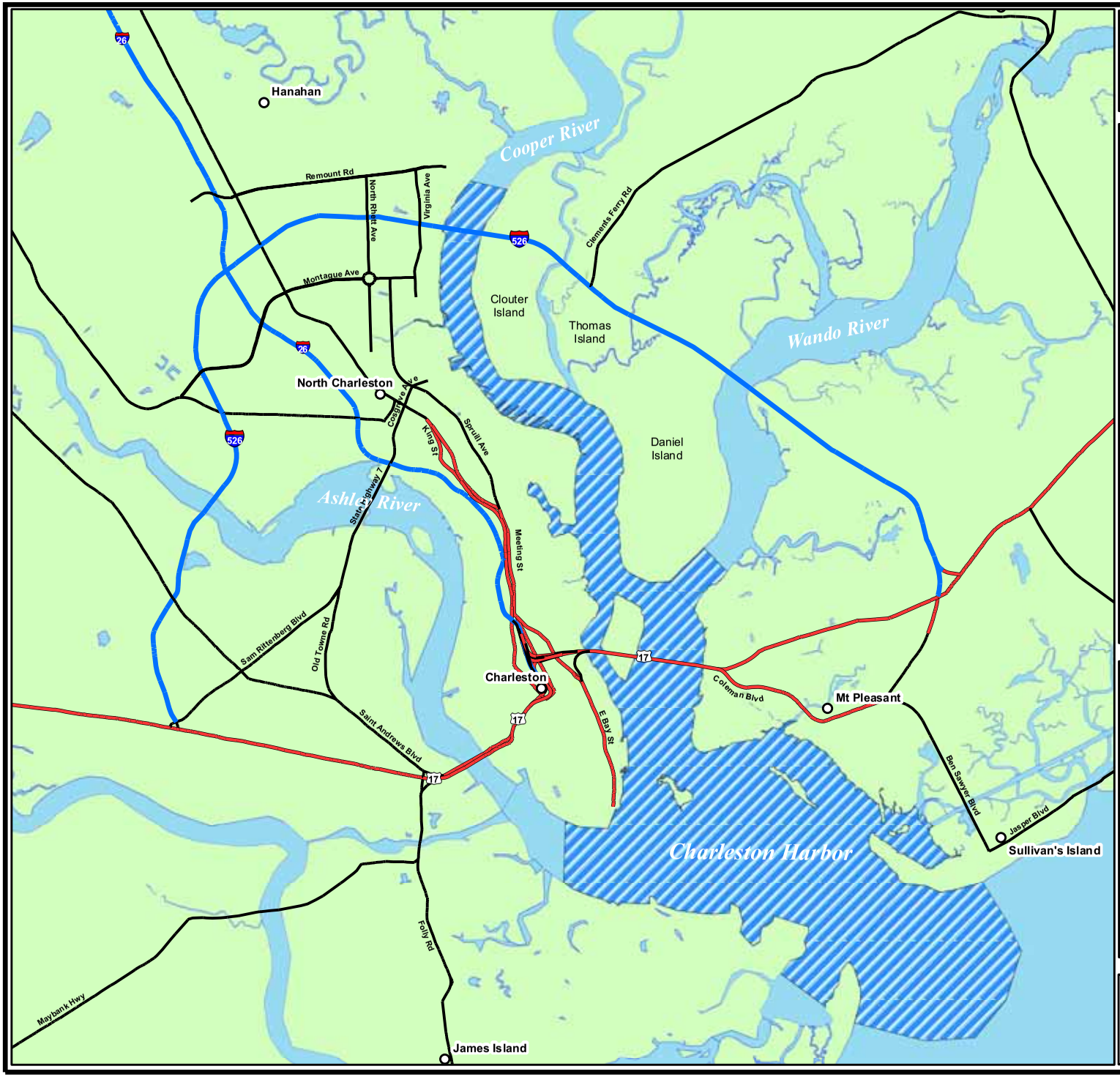
Figure 5.1-19

Water Resources Study Area


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Aquatic Sediments Quality
& Dredging Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-20
Aquatic Sediments Quality
& Dredging Study Area
Hanahan
Cooper River
Remount Rd
North Rhett Ave
Virginia Ave
Clements Ferry Rd
Montague Ave
Wando River
North Charleston
Cosgrove Ave
King St
Spruill Ave
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
Saint Andrews Blvd
E Bay St
Ben Sawyer Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Folly Rd
Maybank Hwy
James Island


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Natural Resources Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Hanahan
Cooper River
Remount Rd
North Rhett Ave
Virginia Ave
Clements Ferry Rd
Montague Ave
Clouter Island
Thomas Island
Wando River
North Charleston
Cosgrove Ave
King St
Spruill Ave
Daniel Island
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
Saint Andrews Blvd
E Bay St
Ben Sawyer Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Folly Rd
Maybank Hwy
James Island
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-21
Natural Resources Study Area


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Endangered Species Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Hanahan
Cooper River
Remount Rd
North Rhett Ave
Virginia Ave
Clements Ferry Rd
Montague Ave
Clouter Island
Thomas Island
Wando River
North Charleston
Cosgrove Ave
King St
Sprull Ave
Daniel Island
Ashley River
State Highway 7
Meeting St
Sam Rittenberg Blvd
Old Towne Rd
Charleston
Coleman Blvd
Mt Pleasant
E Bay St
Saint Andrews Blvd
Ben Sawyer Blvd
Jasper Blvd
Sullivan's Island
Charleston Harbor
Folly Rd
Maybank Hwy
James Island
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-22
Threatened and Endangered
Species Study Area



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

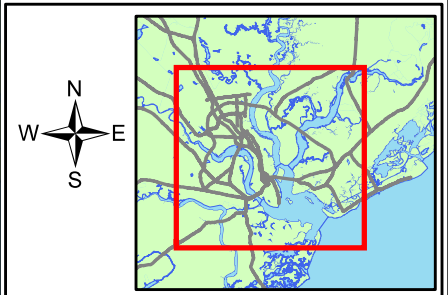
Legend

- Towns
- Shoreline Study Area

0 1 2 4

Miles

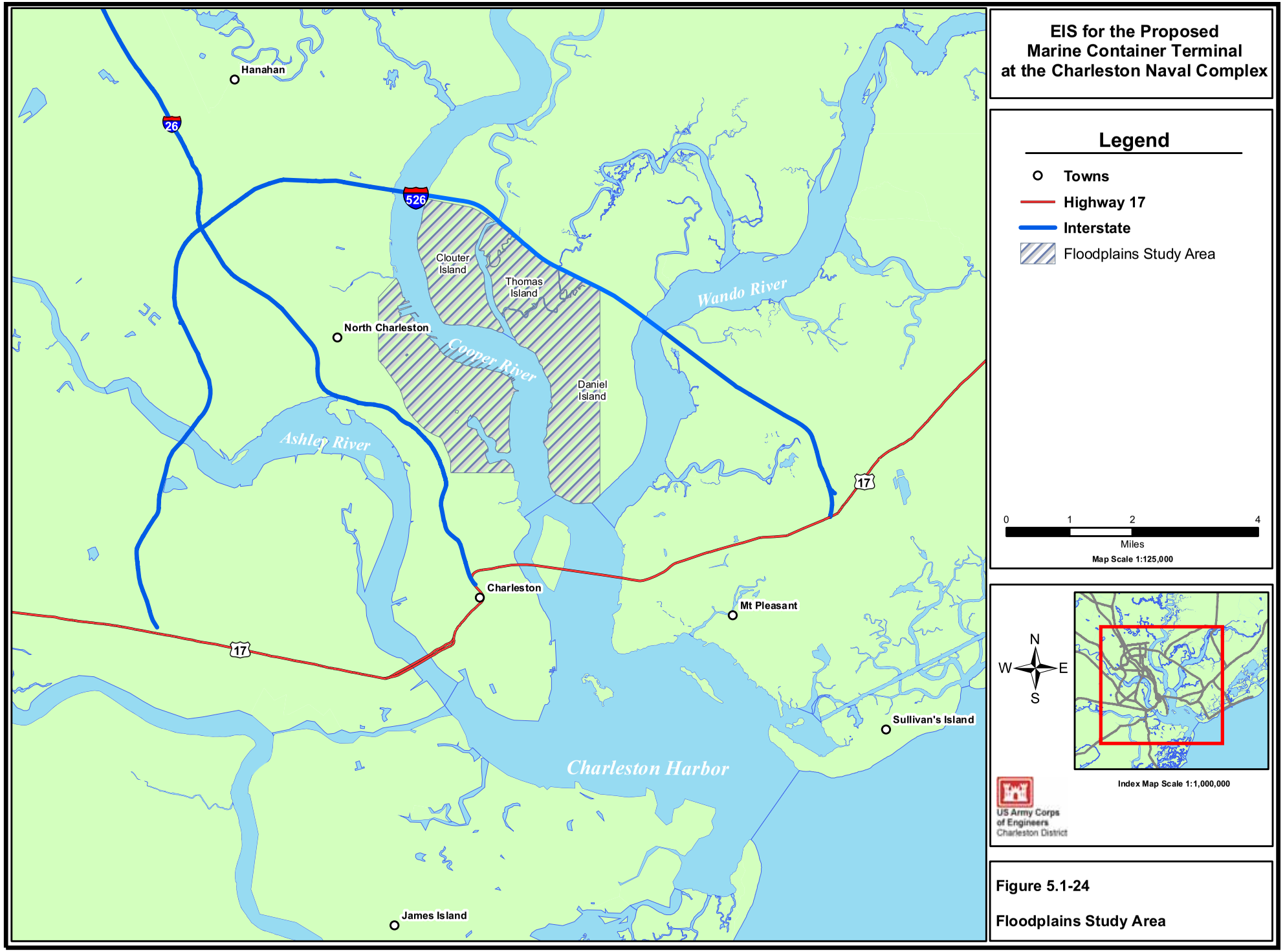
Map Scale 1:250,000



Index Map Scale 1:1,000,000

US Army Corps of Engineers
Charleston District

Figure 5.1-23
Shoreline Study Area for Wake Impacts


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Highway 17
Interstate
Floodplains Study Area
0
1
2
4
Miles
Map Scale 1:125,000
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.1-24
Floodplains Study Area
Hanahan
26
526
Clouter
Island
Thomas
Island
Wando River
North Charleston
Cooper River
Daniel
Island
Ashley River
17
Charleston
Mt Pleasant
17
Sullivan's Island
Charleston Harbor
James Island

5.2. PROPOSED PROJECT

This section evaluates the potential environmental impacts of the Proposed Project. The Proposed Project has not been constructed and would need a permit from the USACE prior to being constructed. A schematic diagram of the Proposed Project is provided in Figure 3.2-2. The Proposed Project includes the construction of container processing and support facilities, wharf and crane structures, navigational improvements, utilities, and access roadway. Proposed support structures include office buildings, a truck interchange facility, maintenance buildings, container freight station, and a security gatehouse. The various components of the Proposed Project are described in greater detail in Section 3.2 and are summarized as follows:

- An 11.6-acre wharf, 3,510 feet long,
- 245.5 acres of container yard and support facilities,
- Improvements to Tidewater Road (the access road to the Cooper River Marina),
- 24.4 acres of stormwater management facilities,
- 77.9 acres of deepened berth and access area to -49 ft CLW (a design depth of -47 feet plus 2 feet of allowable overdredge),
- Placement of 6.45 million cubic yards of fill for the container yard and support area (which covers 56.6 acres of existing open water habitat, 9.6 acres of tidal marsh and 2.4 acres of freshwater marsh).
- Disposal of dredged material in the existing upland dredged material disposal area on the south end of Daniel Island,
- A sediment suspension system in the river along the front of the wharf to minimize maintenance dredging at the berths, and
- An access roadway from the terminal to I-26, which includes:
    - A mainline roadway between the terminal and I-26 approximately 0.85 mile in length with approximately 0.71 mile on structure,
    - A new I-26 interchange (almost entirely on structure) and removal of the existing Exit 218 interchange,
    - Reconstruction of the Exit 217 interchange, and
    - A 1.0 mile long local access road that connects to Spruill Avenue to the northwest, to Bainbridge Avenue to the north, and to a secondary gate at the new terminal to the south (which includes a low-level bridge crossing at Shipyard Creek).

As stated previously, a turning basin in this reach of the Cooper River was authorized along with the most recent deepening project of the Federal Navigation Channel to -45 feet MLW. The turning basin was included as part of the deepening project to accommodate a new marine container terminal in this reach of the Cooper River, but was never constructed. The USACE may conduct a General Reevaluation Report to assess the feasibility of incorporating the turning basin from the Proposed Project into the Federal Navigation Project.

The SCSPA and the City of North Charleston entered into a Memorandum of Understanding and Agreement (MOUA) regarding the Charleston Naval Complex (CNC) dated October 25, 2002 (Appendix B). The MOUA is an agreement with regard to the division of the property, infrastructure issues, highway and rail access issues, waterfront access issues, environmental

issues, public safety issues and other related issues having to do with development by the SCSPA of facilities on the south part of the CNC and the development by the City of the Noisette Project on the north part of the CNC. The MOUA, among numerous points, stipulated that the City of North Charleston would establish and maintain a transitional port overlay district that would rezone residential uses in this area to industrial uses of this land to industrial uses. The Port Overlay District extends from Pittsburgh Avenue to the south to approximately Jacksonville Road to the north along the east side of Spruill Avenue and extending eastward to the CNC property. The City agreed to not allow any new residential uses within 500 feet of port facility land. The City also agreed, to the extent allowed by law, not to rezone any property in the overlay area for residential uses in the future. However, existing residential uses within the zone would be "grandfathered."

The MOUA also stipulates that certain minimum infrastructure must be in place before the SCSPA commences container operations, including a truck access road leading directly from the terminal to I-26 and three rail overpasses in the areas of Rivers Avenue and Harley Street, Rivers Avenue and Durant Road, and North Rhett and I-526 Streets.

In the MOUA the SCSPA acknowledges that the City does not want the SCSPA to utilize existing rail access from the north end of the property. The SCSPA plans to transport about 23 percent of the containerized cargo from the Proposed Project to existing intermodal rail yards.

Some other stipulations included in the MOUA are that:

a. The SCSPA will encourage all trucks transporting cargo to use designated truck routes after the terminal begins operation;

b. The SCSPA will provide certain minimum buffering prior to commencing port operations (including landscape buffering around Viaduct Road, from Hobson Avenue to Supply Street and from Suppy Street to the Cooper River;

c. The SCSPA will provide noise and visual buffer from Spruill Avenue to the County incinerator in the event that the SCSPA acquires land within the Port Overlay District;

d. The SCSPA will lease the city a 3-acre parcel of land adjacent to the current marina to be used for a public boat landing;

e. The City will provide all of the police, fire and public safety services to the terminal, and the SCSPA agrees to provide for its own garbage and trash collection and disposal;

f. The City will provide over city land all requested utilities or access to others providing those utilities to the terminal; and

g. After an offer of dedication by the SCSPA of its portion of the following roads as public streets, the city will maintain at all times and at its expense Viaduct Road, North Hobson Avenue and Supply Street to standards of the City of North Charleston applicable to public streets.

The following Sections 5.2.1 through 5.2.20 describe the potential environmental impacts of the Proposed Project. In addition, an evaluation of access roadway alternatives is given in Section 5.2.6. Prior to the selection of the proposed access roadway alignment, the environmental impacts of five feasible access roadway alternatives were evaluated. Although these feasible

access roadway alternatives are not part of the Proposed Project, the results of the environmental impacts assessment for these alternatives are summarized in Section 5.2.6.

5.2.1. Land Use

This section describes the potential impacts of the Proposed Project on land uses in the study area (shown in Figure 5.1-1). The following subsections describe the Proposed Project impacts to land use in the Tri-County region and the Greater Charleston area.

5.2.1.1. Tri-County Region

The Proposed Project will likely have a minimal impact on regional land uses, especially when compared to the rapid regional growth projected for the No-Action Alternative over the next 20 years. The Proposed Project will likely induce some further development, which may consist of new or expanded warehouses, distribution centers, and industries located throughout the region and State of South Carolina. It is assumed that these facilities would be located on appropriately zoned properties.

Agricultural Lands

The Proposed Project is not anticipated to have any adverse direct or indirect impacts on agricultural land uses in this area, including prime farmland. Agricultural land uses are expected to continue as described in Section 5.1.1.

Francis Marion National Forest

The Proposed Project is not anticipated to have any adverse direct or indirect impacts on land uses in this area. Land uses in this area are expected to continue as described in Section 5.1.1.

5.2.1.2. Greater Charleston Area

In the following paragraphs, impacts to land uses in the greater Charleston area are described using the same regions (i.e., west of the Ashley River, between the Ashley and Cooper Rivers, and east of the Cooper River) and land use categories as presented in Section 5.1.1.

West of the Ashley River

The Proposed Project is not anticipated to have any adverse direct or indirect impacts on land uses in this area. Changes in land uses are expected to continue as described in Section 5.1.1.

Between the Ashley and Cooper Rivers

The Proposed Project is compatible with existing plans and documents to redevelop economically disadvantaged sections of North Charleston and Charleston. The Comprehensive Plan for the City of North Charleston specifically addresses the reuse of the Naval Complex and the possible impacts to the communities adjacent to the complex. Economic goals associated with the redevelopment of the Naval Complex include:

- Redevelop the Naval Base in a manner that maximizes job retention and creation;
- Optimize redevelopment opportunities at the Naval Base Complex to enhance economic, social, and environmental conditions within the community;
- Elevate economic conditions in areas of the city with high unemployment, low-income, and limited economic opportunities; and

- Capitalize on the resources of the Cooper River to stimulate economic growth and prosperity through redevelopment and reuse of the Naval Complex as planned.

The Proposed Project is also compatible with the goals identified in the County of Charleston Comprehensive Plan. Goals met by this project include:

- Land Use – Support infill of existing vacant sites in urban areas over development in low growth rural areas, giving high priority to areas of greatest employment and residential density; and
- Economics – Strengthen the economic viability of traditional industries, including but not limited to, shipping, manufacturing, health care, farming, forestry, and commercial fishing.

As described in Section 5.1.1, there are several planned and/or ongoing redevelopment projects in the North Charleston area near the Proposed Project site (i.e., Noisette Project, Magnolia Project, and the Macalloy property). The Proposed Project is located south of the Noisette Project footprint (Figure 5.1-3) and, therefore, no significant impacts would occur to land uses associated with this development project. Due to the proximity of the Magnolia Project to I-26 (the redevelopment project includes land on both sides of the Interstate highway), there may be some small impacts to land uses closest to I-26 as a result of the proposed access roadway construction. However, these impacts will likely be minimal. Conversely, the proposed access roadway does traverse the Macalloy property, so there would be some amount of impact to the future industrial land uses at this site.

Descriptions of the impacts expected for developed lands and conservation areas in this region are as follows.

a. **Residential Land Uses**:

   The proposed terminal site at the CNC is currently planned for industrial development and the proposed access roadway avoids residential land uses. Therefore, the Proposed Project will not directly impact residential land use.

   The Proposed Project may indirectly affect residential land use as a result of the MOUA between the City of North Charleston and the SCSPA (Appendix B). The MOUA indicates that the City of North Charleston agreed to rezone properties along Spruill Avenue (Area D as shown in Exhibit 1 of the MOUA) to be used for support areas and complementary and related uses for SCSPA facilities. The City agreed that it will have all those properties rezoned to M-2 (Heavy Industrial), or if requested by SCSPA, by the creation of a port related zoning district for the Port Overlay District. The City also agreed to establish and maintain a transitional port overlay zone that would prohibit residential uses and would not allow the development of any new residential areas within 500 feet of Port Facility Lands, and would not rezone properties within the zone for residential use in the future (to the extent allowed by law). However, the City would grandfather existing residential uses within the zone. Rezoning of this area to M-2 uses would likely result in secondary impacts to residential property owners close to the Port Overlay District.

   Removal of Exit 218 potentially could create open space. This space could be used for housing or to create an open area for residents.

b. **Commercial Land Uses**:

The Proposed Project is expected to cause indirect impacts to commercial land uses by spurring ancillary commercial development within the region and study area; it is assumed that such development would occur in appropriately zoned areas. New businesses would likely locate near the CNC as a result of the Proposed Project.

The development of the proposed access roadway would directly impact some commercial land uses. The access roadway would cross directly over the Southern Lumber property. Land uses along Meeting Street, Spruill Avenue, and Stromboli Avenue could become more commercial in nature. Vacation of Carner Avenue at the intersection with Meeting Street could open area to expand existing businesses or could create land area for higher land uses.

c. **Industrial Land Uses:**

Development of the site as a marine container terminal will change the site land use from largely undeveloped to heavy industrial; however, this impact would be in keeping with the current zoning and planned land use. The Proposed Project site is currently zoned M-2 (Heavy Industrial). The Proposed Project may be reasonably expected to spur ancillary industrial development throughout this area; it is assumed that such development would occur in appropriately zoned areas.

Also, the proposed access roadway will traverse the Macalloy property across Shipyard Creek, and traverse other industrial properties located within the roadway corridor. As a result, the roadway may affect development plans on these properties. The SCDOT has been coordinating with these parties to minimize disruptions to existing and future operations.

d. **Institutional Land Uses:**

The proposed access roadway will traverse a small portion of the FLETC property on the CNC. The SCDOT and SCSPA have been coordinating with FLETC to minimize disruptions to existing and future operations.

e. **Community Features:**

The Proposed Project would not have any direct adverse impacts on community features in this area. Development of community features is expected to continue as described in Section 5.1.1.

f. **Open Spaces:**

The Proposed Project will change some open water and marsh areas at the terminal site to industrial land use, which is described in detail in Section 5.2.17. Also, the proposed access roadway will affect wetlands through direct loss by the placement of fill material and/or by increasing the shading of these areas.

The eastbound interchange ramps of the proposed access roadway would impact Rosemont Field to some degree. Rosemont Field is located at the northeast corner of the Rosemont neighborhood and is considered a district park for the City of Charleston. Existing plans call for Rosemont Field to be made into a baseball field. Preconstruction grading of the field began in May 2006. It is not likely that the Proposed Project will prevent the intended use of this land; however, some adjustments in the design plan of the field may be required.

As mentioned previously, removal of Exit 218 potentially could create open space. This space could be used for housing or to create an open area for residents.

East of the Cooper River

The Proposed Project is not anticipated to have any adverse direct or indirect impacts on land uses in this area. Changes in land uses are expected to continue as described in Section 5.1.1.

5.2.1.3. Summary of Land Use Impacts

The Proposed Project would redevelop a portion of the CNC to construct a new marine container terminal, which would be in keeping with the current zoning and planned redevelopment of the CNC. The terminal site is presently zoned for heavy industrial land use, and it consists of a former CDF, a number of buildings, ammunition storage bunkers, roadways, parking lots, and undeveloped areas. In order to provide access to deep water approximately 66 acres of tidal marsh and open water would need to be filled and converted into high ground, and the area between the wharf and the Federal navigation channel will be deepened.

Several of the buildings on the terminal site are currently being used by the adjacent property owner, FLETC. However, these operations would be relocated if the Proposed Project is constructed.

Development of the Proposed Project may be reasonably expected to spur ancillary commercial and industrial development within the region; it is assumed that such development would occur in appropriately zoned areas. Maritime support industries are likely to locate within the Port Overlay District that was established by the City of North Charleston.

Adverse impacts of the proposed access roadway would be primarily impacts to existing industrial and commercial land uses. Property owned and operated by several industries and businesses would need to be acquired to construct the proposed port access roadway and a new interchange on Interstate 26.

The Proposed Project would likely have some beneficial impacts to land uses along Meeting Street, Spruill Avenue, and Stromboli Avenue. Improvements to existing roadways will benefit residents and businesses. Likewise, improvements near the intersection of Meeting Street and Stromboli Avenue could open area to expand existing businesses or could create land area for higher land uses.

The access roadway was designed to avoid direct impacts to existing residential land use, and the Proposed Project would not cause any adverse direct impacts to residential land use. The MOUA would prohibit residential uses, would not allow the development of any new residential areas within 500 feet of Port Facility Lands, and would not rezone properties within the zone for residential use in the future (to the extent allowed by law).

The removal of Exit 218 would potentially be a beneficial land use impact by creating open space. This space could be used for housing or to create an open area for residents.

The eastbound interchange ramps of the proposed access roadway would adversely impact Rosemont Field to some degree, but it would not likely prevent the intended use of this land. However, some adjustments in the design plan of the field may be required.

5.2.2. Physical Setting

This section discusses the impacts the Proposed Project would have on the physical setting of the Tri-County region and the study area (Figure 5.1-4). The physical setting is described by the parameters of climate, topography, and geology.

5.2.2.1. Climate

Development of the Proposed Project site would cause localized increases in temperature, because most of the proposed terminal site would be paved. This is because during periods of solar radiation, paved areas, and to a lesser degree, structures can absorb heat. In turn, these areas can release stored heat as daylight wanes and ambient air temperatures begin to cool. This phenomenon of storing and releasing heat accounts, in part, for the elevated ambient air temperatures associated with heavily urbanized areas. Release of stored heat from pavement and structures may be noticeable to onsite terminal workers and visitors; however, the Proposed Project will not cause a measurable effect on the local or regional climate.

The Proposed Project would have a negligible impact to climate change as a result of greenhouse gas emissions. As discussed in Section 5.2.11 (Air Quality), the air emissions from the Proposed Project represent a very small fraction of the permitted regional air emissions, and an even smaller fraction of total emissions when considering other mobile sources that do not require an air permit (e.g., automobiles, trains, etc.).

5.2.2.2. Topography

Topography on the proposed terminal site would be altered to establish project elevations. During the construction phase of the Proposed Project, upland areas would require surcharging to consolidate the underlying soil profile. Surcharging would be accomplished by static loading of fill material to an elevation of +30 feet to +40 feet MLW. It is expected that the surcharging would require 18 to 24 months to achieve the necessary soil consolidation.

Pre-consolidation land surface elevations range from approximately +8 to +21 feet MLW. Fill material would be placed on the post-consolidation land surface and the finished site elevation is expected to be +16 to +18 feet MLW. Figure 5.2-1 provides a schematic cross-section of the proposed terminal facility.

Earthwork, including construction of ramps, would be required for the access roadway. Roadway modifications to the local topography would be restricted to the roadway right-of-way.

5.2.2.3. Geology

Modification of the existing local geology would be limited to construction areas for the terminal and access roadway. The Proposed Project fill requirements will create additional demand on regional borrow sources, which may include mines. The SCSPA plans to contract for the fill material, which will likely use a combination of borrow sources and could include open water or upland borrow areas. Given the large number of active sand and dirt mines in the region and the material available from open water sites, the Proposed Project is expected to cause a relatively small demand in comparison to available resources.

Hydrogeology

During pre-construction, the upland area of the Proposed Project footprint would be surcharged and vertical drainage wicks would likely be used throughout the area to drain groundwater from the upper part of the surficial aquifer to facilitate the soil consolidation process. The placement of vertical wicks and subsequent drainage would alter the existing groundwater flow regime within the surficial aquifer by redirecting groundwater flow paths toward the wicks and drains.

Much of the Proposed Project area is currently unpaved and, therefore, allows for local recharge to the surficial aquifer. As a result of site development and subsequent conversion of a large

percentage of the upland area to impervious surfaces through paving, groundwater flow paths within the surficial aquifer would be altered during the operational life of the facility. However, the potential alteration of flow paths within the surficial aquifer beneath the Proposed Project site would be comparable to that of any large paved area, such as a shopping center parking lot, and would not cause an adverse impact to the local or regional groundwater system.

Seismotectonics

During the development of the Proposed Project, the surficial geology beneath the terminal facility and access roadway right-of-way would be modified through soil compaction necessary for development. The terminal facility as well as the access roadway would need to be designed in accordance with applicable South Carolina seismic building standards.

5.2.2.4. Summary of Physical Setting Impacts

In summary, the Proposed Project would cause minor impacts to the physical setting. The Proposed Project would cause minimal adverse impacts to the local climate as a result of localized increases in temperature associated with paving of the terminal area and roadway. It would have negligible impacts to regional climate change. The Proposed Project would cause minor impacts to the topography, limited to localized changes at the terminal site and within the roadway right-of-way. The Proposed Project would cause minor localized impacts to the surficial geology and hydrogeology at the terminal site, and it would create a minor demand on local borrow sources as a result of the 6.5 Mcy fill requirements.

5.2.3. Socioeconomic Environment

The impacts from the Proposed Project on the socioeconomics of the Tri-County region and the North Charleston community study area (shown in Figure 5.1-5) are summarized in this section. The parameters used to describe the socioeconomic environment include economic sectors, employment, income, poverty, and housing characteristics.

5.2.3.1. Economic Sectors and Employment

The Proposed Project assumes that the marine container terminal facility is constructed and operated as planned. At the end of the first year of operation, it is assumed that the facility will handle 280,000 TEUs/year and at build-out it will handle 1.4 million TEUs/year. At build-out of the Proposed Project, all of the container terminals within the Port of Charleston would be expected to handle approximately 4.0 million TEU/year.

In 1998, the Mercer report identified five goals for the SCSPA to meet in order to remain economically strong and competitive: (1) respond to the priority needs of existing customers, (2) maximize capacity of the existing asset base, (3) maximize operational efficiency, (4) focus on incremental capital investment to expand maximum practical capacities (MPC), and (5) develop a new container terminal. Successful implementation of SCSPA's strategy was predicted to generate $259 billion in sales revenue, $63 billion in wages, $7.7 billion in tax revenues, and generate and sustain 92,000 full time jobs over a 20-year period.

Likewise, the report entitled, *The Economic Impact of the South Carolina State Ports Authority* (Parish, 2003), indicated that SCSPA activities are major contributors to the local as well as the statewide economy.

Much of the direct employment created by the Proposed Project will be dispersed throughout the region. However, it is likely that the Proposed Project would encourage a growth in

businesses in the area surrounding the CNC, particularly those specializing in maritime support, construction and industry. The local economy and employment within the study area would likely improve from direct and indirect employment resulting from the Proposed Project. The local access road improvements along Stromboli Avenue from Spruill Avenue to Meeting Street would likely spur local economic growth and new businesses along this corridor.

5.2.3.2. Income and Poverty

It is likely that the Proposed Project would have a major positive impact on the region's economy and, in turn, would likely improve the region's income and poverty statistics. It is also likely that the Proposed Project would have a greater benefit to income and poverty in the study area. However, at this time, the magnitude of these improvements is uncertain.

5.2.3.3. Housing Characteristics

The impacts of the Proposed Project on regional housing characteristics are expected to be minimal. Therefore, the conditions of housing in the Tri-County region are expected to be similar to those of the No-Action Alternative. Section 5.1.3.1 provides a discussion of these characteristics.

The impacts of the Proposed Project on local housing characteristics and redevelopment plan adjacent to the CNC are expected to be minimal. Therefore, housing characteristics in the North Charleston study area would likely be similar to those impacts described for the No-Action Alternative (Section 5.1.3.2).

5.2.3.4. Summary of Socioeconomic Impacts

The Proposed Project will result in a major socioeconomic benefit to the region and the State of South Carolina by supporting future job growth and industrial development. The Proposed Project will also benefit the local economy surrounding the CNC by increasing employment opportunities, spurring additional business and maritime support services, and developing a new commercial corridor along Stromboli Avenue. The Proposed Project will have a minimal impact on nearby housing conditions. However, the proposed roadway improvements will likely have both beneficial and adverse impacts to nearby housing and property values.

5.2.4. Social Characteristics and Environmental Justice

The impacts from the Proposed Project on the social characteristics of the Tri-County region and the North Charleston community study area are summarized in this section. The North Charleston community study area is described in Section 5.1.3 and illustrated in Figure 5.1-6. In addition to impacts to social characteristics (including population, racial composition, age distribution, educational attainment, and income), topics discussed in this section include acquisition or relocation of properties and environmental justice.

5.2.4.1. Social Characteristics

Tri-County Region

Population Trends

It is reasonable to expect that the Proposed Project will create new jobs, both directly as part of Port activities and indirectly as ancillary growth. However, the addition of households resulting from new jobs is uncertain. It is most likely that many jobs will be filled by residents already living in the Tri-County region.

Racial Composition

It is unlikely that the Proposed Project would impact the existing racial composition of the Tri-County region. Section 4.4.1.1 describes the existing racial composition of the population within the Tri-County region.

Age Distribution

The Proposed Project is not expected to have any effect on the age distribution within the Tri-County region. Age distribution will likely be similar to that described for the No-Action Alternative in Section 5.1.4.1.

Income Distribution

Based on the report entitled, *The Economic Impact of the South Carolina State Ports Authority* (Parish, 2002), a marine container terminal located at the Proposed Project site would likely have an overall positive impact on household incomes and reducing poverty and unemployment in the Tri-County region. Employment opportunities provided either directly or indirectly by the development of the Proposed Project would likely be dispersed throughout the region.

Educational Attainment

It is unlikely that the Proposed Project would impact the educational attainment trends of the Tri-County region. Section 5.1.4.1 provides a discussion of the educational attainment levels expected in the No-Action Alternative.

North Charleston Community Study Area

Population Trends

Since most of the new jobs generated by the Proposed Project are expected to be filled by residents from throughout the region, impacts to the North Charleston study area's population growth are likely to be small.

Racial Composition

It is uncertain how the racial composition of the population living within the North Charleston study area will be impacted by the Proposed Project. However, it is likely that any change would be minimal and that the racial composition of the area expected for the No-Action Alternative and described in Section 5.1.4.1 is representative of conditions within the Proposed Project.

Age Distribution

The Proposed Project is not expected to have any effect on the age distribution of residents in the North Charleston study area. Age distribution will likely be similar to that described for the No-Action Alternative in Section 5.1.4.1.

Income Distribution

A marine container terminal facility located at the Proposed Project site would likely have an overall positive impact on the local economy of the North Charleston study area. The terminal facility itself would create new jobs, as well as create a need for additional nearby supporting businesses (particularly those specializing in maritime support, construction and industry) that would provide additional job opportunities. Although workers from outside the immediate project vicinity would fill some percentage of the terminal facility positions, and many of the supporting

service industry jobs would be spread throughout the Tri-County region, the positive impact on income, poverty and unemployment in the immediate vicinity (i.e., North Charleston community study area) would likely be greater than for the rest of the region.

Educational Attainment

It is uncertain how the educational attainment of the population living within the North Charleston study area will be impacted by the Proposed Project. However, it is likely that any change would be minimal and that the educational attainment trend of the area described for the No-Action Alternative (Section 5.1.4.1) would be representative of future conditions.

5.2.4.2. Acquisition/Relocation of Properties

Overall, development of the Proposed Project would not adversely impact community stability, cohesion, or interaction. Development of the proposed terminal on the CNC would be located on vacant land to be turned over to the SCSPA. Therefore, no acquisition or relocation of residences, businesses, or community facilities would be required to develop the terminal.

The construction of the proposed access roadway would require the acquisition of right-of-way. Parcels of land acquired as a result of the proposed access roadway will be acquired in accordance with the Uniform Relocation and Real Property Act of 1970, as amended.

As shown in Figure 5.2-2, the majority of direct impacts would be to commercial and light industrial properties, as well as to several vacant properties. One fire substation would also be impacted by the proposed improvements to the Meeting Street/Carner Avenue intersection. However, this facility is scheduled to be closed by the City of North Charleston. Businesses that would be impacted include container storage areas and "parts" businesses. There also would be partial takes of some additional supplier oriented businesses. No residential or community properties would be directly impacted by the construction of the proposed access roadway.

The surrounding area east of I-26 is actively undergoing commercial and industrial development. There may be opportunities to relocate some impacted properties within the study area.

5.2.4.3. Environmental Justice

Environmental Justice Impacts

Table 5.2-1 presents the data and results of the environmental justice analysis. As described in Section 4.4 and illustrated in Figure 4.4-4, the North Charleston study area is comprised of eight Census block groups. All eight block groups in this study area met either the minority or poverty threshold for environmental justice status. Seven out of the eight block groups met the minority threshold and four out of eight block groups met the poverty threshold. Therefore, it has been determined that the North Charleston study area does meet the criteria described in Section 4.4 for an environmental justice population.

Table 5.2-1. Environmental Justice Analysis for the North Charleston Study Area[1].

Block Group	Total Population	Total Minority Population	Percent Minority Population	Threshold for EJ status for Minority Population met?	Persons Below Poverty Level	Percent Persons Below Poverty Level	Threshold for EJ status for poverty met?
Tract 42, Block Gp 1	808	309	38%	**No**	154	63%	**Yes**
Tract 43, Block Gp 1	489	459	94%	**Yes**	252	52%	**Yes**
Tract 43, Block Gp 3	908	837	92%	**Yes**	370	41%	**No**
Tract 43, Block Gp 3	1,085	998	92%	**Yes**	447	41%	**No**
Track 44, Block Gp1	937	857	91%	**Yes**	371	40%	**No**
Track 44, Block Gp 2	634	557	88%	**Yes**	329	52%	**Yes**
Track 44, Block Gp 3	486	383	79%	**Yes**	228	81%	**Yes**
Track 45, Block Gp 1	832	816	98%	**Yes**	228	29%	**No**
Charleston County	309,969	121,427	39%		49,330	16%	
South Carolina	4,012,012	1,359,721	34%		547,869	14%	

[1] *2000 Census data*

During the early planning stage of the Proposed Project, many of the concerns to residents in the North Charleston study area were from transportation-related issues, such as truck traffic using existing roads. However, as the Proposed Project plans were finalized, many of these impacts were avoided by developing an access roadway with local access improvements. The proposed access roadway between the proposed terminal site and I-26 will avoid the impacts caused by heavy truck traffic on local neighborhood roads.

The Proposed Project would cause a minimal increase in mobile emissions (from gas and diesel) in the study area. Consequently, residents of neighborhoods surrounding the Proposed Project would be minimally impacted by an increase in mobile sources. The new emission sources have very low emission factors for hazardous air pollutants of concern.

Overall, because of the existing industrial-like nature of the area surrounding the Proposed Project site, the additional adverse impacts of noise, light, and aesthetics would likely be minimal. However, it is also likely that the residents of the neighborhoods surrounding the Proposed Project site would be aware of additional noise and light (in terms of night-glow) emitted from the terminal facilities and vehicles using the access roadway. Also, it is likely that the wharf cranes would be visible to some residents within these nearby neighborhoods.

In summary, the Proposed Project is located in an area of North Charleston that is predominantly minority and low-income. As such, the potential adverse impacts (e.g., traffic-related impacts, increased air emissions, noise and light, and diminished aesthetic quality) and benefits (e.g., socioeconomic, roadway improvements, and interstate access) associated with the Proposed Project are likely to affect surrounding populations meeting environmental justice thresholds. The adverse impacts have been minimized to the degree practicable in the planning of the Proposed Project. Unavoidable adverse impacts will be further mitigated by the SCSPA

and SCDOT as described in Section 6.0. Their proposed mitigation program is included as Appendix N.

5.2.4.4. Summary of Social Characteristics and Environmental Justice Impacts

In summary, it is likely that the Proposed Project would create new jobs, either directly or indirectly. However, the addition of households resulting from new jobs is uncertain. It is expected that most jobs would be filled by residents already living in the Tri-County region. In contrast, the local access roadway improvements along Stromboli Avenue from Spruill Avenue to Meeting Street would likely benefit local income statistics as a result of new businesses and jobs occurring along this corridor.

Overall, the Proposed Project would not adversely impact community stability, cohesion, or interaction. Development of the proposed terminal would be located on vacant land transferred to the SCSPA. Therefore, no acquisition or relocation of residences, businesses, or community facilities would be required to develop the terminal. The construction of the proposed access roadway would require the acquisition of some parcels of land. The majority of these land parcel impacts would be to commercial and light industrial properties, as well as several vacant properties. No residences or community facilities would be directly impacted by the construction of the proposed access roadway.

An EJ assessment determined that the North Charleston study area meets the criteria set for an EJ population. Many of the transportation-related issues that were a concern in the early planning stages of the Proposed Project have been avoided by designing an access roadway with local access improvements. The proposed access roadway between the proposed terminal site and I-26 would avoid impacts caused by heavy traffic on local neighborhood roads. Other impacts to this EJ population would include a minimal increase in mobile air emissions, increases in noise and light (in terms of sky glow), and changes to the visual character of the area. The potential adverse impacts have been minimized to the degree practicable in the planning of the Proposed Project and the transportation improvements will likely benefit the local communities.

5.2.5. Community Infrastructure and Municipal Services

This section discusses potential impacts from the Proposed Project on community infrastructure and municipal services within the study area depicted in Figure 5.1-7. Topics discussed in this section include water supply; wastewater treatment; fire, law enforcement, and emergency medical services; schools; solid waste generation and disposal; and utilities.

5.2.5.1. Water Supply and Wastewater Treatment

The Proposed Project would not require any additional capacity expansions of potable and/or wastewater treatment facilities. The SCSPA expects that the proposed terminal will use or generate a maximum of 800,000 gallons of water or wastewater a month (approximately 2,700 gallons a day). It is expected that the existing capacity at water/wastewater treatment plants described in Section 4.5 will sufficiently handle the Proposed Project's demands.

Presently, there is a water distribution network surrounding and within the proposed terminal property. It is anticipated that water would be provided to the proposed terminal by an existing 8-inch water line located adjacent to the site at the intersection of Bainbridge Avenue and Holland Avenue.

For collecting wastewater, the pump station at the intersection off Dyess Street and Holland Street was recently replaced. It is expected that a new gravity line or force main will be installed from the proposed terminal to the pump station, which is located approximately 800 feet away.

5.2.5.2. Fire, Law Enforcement, and Emergency Medical Services

The Tri-County region population is expected to increase substantially from the present year to 2025. As described in Section 5.1.5.2, the expected regional population growth will likely require increases in public services. Additional service requirements will likely include personnel, equipment, and stations.

The Proposed Project is expected to impact public service providers through a relatively small increase in the requirements for personnel and equipment in the Tri-County region. Response times may also be impacted to some small degree due to the Proposed Project's contribution to future traffic and rail crossing delays. Population in-migration attributable to the Proposed Project is likely to be small compared to the projected overall regional growth. Therefore, the increase in the demand for public services from the Proposed Project's impact on population growth is likely to be minimal.

5.2.5.3. Schools

Since most of the new jobs generated by the Proposed Project are expected to be filled by residents in the region, impacts to schools regarding additional student enrollment are expected to be small. Other redevelopment projects within the study area, namely Noisette and Magnolia, are expected to have larger impacts on population and, consequently, student enrollment than the Proposed Project.

It should be noted that with the development of the Proposed Project, there will be more technical training opportunities made available in the North Charleston area.

5.2.5.4. Solid Waste Facilities

Solid Waste Management Practices and Procedures

The Proposed Project is not anticipated to impact waste management practices and procedures within the Tri-County region. It is assumed that they will proceed as described in the No-Action Alternative (Section 5.1.5.4).

Municipal Solid Waste Collection and Disposal Facilities

No substantial direct or indirect impacts to solid waste capacity within the Tri-County region are anticipated as part of the Proposed Project. As detailed in Section 4.5.4, the projected remaining capacity available in the existing facilities can more than accommodate projected future disposal demands.

5.2.5.5. Utilities

The anticipated electrical requirements of the Proposed Project include the electricity necessary to power rail-mounted gantry cranes in lieu of diesel-powered rubber-tired gantry cranes. Therefore, a new 115kv service to the proposed terminal will be required. The SCSPA has discussed its needs with SCE&G, which anticipates providing this service from the new CNC substation on McMillan Street.

Since most of the new jobs generated by the Proposed Project are expected to be filled by residents from the region, impacts to population growth in the region and North Charleston are expected to be small. Accordingly, any additional demand on utility providers to supply services to residential properties would be minimal. However, there is projected to be some induced business development in the area that would create some additional demand on utility providers. It is difficult to predict at this time what the additional utilities demand for these businesses might be in the future as no businesses have yet to be proposed.

5.2.5.6. Summary of Impacts to Community Infrastructure and Municipal Services

The Proposed Project would not require additional capacity expansions at potable or wastewater treatment facilities. The Proposed Project would not have an effect on the quality of water provided by the facilities.

Public service providers such as fire, law enforcement, and emergency medical services would be minimally impacted by the Proposed Project by a relatively small increase in personnel and equipment requirements. There also will likely be some small increase in response times due to increased traffic and rail crossing delays.

Population in-migration attributable to the Proposed Project is not likely to differ from the projected overall regional growth. Therefore, student enrollment is schools should be similar to that of the No-Action Alternative.

The project remaining capacity at existing solid waste facilities will be sufficient to accommodate waste generated by the Proposed Project. Furthermore, the Proposed Project would require utility services similar to the No-Action Alternative (assuming that the site would be industrially developed in the future).

5.2.6. Transportation

The SCSPA's permit application states that all container cargo resulting from the Proposed Project will be loaded on trucks and carried to a local rail yard, distribution center, warehouse, or other destination. Roadway traffic conditions and capacity of roadway infrastructure to efficiently handle volumes have a direct bearing on quality of life concerns, safety, and property values. As such, transportation impacts have far reaching effect within the region and, especially, in the study areas. SCDOT submitted a permit application (included as Appendix D) in August 2005 for a conceptual access roadway that would directly connect the proposed terminal with I-26. Based on additional studies, the SCDOT has submitted a revised permit application to include more detail for the proposed access roadway improvements (included in Appendix D).

As mentioned previously in this EIS, the USACE is evaluating the proposed access roadway as part of the Proposed Project. Therefore, the transportation impacts discussed in this section include those impacts with the access roadway in place. The study area for traffic from the Proposed Project is shown in Figure 5.1-8. The primary impact of the Proposed Project would occur in the North Charleston study area, which encompasses those areas of North Charleston approximately bounded by I-526 to the north and west, the Cooper River to the east, and US Highway 17 to the south.

5.2.6.1. Roadways

Process for Development of the Proposed Access Roadway

Two transportation studies were completed to evaluate potential access roadways and the potential impacts of the Proposed Project. The objectives of the studies and evolution of the access roadway conceptual layout are described below.

In order to evaluate the potential effect of traffic from the proposed terminal on existing roadway infrastructure, the *Existing Roadway Traffic Study for the North Charleston Study Area* was prepared to: (1) measure existing traffic conditions (see Section 4.6), (2) predict future traffic conditions without the proposed terminal (i.e., No-Action Alternative; see Section 5.1.6), and (3) predict future traffic conditions with the proposed terminal using only existing roads. The *Existing Roadway Traffic Study for the North Charleston Study Area* is included as Appendix T.

The results of the *Existing Roadway Traffic Study for the North Charleston Study Area* suggest that some existing roads will need improvements to accommodate future traffic whether or not the proposed port facility is developed.

The *Access Roadway Feasibility Study (ARFS)*, included as Appendix W, provided the basis for transportation planning agencies to identify the proposed access roadway. The feasibility study includes conceptual designs (i.e., length of roadway, elevations, necessary foundations, interchanges, etc.) of various roadway alternatives considered, as well as the potential impacts, costs and constraints of constructing and operating the alternative roadways. Appendix V summarizes the environmental impacts of the other access roadway alternatives considered in the *ARFS*.

A recommended access roadway alternative (Alternative 1C) was initially identified in the ARFS, based upon the evaluation criteria established for the decision-making process. However, this roadway alternative was met with criticism after it was presented to the public in January 2006. Most of the criticism stemmed from the proposal to connect the local access roadway to the Spruill Avenue/Hackemann Avenue intersection. This connection would impact several existing residences and Mt. Nebo Church. After considering feedback from the public and stakeholders within the study area, the SCDOT evaluated modifications to avoid and minimize the potential impacts associated with Alternative 1C. These modifications included relocating the local access roadway connection from Spruill Avenue/Hackemann Avenue intersection to the Stromboli Avenue/Spruill Avenue intersection.

Stromboli Avenue is a light industrial corridor, which runs between two neighborhoods. Additional modifications to the recommended roadway alternative incorporated into the proposed access roadway include leaving the existing Exit 217 open for public access to I-26 to and from North Charleston. This modification was based upon public comment concerning leaving the existing interchanges open for local resident and business use. The proposed access roadway would also mitigate impacts to the community by improving several intersections within the study area including Spruill Avenue and the Meeting Street/Carner Avenue intersection.

A final modification to the recommended roadway alternative included a local access connection between the mainline port access roadway and the SCSPA Veteran's Terminal. The modification included a new signalized intersection along Bainbridge Road to provide access to and from the terminal. This new intersection would also provide access for all Federal Law

Enforcement Training Center (FLETC) property located at the southern end of the CNC property.

Proposed Access Roadway Improvements

The proposed access roadway, identified as Alternative 1D in the *Access Roadway Feasibility Study* (Appendix W), is shown in Figure 5.2-3. The proposed access roadway is on new location for its entire length, has a design speed of 50 mph (i.e., posted speed of 45 mph), and is classified as an urban arterial. The access roadway begins with a new Semi-Directional Tee interchange along I-26 at Exit 218 and extends westward across the lower end of the Union Heights neighborhood, crossing at a point approximately 100 feet south of Little Avenue. It crosses the existing CSX Cooper Yard, the Macalloy site, and then crosses Shipyard Creek before entering the designated terminal gate area. Interchange ramps have a design speed of 45 mph (i.e., posted speed of 35 mph). This mainline, measured from the I-26 interchange ramp junctions, is approximately 0.85 mile in length, with approximately 0.71 mile on structure.

The new I-26 interchange would require removal of the current Spruill Avenue on- and off-ramps (Exit 218), and construction of new Collector-Distributor (C-D) roads on each side of I-26 parallel to the mainline and separated by barrier. The C-D roads would extend approximately 0.52 miles northward, starting in an area within the new interchange and extending to a point just south of the I-26 bridge over Azalea Road. The purpose of the C-D roads is to combine the CNC ramps with the Meeting Street ramps and have single ingress and egress points on I-26 for traveling to and from Columbia. The new C-D roads are needed to keep the Meeting Street on- and off-ramps (Exit 217) open while providing safe ingress and egress movements between the two closely spaced interchanges by eliminating multiple points of traffic acceleration and deceleration. The existing I-26 right-of-way appears adequate for containing these improvements for the collector-distributor road system along this slightly elevated fill section of I-26.

The ARFS includes information on the potential impact of the Proposed Project on I-26 with its current six-lane configuration and a future widened eight-lane configuration. The new CNC interchange with C-D roads was designed to work with the current six-lane configuration (three lanes in each direction) of I-26 as well as with the future widened eight-lane configuration.

Within the Macalloy site, the access roadway includes a “half urban diamond” type interchange, with the access roadway grade separated above a local access road. Northward, the local access road connects to Spruill Avenue through to Meeting Street along Stromboli Avenue to the northwest and connects to Bainbridge Road to the north. Southward, the local access road connects to a secondary gate at the new terminal and Cooper River Marina via a two-lane roadway, including a low-level bridge crossing at Shipyard Creek. The half urban diamond interchange accommodates limited turning movements to and from the interstate, local roads, and the secondary gate at the new terminal, handling passenger vehicles only. Access between the main gate of the new terminal and any local roads is not provided, as this is a partial interchange.

The local access road proceeds along the new location on a low-level bridge structure northwest from the half diamond interchange to a point just behind the County incinerator building adjacent to the northern limits of Shipyard Creek. From this point, the local access road continues at-grade to the northwest ending at Bainbridge Road with a new four-way, at-grade, signalized intersection. Additionally, a signalized tee intersection is included along this portion of the local access road. The local access road then would continue and cross the existing CSX railroad track system at an existing at-grade crossing location and include an “S” curve

configuration just prior to connecting to Spruill Avenue at its existing intersection with Stromboli Avenue. This intersection would be signalized and improvements along Spruill Avenue would be required to provide an adequate level of service to accommodate the increased traffic volumes for the proposed conditions. The local access roadway extends further westward along Stromboli Avenue to Meeting Street, where an un-signalized tee intersection is planned. The portion of Meeting Street that is located north of this intersection would be closed to through traffic and existing traffic would be rerouted to Carner Avenue as shown on Figure 5.2-3. The local access road would be classified as an urban arterial, have a design speed of 45 mph (i.e., posted at 35 mph), and is approximately 1.03 miles in length.

Traffic Modeling Methodology

Projected impacts to roadway capacities and intersections were analyzed using traffic models, trip generation input data provided by SCSPA, traffic count data from SCDOT, and peak hour traffic and vehicle classification counts conducted from 2004 through 2006. The traffic analysis used several models commonly used in traffic engineering and impact studies. The models predicted Level of Service (LOS), traffic delay, traffic saturation (i.e., volume-to-capacity ratios) and other performance measures based on traffic demand, lane capacities, truck percentages, signal timing, turning movement pattern, and peaking characteristics. The modeling and analyses considered PM peak hour traffic to evaluate worst-condition operations. A detailed description of the traffic modeling methodology is given in Appendix W.

The LOS measure is based on a six-point scale and varies from letter grade A, representing free flow conditions, to letter grade F, representing congested or stop-and-go conditions. LOS E reflects at-capacity conditions and LOS D reflects near-capacity conditions. In urban areas, such as the North Charleston study area, it is desirable to maintain LOS D or better traffic operational conditions.

The projected build-out of the proposed container terminal is 2025. Consequently, the Proposed Project traffic impacts were analyzed at 2025 projected conditions. The current traffic was projected to 2025 conditions based on growth rates computed for each major corridor in the study area. This includes the projected regional growth, including an estimate of growth associated with the Noisette Project and other approved developments, as discussed in Section 5.1.6. Therefore, the projected future traffic conditions for the Proposed Project include the cumulative impact of future traffic projected to 2025, along with the additional traffic generated by the Proposed Project. The impact of the Proposed Project on traffic considers the relative change in projected future traffic conditions for the Proposed Project as compared to the No-Action traffic condition.

Because of the proposed connection to Bainbridge Avenue, additional trips were added to the trip generation and distribution used for modeling traffic associated with the proposed access roadway to account for existing and future activities at the SCSPA Veterans Terminal (VT) and FLETC.

Regional Traffic Impacts

The Proposed Project is expected to handle 1.4 million TEUs per year at full capacity and generate an average of 7,700 trips per day (where one trip is equal to one vehicle entering or leaving the proposed facility). Approximately 63 percent of this traffic volume would be trucks. The proposed terminal would generate 10,920 trips per day under peak conditions.

The proposed access roadway will direct all of the truck traffic generated by the Proposed Project to I-26. The greatest concentration of these trucks will occur as they merge with existing traffic on the interstate. However, many of these trucks will exit the interstate within a few interchanges and deliver containers to local warehouses and existing intermodal rail yards. Approximately 30 percent of the truck traffic is expected to leave the North Charleston study area using I-26 to points west and connect with interstate highways I-95, I-77 and I-20. Less than 2 percent of truck traffic would be expected to leave the area by way of US Highway 17, US Highway 17A, and US Highway 52. Local truck traffic generated by the Proposed Project will be distributed over a number of different highways and roads throughout the day.

The daily traffic volume (all vehicle types) on I-26 between I-526 and Remount Road, which is the most heavily traveled segment of I-26, is projected to increase by 1.75 percent due to the traffic generated by the Proposed Project. The proportion of trucks for 2025 daily traffic flow along the I-26 segment between I-526 to Remount Road is projected to increase by one percent, from 8 percent trucks to 9 percent trucks, due to the traffic from the Proposed Project. The increases in traffic caused by future growth in the region and the Proposed Project would impact commuters and commercial truck traffic traveling to and from the study area on I-26, north of I-526.

North Charleston Traffic Impacts

The North Charleston study area includes the portion of the transportation study area shown in Figure 5.1-8 between the Ashley and Cooper Rivers on the Charleston Peninsula.

Interstate Highway Impacts

Interstate 26:

As described previously, the access roadway will provide the proposed marine container terminal, VT, FLETC, and local traffic access to I-26. The additional traffic from the Proposed Project would add to the overall future traffic congestion in the study area. Analysis of peak hour traffic volume for I-26 between the CNC Access Road and Cosgrove Avenue shows that the proposed terminal traffic volume is less than 7 percent of the overall freeway traffic volume where terminal traffic would have the highest concentration. However, the proposed access road interchange would contribute approximately 20 percent of the overall freeway traffic because of additional traffic from the FLETC, VT, and local roadways.

Table 5.2-2 compares the future I-26 interstate highway traffic condition with the Proposed Project to the 2025 No-Action traffic condition. The traffic analysis indicates that several I-26 segments in its current three-lane configuration would operate at LOS E or F for the No-Action Alternative in 2025, indicating at-capacity or over-capacity conditions. The Proposed Project would cause the highest net increase in traffic to I-26 segments south of the I-526 interchange, and it would cause only a minimal increase in traffic for I-26 segments north of the I-526 interchange.

Table 5.2-2 also shows the LOS with the Proposed Project if the I-26 corridor is widened to four lanes in each direction from Dorchester Road to Mt. Pleasant Street. The results indicate that widening to four lanes from access roadway ramps to at least the Montague Avenue interchange would maintain LOS D or better peak hour operations along the mainline.

Although the I-26 freeway congestion would primarily be due to background growth in traffic and inadequate number of lanes, the Proposed Project would cause at-capacity or over-capacity conditions sooner than the No-Action Alternative. Therefore, a traffic step analysis was

completed to determine when I-26 segments would fail for the No-Action Alternative and the Proposed Project scenario in order to estimate how much faster the Proposed Project would cause at-capacity or over-capacity conditions.

The results of the analysis indicate that the addition of traffic from the proposed port facility on I-26, which is already nearing capacity, will require the interstate to be widened sooner than originally expected. Traffic analyses show that the segment of I-26 between Dorchester Road and Montague Avenue will reach a failing level of service in 2012/2013 as a result of background traffic growth whether or not the proposed port facility is constructed.

SCDOT has determined that the widening of the I-26 corridor from the proposed access roadway through the Montague Avenue interchange needs to be completed and has initiated the necessary environmental studies. Upon conclusion of these environmental studies, FHWA will evaluate, in concert, the environmental document for the I-26 widening and the USACE's final EIS for the Proposed Project in determining final approval of the proposed interstate modifications.

Table 5.2-2 Impacts to I-26 Level of Service (LOS) with and without Traffic from the Proposed Project.

I-26 Segment	2025 No-Project LOS[1]	2025 with Project LOS[1]	2025 with Project and widening LOS[1]
I-26 Eastbound			
Aviation Avenue to Remount Road	F	F	
Remount Road to I-526 Interchange	E	E	
I-526 Interchange	C	C	
I-526 Interchange to Montague Avenue	D	D	
Montague Avenue Interchange	D	E	
Montague Avenue to Dorchester Road	D[2]	F[2]	C[2]
Dorchester Road to SC Hwy 7 (Cosgrove Avenue)	D[2]	E[2]	D[2]
SC Hwy 7 (Cosgrove Avenue) to Meeting St Ramps	D[2]	E[2]	C[2]
Spruill Ave to Heriot St (No-Action) C[2]	D[2]	C[2]	
Heriot St to Mt Pleasant Street	C	D	
Mt Pleasant Street to Brigade Street	C	D	
Brigade/Romney Street Interchange			
I-26 Westbound	C	C	
Huger Street to Romney Street	C	C	
Romney Street to Mt. Pleasant Street	D[2]	D[2]	C[2]
Mt. Pleasant Street to Heriot Street	E[2]	E[2]	D[2]
Heriot St to Spruill Ave (No-Action)			
Meeting St to SC Hwy 7 (Cosgrove Avenue)	F[2]	F[2]	D[2]
SC Hwy 7 (Cosgrove Avenue) to Dorchester Road	F[2]	F[2]	D[2]
Dorchester Road to Montague Avenue	D	D	
Montague Avenue to I-526	E	E	
I-526 Interchange	E	E	

I-26 Segment	2025 No-Project LOS[1]	2025 with Project LOS[1]	2025 with Project and widening LOS[1]
I-526 to Remount Road			
Remount Road Interchange	F	F	

Sources: Parsons Brinckerhoff, 2005. Existing Roadway Traffic Study for North Charleston Study Area; and Parsons Brinckerhoff 2006, Access Roadway Feasibility Study.

[1] LOS represents average conditions for mainline traffic with existing lane configuration. Individual ramps, ramp merges, and diverge areas may have greater degree of congestion than reflected in this summary table.

[2] Project impacts for these segments based on Access Roadway Feasibility Study; all other LOS data from Existing Roadway Traffic Study for North Charleston Study Area.

Interstate 526:

Table 5.2-3 compares the future I-526 interstate highway traffic condition with the Proposed Project to the 2025 No-Action traffic condition. I-526 is projected to have high traffic demand in the future due to expected employment and housing growth in the BCDCOG planning area. The 2025 traffic on I-526 is expected to almost double as compared to existing conditions. The major traffic bottleneck in the area appears to be the I-26/I-526 interchange area, with or without the Proposed Project traffic under future 2025 projected conditions.

As shown in Table 5.2-3, most I-526 segments, both eastbound and westbound, are projected to operate at LOS E or F in 2025 with or without the Proposed Project. Only a small percentage of traffic related to the proposed terminal will use I-526. Consequently, the Proposed Project would have minimal impacts to I-526; however, the minimal traffic increase would add to an already highly stressed future traffic situation.

Table 5.2-3. Impacts to I-526 Level of Service (LOS) with and without Traffic from the Proposed Project.

I-526 Segment	2025 No-Project LOS[1]	2025 with Project LOS[1]	Impact Due to Project Traffic
I-526 Eastbound			
Ashley River to Leeds Avenue	F	F	Low
Leeds Avenue Interchange	D	D	Low
Leeds Avenue to Dorchester Road	D	D	Low
Dorchester Road Interchange	F	F	Low
Dorchester Road to Montague Avenue	F	F	Low
Montague Avenue Interchange	F	F	Low
Montague Avenue Interchange to I-26 Interchange	F	F	Low
I-26 Interchange	F	F	Low
I-26 to Rivers Avenue	F	F	Low[2]
Rivers Avenue Interchange	F	F	Low[2]
Rivers Avenue to North Rhett Avenue	E	E	Low
North Rhett Avenue Interchange	D	D	Low
Virginia Avenue Interchange	E	E	Low
I-526 Westbound			
Virginia Avenue Interchange	F	F	Low

I-526 Segment	2025 No-Project LOS[1]	2025 with Project LOS[1]	Impact Due to Project Traffic
North Rhett Avenue Interchange	F	F	Low
North Rhett Avenue to Rivers Avenue	F	F	Low
Rivers Avenue Interchange	E	E	Low
Rivers Avenue to I-26	E	E	Low[2]
I-26 Interchange	E	E	Low[2]
I-26 Interchange to Montague Avenue Interchange	E	E	Low
Montague Avenue Interchange	F	F	Low
Montague Avenue to Dorchester Avenue	F	F	Low
Dorchester Road Interchange	F	F	Low
Dorchester Road to Leeds Avenue	F	F	Low
Leeds Avenue Interchange	F	F	Low
Leeds Avenue to Ashley River	F	F	Low

Parsons Brinckerhoff, 2005. Existing Roadway Traffic Study for North Charleston Study Area.

[1] *LOS represents average conditions for mainline traffic with existing lane configuration. Individual ramps, ramp merges, and diverge areas may have greater degree of congestion than reflected in this summary table.*

Arterial Roadway Impacts

The proposed access roadway limits the access of port-related traffic, particularly trucks, to local arterial roads. Terminal employees may use either local arterial roads, or the interstate for commuting to the proposed port facility. Therefore, the Proposed Project would cause only minor impacts to traffic volumes on local arterial roads as a result of terminal employee traffic. The primary impact of the Proposed Project on arterial roads will be changes to traffic patterns. The proposed access roadway will reroute some traffic from local roads currently used to access the CNC. Various local access road and intersection improvements, which are included as part of the Proposed Project, will also tend to improve traffic flow within and adjacent to the CNC.

Local traffic that uses Exit 218 (Spruill Avenue) to access I-26 would be forced to use the new local connector road at Stromboli Avenue or another existing interchange because of the closure of the existing interchange. Likewise, local traffic in the vicinity of Meeting Street and Carner Avenue would be re-routed as a result of improvements to the existing intersection, and the reopening of Stromboli Avenue would provide improved access from Meeting Street to Spruill Avenue.

Access to Cooper River Marina is currently provided by Juneau Avenue, which is immediately adjacent to the Cooper River. In order to accommodate future marina traffic, the SCSPA proposes to construct improvements to Tidewater Road. Tidewater Road would be connected to the proposed access roadway and a local connector road by a separate bridge crossing Shipyard Creek. These improvements will greatly improve access to the Cooper River Marina, especially from I-26.

The proposed access roadway includes a number of modifications to local roadways to improve future traffic flow. The construction of C-D roads and the reconstruction of the existing Meeting Street ramps (Exit 217) would improve operations and enable this existing interchange to remain open. The construction of the local connector would provide eastbound and westbound

access to the interstate via the port access road. In addition, the local connector road provides more direct access to the interstate from the CNC at Bainbridge Avenue,which will reduce overall traffic volumes on Viaduct Road and local roadways.

Intersection Impacts

As mentioned previously, the proposed access roadway limits the access of port-related traffic, particularly trucks, to local arterial roads. Therefore, there should be negligible impact to intersections on arterial roads from increases in truck traffic, and only minor impacts resulting from terminal employee traffic. However, the proposed roadway improvements do include improvements to various interchanges.

Table 5.2-4 presents the intersection analysis results. The prevalence of low speed observed throughout the study area arterials indicates a general capacity deficiency to handle future growth anticipated for the area without the Proposed Project. However, it should be mentioned that the simulation results are based on the modeled network which only included the major roadways in the study area and have not included all routes that serve the local traffic (this tends to provide for a conservative estimate of the LOS). The Proposed Project would improve intersection level of service by both reducing the volume of traffic from the CNC that would otherwise use local arterial roads and by increasing the connectivity in the local transportation network.

Table 5.2-4. Intersection Level of Service.

Intersection	Signal Needed?	Volume-to-Capacity Ratio	Delay (sec/vehicle)	LOS*	Required Turn Lanes**
Spruill Ave at Stromboli Ave	Yes	0.72	29	C	EB: Lt, Th, Rt WB: Lt, Th, Rt NB: Lt, Th, Th/Rt SB: Lt, Th, Th/Rt
Local Access Rd at Stromboli Ave Ext	Yes	0.74	29	C	EB: Lt, Rt WB: none NB: Lt, 2 Th SB: Th, Th/Rt
Local Access Rd at Bainbridge Av	Yes	0.44	32	C	EB: Lt, 2 Th, Rt WB: 2 Lt, Th/Rt NB: Lt, Th, Rt SB: All
Local Access Rd at CNC Half-Diamond On-Ramp	Yes if left turn is allowed	0.75	3	A	EB: none WB: none NB: 2 Th SB: Th, Rt
Local Access Rd at CNC Half-Diamond Off-Ramp	Yes	0.48	10	A	EB: Lt/Th WB: Rt NB: none SB: Lt
Spruill Ave at Meeting St	Yes	0.86	18	B	EB: 2 Rt WB: none NB: Lt, 2 Th SB: 2 Th
Spruill Ave at Viaduct Rd	Signal exists	0.68	29	C	EB: Lt, Th/Rt WB: Lt, Lt/Th, Rt NB: Lt/Th, Th, Rt SB: Lt, Th, Th/Rt

Intersection	Signal Needed?	Volume-to-Capacity Ratio	Delay (sec/vehicle)	LOS*	Required Turn Lanes**
Meeting St at Stromboli Ave Ext	No	Not available	Not Available	A	EB: none WB: Lt, Rt NB: Th, Th/Rt SB: Lt, 2 Th

*Source of LOS is Synchro traffic modeling results for Alternative 1D 2025 PM peak hour condition. For unsignalized intersection analysis, V/C and delay performance measures do not apply. Consequently, LOS is reported based on Synchro's Intersection Capacity Utilization (ICU) measure.
** Note that the recommended lanes are presented by approach (*EB* for eastbound, *WB* for westbound, *NB* for northbound, and *SB* for southbound) and by turning movement type (*Lt* for Left, *Th* for Through, *Rt* for Right, and *All* for shared movements).

5.2.6.2. Railroads

The Proposed Project does not include any modifications to existing rail service on the CNC. All of the containers will leave the proposed marine container terminal by truck. According to data provided by the SCSPA, approximately 23 percent of the containerized cargo from the Proposed Project would likely go to existing intermodal rail yards. The projected annual throughput of the Proposed Project at build-out in 2025 is 1.4 million TEUs. Typically, about half of container traffic equivalent to two TEUs (i.e., 40-ft containers), and half is equivalent to one TEU (i.e., 20-ft containers). Therefore, approximately 200,000 additional containers annually would be hauled by trucks to existing intermodal rail yards. It is estimated that for 2025 approximately 600 containers per day would be delivered to the existing CSX and Norfolk Southern (NS) intermodal facilities in the North Charleston study area. Figure 5.2-4 shows the location of rail yards and rail lines in the study area.

Regional Rail Carriers

Assuming an even split of containers between CSX and NS, each intermodal yard would handle approximately 25,000 additional containers per year when the terminal would begin operating in 2012. This volume would increase gradually until the terminal reaches maximum throughput capacity in about 2023. At this point, each intermodal yard would handle about 100,000 additional containers per year. The additional container volume would likely require both CSX and NS on average to add two trains per day to handle the increased traffic. According to both carriers, containerized cargo typically operates as a hub and spoke system. Trains are built in Charleston and are carried to large intermodal railyards such as Atlanta (NS I-26 corridor), Jacksonville (CSX Highway 17 corridor), or Charlotte (CSX Highway 52 corridor). Since there are a limited number of train slots, intermodal trains may get longer in the future to accommodate increases in containerized cargo. Both carriers would plan to accommodate additional container volumes generated by the Proposed Project and would benefit from any future shift in transporting more containers by rail to relieve traffic on local roads, including possible future direct rail access to terminals.

Rail Yards

Trip destination information obtained from the SCSPA estimates that 23 percent of containerized cargo would continue to go to intermodal yards in North Charleston, East Bennett and Seven-Mile Yards. As stated in Section 4.6.2, East Bennett Yard is operated by CSX and Seven-Mile Yard is operated by NS.

Based on interviews with CSX Intermodal (CSXI) and NS intermodal operation managers, the existing intermodal yards in North Charleston are operating at near capacity. Improvements to

the existing intermodal rail yard would be required to handle any substantial increase in container traffic at the intermodal yards.

The need to handle the full projected increase in containers would not occur until 2025 and would likely be identified in their long range plans. Although there will likely be a gradual ramp up between 2012 and 2025, it would be difficult for the rail carriers to project their specific intermodal improvements until the actual rail customers are identified. In addition, their future plans are dependent upon whether other potential projects that require rail, including Kinder Morgan, CaroLinks, and additional military traffic occur in the Charleston area, as discussed in Section 5.1.6.2. The timing of the proposed port facility and future potential projects would likely influence how these carriers decide to increase their capacity.

Rail Crossings

Additional trains would be required to handle the additional projected future container volume. Trains made up at the existing rail yards are presently 6,600 feet long and travel at 10 miles per hour in the study area for at-grade crossings, it is estimated that each train, 6,600 feet long, will require approximately 7½ minutes to pass an at-grade crossing. Accordingly, there would be a total delay of approximately 9 minutes for the first vehicle in line for the at-grade crossing. The total delay for the first vehicle in line assumes that the at-grade control signal activated one minute prior to the arrival of the train and de-activates 30 seconds after passing for a total of 9 minutes.

Four at-grade rail crossings shown in Figure 5.2-4 in the transportation study area would be impacted by the increased number of trains per day for the increased intermodal rail freight resulting from the operation of the Proposed Project. The NS railway at-grade crossings at Taylor Street and Remount Road, both west of I-26 and north of I-526, would experience two additional trains per day and therefore would be blocked for an additional 18 minutes per day, 9 minutes per train, while the train passed through the at-grade crossing. Two at-grade rail crossings for trains transporting intermodal freight on the CSX line would be impacted within the transportation study area. Intermodal freight enters and exits the East Bennett Yard to the west and north and travels on two different rail lines. A portion of the CSX trains travel west and south using the existing CSX railway that crosses the Ashley River. The other CSX trains travel north from East Bennett Yard and would affect the at-grade crossings at Montague Avenue and Remount Road within the transportation study area. The nearest CSX at-grade crossing for the railway passing over the Ashley River is SC Hwy 162 in Rantowles, South Carolina, approximately 10 miles southwest of the intersection with US HW 17 and I-526 west. Additional CSX at-grade crossings southwest of the transportation study area that would be impacted by the two additional trains per day are located in Ravenel and Adams Run, South Carolina. Since the CSX trains use two major lines, the increase at each crossing would likely average one train per day for each line.

Additional NS at-grade crossings north of the transportation study area that would be impacted by the two additional trains per day are located at Aviation Avenue, Jet Park Road, Midland Park Road, and Ashley Phosphate Road.

The Proposed Project includes a local connector road between the proposed access roadway and Spruill Avenue at Stromboli Avenue. It should be noted that the local connector road will add an at-grade crossing to an existing CSX line north of the Cooper Yard. However, this line is not currently being used. It should also be noted that the mainline of the proposed access roadway would be elevated on structure to bridge over three main rail lines and other active spur lines.

The Memorandum of Understanding and Agreement (MOUA) between the City of North Charleston and SCSPA dated October 25, 2002, included as Appendix B, refers to three rail overpasses within the City of North Charleston that would be in place before SCSPA starts container operations at the Proposed Project. The existing at-grade crossings referenced in the MOUA are Rivers Avenue just north of I-526, Rivers Avenue at Durant Avenue, and North Rhett Avenue. All three of the at-grade intersections described in the MOUA are within the transportation study area; however, according to interviews with CSX Intermodal and NS representatives, trains passing through these intersections do not originate from the local intermodal yards. These new overpasses would not affect the rail crossing delays described above, but they would reduce delays at other nearby rail crossings.

5.2.6.3. Summary of Impacts to Transportation

At build-out in 2025, the proposed terminal would generate 10,920 trips per day under peak conditions (where one trip is equal to one vehicle entering or leaving the proposed facility). Under average conditions 7,700 daily trips are projected, of which 63 percent would be made by trucks.

The additional traffic from the Proposed Project would add to the overall future traffic congestion picture in the study area. However, the congestion is contained along the I-26 freeway corridor due to the access roadway that will connect the proposed terminal with I-26 and carry all truck traffic from the terminal to the interstate highway. The access roadway will also connect to the FLETC and Veterans Terminal, and a majority of the impact to I-26 traffic from the Proposed Project would be caused by the rerouting of FLETC and Veterans Terminal traffic.

Assuming the interstate highways have the same number of lanes as they do presently, the additional traffic from the Proposed Project on I-26 and I-526 would impact an already congested condition. The Proposed Project would cause the greatest impact to traffic on I-26, and the impacts to traffic on I-526 would be minimal due to the smaller fraction of traffic from the proposed terminal that would travel on I-526.

The daily traffic volume (all vehicle types) on I-26 between I-526 and Remount Road, which is the most heavily traveled I-26 segment, is projected to increase by 1.75 percent due to the traffic generated by the Proposed Project. Truck traffic is projected to increase by 13.8 percent. However, the proportion of trucks in 2025 traffic along the I-26 segment between I-526 to Remount Road is projected to increase by only one percent, from 8 percent trucks to 9 percent trucks, due to the traffic from the Proposed Project.

The impact to traffic on I-26 south of I-526 would result in the failure (LOS F) for several segments. Although the I-26 highway congestion would primarily be due to background growth in traffic and inadequate number of lanes, the Proposed Project would cause at-capacity or over-capacity conditions sooner than the No-Action Alternative. These cumulative impacts to I-26 would likely require the widening of segments south of I-526 prior to 2025. Impacts from the widening are being addressed in a separate study by the SCDOT and are expected to occur within the existing right of way.

The access roadway would affect local access to the I-26 highway, specifically Exit 218 would be closed. A new access for local traffic to I-26 would be provided by developing a connector road to Spruill Avenue and Meeting Street along Stromboli Avenue. Extension of the local connector road along Stromboli Avenue to Meeting Street would provide further improvements to traffic and may help establish a business corridor in the area. Also, Meeting Street traffic

would need to be re-routed to Carner Avenue. In general, the Proposed Project would improve traffic conditions within and adjacent to the CNC.

The Proposed Project does not include any modifications to existing rail service on the CNC. Approximately 23 percent of the containers handled at the Proposed Project would be delivered to either the Norfolk Southern (NS) or CSX intermodal rail yards. There are only two at-grade crossings on the CSX intermodal rail line within the North Charleston study area and several at-grade rail crossings on the Norfolk Southern intermodal railway line within the study area and within close proximity beyond the study area to the northwest. It is estimated that additional traffic delays of 9 minutes and 18 minutes per day for CSX and NS, respectively, for at-grade rail crossings impacted by the Proposed Project.

5.2.7. Navigation and Terminal Facilities

This section describes the potential impacts to navigation and existing terminal facilities in the navigation study area as a result of operation of the Proposed Project. Potential impacts evaluated include impacts to the Federal navigation project, SCSPA terminals, private terminals, and navigational operations (including increases in vessel traffic, traffic delays from channel blockages during turning maneuvers and recreational vessel safety). The navigation study area, shown in Figure 5.1-11, includes the entrance to Charleston Harbor, Charleston Harbor, and the navigation channel in the Cooper River and Shipyard Creek.

Two studies were completed to evaluate the potential impacts caused by increased vessel traffic and potential delays to other vessels: the *Ship Simulation Model Study* (Appendix BB) and the *Vessel Queuing Model Study* (Appendix CC). The *Ship Simulation Model Study* evaluates potential conditions or navigation restrictions that are required to ensure navigation safety in Charleston Harbor and quantifies the time that the container ships calling on the proposed terminal will obstruct the navigation channel during turning maneuvers. The *Vessel Queuing Model Study* evaluates the delay times and type of vessels that may be delayed as a result of increased traffic or turning maneuvers at the berth and access area for the Proposed Project.

5.2.7.1. Federal Navigation Channel

The Proposed Project includes development of a berth and access area between the berth and navigation channel in the Cooper River. The conceptual layout of the wharf, berth and access area for the Proposed Project are shown in Figure 3.2-2. It is expected that the vessels calling on the proposed terminal will perform turning maneuvers in the access area and navigation channel. At this time, it is assumed that the proposed berth and access area would be constructed and maintained by the SCSPA. However, the SCSPA has requested funding for the USACE to evaluate modifying the currently authorized turning basin on the Daniel Island Reach.

As discussed in Section 4.7, a Daniel Island Reach turning basin is authorized as part of the Federal navigation project (but currently not constructed) along the same segment of the Cooper River and within the access area for the Proposed Project. The Daniel Island Reach turning basin was authorized by the U.S. Congress in the 1996 Water Resources Development Act (WRDA) to accommodate future traffic from additional vessel calls and maneuvering requirements resulting from the operation of a marine container terminal on Daniel Island. The USACE would likely evaluate modifying the existing authorization for the Daniel Island Reach turning basin in a General Reevaluation Report (GRR).

The potential impacts of revising the authorized navigation project would include an increase in the amount of dredged material to maintain an authorized depth of -45 feet MLW in a new turning basin (which may be dredged as deep as -49 feet MLW given 2 feet of advance maintenance dredging and 2 feet of allowable over dredge). The increase in the amount of dredge material to maintain the new turning basin would decrease the amount of disposal capacity the USACE has at the nearest CDF on Clouter Island. The Clouter Island CDF is operated by the USACE to dispose of dredged material from the upper reaches of the navigation channel in the Cooper River. The USACE is planning to use the Clouter Island CDF as a long-term disposal option for dredged material. The increase in dredged material required to maintain the authorized depth in the new turning basin would shorten the life or reduce the projected long-term capacity for the disposal of dredged material for the upper Cooper River.

5.2.7.2. Terminal Facilities

SCSPA Terminals

The Proposed Project would not impact SCSPA terminals, except for impacts to the NCT as a result of the increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers (traffic delay impacts are described in Section 5.2.7.3). Similar to the No-Action Alternative, the other SCSPA terminals will be improved and expanded to the extent possible to maximize throughput capacity, even if the Proposed Project is constructed.

Private Terminal Facilities

The Proposed Project will not impact private terminals, except for impacts associated with increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers (traffic delay impacts are described in Section 5.2.7.3).

Port Security

As required by the Maritime Transportation Security Act of 2002 (MTSA), the SCSPA would submit security and incident response plans for the proposed terminal to the Coast Guard (USCG). The Proposed Project would affect Project SeaHawk by increasing the vessel and container traffic to be monitored by the security center operation. The Proposed Project would not impact port security at other private terminal facilities.

The additional vessel and container traffic associated with the Proposed Project may cause a small increase in the risk of a terrorist attack via port related activities, as compared to the No-Action Alternative. This potential increase in risk would be minimized by ongoing improvements to port security.

5.2.7.3. Navigation Operations

Cooper River Vessel Traffic

This section assumes that the Proposed Project would be operational by calendar year 2012. In the first year it is assumed that three new major weekly container line services will call. This is about 300 vessel trips per year (where each vessel call equals two trips: one inbound and one outbound). The 300 vessel trips will transport 330,000 TEUs. Thereafter, the proposed new facility is assumed to attract one major new weekly container service each year (100 vessel trips per year) over the build out life of the new facility. At year 2022, the capacity of the new facility is projected to reach stated maximum capacity of 1.4 million TEUs (transported by 1,300 vessel

trips). After 2022, vessel movements associated with the Proposed Project would be constant as the Proposed Project continues to operate at the stated capacity.

The projection of Upper Cooper River vessel traffic indicates that total vessel traffic would increase from 1,365 trips per year in 2004 to 3,219 trips per year in 2025 (or a 136 percent increase in annual trips). This would be an approximate 68 percent increase in Upper Cooper River deep-water vessel traffic, as compared to the No-Action Alternative.

Potential delays to vessels traveling in the navigation channel would result from the temporary blockage of the Daniel Island Reach, when container ships perform turning maneuvers at the project site. The *Ship Simulation Model Study* (Appendix BB) estimates that the average time for docking (which included some turning maneuvers) would be 36 minutes and the average time for undocking would be 22 minutes. These times represent the full amount of time needed to move between the channel and the wharf during docking and undocking maneuvers. The actual time when the ship would be across the channel would be about one-third of that time. Vessel traffic delays would occur only when the vessel is being turned. If a "straight in mooring" (i.e., port-side-to the dock) or "straight out mooring" (i.e., from a starboard-side-to the dock) maneuver is executed, the time of interference with channel vessel movements is only about five minutes.

The temporary blockage of the navigation channel could cause an economic impact if a vessel traveling upriver or downriver has to slow its approach or delay outbound departure from a terminal upriver of Shipyard Creek. This delay could potentially cause an economic impact to existing and projected waterborne commerce on the Cooper River. Potential impacts caused by potential delays were quantified by the *Vessel Queuing Model Study* (Appendix CC).

The vessel queuing model used the vessel fleet projections (Table 5.2-5) in order to simulate Upper Cooper River traffic that would potentially be delayed by turning of container vessels calling on the proposed terminal from 2012 through 2025. The simulation model reflects two scenarios about how delays to other Cooper River vessels would be handled: (1) high delay assumes that turning will delay all vessels at the dock (departing) or at the sea buoy (arriving) until the operation has been completed and the channel is clear; (2) low delay assumes that turning will delay all vessels departing the dock or arriving at the sea buoy by 15 minutes of slowdown. In addition, delays to Cooper River vessels as a result of increased two-way passages in the navigation channel from increased marine container traffic were estimated for two situations: (1) outbound container vessels from the proposed terminal with inbound vessels and (2) other outbound vessels and inbound vessels affected by turning so that they must subsequently pass each other.

The simulation of vessel delays compiles results for the types and sizes of vessels. For the entire fleet, the simulation results indicate that the high delays would range from an average total of 64 hours in year 2012 to an average total of 295 hours in year 2025. The low delays would range from an average total of 21 hours in year 2012 to an average total of 97 hours in year 2025. The delays to passing vessels after turning are quite low, ranging from an average total of 7 hours in year 2012 to an average total of 33 hours in year 2025 for outbound container vessels from the proposed terminal with inbound vessels. Delays for other passing outbound and inbound vessels indirectly affected by turning are inconsequential.

The hourly operating costs of different vessels and sizes as compiled by the USACE were used to estimate the total costs to shipping companies as a result of turning and passing delays to Upper Cooper River deep draft vessel traffic. The average total daily and average total annual

costs for high delay range from $102 to $37,287 in year 2012 to $471 to $172,070 in year 2025. The average total daily and average total annual costs for low delay range from $34 to $12,389 in year 2012 and $155 to $56,739 in year 2025. The costs of delays from passing vessels after turning range from an average total of $12 per day and $4,586 per year in year 2012 to $58 per day and $21,117 per year in 2025 for outbound container vessels from the proposed terminal with inbound vessels. These are direct costs to shipping companies, but they are ultimately passed on to U.S. consumers through increased product costs.

Shipyard Creek

The increase in deep draft vessel traffic in the Cooper River downriver of the Proposed Project should not impact the existing shallow draft and future deep draft vessel traffic entering Shipyard Creek. Vessels entering Shipyard Creek would be downriver of the Proposed Project and therefore not delayed by a temporary blockage of the navigation channel for a turning maneuver.

The increase in deep draft vessel traffic in the Cooper River may affect or limit when vessels traveling to Shipyard Creek could travel from Charleston Harbor to Shipyard Creek using Daniel Island Bend and Daniel Island Reach. Restrictions on passing ships in these existing reaches could cause a delay for a ship traveling inbound to Shipyard Creek or outbound from Shipyard Creek. The Charleston Branch Pilots Association can minimize the potential impact resulting from this potential delay by coordinating schedules and managing the navigation restrictions.

Charleston Branch Pilots' Association

The increased vessel traffic associated with the Proposed Project will increase the demand for the pilotage services of the Charleston Branch Pilots' Association. Additional pilots will be hired and trained as necessary to meet the expected demand caused by the growth in vessel traffic.

Docking Masters

The increased vessel traffic associated with the Proposed Project will increase the demand for docking masters. Additional docking masters will be hired and trained as necessary to meet the expected demand caused by growth in vessel traffic.

Vessel Safety

The *Ship Simulation Model Study* (Appendix BB) also evaluated navigational safety for container vessels calling on the proposed terminal. The study concluded that during typical wind and tidal current conditions, even the largest container ships calling on the port (such as the 1043 ft Regina Maersk) could safely navigate in and out of the proposed terminal with tug assistance, including navigating Drum Island Reach and Meyers Bend, and performing turning maneuvers near the project site. High wind and current conditions create difficult navigation conditions, and the harbor pilots would not attempt to dock or undock under these conditions.

Although the chance for a collision between a large ship and a smaller vessel will remain small, the future growth in vessel traffic as a result of the Proposed Project will increase the possibility for a collision.

5.2.7.4. Summary of Impacts to Navigation and Terminal Facilities

The maximum increase in container vessel traffic would be 1,300 vessel trips per year, which would be a 68% increase in Upper Cooper River deep-draft vessel traffic, as compared to the No-Action Alternative.

The Proposed Project would not impact SCSPA terminals or other private terminals, except for impacts as a result of the increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers. The Proposed Project would cause minor delays to commercial navigation resulting from temporary blockage of the navigation channel for container vessel turning operations. These delays would result in minor economic impacts as a result of increased costs to shipping companies.

The Proposed Project would slightly increase the risk to port security as a result of increased container traffic, as compared to the No-Action Alternative. This potential increase in risk would be minimized by ongoing improvements to port security.

The increased vessel traffic associated with the Proposed Project would also slightly increase the risk for a collision with recreational vessels.

Table 5.2-5. Projected Upper Cooper River Vessel Trips by Vessel Type with the Proposed Project (2004-2025).

	Vessel Type							
Year	Break-bulk	Bulk	NCT Container	New Container	Ro-Ro	Tank	Tug/-Barge	Other
2004	70	150	726	0	70	230	94	25
2005	71	152	784	0	71	232	95	25
2006	71	153	843	0	71	235	96	26
2007	72	155	907	0	72	237	97	26
2008	73	156	973	0	73	239	98	26
2009	74	158	1,043	0	74	242	99	26
2010	74	159	1,087	0	74	244	100	27
2011	75	161	1,132	0	75	247	101	27
2012	76	162	1,132	300	76	249	102	27
2013	77	164	1,132	400	77	252	103	27
2014	77	166	1,132	500	77	254	104	28
2015	78	167	1,132	600	78	257	105	28
2016	79	169	1,132	700	79	259	106	28
2017	80	171	1,132	800	80	262	107	28
2018	80	172	1,132	900	80	264	108	29
2019	81	174	1,132	1,000	81	267	109	29
2020	82	176	1,132	1,100	82	270	110	29
2021	83	178	1,132	1,200	83	272	111	30
2022	84	179	1,132	1,300	84	275	112	30
2023	85	181	1,132	1,300	85	278	114	30
2024	85	183	1,132	1,300	85	281	115	31
2025	86	185	1,132	1,300	86	283	116	31

Notes: vessel trips are counted as one-way passages.
Source: G.E.C., Inc.

5.2.8. Noise

The Proposed Project would be expected to generate noise during both the operational and construction phases. Operational noise impacts would be long-term, while construction phase noise impacts would occur intermittently over a relatively short duration compared to the operational life of the facility.

The noise study areas are shown in Figure 5.1-12. For an explanation on the methodology and terminology used in this section, refer to Section 4.8.

Most of the noise impacts associated with the Proposed Project would be localized within the North Charleston study area. Hence, only impacts within the North Charleston study area were quantified for the Proposed Project. However, it should be noted that residents on Daniel Island may be able to discern some intermittent noises attributable to the Proposed Project such as pile driving and/or dropped containers or hatches. Also, the increase in noise along the interstate highway system and railways outside of the study area would be minimal as compared to the existing ambient noise field.

5.2.8.1. Construction Noise

During the construction phase of the Proposed Project, major noise sources would be from heavy-duty trucks entering and leaving the construction site(s), earth moving equipment, pile driving, and dredging operations. These noise sources would be intermittent and would occur over a relatively short time span in comparison with the operational life of the project.

Construction noise is regulated by local ordinances, EPA emission standards for construction equipment, and FHWA regulations. The local and EPA requirements mandate that certain classifications of construction equipment and motor vehicles meet specified noise emission standards. Except under very special circumstances, construction activities must be limited to weekdays between the hours of 7 AM and 6 PM and construction material must be handled and transported in such a manner as not to create unnecessary noise.

The construction phase noise impact assessment assumes the following general construction methods and approaches would be followed. However, it should be noted that the actual materials, equipment, procedures, and durations may vary as the detailed design plan and construction schedule are developed.

- The proposed access roadway is on new location for its entire length. Its length measures approximately 0.85 miles from the I-26 interchange ramp junctions, with approximately 0.71 miles on structure.

- The proposed terminal wharf structure would be approximately 120 feet wide by 3,510 feet long. The wharf structure would be pile supported of sufficient strength to support a typical container terminal operation. Pile driving for the wharf is estimated to take 12 months beginning approximately 4 years after obtaining the permit. Pile driving for support structures is estimated to take a total of 65 days, spread over 24 months, beginning approximately 4 to 5 years after obtaining the permit. Pile driving would be limited to 7:00 A.M to 7:00 P.M. The pile-driving hammer is expected to be similar to a Delmag D46-32 diesel impact hammer. The pile-driving hammer for the support structures is expected to be similar to a Delmag D30-32 diesel impact hammer. The vibratory hammer for the containment structure is expected to be similar to an ICE V360 vibratory hammer. The percentage of over-water piles is 75

percent. The percentage of upland piles is 25 percent. The average estimated number of impacts per pile for the wharf piles (over water piles) is 400. The average estimated number of impacts per pile for the support structures (upland piles) is 750. It is expected that plywood pile cushions would be used during pile driving activities. Additional measures are not being proposed at this time, however, it is anticipated that pile-driving activities would be limited to daylight hours only.

- The proposed terminal containment structure would be a combination of steel sheet pile and gravel dike (along the back of the wharf). Support structures to be constructed in the upland area would be pile supported.

- Terminal site stabilization would require the installation of wick drains and the placement of surcharge materials. The time required for site stabilization is on the critical path schedule for construction of the terminal. Surcharge material would remain in place for a minimum of 2 years.

- The geologic materials across the upland area into which piles would be driven are generally classified as three types: fill, soft clay, and marl (Cooper Formation). The fill material across the site is generally sand mixed with varying amounts of silt and clay. The fill is generally loose to medium dense or of medium to firm consistency. Additional fill that is placed on the site is anticipated to be medium dense sand. The soft clay layers underlying the fill are dredge spoils and native marsh deposits. This soil has a very soft to soft consistency. The marl underlying the soft clay is a calcareous marine deposit of sandy silt or clay. The marl has a firm to stiff consistency. The sediments underlying the water column into which piles would be driven are generally classified as fill and marl. The piles would be driven to an approximate average tip elevation of -90 feet. The wharf piles would be driven approximately 30 to 60 feet into the Cooper Formation. The upland piles would be driven approximately 15 to 30 feet into the Cooper Formation.

- Heavy earthmoving equipment would begin operating immediately upon starting construction of the proposed terminal. This work is estimated to last approximately 2 years through the site preparation and surcharge placement phases. Minimal earthmoving equipment may be required during the following 2 years to maintain the surcharge. Upon conclusion of the 2-year surcharge period, earthmoving equipment will return to the site for approximately 3 years to remove surcharge and prepare the site for construction.

- Project construction for the Proposed Project would also involve the use of bulldozers, graders, loaders, generators, cranes, miscellaneous trucks and equipment, and/or at least one cutter-head dredge.

- Construction durations assume the contractors would work an average of 6 days per week unless noted otherwise. Construction durations assume optimal conditions and may be extended by adverse weather and/or unanticipated site conditions.

- If construction takes place at night, it is assumed that lights powered by a portable generator would be utilized by the contractor.

Typical noise levels from construction equipment that may be employed during the construction period are presented in Table 5.2-6. Noise levels measured at 50 feet from the construction equipment range from 78 dBA for generators to 101 dBA for pile drivers.

Table 5.2-6. Typical Construction Equipment Noise Levels (dBA).

Equipment	Average Noise Level at 50 feet	Usage Factor [1]	Leq During Work Period
Pile Driver	101	0.1	91
Crane	83	0.16	75
Compressor	81	1.0	81
Wheel Loader	79	0.3	74
Dump Truck	88	0.4	84
Compactor	80	0.5	77
Bulldozer	87	0.4	83
Grader	85	0.2	78
Water Truck	88	0.4	84
Flat Truck	88	0.4	84
Finisher	89	0.5	86
Paver	89	0.5	86
Pump	82	0.4	78
Boring Machine	98	0.1	88
Generator	78	1.0	78
Concrete Truck	88	0.4	84
Pavement Breaker	88	0.5	85

Source: EPA, 1974

[1] Usage factor accounts for the percent of time that a piece of equipment is in use. For instance, a usage factor of 1.0 applies for equipment in use for one entire hour, while a usage factor of 0.33 applies for equipment in use for 20 minutes per hour.

Noise from construction activities potentially would affect existing noise levels in adjacent sensitive areas. According to EPA studies, construction equipment noise levels range from 78 dBA to 101 dBA at 50 feet from the source. Noise levels at a receptor (receptor types are described in Table 4.8-3) would depend on the type of construction activity, noise levels generated by various pieces of construction equipment, distance between the noise source and receptor, the presence of intervening structures such as walls or buildings, sound absorption by intervening ground conditions, and atmospheric factors such as temperature and humidity. Typical construction equipment noise is considered to emanate from a point source, which generally decays at a rate of 6 dBA per doubling of distance from the source to the receiver. This is a logarithmic relationship applicable to the acoustical spreading of pure spherical wave in air without including the other effects listed; hence, it is a conservative relationship.

Noise levels from construction activities can vary widely, depending on the specific phase of construction, which includes land clearing and excavation, construction of new roadways, and construction of retaining walls. At a typical receptor, the noise levels would be highest during the early phases of construction, when excavation and heavy daily truck traffic would occur.

Construction activities would have short-term noise effects on receptors in the immediate vicinity of the construction site. The total hourly average dBA noise level, Leq (1 hour), at a distance of

50 feet from the construction site boundary, usually is approximately 80 dBA. Noise levels at receptors located at known distances from the construction site boundary can be conservatively estimated by assuming a 6-decibel dropoff per doubling of distance from construction equipment and by combining the noise contributions from each piece of construction equipment. Generally, annoyance effects can be expected during construction at existing quiet sites within 1,000 to 1,500 feet of the construction activity. Actual distances at which noise impacts would occur depend on a number of factors such as the type and number of construction equipment operating and their usage factors.

The sensitive receptors discussed in this noise impact evaluation are defined by the FHWA as "Category B" and consist of residences, schools, places of worship, and parks and recreational areas where outdoor activities occur. Hourly Leq noise contours from construction activities were estimated for the Proposed Project construction and are shown in Figure 5.2-5. For noise monitoring site 1 (a FLETC dormitory), Leq noise levels are predicted to reach approximately 73 dBA. The Cooper River Marina is expected to experience construction noise levels of around 65 to 70 dBA. However, it should be pointed out that some construction activities will be contained to certain areas of the site at various times during the construction phase. For instance, pile driving will be contained to the wharf area. During times when pile driving is occurring at the north or south end of the wharf, the FLETC dormitory or Cooper River Marina, respectively, would be experiencing considerably higher noise impacts.

Effects on residential areas during construction would result from noise from the construction of the access roadway and from construction and delivery vehicles traveling to and from the terminal site. Increases in noise levels due to operation of delivery trucks and other construction vehicles will be limited to locations near defined truck routes and in the immediate vicinity of the construction site. Construction noise effects would be partially masked by traffic noise along roads in the project vicinity. As mentioned previously, construction generally will be limited to daytime hours six days a week. Construction noise levels at adjacent residential lot lines will be limited to a maximum daytime Leq of 65 dBA. Based on typical noise levels for the anticipated construction equipment, construction equipment noise levels should be limited to a maximum level of 86 dBA at 50 feet from the construction equipment.

5.2.8.2. Operational Noise

The two aspects of the Proposed Project, i.e., the terminal and the access roadway, will generate different operational noises and, therefore, will have different impacts on sensitive receptors. For this reason, the operational noise impacts of the Proposed Project are discussed individually in the following two subsections. A third subsection discusses the noise impact from the additional train traffic generated by the Proposed Project.

Terminal

Noise emission levels from existing port facilities at the Wando Welch Terminal were used to identify major noise sources that would be associated with the proposed terminal. Major noise sources at port facilities include unloading/loading of vessels and trucks, loading cranes, rubber-tired gantries, vehicular traffic from yard hustlers, which take containers from ships to storage locations, as well as miscellaneous noises associated with traffic within the facility such as vehicle back-up alarms. Noise levels from terminal activities would likely include instantaneous noise events (i.e., dropped container or hatch cover) that are short in duration. These events often produce noise levels that are audible, however, due to their short duration they have very little effect on the Day-Night Sound Level (DNL) defined in Section 4.8.1.

To determine the potential noise effects of the proposed terminal, available results of the noise monitoring program at several sites in and around the existing Wando Welch Terminal were used since the Wando Welch Terminal is considered to be representative of operational noise levels associated with a modern marine container terminal. The monitored noise levels were used to generate DNL noise contours for the proposed terminal (Figure 5.2-6). The existing noise levels that were monitored for this study were used in assessing the existing noise conditions at receptor sites and in determining potential noise impacts at the monitored sensitive receptors from operations at the proposed terminal. The sensitive receptors in the North Charleston study area are discussed in Section 4.8.4 and presented in Table 4.8-4. The sensitive receptors potentially affected by the proposed terminal are shown in Figure 5.2-6.

For assessing potential noise impacts from terminal operations, certain criteria were used. Noise effects in areas where the DNL is less than 65 dBA are generally not considered adverse. All residences and sensitive receptor sites in the Howard Heights, Windsor and Union Heights communities and other adjoining communities in the area are situated outside of the modeled 65 DNL noise contour. Therefore, these communities would not be adversely impacted by noise from terminal operations.

The layout of the proposed terminal locates the dockside activities away from residential areas. However, sensitive receptors located near or along the Cooper River (i.e., FLETC and the Cooper River Marina) are located proximal to the planned wharf area and its associated noise sources. Distances from the center of the terminal to the monitored sensitive receptors range from 1,425 feet to 6,510 feet.

The FLETC dormitory located at Site 1 would be adversely impacted by noise and would experience a DNL noise level up to approximately 74 dBA. The FLETC dormitory may also experience low frequency noise-induced vibration from ship maneuvering.

Access Roadway

Traffic noise predictions were performed using the FHWA's Traffic Noise Model (TNM), Version 2.5 (February 2004). The TNM takes into account factors such as ground absorption, roadway geometry, receptor distance, operating speed, and traffic volumes. Traffic data for the TNM model were input as peak-hour volumes and running speeds by roadway segment for the 2005 existing conditions and the 2025 No-Build and Build conditions. Three vehicle classifications were assumed: cars (all vehicles with two axles and four tires), medium trucks (all cargo vehicles with two axles and six tires), and heavy trucks (all cargo vehicles with three or more axles). Traffic data used as input to the noise prediction model were derived from the *Traffic Analysis Technical Report*, which is appended to the *Access Roadway Feasibility Study* (Appendix W).

The assessment of traffic noise impacts required the following three comparisons:

- The change in noise levels from existing conditions to future conditions with the Proposed Project and whether that difference is substantial;
- The difference in future noise levels with and without the Proposed Project; and
- Whether noise levels with the Proposed Project would exceed the FHWA's noise abatement criteria (NAC). The FHWA's NAC were presented in Section 4.8 (Table 4.8-3).

Noise impact from the proposed access roadway was identified as FHWA "Category B" land uses using SCDOT and FHWA criteria for assessing impacts. The following methodology was used to determine impacts associated with the proposed access roadway:

- Based on a corridor wide inspection of aerial photographs and from the overlay of future estimated noise contours, an approximate count was made of the total number of residences that would experience traffic impacts from the proposed access roadway.

- The total corridor wide count as determined in step one was separated into two sets: Those residences that would experience traffic noise impacts as defined by FHWA and SCDOT NAC, and those residences that would experience substantial impact as defined by FHWA and SCDOT criteria (areas where the future traffic noise levels would be less than NAC but 15 dBA above the existing ambient noise levels). All of these properties would qualify for abatement considerations.

- The third and final step consisted of determining the feasibility and reasonableness of erecting noise barriers along the highways to protect clusters of impacted properties (using SCDOT guidelines).

The noise prediction results are shown in Figure 5.2-7 and summarized in Table 5.2-7. This table presents the impact assessment for each neighborhood located within the study area. The proposed access roadway will result in predicted noise levels that will approach or exceed the NAC. The majority of these impacts are located where the proposed alignment of Ramp B passes close to the Rosemont neighborhood.

Table 5.2-7. Noise Assessment Summary for the Proposed Access Roadway.

	Noise Impacts					
			Build (2025)			
Neighborhood	**Existing (2005)**	**No-Build (2025)**	**Approach or Exceeds NAC *ONLY***	**Substantial Increase over Existing *ONLY***	**Approach or Exceeds NAC *AND* Substantial Increase over Existing**	**Total Receptors Impacted**
Union Heights	33	48	37	0	0	37
Windsor Heights	10	10	10	0	0	10
Howard Heights	4	4	4	0	0	4
4-Mile Hibernian	7	7	7	0	0	7
Rosemont	45	45	45	0	26	71
Total	**99**	**133**	**103**	**0**	**0**	**129**

According to the noise study, the proposed access roadway will impact approximately 129 sensitive receptors where the existing noise levels already approach or exceed the NAC at many of these sites. The majority of these impacted sites (71 sites) are found in the Rosemont neighborhood located just south of the proposed "Semi-Directional Tee" type interchange along the west side I-26. These impacts include two recreational facilities: Rosemont Field and the Freddie Whaley Playground.

The proposed access roadway will also impact 7 sensitive receptors located in the 4-Mile Hibernian neighborhood as well as 37 sensitive receptors in Union Heights. The total number of impacted receptors for the Union Heights neighborhood is less than the future No-Build due to the elimination of the Exit 218 ramp. However, there are new impacted receptors for the Build scenario located near the new mainline at the southern tip of Union Heights. The remaining noise impacts occur adjacent to the at-grade local access road along Stromboli Avenue.

Regarding abatement, there are a number of abatement measures that can be considered as mitigative actions to reduce or limit noise at affected sensitive receivers. More information about abatement measures is provided in the *Access Roadway Feasibility Study* (Appendix W).

Railway

There will be additional train movements as a result of increased container throughput at the Proposed Project. According to data provided by the SCSPA, approximately 23 percent of the containerized cargo from the Proposed Project would likely go to existing intermodal rail yards. As with vehicular traffic, it is reasonable to assume that railway noise will increase commensurate with the increase in the number of daily intermodal trains. Existing noise sensitive receptors located within the 65 dBA DNL contour of railway operations would be impacted by increased duration of train noise resulting from the Proposed Project.

Overall regional noise impacts caused by increased daily trains would be minimal, as train noise would tend to be absorbed and masked by the existing ambient background noise.

5.2.8.3. Summary of Noise Impacts

In summary, noise from the proposed terminal will have an adverse impact on receptors at the CNC and adjacent to the proposed terminal site. For instance, the FLETC dormitory (monitoring site 1) would experience a DNL noise level up to about 74 dBA and the Cooper River Marina would experience a DNL noise level up to approximately 67 dBA (Figure 5.2-6). Receptors further away, such as residential neighborhoods, would not be adversely impacted by noises generated by the proposed terminal.

Noise from the proposed access roadway would impact approximately 129 sensitive receptors. In many cases, the existing noise levels already approach or exceed FHWA's noise abatement criteria at these sites. None of these receptors would experience a substantial increase over existing conditions.

Railway noise caused by an increase in daily train traffic generated by the Proposed Project would be minimal. Existing sensitive receptors located within the 65 dBA DNL contours of railway operations would be impacted by an incrementally increased duration of train noise.

5.2.9. Light

This section discusses the potential impacts from lighting associated with the Proposed Project. The study areas where impacts were analyzed are shown in Figure 5.1-13.

5.2.9.1. North Charleston Study Area

Terminal

The Occupational Safety and Health Administration (OSHA) has established stringent requirements for illumination levels of work areas at marine terminal facilities. The lighting of marine terminal facilities will increase the ambient light levels of the surrounding area, which can

be viewed as a potential impact. However, there are no Federal regulatory standards regarding the environmental impacts resulting from the illumination of port facilities. The Proposed Project would cause an increase in the nighttime light levels at the site. Illumination levels would be expected to be similar to those at the existing Wando Welch Terminal in Mt. Pleasant

Marine terminals that are located within established industrial locations blend with the background lighting, and lighting impacts are not as noticeable as new facilities located within unlighted areas. The Proposed Project site is in an industrially zoned area; however, the existing ambient lighting levels are low, due to much of the project footprint consisting of undeveloped land (abandoned CDF).

The primary light impact concern is “light trespass,” the impact the illumination has on the surrounding communities. The Illuminating Engineering Society of North America (IESNA) defines light trespass as occurring when adjacent property receives unwanted light and excessive brightness occurs in the normal field of view. While the degree of light trespass impact is generally a subjective matter that depends on the sensibilities of the observer, it is a factor that must be considered in the selection of location and design of the terminal, as well as in assessing its impacts. Less obvious is the concern regarding artificial lighting and its impact to the behavior of animal species such as migratory birds and sea turtles. Spill lighting is light that illuminates the areas surrounding the facility. It is a measurable quantity that can be minimized by using cutoff fixtures, reducing mounting heights, and aiming the lights.

The glow of a facility is caused by light that is reflected and scattered by particles in the atmosphere; sky glow varies according to atmospheric conditions. The location of brightly illuminated areas with respect to surrounding areas and turning off unneeded lights would help minimize the impact of glow.

The proposed marine container terminal would be divided into zones, each of which would have specified levels of illumination based on the activities conducted there, as required by OSHA:

- The wharf area, where containers are hoisted and landed, would require the highest levels of the outdoor lighting. At the required level of 5.0 foot-candles, the illumination is bright enough to perform detailed tasks and clearly see hazards.

- General container storage areas require less lighting than the wharf areas. These areas would require 1.0 foot-candle illumination and would be approximately twice as bright as a shopping mall parking lot.

- Inactive storage areas and employee parking areas require 0.5 foot-candle, the same lighting level as shopping mall parking.

The lighting systems in the areas listed above would likely be high mast lighting with multiple fixtures on poles ranging from 65 to 120 feet high. Where light trespass is not a consideration, the most economic systems use higher, but fewer poles with up to twelve fixtures per pole. Where lighting impact is a consideration, the poles are shorter, with four to six fixtures per pole and a greater number of poles. The recommended lighting system would include additional shielding to further cut off spill light. In the wharf areas, crane-mounted lights will provide additional illumination where most of the activity is taking place. Local switching control is also recommended to allow banks of lights on each pole to be turned on and off as needed.

- The facility entrance, weighing scales, and pedestrian walkways require 1.0 foot-candle. These areas may be illuminated with conventional roadway lights on poles.

- Where high security and inspection lighting is required, the area would be covered with a canopy and the illumination levels would be similar to that of a typical gasoline station/convenience store.

Preliminary lighting layouts were analyzed using general assumptions as to the functional zones. The lighting model poles are 75 feet high, with four 1000-watt HPS fixtures per pole in the general areas and six 1000-watt HPS fixtures per pole in the wharf area. Computer-generated illumination contours based on these layouts indicate that spill lighting levels greater than that provided by a full moon (approximately 0.05 foot-candles) may extend as far as 300 feet beyond the project boundary. Beyond 300 feet, the illumination levels would drop off rapidly to near zero. These predictions should be considered conservative. When the facility is designed and the lighting design is optimized, the spill lighting may be further minimized through choice of fixture characteristics, lamp wattage, reflector patterns, shielding, fixture orientation, and mounting heights.

Light trespass would cause adverse impacts up to approximately 300 feet beyond the Proposed Project boundaries. Sky glow impacts to viewers to the west from Daniel Island would tend to be lessened due to elevated ambient nighttime light within the City of North Charleston. However, sky glow would likely be visible to nearby residential areas, such as Union Heights, Windsor, Chicora, and Cherokee neighborhoods when viewing the nighttime sky to the east and southeast. Glare is not expected to cause adverse lighting impact at the Proposed Project site.

Figure 5.2-8 shows the preliminary lighting layout used to model spill lighting. Figure 5.2-9 shows the predicted lighting contours at the Proposed Project site.

Nighttime lighting can have negative impacts to wildlife, especially nesting sea turtles and avian species during migration, many of which transit the area during darkness. The Proposed Project is not located within or proximal to an area where sea turtle nesting is likely to occur. The additional nighttime sky glow attributable to the Proposed Project would be masked by the existing ambient urban sky glow of the area and is not expected to cause substantial impact to nighttime bird migration.

Access Roadway

Preliminary lighting layouts were developed for the proposed access roadway. The model roadways are approximately 90-feet wide sections and are elevated 25-feet above grade. The light poles are 35-feet high, mounted in the median where possible, with two 250-watt HPS luminaries mounted on 12-foot arms. The spill light would be shaded at grade by the roadway deck for a distance of approximately 20-feet. Lighting levels beyond the shaded region rise uniformly from 0.05 foot- candles to a maximum of 0.3 and back down to 0.05 foot-candles in a band that extends out approximately 100-feet from the edge of the roadway deck.

At this time, lighting is only expected to be along the local access roadway and not the mainline leading from the proposed terminal to I-26.

The lighting impacts were carefully evaluated because of the proposed access roadway's proximity to neighborhoods such as Union Heights and Rosemount. The high mast lighting on the local access roadway and headlights from truck traffic would potentially increase ambient nighttime light levels in areas directly adjacent to the proposed access roadway. However, it is

important to note that lighting intensity would likely be minimized by installing shields on the light fixtures. Furthermore, truck traffic during nighttime hours is expected to be much less than during daylight hours.

Based on an assessment of the preliminary lighting layout, the spill light (i.e., light trespass) from the roadway would extend approximately 150-feet from the proposed right-of-way line. The light level at 150-feet from the roadway was calculated to be 0.05-foot candles, which is similar to the lighting emitted by the moon at its full stage. Also, a large portion of the proposed access roadway that would be lighted, i.e., along the local access roadway, is located near industrial and institutional areas. These areas are not considered sensitive receptors, and are not typically adversely impacted by roadway lighting.

Therefore, light impacts from the proposed access roadway are considered to be moderate.

Railway

The existing intermodal yards are lighted and no additional lighting would be required as a result of the Proposed Project. Rail lines are typically unlighted and the Proposed Project would require no additional lighting of rail lines. The increase in the number of trains, which is projected but not yet scheduled, could result in a minimal impact during night time trips. The Proposed Project would not likely cause adverse light impacts. However, if the existing intermodal yards are expanded in the future, additional lighting may be required. Inasmuch as the intermodal yards are located within already commercially/industrially developed areas, it is expected that any future additional lighting would result in minimal impacts.

5.2.9.2. Daniel Island Study Area

Light trespass and glare impacts from the Proposed Project would not be expected within the Daniel Island study area. Increased sky glow from the Proposed Project may be noticeable to residents of neighborhoods on Daniel Island and to residents of Thomas Island. The sky glow caused by the Proposed Project would be comparable to that associated with the existing Wando Welch and North Charleston Terminals.

5.2.9.3. Clouter Island Study Area

Inasmuch as Clouter Island is undeveloped and expected to remain so for the foreseeable future there are no potential receptors on Clouter Island. Therefore, no light impacts would be expected from the Proposed Project.

5.2.9.4 Summary of Light Impacts

In summary, sky glow would be the primary light impact from the Proposed Project, which would be visible to receptors on Daniel and Thomas Islands. However, the contribution to sky glow from the Proposed Project would be minor compared to the existing urban lighting within the study area. Light trespass from the proposed terminal would likely impact nighttime residents of the FLETC campus and the Cooper River Marina.

The preliminary roadway lighting design only includes high mast lighting along the local access roadway and not along the mainline leading from the proposed terminal to I-26. Light trespass impacts from the roadway would mostly occur to industrial and institutional properties and not to residential areas. Truck traffic to and from the proposed terminal would mostly occur during daylight hours, making light impacts from vehicle headlights at night minimal.

5.2.10. Aesthetics

As indicated in Section 4.10, the subject of aesthetics is personal and subjective in its evaluations of the acceptability of visual scenes that are difficult to quantify and for which there are no applicable regulatory standards. The discussion of aesthetic impacts is limited to describing probable changes in the existing viewsheds in the vicinity of the proposed facility sites if the Proposed Project is constructed.

The Proposed Project itself or the associated cranes would be visible over a relatively wide area: from the Arthur Ravenel Bridge, the Don Holt Bridge, elevated sections of I-26 and I-526, recreational boaters within the lower Cooper River, parts of North Charleston, Mount Pleasant, and Daniel Island. The general aesthetics study areas are shown in Figure 5.1-14.

5.2.10.1. North Charleston Study Area

The construction of the Proposed Project will result in a change in the appearance of the south end of the CNC property. It is expected that the shoreline of the terminal site will appear much the same as the existing Wando Welch Terminal when viewed from the waterside (Figure 4.10-14). The Proposed Project, however, would have only three berths at full build-out (the Wando Welch Terminal has four) and fewer cranes than the Wando Welch Terminal.

The appearance of the Proposed Project site from the landside would also change, although the MOUA between the City of North Charleston and the SCSPA includes visual buffering along the perimeter of the proposed terminal and the Port Overlay District along Spruill Avenue. The entrance and gatehouse facilities at the Wando Welch Terminal reasonably represent the likely appearance of the proposed terminal when viewed from other properties onboard the CNC. Most of the properties along the western bank of the Cooper River up and down river of the proposed terminal that would have views of the Proposed Project are industrial and institutional. However, visitors to the Riverfront Park (the newly opened public park on the CNC that was constructed as part of the Noisette Project) would have a downriver view of the Proposed Project that will likely change the view for visitors. Also, motorists and pedestrians on the Arthur Ravenel Bridge would have views up the Cooper River of the Proposed Project.

The entrance and gatehouse for the proposed terminal would not be visible from nearby residential neighborhoods, but might be visible from elevated roadways. The view to the east from the Windsor, Howard Heights, and Union Heights neighborhoods along Spruill Avenue would change in as much as the cranes would be of sufficient height (approximately 250 feet with booms in raised position) to be seen from these neighborhoods. The view to the east from the northern end of the Windsor neighborhood is dominated by the Montenay Incinerator facility and stacked containers at the Container Care yard immediately north of the incinerator. Containers would not typically be stacked more than five high at the Proposed Project site and would not be visible from street level within the Windsor and Union Heights neighborhoods.

The proposed access roadway improvements are located adjacent to the Union Heights, Rosemont, Windsor Subdivision, and Accabee neighborhoods. Therefore, these residential areas have the potential for visual impacts. The Rosemont neighborhood is located immediately southwest of the proposed access roadway interchange and also has the potential for visual impacts. The elevated segments of the proposed access roadway also would likely be visible to residents of Howard Heights, Union Heights, and Windsor Subdivision. It is likely that the elevated parts of the access roadway would be similar in appearance to the elevated approaches to the Arthur Ravenel Bridge.

The Windsor Subdivision is located just south of the Stromboli Avenue corridor and would likely not have adverse changes to the viewshed from adjacent residences since the corridor is located at-grade and will replace existing container storage yards. The areas to the north and south of these residential neighborhoods are mostly industrial (i.e., businesses and container storage yards). The CNC, Montenay incinerator, and more industrial land uses are located to the east. Park South is located on the east side of Spruill Avenue, just north of the Spruill Avenue/Stromboli Avenue intersection. This park is completely surrounded by industrial land uses, so users of the park already have views of primarily industry beyond the park.

5.2.10.2. Daniel Island Study Area

The Proposed Project is not expected to cause major adverse aesthetic impacts to the existing and future residents in the Daniel Island study area. Aesthetic impacts from the Proposed Project to the existing developed areas on Daniel Island, which are inland, would likely be minimal. Once the proposed terminal is operational, the tops of the crane booms, when in their retracted and upright positions, might be visible from some parts of the developed areas.

The east bank of the Cooper River on Daniel Island is currently undeveloped. As stated in Section 5.3.1, this area will likely be developed in the future into a mixed-use development. The appearance of the proposed terminal from the viewpoint of the Daniel Island shoreline will be that of a marine container terminal similar to Wando Welch Terminal (except the proposed terminal will have three berths whereas the Wando Welch Terminal has four and, therefore, there will be fewer cranes at the proposed wharf). However, since the existing appearance of the CNC is industrial in nature, the construction of a terminal at this site would not drastically change its visual appearance.

Hence, it is concluded that the Proposed Project would only cause a minor adverse aesthetic impact to viewers in the Daniel Island study area.

5.2.10.3. Clouter Island Study Area

Clouter Island is undeveloped and likely to remain so for the foreseeable future. Motorists crossing the Cooper River on I-26 via the Don Holt Bridge would likely have a view of the wharf and cranes associated with the Proposed Project. Some aspects of the Proposed Project would also be visible to residents on the southern part of Thomas Island fronting on Beresford Creek. The Proposed Project would be similar to the view of the existing Veteran's Terminal except that the cranes would be larger and be more visually intrusive. Overall, it is concluded that the Proposed Project would cause only a minor adverse aesthetic impact to viewers in the Clouter Island study area.

5.2.10.4. Summary of Aesthetics Impacts

The construction of the Proposed Project would change the existing appearance of the south end of the CNC. It is expected that the shoreline of the terminal site would appear much the same as the Wando Welch Terminal. From the landside, viewers from residential areas would only be able to see the tops of the cranes at the terminal facility and the elevated access roadway connecting with I-26. The aesthetic character of the area surrounding the Proposed Project is already dominated by industrial and commercial land uses. Therefore, the development of the Proposed Project would be in keeping with the existing and historical use of the CNC as a whole and the surrounding maritime industries.

5.2.11. Air Quality

This section evaluates the potential effects of the operation and construction of the Proposed Project on regional and local air quality conditions. The study area for air quality impacts is the Tri-County region as shown in Figure 5.1-15.

Although an air permit is not required to operate the proposed facility, air quality modeling was used to determine if the Proposed Project would cause unacceptable impacts in the project study area. The following subsections describe: (1) the estimates of maximum potential emissions for input to the model, and (2) the air quality model predictions of impacts to air quality. The model predictions are used to evaluate NAAQS and PSD increment compliance, visibility impacts to Class I areas (i.e., Cape Romain Wildlife Refuge), and deposition impacts to Class I areas.

5.2.11.1. Emissions Estimates

The Proposed Project would impact air quality as a result of construction phase emissions as well as operational phase emissions. The Proposed Project emissions would include:

Construction phase emissions:

- Temporary generation of fugitive dust and fuel combustion emissions during construction of the terminal and access roadways; and

Operational phase emissions:

- Generation of fuel combustion emissions from container-handling yard equipment (gantry cranes, top lifters, chassis flippers, hustlers);

- Generation of fuel combustion emissions from container ships and other small marine vessels entering and leaving the terminal, during maneuvering, and during hoteling/berthing; and

- Generation of fuel combustion emissions from light duty gas vehicles (LDGVs) and heavy duty diesel vehicles (HDDVs) along terminal access routes and while idling on site.

Because the project related emissions are primarily mobile emissions associated with combustion of diesel and gasoline fuels, only those criteria pollutants emitted from fuel combustion were analyzed. This includes CO, NOx, PM10, PM2.5, SO2, and VOCs. Although the Proposed Project will increase the regional level of precursor pollutants that affect ozone (i.e., NOx and VOCs), predicting a related increase in ozone levels is a complicated process that includes numerous regional factors. Based on coordination with EPA and SCDHEC, it was determined that the quantitative evaluation for this EIS would be limited to the above mentioned precursor pollutants. However, a qualitative discussion of project impacts to ozone based on SCDHEC planning studies is provided in Section 5.2.11.2.

Toxic emissions are also quantified for car and truck emissions. This includes the chemicals 1,3 Butadiene, Formaldehyde, Acetaldehyde, Acrolein, Benzene and MTBE. However, these emissions could not be quantified for marine diesel engines, which are the largest potential emission sources associated with the Proposed Project, or other diesel-fueled mobile sources. EPA has developed a nationwide inventory of air toxic emissions from mobile sources at the

county level; however, the agency acknowledges that this inventory was developed using very limited speciation data. No published speciation data could be located from this inventory to develop emission factors suitable for estimating emissions of specific air toxics from marine diesel engines. For these reasons, emissions of toxic air pollutants are only discussed qualitatively.

Construction Emissions

Emissions during construction activities for the Proposed Project were estimated in the *Air Quality Report* (Appendix S). The construction activities for the Proposed Project will likely be spread over six years. Site preparation, including demolition, land clearing, surcharging, consolidation, filling, and grading, will likely take three to four years. Construction of site utilities, paving, and structures will likely extend for another two to three years. These activities will generate fugitive dust and diesel fuel combustion emissions prior to operation of the facility. The construction activities are not expected to involve the excavation or disturbance of contaminated soils that may be present at the site. During construction, additional soils will be brought in and placed on top of any contaminated soils, thereby reducing the potential for toxic air emissions from contaminated soils. Because the various stages of construction will not occur simultaneously, the emissions from the different stages were not added together.

The analysis in the *Air Quality Report* demonstrated that the construction emissions would be much lower than the operational emissions at full build-out in 2025 (which were used for the air model simulations of the maximum anticipated emission rates for the facility and resulting impacts to air quality). Because the air modeling analysis demonstrated that higher level of operational emissions would cause minimal impacts to air quality (as explained later in this section), the lower level of construction emissions can be assumed to also cause minimal impacts to air quality. Also, the construction emissions will not occur concurrently with the full build-out operational emissions. For these reasons, air quality impacts from construction emissions were not included in the air model simulations.

Operational Emissions

Operation of the Proposed Project would result in emissions from mobile sources, including large and small marine vessels, cargo handling equipment, and motor vehicles (especially trucks with diesel engines). The *Air Quality Report* in Appendix S provides detailed explanations of the emission estimate calculations for each of these sources.

By far, the largest emission source would be the container vessels calling on the proposed terminal. Emissions were determined based on the ICF Consulting (ICF) document *Current Methodologies and Best Practices in Preparing Port Emission Inventories* (ICF, 2006). Table 5.2-8 provides the estimated emissions of criteria pollutants associated with container ships calling on the proposed terminal in the year 2025.

Several types of smaller marine vessels are used within the harbor to support port operations. These include tugboats, tow boats, push boats, and dredges. These emissions were also determined based on the ICF document (ICF, 2006). Table 5.2-8 provides estimated emissions of criteria pollutants associated with smaller marine vessels associated with the proposed terminal in the year 2025.

Emissions of criteria pollutants were estimated from diesel-powered equipment that would be operated at the Proposed Project to move cargo from the container ships to the trucks that transport cargo within and from the facility. Emission factors for estimating emissions from cargo

handling equipment were obtained from an EPA report that provides the equations and emission factors used in the NONROAD2004 Emissions Inventory Model. Table 5.2-8 provides the estimated criteria pollutant emissions estimated from wharf and container yard cargo handling equipment in the year 2025.

Emissions from the on-road vehicle traffic approaching, departing, and idling at the terminal were estimated using the MOBILE6.2 model. The MOBILE6.2 model is an EPA emission factor model that provides emission factors of criteria pollutants and several air toxic pollutants. It predicts emissions from cars and trucks under various operating conditions, and takes into account a timeline of regulatory programs effecting vehicle emission reductions and cleaner burning fuels. As stated in the *Existing Roadway Traffic Study for North Charleston Study Area* (Appendix T), according to the SCSPA, at build-out in year 2025, the proposed terminal will generate 10,920 trips per day under peak conditions and about 7,700 trips per day under average conditions. The annual emissions from these vehicles traveling offsite, based on average hourly emission rates, as well as estimates of air emissions during idling at the terminal in the year 2025 are provided in Table 5.2-8. Additionally, estimates of air toxic emissions from these vehicles are provided in Table 5.2-9.

The estimated total emissions of criteria pollutants from the Proposed Project were compared to the 2001 regional criteria pollutant emissions from permitted sources (Table 5.2-10). As described in Section 4.11, the 2001 emissions were the most recent available for permitted sources (it does not include mobile sources such as emissions from marine vessel and highway traffic), and they were used as the baseline emissions for this evaluation. Table 5.2-10 presents the estimated emissions from all sources for the Proposed Project in tons per year and as a percent of 2001 regional emissions. As shown by this comparison, the Proposed Project would result in a relatively small increase in emissions (generally less than 1 percent) as compared to the regional permitted emissions. Additionally, the increase in emissions resulting from the Proposed Project would be an even smaller fraction as compared to the total regional emissions if background mobile emissions (e.g., non-project related marine vessels and highway traffic) were included.

Table 5.2-8. Estimated Emissions from the Proposed Project in Year 2025 (tons/year).

Source	CO	NOx	PM10	PM2.5	SO2	VOC
Container Ships	166	1,312	107	99	490	141
Smaller Marine Vessels	6.35	73.13	3.97	3.82	3.53	2.17
Cargo Handling Equipment	4.53	20.92	0.80	0.78	0.40	2.81
Arterial Traffic	18.61	3.79	0.33	0.18	0.05	2.09
Freeway Traffic	56.45	13.81	0.88	0.49	0.14	3.60
Onsite Truck Idling	11.72	6.07	1.57	1.44	0.04	3.95

Source: North Wind Consulting Group, 2006.

Table 5.2-9. Estimated Air Toxic Emissions from On-Road Vehicles for the Proposed Project in Year 2025 (tons/year).

Source	1,3 Butadiene	Formaldehyde	Acetaldehyde	Acrolein	Benzene	MTBE
Arterial Traffic	0.10	1.03	0.39	0.05	0.41	0.28
Freeway Traffic	0.18	1.58	0.61	0.07	0.85	0.61
Onsite Truck Idling	0.20	2.49	0.92	0.11	0.50	0.24

Source: North Wind Consulting Group, 2006.

Table 5.2-10. Estimated Total Proposed Project Emissions and Comparison to 2001 Regional Permitted Emissions.

Estimated Emissions (tons/year)				
Pollutant	Regional Emissions 2001 (tons/year)	Proposed Project Estimated Emissions 2015 (tons/year)	Proposed Project Estimated Emissions 2020 (tons/year)	Proposed Project Estimated Emissions 2025 (tons/year)
CO	207,585	101.23	187.62	263.66
NOx	62,599	608.57	1,128.27	1,429.72
PM10	26,653	45.32	88.82	114.55
PM2.5	10,231	42.01	81.30	105.71
SO2	66,426	190.80	380.60	494.16
VOC	37,426	60.19	118.67	155.67
Estimated Emissions as a Percent of 2001 Regional Emissions				
Pollutant	**-**	**2015 (%)**	**2020 (%)**	**2025 (%)**
CO	-	0.05 %	0.09 %	0.13 %
NOx	-	0.97 %	1.80 %	2.28 %
PM10	-	0.17 %	0.33 %	0.43 %
PM2.5	-	0.41 %	0.79 %	1.03 %
SO2	-	0.29 %	0.57 %	0.74 %
VOC	-	0.16 %	0.32 %	0.42 %

Source: North Wind Consulting Group, 2006.

5.2.11.2. Evaluation of Project Impacts

Air dispersion modeling was used to predict the impact of project related emissions on the air quality of surrounding areas. By using the maximum anticipated emission rates for the Proposed Project, the results of the modeling can be used to determine if the Proposed Project, operating at capacity, will maintain the applicable air quality standards. Section 4 of the *Air Quality Report*, included as Appendix S, contains a detailed discussion of the air quality modeling and impact assessment concerning both short- and long-term air quality impacts. The dispersion modeling was separated into four distinct classifications based on the location of the receptors and the type of air quality standard (or increment) being evaluated:

- Class I NAAQS
- Class I PSD Increments
- Class II NAAQS

- Class II PSD Increments

Here, the Class I area is identified as the environmentally sensitive Cape Romain Wildlife Refuge. The Class II area is represented by the greater Charleston area.

In the *Air Quality Report*, the EPA's ISCST3 air dispersion model was used to evaluate potential air quality impacts for comparison to the NAAQS and Prevention of Significant Deterioration (PSD) increments. It should be emphasized that the Proposed Project does not require a PSD permit under federal regulation 40CFR52.21, but has agreed to perform an assessment of cumulative impacts at the request of SCDHEC and EPA. In this case, a cumulative impact assessment includes proposed onsite and offsite Project-related sources as well as existing permitted offsite sources.

The dispersion modeling input data for this study was based on the available level of design information for the build-out year 2025 to represent the facility at capacity operation. It focuses on terminal-related emissions occurring within the terminal site boundaries, and from the increase in offsite terminal-related traffic along main access roadways (primarily I-26 and I-526) and waterways in the vicinity of the terminal site. For modeling of short-term air quality impacts (i.e., averaging periods of 24-hours or less), peak hourly emission rates were used. Long-term air quality impacts (i.e., annual averaging period) were based on the port's average emission rates. In addition to the port-related emission sources, the dispersion modeling analysis also considered all other permitted air emission sources within Berkeley, Charleston, and Dorchester Counties as part of the cumulative impact analysis requested by SCDHEC and EPA..

Emissions of the criteria pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter with a diameter of 10 µm or less (PM10), particulate matter with a diameter of 2.5 µm of less (PM2.5), sulfur dioxide (SO_2), and total suspended particulates (TSP) were modeled to assess NAAQS/SCAAQS compliance. The pollutants NO_2, PM10, and SO_2 were also modeled for the PSD increment compliance assessment. Two other criteria pollutants, lead (Pb) and ozone (O3), were not included in the modeling for the following reasons. With regard to lead, emissions would only be expected from combustion of leaded gasoline, which is no longer available. Therefore, lead emissions are expected to be non-existent or negligible. With respect to ozone, modeling is generally performed at a regional scale using sophisticated photochemical dispersion models. As discussed previously, based on coordination with EPA and SCDHEC, it was determined that the quantitative evaluation of ozone for this EIS would be limited to the precursor pollutants.

Receptors

The air dispersion model predicts air quality impacts at specific locations called receptors. For this analysis, several sets of receptors were used:

- Class II Areas – A coarse-receptor grid with 500-m spacing extending from the property line out to a distance of 5 km, 1000-m spacing for distances between 5 and 10 kilometers, 2500-m spacing for distances between 10 and 15 km, and 5000-m spacing for distances between 15 and 25 km from each site used to (1) define the Significant Impact Areas and (2) identify the general location of maximum impacts for each pollutant in the NAAQS and PSD Increment analyses. This is a typical receptor grid setup for use in a first pass in dispersion modeling. Subsequent modeling was performed using fine grid receptors (see below) that focused on the areas of higher impacts identified with the coarse grid.

- Class II Areas – Fine receptor grids with 100-m spacing centered on the maximum impact locations for each pollutant, averaging period, and NAAQS or PSD Increment analysis, as determined from the coarse receptor grid analysis

- Class II Areas – Property line receptors with 50- to 100-m spacing.

- Class II Areas – Sensitive population locations (such as schools, hospitals, nearby neighborhoods or government facilities) within 5 km of the sites.

- Class I Area – For this environmentally sensitive area (i.e., Cape Romain Wildlife Refuge which is located 27.1 km to the east-northeast of the Proposed Project), dispersion modeling receptors were obtained directly from the National Park Service website http://www2.nature.nps.gov/air/maps/Receptors/index.cfm.

Figure 5.2-10 shows the general locations of sensitive population receptors within a five-kilometer radius of the Proposed Project.

Air Quality Impacts - Class I NAAQS and PSD Increment

For the NAAQS evaluation, the maximum cumulative impacts from ISCST3 were added to the maximum background concentrations before comparison to the standards. For the PSD increment evaluation, the maximum cumulative impacts from ISCST3 were compared directly to the standards (i.e., background concentrations are not applicable to PSD increments). In all cases, the modeled impacts are below the respective air quality standards. These results indicate that the Proposed Project emissions will not cause or contribute to an exceedance of the NAAQS or PSD increments within the Class I area (i.e., Cape Romain Wildlife Refuge).

Air Quality Impacts - Class II NAAQS and PSD Increment

For the NAAQS evaluation, the maximum cumulative impacts, as modeled with ISCST3, were added to the maximum background concentrations before comparison to the standards. For the PSD increment evaluation, the maximum cumulative impacts, as modeled with ISCST3, were compared directly to the standards (i.e., background concentrations are not applicable to PSD increments). For both the NAAQS and PSD analyses, the Proposed Project was predicted to be in compliance with the NAAQS and PSD increments.

It should be noted that during the cumulative impact analysis for the Class II areas only, the dispersion modeling predicted exceedences of several SO_2 air quality standards associated with existing offsite permitted emission sources. USEPA guidance on air dispersion modeling provides a method whereby the Proposed Project can still gain approval, despite the presence of modeled exceedences, by demonstrating that it does not have significant impacts at the time and location of any exceedence event. It should also be noted that an exceedence predicted by the model does not by itself indicate that an exceedence actually exists. This is especially true in an area where ambient air quality monitoring (i.e., background ambient air quality) shows that current air quality levels are in attainment with all air quality standards.

There are several reasons why dispersion modeling can predict an exceedence where one may not actually exist. A complete discussion of this is presented in the *Air Quality Report* (Appendix S) along with an explanation of modeled exceedence events and the concept of significant impact levels. In the *Air Quality Report*, it is demonstrated that the Proposed Project's contribution of SO_2 would not cause or significantly contribute to any of the identified modeled exceedence events for either the NAAQS or PSD increments in the Class II area. Therefore,

Proposed Project emissions would not cause or contribute to an exceedance of the NAAQS or PSD increments in the Class II area.

Sensitive Population NAAQS

Potential impacts of the Proposed Project to sensitive populations were also evaluated in the *Air Quality Report* (Appendix S). In this compliance evaluation, the maximum impacts based on the Class II NAAQS modeling inventory were added to the background concentrations to predict a total maximum impact. In all cases, these impacts are below the NAAQS. Therefore, the Proposed Project emissions would have minimal impact to the adjacent sensitive population receptors.

Air Toxics

EPA has recognized emissions of air toxics from mobile sources as a potential environmental and human health concern. On February 28, 2006, EPA proposed new standards that would establish new controls on gasoline passenger vehicles and gas cans to further reduce emissions of benzene and other mobile source air toxics. In May 2004, EPA had previously proposed emission standards for locomotives and marine engines; however, those standards only addressed criteria pollutants and did not apply to larger marine engines found on ocean-going vessels. EPA has not developed emission factors for estimating air toxic emissions from marine diesel engines. A review of published emission factors was conducted, but no emission factors could be identified for marine diesel engines.

EPA has developed a nation-wide inventory of air toxic emissions from mobile sources at the county level; however, the agency acknowledges that this inventory was developed using very limited speciation data. No published speciation data could be located to develop emission factors suitable for estimating emissions of specific air toxics from marine diesel engines.

EPA has an ongoing project to build a comprehensive database of all compounds emitted by mobile sources. The most recent report published as a result of this effort, *Expanding and Updating the Master List of Compounds Emitted by Mobile Sources – Phase III*, was prepared by ENVIRON International Corporation, February 2006. The recent ENVIRON work consists of a literature review of studies reporting detailed speciation of mobile source exhaust emissions. The information on marine engines in the ENVIRON report was originally published by Lloyd's Register in 1995 (*Lloyd's Register Work in Marine Based Air Pollution and Its Relationship to Other Work in the Field*). The air toxics data provided in the Lloyd's report was presented in terms of concentration rather than emission rate and could not be used to develop emission rates for specific air toxic compounds.

Although EPA has identified air toxics from large marine engines as a source of air toxic emissions, emission factors for engines of this size were not reasonably available at the time of this study.

As described previously, emissions of several air toxic pollutants from on-road vehicles were quantified using the U.S. EPA MOBILE6.2 model. Because of the very small emission factors for diesel truck engines and other mobile sources of air toxic pollutant emissions, the impact to air quality in the study area would be negligible.

Ozone NAAQS Attainment

As described in Section 5.1.11, the SCDHEC Early Action Compact study predicts a continuing reduction in ozone levels through year 2017. The predictions incorporate the effects of population and industry growth, technology changes, and national or statewide control measures that are expected to be in place. Because these projected decreases in emissions result in a predicted decrease in ozone levels and are much larger in magnitude than the projected emission increases associated with the Proposed Project, it is anticipated that the Proposed Project will not affect the Charleston and Cape Romain Wildlife Refuge areas' current attainment status for ozone.

Class I Visibility Analysis

An analysis was conducted to assess the visibility impact from the terminal emissions on the nearby Cape Romain Wildlife Refuge. This analysis was based on a Level II visibility screening using the EPA's VISCREEN model. This plume visual impact screening model is designed to determine whether the facility's plume has the potential to be perceptible to untrained observers under "reasonable worst case" conditions. The model calculates and evaluates a plume's visibility against a sky background and a terrain background using two screening criteria: a total color contrast (ΔE) value of 2.0 and a green contrast value of 0.05. If neither is exceeded for both backgrounds, then the plume is not anticipated to adversely impact visibility.

Inputs to the VISCREEN Level II screening analysis included the terminal's peak hourly emission rates, distance to the Cape Romain Class I area, standard visual range (obtained from the National Park Service), and worst-case meteorological conditions for plume visual impact calculations. The worst-case meteorological conditions were identified using the method listed in the VISCREEN User's Guide.

The VISCREEN Level II analysis predicted a maximum total color contrast (ΔE) value of 0.0608 which is less than the screening threshold of 2.0, and a maximum green contrast value of 0.005 which is less than the screening threshold of 0.05. From these results, the Proposed Project is not anticipated to have an adverse affect on visibility within the Cape Romain Wildlife Refuge. The VISCREEN model results and the determination of worst-case meteorological conditions are presented in Appendix S.

Class I Deposition

The National Park Service (NPS) and the U.S. Fish and Wildlife Service (FWS) have developed criteria for evaluating the contribution of additional nitrogen (N) or sulfur (S) to deposition within Class I areas. In particular, Deposition Analysis Thresholds (DATs) have been developed for Class I areas in response to requests by permitting authorities and permit applicants to continue to develop consistent, predictable permit review processes, and to expedite the permit review process. The NPS and FWS have determined that a total increase in deposition greater than fifty percent of natural background deposition would trigger management concerns. For eastern Class I areas, the background levels are 0.50 kg/ha/yr for nitrogen and 0.50 kg/ha/yr for sulfur. The DATs, which are approximately 2% of the background levels, identify the additional amount of deposition below which does not trigger a management concern. The DATs are basically a screening level, and do not necessarily indicate the amount that constitutes an adverse impact to the environment. For eastern Class I areas, the DAT is 0.01 kg/ha/yr for nitrogen and 0.01 kg/ha/yr for sulfur.

An analysis was conducted to assess the dry deposition of nitrogen and sulfur from the Proposed Project emissions on the nearby Cape Romain Wildlife Refuge. This analysis compared the deposition between the No-Action Alternative and the Proposed Project. The No-Action Alternative was based only on the Class I NAAQS modeling inventory that included all existing permitted emission sources for NO_2 and SO_2. The Proposed Project alternative included the Class I NAAQS inventory of existing sources plus all proposed project-related NO_2 and SO_2 emissions. The ISCST3 model was set to predict the annual dry deposition amounts of nitrogen and sulfur. The Proposed Project is predicted to increase the sulfur and nitrogen deposition in the Class I area (i.e., Cape Romain Wildlife Refuge) by 0.28 and 0.19 kg/hectare/year, respectively, which cumulatively are less than 50 percent of the background levels and less than 2 percent above current levels that result from the existing permitted sources in Berkeley, Charleston, and Dorchester Counties.

While the modeling indicates that the Proposed Project will increase deposition above the DATs, both the NPS and FWS utilize a case-by-case approach for evaluating the significance of the predicted impact. Adverse impact determinations should be considered on a case-by-case basis for modeled deposition values that are higher than the DAT. This approach considers the best scientific information available for each park or refuge to assess existing as well as potential future deposition impacts. The magnitude of the deposition that an individual source would contribute as well as the sensitivity of the ecosystem must be considered. At present there is no equation that would, in all situations, allow a Federal Land Manager (FLM) to determine whether or not a source of nitrogen or sulfur deposition would cause or contribute to an adverse impact. Therefore, FLMs must continue to use scientific data and information, in conjunction with modeling, to evaluate whether or not an adverse impact may occur. FLMs must also take into account site-specific information for each Class I area. This would include evaluating the potential deposition impacts from a source not just in relation to the DAT, but with other factors as well, such as whether adverse impacts resulting from existing deposition have been documented, or are suspected, in that specific Class I area. Also, coastal ecosystems have evolved under naturally higher sulfur deposition rates due to contribution from oceanic sources. This factor must be considered by the NPS and FWS when making the case-by-case determination as to whether sulfur deposition from a proposed source will adversely impact a Class I area containing coastal ecosystems. From this, the predicted nitrogen and sulfur deposition amounts from the Proposed Project are not likely to cause an adverse impact in the Class I area.

5.2.11.3. Summary of Air Quality Impacts

Regional air emissions associated with direct and indirect terminal activities would increase above the current levels due to construction phase emissions and operational phase emissions. Construction phase emissions would include temporary generation of fugitive dust and fuel combustion emissions during construction of the terminal and access roadway improvements. Operational phase emissions would include: emissions from container-handling yard equipment; emissions from container ships and other small marine vessels; and emissions from cars and trucks along terminal access routes and while idling on site. Altogether, these emissions would be a small fraction of the total regional emissions (generally less than 1 percent).

The *Air Quality Report* (Appendix S) completed for this EIS concluded that these emissions would cause minimal adverse impact to regional and local air quality. The results of the air quality modeling indicate that the Proposed Project emissions:

- Will not cause or contribute to an exceedance of the NAAQS or PSD increments within the Class I area (i.e., Cape Romain Wildlife Refuge);

- Will not cause or contribute to an exceedance of the NAAQS or PSD increments in the Class II area (i.e., the study area outside the Cape Romain Wildlife Refuge);

- Will not cause or contribute to an exceedance of the NAAQS for sensitive populations in the study area (the emissions will have minimal impact to the adjacent sensitive receptors);

- Will not affect the Charleston and Cape Romain Wildlife Refuge areas' current attainment status for ozone;

- Is not anticipated to have an adverse affect on visibility within the Cape Romain Wildlife Refuge; and

- Is not likely to cause an adverse impact to the Class I area as a result of nitrogen and sulfur deposition (less than a 2% increase).

5.2.12. Cultural Resources

This section discusses potential impacts from the Proposed Project on cultural resources. The Area of Potential Effect (APE) for this evaluation is shown in Figure 5.1-16. Discussions of potential impacts to existing cultural resources are separated by study area. The study areas are shown in Figures 4.12-2 through 4.12-5. These figures also show the locations of several cultural resources within their respective study areas.

5.2.12.1. Charleston Harbor Study Area

Historic Properties

Increased ship traffic related to the operation of the Proposed Project could potentially affect 10 historic properties listed on the NRHP located within the Charleston Harbor between the Proposed Project on the Cooper River and entrance to Charleston Harbor from the Atlantic Ocean. Additional vessel traffic may alter the current setting of the historic properties along Charleston Harbor, creating visual and audible impacts as well as potential degradation of the setting through shoreline erosion caused by vessel wakes. However, findings discussed in Section 5.2.19 describe the impact of ship wakes on shorelines, including those of historic properties, to be negligible.

The operation of the Proposed Project will result in more vessels being visible and audible from any of the 10 historic properties that lie along Charleston Harbor. In the case of the Old and Historic District Charleston, the Mount Pleasant Historic District, and Magnolia Cemetery, these vessels will travel through the ship channel that lies 3,000-6,000 feet away. Industrial and existing maritime facilities currently separate the Old and Historic District Charleston from the ship channel. Additional vessels in the navigation channel will not alter the existing setting of the District to such an extent that the feeling or character of the District will be affected. In addition, Charleston was one of the most active seaports of the colonial and antebellum periods, and owes much of its growth throughout its past to its port facilities. Thus, the continued use of Charleston Harbor as a maritime facility does not affect the setting of the District.

Similarly, extensive marshes and industrial facilities separate most of Magnolia Cemetery from the Cooper River. Increased ship traffic in the Cooper River channel will not alter the setting of the cemetery to such an extent that its historic character is degraded. The Mount Pleasant Historic District lies over 6,000 feet from the main navigation channel. Small islands and shallow flats lie between the District and the channel. Similar to the Charleston District, the relationship of the Mount Pleasant District to the Harbor and view sheds from the District to the Harbor will not be altered. Thus, increased shipping will not affect Magnolia Cemetery and the Mount Pleasant Historic District.

The setting and condition of the four warships at Patriot's Point Maritime Museum will not be altered by increased ship traffic in Charleston Harbor. The vessels themselves provide the setting of their associations. None has a specific connection to Charleston Harbor, nor will the relationship of the vessels to the Harbor be altered. Thus, increased shipping in Charleston Harbor will not affect the four warships.

Fort Sumter, Fort Moultrie, and Castle Pinckney are located 1,500-3,000 feet from main navigation channel into Charleston Harbor. Every day, vessels call on terminals in Charleston Harbor. Increased ship traffic will not alter the setting of these forts to the Harbor or the Harbor entrance. View sheds from the forts to each other and to other elements of the Harbor will not be altered. Castle Pinckney is not currently available for visitors. However, Forts Sumter and Moultrie are both owned and operated by the National Park Service and receive hundreds of visitors each day. While the presence of a large ship in the channel may detract from a visitor's experience during a visit to either fortification, vessels seldom require more than a few minutes to pass either one. The limited imposition of cargo vessels likely will not alter a visitor's experience to such an extent that the historical character of Fort Sumter or Fort Moultrie cannot be visualized or understood. Thus, increased shipping associated with the operation of the proposed Marine Container Terminal will not affect Fort Sumter, Fort Moultrie, or Castle Pinckney adversely.

In summary, construction and operation activities associated with the Proposed Project will not have an effect on any known historic properties in the Charleston Harbor study area.

Archaeological Resources

As mentioned in Section 4.12.3, numerous terrestrial and underwater archaeological resources exist in the Charleston Harbor study area. None have been identified within the Federal Navigation Channel or in an area that could be impacted by potential vessel wakes from container ships. Therefore, the Proposed Project would not affect archaeological resources within this area.

5.2.12.2. North Charleston Study Area

Historic Properties

Based on the current design of the proposed terminal, construction may affect two potentially eligible historic properties: Buildings 1303, and 1310. These properties stand 800 feet north of the footprint of the Proposed Project. There are other buildings between the Proposed Project and these potentially eligible historic properties, including mixed use facilities (i.e., administrative, commercial, and industrial). As such, the construction and maintenance of the Proposed Project will not alter the present setting or condition of Buildings 1303 and 1310.

Historic properties near the Proposed Project are separated from the footprint of the terminal by an existing port facility and/or commercial and industrial facilities that presently exist on the

CNC. Thus, the construction and operation of the Proposed Project will not alter the setting or condition of these historic properties. Therefore, the construction and operation of the Proposed Project will not affect any of the known historic properties that lie within one mile of the project site.

Archaeological Resources

The one archaeological resource identified within the North Charleston study area is located on the CNC 1.9 miles northwest of Proposed Project. This resource would not likely be impacted by the development of the Proposed Project.

5.2.12.3. Daniel Island Study Area

Historic Properties

As mentioned in Section 4.12.3.3, there are no historic properties listed on the NRHP that are located in the Daniel Island study area. Therefore, the Proposed Project would not affect historic properties within this area.

Archaeological Resources

It is not likely that the Proposed Project would have any adverse impact on archaeological resources located in the Daniel Island study area.

5.2.12.4. Clouter Island Study Area

Historic Properties

As mentioned in Section 4.12.3.4, there are no historic properties listed on the NRHP that are located in the Clouter Island study area. Therefore, the Proposed Project would not affect historic properties within this area.

Archaeological Resources

It is not likely that the Proposed Project will have any adverse impact on archaeological resources located in the Clouter Island study area.

5.2.12.5. Summary of Cultural Resources Impacts

In summary, the Proposed Project would have no effect on historic or potentially historic properties or archaeological resources within the Area of Potential Effect (APE).

5.2.13. Section 4(f) Properties, Section 6(f) Properties, and Other Recreational Facilities

This section discusses potential impacts from the Proposed Project on potential Section 4(f) properties, Section 6(f) lands, and other recreational facilities within the study area depicted in Figure 5.1-17.

5.2.13.1. Section 4(f) Properties

Twenty-four potential Section 4(f) properties were identified in the study area and described in Section 4.13.2. In keeping with Section 4(f) which requires "…that special effort be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites" the analysis of impacts focus primarily on visual and aesthetic concerns, although noise impacts are also considered. In this case, the Proposed

Project, including the proposed access roadway, would have minimal noise impacts on the identified Section 4(f) properties since they are already affected by noise from nearby roads (local and interstate), rail, and adjacent industrial and commercial sites. Other potential impacts to Section 4(f) properties are discussed in the following paragraphs.

The Cooper River Marina is located within 1,000 feet of the Proposed Project site. Although the marina is not located in a pristine site, the view upriver from the Cooper River Marina for approximately 4,200 feet is of largely undeveloped land. The FLETC compound is visible in the distance. The Proposed Project would substantially change the upriver view from the marina and adverse noise impacts would be a potential concern. Also, the access road for the Cooper River Marina would require relocation from its existing alignment, but no land would be acquired from the Charleston County Parks and Recreation Commission.

Numerous Section 4(f) properties are situated along the shoreline of the Charleston Harbor and its tributaries, including the Charleston Waterfront Park, White Point Gardens, Charleston Maritime Center, South Carolina Aquarium, Fort Sumter National Monument, Fort Moultrie National Monument, Patriots Point Naval and Maritime Museum, Alhambra Hall, Charleston Harbor Marina, Remleys Point Boat Ramp, Mount Pleasant Memorial Park (under construction), and Charleston Regional Park. These properties would be indirectly affected by increased container vessel traffic navigating to the proposed terminal. However, a part of the current Charleston Harbor waterfront experience involves viewing maritime activity, and the increase in vessel traffic would be in keeping with this experience.

5.2.13.2. Section 6(f) Properties

Remleys Point Boat Ramp and Charleston Waterfront Park are both Section 6(f) properties. However, these properties would not be converted from their current recreational uses as a result of the Proposed Project.

5.2.13.3. Other Recreational Facilities

It is not likely that the Proposed Project would cause a significant increase in regional population through the creation of employment opportunities related to increased port activity. However, the region is experiencing substantial population growth under existing conditions, and recreational facilities will have to be increased in order to keep up with future demands, even without the Proposed Project.

As the region's population continues to grow, additional recreational boat traffic will increase on the area waterways. The Proposed Project would cause an increase in large ocean-going vessel and tugboat traffic within Charleston Harbor and, as a result, increase the possibility of close quarter or collision situations, especially during the peak boating times. During the recreational shrimp-baiting season (mid-September through mid-November) large numbers of recreational shrimpers work the shallow waters adjacent to the navigation channel especially in the areas southwest of Crab Bank and west of Patriots Point Naval Museum.

Further inland, Rosemont Field is a proposed baseball park facility that, once completed, will be considered a district park for the City of Charleston. Rosemont Field would be impacted by interstate ramps to I-26. However, this park should still be able to function upon completion of the proposed access roadway.

5.2.13.4. Summary of Impacts to Section 4(f) Properties, Section 6(f) Properties, and Other Recreational Facilities

The Proposed Project would have minor adverse impacts on Section 4(f) properties, Section 6(f) Properties, and other recreational facilities. The proposed terminal may potentially impact the Cooper River Marina, a Section 4(f) property, inasmuch as the upriver view from the marina would change substantially. Noise levels at the marina would also increase as a result of the development of the proposed terminal.

The proposed access roadway would not directly impact any Section 4(f) or Section 6(f) properties or any other recreational facilities. However, the roadway will be located adjacent to Park South Recreation Center and Rosemont Field.

5.2.14. Hazardous Waste and Materials

5.2.14.1. Site Contamination

This section assesses the potential impacts to contaminated sites within and adjacent to the Proposed Project footprint, including the proposed access roadway. The following discussions focus on the North Charleston study area, which is illustrated in Figure 5.1-18. Contaminated sites near the CNC are shown in Figure 5.2-11.

Site Remediation

The Hazardous and Solid Waste Amendments (HSWA) portion of the Resource Conservation and Recovery Act (RCRA) Part B permit (SCO 170 022 650) requires the environmental investigation and remediation of identified SWMUs and AOCs onboard the CNC. The purpose of the investigation is to evaluate the nature and extent of hazardous wastes or constituents, and to identify, develop, and implement an appropriate corrective measure or measures to protect human health and the environment. The U.S. Navy is the responsible party for implementing the corrective measures for selected sites. The U.S. Navy is conducting the remaining investigations and remediation at the CNC with state and federal regulatory oversight.

The RCRA permit status of SWMUs and AOCs within and adjacent to the Proposed Project footprint is summarized in Section 4.14 (Table 4.14-1). At this time, SWMU 17 is the only RCRA site close to the Proposed Project that will need active remediation to achieve NFA status. SWMU 17, located adjacent to the northern boundary of the Proposed Project footprint, has No. 5 fuel oil, chlorobenzenes, and PCB contamination in soil and groundwater that will require several years for the necessary remediation to be completed prior to obtaining NFA status.

If subsurface soil contamination were encountered during construction and associated excavation and earthwork, it would be removed and disposed of in accordance with applicable State and Federal regulations.

The proposed access roadway would cross two previously remediated soil contamination sites on the Macalloy Superfund site. Remediation of contaminated soils was completed from land surface to a depth of approximately five feet (i.e., the top of the surficial aquifer). The roadway would also cross an area of groundwater contamination (primarily hexavalent chromium). Engineering controls may be required when installing support pilings, so as to reduce the possibility of contaminated groundwater in the upper surficial aquifer cross-contaminating the lower zone. Neither the upper or lower surficial aquifer zones are used as potable water sources; however, SCDHEC water quality regulations classify all groundwaters of the State as potential potable sources.

Land Disturbance

The potential for contaminant releases from soil and groundwater during construction activities was evaluated by comparing constituent concentrations to OSHA permissible exposure concentrations. All constituents detected in groundwater and/or soils in the Proposed Project area were identified. The published OSHA permissible exposure limits (PEL) for each of these constituents were identified. The PEL (mg/m^3) was then used to calculate an equivalent inhalation reference dose of milligrams per kilograms per day (mg/kg/d). The equivalent reference dose was then used to back-calculate a media concentration that could produce constituent vapors that would exceed the PEL for that constituent at single point locations.

Soil contaminant concentrations detected within the proposed terminal area do not exceed the media concentrations that could lead to inhalation of vapors that would exceed the PEL. However, it should be noted that it is possible for vapors heavier than air to accumulate in trenching areas or enclosed spaces.

The potential for human and environmental health risks from various potentially contaminated media are discussed in the following paragraphs.

With the exception of Zone E and the SWMU 9 landfill (Zone E and SWMU 9 are located outside the terminal footprint), the investigations at the CNC had surface soil chemical data comparable to EPA Region IV Residential Risk Based Concentrations (RBCs). Based on the available information at the time of the evaluation, any contamination that exceeded the residential RBC has been remediated. Therefore, the surface soil and sediment within the proposed terminal boundary are not expected to be a threat to human health. The Navy currently has a dig permit process in place to prevent the unauthorized installation of monitoring wells and land disturbance, although SCDHEC has not yet formalized the process.

Future exposures to contaminated soils are a relatively low probability given that most of the proposed terminal site would be covered with clean fill to achieve the required land surface elevation. However, monitoring of potential airborne contaminants would likely be an OSHA requirement when excavating in or near to known SWMU/AOCs.

As part of the pre-construction surcharging, shallow groundwater would be collected in drainage wicks and directed to outfalls. There is a potential for contaminated groundwater to enter the subsurface drainage system and be discharged through the outfalls. Therefore, SCDHEC may require monitoring and other management measures.

As mentioned previously, the proposed access roadway would traverse an area of groundwater contamination at the Macalloy site. Engineering controls may be required when installing support pilings to reduce the possibility of contaminated groundwater in the upper surficial aquifer cross-contaminating the lower zone.

Surface water sampling and analysis conducted as part of the RFI at various SWMUs/AOCs throughout the CNC has not reported concentrations of hazardous constituents above the relevant human health action levels. Therefore, surface water at CNC does not pose a threat to human health.

Releases to air from soil, groundwater, sediments and/or surface water contaminated by SWMUs/AOCs at the CNC are not known to have occurred or be occurring above relevant action levels. Consequently, the proposed terminal is not expected to cause an adverse impact from releases of airborne contaminants.

The contaminants at the Macalloy site are primarily metallic compounds and would be unlikely to volatilize into the air. However, fugitive dust containing elevated concentrations of hexavalent chromium could potentially be released during the construction of the proposed access roadway.

5.2.14.2. Handling of Hazardous Materials

SCSPA indicated that during July 2005, less than 5 percent of the Port of Charleston's containerized cargo contained some amount of hazardous material (the SCSPA indicated that such a percentage was typical); the number of containers with some amount of hazardous material is relatively constant. Based on this information, it is assumed that the Proposed Project would similarly handle containerized hazardous materials.

5.2.14.3. Oil and Hazardous Materials Spill Response

The proposed facility would be expected to store small quantities of petroleum-based lubricants, diesel fuel, and possibly gasoline onsite. It should be noted that no bulk storage or pipeline facilities handling hazardous materials are included in the Proposed Project. Storage of small quantities of hazardous materials would be in accordance with all applicable SCDHEC regulations. The SCSPA Spill Prevention, Control, and Countermeasures (SPCC) Plan would be updated to address additional fuel and lubricants storage. A SPCC Plan would be maintained onsite at the proposed terminal facility.

Approximately 5 percent of containers that would be handled at the proposed terminal facility and transported on local roads and railways would contain some quantity of hazardous materials. The U.S. Department of Transportation regulates shipment and handling of hazardous materials in transit; those regulations are codified at 49 CFR 171 and 172. Hazardous materials arriving at or departing from the proposed terminal facility would be handled in accordance with those and other Federal, State, and local regulations.

OSHA regulations address worker safety and exposure reduction requirements when handling hazardous materials. The applicable OSHA regulations are codified at 29 CFR 1910; workers and others who would come in contact with hazardous materials would receive the required initial 40-hour health and safety training as well as annual 8-hour refresher training.

The Area Contingency Plan would be followed in the event of petroleum and/or hazardous material spills on the water. The U.S. Coast Guard Base Charleston would need to increase staffing and equipment as necessary to meet the increased probability of spills associated with the increased number of vessel calls.

The proposed facility would handle exclusively containerized cargo; no bulk oil or other bulk liquid hazardous material would be handled by the facility. Nevertheless, incidental spills and/or releases of potentially hazardous material invariably occur in association with maritime shipping and handling. Such incidents would be handled by local response contractors having the necessary equipment, staff, and expertise as necessary to contain and control the spill or release.

Large scale spills and releases (typically defined as 10,000 gallons or more) are less predictable and difficult to quantify. Such spill or releases are often associated with catastrophic accident such as the 12,500-gallon oil spill from the M/V Ever Reach in October 2002. This spill occurred as the result of breach of a fuel tank when the M/V Ever Reach struck a submerged dredge

discharge pipeline. With an increase in vessel calls and attendant activities, the risk of large-scale spills would increase.

Non-accidental discharges (pollution incidents) accounted for about 50 percent of all oil spilled by vessels in US Waters; groundings were the leading cause of accidental in-water spills during the period of record.

5.2.14.4. Summary of Hazardous Waste and Materials Impacts

In summary, the design and construction of the proposed terminal would have to consider the locations of SWMUS and AOCs within the project footprint and the degree of contaminant concentrations. The proposed access roadway would traverse two previously remediated soil contamination sites on the Macalloy Superfund site as well as one area of groundwater contamination. Engineering controls may be required when installing support pilings to reduce the possibility of contaminated groundwater in the upper surficial aquifer cross-contaminating the lower zone.

The Proposed Project would handle a relatively small percentage (typically less than 5 percent) of total containers that contain some amount of hazardous materials. With the increase in throughput generated by the Proposed Project, it is likely that there will be some incremental increase in the risk of spills.

5.2.15. Water Resources

This section summarizes the potential impacts the Proposed Project may have on the water resources environment. This includes groundwater resources, stormwater runoff, and surface waters (e.g., lakes, streams, etc.). The study area with respect to water resources includes the surface waters of the Charleston Harbor Estuary extending from the Atlantic Ocean through the harbor, up the Cooper River to the confluence with the Back River, as well as the groundwater resources underlying the Tri-County area (shown in Figure 5.1-19).

5.2.15.1. Groundwater Resources

This section discusses potential impacts to groundwater as a resource. Impacts with regard to groundwater contamination issues are addressed separately under the site contamination section (Section 5.2.14.1).

No major permanent groundwater resource impacts from the construction and operation of the Proposed Project should occur. The construction of the facility would increase the impervious areas at the site and reduce local infiltration and recharge of the surficial aquifer. However, there are no groundwater wells utilizing underlying aquifers for potable water at the CNC or nearby areas.

The Proposed Project facility would utilize treated municipal surface water resources from the CWS during construction and operation of the facility. Therefore, the construction and operation of the Proposed Project would not create increased demands on groundwater resources.

The top of the Cooper Formation confining unit, which separates the surficial aquifer from the Santee Limestone/Black Mingo aquifer, lies between the approximate elevations of -10 and -60 ft–MSL, with thickness varying from approximately 200 to 260 feet. Proposed dredging of the berth and access area would occur at elevations between -45 and -50 ft-MSL. Therefore, dredging operations would be contained within or above the Cooper Formation confining unit and not encroach into the underlying Santee Limestone/Black Mingo aquifer.

5.2.15.2. Stormwater Runoff

The proposed terminal would result in the filling and paving of upland, intertidal and subaqueous areas, as shown by Figure 3.2-2, thereby increasing stormwater runoff quantity and non-point source (NPS) pollutant loads. It is expected that the trucks and operating equipment at the facility would contribute a variety of materials that may impact stormwater runoff quality. Harper (1998) lists common constituents generated by motor vehicles, including fuels, lubricants, particles from tires or brake lining, exhaust emissions that collect on the roadway surface, corrosion products, and parts that fall from vehicles during operation. Although the actual quantity of material generated by the operation of motor vehicles is relatively small, the pollution potential over time is a concern since some of the contaminants are toxic to aquatic life. Motor vehicles have been found to be the principle nonpoint source contributor of asbestos and many heavy metals including lead, zinc and copper to stormwater. However, not all the pollutants generated by motor vehicles during rain events originate with the vehicle itself. A large portion of the pollutant loading consists of organics, nutrients and suspended solids that have become attached to the vehicle surface or underside and are washed onto the roadway surface by rain or splashing from street runoff.

Change in the permeability of the land at the site may alter the quantity and flow of stormwater runoff. At the existing site, the stormwater runoff is generally controlled by permeating through soils, draining to wetlands, or directed into catch basins and discharged at outfalls into Shipyard Creek or the Cooper River. The proposed terminal would replace some permeable areas (e.g., wetland, wooded, and dredged disposal vegetative cover types) with impermeable areas; therefore, the quantity of stormwater runoff is expected to increase.

The Non-Point Source Loading Analysis Model (NPSLAM) numerical model was used to evaluate the impacts of the proposed terminal on stormwater pollutant loads. This model estimates the unit loadings, or the unit mass of a given pollutant (in pounds, per acre, per year), for individual drainage basins and the total loading (i.e., mass of pollutant in pounds, per acre, per year) for individual basins using the constant concentration concept (ASE/WEF, 1992 and 1998).

It should be noted that the NPSLAM analysis was completed based on the conceptual terminal layout presented in the January 2005 amendment to the SCSPA permit application (Appendix C). The September 2005 amendment to the conceptual terminal layout includes an additional 510 feet of wharf structure, and small changes to other upland areas. This would result in only small changes to the stormwater calculations, and therefore, the stormwater calculations presented in this section (based on the January 2005 amendment) are sufficient to evaluate project impacts.

The pre-development land use is input to the model as 71 percent “open space” and 29 percent “commercial.” Post-development land use for high traffic areas of the port facility are characterized as “highway” in the model, which is the most appropriate land use for which unit loadings are available in literature. Since the truck and machinery traffic is limited to only a portion of the container yard, this equates to about 52 percent of the total area. The remainder of the area is buildings and container storage, which is characterized as “commercial,” and a 25-acre stormwater management facility characterized as “open.” Additionally, the total acreage of area at the site increases as a result of the construction into the river.

The results of the stormwater quality evaluation indicate that pollutant runoff prior to treatment would increase once the proposed marine container terminal is constructed (Table 5.2-11). There are two reasons for this increase: (1) the proposed terminal will increase the amount of

impervious area, thereby increasing the volume of stormwater runoff, and (2) the proposed terminal will change much of the land use cover from undeveloped open areas to paved areas (characterized as “commercial” and “highway” for the model).

It should be noted that these stormwater calculations are based on a conservative approach to estimate potential stormwater pollutant loads and they are based on a conceptual site layout. Further stormwater quality evaluations may be required after a more detailed design is completed.

Table 5.2-11. Pre- and Post-Development Stormwater Loads for the Proposed Terminal (Prior to Stormwater Management Ponds).

	PRE-DEVELOPMENT Loading Concentration		POST-DEVELOPMENT Loading Concentration		Change in Loading	
Parameter of Concern	lbs/acre/yr	lbs/yr	lbs/acre/yr	lbs/yr	lb/yr	Percent
BOD	2.61E+01	5.21E+03	7.28E+01	1.88E+04	1.36E+04	260
TSS	1.35E+02	2.70E+04	6.59E+02	1.70E+05	1.43E+05	529
TP	7.67E-01	1.53E+02	1.98E+00	5.10E+02	3.56E+02	233
TN	3.56E+00	7.12E+02	1.49E+01	3.85E+03	3.13E+03	440
Lead	4.41E-02	8.81E+00	1.85E-01	4.76E+01	3.88E+01	440
Arsenic	8.94E-03	1.79E+00	1.96E-02	5.05E+00	3.27E+00	183
Copper	4.23E-02	8.46E+00	2.35E-01	6.06E+01	5.22E+01	617
Zinc	3.15E-01	6.29E+01	1.49E+00	3.83E+02	3.20E+02	509
Cadmium	2.17E-03	4.33E-01	8.00E-03	2.06E+00	1.63E+00	376
Chromium	1.72E-02	3.44E+00	6.16E-02	1.59E+01	1.24E+01	362
Oil & Grease	9.75E+00	1.95E+03	5.58E+01	1.44E+04	1.24E+04	639

Stormwater Management at the Proposed Project

For the proposed terminal, the stormwater from the support area, container yard, wharf, and Tidewater Road would be collected by a network of pipes and inlets and routed into a dry detention stormwater treatment pond constructed along the south side of the terminal. A total of 25 acres are allocated along the south side of the terminal for stormwater management. The stormwater runoff would be detained as proposed by the SCSPA before being released into Shipyard Creek through a series of controlled outfall structures.

The SCSPA has indicated that the pond would be constructed during the early stages of site development and would be an integral part of the stormwater and erosion control plan during construction of the container yard and support area. It is expected that the construction contractor would use the pond as a sediment basin during construction. Temporary diversion ditches will also be used during construction along the property boundary to divert runoff to the sediment basin. Silt fencing and additional sediment basins will also be used where needed.

It is estimated that the controlling elevation in the pond (maximum water surface elevation) would be between 13 ft MLW (mean low water) and 15 ft MLW. The average pond depth would be approximately 6 ft to 8 ft. As a minimum, the pond would be designed to store and release the first 0.5 inch of runoff from the site over a 24-hour period. As a minimum, the pond would be designed for a sediment removal efficiency of 80 percent suspended solids or 0.5 ml/l peak settable solids concentration. The design storm event shall be the 10-year, 24-hour storm event.

No plant types are anticipated to be used for the design of the stormwater control pond. Debris control is anticipated to be handled by trash racks and routine maintenance.

Pollutant Removal Efficiencies

The detention pond would reduce the amount of pollutant(s) entering receiving waters. A dry detention pond is a BMP designed to increase detention times to provide treatment for the captured first flush of stormwater runoff. This detainment works to enhance the settlement of solids and particulate pollutants. The detained runoff is drawn down through a control structure at a rate that is slow enough to achieve efficient pollutant removal via sedimentation. The detention pond would likely be wet much of the time; however, the SCSPA would allow the pond to dry. For the purposes of this evaluation, it is assumed that the pond would be dry, which overall, gives more conservative (i.e., lower) pollutant removal efficiencies. The anticipated percent removal efficiencies of a dry detention pond for typical pollutants associated with stormwater are presented in Table 5.2-12. A range of removal efficiencies is presented based on literature searches of laboratory and field measurements of BMP efficiencies (Beaufort County Department of Public Works, 2003). Removal efficiencies were not available for arsenic, chromium or oil and grease; however, some of these constituents would be removed by the detention pond. Oils and greases can be effectively retained in stormwater management systems by using oil skimmers at the discharge weir (Harper, 1998), or other stormwater system BMPs designed to reduce oil and grease concentrations (oil/water separators, hydrodynamic systems or catch basins). This analysis assumes no reduction of oil and grease loads from BMPs, but if skimmers are employed, then the loads are expected to be substantially less.

Table 5.2-12. Percent Removal Efficiencies for Dry Detention.

Parameter of Concern	Percent Removal Efficiency (Range)	
	Low	High
BOD	20%	30%
TSS	80%	90%
TP	20%	30%
TN	10%	20%
Lead	70%	80%
Copper	50%	60%
Zinc	40%	50%
Cadmium	70%	80%

Source: Beaufort County Department of Public Works, Manual for Stormwater BMPs (2003).

Other BMPs, if employed, could further reduce the pollution loading of the stormwater. For example, wet detention can result in greater removal efficiencies for some constituents. Also, weekly street sweeping can also reduce the pollution load by 10 percent.

Assuming that the stormwater pond would achieve at least the low end of the range of removal efficiencies, the pollutant loads to Shipyard Creek were calculated in Table 5.2-13.

Table 5.2-13. Post-Development Stormwater Pollutant Loads for the Proposed Terminal.

Parameter of Concern	Post-Development Loading Concentration		After Stormwater Pond		Change from Pre-development
	lb/acre/yr	lb/yr	lb/yr	lb/yr	Percent
BOD	7.28E+01	1.88E+04	5.83E+01	1.50E+04	188%
TSS	6.59E+02	1.70E+05	1.32E+02	3.40E+04	26%
TP	1.98E+00	5.10E+02	1.58E+00	4.08E+02	166%
TN	1.49E+01	3.85E+03	1.34E+01	3.46E+03	386%
Lead	1.85E-01	4.76E+01	5.54E-02	1.43E+01	62%
Arsenic	1.96E-02	5.05E+00	<1.96E-02	<5.05E+00	<183%
Copper	2.35E-01	6.06E+01	1.18E-01	3.03E+01	258%
Zinc	1.49E+00	3.83E+02	8.92E-01	2.30E+02	265%
Cadmium	8.00E-03	2.06E+00	2.40E-03	6.19E-01	43%
Chromium	6.16E-02	1.59E+01	<6.16E-02	<1.59E+01	<362%
Oil & Grease	5.58E+01	1.44E+04	<5.58E+01	<1.44E+04	<639%

Stormwater from the Proposed Roadway

As described in the ARFS (Appendix W), stormwater from all interchange ramps and elevated roadways would be collected by a scupper drainage system. Stormwater from the other parts of the roadway would be collected by open ditch systems and closed conduit systems. The roadway would require the construction of stormwater detention facilities to avoid significant increase in the peak discharge rate to the receiving watercourses.

The roadway is expected to increase pollution loads somewhat (heavy metals, oils and greases, in particular) because some open areas would be converted to highway. Detention basins, grassed drainage swales (for sections of the roadway at grade), or other BMPs may be used to attenuate stormwater pollution from the access roadway. Therefore, the impact of stormwater runoff to water quality in receiving waters would be minimal.

Short-term impacts on surface water quality in the vicinity of the proposed roadway would be potential sediment-laden run-off and siltation during construction. This impact would be minimized by implementation of BMPs to control non-point source pollution from erosion and sediment transport. Specific BMPs would be developed during project design and in coordination with Federal and state agencies. No substantial permanent deleterious effect on water quality from siltation is expected. Disturbed areas would likely be restored to a grade similar to that existing prior to construction and protected to prevent erosion after construction.

There are two existing pond areas that would require analysis during the design phase. They are located within the Macalloy site and Montenay incinerator area.

5.2.15.3. Surface Waters

The surface waters potentially affected by the Proposed Project include Shipyard Creek and the Lower Cooper River. As described in the previous subsection, stormwater discharges would cause minimal impacts to surface waters. Other potential impacts to surface waters include changes to tides, currents, salinity, water quality and sedimentation. A hydrodynamic, salinity and sedimentation computer model was applied to predict the changes to the surface waters (described in detail in Appendix Y).

It should be noted that the Proposed Project described in the computer model study is based on the conceptual terminal layout presented in the September 2005 amendment to the SCSPA permit application (Appendix C). The Option B alternative in the model study report is the same as the Proposed Project for this final EIS, as described by the September 29, 2006 amendment to the SCSPA permit application.

The project impacts to tides, currents, salinity and water quality are discussed in the following subsections. Impacts to sedimentation patterns are discussed in the section on dredging (Section 5.2.16.1).

Tides, Currents and Flows

The Lower Cooper River would be affected by the dredging and filling of the river associated with the construction of the project. The berth and access area would be dredged and deepened, as shown in Figure 3.2-2. The container yard and wharf structure will extend approximately 1,000 feet into the Cooper River as shown in Figure 3.2-2. Behind the pile-supported wharf, a rock dike and sheet pile wall will be constructed to retain the backfilled terminal area.

The numerical model was used to quantify the changes in flows and current patterns caused by the changes to the river geometry. The results indicate that the Proposed Project would cause a localized reduction in current velocities near the terminal site. Currents in the vicinity of the berth and access area would be slightly reduced. However, the project would not cause any major changes to currents in areas upstream or downstream from the project site. The project would not substantially affect currents near Cooper River Marina, and the project would not cause any substantial changes in tidal elevations in the Lower Cooper River.

Shipyard Creek would be crossed by the proposed roadway. However, the road will be elevated over the creek, and it would not alter the geometry or flows of the creek; therefore, it would not result in any impacts to surface water, tides, or currents.

In-stream Water Quality

This section evaluates the potential surface water quality impacts caused by the Proposed Project. Specifically, the potential impacts to in-stream salinity, dissolved oxygen (DO), biochemical oxygen demand (BOD), nutrients, fecal coliform, suspended sediments, and heavy metals are discussed. This section also addresses potential changes to specific pollution sources, such as ship bilge water, accidental spills and container wash wastewater. Potential ballast water impacts with regard to invasive species are addressed in the natural resources section (Section 5.2.17.6).

Salinity

A hydrodynamic, salinity and sedimentation computer model was utilized to evaluate the project related changes to hydrodynamics, salinity and sedimentation. The model setup, calibration and results are presented in detail in Appendix Y. It should be noted that the hydrodynamic model is too coarse to accurately simulate such small-scale flows as the proposed water jet sedimentation control system. However, the water jet system will have only a localized impact to hydrodynamics (i.e., within 200 ft of the wharf). The water jet system may cause some small increase in vertical mixing along the berth area, thereby decreasing the estimated project impacts to vertical stratification, dissolved oxygen and salinity increase at the project site. Therefore, in regard to salinity, it is conservative to not include the water jet system in the estimation of project impacts.

The model results show that the project construction would cause localized changes in salinity concentrations. The results show that for the Proposed Project, the bottom salinity in the areas dredged to create the berth and access area would be up to about 5.1 ppt higher than the bottom salinity in the existing shallower waters. This increase is related to the fact that salt water is denser than fresh water, and the existing depths at the berth location are much shallower than the post-project depths. For the post-project conditions, the higher salinity (and, therefore, more dense) bottom water in the navigation channel would spread out into the berth and access area, thereby increasing the salinity (as compared to the existing conditions). Therefore, this change (5.1 ppt) is not really a change to existing water column salinity, but instead, it is the creation of additional water column in which the bottom salinity would be similar to that in the existing navigation channel. Project changes to adjacent areas that would not be deepened are 1.9 ppt or less.

The changes in salinity are mostly limited to the immediate project site, and the Proposed Project would not cause major changes to salinity upstream and downstream of the project site. Based on simulated 50th percentile salinities along the navigation channel in the Lower Cooper River, increases in salinity along the navigation channel would not exceed 0.3 ppt. Changes of 0.1 ppt or more are limited to within 15 miles of the project site.

The Proposed Project would not affect the salinity alerts for the Bushy Park Reservoir. The farthest downstream station monitored for salinity as part of the alert system is Dean Hall (USGS gage 02172050, about 25 miles upstream from the Proposed Project site). A specific conductance of 1,550 µmho/cm (equivalent to a salinity of 0.78 ppt) at the Dean Hall gage will trigger a Level 1 salinity alert. The results show zero change in 90th percentile salinity at Dean Hall, which indicates that the project would not cause any increase in salinity intrusion events that affect the Bushy Park Reservoir, and it would not affect the frequency of salinity alerts under normal conditions.

Dissolved Oxygen

The Proposed Project can potentially affect in-stream DO in four ways: (1) the physical changes to the river geometry can affect the reaeration of the water column by changing depth and current speed, (2) the changes in pollutant loading can increase the BOD and thereby decrease the DO concentration, (3) change in salinity concentration causes change in DO saturation concentration, and (4) change in circulation patterns can affect the residence time of BOD in the river. In order to quantify the potential impacts to DO, the 3-D model developed for the Charleston Harbor TMDL was used to simulate the changes in DO concentration caused by the Proposed Project. The model input conditions and results are provided in detail in Appendix AA. The model study presents multiple time- and spatial averaging representations of the model results. Time averaging includes 3-month averages (June through August, 2004) and daily averages. Spatially, model output from the bottom layer and depth averaged values were analyzed for several different horizontal averaging areas: Segment 1 extends from Daniel Island to Patriots Point; Segment 2 includes the Cooper River just downstream of Shipyard Creek to Goose Creek; Segment 3 consists of the four deepened cells in the proposed berth and access area; Segment 4 represents the near field area around the proposed deepening (Daniel Island Bend to the Shipyard Creek entrance); and Segment 5 represents Shipyard Creek. Additionally, simulation results for three dam flow conditions are presented: 3010, 5000, and 6000 cfs.

Three-month averaged DO impacts:

The model results show that the Proposed Project would cause both increases and decreases in DO concentrations in the study area. The greatest adverse impacts are predicted to occur in

the local area around the berth and access area. The results also indicate that the greatest impacts occur during periods of low dam flow conditions.

The DO model results indicate that the three-month volume-averaged change in DO indicate that very minimal impacts (less than 0.1 mg/L) would occur as a result of the Proposed Project. For the simulated range of dam flow conditions over the three-month period, the depth averaged DO is predicted to decrease by 0.004 to 0.015 mg/l in Segment 1, but increase by 0.009 to 0.025 mg/l in Segment 2. For the existing conditions, Segment 2 represents the critical area (i.e., the lowest DO concentrations) in the Lower Cooper River. The existing DO concentrations are lower in Segment 2 than in Segment 1, and therefore, the overall large-scale three-month average DO conditions in the harbor are not adversely impacted by the Proposed Project.

Segment 4 represents a smaller area extending just upstream and downstream of the Proposed Project. For the simulated range of dam flow conditions, the Proposed Project would increase Segment 4 depth averaged DO by 0.00 to 0.014 mg/l. Therefore, the overall three-month average DO conditions in this reach of the river would not be adversely impacted by the Proposed Project.

Segment 3 represents the deepened areas only and presents the smallest spatial scale estimate of the project impacts. For the simulated range of dam flow conditions, the Proposed Project would decrease Segment 3 depth averaged DO by 0.015 to 0.077 mg/l. It should be noted that these values represent not only DO change to the existing water column, but additional “new” water at the river bottom where the berth and access area would be excavated. Therefore, the Proposed Project would cause localized decreases to the three-month average DO conditions in the berth and access area.

Maximum daily-averaged DO impacts:

For the simulated range of dam flow conditions over the three-month period, the maximum daily-averaged predicted impacts to depth-averaged DO are -0.025 to -0.032 mg/l in Segment 1, -0.005 to -0.021 mg/l in Segment 2, -0.107 to -0.165 mg/l for Segment 3 and -0.013 to -0.021 mg/l for Segment 4 (however, it should be noted that the maximum DO impacts to the different segments are not predicted to occur on the same day). The greatest potential impacts are localized near the project site (Segment 3) and the river bottom. Also, the results indicate that less DO impacts are predicted with increasing dam flow.

In addition to the above described impacts resulting from the changes to the river geometry (i.e., the deepening of the berth and access area and infilling of the terminal area), the potential impacts to DO from stormwater pollution were evaluated with the DO model. The results indicate that the stormwater impacts on DO in Shipyard Creek and the adjacent Cooper River are negligible.

It should be noted that the model is too coarse to accurately simulate such small-scale flows as the proposed water jet sedimentation control system. However, as described in the previous section on salinity impacts, the water jet system may cause some small increase in vertical mixing along the berth area, thereby decreasing the estimated project impacts to vertical stratification, dissolved oxygen and salinity increase at the project site. Therefore, in regard to dissolved oxygen, it is conservative to not include the water jet system in the estimation of project impacts.

Nutrients

The Proposed Project can potentially affect in-stream nutrient concentrations by way of pollutant loading from stormwater runoff. The change in the stormwater runoff nutrient load is described in the previous section on stormwater. The results of the stormwater analysis indicate that the change in land use at the project site would cause an increase in stormwater runoff nutrient concentrations. This would cause a slight increase in in-stream nutrient concentrations in Shipyard Creek and the Lower Cooper River. Simulation of the stormwater discharges with the 3-dimensional water quality model (Appendix AA) demonstrated that stormwater pollutant concentration increases due to the project diminish quickly, and the downstream portion of Shipyard Creek and the adjacent Cooper River would not experience significant increases in stormwater pollutant concentrations. Additionally, impacts would be minimized because the NPDES industrial stormwater permitting process mandates a Stormwater Pollution Prevention Plan (SWPPP).

Fecal Coliform

Similar to nutrients, the Proposed Project can potentially affect in-stream fecal coliform concentrations by way of pollutant loading from stormwater runoff. However, post-development plans for the Proposed Project do not include activities that would increase pathogen levels (primary sources of pathogens in stormwater include animal wastes, illegal wastewater connections into storm sewer lines, seepage of groundwater containing pathogens into storm sewer lines, and septic tanks). Therefore, the Proposed Project would not substantially affect fecal coliform concentrations in Shipyard Creek or the Lower Cooper River.

Suspended Sediments

The Proposed Project can potentially affect in-stream suspended sediment in multiple ways: (1) change in long-term pollutant loading from stormwater runoff caused by the change in land use, (2) temporary increases caused by construction activities both upland (via stormwater runoff from disturbed land) and in the river (via dredge and fill activities for the proposed terminal and construction of the access roadway over Shipyard Creek), and (3) long-term periodic increases from maintenance dredging operations and the water jet sedimentation control system. The potential impacts from stormwater runoff, dredging and the water jet sedimentation control system are discussed in the following subsections.

Stormwater Runoff:

Long-term changes in stormwater runoff pollutant loads are described in the section on stormwater (Section 5.2.15.2). The results of the stormwater analysis indicate that the change in land use at the project site would cause an increase in stormwater runoff suspended sediment concentrations. However, stormwater management at the site would be in compliance with State stormwater regulations. The stormwater control ponds at the site would be designed to remove a minimum of 80 percent of the suspended sediments from the stormwater before discharge to surface waters. Further, impacts would be minimized because the NPDES industrial stormwater permitting process mandates an SWPPP. Based on the 3-dimensional water quality model results (Appendix AA), the stormwater pollutant concentration increases due to the project would diminish quickly, and the downstream portion of Shipyard Creek and the adjacent Cooper River will not experience significant increases in stormwater pollutant concentrations. Therefore, the resulting discharge is expected to cause only a minimal increase in in-stream suspended sediment concentrations in Shipyard Creek and the Lower Cooper River

The construction activities at the facility would involve the disturbance and moving of large quantities of earth, thereby temporarily increasing stormwater runoff TSS. The activities would be conducted in compliance with State stormwater regulations. It is expected temporary sediment basins along with other temporary stormwater management/erosion control BMPs would be utilized to protect the surface waters from sediment-laden runoff from the site during construction. Therefore, surface water impacts from stormwater runoff during construction should be minimal.

Dredging and Filling:

Dredging activities during project construction and maintenance dredging would cause the suspension of bottom sediments. The dredging in the river would likely require 12 to 15 months for the proposed terminal, not including any major stoppages. The SSFATE model was used to simulate the suspended sediment plume created by dredging operations at the proposed terminal. The results are shown in detail in Appendix X. The model results show the following:

- The high TSS plume is limited to the region near the river bottom;
- The periods of peak TSS concentrations at any given location (other than immediately adjacent to the dredge) occur over short periods of time (i.e., less than 1 hour);
- The simulated TSS plume is less than 300 mg/l above background concentrations within a distance of 50 m from the dredge; and
- The simulated TSS plume is less than 100 mg/l above background concentrations within a distance of 1,700 m from the dredge location.

For comparison purposes, suspended sediment samples collected in 2003 in the river near the Proposed Project site during normal weather conditions show average observed TSS of 39 mg/l near the river surface and average TSS of 116 mg/l near the river bottom, with a peak value near the bottom of 691 mg/l. During storm conditions, the river suspended sediment concentrations can be up to 40 times higher than typical conditions (Teeter, 1989), and TSS measurements in the harbor in December 1985 showed concentrations of 1,350 mg/l for a period of two days following a storm event.

As the dredged material is placed in a CDF, most of the sediments will settle to the bottom, and the supernatant water will be discharged back to the Cooper River (or ditches that are connected to the Cooper River). Column settling tests were performed on sediment samples from the proposed dredge site, and the data were used to evaluate the suspended sediments in the CDF effluent discharged to the river (presented in the *Sediment Quality Evaluation* in Appendix X). It is estimated that the CDF effluent would have a TSS of about 84 mg/l, which is expected to have a minimal impact on the river suspended sediment concentrations.

There is no standard for maximum allowable TSS; however, the potential effects of the suspended sediment plume are discussed in detail in the natural resources impacts section (Section 5.2.17). The aquatic species in the Lower Cooper River are necessarily tolerant of high TSS (as they live in an environment with naturally high TSS). Because the suspended sediment plume is transient in nature, and the spatial extent of the high TSS dredge plume is relatively small, the dredge plume is expected to cause minimal adverse effects to the aquatic environment.

A large quantity of fill (approximately 2.4 MCY below MLW) will be placed into the Cooper River as part of the terminal construction between the shoreline and the wharf. However, sheet pile

walls will be installed around the perimeter of the fill area prior to backfilling. Therefore, the backfilling of the terminal site will have minimal impacts to suspended sediments in the river.

Access Roadway Construction:

Construction of pile foundations and abutments for the proposed access roadway may disturb the bottom and banks of Shipyard Creek, respectively. Temporary increases in turbidity would result. Best management practices would be implemented to minimize the increase in water turbidity. Thus, the increased turbidity should have little effect on water quality in Shipyard Creek and Charleston Harbor.

Water Jet Sedimentation Control System:

A water jet sedimentation control system would be installed along the face of the berth in order to minimize sedimentation rates and maintenance dredging requirements within the berth. A water jet sedimentation control system is a set of multiple water jet units mounted on piles along the face of the dock that draw water from about 12 feet above the river bottom and direct a current that would keep fluid mud in suspension until the natural water flow carries it out of the berths. It is expected that these units may operate for durations up to three hours for each 6 hour flood or ebb tidal cycle (i.e., about four times a day). The actual operation times would be determined based on sediment and flow characteristics, and operations could be adjusted by a computer console to achieve the desired results.

The jet will prevent passing sediments from settling in the berthing area by keeping near bottom current velocities above the threshold for sediment deposition. The system will add no new sediment to water column and it will not erode the existing mud bottom. Although the system may cause short-term fluctuations in suspended sediment concentrations (for periods of minutes), the system will not increase the daily averaged suspended sediment concentrations, as compared to the No-Action Alternative.

Heavy Metals and Other Toxic Contaminants

The primary project related sources of surface water contamination from heavy metals or other toxic contaminants (e.g., low-boiling hydrocarbon fractions of oils and greases resulting from transportation and industrial sources, benzene from gasoline, synthetic detergents, pesticides, herbicides, wood preservatives, and a wide range of synthetic organic industrial chemicals) are stormwater runoff pollution and release of sequestered contaminants from sediments dredged from the river bottom.

The large number of trucks operating at the facility and traveling along the access road and highways would generate some heavy metal, oil and grease pollution via stormwater runoff. Motor vehicles have been found to be the principle nonpoint source contributor of many heavy metals including lead, zinc and copper (Harper, 1998). However, stormwater treatment ponds would remove some (40 to 80 percent) of the heavy metal pollutants before discharge to the surface waters in Shipyard Creek and the Cooper River. Further, impacts would be minimized because the NPDES industrial stormwater permitting process mandates an SWPPP. Based on the 3-dimensional water quality model results (Appendix AA), the stormwater pollutant concentration increases due to the project would diminish quickly, and the downstream portion of Shipyard Creek and the adjacent Cooper River will not experience significant increases in stormwater pollutant concentrations. Therefore, the Proposed Project would likely cause minimal impacts to in-stream heavy metal and oil and grease pollution concentrations.

The potential impacts from sediment contaminants may occur both at the dredge site during dredge operations, or at the disposal site when water is discharged back into the surface waters from the CDFs. Both of these potential impacts are discussed following paragraphs.

Dredge Releases:

The DREDGE module of the Automated Dredging and Disposal Alternatives Modeling System (ADDAMS) was used to assess the potential water column impacts from contaminants released at the dredge site during dredging operations. Total PCBs was identified as the Contaminant of Concern (COC) requiring the greatest dilution in order to meet the acute saltwater water quality standards (WQS). The model results indicate that Total PCBs will be 0.007 µg/l in the immediate vicinity of the dredge cutterhead, which is much less than the acute WQS of 0.03 µg/l. The dissolved concentrations are very low because of the large partitioning coefficient, and the fact that most of the Total PCBs will remain attached to the sediments and not in dissolved form. Based on these results, the dredging of the sediments at the site is not expected to cause any adverse water column impacts from toxic contaminants.

CDF Effluent:

The Proposed Project includes the placement of dredged material in CDFs on Daniel Island. As described previously, as the mixture of dredged sediments and water is placed in the CDF, most of the sediments will settle out in the CDF and the water from the CDF will eventually discharge through outfall pipes to the Cooper River. The CDF effluent water quality and potential impacts to surface water quality was evaluated and is described in detail in the *Sediment Quality Evaluation* (Appendix X).

The CDF effluent quality evaluation for the dredge disposal associated with the proposed CNC marine terminal facility was completed following effluent quality determination guidance from the *Inland Testing Manual* (EPA and USACE, 1998). Total PCBs was identified as the COC requiring the greatest dilution in order to meet the acute saltwater WQS. Chlordane (a pesticide) was identified as the COC requiring the greatest dilution in order to meet the chronic saltwater WQS. The results of the evaluation indicate that concentrations of COCs in the effluent should meet both acute and chronic saltwater WQS when mixing zones are considered. The maximum mixing zone required to meet the dilution requirements is 6,300 ft^2, with a length of 79 ft and leading edge width of 107 ft (which represents only a small fraction of the river width). Therefore, the CDF effluent will result in minimal impact to surface water from toxic contaminant concentrations.

Ship Bilge Water, Accidential Spills and Container Washwater

The Proposed Project would result in an increase in ship traffic in the Lower Cooper River and Charleston Harbor. Impacts to water quality resulting from bilge water discharges are anticipated to be minimal because existing regulations prohibit the discharge of untreated and treated oily bilge water in Charleston Harbor. Ships can discharge oil wastes in U.S. territorial water only when the vessel is underway more than 12 nautical miles from land and only after processing the oil waste through an oil water separator, resulting in an effluent that does not exceed 15 parts per million and does not cause a visible sheen. Ships can retain bilge water on-board when in port or deposit untreated bilge water into a pipe line, slop barge, or tank truck which carries the wastewater to a licensed wastewater treatment plant capable of treating oily wastewater. Accidental discharges of bilge water can occur, and it is reasonable to assume that the increased ship traffic would increase the potential for accidental bilge water discharges. Because bilge water typically has oil, grease, sewage and other wastes, accidental discharge of

bilge water can degrade the water quality of the estuary surface waters. Accidental discharges have typically been small volumes, and it is reasonable to assume that the increased potential for accidental bilge water discharges would have a minimal impact to surface water quality.

Surface water quality may be impacted from accidental pollutant spills both at the upland facility as well as offsite (by ship, truck and rail traffic). The proposed facility would be expected to store small quantities of petroleum-based lubricants, diesel fuel, and possibly gasoline onsite (stored in accordance with all applicable SCDHEC regulations). It is reasonable to assume that accidental spills of these materials may occur. Additionally, although this container terminal would not handle bulk liquid cargo or fuels, it is reasonable to assume that the increased container ship, truck and rail traffic would cause an increase in the potential for offsite accidental small quantity spills of pollutants that may contaminate surface waters. At the upland port facility, the storm sewer system is expected to be designed to intercept and temporarily contain any accidentally spilled liquids that might otherwise drain through the storm sewer into Shipyard Creek. The SCSPA Spill Prevention, Control, and Countermeasures (SPCC) Plan would provide a detailed plan designed to minimize impacts resulting from accidental spills (described in Section 5.2.14.3).

It is expected that the Proposed Project would not include SCSPA maintenance or operation of a container washwater facility. Generally, the shipping lines subcontract the washing out of their containers to local maintenance and repair vendors who lease space from the SCSPA onsite at the terminal. Some facilities may be fixed, where containers would be washed on a concrete platform with a wastewater collection system that ensures that the wastewater does not enter ground or surface waters. Some facilities may be mobile, where a collection device is placed at the opening of the container to collect the washwater, which ensures that the wastewater does not enter the ground or surface water. The wastewater would be collected by a disposal company and disposed of at an appropriate wastewater treatment facility. Containers requiring cleaning of hazardous materials would need to be decontaminated by a licensed contractor prior to routine cleaning. Therefore, container wash wastewater is not expected to have any adverse impacts to surface waters.

An overview of the pollutants found in the wastewater is not available. It is expected that the potential pollutants are highly variable depending on the cargo transported in each individual container.

5.2.15.4. Summary of Water Resource Impacts

The Proposed Project would cause negligible adverse impacts to groundwater resources either as a result of increased potable water demand or from excavation of the berth and access area.

The Proposed Project would increase stormwater runoff quantity and pollution. However, the Proposed Project would be required to comply with SCDHEC stormwater regulations, and the adverse impacts of the Proposed Project on surface waters resulting from the stormwater runoff would be minimal as a result of stormwater treatment and BMP's.

The Proposed Project would create additional water column near the river bottom where the berth and access area would be excavated. This area would exhibit increased salinity concentrations as compared to the existing bottom salinity in this area. The Proposed Project would cause minimal adverse impacts to salinity upstream and downstream from the terminal, and it would cause negligible impacts to salinity intrusion events that affect the Bushy Park Reservoir.

The Proposed Project would cause small increases and decreases in DO concentrations in the lower Cooper River. The maximum adverse impacts (i.e., decreases) to DO would occur in the berth and access area near the river bottom, and the maximum adverse impacts also occur at times when the Pinopolis Dam flows are low. The maximum adverse impacts to depth-averaged DO in the berth and access area would be about –0.015 to -0.077 mg/l averaged over a 3-month period, and about -0.107 to -0.165 mg/l averaged over twenty-four hours.

The Proposed Project would cause temporary increases in suspended sediment concentrations caused by dredge operations during project construction (over a 12 to 15 month period) and during maintenance dredging events. The greatest increases in suspended sediment concentrations would be limited to a localized area at the river bottom near the dredge (within 50 m). These increases are less than suspended sediment concentrations that occur during storm events (both in concentration and spatial extent), and therefore, these adverse impacts are considered minor.

Other aspects of the Proposed Project would have minimal adverse impacts to suspended sediment concentrations. Effluent from the CDF during dredging operations would have minimal adverse impact to in-stream suspended sediment concentrations. Backfilling of the terminal area in the Cooper River would have minimal adverse impact to suspended sediment concentrations because the area would be enclosed by a sheet pile wall prior to backfilling. Access roadway construction would have minimal adverse impacts to suspended sediment concentration as a result of pile foundation and abutment construction. The water jet sedimentation control system would be designed to keep sediments in suspension, and although the system may cause short-term fluctuations in suspended sediment concentrations (for periods of minutes), the system would have negligible impacts to the daily averaged suspended sediment concentrations.

The Proposed Project would have minimal adverse impacts to water column concentrations of toxic chemicals during dredging operations, either at the dredge site or at the CDF outfall. Adverse impacts to water quality resulting from bilge water discharges, accidental spills or container washwater would be minimal.

5.2.16. Aquatic Sediments and Dredging

This section summarizes the potential impacts the Proposed Project may have on sedimentation and dredging in the Charleston Harbor Estuary. Also, this section describes the sediment quality of the aquatic sediments disturbed by the Proposed Project. As shown in Figure 5.1-20, the study area includes the surface waters and bottom sediments of the Charleston Harbor Estuary extending along the Cooper River from Drum Island up I-526, including Shipyard Creek, as well as the upland areas affected by dredge disposal areas on Daniel Island and Clouter Island.

5.2.16.1. Sedimentation and Dredging

The Proposed Project would require dredging for the initial construction of the proposed marine terminal, berth and access area. For the project construction, a total of approximately 6.5 million cubic yards (Mcy) of material would be excavated. Of this volume, 1.2 Mcy would be excavated from the area between the river shoreline and the proposed wharf and then backfilled with more stable soils upon which the container yard and support facilities would be constructed. Approximately 4.0 Mcy would be dredged from the berth and access areas. Approximately 0.7 Mcy will be dredged for the foundation for the wharf and fill containment structures. Approximately 0.2 Mcy would need to be dredged for shoaling that occurs prior to completion of

project construction. An additional 0.3 Mcy dredge volume is included in the estimate to account for miscellaneous design variables such as final slopes and areas.

Although the method for the dredging is yet to be determined, based on previous harbor dredging practices, a majority of the project would likely be dredged using a 30-inch hydraulic cutterhead dredge. The dredging would occur over a period of 12-15 months. The dredged material would be placed in the Daniel Island CDF, which is owned and managed by the SCSPA.

The following subsections discuss the potential project impacts to sedimentation in the Federal navigation channel and sedimentation in areas outside of the navigation channel (e.g., Proposed Project berth and access area).

Federal Navigation Channel

The Proposed Project would affect long-term maintenance dredging of the Federal navigation channel by altering the existing river geometry. A numerical sedimentation model was used to quantify the changes in sedimentation rates, as described in detail in Appendix Y. As noted in the previous water resources section (Section 5.2.15), the Proposed Project described in the computer model study is based on the conceptual terminal layout presented in the September 2005 amendment to the SCSPA permit application (Appendix C). The Option B alternative in the model study report (Appendix Y) is the same as the Proposed Project for this FEIS, as described by the July 2006 amendment to the SCSPA permit application.

Although comparisons to measured data confirm that the sedimentation model provides a reasonable prediction of sedimentation rates in the Lower Cooper River, it should be noted that the Proposed Project would also cause some shoaling that is not represented by the numerical sedimentation model. The piles that support the wharf structure create turbulence that increases flocculation of fine suspended sediments in the water column. This can result in increased shoaling around and downstream of the piles.

The sedimentation model results indicate that the Proposed Project would cause an increase in the total shoaling in the Federal navigation channel on the order of $2x10^4$ cy/yr (not including the proposed turning basin, which is not part of the navigation channel). The Proposed Project would also cause a shift in the location of shoaling in the Federal navigation channel. The results indicate that the Proposed Project would cause an increase in Daniel Island Reach/Bend and Myers Bend shoaling ($5x10^4$ cy/yr) and small reductions in shoaling some of the other adjacent reaches ($2x10^4$ cy/yr in Drum Island Reach and $1x10^4$ cy/yr in the Navy Yard Reach). The Proposed Project is not expected to impact shoaling rates downstream of Myers Bend.

Two additional design options for the Proposed Project were simulated with the sedimentation model to demonstrate the differences that would occur if certain design elements were modified (hereafter referred to as Option A and Option B). As shown in Figure 5.2-12, Alternative 1 (labeled Option A in Appendix Y) represents a design with the berth located near the existing shoreline (which would result in less fill into the Cooper River and a much larger access area). Alternative 2 (labeled the Proposed Project in Appendix Y) represents a design with the access area extending to the north around Daniel Island Bend, which is a design that truncates the existing contraction dike at Daniel Island Bend.

The model results indicate that Alternative 1 would cause a small decrease in the total shoaling in the Federal navigation channel (on the order of $2x10^4$ cy/yr). The Alternative 1 design would cause no change in Daniel Island Reach/Bend and Myers Bend and small reductions in

shoaling some of the other adjacent reaches (around $1x10^4$ cy/yr in Drum Island Reach, $1x10^4$ cy/yr in Shipyard Creek and $1x10^4$ cy/yr in the Navy Yard Reach).

Alternative 2 would cause an increase in the total shoaling in the Federal navigation channel (on the order of $5x10^4$ cy/yr). Alternative 2 would cause a 100 percent increase in shoaling of the Daniel Island Reach, Daniel Island Bend and Myers Bend portions of the navigation channel (this is on the order of a $5x10^4$ to $10x10^4$cy/yr increase). Alternative 2 would also cause small reductions in shoaling of the other adjacent reaches ($3x10^4$ cy/yr in Drum Island Reach, Clouter Creek Reach, and $1x10^4$ cy/yr in North Charleston/Filbin Creek Reaches).

Outside the Federal Navigation Channel

The Proposed Project would also impact sedimentation rates in areas outside the Federal navigation channel, such as the berth and access channel constructed as part of the Proposed Project. The Proposed Project is estimated to cause long-term shoaling of approximately $6x10^4$ cy/yr in the berth area if a water jet sedimentation control system is not in operation. The Proposed Project includes installation of a water jet sedimentation control system, and therefore, the shoaling rate in the berth would be much lower. The Proposed Project is expected to cause shoaling at a rate of approximately $17x10^4$ cy/yr in the access area.

In regard to the simulated design options (shown in Figure 5.2-12), the Alternative 1 design would cause shoaling in the berth and access area at a rate of approximately $47x10^4$ cy/yr, which is 104 percent more than that predicted for the Proposed Project. Alternative 2 would cause shoaling in the berth and access area at a rate of approximately $21x10^4$ cy/yr, which is 9 percent less than that for the Proposed Project.

To summarize the design options, moving the wharf close to the shoreline (Alternative 1) would greatly increase construction and maintenance dredging volumes, as compared to the Proposed Project. Shortening the contraction dike and extending the north end of the access area (Alternative 2) would: (1) increase initial construction dredging, (2) cause more maintenance dredging in the Daniel Island reach of the Federal navigation channel, and (3) cause slightly less maintenance dredging of the berth and access area, as compared to the Proposed Project.

5.2.16.2. Sediment Quality

The Tier I analysis indicated that the dredged materials could include the following contaminants of potential concern (CoPCs): nutrients, metals, phenols, phthalate esters, PAHs, PCBs, butyltins, dioxins and furans, pesticides, non-metals and other pollutants. The dredging and disposal of these sediments could impact aquatic and terrestrial wildlife by exposure to these contaminants.

A project-specific Sampling and Analysis Plan (SAP) was developed based, in part, on the results of the Tier I analysis.

Nine sediment samples (five core and four grab samples) were collected from within the CNC dredging prism. Sediment core samples were collected using a barge-mounted rotary drill rig; sediment cores were collected by advancing a 3-inch diameter stainless-steel split spoon from bed elevation to the approximate expected dredge cut depth. Sediment samples were collected and vertically composited at each sediment core sampling station (designated as CHCNC-01 through CHCNC-05). Sediment grab samples were collected from bed elevation at sampling stations CHCNC-06 through CHCNC-09.

The core samples were intended to be representative of “new work” sediment quality and the grab samples were intended to be representative of “maintenance” dredging sediment quality. Each sediment sample was analyzed for metals (including reference metals: aluminum and iron), organotins (tetra-n-butyltin, tri-n-butyltin, di-n-butyltin, and n-butyltin), PAH compounds, PCB congeners and arochlors, pesticides, polychlorinated dioxins and furans, nutrients, and geotechnical parameters. In addition, total and dissolved phase sediment elutriate analyses were completed.

The bulk sediment chemistry data were screened by comparing the geometric mean concentration, maximum concentration, and minimum concentration of each parameter with applicable sediment screening values; in this case EPA Region 4 Hazardous Waste Site Screening Values, Effects Range-Low (ER-L), and Effects Range-Median (ER-M) values where available and sediment and soil reference sample results. In the absence of other, established sediment screening values, the analytical data were compared to consensus sediment screening values developed by ATM. The consensus sediment screening values developed by ATM consist of Threshold Effects Concentration (TEC) and Probable Effects Concentration (PEC).

It should be noted that the TEC and PEC values are not recognized by any state or Federal regulatory agency and were relied on for screening purposes only in the absence of widely recognized and accepted sediment screening values.

A summary of the results is presented in Table 5.2-14, which shows the percentage of samples that exceeded the screening values for each analyte. The analysis results are presented in detail in the *Sediment Quality Evaluation* (Appendix X). As shown in the table, the quality of maintenance and “new work” sediments in the proposed dredging area are comparable for metals, tri-n-butyltin, PAH compounds, dioxin/furans, and total PCB. Pesticide concentrations in maintenance sediments were somewhat lower compared to “new work” sediments. Both “new work” and maintenance sediment concentrations were comparable to the sediment reference for metals, tri-n-butyltin, and PAH compounds; the CNC area sediment concentrations, as a group, were elevated compared to the sediment reference for pesticides, dioxins/furans, and total PCBs.

It should be noted that many of the sample concentrations shown to exceed sediment screening values occurred as a result of assuming concentrations equal to the laboratory method detection limit (MDL) for tests that did not detect the analyte (non-detects). Therefore, many of the exceedences are a result of this conservative assumption, when in reality, the analyte concentrations may not exceed the screening values.

A draft of the *Sediment Quality Evaluation* was submitted to state and Federal regulatory and resource agencies for review and comment. The draft report was revised to address agency comments; this final version incorporates suggested revisions. State and Federal agency representatives concurred that the proposed dredging and disposal of dredged material (in a CDF) would not result in adverse impacts to the environment.

Likewise, the evaluation of CDF effluent water quality (included as an appendix to the *Sediment Quality Evaluation* in Appendix X) indicated that the CNC dredging area sediments would not cause degradation of the receiving water body (Cooper River) or other adverse impacts.

Table 5.2-14. Percentages of Sediment Samples Exceeding Sediment Screening Values for the Proposed Project.

Analyte Group	Sediment Reference	CNC Sediment Core Samples (geometric mean)	CNC Sediment Grab Samples (geometric mean)
Metals			
Samples less than EPA Region 4 screening values or ER-L (%)	46.6	53.3	53.3
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	40.0	46.6	40.0
Samples exceeding ER-M (%)	13.3	0.0	6.6
Organotins (Tri-n-butyltin only)			
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	100.0	100.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	0.0	0.0
Samples exceeding ER-M (%)	0.0	0.0	0.0
Polynuclear Aromatic Hydrocarbons (C1-C4 compounds not included)			
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	94.5	94.5
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	5.5	5.5
Samples exceeding ER-M (%)	0.0	0.0	0.0
Pesticides			
Samples less than EPA Region 4 screening values or ER-L (%)	48.4	77.4	51.6
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	38.7	19.4	35.5
Samples exceeding ER-M (%)	12.9	3.2	12.9
Dioxins/Furans			
Samples less than EPA Region 4 screening values or ER-L (%)	47.0	64.7	64.7
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	52.9	35.3	35.3
Samples exceeding ER-M (%)	0.0	0.0	0.0
Polychlorinated Biphenyls (Total PCBs Only)			
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	0.0	0.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	100.0	100.0
Samples exceeding ER-M (%)	0.0	0.0	0.0

5.2.16.3. Summary of Dredging and Aquatic Sediments

The Proposed Project would have minimal effect to long-term maintenance dredging of the Federal navigation channel by altering the river geometry. Sedimentation modeling results indicate that the Proposed Project would cause an increase in the total shoaling in the Federal navigation channel on the order of $2x10^4$ cy/yr. The changes would include an increase in Daniel Island Reach/Bend and Myers Bend shoaling ($5x10^4$ cy/yr) and small reductions in shoaling some of the other adjacent reaches ($2x10^4$ cy/yr in Drum Island Reach and $1x10^4$ cy/yr in the Navy Yard Reach). The Proposed Project is not expected to impact shoaling rates downstream of Myers Bend.

The Proposed Project would also impact sedimentation rates in areas outside the Federal navigation channel, such as the berth and access area constructed as part of the Proposed Project. The Proposed Project is estimated to cause long-term shoaling of approximately $6x10^4$ cy/yr in the berth area if a water jet sedimentation control system is not in operation. The Proposed Project includes installation of a water jet sedimentation control system, and therefore, the shoaling rate in the berth would be much lower. The Proposed Project is expected to cause shoaling at a rate of about $17x10^4$ cy/yr in the access area.

Based on an evaluation of sediment quality, the dredged materials contain small amounts of the following CoPCs: nutrients, metals, phenols, phthalate esters, PAHs, PCBs, butyltins, dioxins and furans, pesticides, non-metals and other pollutants. The dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants. Potential impacts from the dredging from the contaminants of concern were comprehensively evaluated in the *Sediment Quality Evaluation Report,* Appendix X).

The development of the proposed access roadway would require two bridges across Shipyard Creek. Construction of the bridges could result in disturbance of aquatic sediments in the waterway from pile driving. Because of the potential presence of contaminated sediments in this portion of Shipyard Creek, aquatic sediment to be disturbed or excavated for pile foundation and abutment work may require appropriate management measures.

5.2.17. Natural Resources

This section discusses impacts from the Proposed Project (i.e., the proposed terminal and proposed access roadway) on natural resources located within the study area (Figure 5.1-22). General natural resource concerns associated with the construction and operation of ports include the following categories: (1) surface water quality (e.g., stormwater runoff, wastes generated from ship operation and maintenance, etc.), (2) dredging and disposal, (3) placement of protective structures on the shoreline, and (4) ecological impacts such as loss of wetlands and shorebird foraging habitat. Other related activites with secondary effects include infrastructure and industrial development, increases in population growth, shipping, and potential harbor dredging in the future.

Construction of the Proposed Project will require new work dredging, placement of fill and structures along the shoreline, and impacts to habitats. Long-term impacts include maintenance dredging (of the new berth and acccess area) and increased ship traffic. This section describes the Proposed Project impacts to natural resources within the study area as shown by Figure 5.1-22, which includes the area surrounding the proposed terminal and the proposed access roadway.

The area surrounding the affected estuarine environment consists primarily of the Lower Cooper River, although species that could potentially use the navigation channel within the Charleston Harbor and offshore or upriver of the Proposed Project site are also discussed. The following subsections provide detailed assessments of potential impacts to wetlands, upland biotic communities, aquatic biotic communities, EFH, and potential for increased introduction of invasive species. Potential impacts to federal and state listed threatened and endangered species is discussed in Section 5.2.18

As shown in Figure 5.2-13, the proposed terminal (not including the road corridor) will alter 208 acres of upland habitat, 9.6 acres of tidal wetland and 146 total acres of open water. Of these 146 total acres, terminal facilities along the Cooper River will fill 52.1 acres of deep water (>2 ft MLW), 2.4 acres of shallow water habitat, and 2.1 acres of mudflat and require the excavation of

approximately 6.5 million cubic yards of sediment. Adjacent to the dredge and fill area, a 13.6-acre wharf structure (3,510 feet long and 150 feet wide) will be constructed and the Proposed Project also includes dredging a 77.9-acre berth and access area adjacent to the wharf. Total impacts from the Proposed Project are shown in Table 5.2-15.

Table 5.2-15. Proposed Terminal Site Affected Land Cover Types.

Land Cover	Acres	% of Total
Impervious	44.2	20
Upland forest/scrub	75.9	35
Maintained grass	31.5	14
Barren land	7.1	3
Revegetated CDF	49.2	22
Tidal Wetland	9.6	4
Freshwater Wetland	2.4	1
Total	219.9	~100

Specific impacts from major components of the terminal are:

- Dredging for berth and access area: 77.6 acres of open water;
- Partial fill for wharf: 11.6 acres of open water;
- Fill for container yard and support area: 56.6 acres of open water, 9.6 acres of tidal marsh, 2.4 acres of freshwater marsh and 178.0 upland acres;
- Stormwater retention basin construction: 24.5 upland acres and 0.1 acres of tidal marsh; and
- Onsite road construction: 4.2 upland acres and 0.4 tidal marsh acres.

By locating the project at a previously disturbed area, impacts to undeveloped lands are reduced. The same approach applied for placing the roadway, which will impact mostly developed, industrial areas and existing road right of ways (Table 5.2-16).

Table 5.2-16. Proposed Access Roadway Affected Land Covers.

Land Cover	Acres	% of Total
Impervious	20.3	44
Upland forest/scrub	6.5	14
Maintained grass	7.2	16
Barren land	6.4	14
Tidal Wetland	4.3	9
Freshwater Wetland	0.4	0.8
Open Water	0.8	2
Total	45.9	100

The proposed roadway corridor includes improvements to sections of Tidewater Road as well as all access road and ramp improvements. A conceptual design is discussed in the *Access Roadway Feasibility Study* (Appendix W), along with the impacts from other feasible access roadway corridors. Where feasible, all Tidewater Road improvements will be made on the land side of the existing road to avoid impacts to Shipyard Creek. Two access bridges are proposed to cross Shipyard Creek, which will result in some pile driving and shading impacts. The access roadway for the Proposed Project will result in direct loss of habitat where the roadway is at grade. Most of the bridges and roadways will be elevated to avoid impacts to wetlands and other natural resources. Where the road or bridges are low level, some shading and loss of wetland functions will occur. Fill and shading impacts to waters of the US are described below.

The proposed roadway planning corridor ranges from 85 to 200 feet wide; the actual roadway, at-grade or on structure would likely impact a smaller area. A conceptual design is discussed in the *Access Roadway Feasibility Study* (Appendix W).

5.2.17.1. Upland Communities

The upland communities at the Proposed Project site have been previously disturbed by a range of industrial uses including disposal of military waste and dredged material, and development of barracks, offices, and other impervious surfaces. Low value habitat such as pioneer forests and maintained grassland provide suitable habitat for many common species. Dominant plant species in the forested areas include privet, red mulberry, southern hackberry, wax myrtle, salt marsh elder, Chinese tallow, and red cedar. Numerous upland berms are found in the tidal habitats that are vegetated by red cedar, Yaupon holly, and vines such as poison ivy. Forested habitats within the CDF are dominated by Chinese tallow and privet, with heavy vine growth dominated by Japanese honeysuckle. These common species are found throughout the coastal plain.

Impacted animal communities include typical species that have adapted to living near human development. Wading birds, migratory songbirds, raptors, and common urban/suburban birds species will be impacted by loss of habitat. Wildlife such as raccoons will also lose forested habitat. Existing reptiles and amphibians are common species and although they will lose their habitat, their abundance does not threaten the general population or their predators.

While birds sighted on the property will lose forested, shore, grass, and river habitat, they can relocate with minimal impact to adults. Construction during nesting season will have greater impacts on nesting pairs and their young. Minimal interference with nesting osprey at the Cooper River Marina, and wading birds along the marsh fringe may occur during construction.

Osprey are tolerant of human activity and build nests on pilings, docks, and buoys over water. No osprey nests are known within the Proposed Project area, therefore, impacts should be to foraging only. Other raptors such as turkey vultures, black vultures, and red-tailed hawks hunt in the habitats at the Proposed Project. The presence of adjacent suitable habitats will likely mean the Proposed Project will have minimal impact to these raptors.

An additional potential long-term impact to migratory birds includes light pollution and container cranes. Migratory birds have been known to become disoriented at night around tall, well-lit buildings and towers. Container cranes are typically around 250 feet tall, and large spotlights are used at terminals. The Proposed Project will cause negligible impact to these species.

5.2.17.2. Freshwater Wetland Communities

Wetlands within the Proposed Project facility footprint, as shown in Figure 5.2-13, were delineated by a wetlands survey. Figure 5.2-14 shows the freshwater and tidal wetland impacts from the proposed access roadway. Freshwater wetland impacts include filling 2.43 acres of herbaceous, scrub-shrub and wooded wetlands, and filling of 0.34 acre and bridging (shading) 0.04 acre of freshwater wetlands for the road corridor. Ramp A of the proposed roadway will impact 0.044 acre of this wetland as it passes overhead by shading or because of support structures. The wetland is dominated by cattail, bulrush, and sedges. The road corridor wetlands have been disturbed by road creation already and are limited in function and value. At the proposed terminal site, the freshwater wetlands have been formed primarily by stormwater culverts/drainage and are ditched and impacted by stormwater drainage and debris.

Freshwater animal communities will be impacted by loss of habitat; however, many species can relocate with minimal impact to adults.

5.2.17.3. Tidal Wetland Communities

Much of the shoreline along the proposed terminal site has been previously lined with rock, and marsh grass has established in a thin strip along the outside of the riprap. Tidal marshes and flats of Shipyard Creek, an aquatic habitat with known contamination in the study area (SCECAP, 2002 and 2004), would be minimally impacted by the development of the Proposed Project site. They will be affected by the construction of the proposed access roadway by roadbed filling, pile driving during construction and shading by the elevated roadway.

Wetland animal communities will be impacted in the immediate area by the dredging/filling construction activities at the proposed terminal site as well as construction of an access roadway over Shipyard Creek. The small wetland animals expected to be in this area include microorganisms (decomposers), sea worms (polychaetes), small crustaceans, snails and shellfish. Animal communities in wetlands adjacent to the project site should be largely unaffected by the project. Impacts to upland and estuarine animals caused by wetland loss will be discussed in separate sections. Wetland plant communities adjacent to the project site should also be largely unaffected by the project because sedimentation from dredging will occur primarily within the navigation channel.

Development of the site includes filling approximately 9.8 acres of tidal wetlands at the terminal site, and filling 3.45 acres for the road infrastructure. Tidal wetlands to be impacted include emergent Spartina and Juncus dominated marsh, estuarine scrub shrub, unvegetated tidal ditches, and mudflat. As described in Section 4.17.4, dominant tidal species affected varies from cordgrass to black rush, with large high marsh areas of salt grass and salt hay, as well as areas dominated by cattail. Shrub areas at the edges are dominated by salt marsh elder, sea oxeye daisy, and groundsel tree.

5.2.17.4. Open Water River and Creek Communities

Estuarine animal communities will primarily be impacted by the loss of estuarine habitat due to filling of the Cooper River. Local current patterns will also change and possibly create new eddies. The project will cause small, localized decreases in DO near the project site, particularly at the river bottom, as well as localized increases in bottom salinities. Presently, this section of the Cooper River already experiences low DO conditions (<4.0 mg/l) during the warmer summer months. In general, crabs and shrimp (especially bottom-dwellers) are considered more vulnerable to low dissolved oxygen than are vertebrate fish.

Recreationally important fish like striped bass, red drum, and spotted seatrout; commercial fisheries like brown, white, and pink shrimp, and blue crab; and endangered species like the shortnose sturgeon are of concern when studying low DO levels. For all of these fish, levels at and above 4.0 mg/l are considered to be suitable and typically do not register as a stress in laboratory studies.

An additional long-term effect would result from the use of a water jet sedimentation control system. The primary environmental concern with the water jet units is the entrainment of fish larvae and eggs in the intake pipe. The units operate by drawing water from the river to direct a current that keeps fine, suspended materials moving and out of the berths. While a smaller screened intake minimizes entrainment, fouling problems occur more frequently and, therefore, the operation requires a minimum opening of 4 inches. This opening is large enough for fish and crustaceans to get in the pipe, harmed by the impeller, or stunned. Eggs and small larvae would likely travel through the units relatively unharmed, conditions in the pipe during operation and down times may affect trapped organisms.

Water jet sedimentation systems operate at the bottom of the water column along the dock face and limited, localized adverse effects on sensitive biota are expected. This system also significantly reduces maintenance dredging at vessel berths, and therefore reduces dredging impacts at these sites. Water jet sedimentation systems are currently installed and operating in Savannah, GA and Wilmington, NC.

Sampling results from a previous water jet sedimentation impact study in the Savannah River found that entrainment rates were generally low for all species, typically ranging from 1 to 10 larvae for the most abundant species over each two hour sampling period (ATM 2002).

Short-term construction impacts are primarily from dredging. Estuarine and coastal organisms are exposed to suspended sediments from storms, tidal flows, and currents and, therefore, have behavioral and physiological mechanisms for dealing with this feature of their habitat. Because dredging-related suspended-sediment plumes may differ in scope, timing, duration, and intensity from natural conditions, dredging may create conditions not typically experienced by resident or transient species.

Three major impacts from dredging are increased suspended solids, increased bottom sedimentation and entrainment. In general, TSS effects are less damaging than those of low DO, high temperature, or exposure to contaminated sediments (Peddicord, 1980). However, when the background TSS conditions are substantially exceeded over a long time span, fish can experience the following harmful effects: burial, clogging of gills and pores, damage to delicate tissues such as gills and fins, problems with catching prey, disruption of migration routes, reduced growth and diminished overall health. Increased bottom sedimentation impacts to benthic flora and fauna include mortality and reduced growth, which can subsequently impact the food chain. Entrainment involves the direct mortality of species by the dredging process.

Long-term impacts include the loss of intertidal mudflat, marsh and open water habitat for foraging. Most non-schooling fish are attracted to structures for their cover/shelter, as well as substrate from which to forage for invertebrates, algae, etc. Therefore, some fish species may be positively impacted by the wharf structure.

Finfish are capable of avoiding construction impacts (excavation and filling). Elevated suspended sediment levels could impact foraging during construction. Relatively high suspended sediment concentrations (>500 mg/L) are known to have impacts on early life stages

of estuarine fish (Clarke and Wilber, 2000; Berry et al., 2003). However, the duration of exposure to suspended sediment from dredging or disposal must be related to the type and residence time of eggs or larvae in an affected habitat. Additionally, natural storm events have created average Cooper River TSS levels as high as 1,350 mg/l over a 2 day period (Teeter and Pankow, 1989). Fish also have the ability to expel materials that may clog their gills when they return to cleaner, less sediment-laden waters.

Most fish species (e.g., slender sole, *Lyopsetta exilis*) have relatively low absolute entrainment rates approaching 0.001 fish/cy, and considerably lower still for cutterheads (Reine and Clarke, 1998). Larson and Moehl (1990) concluded that it is unlikely that anadromous fishes are entrained in large numbers by dredges, at least outside of constricted river areas.

Long-term impacts to shrimp, squid and blue crab include loss of intertidal mudflat, marsh and open water areas that provide habitat. Shrimp, squid and other invertebrates found in the water column should be able to avoid construction impacts (excavation and filling). Blue crabs are primarily benthic; however, they are good swimmers and minimal construction impacts to them are expected. Elevated suspended sediment levels could impact foraging during construction, although turbid estuarine waters may also provide refuge from predation for juvenile shrimp, which are heavily preyed upon by estuarine fishes (Clarke and Wilber, 2000).

Brown (*Peneaus aztecus*) and white (*P. setiferus*) shrimp are common over a wide range of turbidities, whereas pink shrimp (*P. duorarum*) are most abundant in areas with low turbidity levels. Juvenile penaeid shrimp burrow in sandy sediments during the day and emerge at night to forage. In experimental aquaria, predation by Atlantic croaker and pinfish on juvenile shrimp was reduced in turbid water, whereas the predation efficiency of the southern flounder (*Paralichthys lethostigma*), an ambush predator, was increased (Minello et al., 1987).

Blue crabs may be vulnerable to entrainment during dredging activities, particularly during late fall and winter months when egg-bearing females emigrate to deep water and remain buried in surficial sediments until spring (Reine and Clarke, 1998). Overwintering crabs may be too lethargic during this period of inactivity to move out of the path of an approaching dredge.

The diamond back terrapin can most likely avoid short-term construction entrainment. Elevated suspended sediment levels could impact foraging during construction. Long-term impacts include loss of intertidal mudflat, marsh and open water habitat for foraging. Diamond back terrapins are not known to nest in this area. Impacts to sea turtles are discussed in the endangered species section.

Benthic organisms are commonly monitored for impacts because of their intimate contact with dredged sediments. Organisms that feed on suspended and deposited materials in these areas also ingest dredged sediments that are resuspended and redeposited during the dredging process. A second reason for understanding benthic organisms stems from their utility as an indicator organism (Blake, 1996). They are much less likely to escape the dredged area than fish and more mobile species. A third area of concern for benthic organisms is that they provide a crucial link in the detritus-based food chain (Blake, 1996). They eat organic matter and thus recycle nutrients that otherwise would collect and remain trapped in the sediments. Benthics are important food for demersal (bottom dwelling) fish and other predators. Additionally, many benthic species such as clams, mussels, oysters, scallops and lobsters are important commercial fishery resources.

The annual or biannual dredging currently performed around the naval piers out to the main ship channel prohibits the development of mature benthic communities. The benthic organisms likely to occur in these areas are short-lived species that are adapted to recurrent disturbance and are capable of rapid recolonization. Shading caused by the wharf associated with the proposed terminal would not have a substantial impact on benthic algae populations.

Beneficial impacts have also been documented because of additional hard structures. A study by Wendt (1990) in Hilton Head found that benthic and oyster diversity values were consistently higher at a marina than at their control site. This was largely due to the additional habitat provided by the physical structures at the marina. In general, the study found a variety of community responses because of muddier sediments, hard substrata provided by docks and pilings, possible organic enrichment of sediments, and possible contamination of sediments by petroleum-derived hydrocarbons. The wharf structure will consist of concrete piles that are slightly porous and non-leaching.

Although oysters can tolerate extreme environmental fluctuations, they are sensitive to changes in conditions associated with creation and operation of dredged material disposal sites, including increases in turbidity, high sedimentation, and chemical contamination. Excessive turbidity clogs the filtering apparatus of oysters, reducing growth, and may ultimately cause mortality. In addition, shellfish such as oysters can bioaccumulate chemical and microbial contaminants in their tissues. The National Shellfish Sanitation Program samples oysters as sentinels of microbial contamination, and the National Status and Trends Monitoring Program use oysters as indicators of the degree and extent of chemical contamination in estuarine waters.

As with estuarine fish, the egg and larval stages of shellfish are more sensitive to suspended-sediment impacts than the adults. Bivalve larvae appear to tolerate relatively high suspended sediment concentrations (up to 400-800 mg/l for oyster larvae for less than 2 days, Wilber and Clarke 2001).

Suspended sediment and resuspended sediment (for attached or burrowing post-larvae) can affect the feeding and growth of bivalves (both larval and adult), and frequent or sustained exposure to high suspended sediment loads is clearly detrimental to most species. It is important to note that oysters in this region are predominantly intertidal, where sedimentation/TSS effects from dredging are negligible.

Most estuarine benthic organisms are adapted to living in an environment subject to periodic resuspension of sediment and can dig out from under a small amount of sediment (Maurer, 1986). Demersal eggs may be particularly vulnerable, however, as only a few millimeters of deposited sediment may prevent them from hatching (Berry et al., 2003), although freshly deposited sediments are subject to nearly immediate resuspension and mixing with the ambient suspended material field (Germano and Cary, 2005). Such mixing has the potential to substantially reduce the effect of the newly introduced sediments on the benthic community field (Germano and Cary, 2005).

Toxic contaminants can adversely impact benthic species. Possible pollution resulting from the addition of heavy metals has been shown to be negatively correlated with species diversity, not because a few pollution-tolerant species increase in abundance as they do in areas of organic enrichment, but rather because the toxicity of these compounds results in an overall decline in the number of species present (Rygg, 1986). Therefore, species diversity on the benthic level is one of the first indicators of released contaminants. Van Dolah (2004) sampled the Cooper

River just to the north of the Proposed Project and found marginal levels of contaminated sediment, while Shipyard Creek was designated poor sediment quality and Beresford Creek showed traces of DDT within the sediment.

Proposed Project stormwater drainage and construction impacts to Shipyard Creek should be minimal because the stormwater treatment facilities should minimize water quality impacts to receiving surface waters. Also, the access roadway for the Proposed Project will affect Shipyard Creek by construction activities (e.g., pile driving) and by shading caused by the elevated roadway over the creek. Essential Fish Habitat discussions below provide more detail on project implications for estuarine species and habitats.

5.2.17.5. Essential Fish Habitat (EFH)

All of the Charleston Harbor's tidally influenced reaches and adjacent wetlands are considered EFH. Specific EFH types in the conceptual project area include salt, brackish and freshwater emergent marshes, intertidal consolidated areas (mudflats), and the estuarine water column. Hydraulically connected wetlands can also be considered as EFH.

EFH impacts at the proposed terminal site (not including the access roadway) include 9.6 acres of tidal marsh, approximately 2.4 acres of shallow (less than 2 ft) subtidal areas, approximately 141.3 acres of deep (greater than 2 ft deep) areas, 3042 linear feet of shoreline, and approximately 2.1 acres of intertidal consolidated areas (mudflats). Besides marsh, the only other EFH designation that occurs in the vicinity is estuarine water column habitat. Also, the proposed access roadway will impact the Shipyard Creek EFH.

Of the 146 total acres of deep and shallow water habitat, dredging for the berth and access area would alter (deepen) 77.9 acres of river bottom and the overlying water column. The container wharf would alter (partially fill) 11.6 acres of river bottom and overlying water column. The container yard/terminal would also require filling 56.6 acres where there now exists subtidal habitat and water column.

Filling of estuarine water column habitat will occur. Shading of estuarine water column habitat also causes an impact. Temporary construction impacts to this EFH include localized increased turbidity and decreased DO near the dredge site. Additional impacts to this EFH as a result of the river deepening include small, localized decreases in DO near the project site, particularly at the river bottom, as well as localized increases in bottom salinities.

The main fishery concerns will be impacts to shrimp and crab, primarily due to the loss of wetlands, which function as nursery areas for these and many other species. Destruction or degradation of this habitat would adversely affect productivity of the shrimp fishery. Increased siltation and/or chemical contamination of sediments in salt marshes or tidal creeks may also adversely impact juvenile shrimp and propagate contaminants through the estuarine food chain.

Commercial crabbing and seasonal eel fisheries also exist in this reach of the Cooper River, and these will likely be impacted.

5.2.17.6. Invasive Species

The Proposed Project would increase future ship traffic, thereby increasing the chance for an accidental release of exotic species into the Charleston Harbor via ship ballast water and, to a lesser extent, within cargo or from ship hulls. Ships carry ballast water to aid in stability, trim (or

balance), and structural integrity. Container vessels are usually equipped with segregated ballast tanks water and carry a maximum of about 15,000 tons (Gollasch, 1997).

Ballast water impacts include introducing plant and animal organisms ranging in size from plankton to small fish. Sediment as well as contaminants may have also been taken on board, especially if the area of intake is shallow (Gollasch, 1997). Exchanging ballast water in the middle of the ocean to reduce the risk of transferring organisms from one ecosystem to another is the primary management tool currently available for ships to control the introduction of invasive species, although this approach is not helpful in controlling domestic port-to-port contamination. To strengthen invasive species management, the Coast Guard has issued regulations mandating ballast water exchange by vessels entering the United States from outside the exclusive economic zone (EEZ). Measures for reducing the risk of exotic species introduction include strict adherence to applicable U.S. and international laws and implementation of voluntary guidelines regarding exchange of ballast water.

The existing upland habitats at the site support many introduced, invasive plant and animal species, including Japanese privet, Japanese honeysuckle, red fire ants, and Asian long horned beetle.

5.2.17.7. Summary of Natural Resources Impacts

In summary, the predicted impacts on Natural Resources from the Proposed Project are as follows:

- Habitat impacts from the proposed terminal include 9.6 acres of tidal wetland, 2.4 acres of freshwater wetland, 75.9 acres of wooded upland, and 146 acres of open water.

- Habitat impacts from the proposed access roadway include 4.2 acres of tidal wetland, 0.4 acres of freshwater wetland, 6.5 acres of wooded upland, and 0.8 acres of open water.

- The Proposed Project will cause small, localized decreases in DO near the project site, particularly at the river bottom. In general, crabs and shrimp (especially bottom-dwellers) are considered more vulnerable to low dissolved oxygen than are vertebrate fish.

- EFH impacts from loss of habitat include 13.8 acres of tidal marsh (9.6 acres from the proposed terminal and 4.2 acres from the proposed roadway), 2.4 acres of shallow, subtidal waters (< 2 ft), 141.3 acres of deep water (> 2 ft), 3042 linear feet of shoreline, and 2.1 acres of mudflats. EFH impacts from modification of habitat include 101.9 acres of deep water.

- Crab and shrimp are the EFH species most likely to be impacted by the Proposed Project (i.e., direct short-term impacts as a result of dredging activities).

- The Proposed Project would increase future ship traffic, thereby increasing the chance for an accidental release of aquatic exotic species into the Charleston Harbor via ship ballast water and, to a lesser extent, within cargo or from exterior ship hulls.

5.2.18. Threatened and Endangered Species

This section addresses species that have been placed on the Federal or state list of endangered and threatened wildlife and plants, including candidate species, and any species of concern that may be found within the study area shown in Figure 5.1-23. It is important to note that while Section 4.17 (i.e., Natural Resources) describes habitats and species observed in the study area, this section focuses on the potential for threatened, endangered, and rare species of concern to inhabit areas within or near the Proposed Project site.

South Carolina supports 22 Federally listed animals and 19 Federally listed plants, according to the USFWS. Only one individual, a bald eagle, was observed during the wildlife surveys or in subsequent field visits to the site. Habitats critical to the recovery of listed species have been considered during impact evaluations.

5.2.18.1. Federally Listed Species

The anticipated impacts to Federally listed species identified in Section 4.18 that potentially inhabit or transit the study area (Figure 5.1-23) are described in the following paragraphs.

Bald Eagle

Eagles need several features in their habitat for nesting, feeding, and roosting. They nest in large trees, often those that have bare branches or are dead but standing and in a sparsely forested area. Their nests are very large and often found along rivers, lakes, or marshes, near foraging areas for fish, waterfowl, or carrion. During field surveys, one bald eagle was seen over Shipyard Creek. Another sighting occurred in the lower Cooper River near Crab Bank in the same week. Over a two year period, no other sightings occurred. Both sightings were of an individual eagle being harassed by a pair of osprey. It is likely that the breeding pair at the Cooper River Marina deters eagles from foraging in the area, as eagles will steal prey from osprey and prey on their nestlings. The Proposed Project would not harm individual eagles or destroy or damage any critical habitat for this species; therefore the Proposed Project will have no effect on bald eagles.

Shortnose Sturgeon

The shortnose sturgeon is the only sturgeon listed as endangered or threatened in South Carolina. In the Cooper River, shortnose sturgeon spawn at the base of the Pinopolis dam (over 40 miles upriver of Proposed Project), where larvae and juveniles are also found. As they get older they migrate downstream, residing at the fresh/salt-water interface near Bushy Park (over 12 miles upriver of the Proposed Project).

Because shortnose sturgeon rarely enter the lower reaches of the Cooper River, much less the open ocean, it is very unlikely that the Proposed Project will affect them or their critical habitats.

American Alligator

Although no alligators were observed in the project area during field observations, the species could potentially be found passing through this area in search of suitable freshwater habitat in an effort to expand their range. However, the Proposed Project is expected to have a negligible impact on this species.

Sea Turtles

Four sea turtle species that are listed as endangered or threatened are found along the South Carolina coast. These are the Kemp's (Atlantic) Ridley turtle, green turtle, leatherback turtle, and loggerhead turtle. No turtle observations for the Cooper River reach where the Proposed Project activity will occur have been recorded. The Proposed Project would likely employ a stationary dredge that poses less of a risk to turtles. Research by USACE and historical data indicate that hopper dredges in a given situation are much more likely to cause adverse impacts to sea turtles than stationary dredges (hydraulic pipeline, clamshell).

Of the species listed, loggerhead turtles are the only ones who appear to transit estuarine habitat, although they tend to remain in the river mouths/inlets. Hopper dredging of the Charleston Harbor Inlet has entrained several loggerhead turtles. From 1991 to 1997, eight turtles were taken (Reine and Clarke, 1998). Again, cutterhead dredging is much slower and occurs in more inland areas where turtles do not usually occur. Therefore, the risk of entrainment impacts is negligible for the Proposed Project.

Ship strikes offshore and within the navigation channel are higher risk activities that can potentially affect all sea turtle species. The Southeast Fisheries Science Center (SEFSC) records and publishes sea turtle strandings along the entire East Coast. Table 5.2-17 provides the latest data for zone 32, which comprises the southern half of the South Carolina coast. As seen in the table, loggerheads represent the majority of strandings.

Table 5.2-17. SEFSC Sea Turtle Strandings for the Lower Half of the South Carolina Coast (2002 - 2005).

Year	Loggerhead	Green	Leatherback	Hawksbill	Kemp's Ridley	Unknown
2002	57	6	4	0	7	3
2003	78	3	7	0	9	2
2004	81	4	10	0	15	1
2005	48	6	1	0	8	2
Average	**66**	**5**	**6**	**0**	**10**	**2**

In terms of ship strikes, turtle stranding research has implicated all watercraft, from jet skis to container vessels. The increase in container vessel traffic as a result of the Proposed Project will have negligible effect.

Manatee

Dredging and filling of open water areas could potentially harm manatees, if this occurs in the warmer summer months when manatees may be present. Collision with small, fast-moving boats accounts for about 25 percent of human-related manatee deaths; therefore tugboats, harbor pilot boats, and work skiffs can impact manatees. Large, deep-draft vessels can also harm manatees, although manatees typically prefer shallower areas where vegetation is found.

The Proposed Project site is lacking in abundant submerged aquatic vegetation and slow-moving waters for suitable manatee habitat, but they have been observed here infrequently. The Proposed Project is not likely to affect manatees; although manatee precautions will be enacted during project construction.

Whales

Several whale species are listed as Federally endangered and are documented to occur in South Carolina: humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter catodon*), blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), Sei whale (*Balaenoptera borealis*), and the northern right whale (*Eubalaena glacialis*).

The Proposed Project will have no effect on the blue, sperm, fin, and Sei whales because they are rare visitors to the South Carolina coast (see Section 4.18). The humpback and right whale species could potentially be found in transit near the Charleston Harbor mouth and adjacent coastal areas while migrating; however, it would be unlikely that they would be found in the Cooper River and near the Proposed Project as these species do not often enter rivers.

The northern right whale is of particular concern because these whales are the world's most endangered large whale. The death of a calf or a female is a serious loss to the right whale population as there are only 250 to 300 individuals left, and their reproductive ability is very limited.

Impacts to the right whale from the Proposed Project include an indirect increase in underwater noise, which can hamper mating and hunting, and an indirect increased risk of collision with ships. Due to the precarious population size, indirect impacts associated with the Proposed Project have undergone a thorough analysis through the Federal consultation process, as well as detailed analysis regarding ship traffic. The proposed terminal would increase container vessel traffic by approximately 1.8 ships/day in 2022 when the terminal is operating at full capacity. Table 5.2-18 presents the vessel traffic estimates as a result of the proposed terminal expansion. Note that the term 'trip' represents a one-way passage; therefore it includes arrivals and departures separately.

Table 5.2-18. Estimated Ship Traffic Increase due to the Proposed Project.

Year	Trips	TEUS	Arrivals	Arrivals/week	Arrivals/day
2006	0	0	0	0	0
2007	0	0	0	0	0
2008	0	0	0	0	0
2009	0	0	0	0	0
2010	0	0	0	0	0
2011	0	0	0	0	0
2012	300	330,000	150	2.9	0.4
2013	400	440,000	200	3.8	0.5
2014	500	550,000	250	4.8	0.7
2015	600	660,000	300	5.8	0.8
2016	700	770,000	350	6.7	1.0
2017	800	880,000	400	7.7	1.1
2018	900	990,000	450	8.7	1.2
2019	1000	1,100,000	500	9.6	1.4
2020	1100	1,210,000	550	10.6	1.5
2021	1200	1,320,000	600	11.5	1.6
2022	1300	1,430,000	650	12.5	1.8

Year	Trips	TEUS	Arrivals	Arrivals/week	Arrivals/day
2023	1300	1,430,000	650	12.5	1.8
2024	1300	1,430,000	650	12.5	1.8
2025	1300	1,430,000	650	12.5	1.8

GEC, 2006

For 2003 (the most recent data available to date), the USACE reported over 5,335 self propelled vessel arrivals to Charleston Harbor (including tankers, dry cargo, passenger ships, tows and tugs) (Table 5.2-19). These records do not document Navy, USCG, NOAA ships, and mega-yachts, among others. Therefore, at full operation in 2022, an approximate 12% increase to Charleston Harbor ship traffic will occur as a result of the container port expansion when compared to existing (2003) traffic.

Table 5.2-19. 2003 Charleston Harbor Inbound Vessel Traffic.

			Inbound (arrivals)				
			Self Propelled			Non-self Propelled	
		TOTAL	Passenger and Dry Cargo	Tanker	Tow or Tug	Dry Cargo	Tanker
Charleston	Foreign	*2260*	2101	155	3	1	-
	Domestic	*4962*	-	43	2681	1881	357
Shipyard River	Foreign	*75*	66	9	-	-	-
	Domestic	*685*	-	12	260	391	22
Ashley River	Domestic	*5*	-	-	5	-	-
	TOTALS		2167	219	2949	2273	379
			5335			**2652**	

Domestic shipping is included in the overall total because, according to tonnage, 89% of all cargo is transported via the coast (as opposed to the Intracoastal Waterway). It must be noted that domestic tugs/towing vessels are slower and shallower draft than most foreign vessels.

In considering that no documented right whale ship strikes have occurred in South Carolina, the Proposed Project is not likely to affect the species. NMFS has developed and proposed many management measures for the right whale and any increased shipping from the Proposed Project will comply with regional management plans in order to prevent ship strikes.

Other Species

The surveys discussed in Section 4.18 concluded that the flatwoods salamander, wood stork, red-cockaded woodpecker, Bachman's warbler, piping plover, and roseate tern are not expected to occur in the study area. Therefore, their status is not expected to be affected by the Proposed Project.

5.2.18.2. State Listed Animals and Animals of Conservation Concern

Section 4.18 stated that of the 30 state endangered or threatened (or of concern) species occurring in Charleston County two are known to occur in the study area: the brown pelican and the least tern.

The nesting colonies of brown pelicans occurring in the study area are at Crab Bank and Castle Pinkney. While the pelican may be seen aloft or feeding near the proposed terminal site, it is unlikely that the development of the proposed terminal will impact the nesting colonies or food supply.

Historically, least terns have nested on the rooftops of buildings at the proposed terminal site. The last known nesting was in 2001; no active nesting occurred at the proposed terminal site from 2004-2006 (SCDNR National Heritage Inventory, 2006). For the Proposed Project, buildings will be demolished that have been used as nesting sites in the past. The Proposed Project is unlikely to affect the least tern population.

5.2.18.3. Summary of Threatened and Endangered Species Impacts

The Proposed Project is expected to have no effect on the following Federally-listed species identified to potentially inhabit or transit the study area: bald eagle, shortnose sturgeon, and American alligator. Other Federally-listed species potentially occurring in the study area include sea turtles, manatees, humpback whales, and right whales.

Dredging and filling activities have the potential to affect sea turtles and manatees. The dredging technique expected to be employed during the construction of the Proposed Project, i.e., a cutterhead dredge, is much slower than other dredges and will occur in an inland area where sea turtles and manatees do not usually occur. Also, the predicted increase in vessel traffic by 1300 trips per year resulting from the Proposed Project at build-out may affect, but is not likely to adversely affect, the loggerhead sea turtle, manatee, humpback whale, and right whale. No impacts to designated Critical Habitat would occur.

The Proposed Project is not expected impact the two State listed species known to occur in the study area: the brown pelican and the least tern.

5.2.19. Shorelines

Direct impacts to shorelines would be caused by construction of the terminal and wharf. The shorelines under the wharf at the project site would be stabilized by a rock dike with armor stone below the low water line and a sheet pile wall above the low water line. The areas immediately adjacent to the terminal would have reduced current velocities in these areas, which may cause these areas to accrete. The closest the dredged berth and access area would come to the adjacent shorelines is about 1,000 ft. Therefore, it is not expected that the proximity of the deepened berth and access area would cause erosion to the adjacent shorelines.

The Proposed Project would cause additional container ship and tug traffic (a 12% increase in Charleston Harbor deep-draft vessel traffic), and the associated increase in ship wakes would affect the study area shorelines. The increase in ship wake frequency may increase erosion of unstabilized shorelines in the harbor. However, the vessel wakes would continue to be solitary and infrequent in comparison to wind waves, and they would still be a minor factor contributing to shoreline erosion (other factors that would continue to erode shorelines include wind waves, wakes from recreational vessels, tidal currents, and sea level rise). Therefore, impacts to shorelines near important cultural resources such as Fort Sumter and Castle Pinckney and eroding areas such as the southern end of Sullivan's Island and Crab Bank caused by vessel wakes would be minimal.

The potential effect of propwash on the shoreline stability of Daniel Island is evaluated in Appendix DD. Large tugs would assist the turning of container ships in the berth and access

area located on the Daniel Island Range of the federal navigation channel in the Lower Cooper River. These tugs would generate a current field behind the ship propeller (propwash). Based on the calculations in Appendix DD, it is expected that the tug operations would not cause measurable erosion of the Daniel Island shoreline.

In summary, the Proposed Project would cause negligible adverse impacts to shorelines as a result of the terminal construction and increased vessel traffic.

5.2.20. Floodplains

The Proposed Project would result in direct impacts associated with the development of the proposed terminal and the proposed access roadway. The proposed terminal would directly affect flooding of the project site by raising existing ground elevations in flood zones. Most of the proposed terminal would be constructed on compacted fill, graded and paved for container storage and handling. Specific changes to the flood zones are provided in the following paragraphs.

Approximately 46 percent of the proposed terminal site (mostly container and support areas) is currently located in flood zone AE with a Base Flood Elevation (BFE) from 13 ft to 14 ft, NGVD29. After fill has been added, the post-project ground elevations for the container yard and support facilities would range from 14 ft to 16 ft, NGVD29. Therefore, these areas would not flood during the 100-yr event.

Approximately 29 percent of the proposed terminal site is currently in a VE zone with a BFE from 14 ft to 16 ft, NGVD29. This includes container areas, support facilities and the wharf. The wharf would be at an elevation of 16 ft NGVD29, and the grade would gently slope westward to an elevation of 14 ft NGVD29. The wharf would not flood during the 100-yr event. Container yard and support facility areas in the VE zone may flood up to 2 ft during a 100-yr event. Storm preparedness plans should contain contingencies to secure any containers that are stored in VE zones.

The remaining 25 percent is currently classified as zone X because it is an area surrounded by levees (it is an old CDF). This area is surrounded mostly by zone AE and, to a much lesser extent, some zone VE. Some of this area would become a stormwater detention pond with the berm along the south side of the stormwater pond at elevations between 14 and 16 ft NGVD29, and the rest of the area would be container storage areas at elevations between 14 and 16 ft NGVD29. Given the BFE of the adjacent AE zone ranges from 13 ft to 14 ft, NGVD29, it is expected that most of this area would not flood during a 100-yr event for the post-project conditions. However, given that the BFE of the adjacent VE zone ranges from 14 ft to 16 ft, NGVD29, a smaller portion of this area would potentially flood up to 3 ft during a 100-yr event for the post-project conditions.

Because the site is located in FEMA flood zones, National Flood Insurance Program regulations (NFIP, 44 CFR 60.3) would apply to portions of the project site in flood zone areas. In addition, local flood ordinances of Charleston County and North Charleston may require equal or stricter building and development requirements than the minimums specified by FEMA.

Typically, development in AE zones can be undertaken if it can be demonstrated that no rise would occur to the existing FEMA 100-yr flood elevations as a result of constructing in the 100-yr flood plain. The project site is located in a tidal estuary, and the FEMA computed 100-yr flood elevation at the project site is based on hurricane storm surge from the Atlantic Ocean. The volume of the infilling caused by the project is extremely small as compared to the volume of

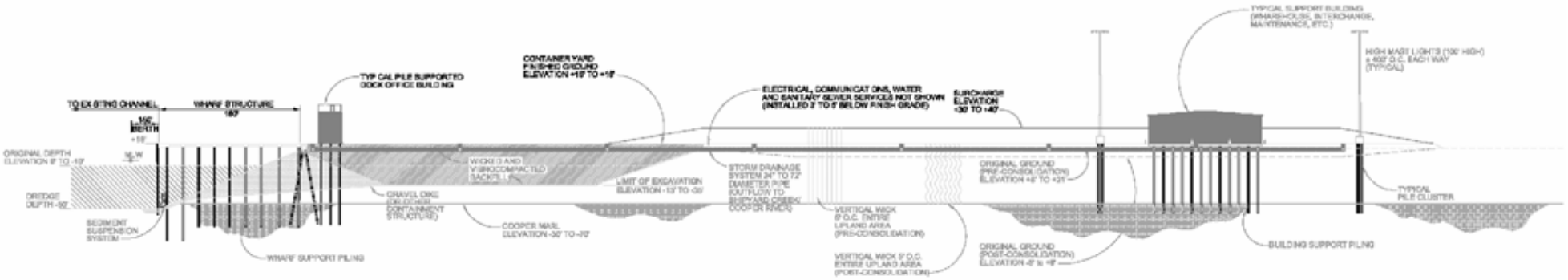
storm surge water that would flood the region during a 100-year storm surge event. Therefore, the Proposed Project would not cause any appreciable increase in the 100-yr flood elevations.

The Charleston County flood ordinance prohibits fill in the V-Zone. However, the ordinance also allows for variances to be issued for new construction necessary for the conduct of a functionally dependent use. Functionally dependent use means a use which cannot perform its intended purpose unless it is located or carried out close to water, such as a docking or port facility. Therefore, the Proposed Project would likely be required to obtain a variance for the fill in the V-Zone.

Another flooding mechanism of concern is increased runoff from additional impervious areas that could cause localized flooding during storm events. However, the Proposed Project would be constructed in accordance with applicable federal, state and local regulations and it would not increase flooding at other properties.

The proposed access roadway would traverse flood zones AE and X. Placement of fill for construction of the road bed could alter existing flood zones. However, the roadway would be designed to avoid adverse impacts to flooding, and the bridge crossing at Shipyard Creek would meet the appropriate American Association of State Highway and Transportation Officials (AASHTO) and SCDOT guidelines for flood design.

In summary, the Proposed Project would change elevations within the floodplain. Some areas within the terminal and roadway boundaries would still flood during 100-year return period storm surge events. However, the Proposed Project would cause negligible adverse impacts to flooding in areas outside the project footprint.



SECTION

(ELEVATIONS BASED ON MLW)

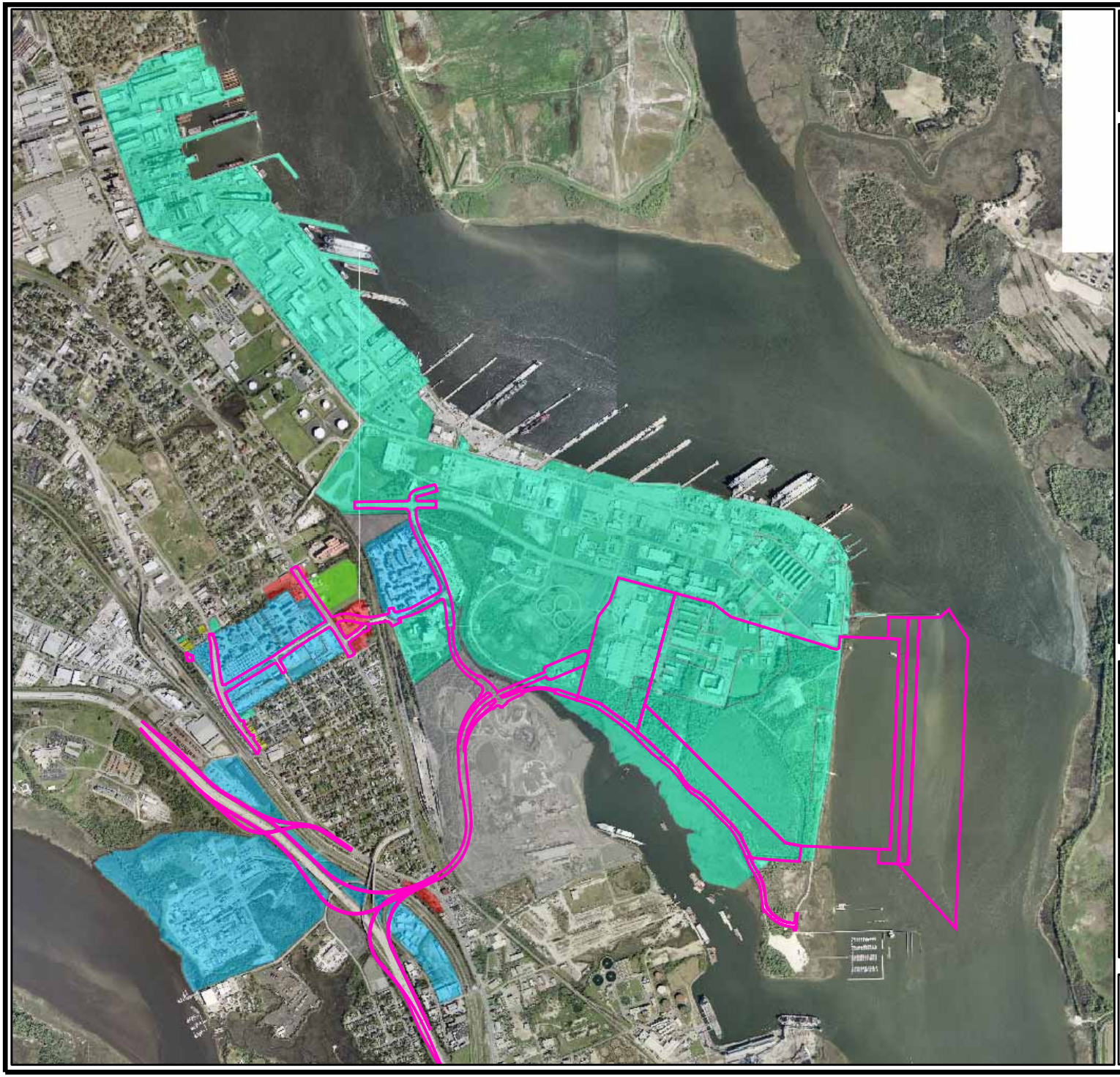
PRELIMINARY

INFORMATION PROVIDED ON THIS DRAWING IS CONCEPTUAL AND PROVIDED FOR PLANNING AND PERMITTING PURPOSES ONLY.

Figure 5.2-1

Schematic Cross-Section of the Proposed Terminal Facility

US Army Corps of Engineers
Charleston District



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Proposed Project

Land use

- Commercial
- Industrial
- Institutional
- Parks/Recreation
- Residential
- Vacant

0 1,000 2,000 4,000

Feet

Map Scale 1:24,000

N

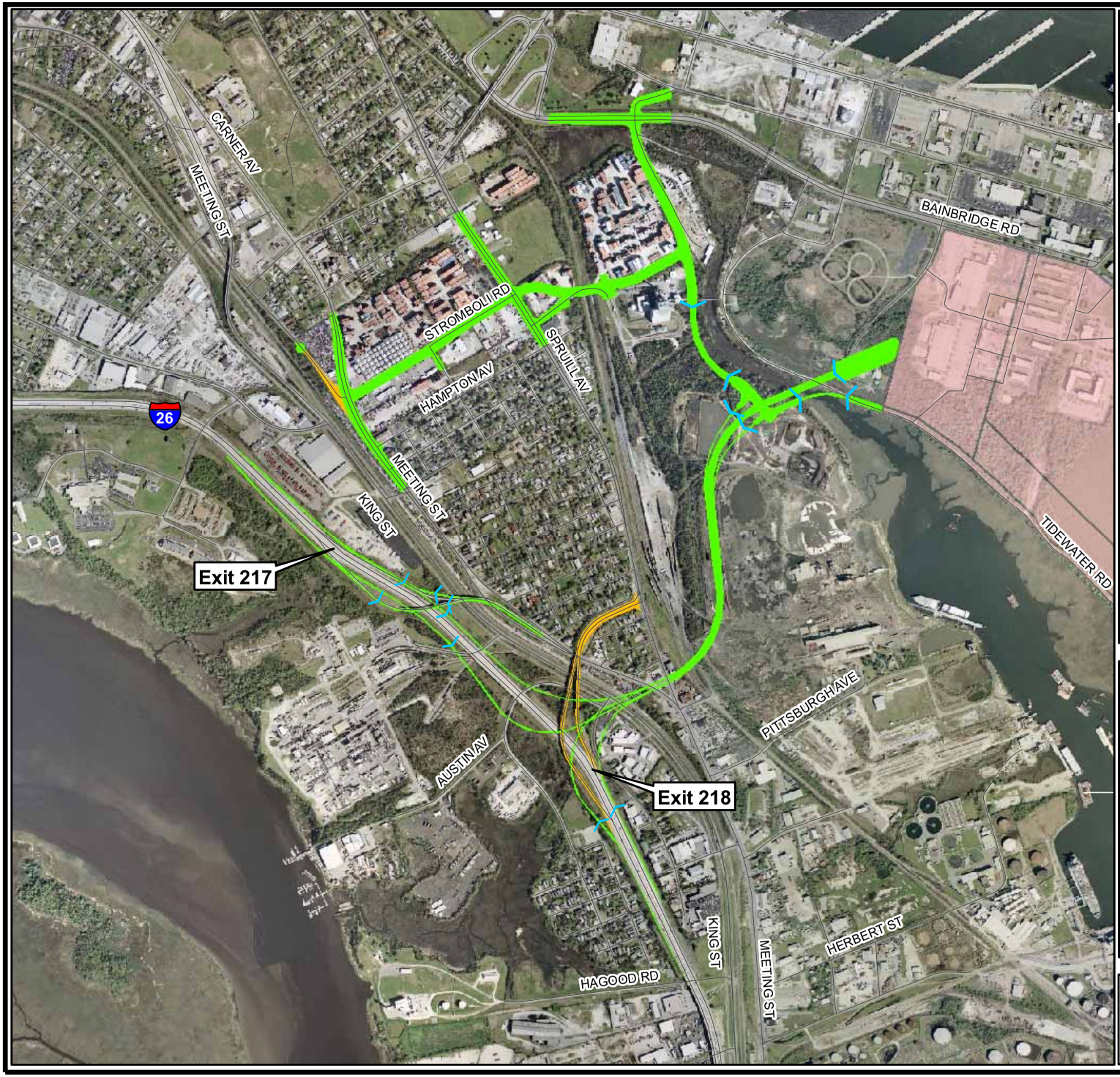
W E

S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.2-2
Land Parcels Impacted by the Proposed Project

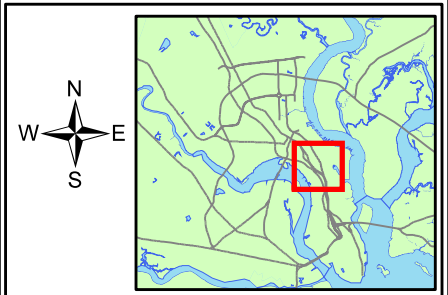


EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Proposed Access Roadway
- Abandoned Areas
- Proposed Terminal
- Bridge Limits

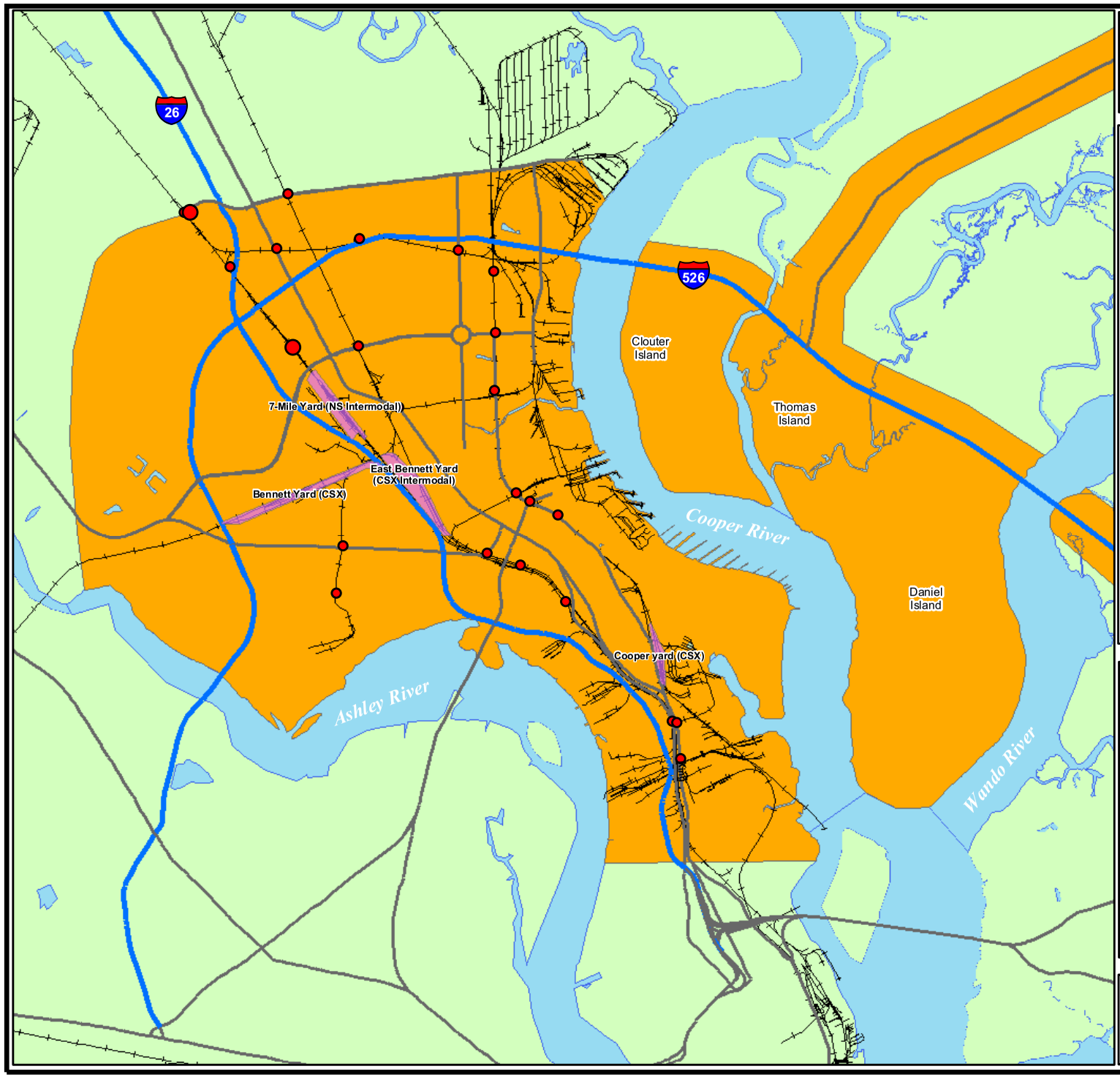
0 500 1,000 2,000
Feet
Map Scale 1:16,000



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.2-3
Location of Proposed Access Roadway Alternative, Alternative 1D



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- RailXings
- Railways
- Rail Yards
- Transportation Study Area

0 0.5 1 2

Miles

Map Scale: 1:80,000

N W E S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.2-4
Locations of Railway Crossings & Railyards in the Study Area

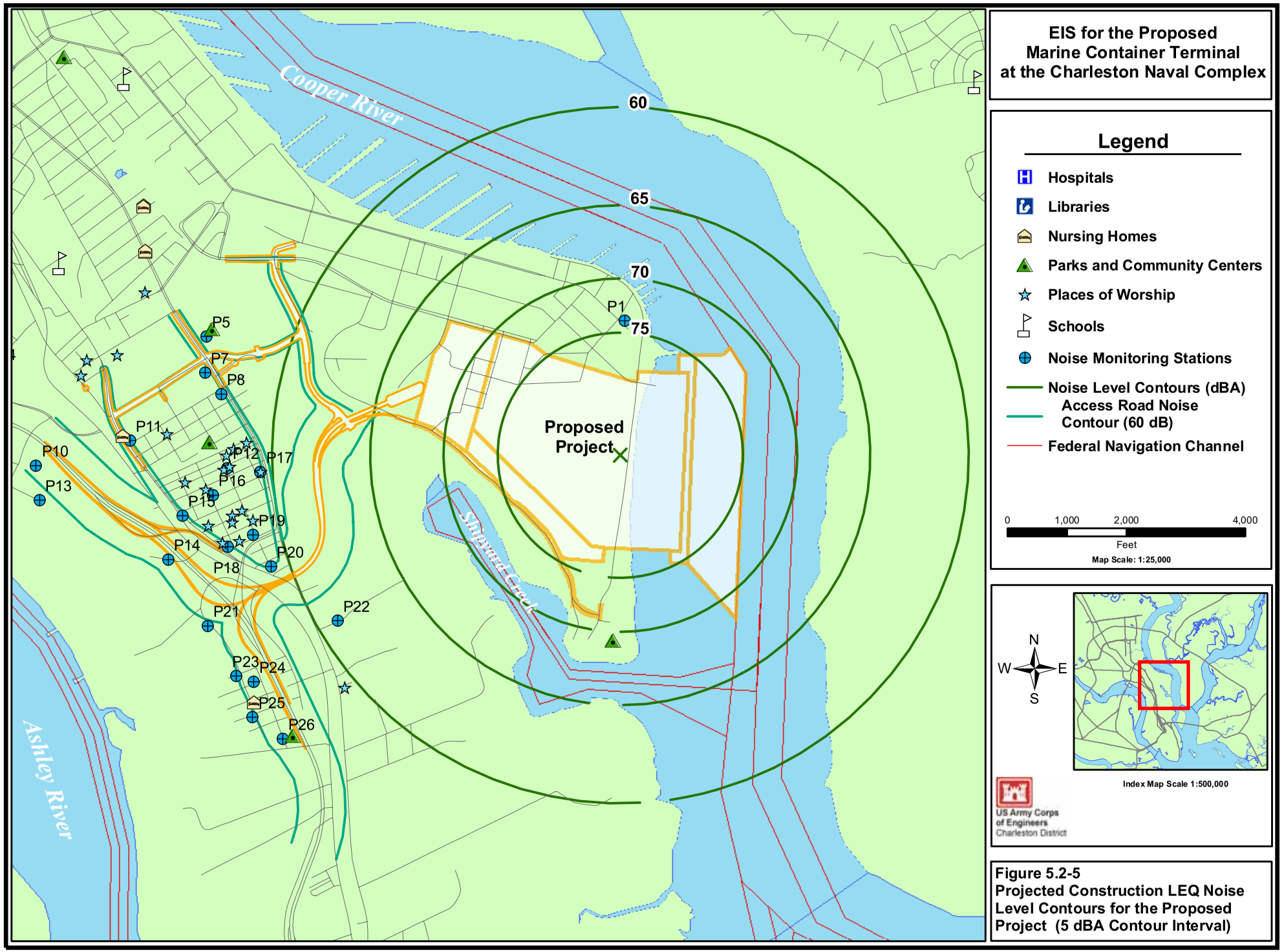


Figure 5.2-5
Projected Construction LEQ Noise Level Contours for the Proposed Project (5 dBA Contour Interval)

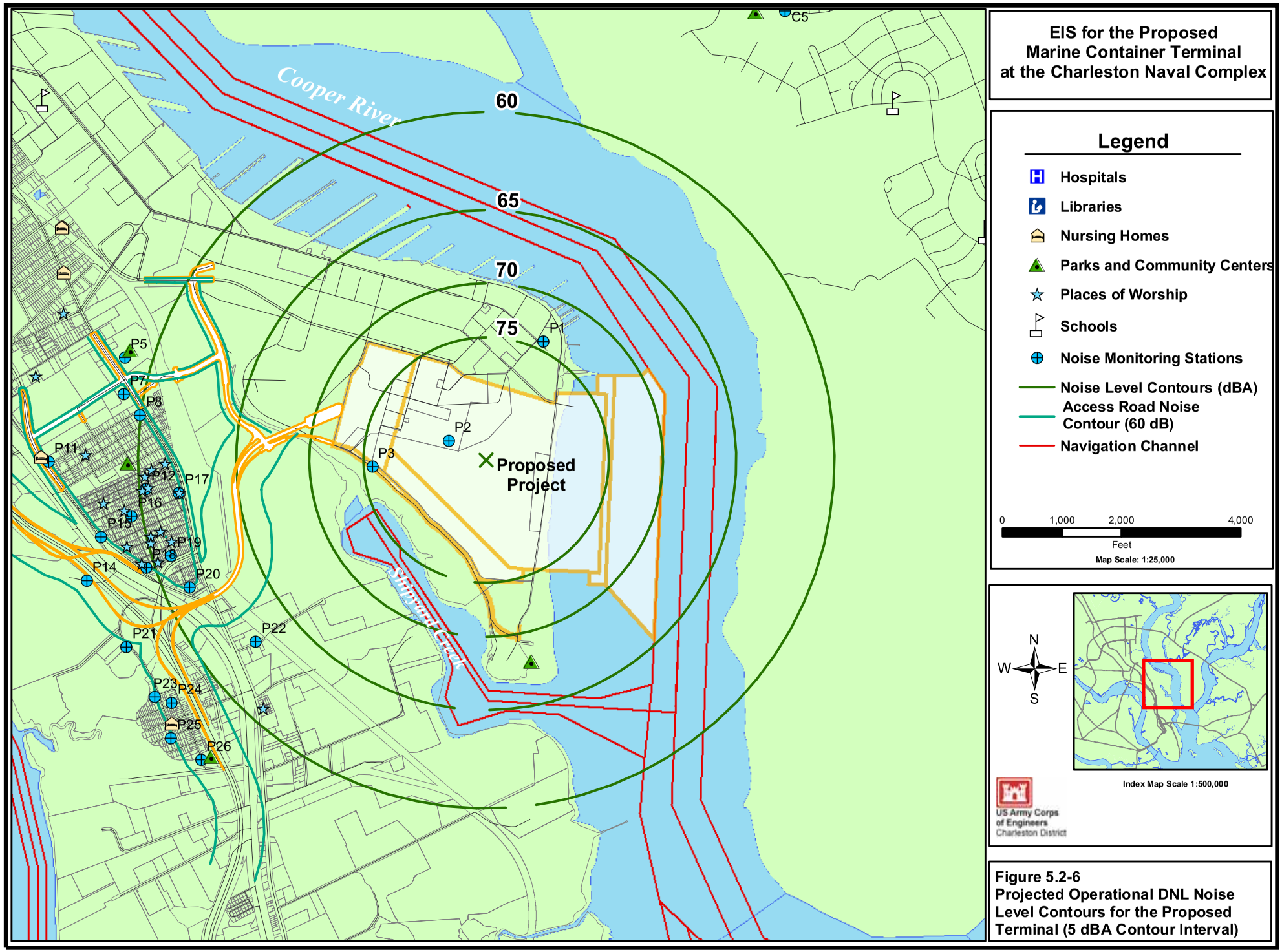
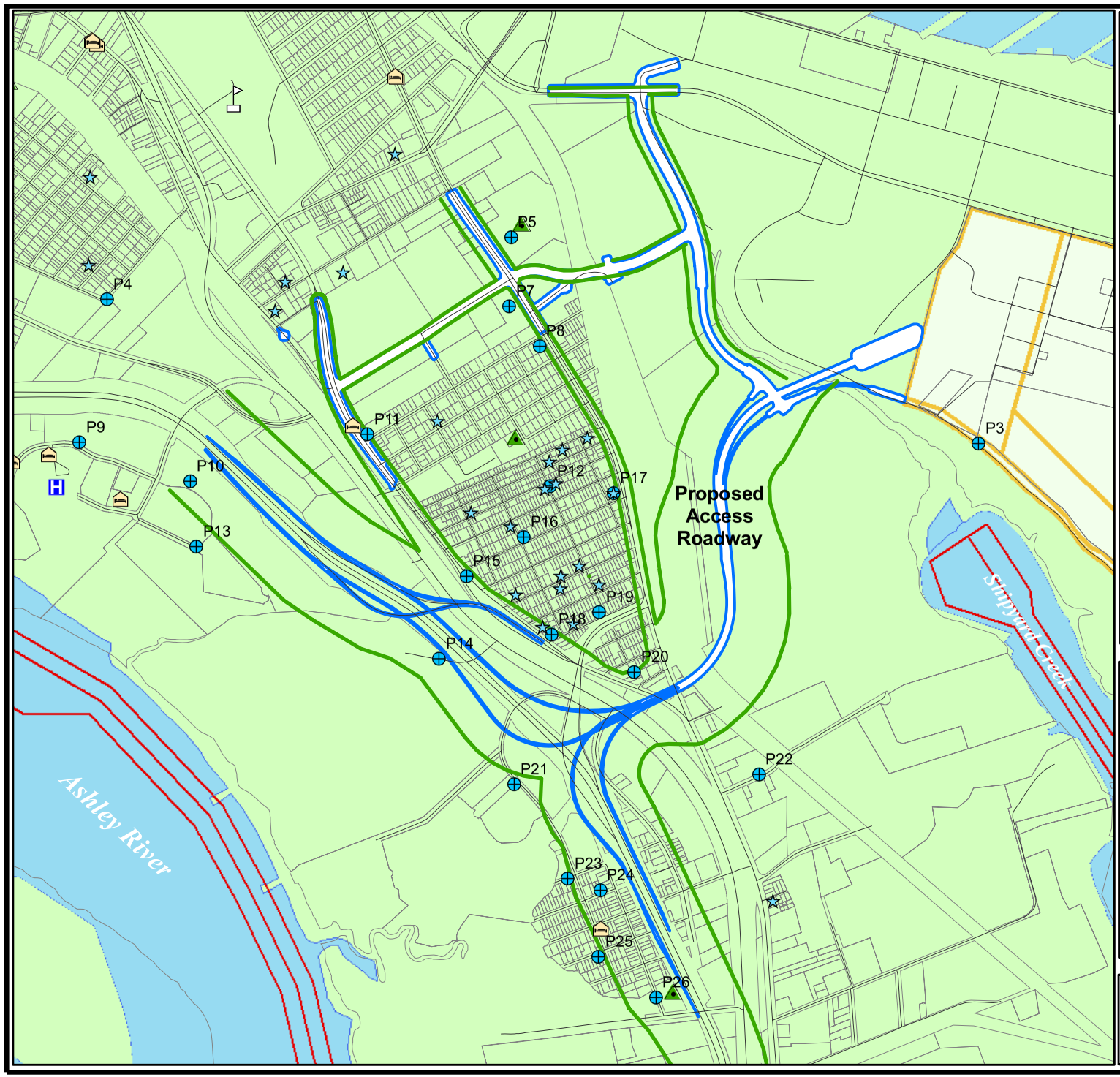


Figure 5.2-6
Projected Operational DNL Noise Level Contours for the Proposed Terminal (5 dBA Contour Interval)



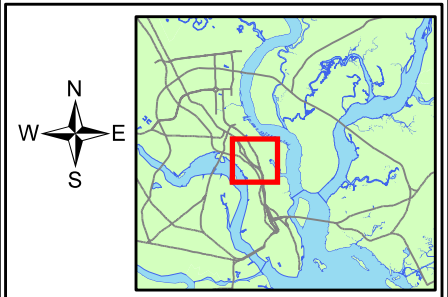
EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Hospitals
- Libraries
- Nursing Homes
- Parks and Community Centers
- Places of Worship
- Schools
- Noise Monitoring Stations
- Access Road Noise Contour (60 dB)
- Proposed Access Roadway
- Proposed Terminal

0 500 1,000 2,000
Feet

Map Scale: 1:25,000



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.2-7
Projected 66 dBA Noise Level Contour along the Proposed Access Roadway

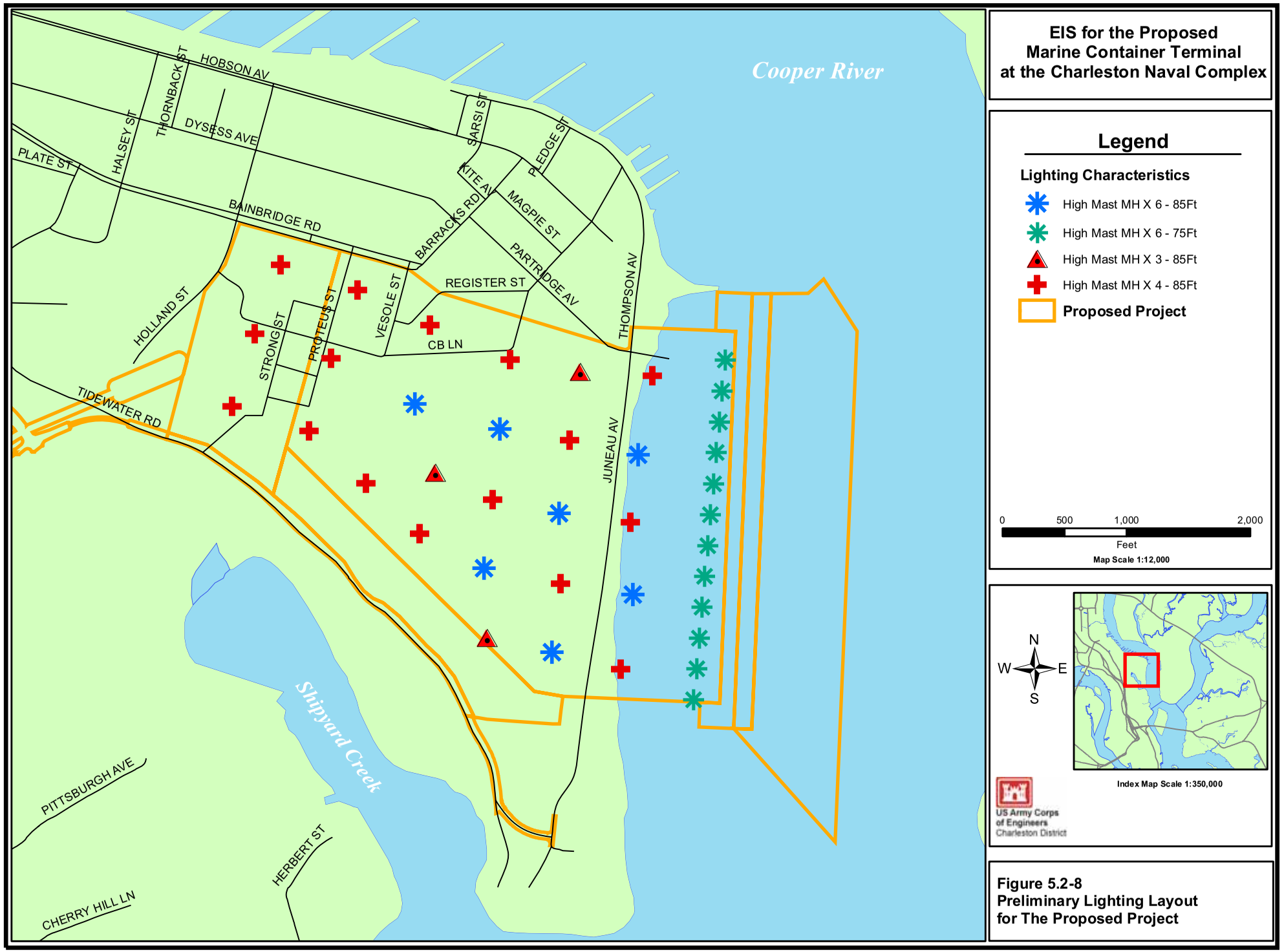


Figure 5.2-8
Preliminary Lighting Layout
for The Proposed Project

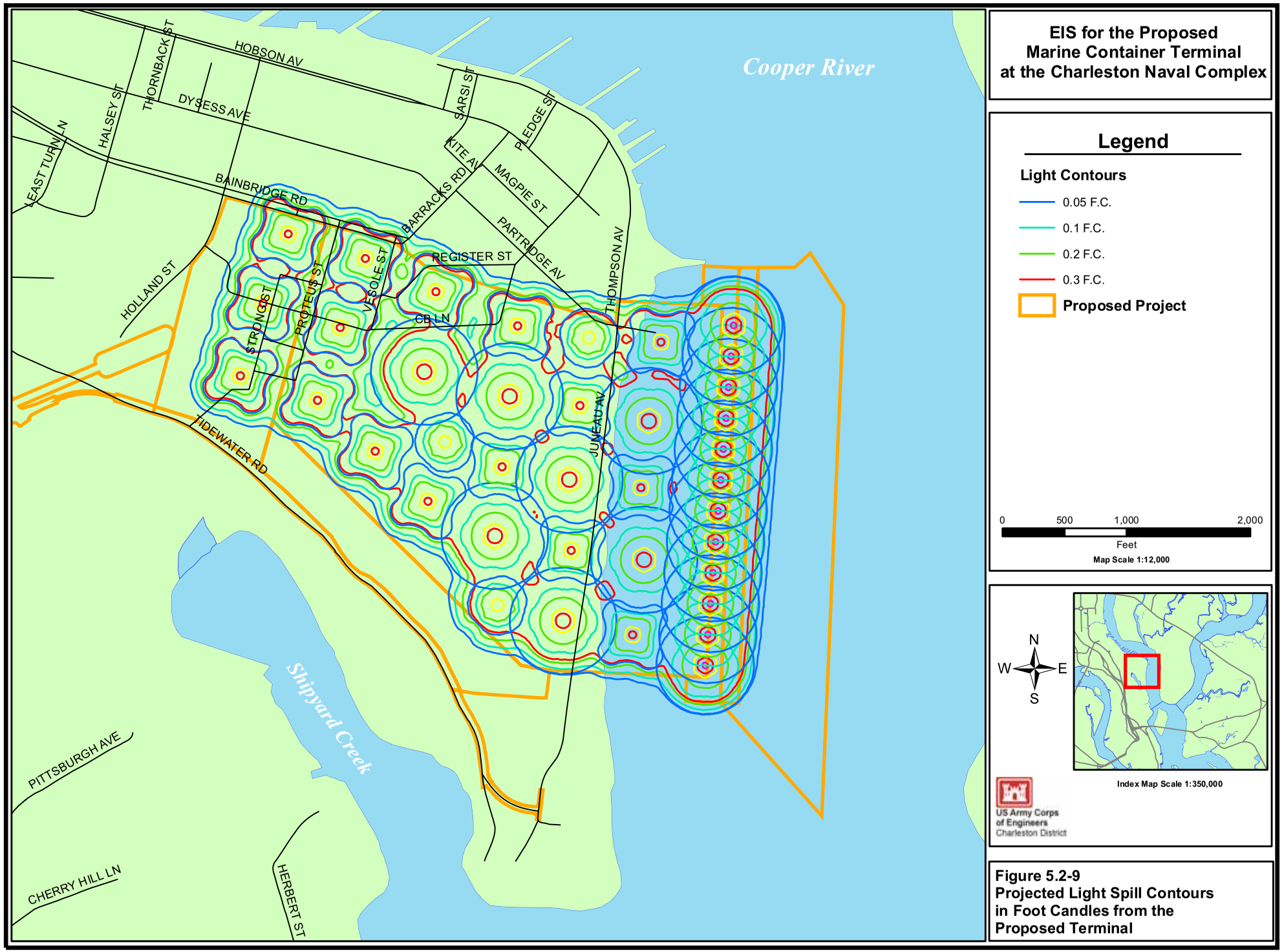
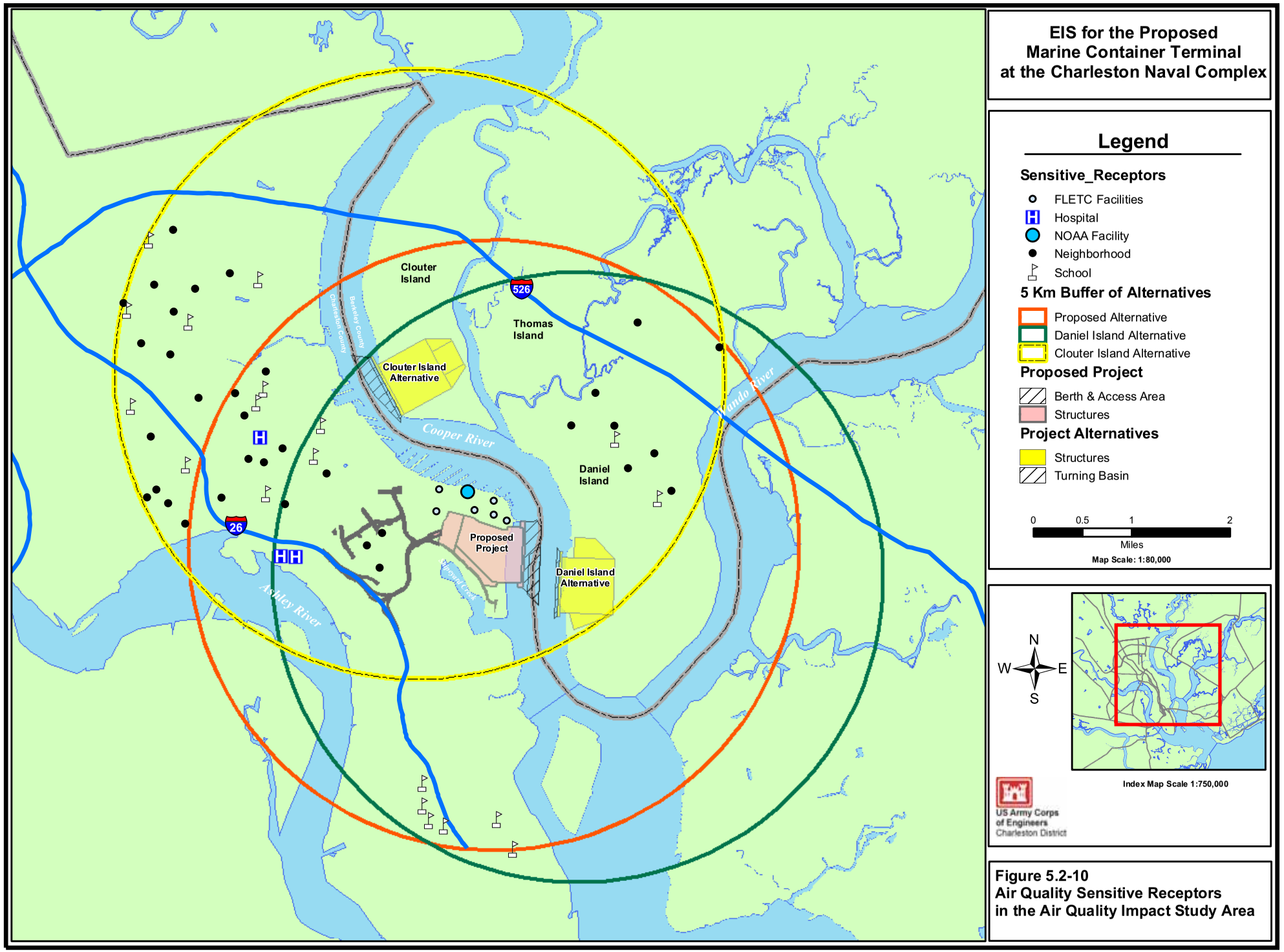
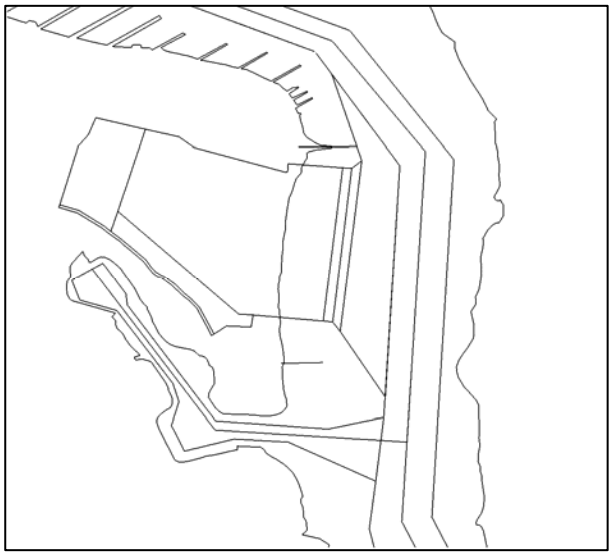


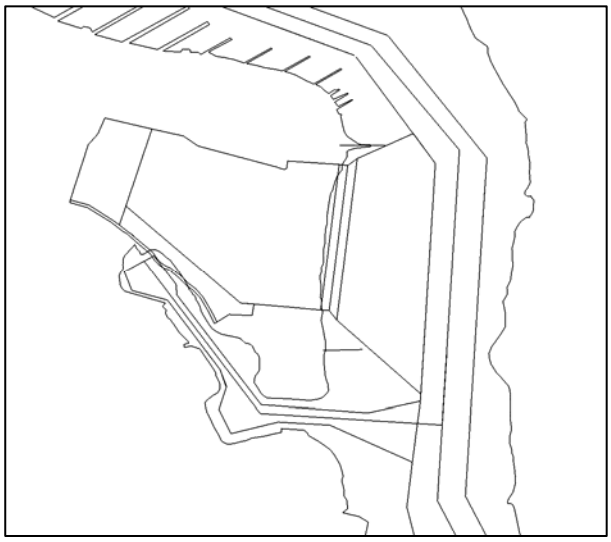
Figure 5.2-9
Projected Light Spill Contours in Foot Candles from the Proposed Terminal


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Sensitive_Receptors
FLETC Facilities
Hospital
NOAA Facility
Neighborhood
School
5 Km Buffer of Alternatives
Proposed Alternative
Daniel Island Alternative
Clouter Island Alternative
Proposed Project
Berth & Access Area
Structures
Project Alternatives
Structures
Turning Basin
0 0.5 1 2
Miles
Map Scale: 1:80,000
Clouter Island
Thomas Island
Clouter Island Alternative
Cooper River
Daniel Island
Proposed Project
Daniel Island Alternative
Ashley River
Wando River
Berkeley County
Charleston County
526
26
N
W
E
S
Index Map Scale 1:750,000
US Army Corps of Engineers
Charleston District
Figure 5.2-10
Air Quality Sensitive Receptors
in the Air Quality Impact Study Area

Proposed Project layout:



Option A layout:



Option B layout:

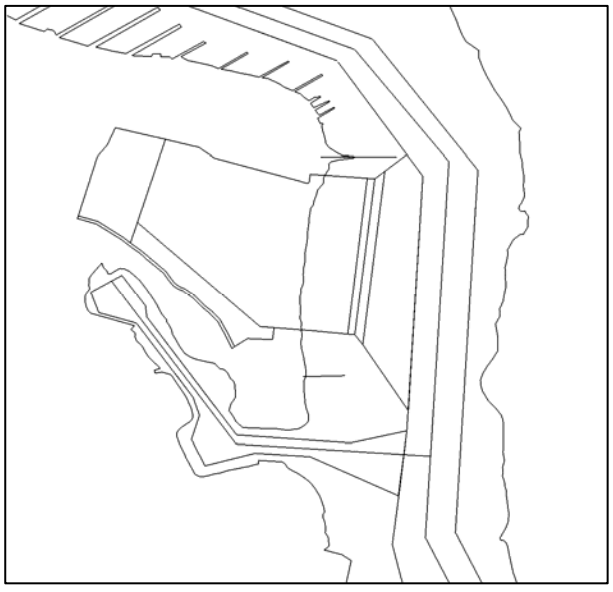
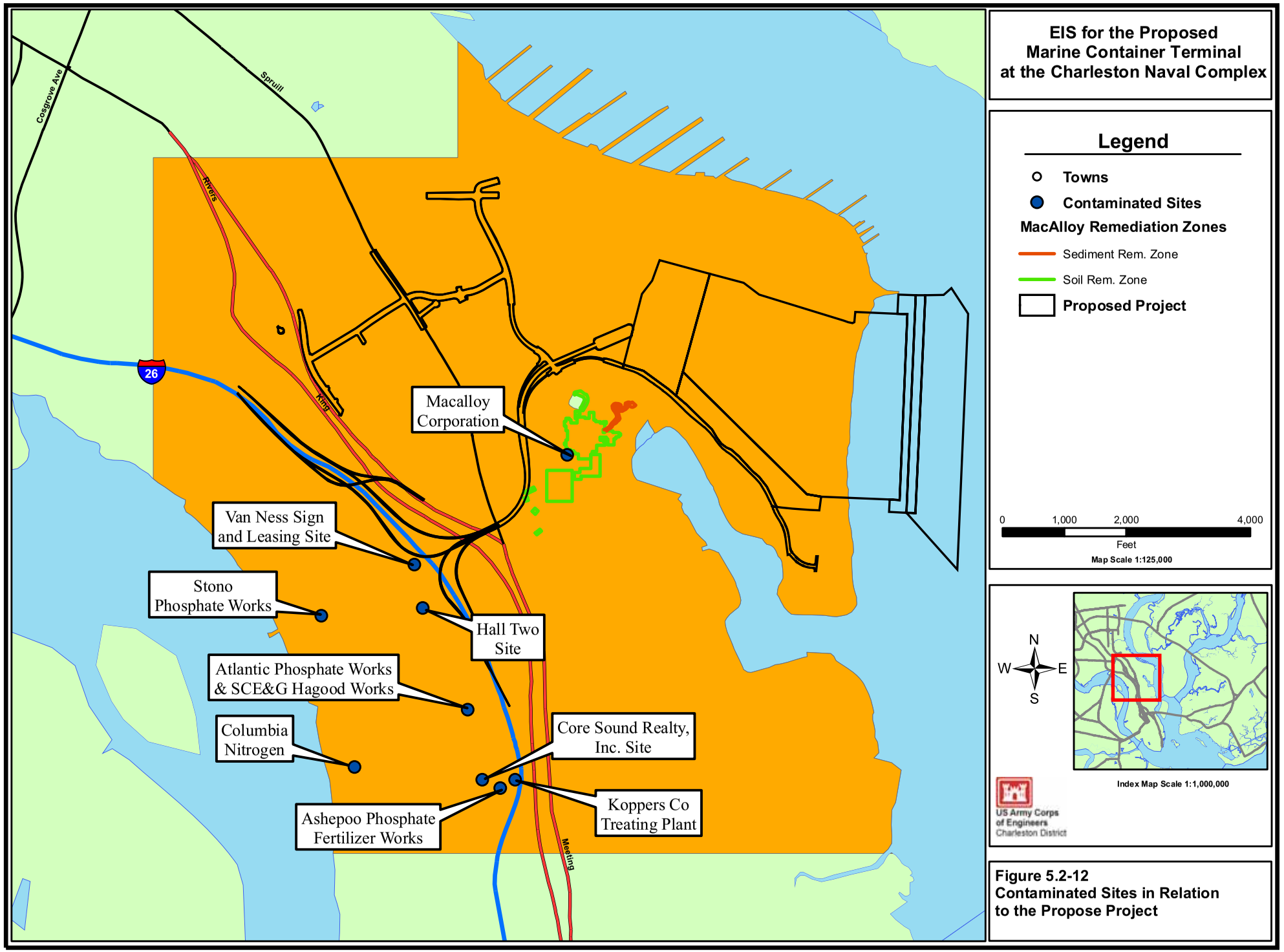


Figure 5.2-11
Sedimentation Model Simulated Design Options.

US Army Corps
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Charleston District


EIS for the Proposed
Marine Container Terminal
at the Charleston Naval Complex
Legend
Towns
Contaminated Sites
MacAlloy Remediation Zones
Sediment Rem. Zone
Soil Rem. Zone
Proposed Project
0
1,000
2,000
4,000
Feet
Map Scale 1:125,000
N
W
E
S
Index Map Scale 1:1,000,000
US Army Corps
of Engineers
Charleston District
Figure 5.2-12
Contaminated Sites in Relation
to the Propose Project
Cosgrove Ave
Spruill
Rivers
King
Meeting
26
Macalloy
Corporation
Van Ness Sign
and Leasing Site
Stono
Phosphate Works
Hall Two
Site
Atlantic Phosphate Works
& SCE&G Hagood Works
Columbia
Nitrogen
Core Sound Realty,
Inc. Site
Koppers Co
Treating Plant
Ashepoo Phosphate
Fertilizer Works



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Proposed Terminal

CNC Land Cover Impacts

- Barren
- Freshwater Wetlands
- Impervious
- Maintained Grass
- Revegetated CDF
- Tidal Wetlands
- Upland Forest/Scrub

0 500 1,000 2,000

Feet

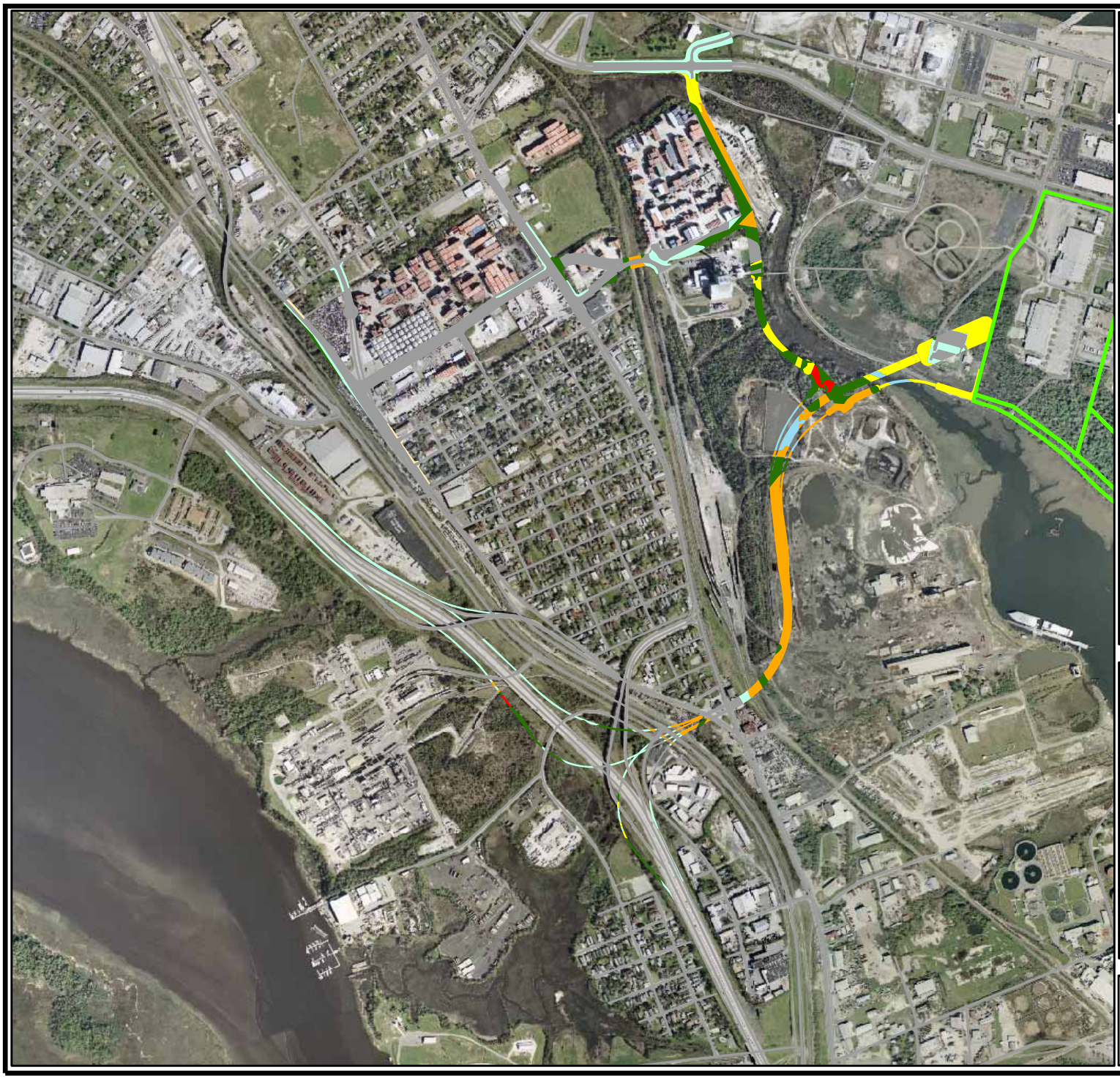
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Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.2-13
Existing Land Cover Impacted by the Proposed Terminal



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Land Cover Types

- Barren
- Freshwater Wetlands
- Impervious
- Maintained Grass
- Open Water
- Residential
- Revegetated CDF
- Tidal Wetlands
- Upland Forest/Scrub
- **Proposed Terminal**

0 500 1,000 2,000

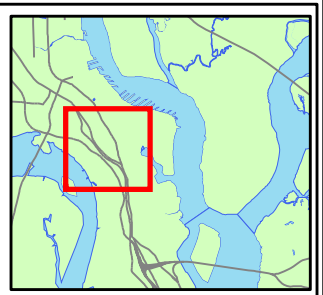
Feet

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US Army Corps of Engineers
Charleston District

Figure 5.2-14
Existing Land Cover Impacted by the Porposed Access Roadway

5.3. DANIEL ISLAND ALTERNATIVE

This section evaluates the potential environmental impacts of the Daniel Island Alternative. A schematic diagram of the Daniel Island Alternative is provided in Figure 3.4-2. The Daniel Island Alternative would include similar elements as the Proposed Project, including the construction of container processing and support facilities, wharf and crane structures, navigational improvements, utilities, and access roadway. The various components of the Daniel Island Alternative are summarized as follows:

- Wharf, container yard, support facilities, stormwater management facilities similar to the Proposed Project,
- 49.3 acres of deepened berth and access area to -49 ft CLW,
- Disposal of dredged material in the existing upland dredged material disposal area on Clouter Island,
- A sediment suspension system in the river along the front of the wharf to minimize maintenance dredging at the berths, and
- An access roadway from the terminal to I-526 approximately 2.75 miles in length, mostly on grade, that would traverse the western edge of Daniel Island and cross Beresford Creek near its Clouter Creek confluence with a bridge allowing 25 feet of vertical clearance. The conceptual access roadway would be a divided 4-lane highway and tie into the southern terminus of Clements Ferry Road on Thomas Island, and use the existing Clements Ferry Road/I-526 interchange.

The following Sections 5.3.1 through 5.3.20 describe the potential environmental impacts of the Daniel Island Alternative.

5.3.1. Land Use

This section evaluates the environmental impacts of the Daniel Island Alternative on land uses within the Tri-County region and the study area shown in Figure 5.1-1. Those land uses evaluated include agricultural, forest, residential, commercial, industrial and institutional. Also discussed are the impacts to community features and open spaces.

5.3.1.1. Tri-County Region

Similar to the Proposed Project, the Daniel Island Alternative would likely result in some induced development, which may consist of new or expanded warehouse distribution centers and industries located throughout the region and state of South Carolina. It is assumed that these facilities would be constructed in appropriately zoned areas. Overall, the Daniel Island Alternative would have minimal impacts to regional land use.

Agricultural Lands

The Daniel Island Alternative would not have any adverse direct or indirect impacts on agricultural land uses in this area, including prime farmland. Agricultural land uses are expected to continue as described in Section 5.1.1.

Francis Marion National Forest

The Daniel Island Alternative is not anticipated to have any adverse direct or indirect impacts on land uses in the Francis Marion National Forest. Land uses in this area are expected to continue as described in Section 5.1.1.

5.3.1.2. Greater Charleston Area

In the following paragraphs, impacts to land uses in the greater Charleston area are described using the same regions as presented in Section 5.1.1 (i.e., west of the Ashley River, between the Ashley and Cooper Rivers, and east of the Cooper River). Also, the same six generalized land use categories are used in the discussions.

West of the Ashley River

The Daniel Island Alternative is not anticipated to have any adverse direct or indirect impacts on land use west of the Ashley River. Changes in land use are expected to continue as described in Section 5.1.1.

Between the Ashley and Cooper Rivers

The Daniel Island Alternative is not anticipated to have any adverse direct or indirect impacts on land use between the Ashley and Cooper Rivers. Changes in land use are expected to continue as described in Section 5.1.1.

East of the Cooper River

The Daniel Island Alternative terminal site is located within an inactive CDF that is owned by the SCSPA. As described in Section 5.1.1, the SCSPA is currently seeking to sell this land to developers who will incorporate New Urban Planning Principles in their development plans. Therefore, the Daniel Island Alternative would create a large area of industrial land use in place of what would otherwise be a mix of residential, commercial and open space land uses. Impacts to each land use type are discussed in the following paragraphs.

a. **Residential Land Uses**:

   The construction of a marine container terminal at the Daniel Island Alternative site would not impact any existing residential land use. However, it is likely that the construction of the conceptual access would impact some existing residential land use.

   The Daniel Island Alternative would create industrial land use at the terminal site instead of the expected development that would occur with the No-Action Alternative, which would include some new residential land use. The Daniel Island Alternative would cause minimial indirect impacts to residential land use.

b. **Commercial Land Uses:**

   The Daniel Island Alternative would create industrial land use at the terminal site instead of the expected development that would occur with the No-Action Alternative, which would include some new commercial land use. Also, the Daniel Island Alternative may cause indirect impacts by encouraging ancillary commercial development within this area, especially along Clements Ferry Road. It is assumed that such development would occur in appropriately zoned areas.

c. **Industrial Land Uses:**

   The Daniel Island Alternative would create new industrial land use at the terminal site instead of the expected mixed land use development that would occur with the No-Action Alternative. The Daniel Island Alternative is not anticipated to have any impacts on existing industrial land uses east of the Cooper River. However, the Daniel Island Alternative may cause some indirect impacts from induced industrial development, particularly along Clements Ferry Road, as a result of a port development in the area.

d. **Institutional Land Uses:**

The Daniel Island Alternative terminal site is located within an inactive CDF, and construction of a marine container terminal at this site would change the current land use to industrial land use. However, under the No-Action Alternative this land is expected to be sold and developed using New Urbanist planning principles. Therefore, as compared to the No-Action Alternative, the Daniel Island Alternative is not expected to impact institutional land uses at the project site.

The Daniel Island Alternative is not anticipated to have any direct or indirect impacts on other institutional land uses (i.e., schools, hospitals, churches, etc.) east of the Cooper River.

e. **Community Features:**

In general, community features such as police and fire stations are developed in response to growth patterns and, therefore, are reactive developments. It is unlikely that the Daniel Island Alternative would have any effect on growth patterns affecting the development of community features east of the Cooper River.

f. **Open Spaces:**

The Daniel Island Alternative will convert open water and marsh areas to industrial and highway land use. Also, the Daniel Island Alternative would create industrial land use at the terminal site instead of the expected development that would occur with the No-Action Alternative, which would include some new open spaces.

There has been several hundred acres of land set aside on Daniel Island to be used as conservation areas. It is unlikely that the Daniel Island Alternative would adversely impact any of these conservation areas.

5.3.1.3. Summary of Land Use Impacts

The Daniel Island Alternative would develop an inactive CDF that is owned by the SCSPA. The SCSPA is currently seeking to sell this land for mixed use development. Therefore, the Daniel Island Alternative would create a large area of industrial land use in place of what would otherwise be a mix of residential, commercial and open space land uses. The conceptual access roadway would likely cause direct impacts to existing residential land use. Similar to the Proposed Project, development of the Daniel Island Alternative may be reasonably expected to spur ancillary commercial and industrial development within the region.

5.3.2. Physical Setting

This section discusses the impacts the Daniel Island Alternative would have on the physical setting of the Tri-County region and the Daniel Island project area (Figure 5.1-4). The physical setting is described by the parameters of climate, topography, and geology.

5.3.2.1. Climate

The Daniel Island Alternative would cause a similar increase in paved area as the Proposed Project. Therefore, similar to the Proposed Project, development of the Daniel Island Alternative site would cause localized increases in temperature, but it would not cause a measurable effect on the local or regional climate.

Also, the Daniel Island Alternative would cause similar air emissions as the Proposed Project, Therefore, similar to the Proposed Project, the Daniel Island Alternative would have a negligible impact to climate change as a result of greenhouse gas emissions.

5.3.2.2. Topography

During the construction phase of the Daniel Island Alternative, surcharging to consolidate the underlying soil profile would be required. Surcharging requirements and topography changes from the Daniel Island Alternative would be similar to the Proposed Project.

5.3.2.3. Geology

The anticipated impacts from the Daniel Island Alternative on regional and local geology would be similar to that described for the Proposed Project in Section 5.2.2.3, with the possible exception that less fill material would be required from borrow sites (i.e., 3.8 Mcy instead of 6.5 Mcy). Similar to the Proposed Project, modification of the existing geology is expected to be limited to the footprint of the port terminal and access roadway and would not substantially impact regional geology.

Hydrogeology

Similar to the Proposed Project, modification of the existing hydrogeology is expected to be limited to the footprint of the port terminal and access roadway and would not substantially impact regional hydrogeology.

Seismotectonics

As stated for the Proposed Project, the terminal facility as well as the access roadway for the Daniel Island Alternative would need to be designed in accordance with applicable seismic standards.

5.3.2.4. Summary of Physical Setting Impacts

In summary, the Daniel Island Alternative would cause minor impacts to the physical setting similar to the impacts that would be caused by the Proposed Project. The Daniel Island Alternative would cause minimal adverse impacts to the local climate as a result of localized increases in temperature associated with paving of the terminal area and roadway. It would have negligible impacts to regional climate change. The Daniel Island Alternative would cause minor impacts to the topography, limited to localized changes at the terminal site and within the roadway right-of-way. The Daniel Island Alternative would cause minor localized impacts to the surficial geology and hydrogeology at the terminal site, and it would create a minor demand on local borrow sources as a result of the 3.8 Mcy fill requirements, which is less than that required for the Proposed Project.

5.3.3. Socioeconomic Environment

The impacts from Daniel Island Alternative on the socioeconomics of the Tri-County region and the Daniel Island community study area (shown in Figure 5.1-5 and described in detail in Section 4.3) are summarized in this section. The parameters used to describe the socioeconomic environment include economic sectors, employment, income, poverty, and housing characteristics. As described for the Proposed Project in Section 5.2.3, development of the Daniel Island Alternative would have similar broad regional and statewide effects.

5.3.3.1. Economic Sectors and Employment

The anticipated impact from the Daniel Island Alternative to regional economic sectors and employment would be similar to that of the Proposed Project. Section 5.2.3.1 provides a description of the expected impacts from the Proposed Project to regional socioeconomic conditions.

The Daniel Island Alternative would likely encourage a growth in businesses and industries along the Cainhoy Peninsula (specifically along Clements Ferry Road) and, as a result, improve employment within the Daniel Island study area and throughout the region.

5.3.3.2. Income and Poverty

The anticipated impact from the Daniel Island Alternative to regional income and poverty would be similar to that of the Proposed Project. Section 5.2.3.1 provides a description of the expected impacts from the Proposed Project to regional socioeconomic conditions.

The anticipated growth in businesses and industries that would result from the Daniel Island Alternative would not be expected to substantially change income and poverty statistics within the Daniel Island study area.

5.3.3.3. Housing Characteristics

The anticipated impact from the Daniel Island Alternative to regional housing characteristics would be similar to that of the Proposed Project. Section 5.2.3.1 provides a description of the expected impacts from the Proposed Project to regional socioeconomic conditions.

As discussed in Section 4.3.3.3, the residential properties nearest the Daniel Island Alternative location (i.e., within the Daniel Island PUD) have increased in value as part of the master planned community. One adverse impact of the Daniel Island Alternative is a potential decrease in property values for these residents nearest to the facility and access roadway. At this time, it is uncertain if, and how much, properties values would decrease.

5.3.3.4. Summary of Socioeconomic Impacts

The Daniel Island Alternative would result in a major socioeconomic benefit to the region and State of South Carolina by supporting future job growth and industrial development similar to the Proposed Project. However, there would likely be a negligible effect to the projected future socioeconomic conditions of the areas surrounding Daniel Island. The largest concentration of business growth from the Daniel Island Alternative would likely by along Clements Ferry Road north of I-526. It is uncertain how many, and to what degree, businesses would locate south of I-526 on Thomas Island. However, the access roadway for the Daniel Island Alternative would likely have an adverse impact on housing values immediately adjacent to the roadway corridor.

5.3.4. Social Characteristics and Environmental Justice

The impacts from the Daniel Island Alternative on the social characteristics of the Tri-County region and the Clouter Island and Daniel Island community study area are summarized in this section. The Clouter Island and Daniel Island study area is described in Section 5.1.3 and illustrated in Figure 5.1-6. In addition to impacts to social characteristics (including population, racial composition, age distribution, educational attainment, and income), topics discussed in this section include acquisition or relocation of properties and environmental justice.

5.3.4.1. Social Characteristics

Tri-County Region

The Daniel Island Alternative is located in the City of Charleston within Berkeley County. While located in a different city and county, the Daniel Island Alternative is located on the same reach of the Cooper River as the Proposed Project. Therefore, the impacts to regional population trends, racial composition, age distribution, income distribution, and educational attainment resulting from the Daniel Island Alternative would be similar to those described for the Proposed Project (Section 5.2.4.1).

Clouter Island and Daniel Island Community Study Area

The following paragraphs discuss the impacts of the Daniel Island Alternative on social characteristics for a study area that includes both Clouter Island and Daniel Island. The study area is illustrated in Figure 5.1-6. There are currently no residents living on Clouter Island as the area is being used as a CDF.

Population Trends

As discussed in Section 5.2.4.1, it is expected that most of the new jobs generated by a terminal located at the Daniel Island Alternative site would be filled by residents who would be living in the Tri-County region. Therefore, any impacts to local population growth would likely be small. Other development projects in the local area, namely the Daniel Island PUD, are expected to have greater population impacts in the future.

Racial Composition

The current trend in racial composition within the Daniel Island study area would not likely be impacted by the presence of a container terminal. It is likely that the area will continue its transition from the relatively undeveloped area that existed prior to the opening of I-526 to an up-scale community that is occurring as a result of planned development projects. Thomas Island, which is included in the Daniel Island study area, is still predominantly minority. However, this area is also undergoing a transition from rural to urban and the demographic may change.

Age Distribution

The Daniel Island Alternative is not expected to affect age distribution within the Daniel Island study area. The continued growth of the Daniel Island PUD will likely have a greater impact on age distribution.

Income Distribution

A container terminal located at the Daniel Island Alternative site would likely have an overall positive impact on reducing poverty and unemployment in the study area. However, it is likely that most of the workers that would fill terminal facility positions and many of the supporting service industry jobs would be spread throughout the Tri-County region. Therefore, the positive impact on income, poverty, and/or unemployment in the study area from the Daniel Island Alternative would likely be greater than for the rest of the region. It is likely that other development projects in the study area will have a greater positive impact on income, poverty, and unemployment.

Educational Attainment

It is unlikely that the development of a container terminal will impact the educational attainment of the population living within the Daniel Island study area. Current data reveals that the Daniel Island study area, as a whole, has higher educational attainment levels than either Berkeley County or the entire Tri-County region.

5.3.4.2. Acquisition/Relocation of Properties

The Daniel Island Alternative site is located on undeveloped land that is owned by the SCSPA, meaning that the development of the facility itself will not require the acquisition or relocation of residences and/or businesses. However, as shown in Figure 5.3-1, the roadway providing access to the terminal facility would likely require the relocation of some residences along Clements Ferry Road south of I-526.

5.3.4.3. Environmental Justice

Environmental Justice Impacts

Table 5.3-1 presents the data and results of the environmental justice analysis. As described in Section 4.4, the Census block group comprising the Clouter, Daniel, and Thomas Islands (Figure 4.4-4) does not meet the environmental justice threshold for minority or low-income residents. However, a review of historical records of residential areas along the access roadway corridor considered for the Daniel Island Alternative, (i.e., Clements Ferry Road on Thomas Island) indicates that this area is likely predominantly minority. Therefore, it was determined that impacts to the area adjacent to Clements Ferry Road would likely be disproportionately borne by minority populations. Impacts to these residents would likely result from the construction of the access roadway, including the relocation of some residents. The truck traffic on the access roadway would also result in increased air emissions, noise, light, and safety concerns for those persons living adjacent to Clements Ferry Road. In addition, the roadway would diminish the visual quality of the area.

Table 5.3-1. Environmental Justice Analysis for the Clouter, Daniel, and Thomas Islands Study Area[1].

Block Group	Total Population	Total Minority Population	Percent Minority Population	Threshold for EJ status for Minority Population met?	Persons Below Poverty Level	Percent Persons Below Poverty Level	Threshold for EJ status for poverty met?
Track 204.02 Block Gp 2	2,134	899	42%	**No**	202	9.5%	**No**
Berkeley County	142,651	47,337	33%		16,066	12%	
South Carolina	4,012,012	1,359,721	34%		547,869	14%	

[1] *2000 Census data*

5.3.4.4. Summary of Social Characteristics and Environmental Justice Impacts

With the opening of I-526, the Cainhoy peninsula, Thomas Island, and Daniel Island quickly changed from rural to urban and suburban land use, with extensive commercial and residential development occurring within a short time. The Daniel Island Community is now a relatively high-income community. Thomas Island is predominantly a minority community and this area is also experiencing development pressure as the area continues to undergo the transition from

rural to urban. The Daniel Island Alternative terminal site, which would be located on undeveloped land, would not cause the displacement of residences or businesses.

It is likely that the Daniel Island Alternative would create new jobs, either directly or indirectly. However, the addition of households resulting from new jobs is uncertain. It is expected that most jobs will be filled by residents already living in the Tri-County region. In contrast, the local access roadway would likely benefit local income statistics as a result of new businesses and jobs occurring along this corridor, specifically Clements Ferry Road.

Overall, the Daniel Island Alternative would not adversely impact community stability, cohesion, or interaction. The access roadway associated with the Daniel Island Alternative would cross Beresford Creek and tie into Clements Ferry Road. This roadway would be nearly twice as long as the access roadway for the Proposed Project and would likely require acquisition of residential properties in Thomas Island. Therefore, the Daniel Island Alternative would cause more direct impacts to residents that the Proposed Project. It should be noted that while the study area that includes Daniel Island did not meet the criteria set for an environmental justice (EJ) population, historical records indicate that residential areas along the access roadway corridor (i.e., Clements Ferry Road on Thomas Island) has been predominantly minority.

5.3.5. Community Infrastructure and Municipal Services

The Daniel Island Alternative would have similar infrastructure needs to the Proposed Project. As described in Section 5.2.5, the regional infrastructure for water supply, wastewater, solid waste, and utilities is capable of accommodating the relatively small needs of a port facility. However, there would likely be small, local impacts associated with site development. Accordingly, this section addresses the impacts to community infrastructure and municipal services (including water supply, wastewater treatment, fire, police and emergency medical services, schools, solid waste generation and disposal facilities, and utilities) that would reasonably expected to be associated with the Daniel Island Alternative.

5.3.5.1. Water Supply and Wastewater Treatment

The Daniel Island Alternative would need similar water/wastewater services as the Proposed Project (Section 5.2.5.1). The area is experiencing rapid growth and utility improvements are underway. The water supply and wastewater treatment facilities planned to serve Daniel Island would provide adequate capacity to serve the Daniel Island Alternative. However, utility lines would need to be constructed from the closest mains to the facility.

The Daniel Island Alternative would not have adverse impacts to existing water/wastewater facilities on a regional, metropolitan, or local basis.

5.3.5.2. Fire, Police, and Emergency Medical Services

The Daniel Island Alternative would impose comparable demands on fire, police, and emergency service providers as would the Proposed Project (Section 5.2.5.2). However, it would be the responsibility of the City of Charleston to provide services rather than the City of North Charleston. A new fire and emergency medical service (EMS) station has recently opened on Daniel Island; this facility would serve the Daniel Island Alternative. The Daniel Island Alternative would not impose adverse impacts to fire, police, and EMS staffing or facilities.

5.3.5.3. Schools

As mentioned previously, the impact from the Daniel Island Alternative on population growth would likely be small. Accrordingly, enrollment numbers at public or private schools would not be affected by the development of a marine terminal on Daniel Island.

There is one private high school (Bishop England High School) and a private pre-school (Daniel Island Academy) located on Daniel Island. Children living on Daniel Island attending public school are currently bused to schools in Hanahan, north of I-526 and east of Rivers Avenue. As of August 2006, the Berkeley County School District opened the first public elementary school on Daniel Island. Middle and high school age children are expected to continue to be bused to public schools off Daniel Island for the foreseeable future.

Based on student enrollment data from 1989-90 through 2002-03 for Berkeley County, there is a downward trend in enrollment of approximately –0.12 percent per year. Estimated Berkeley County public school enrollment is projected to be 25,617 students in 2025 (see Section 5.1.5.3. and Table 5.1-9).

5.3.5.4. Solid Waste Generation and Disposal Facilities

The Daniel Island Alternative would not generate large quantities of solid waste. Berkeley County solid waste management facilities have sufficient capacity to handle any additional waste stream volume generated by the Daniel Island Alternative. Therefore, the Daniel Island Alternative would not have an adverse impact on solid waste facilities regionally or locally.

5.3.5.5. Utilities

The Daniel Island Alternative would have similar utility demands as the Proposed Project (Section 5.2.5.5).

The Daniel Island Alternative is not expected to generate a significant local population increase from direct and/or indirect job growth. Accordingly, any additional demand on utility providers to supply services to residential properties would be minimal.

Regional and local impacts to utility service providers would be expected to be minimal.

5.3.5.6. Summary of Impacts to Community Infrastructure and Municipal Services

The Daniel Island Alternative is expected to have similar infrastructure and municipal service needs as the Proposed Project. The capacity of solid waste, water supply, and wastewater treatment facilities would be adequate to serve the Daniel Island Alternative. However, utility lines would need to be constructed from the closest mains to the facility. The Daniel Island Alternative would not have an adverse impact on fire, police, or EMS staffing or activities, or on school enrollment.

5.3.6. Transportation

This section discusses the impacts to transportation infrastructure and traffic that may result from a marine container terminal on Daniel Island. For the purposes of this EIS, the transportation impacts analyzed are primarily those projected to occur in relation to roadways and rail traffic. For this alternative, there would not be direct rail access to the site; instead a direct access roadway to I-26 would need to be provided.

The overall transportation study area for traffic for this EIS is shown in Figure 5.1-9. Roadway traffic conditions and the capacity of roadway infrastructure to efficiently handle traffic volume have a direct bearing on quality of life concerns, safety, and property values. For these reasons, transportation impacts that may occur as a result of the Daniel Island Alternative would have far reaching effects similar to the Proposed Project within the region and especially within the study area.

Similar to the Proposed Project, development of a marine container terminal on Daniel Island would require the construction of an access road between the alternative location and the closest Interstate Highway, I-526. The access roadway considered for the Daniel Island Alternative was evaluated earlier in the report titled, *Draft EIS for the Daniel Island Marine Container Terminal* (September 1999). The access roadway being evaluated with the Daniel Island Alternative would cross Beresford Creek and Clouter Creek and to use the existing Clements Ferry Road and interchange with I-526. The conceptual access roadway for the Daniel Island Alternative is discussed in Section 5.3.6.1 and shown in Figure 5.3-2.

5.3.6.1. Roadways

Methodology

As discussed in Section 4.6.1, a traffic study was performed to evaluate the existing traffic conditions for the interstates, arterial roadways and intersections in the Daniel Island study area. The *Traffic Study for Daniel Island and Clouter Island Study Areas* evaluated existing roadways and intersections that would likely be used by vehicles entering and leaving an alternative marine container terminal on Daniel Island and to project future conditions with and without the Daniel Island Alternative. The traffic study, dated June 2005, is provided in Appendix U. Projected impacts to roadway capacities and intersections from the Daniel Island Alternative were analyzed using traffic models, trip generation input data provided by SCSPA, traffic count data from SCDOT and peak hour traffic and vehicle classification counts conducted in 2004. The *Traffic Study for the Daniel Island and Clouter Island Study Area* projected impacts to traffic assuming an access roadway would be constructed from the alternative marine container terminal to the north to the existing I-526 interchange with Clements Ferry Road. A conceptual design of an access roadway for the Daniel Island Alternative is shown in Figure 5.3-2.

The traffic analysis for the *Traffic Study for the Daniel Island and Clouter Island Study Areas* used several models commonly used in traffic engineering and impact studies. The freeway and arterial analyses were conducted using the same modeling approach as the *Existing Roadway Study* described in Appendix T.

The projected build-out of the Proposed Project is 2025; therefore, the same assumption was applied to evaluation of an alternative marine container terminal on Daniel Island. Consequently, similar to the evaluation of traffic impacts for the Proposed Project, traffic impacts for the Daniel Island Alternative were analyzed at 2025 projected conditions. The current traffic was projected to 2025 conditions based on growth rates computed for each major corridor in the study area.

Similar to the evaluation of traffic impacts for the Proposed Project, the assumed growth rate to project current traffic conditions was determined by reviewing the observed traffic trends in the area between 2000 and 2003 and the projected household and employment growth obtained from the BCDCOG travel demand model (September 2004 data).

Generation, Vehicle Classification, and Projected Peak and Daily Traffic

Trip generation for the Daniel Island Alternative used the same destinations of port-related traffic as assumed for the Proposed Project; however, the origin of the truck traffic was for the Daniel Island Alternative. The trip generation and distribution data used to project impacts for the Proposed Project were adapted from the data provided by the SCSPA based on a review of available shipping information associated with existing terminal operations. The Proposed Project is expected to generate approximately 10,920 daily trips by 2025 during peak conditions of which 63 percent would be truck traffic. Average daily traffic is projected to be 7,700 trips at build-out. Therefore, the evaluation of impacts to traffic for the Daniel Island Alternative will assume the same trip generation conditions.

Secondary Truck Trips

As described above and in Section 5.2.6.1 for the Proposed Project, the SCSPA formulated some preliminary assumptions about regional container traffic from a general knowledge of the port, freight lines, distribution and packaging centers, warehouses and end users in the area. For the Daniel Island Alternative, the secondary freight traffic demand would likely be spread out due to lack of large, centralized warehouses or distribution centers that handle with container cargo. Therefore, it was not considered to be different than the secondary traffic generated by the Proposed Project or a major factor for the traffic impact analysis.

Regional Traffic Impacts

Approximately 30 percent of the heavy truck traffic generated by the Proposed Project would leave the Transportation study area by existing highways. The evaluation of traffic impacts for the Daniel Island Alternative assumes the same percentage since traffic leaving the Daniel Island study area would be using the same existing highways.

It should also be noted that 85 percent of traffic resulting from operation of the Daniel Island Alternative would use the segment of I-526 between I-26 and Clements Ferry Road. Some of these segments of I-526 already have a LOS of D and are projected to have a LOS of F in the 2025 condition without a new marine container terminal in Charleston Harbor. Therefore, the additional traffic on these segments of I-526 would cause commuters and commercial traffic traveling in the transportation study area to experience more delays with the additional traffic from the Daniel Island Alternative. The traffic generated on I-526 to west of I-26 would be similar to that for the Proposed Project.

Daniel Island Traffic Impacts

The Daniel Island study area includes Daniel and Thomas Islands south of I-526, the Cainhoy Peninsula north of I-526 and a segment of I-526 in Mount Pleasant east of the Wando River. As shown in Figure 5.3-2, Daniel and Thomas Islands are located between Clouter Creek to the west and the Wando River to the east.

Projected Future Traffic Conditions

The projected future traffic conditions for the Daniel Island Alternative include the traffic projected to 2025, and the additional traffic generated by the Daniel Island Alternative. The impact of the Daniel Island Alternative on traffic is determined by evaluating the difference between the projected future traffic conditions for the Daniel Island Alternative and the No-Action traffic condition. The No-Action traffic condition is summarized in Section 5.1.6 of this EIS. The remainder of Section 5.3.6.1 will describe the impacts to traffic from the Daniel Island Alternative.

Interstate Highway Impacts

The access roadway associated with the Daniel Island Alternative, shown in Figure 5.3-2, would traverse the western edge of Daniel Island, cross Beresford Creek near its confluence with Clouter Creek, tie into the southern terminus of Clements Ferry Road on Thomas Island, and use the existing Clements Ferry Road/I-526 interchange. This access roadway corridor was identified previously based on the feasibility and overall environmental impacts of a number of roadway alternatives evaluated in an earlier Daniel Island DEIS.

Interstate 26:

Table 5.3-2 compares the future I-26 interstate highway traffic condition with the Daniel Island Alternative to the 2025 No-Action traffic condition. As compared to the traffic impacts of the Proposed Project, a lesser number of I-26 segments would be impacted by the Daniel Island Alternative. The same volume of traffic would be traveling north of I-26 out of the transportation study area as the Proposed Project. As shown in Table 5.3-2, the segment of I-26 between I-526 and Remount Road is expected to have a LOS of E in the 2025 conditions without the Daniel Island Alternative and a LOS E with the additional traffic from the Daniel Island Alternative. Overall, traffic on this segment is projected to increase by 1.75 percent due to traffic from the Daniel Island Alternative. Truck traffic would increase by 13.8 percent, but the proportion of trucks in 2025 total daily traffic along this I-26 segment (I-526 to Remount Road) would only increase by one percent, from 8 percent trucks to 9 percent trucks due to the project traffic.

Table 5.3-2. Daniel Island Alternative Traffic Impacts to I-26.

I-26 Freeway Segment	2003 Existing LOS [1]	2025 No-Build LOS [1]	2025 Build LOS [1]	Impact Due to Daniel Island Alternative
I-26 Eastbound				
Aviation Avenue to Remount Road	D	F	F	Low
Remount Road to 526 Interchange	D	E	E	Low
I-526 Interchange	C	C	C	Low
I-526 Interchange to Montague Avenue	C	D	D	Low
Montague Interchange	C	D	D	Low
Montague Avenue to Dorchester Road	C	E	E	Low
Dorchester Road Interchange	C	D	D	Low
Dorchester Road. to SC Highway 7	C	D	D	Low
SC Highway 7 Interchange	C	D	D	Low
SC Highway 7 to Spruill Ave. Ramps	C	D	D	Low
Spruill Avenue Interchange	C	D	D	Low

I-26 Freeway Segment	2003 Existing LOS [1]	2025 No-Build LOS [1]	2025 Build LOS [1]	Impact Due to Daniel Island Alternative
Spruill Avenue to Heriot Street	C	D	D	Low
Heriot Street Interchange	C	C	C	Low
Heriot Street to Brigade Street	B	C	C	Low
Brigade/Romney Street Interchange	C	C	C	Low
I-26 Westbound				
Huger Street to Romney Street	B	C	C	Low
Romney Street to Mt. Pleasant Street	B	C	C	Low
Heriot Street Interchange	C	C	C	Low
Heriot Street to Spruill Avenue	C	D	D	Low
Spruill Avenue Interchange	C	D	D	Low
Spruill Avenue to SC Highway 7	C	D	D	Low
SC Highway 7 Interchange	C	D	D	Low
SC Highway 7 to Dorchester Road	C	D	D	Low
Dorchester Road Interchange	C	D	D	Low
Dorchester Road to Montague Avenue	C	D	D	Low
Montague Avenue Interchange	C	D	D	Low
Montague Avenue to I-526	C	D	D	Low
I-526 Interchange	C	D	D	Low
I-526 to Remount Road	C	E	E	Low
Remount Road Interchange	C	E	E	Low

Parsons Brinkerhoff, 2005. Traffic Study for Daniel Island and Clouter Island Study Areas.

[1] LOS results are average conditions for mainline traffic with existing lane configuration. Individual ramps, ramp merge and diverge areas can have higher degree of congestion than reflected in this summary table.

Interstate 526:

Table 5.3-3 compares the future I-526 interstate highway traffic condition with the Daniel Island Alternative to the 2025 No-Action traffic condition. Daily average and peak vehicle traffic volumes, truck and non-truck splits, and trip distributions would be comparable to those of the Proposed Project. Approximately 85 percent of the trips would travel west on I-526. The existing lane configuration on I-526 as it crosses Clouter Creek, Clouter Island, and the Cooper River accommodates three lanes of traffic. However, upon entering North Charleston, the lane configuration is reduced to two lanes. Most of the westbound segments from Clements Ferry Road interchange to the I-26 interchange are currently, according to 2003 AADT data, operating at LOS D and E.

The I-526 interchange with Clements Ferry is projected to operate at LOS D and F in 2025 with the Daniel Island Alternative for the eastbound and westbound ramps respectively. Additional traffic from the Daniel Island Alternative at the Clements Ferry interchange would be a major addition to the future traffic in the No-Action alternative. Hence, the “impact relative to Daniel Island” shown for the I-526 interchange in Table 5.3-3 is “high.”

As shown in Table 5.3-3, the 2025 No-Action Alternative for I-526 westbound has a LOS of F for 16 out of 20 segments whereas the 2025 No-Action Alternative for I-526 eastbound has 9 of 20 segments. With 85 percent of the traffic from the Daniel Island Alternative going west on I-526

from Clements Ferry Road, additional interchanges will be impacted but the future traffic condition would already be at LOS F, thus causing an impact on an already failing segment of interstate highway.

The cause of these failing LOS include but are not limited to traffic demand exceeding capacity east of the Rivers Avenue interchange. The I-526 westbound segment between Rivers and North Rhett is identified as the segment where the most substantial delays will occur in 2025 with the Daniel Island Alternative. The congested conditions on these segments of I-526 would likely result in heavy truck traffic on arterial roadways in this area of North Charleston. The traffic west of I-26 would be similar to that for the Proposed Project. A detailed discussion of the traffic model used to develop the LOS and a description of the queuing analysis that determined the LOS F for the I-526 segments is available in the *Traffic Study for the Daniel and Clouter Island Study Areas* which is included as Appendix U in this EIS.

Table 5.3-3. Daniel Island Alternative Traffics Impacts to I-526.

I-526 Freeway Segment	2003 Existing LOS [1]	2025 No-Build LOS [1]	2025 Build LOS [1]	Impact Due to Daniel Island Alternative
I-526 Eastbound				
Ashley River to Leeds Avenue	D	F	F	Low
Leeds Avenue Interchange	C	D	D	Low
Leeds Avenue to Dorchester Road	C	D	D	Low
Dorchester Road Interchange	C	F	F	Low
Dorchester Road to Montague Avenue	D	F	F	Low
Montague Interchange	D	F	F	Low
Montague Interchange to I-26 Interchange	C	F	F	Low
I-26 Interchange	D	F	F	Low [2]
I-26 to Rivers Avenue	D	F	F	Low
Rivers Avenue Interchange	D	F	F	Low [2]
Rivers Avenue to North Rhett Avenue	D	E	E	Low
North Rhett Avenue Interchange	C	D	D	Low
Virginia Avenue Interchange	D	E	E	Low
Virginia Avenue to Clements Ferry Road	D	F	F	Low [2]
Clements Ferry Road Interchange	D	E	E	High [2]
Clements Ferry Road to Daniel Island Interchange	C	E	D	Low
Daniel Island Interchange	C	D	D	Low
Daniel Island Interchange to Long Point Road	C	E	E	Low
Long Point Road Interchange	B	C	C	Low
Long Point Road to US Highway 17	C	D	D	Low
I-526 Westbound				
US Highway 17 to Long Point Road	C	F	F	Low
Long Point Road Interchange	C	F	F	Low
Long Point Road to Daniel Island	D	F	F	Low
Daniel Island Interchange	C	F	F	Low
Daniel Island to Clements Ferry Road	D	F	F	Low
Clements Ferry Road Interchange	C	F	F	High [2]

I-526 Freeway Segment	2003 Existing LOS [1]	2025 No-Build LOS [1]	2025 Build LOS [1]	Impact Due to Daniel Island Alternative
Clements Ferry Road to Virginia Avenue	E	F	F	Low [2]
Virginia Avenue Interchange	C	F	F	Low
North Rhett Avenue Interchange	C	F	F	Low
North Rhett Avenue to Rivers Avenue	D	F	F	Low
Rivers Avenue Interchange	D	E	E	Low
Rivers Avenue to I-26	E	E	E	Low [2]
I-26 Interchange	C	E	E	Low [2]
I-26 Interchange to Montague Avenue Interchange	C	E	F	High
Montague Avenue Interchange	C	F	F	Low
Montague Avenue to Dorchester Road	D	F	F	Low
Dorchester Road Interchange	C	F	F	Low
Dorchester Road to Leeds Avenue	C	F	F	Low
Leeds Avenue Interchange	C	F	F	Low
Leeds Avenue to Ashley River	D	F	F	Low

Parsons Brinkerhoff, 2005. Traffic Study for Daniel Island and Clouter Island Study Areas.

[1] LOS results are average conditions for mainline traffic with existing lane configuration. Individual ramps, ramp merge and diverge areas can have higher degree of congestion than reflected in this summary table.

[2] Although LOS values have not been degraded due to project traffic, there would be secondary queuing impacts.

Arterial Roadway Impacts

Table 5.3-4 compares the future arterial roadway segment traffic condition with the Proposed Project to the 2025 No-Action traffic condition. Clements Ferry Road would be the only aerials that would be impacted by the additional traffic from the Daniel Island Alternative since a majority of the traffic would access I-526 at the existing Clements Ferry interchange with I-526. Segments of Clements Ferry Road that would be impacted by additional traffic from the Daniel Island Alternative include St. Thomas Island Drive to I-526 and I-526 to Beresford Run, located approximately 1 mile north of the I-526 interchange. It should be noted that this traffic study considered the impacts to primary routes from port-generated traffic. The congestion on I-526 would likely result in trucks taking secondary routes through North Charleston on arterial roads to reach many container handling and storage destinations.

Table 5.3-4. Daniel Island Alternative Traffic Impacts to Arterial Roadways.

Roadway Segment	2003 AADT (vehicles per day)	2003 Existing LOS	2025 No-Build LOS	2025 Build LOS	Impact Due to Daniel Island Alternative
Rivers Avenue from I-526 to Daley Avenue	30,000	D	F	F	Low
Clements Ferry Road from St. Thomas Island Drive to I-526	7,400	B	C	E	High
Clements Ferry Road from I-526 to Beresford Run	22,200	B	E	F	High
Clements Ferry Road from Beresford Run to Yellow House Place	20,800	B	F	F	Low
Clements Ferry Road from Yellow House Place to Charleston Regional Parkway	17,200	B	F	F	Low
Clements Ferry Road from Charleston	14,200	A	F	F	Low

Roadway Segment	2003 AADT (vehicles per day)	2003 Existing LOS	2025 No-Build LOS	2025 Build LOS	Impact Due to Daniel Island Alternative
Regional Parkway to Jack Primus Road/Royal Assembly Drive					
Clements Ferry Road from Jack Primus Road/Royal Assembly Drive to Cainhoy Road	11,500	D	E	E	Low
Long Point Road from Wando Welch Terminal to Wando Park Boulevard	19,300	D	E	E	Low
Long Point Road from Wando Park Boulevard to I-526	22,600	D	F	F	Low
Long Point Road from I-526 to Whipple Road	23,900	D	F	F	Low
Long Point Road from Whipple Road to US Highway 17/701	11,700	B	E	E	Low
North Rhett Avenue from South Park Place to I-526	17,100	B	B	B	Low
N Rhett Avenue from I-526 to Remount Road	34,900	C	F	F	Low
North Rhett Avenue from Remount Road to Yeamans Hall Road	28,600	B	E	E	Low
North Rhett Avenue from Yeamans Hall Road to Red Bank Road	26,000	A	D	D	Low

Parsons Brinkerhoff, 2005. Traffic Study for Daniel Island and Clouter Island Study Areas.

Note: Results are based on HCS Urban Arterial planning capacity analysis with existing roadway lane configuration. No future improvements were included in the analysis to reflect worst-case impact analysis.

Intersection Impacts

Tables 5.3-5 and 5.3-6 compare the future intersection LOS with the Daniel Island Alternative to the 2025 No-Action traffic condition for the peak morning traffic and peak afternoon traffic hours respectively. Similar to the impacts to arterial roadways, the Clements Ferry Road intersection with I-526 is expected to have a “high” impact from the additional traffic from the Daniel Island Alternative since the additional traffic from the Daniel Island Alternative would access I-526 from the existing interchange.

Table 5.3-5. AM Peak Hour, Daniel Island Alternative Impacts to Intersections.

Intersections	Traffic Signal	2004 Existing LOS	2025 No-Build LOS	2025 Build LOS	Impact Due to Daniel Island Alternative
Dorchester Road at I-526 West Ramps	Yes	C	F	F	Low
Dorchester Road at I-526 East Ramps	Yes	B	B	B	Low
Rivers Avenue at I-526 West Ramp	Yes	B	B	B	Low
Rivers Avenue at I-526 East Ramp	Yes	A	B	B	Low
Mount Pleasant Street at King Street	Yes	C	C	C	Low
Mount Pleasant Street at Morrison Drive/Meeting Street	Yes	C	C	C	Low
Montague Avenue at I-526 West Ramps	Yes	C	F	F	Low
Montague Avenue at I-526 East Ramps	Yes	B	C	C	Low
Montague Avenue at Goer Drive	Yes	B	C	C	Low
Rivers Avenue at Meeting Street Road	Yes	B	C	C	Low

Intersections	Traffic Signal	2004 Existing LOS	2025 No-Build LOS	2025 Build LOS	Impact Due to Daniel Island Alternative
North Rhett Avenue at Remount Road	Yes	C	F	F	Low
North Rhett Avenue at I-526 West Ramps	Yes	E	F	F	Low
North Rhett Avenue at I-526 East Ramps	Yes	D	F	F	Low
International Boulevard at I-526 West Ramps	Yes	C	F	F	Low
International Boulevard at I-526 East Ramps	Yes	B	F	F	Low
Rivers Avenue at Remount Road	Yes	E	F	F	Low
Clements Ferry Road at St. Thomas Island Road	No	B [B] [1]	C [2]	B [2]	High
Clements Ferry Road at I-526 East Ramps	No	A [A] [1]	B [2]	D [2]	High
Clements Ferry Road at I-526 West Ramps	No	D [F] [1]	D [2]	C [2]	High
Clements Ferry Rd at Charleston Regional Parkway	No	E [F] [1]	F [F] [1]	F [F] [1]	Low
Clements Ferry Road at Cainhoy Road	No	E [F] [1]	F [F] [1]	F [F] [1]	Low
Long Point Road at I-526 East Ramps	Yes	B	D	D	Low
Long Point Road at I-526 West Ramps	Yes	B	F	F	Low

Parsons Brinkerhoff, 2005. Traffic Study for Daniel Island and Clouter Island Study Areas.

[1] Analyzed as un-signalized intersections and two LOS grades are reported: the first one is based on Synchro's capacity utilization for the full intersection and the second one in brackets is based on HCM's average delay for the worst side street approach.

[2] Analyzed assuming traffic signals and related minor improvements for 2025 No-Build and 2025 Build conditions to accommodate projected growth in traffic. Further reconfiguration and mitigation may be needed.

Table 5.3-6. PM Peak Hour, Daniel Island Alternative Impacts to Traffic.

Intersections	Traffic Signal	2004 Existing LOS	2025 No-Build LOS	2025 Build LOS	Impact Due to Daniel Island Alternative
Dorchester Road at I-526 West Ramps	Yes	B	C	C	Low
Dorchester Road at I-526 East Ramps	Yes	B	E	E	Low
Rivers Avenue at I-526 West Ramp	Yes	B	B	B	Low
Rivers Avenue at I-526 East Ramp	Yes	B	C	C	Low
Mount Pleasant Street at King Street	Yes	C	D	D	Low
Mount Pleasant Street at Morrison Drive/Meeting Street	Yes	C	D	D	Low
Montague Avenue at I-526 West Ramps	Yes	B	D	F	Low
Montague Avenue at I-526 East Ramps	Yes	B	D	D	Low
Montague Avenue at Goer Drive	Yes	C	F	F	Low
Rivers Avenue at Meeting Street Road	Yes	B	D	D	Low
N Rhett Avenue at Remount Road	Yes	D	F	F	Low
N Rhett Avenue at I-526 West Ramp	Yes	E	F	F	Low
N Rhett Avenue at I-526 East Ramp	Yes	C	F	F	Low
International Boulevard at I-526 West Ramps	Yes	C	F	F	Low
International Boulevard at I-526 East Ramps	Yes	C	F	F	Low
Rivers Avenue at Remount Road	Yes	F	F	F	Low

Intersections	Traffic Signal	2004 Existing LOS	2025 No-Build LOS	2025 Build LOS	Impact Due to Daniel Island Alternative
Clements Ferry Road at St. Thomas Island Road	No	A [B] 1	B 2	C 2	High
Clements Ferry Road at I-526 East Ramps	No	A [B] 1	C 2	D 2	High
Clements Ferry Road at I-526 West Ramps	No	D [F] 1	D 2	C 2	High
Clements Ferry Rd at Charleston Regional Parkway	No	C [F] 1	F [F] 1	F [F] 1	Low
Clements Ferry Road at Cainhoy Road	No	B [F] 1	F [F] 1	F [F] 1	Low
Long Point Road at I-526 East Ramps	Yes	C	F	F	Low
Long Point Road at I-526 West Ramps	Yes	B	F	F	Low

Parsons Brinkerhoff, 2005. Traffic Study for Daniel Island and Clouter Island Study Areas.

[1] *Analyzed as un-signalized intersections and two LOS grades are reported: the first one is based on Synchro's capacity utilization for the full intersection and the second one in brackets is based on HCM's average delay for the worst side street approach.*

[2] *Analyzed assuming traffic signals and related minor improvements for 2025 No-Build and 2025 Build conditions to accommodate projected growth in traffic. Further reconfiguration and mitigation may be needed.*

5.3.6.2. Railroads

The Daniel Island study area for railroad impacts is similar to that for for the Proposed Project because containers would be transported by truck from the Daniel Island Alternative to the existing intermodal yards in the North Charleston study area.

As with the Proposed Project, there would be no direct rail service into the Daniel Island Alternative site. It is assumed that the same percentage of truck traffic (23%) will travel to the intermodal yards located in North Charleston and that the rail yard and rail crossing impacts will be similar to those associated with the Proposed Project. Impacts from the increase in intermodal freight are described in Section 5.2.6.2. It should be noted, however, the travel distance by roadway from the Daniel Island Alternative would average approximately 6.5 miles longer than for the Proposed Project.

5.3.7. Navigation and Terminal Facilities

This section describes the potential impacts to navigation and existing terminal facilities in the navigation study area as a result of operation of the Daniel Island Alternative. Potential impacts evaluated include impacts to the Federal navigation project, SCSPA terminals, private terminals, and navigational operations (including increases in vessel traffic, traffic delays from channel blockages during turning maneuvers and recreational vessel safety). The navigation study area, shown in Figure 5.1-11, includes the entrance to Charleston Harbor, Charleston Harbor, and the navigation channel in the Cooper River and Shipyard Creek.

From a navigation and terminal facility perspective, the Daniel Island Alternative is similar to the Proposed Project. The Daniel Island Alternative terminal is located across the Cooper River from the Proposed Project. A turning basin for the Daniel Island Alternative would be located in a similar location of the access area for the Proposed Project. Therefore, in general, the Daniel Island Alternative would have similar impacts to navigation and terminal facilities as the Proposed Project.

5.3.7.1. Federal Navigation Channel

The turning basin for a marine container terminal at the Daniel Island Alternative is shown in Figure 3.4-2. The turning basin is in a similar location as the access area for the Proposed Project, but the turning basin for the Daniel Island Alternative is smaller than the access area for the Proposed Project. Although they are the same width across the river channel, the Daniel Island Alternative turning basin is not as long as that for the Proposed Project, and less dredging would be required to construct the trapezoid shaped turning basin that the access area for the Proposed Project.

As discussed in Section 4.7, a turning basin at Daniel Island Reach was authorized in 1996 assuming the operation of a marine container terminal on Daniel Island. Therefore, the existing authorization could be changed to the Daniel Island Alternative turning basin by conducting a General Revaluation Report (GRR) and obtaining approval of the U.S. Congress.

5.3.7.2. Terminal Facilities

SCSPA Terminals

Similar to the Proposed Project, the Daniel Island Alternative would not impact SCSPA terminals, except for impacts to the NCT as a result of the increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers

Private Terminal Facilities

Similar to the Proposed Project, the Daniel Island Alternative would not impact private terminal facilities, except for impacts associated with increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers

Port Security

Similar to the Proposed Project, the SCSPA would be required to submit security and incident response plans for the terminal to the Coast Guard (USCG), and the Daniel Island Alternative would have minor impacts to port security as a result of increased vessel and container traffic.

5.3.7.3. Navigation Operations

Cooper River Vessel Traffic

The Daniel Island Alternative would cause a similar increase in vessel traffic as the Proposed Project. The Daniel Island Alternative would also cause similar minor impacts as a result of the increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers.

Shipyard Creek

Similar to the Proposed Project, the Daniel Island Alternative would have minimal impacts to vessel traffic calling on Shipyard Creek facilities.

Charleston Branch Pilots' Association

Similar to the Proposed Project, the Daniel Island Alternative would increase the demand for the pilotage services of the Charleston Branch Pilots' Association.

Docking Masters

Similar to the Proposed Project, the Daniel Island Alternative would increase the demand for the docking masters.

Vessel Safety

Although the *Ship Simulation Model Study* (Appendix BB) does not include evaluation of the Daniel Island Alternative, because of its proximity to the Proposed Project site, it is reasonable to assume that container vessels would be able to safely navigate to the terminal with similar constraints as those required for the Proposed Project. Also, similar to the Proposed Project, the Daniel Island Alternative would cause a small increase in the risk of a collision with recreational vessels.

5.3.7.4. Summary of Impacts to Navigation and Terminal Facilities

From a location and vessel traffic perspective, the Daniel Island Alternative is similar to the Proposed Project, and therefore, it would have similar impacts to navigation and terminal facilities as the Proposed Project. The Daniel Island Alternative would cause similar increases in vessel traffic, minor delays to vessel traffic resulting from channel blockages, small increase in port security risk, and small increase in risk for collision with recreational vessels.

5.3.8. Noise

This section discusses the anticipated noise impacts that would be associated with the Daniel Island Alternative. The study area for the Daniel Island Alternative noise impact analysis is comprised of Daniel Island south of I-526 and Thomas Island south of I-526 (Figure 5.1-12). Noise impacts associated with the Daniel Island Alternative would be localized within the Daniel Island study area. Hence, only impacts within the Daniel Island study area were analyzed.

The Daniel Island Alternative would be expected to generate noise during both the operational and construction phases. Operational noise impacts would be long-term, while construction phase noise generation impacts would occur intermittently over a relatively short duration compared to the operational life of the facility. The noise levels and intensity during both the operational and construction phases would be expected to be comparable to the Proposed Project.

The sensitive receptors discussed in this noise impact evaluation are of the same category as used for the Proposed Project. These receptors are defined by the FHWA as "Category B" and consist of residences, schools, places of worship, and parks and recreational areas where outdoor activities occur. Also, impacts to sensitive receptors within the Daniel Island study area are determined in the same manner as for the Proposed Project (Section 5.2.8).

5.3.8.1. Construction Noise

The types of activities and associated noise levels from the terminal construction at the Daniel Island Alternative would be similar to those described for the Proposed Project in Section 5.2.8.1.

No noise sensitive receptors or residences were identified within the 65 dBA (Leq) contour for construction noise emanating from the Daniel Island Alternative (Figure 5.3-3). Accordingly, construction noise from the Daniel Island Alternative would not cause a substantial adverse impact to sensitive receptors or residences. However, it is possible that construction noise from the Daniel Island Alternative would be audible to receptors within the Daniel Island study area (i.e. residential neighborhoods), but outside the 65 dBA (Leq) contour.

Also, there would be an increase in roadway noise from trucks and heavy equipment entering and exiting the construction site. Increased roadway noise levels would primarily impact receptors proximal to Clements Ferry Road south of I-526.

5.3.8.2. Operational Noise

As discussed for the Proposed Project in Section 5.2.8.2, there would be two aspects to the Daniel Island Alternative, i.e., the terminal and the access roadway. These two features would generate different operational noises and, therefore, would have different impacts on sensitive receptors. For this reason, the operation noise impacts of the Daniel Island Alternative are discussed individually in the following two subsections. A third subsection discusses the noise impact from the additional train traffic generated by the Daniel Island Alternative.

Terminal

Similar to the evaluation at the Proposed Project site, the results from the noise monitoring program at the existing Wando-Welch Terminal were used to assess the potential operational noise impacts of the Daniel Island Alternative.

The layout of the Daniel Island Alternative locates the dockside activities away from noise sensitive sites including residences. The approximate distance from the terminal center (which, as a standard practice, was used as the “acoustic center”) to the monitored location was 7,000 feet. Figure 5.3-4 shows DNL noise contours (5 dBA contour intervals) estimated to emanate from the Daniel Island Alternative activities. As with the Proposed Project, 65 DNL is the threshold level for which noise impacts were assessed for terminal area noise at residential receptors. The DNL noise contours show that all reasonably foreseeable residences would lie outside the 65 DNL noise contour. Therefore, it was determined that operational noise impacts associated with the terminal at the Daniel Island Alternative would not cause adverse impacts for sensitive receptors. However, operational noise would be audible to some Daniel Island residences and receptors on the FLETC campus and receptors at the Cooper River Marina. Instantaneous noise events, such as a dropped container or hatchcover, are short in duration and do have much effect on DNL.

Access Roadway

Traffic noise predictions for the conceptual access roadway for the Daniel Island Alternative were performed using the FHWA’s Traffic Noise Model (TNM), Version 2.5 (February 2004). The methodology used for obtaining projections and making noise impact assessments was similar to that used for the Proposed Project (Section 5.2.8.2).

The projected noise impact results are summarized and compared in Table 5.3-7. This table provides the expected noise impacts under the existing, no-build, and with build conditions. A total of 11 receptors would be impacted by the access roadway for the Daniel Island Alternative. The majority of impacted receptors are those properties along Clements Ferry Road.

Figure 5.3-5 shows the estimated traffic noise contours for the conceptual Daniel Island Alternative access roadway. The TNM analysis indicates that there would be a potentially adverse roadway noise impact in the vicinity of noise monitoring site 4, which is a residential area along Clements Ferry Road south of I-526).

Table 5.3-7. Projected Noise Impacts From Daniel Island Alternative Access Roadway.

	Noise Impacts					
			Build (2025)			
	Existing (2005)	No-Build (2025)	Approach or Exceeds NAC *ONLY*	Substantial Increase over Existing *ONLY*	Approach or Exceeds NAC *AND* Substantial Increase over Existing	Total Receptors Impacted
Total	**0**	**1**	**1**	**0**	**10**	**11**

Parsons Brinckerhoff, 2006.

Railway

Containers would likely enter and exit from the same existing intermodal yards as for the Proposed Project. Therefore, the anticipated railway noise impacts associated with the Daniel Island Alternative would be similar to those impacts described for the Proposed Project. However, it should be noted that the average travel distance to the intermodal yard is approximately 6 miles greater for the Daniel Island Alternative than for the Proposed Project. Section 5.2.8.2 provides a discussion of railway noise impacts associated with the Proposed Project.

5.3.8.3. Summary of Noise Impacts

In summary, the Daniel Island Alternative would be expected to cause adverse noise impacts to sensitive receptors. However, noise levels generated by the terminal operation would be similar to the Proposed Project. The roadway associated with the Daniel Island Alternative would cause adverse noise impacts to sensitive receptors located along Clements Ferry Road south of I-526 during both construction and operational phases.

5.3.9. Light

This section discusses the impacts from the Daniel Island Alternative on light levels within the study areas of North Charleston, Daniel Island, and Clouter Island (Figure 5.1-13). Light sources that are evaluated include the terminal area, the access roadway corridor, and railways.

5.3.9.1. North Charleston Study Area

The Daniel Island Alternative would be situated across the Cooper River from the CNC and, as such, would be obvious to observers on the west bank of the Cooper River within the North Charleston study area. However, an assessment of existing light levels in the North Charleston study area (Section 4.9.3) found that light sources already exist on and adjacent to the CNC and that ambient nighttime light in this area is relatively high (excepting the Proposed Project site). Therefore, the additional light attributable to the Daniel Island Alternative would be nominal.

5.3.9.2. Daniel Island Study Area

Terminal

A conceptual terminal lighting layout was developed with input from the SCSPA to determine the impacts of the lighting from the Daniel Island Alternative. Based on this layout, it was concluded that the spill light from high mast lighting would extend out as far as 300 feet from the Daniel Island facility boundary. Inasmuch as the Daniel Island Alternative would be located relatively close (approximately 0.5 mile) to residential areas on the southern end of Daniel Island, sky glow would be noticeable primarily to residents of the Center Park, Barfield Park, Smythe Park, and Pierce Park neighborhoods. Light trespass and glare from the terminal area would not likely cause an adverse impact to residential areas on Daniel Island. Figure 5.3-6 shows the light spill contours that would be expected from the terminal.

The Daniel Island Alternative's lighting impacts to nighttime migratory animals is also expected to be minimal.

Access Roadway

The illumination of the access roadway for the Daniel Island Alternative would be similar to the design described for the proposed access roadway (Section 5.2.9).

A lighting simulation verified that the impact to the surrounding community from spill light from the Daniel Island Alternative conceptual access roadway would be minimal as residential developments are beyond the limits of the affected areas. Using standard flat glass cut off fixtures, the light source (i.e., an HPS lamp) would not impact an area much greater than the limits of the spill light. The only time the roadway lighting could be visible to the surrounding community would be when the light is reflected by fog or rain. The projected light spill contours from the Daniel Island access roadway are shown in Figure 5.3-7.

Railways

Containers destined for rail yards from the Daniel Island Alternative would be carried to the same rail yards as discussed for the Proposed Project. Therefore, lighting impacts as a result of railways would be similar to those described for the Proposed Project in Section 5.2.9.1.

5.3.9.3. Clouter Island Study Area

The nighttime sky glow from the Daniel Island Alternative would be visible to an observer on Clouter Island, particularly on the southern end of Clouter Island. However, there is no development on Clouter Island. Sky glow from the Daniel Island Alternative would be visible to some residents of Thomas Island.

5.3.9.4. Summary of Light Impacts

In summary, the lighting impacts are expected to be similar to those for the Proposed Project, i.e., minimal. The access roadway associated with the Daniel Island Alternative is nearly twice the length of the proposed access roadway. Therefore, impacts from lighting would affect a greater number of sensitive receptors.

5.3.10. Aesthetics

The aesthetic impacts from the Daniel Island Alternative to the study areas of North Charleston, Daniel Island, and Clouter Island (see Figure 5.1-14) are discussed in this section. As discussed in Section 4.10, the subject of aesthetics is personal and subjective in its evaluations of the

acceptability of visual scenes that are difficult to quantify and for which there are usually no regulatory standards. The discussion of aesthetic impacts associated with the Daniel Island Alternative is limited to describing probable changes in the existing viewsheds in its vicinity.

5.3.10.1. North Charleston Study Area

Figure 4.10-14 illustrates the view of Daniel Island from the western shore of the Cooper River within the North Charleston study area. It is not likely that the change in the aesthetic quality of the western shore of Daniel Island would adversely impact residential areas in the North Charleston study area as these areas are sufficiently enough inland. Most of the lands along the western bank of the Cooper River that would have views of the Daniel Island Alternative are industrial and institutional. However, visitors to the Riverfront Park (the newly opened public park on the CNC that was constructed as part of the Noisette Project) would have a downriver view of the Daniel Island Alternative and the change in the viewshed across the Cooper River could adversely impact these visitors. Also, motorists and pedestrians on the Arthur Ravenel Bridge would have views across the Cooper River of the Daniel Island Alternative. However, the impact on these observers would likely be minimal.

5.3.10.2. Daniel Island Study Area

The Daniel Island Alternative terminal facility would likely be visible from homes on the southern end of Thomas Island along Beresford Creek, particularly the tops of crane booms, when in their retracted and upright positions. The view from this area is currently of essentially undeveloped land to the south and east across Beresford Creek and of the CNC to the west across the Cooper River. The access roadway for the Daniel Island Alternative would cross Beresford Creek near its confluence with Clouter Creek; the bridge and roadway would be visible from residences on Thomas Island along Beresford Creek. The access roadway would also be visible to existing residences and a church located along Clements Ferry Road on Thomas Island.

The Daniel Island Alternative and its access roadway would not create major adverse aesthetic impacts to the majority of the existing residences and community facilities in the Center Park, Barfield Park, Pierce Park, Cochran Park, Smythe Park, Etiwan Park, and Codner's Ferry Park neighborhoods on Daniel Island. However, the southwestern-most homes in Center Park and Cochran Park are close enough to the Daniel Island Alternative site and access road to potentially be visually impacted, depending on buffering to the southwest of these neighborhoods.

Although most of the Daniel Island Alternative would not be directly visible from the majority of homes on Daniel and Thomas Islands, the loading and unloading cranes are tall enough to visually affect the skyline to the southwest.

5.3.10.3. Clouter Island Study Area

The Daniel Island Alternative would be visible to an observer on Clouter Island, particularly on the southern end of Clouter Island. However, there is no development on Clouter Island and, therefore, there would be no human impact. Motorists crossing the Cooper River on I-526 via the Don Holt Bridge would likely have a view of cranes associated with the Daniel Island Alternative; however, the visual impact of the Daniel Island Alternative would likely be minimal and be in keeping with other similar views of the lower Cooper River from the Don Holt Bridge.

5.3.10.4. Summary of Aesthetics Impacts

The Daniel Island Alternative would be similar in appearance to the Proposed Project. However, the development of the Daniel Island Alternative would have a greater visual impact because the western shoreline of Daniel Island is currently undeveloped. Most of the lands along the western bank of the Cooper River that would have views of the Daniel Island Alternative are industrial and institutional. However, visitors to the Riverfront Park would have a downriver view of the Daniel Island Alternative and the change in the viewshed across the Cooper River could adversely impact these visitors. The Daniel Island facility would also be visible to homes on the southern end of Thomas Island along Beresford Creek, particularly the tops of boom cranes. The access roadway associated with the Daniel Island Alternative would be visible to existing residences and a church located along Clements Ferry Road on Thomas Island.

5.3.11. Air Quality

This section discusses the impacts from the Daniel Island Alternative on ambient air quality within the study area, which due to the regional nature of air quality, consists of the Tri-County region, as shown in Figure 5.1-15. As with the Proposed Project, the Daniel Island Alternative was evaluated by estimating the project emissions and using dispersion modeling to predict air quality impacts. A detailed description of the air quality modeling study is provided in Appendix S.

5.3.11.1. Emissions Estimates

The Daniel Island Alternative is similar in design to the Proposed Project. Emissions would result from similar types of sources during the construction and operational phases of the Daniel Island Alternative (including the use of large and small vessels, container ships, cargo handling equipment, and motor vehicles). Differences in emissions are discussed below.

Construction Emissions

Unlike the Proposed Project, the Daniel Island Alternative would not require demolition of existing buildings at the terminal site. Also, the Daniel Island Alternative would require substantially less dredging and filling than the Proposed Alternative. Therefore, the Daniel Island Alternative would result in less construction emissions. As with the Proposed Project, construction emissions from the Daniel Island Alternative are much smaller than those from the operation of the alternative. Therefore, construction emissions are not expected to adversely affect regional or local air quality.

Operational Emissions

The operational phase emissions will be similar to that for the Proposed Project, with the exception of on-road vehicle emissions. Trucks leaving the Daniel Island Alternative destined for rail yards and most other primary destinations would have a longer travel distance than trucks leaving the Proposed Project site. The difference in vehicle miles traveled in the study area is accounted for in the on-road vehicle emission estimates shown in Tables 5.3-8 and 5.3-9.

Table 5.3-10 presents the estimated emissions from all sources for the Daniel Island Alternative in tons per year and as a percent of 2001 regional emissions. The total emissions are only slightly greater than that for the Proposed Project. Similar to the Proposed Project, the emissions would be a small fraction of the total regional emissions (generally less than 1 percent).

Table 5.3-8. Estimated Emissions from the Daniel Island Alternative in Year 2025 (tons/year).

Source	CO	NOx	PM10	PM2.5	SO2	VOC
Container Ships	166	1,312	107	99	490	141
Smaller Marine Vessels	6.35	73.13	3.97	3.82	3.53	2.17
Cargo Handling Equipment	4.53	20.92	0.80	0.78	0.40	2.86
Arterial Traffic	33.33	6.79	0.60	0.33	0.10	3.74
Freeway Traffic	64.09	15.68	1.00	0.55	0.16	4.08
Onsite Truck Idling	11.72	6.07	1.57	1.44	0.04	3.95

Source: North Wind Consulting Group, 2006.

Table 5.3-9. Estimated Air Toxic Emissions from On-Road Vehicles for the Daniel Island Alternative in Year 2025 (tons/year).

Source	1,3 Butadiene	Formaldehyde	Acetaldehyde	Acrolein	Benzene	MTBE
Arterial Traffic	0.18	1.84	0.70	0.08	0.74	0.51
Freeway Traffic	0.20	1.79	0.69	0.08	0.97	0.69
Onsite Truck Idling	0.20	2.49	0.92	0.11	0.50	0.24

Source: North Wind Consulting Group, 2006.

Table 5.3-10. Estimated Total Daniel Island Alternative Emissions and Comparison to 2001 Regional Permitted Emissions.

Estimated Emissions (tons/year)				
Pollutant	Regional Emissions 2001 (tons/year)	Daniel island Alternative Estimated Emissions 2015 (tons/year)	Daniel Island Alternative Estimated Emissions 2020 (tons/year)	Daniel Island Alternative Estimated Emissions 2025 (tons/year)
CO	207,585	108.56	200.26	286.02
NOx	62,599	612.85	1,132.69	1,434.59
PM10	26,653	45.48	89.05	114.94
PM2.5	10,231	42.11	81.43	105.92
SO2	66,426	190.82	380.63	494.23
VOC	37,426	60.94	119.91	157.80
Estimated Emissions as a Percent of 2001 Regional Emissions				
Pollutant	-	2015 (%)	2020 (%)	2025 (%)
CO	-	0.05 %	0.10 %	0.14 %
NOx	-	0.998%	1.81 %	2.29 %
PM10	-	0.17 %	0.33 %	0.43 %
PM2.5	-	0.41 %	0.80 %	1.04 %
SO2	-	0.29 %	0.57 %	0.74 %
VOC	-	0.16 %	0.32 %	0.43 %

Source: North Wind Consulting Group, 2006.

5.3.11.2. Evaluation of Project Impacts

The same air quality modeling methods used to evaluate the Proposed Project were used to evaluate the potential impacts of the Daniel Island Alternative. Sensitive population receptors representing specific locations within 5 km of the Daniel Island Alternative that were used for the evaluation are shown in Figure 5.2-10.

Air Quality Impacts - Class I NAAQS and PSD Increment

Similar to the Proposed Project, the modeling analysis in the *Air Quality Report* (Appendix S) demonstrates that the Daniel Island Alternative impacts would be below the respective air quality standards. The emissions would not cause or contribute to an exceedance of the NAAQS or PSD increments within the Class I area (i.e., Cape Romain Wildlife Refuge).

Air Quality Impacts - Class II NAAQS and PSD Increment

Similar to the Proposed Project, for both the NAAQS and PSD analyses the Daniel Island Alternative was predicted to be in compliance with the NAAQS and PSD increments. As with the Proposed Project, the dispersion modeling predicted exceedences of several SO2 air quality standards associated with existing off-site permitted emission sources, but further analysis demonstrated that the Daniel Island Alternative's contribution of SO_2 would not cause or significantly contribute to the modeled exceedence. Therefore, Daniel Island Alternative emissions would not cause or contribute to an exceedance of the NAAQS or PSD increments in the Class II area. A complete discussion of this is presented in the *Air Quality Report* (Appendix S).

Sensitive Population NAAQS

The results of the sensitive population NAAQS compliance evaluations for the Daniel Island Alternative is presented in Appendix S. As with the Proposed Project, in all cases, these impacts are below the NAAQS at each sensitive population receptor. The emissions from the project would have minimal impact to the adjacent sensitive receptors.

Air Toxics

Similar to the Proposed Project, the Daniel Island Alternative would cause negligible impacts as a result of toxic compounds in air emissions.

Ozone NAAQS Attainment

Similar to the Proposed Project, the Daniel Island Alternative emission increases of ozone precursor pollutants would tend to be offset by the overall decreases in regional emissions of these precursor pollutants predicted by the SCDHEC EAC study. Therefore, similar to the Proposed Project, the Daniel Island Alternative is not expected to affect the Charleston and Cape Romain Wildlife Refuge areas' current attainment status for ozone.

Class I Visibility Analysis

Similar to the Proposed Project, the Daniel Island Alternative is not anticipated to have an adverse affect on visibility within the Cape Romain Wildlife Refuge.

Class I Deposition

As with the Proposed Project, the predicted nitrogen and sulfur deposition amounts from the Daniel Island Alternative are not likely to cause an adverse impact in the Class I area (impacts would be less than 2 percent of current levels).

5.3.11.3. Summary of Air Quality Impacts

Overall, the Daniel Island Alternative would result in similar regional air quality impacts as that described for the Proposed Project in Section 5.2.11. The Daniel Island Alternative would result in increased emissions as a result of the construction and operation of the project. These emissions would be similar to those for the Proposed Project, except the operational emissions would be slightly higher as a result of longer travel times for trucks to reach their primary destinations and congested traffic conditions on I-526. Similar to the Proposed Project, the emissions would cause minimal adverse impact to regional and local air quality.

5.3.12. Cultural Resources

This section discusses potential impacts from the Daniel Island Alternative on cultural resources. The overall cultural resources study area for this EIS is shown in Figure 5.1-16. Discussions of impacts to existing cultural resources are separated by study area. The study areas are shown in Figures 4.12-2 through 4.12-5. These figures also show the locations of existing cultural resources within their respective study areas.

5.3.12.1. Charleston Harbor Study Area

Historic Properties

The impacts to historic properties within the Charleston Harbor study area from the Daniel Island Alternative would be similar as those impacts described for the Proposed Project. Section 5.2.12.1 provides a discussion of impacts to cultural resources from the Proposed Project.

Archaeological Resources

As discussed in Section 4.12.3.1, numerous terrestrial and underwater archaeological resources exist in the Charleston Harbor study area though none have been identified within the Federal Navigation Channel or that could be impacted by potential vessel wakes from container ships. Therefore, the Daniel Island Alternative would not affect archaeological resources within this area.

5.3.12.2. North Charleston Study Area

Historic Properties

It is not likely that the Daniel Island Alternative would have any adverse impact on historical properties within the North Charleston study area.

Archaeological Resources

It is not likely that the Daniel Island Alternative will have any adverse impact on archaeological resources within the North Charleston study area.

5.3.12.3. Daniel Island Study Area

Historic Properties

As discussed in Section 4.12.3.3, there are no historic properties listed on the NRHP within the Daniel Island study area. Therefore, the Daniel Island Alternative would not affect historic properties within this area.

Archaeological Resources

The development of the Daniel Island Alternative may affect unevaluated submerged resources DA-01 and CL-17 in the Cooper River southeast and northwest of Daniel Island, respectively. The construction and operation of a terminal on Daniel Island could alter the setting and condition of these resources. However, the NRHP eligibility of DA-01 and CL-17 needs to be determined in order to fully assess the effect on this resource by the Daniel Island Alternative.

Upland, all of the nearby archaeological resources (plantation sites 38BK1627, 38BK1628, and 38BK1629) lay in portions of Daniel Island where various residential developments are planned; similar developments will occur between these historic properties and the Daniel Island Alternative. As noted in Section 5.1.12.3, an MOA and approved recovery plan exists if potential archaeological resources are found within the Daniel Island PUD.

5.3.12.4. Clouter Island Study Area

Historic Properties

It is not likely that the Daniel Island Alternative would have any adverse impact on historical properties within the Clouter Island study area.

Archaeological Resources

It is not likely that the Daniel Island Alternative would have any adverse impact on archaeological resources within the Clouter Island study area.

5.3.12.5. Summary of Cultural Resources Impacts

In summary, The Daniel Island Alternative would have no effect on historic or potentially historic properties or archaeological resources within the Area of Potential Effect (APE).

5.3.13. Section 4(f) Properties, Section 6(f) Properties, and Other Recreational Facilities

This section discusses potential impacts from the Daniel Island Alternative on potential Section 4(f) properties, Section 6(f) properties, and other recreational facilities within the study area depicted in Figure 5.1-17.

5.3.13.1. Section 4(f) Properties

Twenty-four potential Section 4(f) properties were identified in the study area and described in Section 4.13.2. The Daniel Island Alternative would potentially affect the Bellinger Island conservation area, Center Park, Barfield Park, Smythe Park, Pierce Park, Etiwan Park, and Charleston Regional Park (planned) primarily through nominal increases in noise levels; however, adverse affects would not be anticipated.

Impacts to the Charleston Waterfront Park, White Point Gardens, the Charleston Maritime Center, South Carolina Aquarium, Fort Sumter National Monument, Remleys Point Boat Ramp,

Charleston Harbor Marina, Patriots Point Naval and Maritime Museum, Alhambra Hall, and Fort Moultrie National Monument would be comparable to those associated with the Proposed Project and discussed in Section 5.2.13.1.

5.3.13.2. Section 6(f) Properties

Remleys Point Boat Ramp and the Charleston Waterfront Park are both Section 6(f) properties; however, the Daniel Island Alternative would not require the conversion of these properties from their current recreational uses.

5.3.13.3. Other Recreational Facilities

It is not likely that the Daniel Island Alternative would cause a significant increase in regional population through the creation of employment opportunities related to increased port activity. However, the region is experiencing substantial population growth under existing conditions, and recreational facilities will have to be increased in order to keep up with future demands, even without the Daniel Island Alternative.

As the region's population continues to grow, additional recreational boat traffic will increase on the area waterways. The Daniel Island Alternative would cause an increase in large ocean-going vessel and tugboat traffic within Charleston Harbor and, as a result, increase the possibility of close quarter or collision situations, especially during the peak boating times. During the recreational shrimp-baiting season (mid-September through mid-November) large numbers of recreational shrimpers work the shallow waters adjacent to the navigation channel especially in the areas southwest of Crab Bank and west of Patriots Point Naval Museum.

Impacts to water-related facilities would be comparable to those associated with the Proposed Project.

5.3.13.4. Summary of Impacts to Section 4(f) Properties, Section 6(f) Properties, and Other Recreational Facilities

In summary, the Daniel Island Alternative is unlikely to directly impact any Section 4(f) properties, Section 6(f) properties, or other recreational facilities in the study area. Indirect impacts include minor impacts in noise and light to those properties nearby, including several neighborhood parks, the Daniel Island boat ramp, and Bellinger Island.

5.3.14. Hazardous Waste and Materials

5.3.14.1. Site Contamination

The following sections discuss the potential impacts to contaminated sites within and adjacent to the Daniel Island Alternative footprint and those potentially impacted by the access roadway corridor.

Site Remediation

Development of the Daniel Island Alternative would not adversely affect any remediation activities.

The access roadway corridor for the Daniel Island Alternative would not affect any known contaminated sites or remediation activities at any contaminated sites.

Land Disturbance

The construction of the Daniel Island Alternative would require the placement of clean fill material on the existing land surface to surcharge the underlying soil. The fill material would be spread over the site following surcharging to achieve the proper finished grade elevation. The fill material would effectively isolate any contaminated sediments in the CDF cell from human and ecological exposures. Consequently, contaminant concentrations in surface soils at the Daniel Island site are not expected to present human health or ecologic concerns since the existing land surface would be covered by a substantial layer of clean fill.

Groundwater is not currently used as a drinking water source on Daniel Island and the Daniel Island Alternative would not be expected to adversely affect local groundwater quality.

There are no known contaminated surface waters at the Daniel Island Alterative site or on the remainder of Daniel Island. The Daniel Island alternative would not cause an adverse impact to any contaminated surface waters or their remediation.

Releases of contaminants from soil, groundwater, or surface water would not be expected in association with the Daniel Island Alternative.

5.3.14.2. Handling of Hazardous Materials

Impacts to the environment from handling of hazardous materials at the Daniel Island Alternative would be comparable to those anticipated at the Proposed Project.

5.3.14.3. Oil and Hazardous Materials Spill Response

Oil and hazardous material spill responses at the Daniel Island Alternative would be comparable to those at the Proposed Project.

5.3.14.4. Summary of Hazardous Waste and Materials Impacts

The development of the Daniel Island Alternative would not affect existing contaminated sites or remediation activities. The Daniel Island Alternative would handle the same volume of hazardous materials as the Proposed Project and would have the same incremental increase in the risk of spills.

5.3.15. Water Resources

The section summarizes the potential impacts the Daniel Island Alternative would have on the water resources environment. This includes groundwater resources, stormwater runoff, and surface waters (e.g., lakes, streams, etc.). The study area with respect to water resources includes the surface waters of the Charleston Harbor Estuary extending from the Atlantic Ocean through the harbor, up the Cooper River to the confluence with the Back River, as well as the groundwater resources underlying the Tri-County area (shown in Figure 5.1-19).

5.3.15.1. Groundwater Resources

As described in Section 5.2.14, the potential impacts of the Proposed Project are limited to the surficial aquifer. The impacts to the surficial aquifer would be similar for the Daniel Island Alternative.

Similar to the Proposed Project, the Daniel Island Alternative facility would utilize municipal surface water resources from the CWS during construction and operation of the facility.

Therefore, the construction and operation of the Daniel Island Alternative would not create increased demands on groundwater resources.

As with the Proposed Project, the construction and operation of the Daniel Island Alternative would cause minimal groundwater resource impacts.

5.3.15.2. Stormwater Runoff

The Daniel Island Alternative would result in the filling and paving of upland, intertidal and subaqueous areas, thereby increasing stormwater runoff quantity and pollution. As with the Proposed Project, it is expected that trucks and equipment operating at the facility would contribute a wide variety of pollutants (primarily heavy metals, oils and greases) to runoff flow.

The Daniel Island Alternative would result in 250 acres of impervious surface of similar land use as the Proposed Project. Therefore, this alternative would result in similar quantities and quality of stormwater runoff as the Proposed Project.

Although the Daniel Island Alternative would cause a greater increase in impervious area (because the existing land cover at the Daniel Island site has less impervious area than the Proposed Project site), stormwater management would be required such that the stormwater discharge to the Cooper River would have minimal impacts to water quality. The stormwater management system would be similar to that described for the Proposed Project (Section 5.2.15.2). The stormwater runoff would be detained as required by current State environmental regulations before being released into Cooper River through a series of controlled outfall structures. The stormwater quantity and quality discharged from the terminal stormwater management system would be similar to that for the Proposed Project.

The conceptual access roadway to the Daniel Island Alternative site would cause greater stormwater impacts than the access roadway for the Proposed Project. First, the access roadway to the Daniel Island Alternative site would be much longer than that required for the Proposed Project. Second, the roadway would replace undeveloped open areas with impervious surfaces. Both of these factors increase the stormwater quantity and pollution loading above that for the Proposed Project. However, similar to the Proposed Project, stormwater from all interchange ramps and elevated roadway would be collected by a scupper drainage system, and stormwater from the other parts of the roadway would be collected by open ditch systems and closed conduit systems. The roadway would require the construction of stormwater detention facilities to avoid significant increase in the peak discharge rate to the receiving watercourses. Therefore, similar to the Proposed Project, the conceptual access roadway stormwater discharges to receiving waters would have minimal impact on surface water quality.

5.3.15.3. Surface Water

The surface waters potentially affected by the Daniel Island Alternative include the Lower Cooper River and Beresford Creek. As described in the previous subsection, stormwater discharges would cause minimal impacts to surface waters. Other potential impacts to surface waters include changes to tides, currents, salinity, water quality and sedimentation. A hydrodynamic, salinity and sedimentation computer model was applied to predict the changes to the surface waters (described in detail in Appendix Y). The projected impacts to tides, currents, salinity and water quality are discussed in the following subsections; impacts to sedimentation patterns in the river are discussed in the section on dredging (Section 5.3.16).

Tides, Currents and Flows

The Lower Cooper River would be affected by the dredging and filling of the river associated with the construction of the project. The berth and turning basin would be dredged and deepened, as shown in Figure 3.4-2.

A numerical model was used to quantify the changes in flows and current patterns caused by the changes to the river geometry. Currents in the vicinity of the berth and turning basin would be slightly reduced. However, the project would not cause any changes to currents in areas upstream or downstream from the project site. The project would not appreciably affect currents near the Cooper River Marina, and the project would cause negligible changes in tidal elevations in the Lower Cooper River.

In-stream Water Quality

This section evaluates the potential surface water quality impacts caused by the Daniel Island Alternative. Specifically, the potential impacts to in-stream salinity, DO, BOD, nutrients, fecal coliform, suspended sediments, and heavy metals are discussed. This section also addresses potential changes to specific pollution sources, such as ship bilge water, accidental spills and container wash wastewater.

Salinity

A hydrodynamic and salinity computer model was utilized to evaluate the Daniel Island Alternative project related changes to hydrodynamics, salinity and sedimentation. The model setup, calibration and results are presented in detail in Appendix Y.

The model results show that the Daniel Island Alternative project construction would cause localized changes in salinity concentrations. The results show that for the Daniel Island Alternative the bottom salinity in the areas dredged to create the berth and turning basin is up to about 2.4 ppt higher than the bottom salinity in the existing shallower waters. This change is not really a change to existing water column salinity, but instead, it is the creation of additional water column in which the bottom salinity would be similar to that in the navigation channel. Project changes to areas that are not deepened (e.g., the adjacent navigation channel) and side bank areas) are 0.2 ppt or less.

The changes in salinity are mostly limited to the immediate project site and the project would not cause major changes to salinity upstream and downstream of the project site. Based on simulated 50th percentile salinities along the navigation channel in the Lower Cooper River, the Daniel Island Alternative would not increase salinity concentrations along the channel, and decreases in salinity along the navigation channel would be more than 0.8 ppt. Changes of 0.1 ppt or more are limited to within 7 miles of the project site.

The Daniel Island Alternative would not affect the salinity alerts for the Bushy Park Reservoir. The farthest downstream station monitored for salinity as part of the alert system is Dean Hall (USGS gage 02172050, located close to river station 1800+00). A specific conductance of 1,550 µmho/cm (equivalent to a salinity of 0.78 ppt) at the Dean Hall gage will trigger a Level 1 salinity alert. The results show zero change in 90th percentile salinity at Dean Hall, which indicates that the project would not cause any increase in salinity intrusion events that affect the Bushy Park Reservoir, and it would not affect the frequency of salinity alerts under normal conditions.

Dissolved Oxygen

The Daniel Island Alternative can potentially affect in-stream DO in four ways: (1) the physical changes to the river geometry can affect the reaeration of the water column by changing depth and current speed, (2) the changes in pollutant loading can increase the BOD and thereby decrease the DO concentration, (3) change in salinity concentration causes change in DO saturation concentration, and (4) change in circulation patterns can affect the residence time of BOD in the river. The 3-D dissolved oxygen TMDL model was used to quantify the Proposed Project impacts to DO (Appendix AA), and a comparison of the hydrodynamic model results (Appendix Y) are used here to provide a qualitative evaluation of the potential Daniel Island Alternative impacts relative to the Proposed Project impacts.

The hydrodynamic modeling results (Appendix Y) indicate that the project would cause a reduction in currents in the navigation channel at the project site. The current changes are less than that caused by the Proposed Project. This current speed reduction would result in a small reduction in vertical mixing and reaeration, and thereby cause some small localized reduction in DO concentration. The increase in depth would also directly result in a decrease in reaeration of the lower portion of the water column. Although the reduction in current velocities is comparable to that for the Proposed Project, the total area deepened is much less than that for the Proposed Project. It is expected that the these effects would create a reduction in DO that is less than that expected for the Proposed Project. Also, the impact to DO would affect a smaller area than that expected for the Proposed Project.

The post-project stormwater runoff BOD pollution loading for the Daniel Island Alternative terminal is expected to be similar to that for the proposed terminal. However, the access roadway required for the Daniel Island Alternative would be much longer than that required for the Proposed Project. This will generate greater stormwater runoff BOD pollution loading to surface waters than the Proposed Project. Similar to the Proposed Project, stormwater management measures would minimize impacts, and therefore, the Daniel Island Alternative stormwater runoff would cause negligible impact to instream BOD concentrations and DO concentrations.

The changes in salinity concentration would also cause a change in DO saturation concentration, which in turn, affects the DO concentration. The predicted changes in salinity concentration are smaller than that predicted for the Proposed Project. Therefore, the change in salinity is expected to cause only very small changes in DO saturation concentration.

Altogether, it is expected that the project would result in small, localized decreases in DO near the project site, particularly at the river bottom. However, the reduction in DO caused by the Daniel Island Alternative is expected to be less than that caused by the Proposed Project.

Nutrients

It is expected that the Daniel Island Alternative terminal will generate approximately the same stormwater runoff nutrient load as the Proposed Project terminal. As with the Proposed Project, the impacts of the terminal stormwater discharge to surface waters would be minimal.

The access roadway required for the Daniel Island Alternative would be much longer than that required for the Proposed Project. This would generate greater stormwater runoff nutrient pollution loading to surface waters than the Proposed Project. However, as with the Proposed Project, impacts to surface waters would be minimal as a result of stormwater management measures.

Fecal Coliform

Post-development plans for the Daniel Island Alternative do not include activities that would increase pathogen levels (primary sources of pathogens in stormwater include animal wastes, illegal wastewater connections into storm sewer lines, seepage of groundwater containing pathogens into storm sewer lines, and septic tanks). Therefore, similar to the Proposed Project, the Daniel Island Alternative would not substantially affect fecal coliform concentrations in the Lower Cooper River.

Suspended Sediments

The project can potentially affect in-stream suspended sediment in multiple ways: (1) change in long-term pollutant loading from stormwater runoff caused by the change in land use; (2) temporary increases caused by construction activities both upland (via stormwater runoff from disturbed land) and in the river (via dredge and fill activities for the proposed terminal and construction of the access roadway over Beresford Creek); and (3) long-term periodic increases from maintenance dredging operations and water jet sedimentation control system. The potential impacts from stormwater runoff, dredging and water jet sedimentation control system are discussed in the following subsections.

Stormwater Runoff:

The change in land use at the project site will cause an increase in stormwater runoff suspended sediment concentrations. The post-project stormwater runoff suspended sediment concentrations for the Daniel Island Alternative terminal are expected to be similar to that for the Proposed Project. However, the access roadway required for the Daniel Island Alternative would be much longer than that required for the Proposed Project. This will generate greater suspended sediment stormwater runoff pollution loading to surface waters than the Proposed Project access roadway.

The stormwater control ponds at the site will be designed to remove a minimum of 80 percent of the suspended sediments from the stormwater before discharge to surface waters. Further, as with the Proposed Project, impacts would be minimized because the NPDES industrial stormwater permitting process mandates a Stormwater Pollution Prevention Plan (SWPPP). Therefore, similar to the Proposed Project, the resulting discharge is expected to cause only a minimal increase in in-stream suspended sediment concentrations in the Lower Cooper River.

Similar to the Proposed Project, the construction activities at the Daniel Island Alternative facility would involve the disturbance and moving of large quantities of earth, thereby temporarily increasing stormwater runoff TSS. It is expected that temporary sediment basins along with other temporary stormwater management/erosion control BMPs will be utilized to protect the surface waters from sediment laden runoff from the site during construction. Therefore, similar to the Proposed Project, surface water impacts from stormwater runoff during construction should be minimal.

Dredging and Filling:

Dredging activities during project construction and maintenance dredging would cause the suspension of bottom sediments. To quantify the effects of the dredging on suspended sediments, the SSFATE model was used to simulate the suspended sediment plume created by dredging operations at the Daniel Island Alternative. The results are shown in detail in Appendix Z. The analysis shows similar results as the Proposed Project in regard to plume extents and concentrations. The duration of the suspended sediment plume caused by dredging

operations would be less than that expected at the Proposed Project because the amount of material to be dredged from the river for the Daniel Island Alternative is about 41 percent less than that required for the Proposed Project. The dredge plume caused by dredging operations at the Daniel Island Alternative is not expected to cause substantial adverse effects to the aquatic environment.

Fill will be placed into the Cooper River as part of the terminal construction between the shoreline and the wharf. However, sheet pile walls will be installed around the perimeter of the fill area prior to backfilling. Therefore, similar to the Proposed Project, the backfilling of the terminal site will have minimal impacts to suspended sediments in the river.

Access Roadway Construction:

Construction of pile foundations and abutments for the proposed access roadway may disturb the bottom and banks of Beresford Creek, respectively. Temporary increases in turbidity would result. Best management practices would be implemented to minimize the increase in water turbidity. Therefore, similar to the Proposed Project, access roadway construction should have minimal impacts to surface water quality as a result of suspended sediments.

Water Jet Sedimentation Control System:

As with the Proposed Project, water jet units installed along the face of the berth would keep sediments in suspension to prevent them from being deposited in the berth area and minimize sedimentation rates and maintenance dredging requirements. The impact resulting from a water jet sedimentation control system is expected to be similar to that for the Proposed Project.

Heavy Metals and Other Toxic Contaminants

The two main project related potential sources of surface water contamination from heavy metals or other toxic contaminants include stormwater runoff pollution and release of contaminants from sediments dredged from the river.

As with the Proposed Project, the large number of trucks operating at the facility and traveling along the access road and highways will generate some heavy metal, oil and grease pollution via stormwater runoff. The Daniel Island Alternative will result in approximately the same total stormwater pollution load from the terminal site as the Proposed Project. However, the access road for the Daniel Island Alternative is longer than that for the Proposed Project, and therefore, it will generate a greater increase in stormwater pollution than that for the Proposed Project. Similar to the Proposed Project, impacts would be minimized because the NPDES industrial stormwater permitting process mandates an SWPPP.

The potential impacts from sediment contaminants may occur both at the dredge site during dredge operations, or at the disposal site when water is discharged back into the surface waters from the CDFs. The CDF effluent water quality and potential impacts to surface water quality was evaluated and is described in detail in the *Sediment Quality Evaluation Report* (Appendix X). According to the analysis provided in the appendix, the dredged material contains COCs. Similar to the Proposed Project, the concentration of COCs resuspended into the water column at the dredge site would be below the WQSs. Based on these results, the dredging of the sediments at the site is not expected to cause any adverse water column impacts from toxic contaminants. Also, the CDF effluent would meet both acute and chronic saltwater WQSs when mixing zones are considered. Similar to the Proposed Project, the CDF effluent will result in minimal impact to surface water toxic contaminant concentrations.

Ship Bilge Water, Accidental Spills and Container Washwater

Similar to the Proposed Project, the increased container ship traffic associated with the Daniel Island Alternative would have minimal impacts to water quality in the Lower Cooper River or Charleston Harbor as a result of ship bilge water discharges. Impacts to water quality resulting from bilge water are minimal because regulations prohibit the discharge of untreated and treated bilge water into Charleston Harbor or its tributaries.

It is reasonable to assume that the increased container ship, truck and rail traffic would cause an increase in the potential for offsite accidental spills of pollutants that may contaminate surface waters. This potential increase resulting from the Daniel Island Alternative would be similar to that for the Proposed Project.

Similar to the Proposed Project, the Daniel Island Alternative would not include a SCSPA maintained or operated container washwater facility, but local maintenance and repair vendors would provide container washing services. As with the Proposed Project, this wastewater would be collected and disposed of at an appropriate wastewater treatment facility, and the wastewater would not be expected to have any adverse impacts to surface waters.

5.3.15.4. Summary of Water Resource Impacts

Similar to the Proposed Project, the Daniel Island Alternative would cause negligible impacts to groundwater resources either as a result of increased potable water demand or from excavation of the berth and turning basin.

The Daniel Island Alternative terminal would generate stormwater runoff similar to that for the Proposed Project terminal (both quantity and quality). The access roadway for the Daniel Island Alternative is longer than that for the Proposed Project and would therefore create more stormwater runoff. However, as with the Proposed Project, the project would be required to comply with SCDHEC stormwater regulations and the adverse impacts of the Daniel Island Alternative on surface waters resulting from the stormwater runoff would be minimal as a result of stormwater treatment and BMPs.

Similar to the Proposed Project, the Daniel Island Alternative would cause minor adverse impacts to dissolved oxygen, salinity, nutrients, heavy metals, and suspended sediments. However, because the size of the berth area and turning basin to be dredged is smaller than that for the Proposed Project, these minor adverse impacts will be less than that for the Proposed Project.

Similar to the Proposed Project, the Daniel Island Alternative would have minimal adverse impacts to water column concentrations of toxic chemicals during dredging operations, either at the dredge site or at the CDF outfall. Adverse impacts to water quality resulting from bilge water discharges, accidental spills or container washwater would be minimal.

5.3.16. Aquatic Sediments and Dredging

This section summarizes the potential impacts the Daniel Island Alternative may have on sedimentation and dredging in the Charleston Harbor Estuary. Also, this section describes the potential impacts related to the sediment quality of the aquatic sediments disturbed by the Daniel Island Alternative. As shown in Figure 5.1-20, the study area includes the surface waters and bottom sediments of the Charleston Harbor Estuary extending along the Cooper River from Drum Island up I-526, including Shipyard Creek, as well as the upland areas affected by dredge disposal areas on Daniel Island and Clouter Island.

In addition to the direct impacts caused by the project construction dredging, the project would also result in secondary impacts to sedimentation in the Federal navigation channel. Additionally, there would be potential cumulative effects on river bottom sediments related to accidental pollutant releases.

5.3.16.1. Sedimentation and Dredging

The Daniel Island Alternative would require dredging for the initial project construction; the project would also affect long-term maintenance dredging rates. For the project construction, approximately 3.8 million cubic yards (Mcy) of material would be dredged from the river (approximately 59% of the volume required to be dredged from the river for the Proposed Project). Because of the smaller dredging volume, the duration of dredging operations for the project should be less than the 12 to 15 months estimated for the Proposed Project. The dredged material would be placed in the Daniel Island CDF.

The following subsections discuss the potential project impacts to sedimentation in the Federal navigation channel and sedimentation in areas outside of the navigation channel (e.g., the berth and turning basin).

Federal Navigation Channel

As with the Proposed Project, the Daniel Island Alternative would affect long-term maintenance dredging of the Federal navigation channel by altering the river geometry. A numerical sedimentation model was used to quantify the changes in sedimentation rates, as described in detail in Appendix Y.

In contrast to the Proposed Project, the results indicate that the Daniel Island Alternative would not change the total overall shoaling volume in the Federal navigation channel in the lower Cooper River (not including the proposed berth and turning basin, which are not part of the navigation channel).

There is currently an authorized turning basin that could be constructed to support a new facility on Daniel Island. In such case, the turning basin shoaling discussed in the following subsection would be an impact to the Federal navigation channel.

Outside the Federal Navigation Channel

The Daniel Island Alternative is estimated to cause long-term shoaling in the berth and turning basin at a rate of approximately $9x10^4$ cy/yr, which is 61 percent less than that predicted for the Proposed Project. Therefore, the expected long-term maintenance dredging at the Daniel Island Alternative is about 61 percent less than the Proposed Project.

Also similar to the Proposed Project, a water jet sedimentation control system will be implemented as part of the project. The water jet system in not expected to affect the shoaling at adjacent facilities.

5.3.16.2. Sediment Quality

Sediments that would be dredged to construct the Daniel Island Alternative were sampled and analyzed for the following contaminants of potential concern (CoPCs): nutrients, metals, phenols, phthalate esters, PAHs, PCBs, butyltins, dioxins and furans, pesticides, non-metals and other pollutants. As described in detail in the *Sediment Quality Evaluation* (Appendix X), three sediment samples (one core and two grab samples) were collected from within the Daniel

Island Alternative dredging prism. The sediment core sample was collected using a barge-mounted rotary drill rig; the sediment core was collected by advancing a 3-inch diameter stainless-steel split spoon from bed elevation to the approximate expected dredge cut depth. Sediment samples were collected and vertically composited at the sediment core sampling station (designated as CHDI-01). Sediment grab samples were collected from bed elevation at sampling stations CHDI-02 and CHDI-03.

The core sample was intended to be representative of "new work" sediment quality and the grab samples were intended to be representative of "maintenance" dredging sediment quality. Each sediment sample was analyzed for metals (including reference metals: aluminum and iron), organotins (tetra-n-butyltin, tri-n-butyltin, di-n-butyltin, and n-butyltin), PAH compounds, PCB congeners and arochlors, pesticides, polychlorinated dioxins and furans, nutrients, and geotechnical parameters. In addition, total and dissolved phase sediment elutriate analyses were completed.

A summary of the results is presented in Table 5.3-11, which shows the percentage of samples that exceeded the screening values for each analyte. The analysis results are presented in detail in the *Sediment Quality Evaluation* (Appendix X).

The results indicate that the Daniel Island Alternative sediment samples are similar to the Proposed Project samples in regard to the number of samples exceeding the screening values for metals, organotins, and PAHs. For pesticides and PCBs, the Daniel Island Alternative "new work" sediments show fewer exceedances of screening values than the Proposed Project samples, but the surface grab samples show a comparable percentage of exceedances. For dioxins and furans, the Daniel Island Alternative "new work" sediments show fewer exceedances of screening values than the Proposed Project samples, but the surface grab samples show a greater percentage of exceedances. Overall, these sediments show similar low contaminant concentrations, and dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants.

Similar to the Proposed Project, a substantial number of sample concentrations exceeding sediment screening values occurred as a result of assuming concentrations equal to the laboratory method detection limit (MDL) for tests that did not detect the analyte (non-detects). Elevated MDLs in solid matrix samples (e.g., sediments) are a common occurrence and typically are caused by matrix interferences.

Table 5.3-11. Percentages of Sediment Samples Exceeding Sediment Screening Values for the Daniel Island Alternative.

Analyte Group	Sediment Reference	Daniel Island Sediment Core Sample (single sample)	Daniel Island Sediment Grab Samples (geometric mean)
Metals			
Samples less than EPA Region 4 screening values or ER-L (%)	46.6	60.0	40.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	40.0	40.0	46.6
Samples exceeding ER-M (%)	13.3	0.0	13.3

Analyte Group	Sediment Reference	Daniel Island Sediment Core Sample (single sample)	Daniel Island Sediment Grab Samples (geometric mean)
Organotins (Tri-n-butyltin only)			
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	100.0	100.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	0.0	0.0
Samples exceeding ER-M (%)	0.0	0.0	0.0
Polynuclear Aromatic Hydrocarbons (C1-C4 compounds not included)			
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	100.0	100.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	0.0	0.0
Samples exceeding ER-M (%)	0.0	0.0	0.0
Pesticides			
Samples less than EPA Region 4 screening values or ER-L (%)	48.4	93.5	45.2
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	38.7	6.5	41.9
Samples exceeding ER-M (%)	12.9	0.0	12.9
Dioxins/Furans			
Samples less than EPA Region 4 screening values or ER-L (%)	47.0	82.4	29.4
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	52.9	17.6	70.6
Samples exceeding ER-M (%)	0.0	0.0	0.0
Polychlorinated Biphenyls (Total PCBs Only)			
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	100.0	0.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	0.0	100.0
Samples exceeding ER-M (%)	0.0	0.0	0.0

5.3.16.3. Summary of Dredging and Aquatic Sediment Impacts

For the project construction, approximately 3.8 Mcy of material would be dredged from the river (approximately 58 percent of the volume required to be dredged from the river for the Proposed Project). Because of the smaller dredging volume, the duration of dredging operations for the project should be less than the 12 to 15 months estimated for the Proposed Project. Similar to the Proposed Project, the dredged material would be placed in the Daniel Island CDF.

In contrast to the Proposed Project, the results indicate that the Daniel Island Alternative would not change the total overall shoaling volume in the Federal navigation channel in the lower Cooper River (not including the proposed berth or turning basin, which are not part of the navigation channel).

There is currently an authorized turning basin that could be constructed to support a new facility on Daniel Island. In such case, the turning basin shoaling would be an impact to the Federal navigation channel. The Daniel Island Alternative is estimated to cause long-term shoaling in

the berth and turning basin area at a rate of approximately $9x10^4$ cy/yr, which is 61 percent less than that predicted for the Proposed Project.

Similar to the Proposed Project, the dredged materials could include CoPCs. The dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants.

5.3.17. Natural Resources

This section describes the Daniel Island Alternative impacts to natural resources. The introductory section provides an overview of potential project impacts to natural resources. The following subsections provide detailed assessments of potential impacts to wetlands, upland biotic communities, aquatic biotic communities, marine mammals, EFH, and introduced species.

The Daniel Island Alternative site has historically been used for dredge spoil disposal. It is important to note that the current Daniel Island Alternative is much different from the alternative evaluated in the 1999 Daniel Island EIS. The current Daniel Island Alternative is less than half the size of the previous proposal. As described in Section 5.2.6, approximately 23 percent of the containers will be carried to existing railyards by truck. Therefore, the alternative site that is being evaluated in this EIS is much smaller and does not include extensive rail lines going through the Francis Marion National Forest.

As with the Proposed Project, the construction of the Daniel Island Alternative project will result in a number of potential changes to the natural environment. The project will require new dredging, placement of structures along the shoreline and impacts to habitats. Long-term impacts include an increase in impervious surface area and thereby an increase in stormwater runoff, maintenance dredging of the new berth and turning basin, and increased ship traffic.

The Daniel Island Alternative project will result in the modification of land cover at the project site and along the access roadway, as shown in Figure 5.3-8. The total footprint of the conceptual layout of buildings and new impervious surface area (i.e., container yard, wharf, support area) will be approximately 260 acres. Impacts from the Daniel Island Alternative terminal project are shown in Table 5.3-12. Access road impacts are listed in Table 5.3-13.

The Daniel Island Alternative requires a berth and turning basin where dredging will affect 49 acres of open water. The project would require dredging approximately 3.8 million cubic yards of sediment.

Approximately 12 acres of open water areas would be permanently filled during construction of the container yard for the terminal facility. An additional 12 acres of open water would be partially filled during construction of the wharf. The wharf structures will be constructed as a pile support deck that will be partially filled beneath the deck. The conceptual access road for this alternative will also shade approximately 1.0 acre of Beresford Creek.

Specific habitat impacts are:

- Dredging for berth and turning basin: 36.6 acres of open water;
- Dredging for berths: 12.7 acres of open water;
- Partial fill for wharf: 11.8 acres of open water and 0.3 acres of marsh

- Fill for container yard and support area: 12 acres of open water, 20.0 acres of marsh, and 205.6 upland acres; and
- Stormwater retention basin construction: 22.9 upland acres.

Table 5.3-12. Daniel Island Alternative Land Cover Breakdown.

Land Cover	Acres	% of Total
Impervious	0.0	0.0%
Wooded	26.1	8.1%
Landscaped	0.0	0.0%
CDF	202.5	62.9%
Tidal Wetland	20.4	6.3%
Freshwater Wetland	0.0	0.0%
Open Water	73.0	22.7%
Total	*322.0*	100.0%

Table 5.3-13. Daniel Island Alternative Access Road Affected Land Covers.

Land Cover	(Acres)
Impervious	0.7
Wooded	29.1
Landscaped	8.5
CDF	2.1
Tidal Wetlands	21.8
Freshwater Wetland	1.3
Open Water	0.6
Residential	0
Total	*64.1*

The dredging and filling of 73.0 acres of estuarine waters includes 3.7 acres of shallow (less than 2 ft) water and 2.2 acres of mudflat. Considerably less open water is impacted for the Daniel Island Alternative than the Proposed Project because the existing navigation channel is closer to the shore at this location.

5.3.17.1. Upland Communities

The following sections present a discussion of the biotic communities potentially affected by the Daniel Island Alternative. At the Daniel Island Alternative project site, 228.6 acres of upland will be impacted, including 202.5 acres of existing CDF and 26.1 acres of forested land.

Potential impacts within a 200-foot wide corridor for the conceptual access road are discussed to provide an evaluation of impacts resulting from the actual footprint of the conceptual roads serving the Daniel Island Alternative terminal (the limits of fill for the conceptual access road would be for 4 lanes, which would likely be less than 200 feet wide). Drainage structures are also considered. For the access road, 40.4 acres of upland are within the corridor; including

29.1 acres of forested land, 8.5 acres of landscaped land, 2.1 acres of CDF and 0.7 acre of impervious land (the existing Clements Ferry Road).

The Daniel Island Alternative terminal area consists largely of dredged material disposal areas, some of which have been converted to agriculture. Little or no natural upland biotic communities remain in the area to be occupied by this alternative; consequently, no impacts to natural upland plant communities are expected in the area of the terminal.

The conceptual access roadway serving the Daniel Island Alternative terminal would traverse approximately 40 acres of upland biotic communities within 100 feet each side of centerline. Table 5.3-13 lists the biotic communities and acreages covered by the 200-foot corridor. A total of 29.1 acres of mature forested vegetation will be impacted, and the corridor will further isolate and fragment larger upland habitats.

Although the Daniel Island Alternative facility would not affect any native/virgin upland biotic communities, various songbirds, raptors, small mammals (e.g., raccoons, rabbits, etc.), and white tail deer may be found throughout this portion of the island. The Daniel Island Alternative facility will displace most of these species. This displacement should not imperil any of these species as they are common throughout the southeastern United States. Similar impacts are expected for the road corridor.

Effects to upland animal communities along the access road corridor include:

- Taking of individuals during construction;
- Elimination of habitat; and
- Habitat fragmentation.

Cumulative effects include a general reduction in the local population size of some upland animal species due to the direct and indirect effects noted previously. The Daniel Island Alternative is not expected to reduce species diversity within the upland animal community (see Section 5.3.18 for discussion of endangered and threatened species). Although difficult to predict, some changes in species composition within the adjacent upland animal community would be expected.

5.3.17.2. Freshwater Wetland Communities

The Daniel Island Alternative will impact estuarine wetlands and open water areas within the terminal area and along the conceptual access road corridors. Some wetland dredge and fill due to berth, wharf, and container yard construction will occur along the shoreline and tidal marshes adjacent to the terminal facility. The access road serving the terminal will cross several acres of tidal marsh at Beresford Creek. Specific impacts to wetlands are discussed below.

The largest impacts to freshwater wetlands occur for the Daniel Island Alternative because of the conceptual access roadway corridor. Palustrine road corridor impacts only account for 2.0 percent of the total road corridor; however, the Daniel Island Alternative road corridor is much longer than the access roads for the other project alternatives.

With regard to wetlands located along the road corridor, impacts would include:

- Direct loss of wetlands within the footprint of the road;

- Potential alteration of wetland hydrology; and

- Changes in species composition and diversity due to changed hydrology.

Stormwater runoff may cause potential hydrologic changes to wetlands that are currently estuarine. If the stormwater detention ponds are discharged in only a few locations, receiving wetlands may begin to show more freshwater characteristics. Invasion of cattails (*Typha* spp.) and common reed (*Phragmites australis*) may degrade the wetland quality.

Except for small drainage ditches and temporary standing water within some areas of the CDF, no freshwater wetlands are located within the area to be occupied by the terminal facilities for the Daniel Island Alternative. No impacts to freshwater plant communities are expected within the terminal location areas. The conceptual access roadway corridor does contain 1.3 acres of palustrine wetland/forested habitat, according to the latest site inspection and the 1999 Daniel Island EIS. Other freshwater habitats exist in the area and will not be impacted; although increasing development on Daniel Island could impact the habitats.

5.3.17.3. Tidal Wetland Communities

The Daniel Island Alternative terminal facility, including berths, wharves and container yards, would result in the direct loss of approximately 20 acres of estuarine wetlands (cordgrass/needlerush marsh).

The conceptual access road serving the terminal would cross approximately 21.8 acres of cordgrass/needlerush marsh. The access road would be elevated above Beresford Creek and the fringing marsh on pile support structures, thus impacts would be limited to shading of the marsh beneath the elevated road.

5.3.17.4. Open Water River and Creek Communities

Estuarine wetland animal communities will be lost by the dredging/filling construction activities at the Daniel Island Alternative site. The numerous small estuarine wetland animals include microorganisms (decomposers), sea worms (polychaetes), small crustaceans, snails and shellfish. Animal communities in wetlands adjacent to the project site should be largely unaffected by the project. Impacts to upland and estuarine animals caused by wetland loss will be discussed in the following sections.

The Daniel Island Alternative also has the potential to impact estuarine and ocean biotic communities. Specific impacts to each of these biotic communities are discussed below.

The most immediate effect of the Daniel Island Alternative to the estuarine animal community will be loss of habitat. Dredging and filling of the Cooper River and tidal mudflats will impact the shallow water benthic community in the vicinity of the Daniel Island Alternative terminal facility. Construction and maintenance dredging may also increase suspended solids, thereby reducing quality of the remaining habitat and potentially smothering sensitive species. The terminal facility will result in the direct loss of 20 acres of tidal marsh.

Direct effects of the terminal to the estuarine animal community will be loss of individuals during construction (excavating/filling) and permanent loss of habitat along the proposed berth and wharf structures. Other potential effects from the terminal facility include decreased water quality from stormwater runoff (although this is expected to be minimized as a result of stormwater BMPs) and high suspended solids from sediment disturbance during ship

maneuvering. All of these effects could result in an overall decline in abundance and diversity of estuarine animals near the alternative terminal facility.

The 200-foot corridor for the conceptual access road would also impact estuarine animal species inhabiting Beresford Creek. A potential positive impact of the pile supported wharf and bridge over Beresford Creek is that most non-schooling fish are attracted to structures for their cover/shelter, as well as a substrate from which to forage for invertebrates and algae.

Potential finfish impacts are similar to those of the Proposed Project (see Section 5.2.17.3), except the area of open water directly affected by the Daniel Island Alternative project is much less than that for the Proposed Project (i.e., 73 acres versus 156 acres).

Potential shrimp, squid, and blue crab impacts are similar to those of the Proposed Project (see Section 5.2.17.3), except the area of open water directly affected by the Daniel Island Alternative project is much less than that for the Proposed Project (i.e., 73 acres versus 156 acres).

Potential sea turtle and diamondback terrapin impacts are similar to those of the Proposed Project (see Section 5.2.17.3), except the area of open water directly affected by the Daniel Island Alternative project is much less than that for the Proposed Project (i.e., 73 acres versus 156 acres).

Potential benthic organism impacts are similar to those of the Proposed Project (see Section 5.2.17.3), except the area of open water directly affected by the Daniel Island Alternative project is much less than that for the Proposed Project (i.e., 73 acres versus 156 acres).

As described in detail in the Water Resources section (Section 5.3.15), the Daniel Island Alternative will adversely affect both turbidity and dissolved oxygen concentrations in the Lower Cooper River. As for short-term impacts, some increase in turbidity will be associated with the dredging and pile driving but it will be temporary and localized. A reduction in water column DO concentration is possible if anaerobic sediments are disturbed and a corresponding BOD is generated. In regard to long-term impacts, increased depth from the proposed berth and turning basin will cause small localized reductions in bottom DO levels and localized increases in bottom salinity, and increased stormwater pollution will cause a small increase in pollution loads (i.e., heavy metals, oils and greases) to the estuary.

A water jet sedimentation control system is also part of the Daniel Island Alternative project that would potentially have long-term affects on the Cooper River. A water jet sedimentation control system would cause some fluctuations in suspended sediments in the water column (but no increase in average suspended sediment concentrations) and can potentially impact fish larvae and eggs.

The Daniel Island Alternative terminal facility, including berths, wharves, and container yard, would result in the direct loss of approximately 20 acres of tidal wetlands (cordgrass/needlerush marsh) (see Table 5.3-12). Essentially no submerged aquatic vegetation exists in this area and, therefore, no impacts are expected to subtidal plant communities.

Beresford Creek is the only creek affected by the Daniel Island Alternative, and only the conceptual roadway corridor would traverse it. Impacts include pile driving and construction-related damage, while long-term impacts are primarily shading. Potential long-term benefits of the pilings include cover/shelter and foraging.

5.3.17.5. Essential Fish Habitat (EFH)

Several activities associated with construction and operation of the Daniel Island Alternative will impact or have the potential to impact designated EFH and EFH-managed species that use EFH in the Charleston Harbor estuary and near shore marine waters. These activities include:

- Dredging/filling of the Cooper River estuarine water column;
- Dredging/filling of salt marsh areas and intertidal flats that fringe the Daniel Island Alternative site;
- Disposal of dredged material at upland CDF on lower Daniel Island; and
- Increased shipping traffic.

Potential effects expected within each EFH as a result of the Daniel Island Alternative project include habitat loss, modification and disturbance. Potential effects to EFH and dependent resources resulting from these impacts are discussed in the following section.

Construction of the Daniel Island Alternative project will result in the direct loss of approximately 32 acres of estuarine EFH. This loss will be associated with dredge and fill activities in salt marsh (20 acres), and estuarine water column (12 acres; the rest is only deepened). Loss of these habitats can have an adverse effect on organisms within the following EFH-managed species groups: penaeid shrimp, especially the white shrimp; red drum; select species from the snapper grouper complex; and the coastal migratory pelagics (by affecting prey species). No SCDNR classified oyster beds will be destroyed, although some oysters are found within the intertidal area.

Minimal salt marsh areas will be lost in the areas occupied by the concrete pilings for the elevated access road over Beresford Creek.

Construction of the Daniel Island Alternative project will result in modification (i.e., deepening) of approximately 61.4 acres of existing estuarine EFH (49.3 acres for the berth and turning basin and 12.1 acres for the wharf). The 200-foot wide access road corridor covers approximately 22 acres of estuarine EFH; the approximate 86-foot wide pile-supported access road will shade approximately 10 acres of salt marsh if pile-supported elevated roadways are used over all marsh areas.

During terminal construction along the Cooper River, approximately 2.25 million cubic yards of sediment will be removed. Construction of the wharf associated with the Daniel Island Alternative project will result in modification of approximately 12 acres. In these areas, the water column beneath the wharves will only be filled along a slope that extends from the bottom of the berth to the bottom of the deck structure over 150 feet. The result will be an open water zone of varying depth beneath the 150-foot-wide wharf structure (see wharf design figure in permit drawings Appendix C).

The increased depths in the berth and turning basin will result in localized increases in bottom salinity and small, localized decreases in DO in these areas.

Existing estuarine and marine EFH within the study area that is not directly lost or modified by the Daniel Island Alternative project could be subjected to varying levels of disturbance as a result of construction and operation. The predominant cause of this disturbance is expected to

be the increased shipping traffic (up to 3 more ships per day compared to current levels) and will chiefly affect the estuarine and marine water column (open water) habitats. Major spills and other discharges of toxic or hazardous materials are uncommon, but are of concern since large and important areas of EFH exist in the area. These potential impacts will be reduced by the use of stormwater collection systems (for spills on land) and spill prevention and response plans for aquatic spills.

Vessel-induced disturbances (e.g., suspended sediments from propeller wash) also affect the EFH. Effects may include resuspension of sediments and contaminants that can affect EFH. In heavily trafficked areas, bottoms may become unstable and colonization by bottom dwelling organisms may not be possible.

The Daniel Island Alternative berth and turning basin will cause increased sedimentation in these areas. Therefore, some EFH will also be affected by an expanded maintenance dredging effort.

5.3.17.6. Invasive Species

The alternative project would increase future ship traffic, and therefore, has the potential to increase the chance for introduction of exotic species into the Charleston area via ship ballast water and, to a lesser extent, within cargo. Potential mitigation measures for reducing the risk of exotic species introduction include strict adherence to applicable U.S. and international laws and implementation of guidelines regarding exchange of ballast water.

5.3.17.7. Summary of Natural Resources Impacts

In summary, the predicted impacts on natural resources from the Daniel Island Alternative are as follows:

- Habitat impacts from the terminal include 20.4 acres of tidal wetland, 0.0 acres of freshwater wetland, 26.1 acres of wooded upland, and 73.0 acres of open water.

- Habitat impacts from the access roadway include 21.8 acres of tidal wetland, 1.3 acres of freshwater wetland, 29.1 acres of wooded upland, and 0.6 acres of open water.

- The Daniel Island Alternative will cause small, localized decreases in DO near the project site, particularly at the river bottom. In general, crabs and shrimp (especially bottom-dwellers) are considered more vulnerable to low dissolved oxygen than are vertebrate fish.

- EFH impacts from loss of habitat include 42.2 acres of tidal marsh (20.4 acres from the proposed terminal and 21.8 acres from the proposed roadway), 3.7 acres of shallow, subtidal waters (< 2'), 6.1 acres of deep water (> 2'), 3207 linear feet of shoreline, and 2.2 acres of mudflats. EFH impacts from modification of habitat include 61.0 acres of deep water.

- Crab and shrimp are the EFH species most likely to be impacted by the Daniel Island Alternative.

- The Daniel Island would increase future ship traffic, thereby increasing the chance for an accidental release of aquatic exotic species into the Charleston Harbor via ship ballast water and, to a lesser extent, within cargo or from exterior ship hulls.

5.3.18. Threatened and Endangered Species

The impacts for the Daniel Island Alternative are expected to be similar to that for the Proposed Project, for which a detailed list and assessment of impacts is presented in Section 5.2.18. Despite the similarities to the Proposed Project, there are some differences as described in the following paragraphs.

The Daniel Island Alternative is closer to known Federally listed red-cockaded woodpecker habitat and the Francis Marion National Forest than the Proposed Project. However; all red-cockaded woodpecker clusters found in the previous Daniel Island DEIS study were north of I-526 and over 4 miles away from the Clouter Island Alternative (USACE, 1999) and the Francis Marion National Forest is over 7 miles away. Therefore, no direct impacts to the red-cockaded woodpecker as a result of the Daniel Island Alternative are expected. Indirect impacts are also not likely because the alternative does not support red-cockaded woodpecker foraging habitat.

Also, uplands within the active dredged material disposal areas have been known to provide nesting habitat for terns, pelicans, skimmers, and plovers; although local predator populations make nesting in these areas difficult.

Federally listed threatened and endangered animals and species of concern associated with freshwater habitats and potentially occurring within the Daniel Island Alternative project area include the flatwoods salamander. The Daniel Island Alternative access roadway does contain some freshwater habitat; however appropriate habitat (i.e., pine flatwoods and shallow, freshwater wetlands) for flatwoods salamanders does not exist within the Daniel Island Alternative site.

5.3.19. Shorelines

The Daniel Island Alternative would cause similar direct impacts to shorelines as the Proposed Project. The Daniel Island Alternative would alter shorelines by the infilling of the shoreline at the facility site, and replacing the existing unprotected shoreline with an armored shoreline (a rock dike with armor stone below the low water line and a sheet pile wall above the low water line). As with the Proposed Project, the number of container and tug vessels transiting the harbor would increase, but the resulting impacts to Charleston Harbor shorelines, including Fort Sumter and Sullivan's Island, are expected to be minimal. Likewise, impacts to shorelines associated with propwash from turning vessels prior to docking or departure are expected to be minimal.

5.3.20. Floodplains

The Daniel Island Alternative impacts to floodplains would be similar to that for the Proposed Project. As with the Proposed Project, the Daniel Island Alternative would directly affect flooding of the project site by raising existing ground elevations in flood zones. Most of the project would be constructed on compacted fill, graded and paved for container storage and handling. Specific changes to the flood zones are as follows.

Approximately 80 percent of the project site (mostly container areas) is currently located in flood zone AE with a Base Flood Elevation (BFE) from 12 ft to 13 ft, NGVD29. After fill has been added, the post-project ground elevations for the container yard and support facilities would

range from 14 ft to 16 ft, NGVD29. Therefore, no flooding would occur in these areas during the 100-yr event.

Approximately 16 percent of the project site is currently in a VE zone with a BFE from 14 ft to 16 ft, NGVD29. This includes container areas, support facilities and the wharf. The wharf would be at an elevation of 16 ft NGVD29, and the grade would gently slope eastward to an elevation of 14 ft NGVD29. The wharf would not flood during the 100-yr event. Container yard and support facility areas in the VE zone may flood up to 2 ft during a 100-yr event. Storm preparedness plans should contain contingencies to secure any containers that are stored in VE zones. The remaining 4 percent of the project site is currently in zone X with no BFE (i.e., above the 100-yr flood plain).

Since the site is located in FEMA flood zones, National Flood Insurance Program regulations would apply to portions of the project site in flood zone areas. In addition, local flood ordinances of Charleston and Berkeley County can require equal or stricter building and development requirements than the minimums specified by FEMA.

Similar to the Proposed Project, it is unlikely that the Daniel Island Alternative would cause any increase in the 100-yr flood elevation. Also similar to the Proposed Project, the Daniel Island Alternative would be constructed in accordance with appropriate regulations and it would not increase flooding at other properties.

In summary, the Daniel Island Alternative impacts to floodplains would be similar to those for the Proposed Project. The Daniel Island Alternative would change elevations within the floodplain. Some areas within the terminal and roadway boundaries would still flood during 100-year return period storm surge events. However, the Daniel Island Alternative would cause negligible adverse impacts to flooding in areas outside the project footprint.



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Daniel & Clouter Island Alternatives
- Impacted Parcels

0 0.25 0.5 1

Miles

Map Scale: 1:30,000

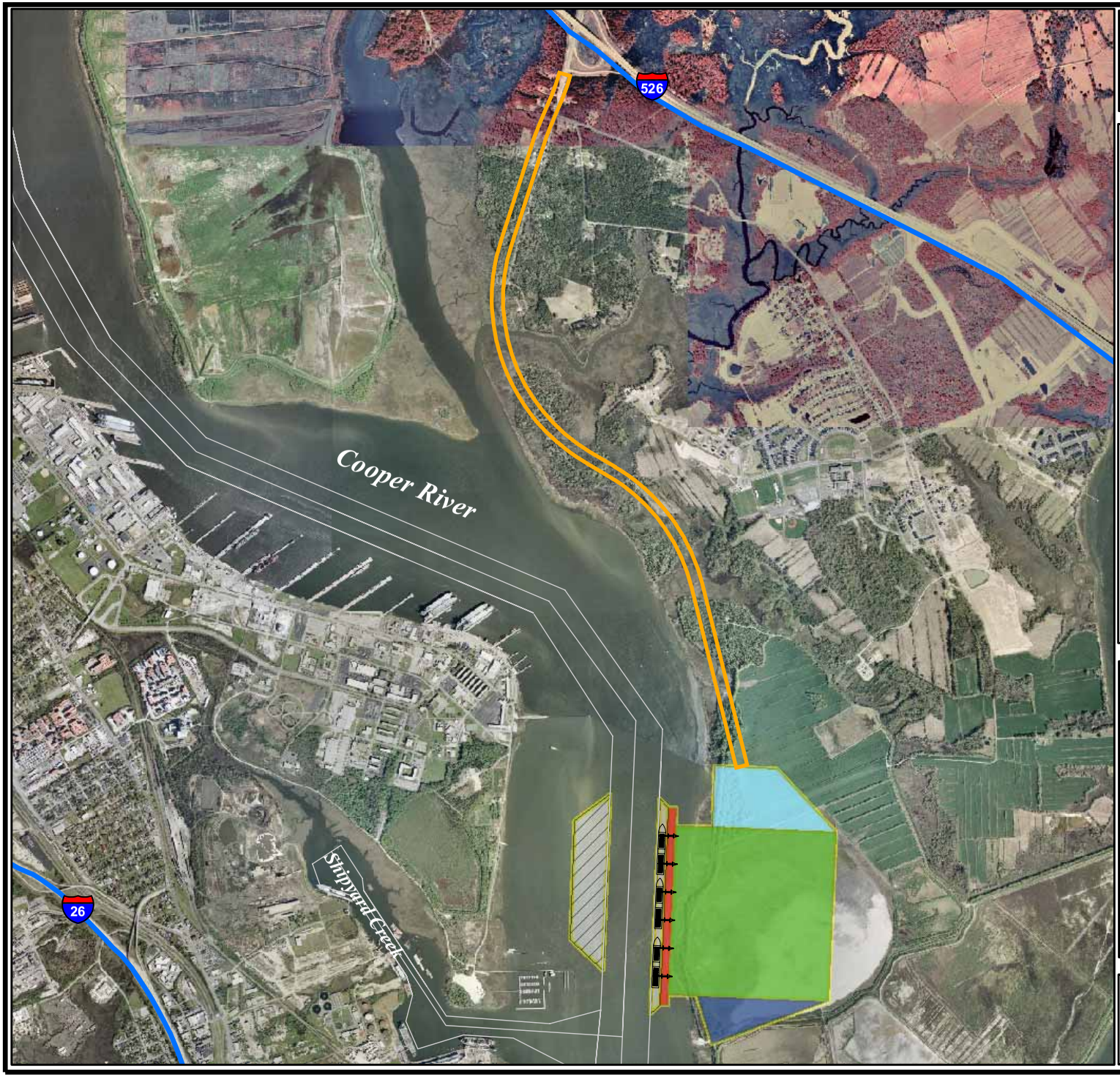
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US Army Corps of Engineers
Charleston District

Figure 5.3-1
Land Parcels Impacted by the Daniel & Clouter Island Alternatives



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Daniel Island Alternative Access Roadway Corridor
- Interstate Hwy.

Daniel Island Alternative Terminal

- Berth
- Container Yard
- Stormwater Management
- Support Area
- Turning Basin
- Wharf

- Federal Navigation Channel

0 0.25 0.5 1

Miles

Map Scale: 1:30,000

N W E S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.3-2
Conceptual Schematic Layout of the Daniel Island Alternative Terminal & Access Roadway

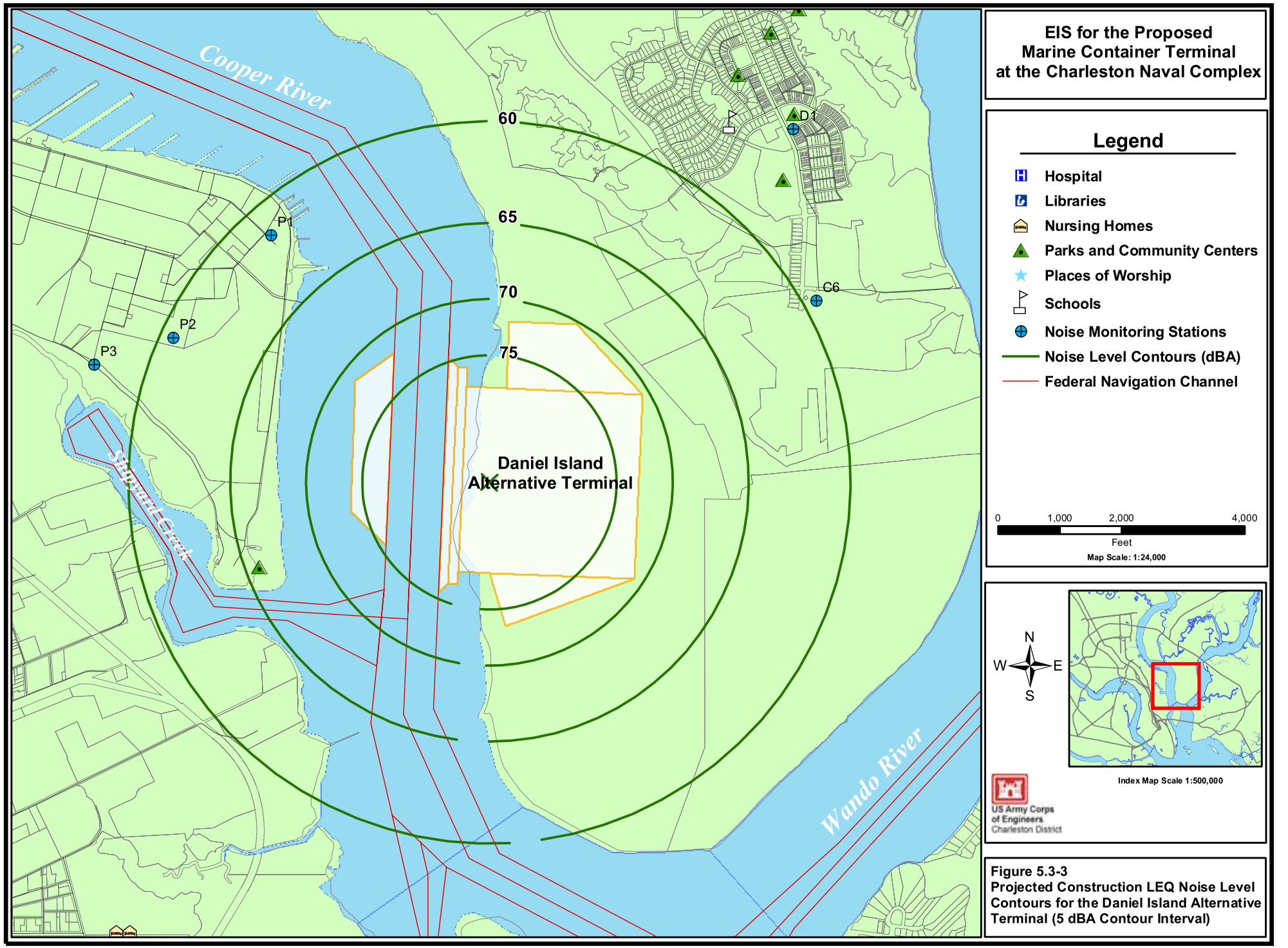


Figure 5.3-3
Projected Construction LEQ Noise Level Contours for the Daniel Island Alternative Terminal (5 dBA Contour Interval)

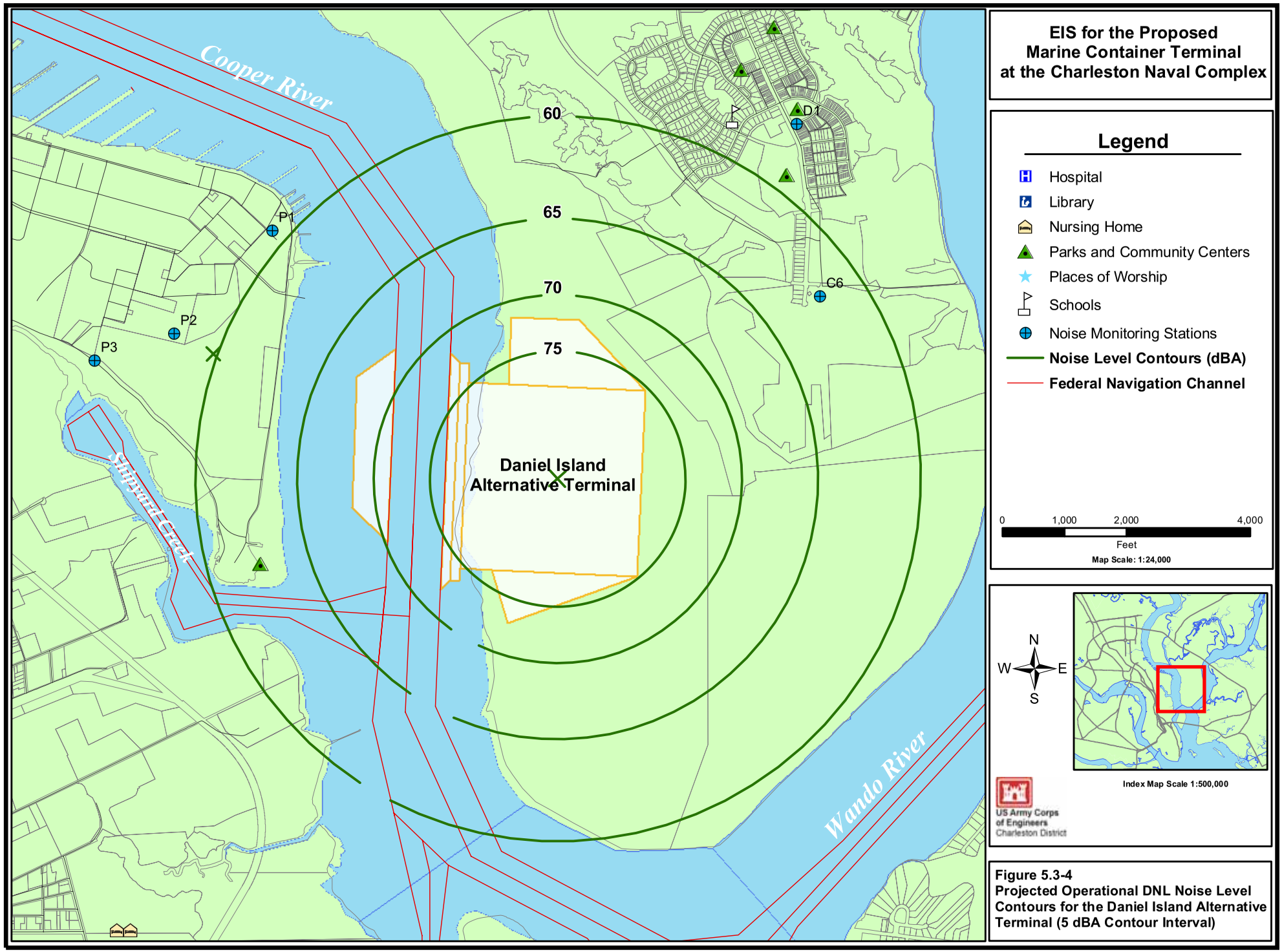


Figure 5.3-4
Projected Operational DNL Noise Level Contours for the Daniel Island Alternative Terminal (5 dBA Contour Interval)

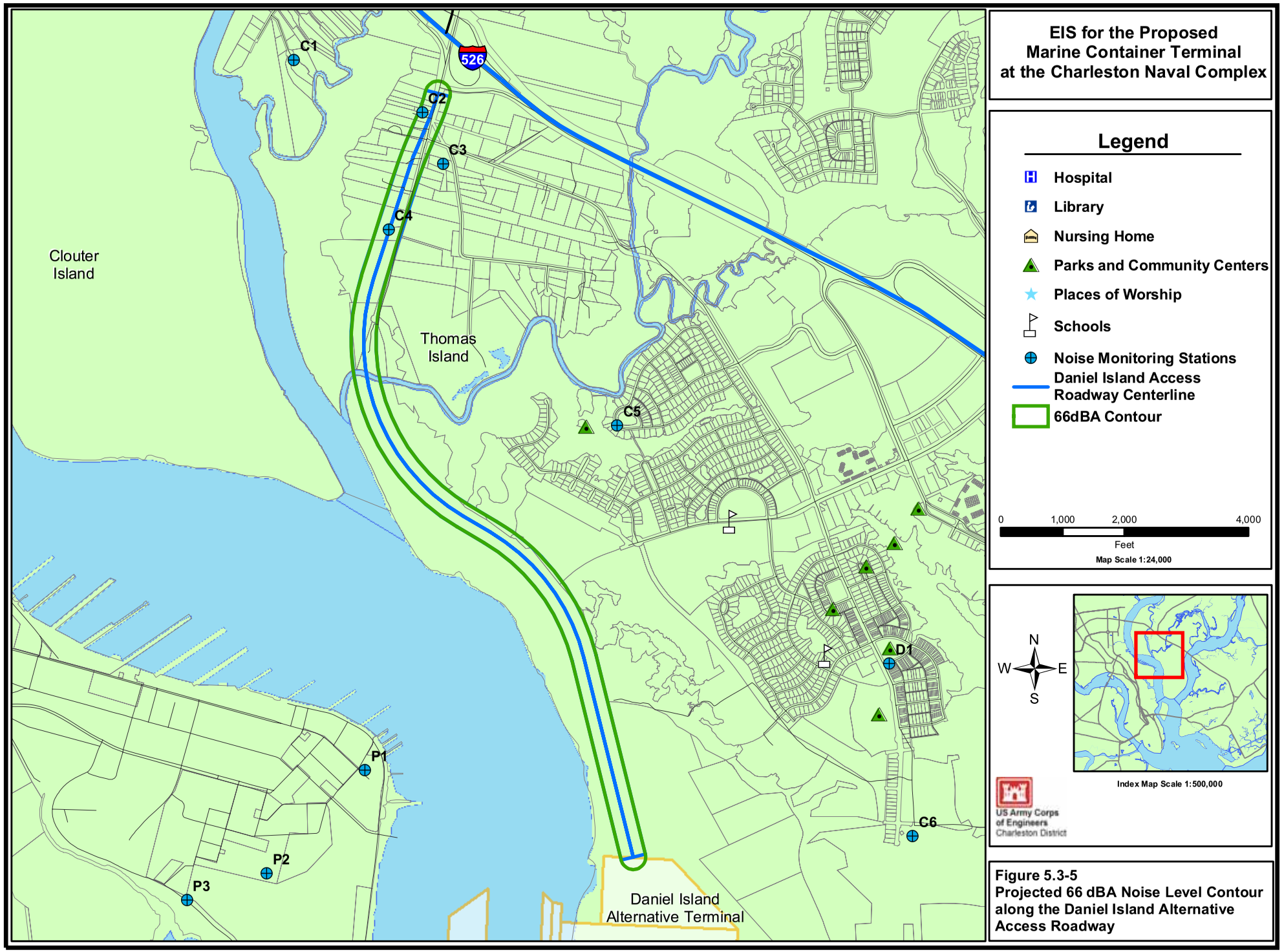


Figure 5.3-5
Projected 66 dBA Noise Level Contour along the Daniel Island Alternative Access Roadway



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Light Level Contours

- 0.05 F.C.
- 0.1 F.C.
- 0.2 F.C.
- 0.3 F.C.

Daniel Island Alternative Terminal

0 500 1,000 2,000

Feet

Map Scale 1:12,000

N W E S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.3-6
Projected Light Spill Contours in Foot Candles from the Daniel Island Alternative

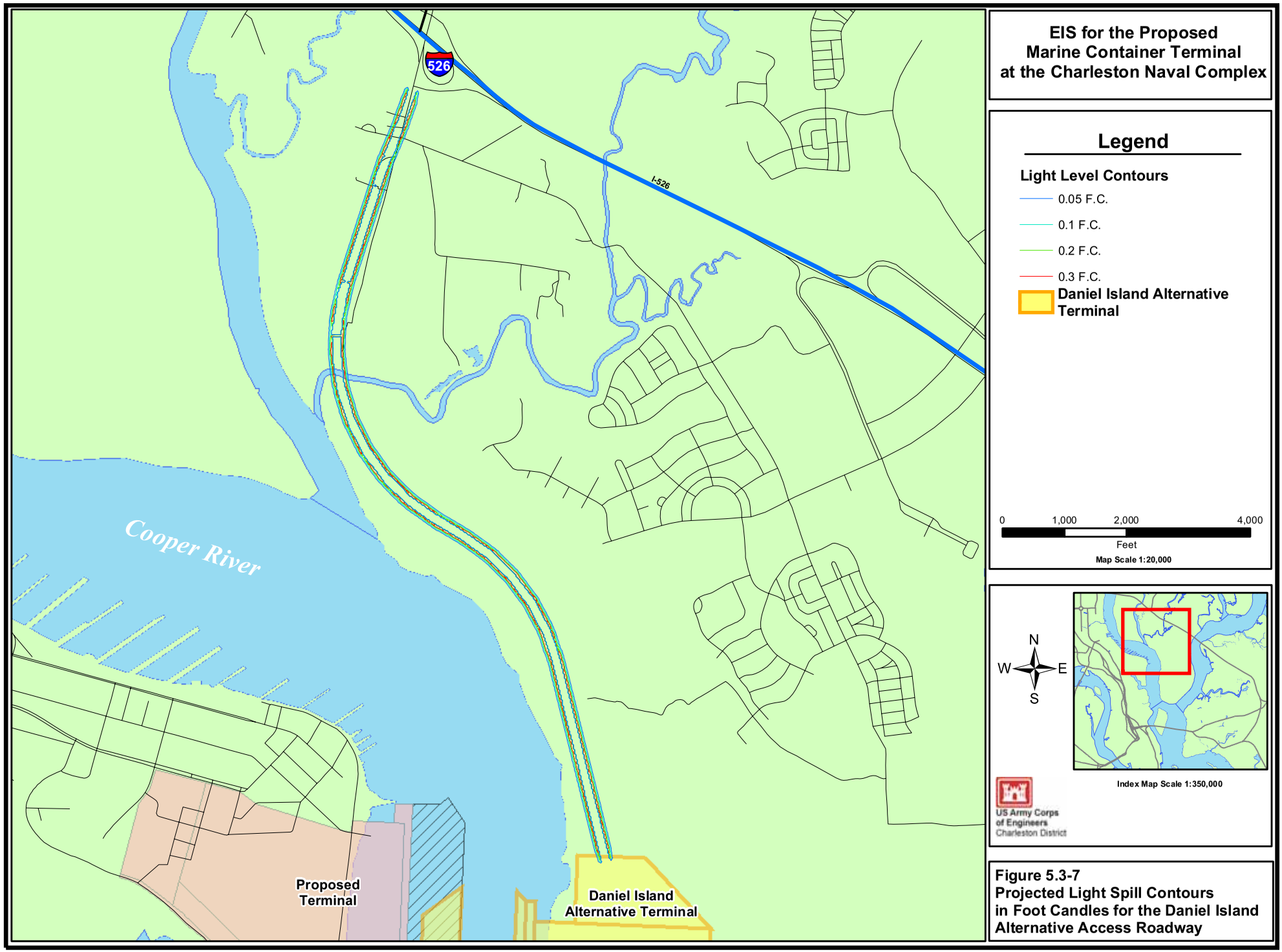
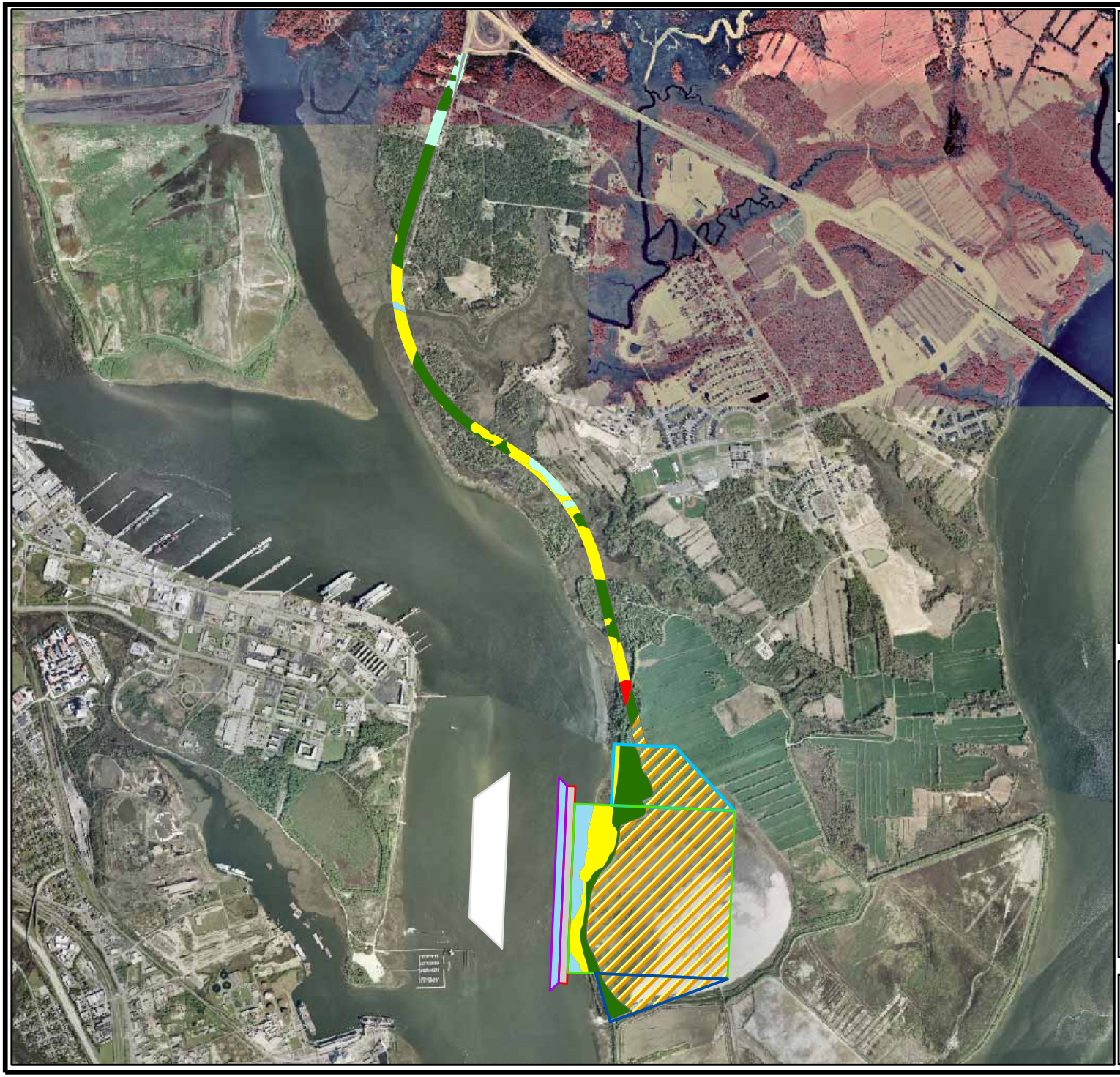


Figure 5.3-7
Projected Light Spill Contours in Foot Candles for the Daniel Island Alternative Access Roadway



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Daniel Island Alternative Projected Land Cover Impacts

- Inactive CDF
- Tidal Wetlands
- Impervious
- Maintained Grass
- Open Water
- Freshwater Wetlands
- Upland Forest/Scrub

Daniel Island Aternative

- Berth
- Container Yard
- Stormwater Management
- Support Area
- Turning Basin
- Wharf

0 1,000 2,000 4,000

Feet

Map Scale 1:30,000

N W E S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.3-8
Existing Land Cover Impacted by the Daniel Island Alternative

5.4. CLOUTER ISLAND ALTERNATIVE

This section evaluates the potential environmental impacts of the Clouter Island Alternative. A schematic diagram of the Clouter Island Alternative is provided in Figure 3.4-3. The Clouter Island Alternative would include similar elements as the Proposed Project, including the construction of container processing and support facilities, wharf and crane structures, navigational improvements, utilities, and access roadway. The various components of the Clouter Island Alternative are summarized as follows:

- Wharf, container yard, support facilities, stormwater management facilities similar to the Proposed Project,
- 62.5 acres of deepened berth and turning basin to -49 ft CLW,
- Disposal of dredged material in the existing upland dredged material disposal areas on the southern end of Daniel Island,
- A sediment suspension system in the river along the front of the wharf to minimize maintenance dredging at the berths, and
- An access roadway from the terminal to I-526 approximately 1.7 miles in length, that would cross Clouter Creek near its Clouter Creek confluence with a bridge allowing 25 feet of vertical clearance. The conceptual access roadway would be a divided 4-lane highway and would tie into the southern terminus of Clements Ferry Road on Thomas Island, and use the existing Clements Ferry Road/I-526 interchange.

The following Sections 5.4.1 through 5.4.20 describe the potential environmental impacts of the Clouter Island Alternative.

5.4.1. Land Use

This section evaluates the environmental impacts of the Clouter Island Alternative on land uses within the Tri-County region and the study area shown in Figure 5.1-1. Those land uses evaluated include agricultural, forest, residential, commercial, industrial, and institutional. Also discussed are the impacts to community features and open spaces.

5.4.1.1. Tri-County Region

Similar to the Proposed Project, the Clouter Island Alternative would have minimal impacts to regional land use. Section 5.2.1.1 provides a discussion of these expected land use conditions.

Agricultural Lands

The Clouter Island Alternative is not likely to have any adverse direct or indirect impacts to agricultural lands.

Francis Marion National Forest

The Clouter Island Alternative is not anticipated to have any adverse direct or indirect impacts on land uses in the Francis Marion National Forest. Land uses in this area are expected to continue as described in Section 5.1.1.

5.4.1.2. Greater Charleston Study Area

In the following paragraphs, impacts to land uses in the greater Charleston area are described using the same regions as presented in Section 5.1.1 (i.e., west of the Ashley River, between

the Ashley and Cooper Rivers, and east of the Cooper River). Also, the same six generalized land use categories are used in the discussions.

West of the Ashley River

The Clouter Island Alternative is not anticipated to have any direct or indirect impacts on land uses west of the Ashley River. Changes in land uses are expected to continue as described in Section 5.1.1.

Between the Ashley and Cooper Rivers

The Clouter Island Alternative is not anticipated to have any direct or indirect impacts on land uses between the Ashley and Cooper Rivers. Changes in land uses are expected to continue as described in Section 5.1.1.

East of the Cooper River

The Clouter Island Alternative site is located within an active CDF. The conversion of CDF cells to other land use would have a substantial adverse impact on the storage capacity of dredged sediments from the Charleston Harbor navigation system. The loss of dredged material storage capacity would have to be replaced for the USACE to continue to maintain the operational depth of the Charleston Harbor Federal navigation channels. Potential Impacts to other land uses are discussed below:

a. **Residential Land Uses**:

   Currently, there is no residential development on Clouter Island, nor are there plans for residential development on Clouter Island. Therefore, the development of a marine container terminal at the Clouter Island Alternative site would not directly impact any residential land uses. However, it is likely that the conceptual roadway providing access to the terminal facility would impact some residential land uses on Thomas Island, i.e., cause some residential displacement.

b. **Commercial Land Uses**:

   The Clouter Island Alternative may encourage ancillary commercial development within the area, especially along Clements Ferry Road. It is assumed that such development would occur in appropriately zoned areas.

c. **Industrial Land Uses**:

   The Clouter Island Alternative is not anticipated to have any impacts on industrial land uses east of the Cooper River.

d. **Institutional Land Uses**:

   Currently, Clouter Island is an active CDF. Therefore, the construction of the Clouter Island Alternative would change the current land use of the island. Furthermore, the USACE would have to find a similar capacity for dredged material at some other location.

   The Clouter Island Alternative is not anticipated to have any impacts on other institutional land uses (i.e., schools, hospitals, churches, etc.) east of the Cooper River.

e. **Community Features**:

   In general, community features such as police and fire stations are developed in response to growth patterns and, therefore, are reactive developments. It is unlikely that

the Clouter Island Alternative would have any effect on growth patterns affecting the development of community features east of the Cooper River.

f. **Open Spaces**:

The Clouter Island Alternative will change 284 acres of an active CDF, open water and marsh areas at the conceptual terminal site to industrial land use. The Clouter Island Alternative is not anticipated to have any effect on preservation trends on open spaces or conservation areas east of the Cooper River.

5.4.1.3. Summary of Land Use Impacts

The Clouter Island Alternative would develop an active CDF. The loss of dredged material storage capacity would have to be replaced for the USACE. The conceptual access roadway would likely impact existing residential land use. Similar to the Proposed Project, development of the Clouter Island Alternative may be reasonably expected to spur ancillary commercial and industrial development within the region.

5.4.2. Physical Setting

This section discusses the impacts the Clouter Island Alternative would have on the physical setting of the Tri-County region and the Clouter Island project area (Figure 5.1-4). The physical setting is described by the parameters of climate, topography, and geology.

5.4.2.1. Climate

The Clouter Island Alternative would cause a similar increase in paved area as the Proposed Project. Therefore, similar to the Proposed Project, development of the Clouter Island Alternative site would cause localized increases in temperature, but it would not cause a measurable effect on the local or regional climate.

Also, the Clouter Island Alternative would cause similar air emissions as the Proposed Project, Therefore, similar to the Proposed Project, the Clouter Island Alternative would have a negligible impact to climate change as a result of greenhouse gas emissions.

5.4.2.2. Topography

During the construction phase of the Clouter Island Alternative, surcharging to consolidate the underlying soil profile would be required. Surcharging requirements and topography changes from the Clouter Island Alternative are assumed to be similar to that for the Proposed Project and will be localized within the footprint. A discussion of these requirements and changes is provided in Section 5.2.2.2.

5.4.2.3. Geology

The anticipated impacts from the Clouter Island Alternative on regional and local geology would be similar to that described for the Proposed Project in Section 5.2.2.3, with the possible exception that less fill material would be required from local borrow sites (i.e., 5.1 Mcy instead of 6.5 Mcy). Similar to the Proposed Project, modification of the existing geology is expected to be limited to the footprints of the proposed terminal and access roadway and would not adversely impact regional geology.

Hydrogeology

Similar to the Proposed Project, modification of the existing hydrogeology is expected to be limited to the footprint of the port terminal and access roadway and would not substantially impact regional hydrogeology.

Seismotectonics

As stated for the Proposed Project, the terminal facility as well as the access roadway for the Clouter Island Alternative would need to be designed in accordance with applicable seismic standards.

5.4.2.4. Summary of Physical Setting Impacts

In summary, the Clouter Island Alternative would cause minor impacts to the physical setting similar to the impacts that would be caused by the Proposed Project. The Clouter Island Alternative would cause minimal adverse impacts to the local climate as a result of localized increases in temperature associated with paving of the terminal area and roadway. It would have negligible impacts to regional climate change. The Clouter Island Alternative would cause minor impacts to the topography, limited to localized changes at the terminal site and within the roadway right-of-way. The Clouter Island Alternative would cause minor localized impacts to the surficial geology and hydrogeology at the terminal site, and it would create a minor demand on local borrow sources as a result of the 5.1 Mcy fill requirements, which is less than that required for the Proposed Project.

5.4.3. Socioeconomic Environment

The impacts from the Clouter Island Alternative on the socioeconomics of the Tri-County region and the community study areas of Clouter and Daniel Islands (shown in Figure 5.1-5 and discussed in detail in Section 4.3) are summarized in this section. The parameters used to describe the socioeconomic environment include economic sectors, employment, income, poverty, and housing characteristics. As described for the Proposed Project in Section 5.2.3, development of the Clouter Island Alternative would have broad regional and statewide effects.

There are currently no residents living on Clouter Island; therefore, there are no socioeconomic impacts to the Clouter Island community study area. However, there would likely be socioeconomic impacts to local communities, primarily on Thomas Island in the Daniel Island community study area.

5.4.3.1. Economic Sectors and Employment

The anticipated impact from the Clouter Island Alternative to regional economic sectors and employment would be similar to that of the Proposed Project. Section 5.2.3.1 provides a description of the expected impacts from the Proposed Project on regional socioeconomic conditions.

The Clouter Island Alternative would have the same impacts on Thomas Island as the Daniel Island Alternative and would encourage growth in businesses and industries along the Cainhoy Peninsula (specifically along Clements Ferry Road).

5.4.3.2. Income and Poverty

The anticipated impact from the Clouter Island Alternative to regional income and poverty would be similar to that of the Proposed Project. Section 5.2.3.1 provides a description of the expected impacts from the Proposed Project to regional socioeconomic conditions.

The Clouter Island Alternative would improve employment, income, and poverty statistics in the Daniel Island study area. However, the growth in business that would result from the Clouter Island Alternative would not be expected to substantially change income and poverty statistics within the Daniel Island study area.

5.4.3.3. Housing Characteristics

The anticipated impact from the Clouter Island Alternative to regional housing characteristics would be similar to that of the Proposed Project. Section 5.2.3.1 provides a description of the expected impacts from the Proposed Project to regional socioeconomic conditions. The Clouter Island Alternative access roadway would adversely affect housing values on Thomas Island, but would not likely affect the rest of the Daniel Island study area.

5.4.3.4. Summary of Socioeconomic Impacts

The Clouter Island Alternative would result in a major socioeconomic benefit to the region and State of South Carolina by supporting future job growth and industrial development similar to the Proposed Project. However, there would likely be a negligible effect to the projected future socioeconomic conditions of the areas surrounding Clouter Island. The largest concentration of business growth from the Clouter Island Alternative would likely be along Clements Ferry Road north of I-526. It is uncertain how many, and to what degree, businesses would locate south of I-526 on Thomas Island. However, the access roadway for the Clouter Island Alternative would likely have an adverse impact on housing values immediately adjacent to the roadway corridor.

5.4.4. Social Characteristics and Environmental Justice

The impacts from the Clouter Island Alternative on the social characteristics of the Tri-County region and the Clouter Island community study area are summarized in this section. The Clouter Island and Daniel Island community study area is described in Section 5.1.3 and illustrated in Figure 5.1-6. In addition to impacts to social characteristics (including population, racial composition, age distribution, educational attainment, and income), topics discussed in this section include acquisition or relocation of properties and environmental justice.

5.4.4.1. Social Characteristics

Tri-County Region

The Clouter Island Alternative is located on the Cooper River immediately upstream from the Proposed Project site. As such, the impacts to regional population, racial composition, age distribution, income distribution, and educational attainment resulting from the Clouter Island Alternative would be similar to those described for the Proposed Project (Section 5.2.4.1).

Clouter Island and Daniel Island Community Study Area

As mentioned previously in Section 5.3.4.1, the Clouter Island and Daniel Island Alternatives are located in the same U.S. census block group; although, there are currently no residents living on Clouter Island. Therefore, there would be no direct social impacts to local communities from a container terminal located on Clouter Island. However, the Clouter Island Alternative requires the construction of an access roadway that would traverse portions of Thomas Island

(see Figure 5.4-1). Impacts to communities located near the conceptualized access roadway would be similar to those described for the Daniel Island study area in Section 5.3.4.1.

5.4.4.2. Acquisition/Relocation of Properties

The Clouter Island Alternative site is located on land used a CDF. Therefore, the development of the facility itself will not require the acquisition or relocation of residences and/or businesses. However, as shown in Figure 5.3-1, the roadway providing access to the terminal facility would cause similar impacts as for the Daniel Island Alternative and likely require the relocation of some residences along Clement Ferry Road south of I-526.

5.4.4.3. Environmental Justice

Environmental Justice Impacts

The analysis of U.S. Census data for the block group containing the Clouter Island Alternative found that the area does not meet the criteria discussed in Section 4.4.2 for an environmental justice population.

However, the access roadway for the Clouter Island Alternative would cross Clouter Creek with a fixed bridge of a 65-foot clearance, tie into the southern terminus of Clements Ferry Road on Thomas Island, and use the existing Clements Ferry Road/I-526 interchange. Portions of the area that the access roadway traverses are bordered by residential development, and based on a review of historical records of the Clements Ferry Road area, the racial makeup of residents along this road (the western portion of Daniel Island, south of I-526 Exit 23) is likely to be predominantly minority. Therefore, it is determined that impacts to the Clements Ferry Road area would likely be disproportionately borne by minority populations. These impacts would be similar to those described for the Daniel Island Alternative (Section 5.3.4.1).

5.4.4.4. Summary of Social Characteristics and Environmental Justice Impacts

In summary, Clouter Island is currently developed as a CDF for the disposal of dredged material. The development of a container terminal at the Clouter Island site would not cause the displacement of residences and businesses and would not likely affect minority and low-income communities. However, the access roadway associated with the Clouter Island Alternative is longer than the access roadway included as part of the Proposed Project and is aligned similar to the access roadway for the Daniel Island Alternative. Therefore, the construction of the roadway would likely require acquisition of residential properties on Thomas Island.

5.4.5. Community Infrastructure and Municipal Services

The Clouter Island Alternative would have similar infrastructure needs to the Proposed Project. As described in Section 5.2.5, the regional infrastructure for water supply, wastewater, solid waste, and utilities is capable of accommodating the relatively small needs of a port facility. However, there would likely be local impacts associated with site development. Accordingly, this section addresses the impacts to community infrastructure and municipal services (including water supply, wastewater treatment, fire, police and emergency medical services, schools, solid waste generation and disposal facilities, and utilities) that would reasonably expected to be associated with the Clouter Island Alternative.

5.4.5.1. Water Supply and Wastewater Treatment

The Clouter Island Alternative would need similar water/wastewater services as the Proposed Project. The Daniel Island/Cainhoy Peninsula area is experiencing rapid growth and utility improvements are currently underway. However, there are no water or wastewater utilities in place on Clouter Island; therefore, a port development on Clouter Island would require that the necessary utilities be provided. Pipelines to Clouter Island would require water crossings located buried underwater, tunneled underground, or supported on a bridge or other structure.

The Clouter Island Alternative would put minimal demands on existing water/wastewater facilities on a regional, metropolitan area, or local basis.

5.4.5.2. Fire, Police, and Emergency Medical Services

The Clouter Island Alternative would impose comparable demands on fire, police, and emergency service providers as the Proposed Project (Section 5.2.5.2). A new fire and EMS station has recently opened on Daniel Island. This facility would likely serve the Clouter Island Alternative. The Clouter Island Alternative would not impose adverse impacts to fire, police, and EMS staffing or facilities regionally or locally.

5.4.5.3. Schools

Although the Clouter Island Alternative could generate some population growth through direct and indirect job growth in the region, it would not be expected to have a substantial impact on public or private school enrollment.

The schools nearest to Clouter Island are located on Daniel Island and in the town of Hanahan. A description of school attendance and enrollment for children living in the area surrounding Clouter Island is provided in Section 5.3.5.3.

5.4.5.4. Solid Waste Generation and Disposal Facilities

Similar to the Proposed Project (Section 5.2.5.4), the Clouter Island Alternative would not generate large quantities of solid waste. Berkeley County solid waste management facilities have sufficient capacity to handle the additional waste stream volume generated by the Clouter Island Alternative. Therefore, the Clouter Island Alternative would not have an adverse impact on solid waste facilities regionally or locally.

5.4.5.5. Utilities

The Clouter Island Alternative would have similar utility demands as the Proposed Project (Section 5.2.5.5). There are currently no utilities on Clouter Island; therefore, these services would need to be provided for operation of the Clouter Island Alternative.

The Clouter Island Alternative is not expected to generate a significant local population increase from direct and/or indirect job growth. Accordingly, any additional demand on utility providers to supply services to residential properties would be minimal. Utilities would require water crossings placed underwater, underground, or overhead.

Regional and local impacts to utility service providers also would be expected to be minimal.

5.4.5.6. Summary of Impacts to Community Infrastructure and Municipal Services

The Clouter Island Alternative is expected to have similar infrastructure and municipal service needs as the Proposed Project. The capacity of solid waste, water supply, and wastewater treatment facilities would be adequate to serve the Clouter Island Alternative. However, utility lines would need to be constructed from the closest mains to the facility. The Clouter Island Alternative would not have an adverse impact on fire, police, or EMS staffing or activities, or on school enrollment.

5.4.6. Transportation

This section discusses the impacts to transportation infrastructure and traffic that would likely result from an alternative marine container terminal on Clouter Island. For the purposes of this EIS, the transportation impacts analyzed are primarily those projected to occur in relation to roadways and rail traffic. Similar to the Proposed Project, the Clouter Island Alternative is not expected to affect future regional population growth. For this alternative, it would not be feasible to provide direct rail access to the site; however, a direct access roadway would need to be provided.

The overall transportation study area for this EIS is shown in Figure 5.1-8. Roadway traffic volume and the capacity of roadway infrastructure to efficiently handle traffic volume have a direct bearing on quality of life concerns, safety, and property values. For these reasons, transportation impacts that may occur as a result of the Clouter Island Alternative would have far reaching effects similar to the Proposed Project within the region and especially within the study area.

Construction of a marine container terminal on Clouter Island would require the construction of an access road between the alternative location and I-526. The access roadway being evaluated for the Clouter Island Alternative crosses Clouter Creek to use the existing Clements Ferry Road Interchange at I-526. The conceptual access roadway for the Clouter Island is discussed in Section 5.4.6.1 and shown in Figure 5.4-1.

5.4.6.1. Roadways

Methodology

Refer to Section 5.3.6.1 for the methods for evaluating impacts to traffic, roadway capacities, and intersections.

Clouter Island Traffic Impacts

As shown in Figure 5.4-1, Clouter Island is located between the Cooper River to the west and Clouter Creek to the east. The Clouter Island study area is developed as a CDF for dredged material. I-526 crosses over Clouter Island on elevated structure and there are no roads on, or roadway access to, Clouter Island.

Projected Future Traffic Conditions

The projected future traffic conditions for the Clouter Island Alternative include the future traffic projected to 2025, the “No-Action” condition, and the additional traffic generated by the Clouter Island Alternative. The cumulative impact of the Clouter Island Alternative on traffic considers both the projected future traffic conditions for the Daniel Island Alternative and the No-Action traffic condition. The No-Action traffic condition is summarized in Section 5.1.6 of this EIS. The

remainder of Section 5.4.6.1 will describe the impacts to traffic from the Clouter Island Alternative. The traffic impacts of the Clouter Island Alternative are the relative difference in the future traffic condition that can be attributed to traffic generated by the Clouter Island Alternative.

Interstate Highway Impacts

For the purpose of this EIS, it is assumed that the Clouter Island Alternative would require the development of a direct access road. The access road would follow the existing alignment of Clements Ferry Road from the I-526 interchange south, cross Clouter Creek just north of its confluence with Beresford Creek and enter the Clouter Island Alternative terminal facility from the south. As shown in Figure 5.4-1, the Clouter Island Alternative would use the existing I-526 Clements Ferry Road interchange, the same interchange that the Daniel Island Alternative would use, therefore the impacts to traffic in the study areas would be similar to those for the Daniel Island Alternative. The access roadway associated with the Clouter Island Alternative would also provide a significant transportation link to Clouter Island for other types of development land uses.

5.4.6.2. Railroads

The Clouter Island study area for railroad impacts is the same as that for the Proposed Project inasmuch as containers would be transported by truck to intermodal yards.

As with the Proposed Project, it is assumed that there will be no direct rail service into the Clouter Island Alternative site. It is also assumed that the same percentage of truck traffic (23%) will travel to the intermodal yards located in North Charleston and that the impacts to rail yards and rail crossings will be the same as those associated with the Proposed Project (see Section 5.2.6.2. for description of estimated impacts). However, the travel distances by roadway from the Clouter Island Alternative would average approximately 5.5 miles longer than for the Proposed Project.

5.4.7. Navigation and Terminal Facilities

This section describes the potential impacts to navigation and existing terminal facilities in the navigation study area as a result of operation of the Clouter Island Alternative. Potential impacts evaluated include impacts to the Federal navigation project, SCSPA terminals, private terminals, and navigational operations (including increases in vessel traffic, traffic delays from channel blockages during turning maneuvers and recreational vessel safety). The navigation study area, shown in Figure 5.1-11, includes the entrance to Charleston Harbor, Charleston Harbor, and the navigation channel in the Cooper River and Shipyard Creek.

The location of the Clouter Island Alternative is upriver from the Proposed Project and on the opposite side of the Cooper River. The conceptual layout of the turning basin for the Clouter Island Alternative is shown in Figure 3.4-3.

From a navigation and terminal facility perspective, the Clouter Island Alternative is similar to the Proposed Project, except that it is located a short distance upriver from the Proposed Project site. Therefore, in general, the Clouter Island Alternative would have similar impacts to navigation and terminal facilities as the Proposed Project.

5.4.7.1. Federal Navigation Channel

The conceptual turning basin for the Clouter Island Alternative is smaller than the access area for the Proposed Project. Less dredging would be required to construct the trapezoid shaped turning basin as opposed to the access area for the Proposed Project.

5.4.7.2. Terminal Facilities

SCSPA Terminals

Similar to the Proposed Project, the Clouter Island Alternative would not impact SCSPA terminals, except for impacts to the NCT as a result of the increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers.

Private Terminal Facilities

Similar to the Proposed Project, the Clouter Island Alternative would not impact private terminal facilities, except for impacts associated with increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers.

Port Security

Similar to the Proposed Project, the SCSPA would be required to submit security and incident response plans for the terminal to the Coast Guard (USCG), and the Clouter Island Alternative would have minor impacts to port security as a result of increased vessel and container

5.4.7.3. Navigation Operations

Cooper River Vessel Traffic

The Clouter Island Alternative would cause a similar increase in vessel traffic as the Proposed Project. The Clouter Island Alternative would also cause similar minor impacts as a result of the increased vessel traffic on the Cooper River and the temporary blockage of the navigation channel by vessels performing turning maneuvers.

Shipyard Creek

Similar to the Proposed Project, the Clouter Island Alternative would have minimal impacts to vessel traffic calling on Shipyard Creek facilities.

Charleston Branch Pilots' Association

Similar to the Proposed Project, the Clouter Island Alternative would increase the demand for the pilotage services of the Charleston Branch Pilots' Association.

Docking Masters

Similar to the Proposed Project, the Clouter Island Alternative would increase the demand for the docking masters.

Vessel Safety

Although the *Ship Simulation Model Study* (Appendix BB) does not include evaluation of the Clouter Island Alternative, because of its proximity to the Proposed Project site, it is reasonable to assume that container vessels would be able to safely navigate to the terminal with similar constraints as those required for the Proposed Project. Also, similar to the Proposed Project, the

Clouter Island Alternative would cause a small increase in the risk of a collision with recreational vessels.

5.4.7.4. Summary of Impacts to Navigation and Terminal Facilities

From a location and vessel traffic perspective, the Clouter Island Alternative is similar to the Proposed Project, and therefore, it would have similar impacts to navigation and terminal facilities as the Proposed Project. The Clouter Island Alternative would cause similar increases in vessel traffic, minor delays to vessel traffic resulting from channel blockages, small increase in port security risk, and small increase in risk for collision with recreational vessels.

5.4.8. Noise

This section discusses the anticipated noise impacts that would be associated with the Clouter Island Alternative. The study area for the Clouter Island Alternative noise impact analysis is shown in Figure 5.1-12. It should be noted that there would be some noise impacts to Thomas Island, which is within the Daniel Island study area, from the access roadway associated with the Clouter Island Alternative.

The Clouter Island Alternative would be expected to generate noise during both the operational and construction phases. Operational noise impacts would be long-term, while construction phase noise generation impacts would occur over a relatively short duration. The noise levels and intensity during both the operational and construction phases would be expected to be comparable to the Proposed Project.

The sensitive receptors discussed in this noise impact evaluation are of the same category as used for the Proposed Project. These receptors are defined by the FHWA as “Category B” and consist of residences, schools, places of worship, and parks and recreational areas where outdoor activities occur. Also, impacts to sensitive receptors within the Clouter Island study area are determined in the same manner as for the Proposed Project (Section 5.2.8).

5.4.8.1. Construction Noise

Noise levels from the construction activities at the Clouter Island Alternative would be similar to those described for the Proposed Project in Section 5.2.8.1.

No noise sensitive receptors were identified within the 65 dBA (Leq) contour for construction noise emanating from the Clouter Island Alternative (Figure 5.4-2). Accordingly, construction noise from the Clouter Island Alternative would not be a substantial adverse impact. However, it is possible that construction noise from the Clouter Island Alternative would be audible to receptors across the Cooper River (i.e., the CNC) or across Clouter Creek (i.e., residents on Thomas Island).

Also, there would be an increase in roadway noise from trucks and heavy equipment entering and exiting the construction site. Increased roadway noise levels would primarily impact receptors proximal to Clements Ferry Road south of I-526.

5.4.8.2. Operational Noise

As discussed for the Proposed Project in Section 5.2.8.2, there would be two aspects to the Clouter Island Alternative, i.e., the terminal and the access roadway. These two features would generate different operational noises and, therefore, will have different impacts on sensitive receptors. For this reason, the operation noise impacts of the Clouter Island Alternative are

discussed individually in the following two subsections. A third subsection discusses the noise impact from the additional train traffic generated by the Clouter Island Alternative.

Terminal

Similar to the evaluation at the Proposed Project site, the results from the noise monitoring program at the existing Wando-Welch Terminal were used to assess the potential operational noise impacts of the Clouter Island Alternative.

The layout of the Clouter Island Alternative locates the dockside activities away from noise sensitive sites including residences. The approximate distance from the terminal center (which, as a standard practice, was used as the acoustic center) to the monitored locations ranged from 5,280 to 9,110 feet. Figure 5.4-3 shows DNL noise contours (5 dBA contour intervals) estimated to emanate from the Clouter Island Alternative activities. As with the Proposed Project, 65 DNL is the threshold level for which noise impacts were assessed for terminal area noise at residential receptors. The DNL noise contours show that all sensitive receptors would lie outside the 65 DNL noise contour. Therefore, it was determined that operational noise impacts associated with the terminal at the Clouter Island Alternative would not be adverse for sensitive receptors.

Roadway

The locations of the conceptual access roadways for the Daniel Island and Clouter Island Alternatives use the same route across Thomas Island and cause similar impacts to surrounding residences and churches. Therefore, the noise impacts from traffic associated with the Clouter Island Alternative would be comparable to those noise impacts described for the Daniel Island Alternative. Section 5.3.8.2 provides a discussion of these noise impacts.

Figure 5.4-4 shows the estimated traffic noise contours for the conceptual Clouter Island Alternative access roadway. As with the Daniel Island Alternative, the TNM analysis indicates that there would be a potentially adverse roadway noise impact in the vicinity of noise monitoring site 4, which is a residential area along Clements Ferry Road south of I-526.

Railway

Containers would likely enter and exit from the same existing intermodal yards as for the Proposed Project. However, it should be noted that the average travel distance to the intermodal yard is greater for the Clouter Island Alternative than for the Proposed Project. Therefore, the anticipated railway noise impacts associated with the Clouter Island Alternative would be somewhat more than those impacts described for the Proposed Project. Section 5.2.8.2 provides a discussion of railway noise impacts associated with the Proposed Project.

5.4.8.3. Summary of Noise Impacts

In summary, the Clouter Island Alternative would be expected to cause adverse noise impacts to sensitive receptors. However, noise levels generated by the terminal operation would be similar to the Proposed Project. The roadway associated with the Clouter Island Alternative would cause adverse noise impacts to sensitive receptors located along Clements Ferry Road south of I-526 during both construction and operational phases. The expected roadway noise impacts would be similar to those for the Daniel Island Alternative and generate similar noise levels as the access roadway included as part of the Proposed Project.

5.4.9. Light

This section discusses the impacts from the Clouter Island Alternative light levels within the study areas of North Charleston, Daniel Island, and Clouter Island (Figure 5.1-13). Light sources that are evaluated include the terminal area, the access roadway corridor, and railways.

5.4.9.1. North Charleston Study Area

The Clouter Island Alternative would be situated across the Cooper River from the North Charleston study area and, as such, would be obvious to observers on the west bank of the Cooper River. However, an assessment of existing light levels in the North Charleston study area (Section 4.9.3) found that light sources already exist on and adjacent to the CNC and that ambient nighttime light in this area is relatively high (excepting the Proposed Project site). Therefore, the additional light attributable to the Clouter Island Alternative would be nominal.

5.4.9.2. Daniel Island Study Area

The Clouter Island Alternative would be situated upriver from Daniel Island and would be noticeable to observers within the Daniel Island study area. The light source most likely to impact residents within the Daniel Island study area would be the access roadway. However, because of the design of the roadway lighting system, the light would not cause adverse impacts at a distance much greater than the limits of the spill light. More information about the light impacts from the Clouter Island Alternative access roadway is provided in Section 5.4.9.3.

Sky glow from the Clouter Island Alternative might be noticeable to residents of neighborhoods located on the western side of Daniel Island, but background sky glow from North Charleston to the west would tend to mask sky glow impacts from the Clouter Island Alternative.

5.4.9.3. Clouter Island Study Area

Terminal Area

A preliminary lighting layout was developed with input from the SCSPA to determine the impacts of the Clouter Island Alternative lighting levels that would be required. Based on this layout, it was concluded that the spill light from high mast lighting would extend out as far as 300 feet from the Clouter Island facility boundary. Inasmuch as the Clouter Island Alternative would be located on the west side of Clouter Island, sky glow would be noticeable primarily to residents of Thomas Island and to those residents at the southern end of Pinefield Road at the southern end of the Cainhoy Peninsula. Light trespass and glare from the terminal area would not cause an adverse impact to residential areas on Daniel Island. Figure 5.4-5 shows the light spill contours that would be expected from the terminal.

The Clouter Island Alternative's lighting impacts to nighttime migratory animals is also expected to be minimal.

Access Roadway

The illumination of the access roadway for the Clouter Island Alternative would be similar to the design described for the proposed access roadway (Section 5.2.9).

The lighting simulation verified that the impact to the surrounding community from spill light from the Clouter Island Alternative conceptual access roadway would be minimal as residential developments are beyond the limits of the affected areas. Using standard flat glass cut off fixtures, the light source (i.e., an HPS lamp) would not adversely impact an area much greater

than the limits of the spill light. The only time the roadway lighting would be visible to the surrounding community would be when the light is reflected by fog or rain. The projected light spill contours from the Clouter Island access roadway are shown in Figure 5.4-6. The access roadway would require an elevated bridge crossing of Clouter Creek, which would be lighted similar to the Proposed Project (Section 5.2.9). The lighting impacts of the roadway crossing Thomas Island would be similar to those for for the Daniel Island Alternative (Section 5.3.9.2).

Railways

Containers destined for rail yards from the Clouter Island Alternative would be carried to the same rail yards as discussed for the Proposed Project. Therefore, lighting impacts as a result of railways would be similar to those described for the Proposed Project in Section 5.2.9.1.

5.4.9.4. Summary of Light Impacts

In summary, the lighting impacts from the Clouter Island Alternative are expected to be similar to those for the Daniel Island Alternative, i.e., minimal. However, the access roadway associated with the Clouter Island Alternative would be approximately 1 mile shorter. Therefore, there would likely be fewer instances of light impacts to sensitive receptors.

5.4.10. Aesthetics

The aesthetic impacts from the Clouter Island Alternative to the study areas of North Charleston, Daniel Island, and Clouter Island (see Figure 5.1-14) are discussed in this section. As discussed in Section 4.10, the subject of aesthetics is personal and subjective in its evaluations of the acceptability of visual scenes that are difficult to quantify and for which there are usually no regulatory standards. The discussion of aesthetic impacts associated with the Clouter Island Alternative is limited to describing probable changes in the existing viewsheds in its vicinity.

5.4.10.1. North Charleston Study Area

It is not likely that the change in the aesthetic quality of the southwestern shore of Clouter Island would significantly impact residential areas in the North Charleston study area. Residential areas are located further inland, but may be able to see the cranes associated with the Clouter Island Alternative; however, the addition of these objects within a viewshed already dominated by industry should not be a substantially adverse impact.

Most of the lands situated along the western bank of the Cooper River that would have views of the Clouter Island Alternative are predominantly industrial and institutional. However, visitors to the Riverfront Park (the newly opened public park on the CNC that was constructed as part of the Noisette Project) would have a view immediately across the Cooper River of the Clouter Island Alternative and the change in the viewshed across the Cooper River would likely adversely impact visitors. Also, motorists and pedestrians on the Arthur Ravenel Bridge would have views across the Cooper River of the Clouter Island Alternative. However, the impact on these observers would likely be minimal.

5.4.10.2. Daniel Island Study Area

The Clouter Island Alternative terminal facility would likely be visible from homes on the southern end of Thomas Island along Beresford Creek. The view from this area is currently of essentially undeveloped land to the south and east across Beresford Creek and of the CNC to the west across the Cooper River. The Clouter Island Alternative would also be visible from

residences located near the southern terminus of Pinefield Road on the southern end of the Cainhoy Peninsula.

The access road for the Clouter Island Alternative would cross Clouter Creek just north of its confluence with Beresford Creek. The bridge and roadway would be visible from residences on Thomas Island along Beresford Creek and from residences near the southern terminus of Pinefield Road. The access roadway would also be visible to existing residences and a church located along Clements Ferry Road on Thomas Island.

The Clouter Island Alternative and access road would not adversely impact the existing residences and community facilities in the Center Park, Barfield Park, Pierce Park, Cochran Park, Smythe Park, Etiwan Park, and Codner's Ferry Park neighborhoods on Daniel Island. Future residential development expected to take place along the southern and western portions of Daniel Island will likely be able to see portions of the Clouter Island Alternative located upriver. Although most of the Clouter Island Alternative would not be directly visible from homes on Daniel Island, the loading and unloading cranes would be tall enough to visually affect the skyline to the west and southwest.

5.4.10.3. Clouter Island Study Area

There is no development on Clouter Island and, therefore, there would be no human impact in the study area from the change in viewshed. However, motorists crossing the Cooper River on I-526 via the Don Holt Bridge would have an unobstructed view of the Clouter Island Alternative. A southwesterly view from the Don Holt Bridge crossing Clouter Island is provided Figure 4.10-15.

The access roadway for the Clouter Island Alternative would be located at-grade along Clements Ferry Road for some of its length. Currently, Clements Ferry Road is a very small, residential gravel road on Thomas Island, and the construction of the access roadway would likely have an adverse visual impact for existing residences and one church located within the immediate area.

5.4.10.4. Summary of Aesthetics Impacts

The Clouter Island Alternative would be similar in appearance to the Proposed Project. However, the Clouter Island Alternative would have a greater visual impact because the western shoreline of the Clouter Island is currently undeveloped. The access roadway associated with the Clouter Island Alternative would be visible to existing residences and a church located along Clements Ferry Road.

5.4.11. Air Quality

This section discusses the impacts from the Clouter Island Alternative on ambient air quality within the study area, which due to the regional nature of air quality, consists of the Tri-County region, as shown in Figure 5.1-15. As with the Proposed Project, the Clouter Island Alternative was evaluated by estimating the project emissions and using dispersion modeling to predict air quality impacts. A detailed description of the air quality modeling study is provided in Appendix S.

5.4.11.1. Emissions Estimates

The Clouter Island Alternative is similar in design to the Proposed Project. Emissions would result from similar types of sources during the construction and operational phases of the

Clouter Island Alternative (including the use of large and small vessels, container ships, cargo handling equipment, and motor vehicles). Differences in emissions are discussed below.

Construction Emissions

Unlike the Proposed Project, the Clouter Island Alternative would not require demolition of existing buildings at the terminal site. Also, the Clouter Island Alternative would require substantially less dredging and filling than the Proposed Alternative. Therefore, the Clouter Island Alternative would result in less construction emissions. As with the Proposed Project, construction emissions from the Clouter Island Alternative are much smaller than those from the operation of the alternative. Therefore, construction emissions are not expected to adversely affect regional or local air quality.

Operational Emissions

The operational phase emissions will be similar to that for the Proposed Project, with the exception of on-road vehicle emissions. Trucks leaving the Clouter Island Alternative destined for rail yards would have a longer commute than trucks leaving the Proposed Project site. The difference in vehicle miles traveled in the study area is accounted for in the on-road vehicle emission estimates shown in Tables 5.4-1 and 5.4-2.

Table 5.4-3 presents the estimated emissions from all sources for the Clouter Island Alternative in tons per year and as a percent of 2001 regional emissions. The total emissions are only slightly greater than that for the Proposed Project. Similar to the Proposed Project, the emissions would be a small fraction of the total regional emissions (generally less than 1 percent).

Table 5.4-1. Estimated Emissions from the Clouter Island Alternative in Year 2025 (tons/year).

Source	CO	NOx	PM10	PM2.5	SO2	VOC
Container Ships	169	1,337	109	101	501	144
Smaller Marine Vessels	6.35	73.13	3.97	3.82	3.53	2.17
Cargo Handling Equipment	4.53	20.92	0.80	0.78	0.40	2.86
Arterial Traffic	23.06	4.70	0.41	0.23	0.07	2.59
Freeway Traffic	64.09	15.68	1.00	0.55	0.16	4.08
On-site Truck Idling	11.72	6.07	1.57	1.44	0.04	3.95

Source: North Wind Consulting Group, 2006.

Table 5.4-2. Estimated Air Toxic Emissions from On-Road Vehicles for the Clouter Island Alternative in Year 2025 (tons/year).

Source	1,3 Butadiene	Formaldehyde	Acetaldehyde	Acrolein	Benzene	MTBE
Arterial Traffic	0.13	1.27	0.48	0.06	0.51	0.35
Freeway Traffic	0.20	1.79	0.69	0.08	0.97	0.69
Onsite Truck Idling	0.20	2.49	0.92	0.11	0.50	0.24

Source: North Wind Consulting Group, 2006.

Table 5.4-3. Estimated Total Clouter Island Alternative Emissions and Comparison to 2001 Regional Permitted Emissions.

Estimated Emissions (tons/year)				
Pollutant	Regional Emissions 2001 (tons/year)	Clouter Island Alternative Estimated Emissions 2015 (tons/year)	Clouter Island Alternative Estimated Emissions 2020 (tons/year)	Clouter Island Alternative Estimated Emissions 2025 (tons/year)
CO	207,585	106.20	196.42	278.75
NOx	62,599	620.06	1,150.81	1,457.50
PM10	26,653	46.41	89.94	116.75
PM2.5	10,231	43.06	83.37	107.82
SO2	66,426	195.81	774.62	505.20
VOC	37,426	61.54	121.24	159.65
Estimated Emissions as a Percent of 2001 Regional Emissions				
Pollutant	**-**	**2015 (%)**	**2020 (%)**	**2025 (%)**
CO	-	0.05 %	0.09 %	0.13 %
NOx	-	0.99 %	1.84 %	2.33 %
PM10	-	0.17 %	0.34 %	0.44%
PM2.5	-	0.42 %	0.81 %	1.05 %
SO2	-	0.29 %	1.17 %	0.76 %
VOC	-	0.17 %	0.33 %	0.43 %

Source: North Wind Consulting Group, 2006.

5.4.11.2. Evaluation of Project Impacts

The same air quality modeling methods used to evaluate the Proposed Project were used to evaluate the potential impacts of the Clouter Island Alternative. Sensitive population receptors representing specific locations within 5 km of the Clouter Island Alternative that were used for the evaluation are shown in Figure 5.2-10.

Air Quality Impacts - Class I NAAQS and PSD Increment

Similar to the Proposed Project, the modeling analysis in the *Air Quality Report* (Appendix S) demonstrates that the Clouter Island Alternative impacts would be below the respective air quality standards. The emissions would not cause or contribute to an exceedance of the NAAQS or PSD increments within the Class I area (i.e., Cape Romain Wildlife Refuge).

Air Quality Impacts - Class II NAAQS and PSD Increment

In contrast to the Proposed Project, the air modeling simulations predicted that the emissions from the Clouter Island Alternative would potentially contribute significantly to exceedences for the 3-hour SO_2 NAAQS and the 24-hour and 3-hour PSD increments. Therefore, for the Clouter Island Alternative was not shown to be in compliance with the NAAQS or PSD increments in the Class II area. A complete discussion of this is presented in the *Air Quality Report* (Appendix S).

Sensitive Population NAAQS

The results of the sensitive population NAAQS compliance evaluations for the Clouter Island Alternative is presented in Appendix S. As with the Proposed Project, in all cases, these impacts are below the NAAQS at each sensitive population receptor. The emissions from the project would have minimal impact to the adjacent sensitive receptors.

Air Toxics

Similar to the Proposed Project, the Clouter Island Alternative would cause negligible impacts as a result of toxic compounds in air emissions.

Ozone NAAQS Attainment

Similar to the Proposed Project, the Clouter Island Alternative emission increases of ozone precursor pollutants would tend to be offset by the overall decreases in regional emissions of these precursor pollutants predicted by the SCDHEC EAC study. Therefore, similar to the Proposed Project, the Clouter Island Alternative is not expected to affect the Charleston and Cape Romain Wildlife Refuge areas' current attainment status for ozone.

Class I Visibility Analysis

Similar to the Proposed Project, the Clouter Island Alternative is not likely to have an adverse affect on visibility within the Cape Romain Wildlife Refuge.

Class I Deposition

As with the Proposed Project, the predicted nitrogen and sulfur deposition amounts from the Clouter Island Alternative are not anticipated to cause an adverse impact in the Class I area (impacts would be less than 2 percent of current levels).

5.4.11.3. Summary of Air Quality Impacts

Overall, the Clouter Island Alternative would result in similar increases in regional air quality impacts as that described for the Proposed Project in Section 5.2.11. The Clouter Island Alternative would result in increased emissions as a result of the construction and operation of the project. These emissions would be similar to those for the Proposed Project, except the operational emissions would be slightly higher as a result of longer travel times for trucks to reach their primary destinations and congested traffic conditions on I-526. However, in contrast to the Proposed Project, air dispersion modeling predicted that the Clouter Island Alternative would potentially contribute to some localized exceedances of air quality standards. Based on air dispersion modeling, the Clouter Island Alternative's contribution would potentially contribute to at least one predicted exceedance event and location for the 3-hour SO_2 NAAQS and the 24-hour and 3-hour PSD increments. Therefore, for the Clouter Island Alternative was not shown to be in compliance with the NAAQS or PSD increments in the Class II area.

5.4.12. Cultural Resources

This section discusses potential impacts from the Clouter Island Alternative on cultural resources. The overall cultural resources study area for this EIS is shown in Figure 5.1-16. Discussions of impacts to existing cultural resources are separated by study area. The study areas are shown in Figures 4.12-2 through 4.12-5. These figures also show the locations of existing cultural resources within their respective study areas.

5.4.12.1. Charleston Harbor Study Area

Historic Properties

The impacts to historic properties within the Charleston Harbor study area from the Clouter Island Alternative would be similar as those impacts described for the Proposed Project. Section 5.2.12.1 provides a discussion of impacts to cultural resources from the Proposed Project.

Archaeological Resources

As mentioned in Section 4.12.3.1, numerous terrestrial and underwater archaeological resources exist in the Charleston Harbor study area though none have been identified within the Federal Navigation Channel or that could be impacted by potential vessel wakes from container ships. Therefore, the Clouter Island Alternative would not affect archaeological resources within this area.

5.4.12.2. North Charleston Study Area

Historic Properties

It is not likely that the Clouter Island Alternative would have any adverse impact on historical properties within the North Charleston study area.

Archaeological Resources

It is not likely that the Clouter Island Alternative will have any adverse impact on archaeological resources within the North Charleston study area.

5.4.12.3. Daniel Island Study Area

Historic Properties

It is not likely that the Clouter Island Alternative would have any adverse impact on historical properties within the Daniel Island study area.

Archaeological Resources

It is not likely that the Clouter Island Alternative will have any adverse impact on archaeological resources within the Daniel Island study area.

5.4.12.4. Clouter Island Study Area

Historic Properties

As mentioned in Section 4.12.3.4, there are no historic properties listed on the NRHP within the Clouter Island study area. Therefore, the Clouter Island Alternative would not affect historic properties within this area.

Archaeological Resources

The development of the Clouter Island Alternative has the potential to impact four submerged archaeological resources (remote sensing anomalies CL-7, CL-12, CL-15, and CL-17) that lay 3,500-6,000 feet southeast of Clouter Island. The construction and operation of a terminal on Clouter Island could alter the setting and condition of these resources. However, the NRHP eligibility of these resources needs to be determined in order to fully assess the impact on these resources by the Clouter Island Alternative.

5.4.12.5. Summary of Cultural Resources Impacts

In summary, The Clouter Island Alternative would have no effect on historic or potentially historic properties or archaeological resources within the Area of Potential Effect (APE).

5.4.13. Section 4(f) Properties, Section 6(f) Properties, and Other Recreational Facilities

This section discusses potential impacts from the Clouter Island Alternative on potential Section 4(f) properties, Section 6(f) properties, and other recreational facilities within the study area depicted in Figure 5.1-17.

5.4.13.1. Section 4(f) Properties

Twenty-four potential Section 4(f) properties were identified in the study area and described in Section 4.13.2. The view from Riverfront Park across the Cooper River would change from undeveloped land to that of a container terminal. The Clouter Island Alternative would also potentially affect Riverfront Park through nominal increases in noise levels.

Impacts to the Charleston Waterfront Park, White Point Gardens, the Charleston Maritime Center, South Carolina Aquarium, Fort Sumter National Monument, Remleys Point Boat Ramp, Charleston Harbor Marina, Patriots Point Naval and Maritime Museum, Alhambra Hall, and Fort Moultrie National Monument would be comparable to those associated with the Proposed Project and discussed in Section 5.2.13.1.

5.4.13.2. Section 6 (f) Properties

Remleys Point Boat Ramp and the Charleston Waterfront Park are both Section 6(f) properties; however, the Clouter Island Alternative would not require the conversion of these properties from their current recreational uses.

5.4.13.3. Other Recreational Facilities

It is not likely that the Clouter Island Alternative would cause a significant increase in regional population through the creation of employment opportunities related to increased port activity. However, the region is experiencing substantial population growth under existing conditions, and recreational facilities will have to be increased in order to keep up with future demands, even without the Clouter Island Alternative.

As the region's population continues to grow, additional recreational boat traffic will increase on the area waterways. The Clouter Island Alternative would cause an increase in large ocean-going vessel and tugboat traffic within Charleston Harbor and, as a result, increase the possibility of close quarter or collision situations, especially during the peak boating times. During the recreational shrimp-baiting season (mid-September through mid-November) large

numbers of recreational shrimpers work the shallow waters adjacent to the navigation channel especially in the areas southwest of Crab Bank and west of Patriots Point Naval Museum.

Impacts to water-related facilities would be comparable to those associated with the Proposed Project.

5.4.13.4. Summary of Impacts to Section 4(f) Properties, Section 6(f) Properties, and Other Recreational Facilities

In summary, the Clouter Island Alternative is unlikely to directly impact any Section 4(f) properties, Section 6(f) properties, or other recreational facilities in the study area. Indirect impacts include minor impacts in noise and light to the Riverfront Park located directly across the Cooper River.

5.4.14. Hazardous Waste and Materials

5.4.14.1. Site Contamination

The following sections discuss the potential impacts to contaminated sites within and adjacent to the Clouter Island Alternative footprint and those potentially impacted by the access roadway corridor (Figure 5.1-18).

Site Remediation

Three AOCs are located on Clouter Island (AOCs 693, 694, and 695). AOCs 693 and 694 have been designated as No Further Action (NFA). AOC 695 is submerged within the Cooper River and has been recommended for NFA status; however, its future status has yet to be resolved. The SCDHEC has indicated that NFA status will not be granted for AOC 695 because of the potential presence of unexploded ordnance. As a result, it is expected that land use controls (LUCs) will be imposed on these AOCs.

The Clouter Island Alternative would not be expected to cause an adverse impact to any current or reasonably foreseeable remediation activities.

Land Disturbance

The construction of the Clouter Island alternative would require the placement of clean fill material on the existing land surface in order to surcharge the underlying soil. The fill material would be spread over the site following surcharging to achieve the proper finished grade elevation. The fill material would effectively isolate any contaminated sediments in the CDF cell from human and ecological exposures. Consequently, the contaminant concentrations in surface soils at the Clouter Island site are not expected to present human health or ecologic concerns since the existing land surface would be covered by a substantial layer of clean fill.

Groundwater is not currently used as a drinking water source on Clouter Island and the Clouter Island Alternative would not be expected to adversely affect local groundwater quality.

There are no known contaminated surface waters at the Clouter Island Alterative site. The Clouter Island Alternative would not cause an adverse impact to any contaminated surface waters or their remediation.

Releases of contaminants into the air from soil, groundwater, or surface water would not be expected in association with the Clouter Island Alternative.

5.4.14.2. Handling of Hazardous Materials

Potential impacts to the environment from handling of hazardous materials at the Clouter Island Alternative would be comparable to those anticipated at the Proposed Project.

5.4.14.3. Oil and Hazardous Materials Spill Response

Oil and hazardous material spill responses at the Clouter Island Alternative would be comparable to those at the Proposed Project.

5.4.14.4. Summary of Hazardous Waste and Materials Impacts

In summary, the Clouter Island Alternative terminal could potentially impact two AOCs located near the southern end of Clouter Island. Both of these AOCs have NFA status. The Clouter Island Alternative would handle the same volume of hazardous materials as the Proposed Project terminal and would have the same incremental increase in the risk of spills.

5.4.15. Water Resources

The section summarizes the potential impacts the Clouter Island Alternative would have on the water resources environment. This includes groundwater resources, stormwater runoff, and surface waters (e.g., lakes, streams, etc.). The study area with respect to water resources includes the surface waters of the Charleston Harbor Estuary extending from the Atlantic Ocean through the harbor, up the Cooper River to the confluence with the Back River, as well as the groundwater resources underlying the Tri-County area (shown in Figure 5.1-19).

5.4.15.1. Groundwater Resources

As described in Section 5.2.15, the potential impacts of the Proposed Project are limited to the surficial aquifer. The impacts to the surficial aquifer would be similar for the Clouter Island Alternative.

Similar to the Proposed Project, the Clouter Island Alternative facility would utilize municipal surface water resources from the CWS during construction and operation of the facility. Therefore, the construction and operation of the Clouter Island Alternative would not create increased demands on groundwater resources.

As with the Proposed Project, the construction and operation of the Clouter Island Alternative would cause minimal groundwater resource impacts.

5.4.15.2. Stormwater Runoff

The Clouter Island Alternative would result in the filling and paving of upland, intertidal and subaqueous areas, thereby increasing stormwater runoff quantity and pollution. As with the Proposed Project, it is expected that trucks and equipment operating at the facility would contribute a wide variety pollutants (primarily heavy metals, oils and greases) to runoff flow.

The Clouter Island Alternative would result in 254 acres of impervious surface of similar land use as the Proposed Project. Therefore, this alternative would result in similar quantities and quality of stormwater runoff as the Proposed Project. Although the Clouter Island Alternative would cause a greater increase in impervious area (because the existing land cover at the Clouter Island site has less impervious area than the Proposed Project site), stormwater management would be required such that the stormwater discharge to the Cooper River would have minimal impacts to water quality. The stormwater management system would be similar to

that described for the Proposed Project (Section 5.2.15.2). The stormwater runoff would be detained as required by current State environmental regulations before being released into Cooper River through a series of controlled outfall structures. The stormwater quantity and quality discharged from the terminal stormwater management system would be similar to that for the Proposed Project.

The conceptual access roadway to the Clouter Island Alternative site would cause greater stormwater impacts than the access roadway for the Proposed Project. First, the access roadway to the Clouter Island Alternative site would be much longer than that required for the Proposed Project. Second, the roadway would replace undeveloped open areas with impervious surfaces. Both of these factors increase the stormwater quantity and pollution loading above that for the Proposed Project.

However, similar to the Proposed Project, stormwater from all interchange ramps and elevated roadway would be collected by a scupper drainage system, and stormwater from the other parts of the roadway would be collected by open ditch systems and closed conduit systems. The roadway would require the construction of stormwater detention facilities to avoid significant increase in the peak discharge rate to the receiving watercourses. Therefore, similar to the Proposed Project, the conceptual access roadway stormwater discharges to receiving waters would have minimal impact on surface water quality.

5.4.15.3. Surface Water

The surface waters potentially affected by the Clouter Island Alternative include the Lower Cooper River and Clouter Creek. As described in the previous subsection, stormwater discharges would cause minimal impacts to surface waters. Other potential impacts to surface waters include changes to tides, currents, salinity, water quality and sedimentation. A hydrodynamic, salinity and sedimentation computer model was applied to predict the changes to the surface waters (described in detail in Appendix Y). The project impacts to tides, currents, salinity and water quality are discussed in the following subsections; impacts to sedimentation patterns in the river are discussed in the section on dredging (Section 5.4.16).

Tides, Currents and Flows

The Lower Cooper River would be affected by the dredging and filling of the river associated with the construction of the project. The berth and access area would be dredged and deepened, as shown in Figure 3.4-3.

A numerical model was used to quantify the changes in flows and current patterns caused by the changes to the river geometry. Currents in the vicinity of the berth and access area would be slightly reduced. However, the project would not cause any changes to currents in areas upstream or downstream from the project site. The project would cause negligible changes to tidal elevations in the Lower Cooper River.

In-Stream Water Quality

This section evaluates the potential surface water quality impacts caused by the Clouter Island Alternative. Specifically, the potential impacts to in-stream salinity, DO, BOD, nutrients, fecal coliform, suspended sediments, and heavy metals are discussed. This section also addresses potential changes to specific pollution sources, such as ship bilge water, accidental spills and container wash wastewater.

Salinity

A hydrodynamic and salinity computer model was utilized to evaluate the Clouter Island Alternative project-related changes to hydrodynamics, salinity and sedimentation. The model setup, calibration and results are presented in detail in Appendix Y.

The model results show that the Clouter Island Alternative project construction would cause localized changes in salinity concentrations. The results show that for the Clouter Island Alternative, the bottom salinity in the areas dredged to create the berth and access area is up to about 7 ppt higher than the bottom salinity in the existing shallower waters. This change is not really a change to existing water column salinity, but instead, it is the creation of additional water column in which the bottom salinity would be similar to that in the navigation channel. Project changes to areas that are not deepened (e.g., the adjacent navigation channel and side bank areas) are 1.5 ppt or less.

The changes in salinity are mostly limited to the immediate project site and the project would not cause substantial changes to salinity upstream and downstream of the project site. Based on simulated 50th percentile salinities along the navigation channel in the Lower Cooper River, increases in salinity along the navigation channel would not exceed 0.2 ppt. Changes of 0.1 ppt or more are limited to within 11 miles of the project site.

The Clouter Island Alternative would not affect the salinity alerts for the Bushy Park Reservoir. The farthest downstream station monitored for salinity as part of the alert system is Dean Hall (USGS gage 02172050, located close to river station 1800+00). A specific conductance of 1,550 µmho/cm (equivalent to a salinity of 0.78 ppt) at the Dean Hall gage will trigger a Level 1 salinity alert. The results show zero change in 90th percentile salinity at Dean Hall, which indicates that the project would not cause any increase in salinity intrusion events that affect the Bushy Park Reservoir, and it would not affect the frequency of salinity alerts.

Dissolved Oxygen

The Clouter Island Alternative can potentially affect in-stream DO in four ways: (1) the physical changes to the river geometry can affect the reaeration of the water column by changing depth and current speed, (2) the changes in pollutant loading can increase the BOD and thereby decrease the DO concentration, (3) change in salinity concentration causes change in DO saturation concentration, and (4) change in circulation patterns can affect the residence time of BOD in the river. A comparison of the hydrodynamic model results (Appendix Y) are used here to provide a qualitative evaluation of the potential Clouter Island Alternative impacts relative to the Proposed Project impacts.

The hydrodynamic modeling results (Appendix Y) indicate that the project would cause a reduction in currents in the navigation channel at the project site. The current changes are less than that caused by the Proposed Project. This current speed reduction would result in a small reduction in vertical mixing and reaeration, and thereby cause some small, localized reduction in DO concentration. The increase in depth would also directly result in a decrease in reaeration of the lower portion of the water column. Because the reduction in current velocities is smaller than that for the Proposed Project, and the total area deepened is much less than that for the Proposed Project, it is expected that these effects would create a reduction in DO that is less than that expected for the Proposed Project. Also, the impact to DO would affect a smaller area than that expected for the Proposed Project.

The post-project stormwater runoff BOD pollution loading for the Clouter Island Alternative is expected to be similar to that for the Proposed Project. Similar to the Proposed Project, the Clouter Island Alternative stormwater runoff is expected to cause a negligible impact to instream BOD concentrations and DO concentrations

The changes in salinity concentration would also cause a change in DO saturation concentration, which, in turn, affects the DO concentration. The predicted changes in salinity concentration are smaller than that predicted for the Proposed Project. Therefore, the change in salinity is expected to cause only very small changes in DO saturation concentration.

Altogether, it is expected that the project would result in small, localized decreases in DO near the project site, particularly at the river bottom. However, the reduction in DO caused by the Clouter Island Alternative is expected to be less than that caused by the Proposed Project.

Nutrients

It is expected that the Clouter Island Alternative terminal will generate approximately the same stormwater runoff nutrient load as the Proposed Project terminal. As with the Proposed Project, the impacts of the terminal stormwater discharge to surface waters would be minimal.

The access roadway required for the Clouter Island Alternative would be longer than that required for the Proposed Project. This would generate greater stormwater runoff nutrient pollution loading to surface waters than the Proposed Project. However, as with the Proposed Project, impacts to surface waters would be minimal as a result of stormwater management measures.

Fecal Coliform

Post-development plans for the Clouter Island Alternative do not include activities that would increase pathogen levels (primary sources of pathogens in stormwater include animal wastes, illegal wastewater connections into storm sewer lines, seepage of groundwater containing pathogens into storm sewer lines, and septic tanks). Therefore, similar to the Proposed Project, the Clouter Island Alternative would not substantially affect fecal coliform concentrations in the Lower Cooper River.

Suspended Sediments

The project can potentially affect in-stream suspended sediment in multiple ways: (1) change in long-term pollutant loading from stormwater runoff caused by the change in land use; (2) temporary increases caused by construction activities both upland (via stormwater runoff from disturbed land) and in the river (via dredge and fill activities for the proposed terminal and construction of the access roadway over Clouter Creek); and (3) long-term periodic increases from maintenance dredging operations and the water jet sedimentation control system. The potential impacts from stormwater runoff, dredging and the water jet sedimentation control system are discussed in the following subsections.

Stormwater Runoff:

The change in land use at the project site will cause an increase in stormwater runoff suspended sediment concentrations. The post-project stormwater runoff suspended sediment concentrations for the Clouter Island Alternative terminal are expected to be similar to that for the Proposed Project. However, the access roadway required for the Clouter Island Alternative would be longer than that required for the Proposed Project. This will generate greater

suspended sediment stormwater runoff pollution loading to surface waters than the Proposed Project access roadway.

The stormwater control ponds at the site will be designed to remove a minimum of 80 percent of the suspended sediments from the stormwater before discharge to surface waters. Further, as with the Proposed Project, impacts would be minimized because the NPDES industrial stormwater permitting process mandates a Stormwater Pollution Prevention Plan (SWPPP). Therefore, similar to the Proposed Project, the resulting discharge is expected to cause only a minimal increase in in-stream suspended sediment concentrations in the Lower Cooper River.

Similar to the Proposed Project, the construction activities at the Clouter Island Alternative facility would involve the disturbance and moving of large quantities of earth, thereby temporarily increasing stormwater runoff TSS. It is expected that temporary sediment basins along with other temporary stormwater management/erosion control BMPs will be utilized to protect the surface waters from sediment laden runoff from the site during construction. Therefore, similar to the Proposed Project, surface water impacts from stormwater runoff during construction should be minimal.

Dredging and Filling:

Dredging activities during project construction and maintenance dredging would cause the suspension of bottom sediments. To quantify the effects of the dredging on suspended sediments, the SSFATE model was used to simulate the suspended sediment plume created by dredging operations at the Clouter Island Alternative. The results are shown in detail in Appendix Z. The analysis shows similar results as the Proposed Project in regard to plume extents and concentrations. The duration of the suspended sediment plume caused by dredging operations would be less than that expected at the Proposed Project because the amount of material to be dredged from the river for the Clouter Island Alternative is about 22 percent less than that required for the Proposed Project. The dredge plume caused by dredging operations at the Clouter Island Alternative is not expected to cause substantial adverse effects to the aquatic environment.

Fill will be placed into the Cooper River as part of the terminal construction between the shoreline and the wharf. However, sheet pile walls will be installed around the perimeter of the fill area prior to backfilling. Therefore, similar to the Proposed Project, the backfilling of the terminal site will have minimal impacts to suspended sediments in the river.

Access Roadway Construction:

Construction of pile foundations and abutments for the proposed access roadway may disturb the bottom and banks of Clouter Creek, respectively. Temporary increases in turbidity would result. Best management practices would be implemented to minimize the increase in water turbidity. Therefore, similar to the Proposed Project, access roadway construction should have minimal impacts to surface water quality as a result of suspended sediments.

Water Jet Sedimentation Control System:

As with the Proposed Project, water jet units installed along the face of the berth would keep sediments in suspension to prevent them from being deposited in the berth area in order to minimize sedimentation rates and maintenance dredging requirements. The impact resulting from a water jet sedimentation control system is expected to be similar to that for the Proposed Project.

Heavy Metals and Other Toxic Contaminants

The two main project-related potential sources of surface water contamination from heavy metals or other toxic contaminants include stormwater runoff pollution and release of contaminants from sediments dredged from the river.

As with the Proposed Project, the large number of trucks operating at the facility and traveling along the access road and highways will generate some heavy metal, oil and grease pollution via stormwater runoff. The Clouter Island Alternative will result in approximately the same total stormwater pollution load from the terminal site as the Proposed Project. However, the access road for the Clouter Island Alternative is longer than that for the Proposed Project, and therefore, it will generate a greater increase in stormwater pollution than that for the Proposed Project. Similar to the Proposed Project, impacts would be minimized because the NPDES industrial stormwater permitting process mandates an SWPPP.

The potential impacts from sediment contaminants may occur both at the dredge site during dredge operations, or at the disposal site when water is discharged back into the surface waters from the CDFs. The CDF effluent water quality and potential impacts to surface water quality was evaluated and is described in detail in the *Sediment Quality Evaluation Report* (Appendix X). According to the analysis provided in the appendix, the dredged material contains COCs. Similar to the Proposed Project, the concentration of COCs resuspended into the water column at the dredge site would be below the WQSs. Based on these results, the dredging of the sediments at the site is not expected to cause any adverse water column impacts from toxic contaminants. Also, the CDF effluent would meet both acute and chronic saltwater WQSs when mixing zones are considered. Similar to the Proposed Project, the CDF effluent will result in minimal impact to surface water toxic contaminant concentrations.

Ship Bilge Water, Accidental Spills and Container Washwater

Similar to the Proposed Project, the increased container ship traffic associated with the Clouter Island Alternative would have minimal impacts to water quality in the Lower Cooper River or Charleston Harbor as a result of ship bilge water discharges. Impacts to water quality resulting from bilge water are minimal because regulations prohibit the discharge of untreated and treated bilge water into Charleston Harbor or its tributaries.

It is reasonable to assume that the increased container ship, truck and rail traffic would cause an increase in the potential for offsite accidental spills of pollutants that may contaminate surface waters. This potential increase resulting from the Clouter Island Alternative would be similar to that for the Proposed Project.

Similar to the Proposed Project, the Clouter Island Alternative would not include a SCSPA maintained or operated container washwater facility, but local maintenance and repair vendors would provide container washing services. As with the Proposed Project, this wastewater would be collected and disposed of at an appropriate wastewater treatment facility, and the wastewater would not be expected to have any adverse impacts to surface waters.

5.4.15.4. Summary of Water Resource Impacts

Similar to the Proposed Project, the Clouter Island Alternative would cause negligible impacts to groundwater resources either as a result of increased potable water demand or from excavation of the berth and access area.

The Clouter Island Alternative terminal would generate stormwater runoff similar to that for the Proposed Project terminal (both quantity and quality). The access roadway for the Clouter Island Alternative is longer than that for the Proposed Project and would therefore create more stormwater runoff. However, as with the Proposed Project, the project would be required to comply with SCDHEC stormwater regulations and the adverse impacts of the Clouter Island Alternative on surface waters resulting from the stormwater runoff would be minimal as a result of stormwater treatment and BMPs.

Similar to the Proposed Project, the Clouter Island Alternative would cause minor adverse impacts to dissolved oxygen, salinity, nutrients, heavy metals, and suspended sediments. However, because the size of the berth area and access area to be dredged is smaller than that for the Proposed Project, these minor impacts will be less than that for the Proposed Project.

Similar to the Proposed Project, the Clouter Island Alternative would have minimal adverse impacts to water column concentrations of toxic chemicals during dredging operations, either at the dredge site or at the CDF outfall. Adverse impacts to water quality resulting from bilge water discharges, accidental spills or container washwater would be minimal.

5.4.16. Aquatic Sediments and Dredging

This section summarizes the potential impacts the Clouter Island Alternative may have on sedimentation and dredging in the Charleston Harbor Estuary. Also, this section describes the potential impacts related to the sediment quality of the aquatic sediments disturbed by the Clouter Island Alternative. As shown in Figure 5.1-21, the study area includes the surface waters and bottom sediments of the Charleston Harbor Estuary extending along the Cooper River from Drum Island up I-526, including Shipyard Creek, as well as the upland areas affected by dredge disposal areas on Daniel Island and Clouter Island.

In addition to the direct impacts caused by the project construction dredging, the project would also result in secondary impacts to sedimentation in the Federal navigation channel. Additionally, there would be potential cumulative effects on river bottom sediments related to accidental pollutant releases.

5.4.16.1. Sedimentation and Dredging

The Clouter Island Alternative would require dredging for the initial project construction; the project would also affect long-term maintenance dredging rates. For the project construction, approximately 5.1 Mcy of material would be dredged from the river (approximately 78 percent of the volume required to be dredged from the river for the Proposed Project). The projected method for dredging the proposed berth and access area is yet to be determined. Because of the smaller dredging volume, the duration of dredging operations for the project should be less than the 12 to 15 months estimated for the Proposed Project. The dredged material would be placed in the Daniel Island CDF.

The construction of the Clouter Island Alternative would affect long-term maintenance dredging by reducing available capacity at existing CDFs. Construction of the Clouter Island Alternative would eliminate the use of the existing Clouter Island CDF and would reduce the existing available upland disposal capacity for future maintenance dredging activities in Charleston Harbor. It is likely that another disposal facility would need to be constructed in order to compensate for the loss of the Clouter Island CDF.

The following subsections discuss the potential project impacts to sedimentation in the Federal navigation channel and sedimentation in areas outside of the navigation channel (e.g., the project berth and access area).

Federal Navigation Channel

As with the Proposed Project, the Clouter Island Alternative would affect long-term maintenance dredging of the Federal navigation channel by altering the river geometry. A numerical sedimentation model was used to quantify the changes in sedimentation rates, as described in detail in Appendix Y.

The sedimentation model results indicate that the Clouter Island Alternative would cause an increase in the total shoaling in the Federal navigation channel on the order of $6x10^4$ cy/yr (not including the proposed berth and access area, which are not part of the navigation channel), which is $4x10^4$ cy/yr greater than that predicted for the Proposed Project. All of the increase is predicted to occur in the Navy Yard Reach of the channel, and the project would not cause an appreciable change in shoaling volume in the other reaches of the navigation channel.

Outside the Federal Navigation Channel

The Clouter Island Alternative is estimated to cause long-term shoaling in the berth and access area at a rate of approximately $28x10^4$ cy/yr, which is 22 percent greater than that predicted for the Proposed Project. Therefore, the expected long-term maintenance dredging at the Clouter Island Alternative berth and access is greater than that for the Proposed Project.

Similar to the Proposed Project, a water jet sedimentation control system will be implemented as part of the project. The water jet system in not expected to affect the shoaling at adjacent facilities.

5.4.16.2. Sediment Quality

Sediments that would be dredged to construct the Clouter Island Alternative were sampled and analyzed for the following CoPCs: nutrients, metals, phenols, phthalate esters, PAHs, PCBs, butyltins, dioxins and furans, pesticides, non-metals and other pollutants. As described in detail in the *Sediment Quality Evaluation* (Appendix X), three sediment samples (all sediment core samples) were collected from within the Clouter Island Alternative dredging prism. The sediment core samples were collected using a barge-mounted rotary drill rig; sediment cores were collected by advancing a 3-inch diameter stainless-steel split spoon from bed elevation to the approximate expected dredge cut depth. Sediment samples were collected and vertically composited from each of the Clouter Island sediment core sampling stations (designated as CHCI-01 through CHCI-03).

The sediment core samples were intended to be representative of “new work” sediment quality. Each sediment sample was analyzed for metals (including reference metals: aluminum and iron), organotins (tetra-n-butyltin, tri-n-butyltin, di-n-butyltin, and n-butyltin), PAH compounds, PCB congeners and arochlors, pesticides, polychlorinated dioxins and furans, nutrients, and geotechnical parameters. In addition, total and dissolved phase sediment elutriate analyses were completed.

A summary of the results is presented in Table 5.4-4, which shows the percentage of samples that exceeded the screening values for each analyte. The analysis results are presented in detail in the *Sediment Quality Evaluation* (Appendix X).

The results indicate that the Clouter Island Alternative sediment samples are similar to the Proposed Project samples in regard to the number of samples exceeding the screening values for metals, organotins, PAHs and pesticides. For PCBs, dioxins and furans, the Clouter Island Alternative "new work" sediments show fewer exceedances of screening values than the Proposed Project samples. Overall, these sediments show similar low contaminant concentrations, and dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants.

Similar to the Proposed Project, a substantial number of sample concentrations exceeding sediment screening values occurred as a result of assuming concentrations equal to the laboratory method detection limit (MDL) for tests that did not detect the analyte (non-detects). Elevated MDLs in solid matrix samples (e.g., sediments) are a common occurrence and typically are caused by matrix interferences.

Table 5.4-4. Percentages of Sediment Samples Exceeding Sediment Screening Values for the Clouter Island Alternative.

Analyte Group	Sediment Reference	Clouter Island Sediment Core Samples (geometric mean)
Metals		
Samples less than EPA Region 4 screening values or ER-L (%)	46.6	60.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	40.0	40.0
Samples exceeding ER-M (%)	13.3	0.0
Organotins (Tri-n-butyltin only)		
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	100.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	0.0
Samples exceeding ER-M (%)	0.0	0.0
Polynuclear Aromatic Hydrocarbons (C1-C4 compounds not included)		
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	100.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	0.0
Samples exceeding ER-M (%)	0.0	0.0
Pesticides		
Samples less than EPA Region 4 screening values or ER-L (%)	48.4	80.6
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	38.7	12.9
Samples exceeding ER-M (%)	12.9	6.5
Dioxins/Furans		
Samples less than EPA Region 4 screening values or ER-L (%)	47.0	82.4
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	52.9	17.6
Samples exceeding ER-M (%)	0.0	0.0
Polychlorinated Biphenyls (Total PCBs Only)		
Samples less than EPA Region 4 screening values or ER-L (%)	100.0	100.0
Samples exceeding EPA Region 4 screening values or ER-L but less than ER-M (%)	0.0	0.0
Samples exceeding ER-M (%)	0.0	0.0

5.4.16.3. Summary of Impacts to Aquatic Sediments and Dredging

For the project construction, approximately 5.1 Mcy of material would be dredged from the river (approximately 78 percent of the volume required to be dredged from the river for the Proposed Project). Because of the smaller dredging volume, the duration of dredging operations for the project should be less than the 12 to 15 months estimated for the Proposed Project. Similar to the Proposed Project, the dredged material would be placed in the Daniel Island CDF.

Similar to the Proposed Project, the Clouter Island Alternative would affect shoaling in the Federal navigation channel in the lower Cooper River. The sedimentation model results indicate that the Clouter Island Alternative would cause an increase in the total shoaling in the Federal navigation channel on the order of $6x10^4$ cy/yr (not including the proposed berth or turning basin, which are not part of the navigation channel), which is $4x10^4$ cy/yr greater than that predicted for the Proposed Project. All of the increase is predicted to occur in the Navy Yard Reach of the channel, and the project would not cause an appreciable change in shoaling volume in the other reaches of the navigation channel.

The Clouter Island Alternative is estimated to cause long-term shoaling in the berth and turning basin area at a rate of approximately $28x10^4$ cy/yr, which is 22 percent greater than that predicted for the Proposed Project.

Similar to the Proposed Project, the dredged materials could include CoPCs. The dredging and disposal of these sediments would not adversely impact aquatic and terrestrial wildlife by exposure to these contaminants.

The Clouter Island Alternative would result in the loss of CDFs for dredged material disposal, and new CDF sites in the estuary would likely be constructed to meet continuing maintenance dredging disposal needs.

5.4.17. Natural Resources

This section describes the Clouter Island Alternative impacts to natural resources. The introductory section below provides an overview of potential project impacts to natural resources. The following subsections provide detailed assessments of potential impacts to wetlands, upland biotic communities, aquatic biotic communities, marine mammals, EFH, and introduced species.

The Clouter Island Alternative site has historically been used for dredged material disposal. In 1993, a multi-agency task force, led by the USACE and SCDNR, was formed to investigate new and existing upland and ocean disposal sites (Holland et al., 1993). Holland et al. studied 29 prospective CDF site alternatives and evaluated existing environmental quality, water quality, critical habitat losses, adjacent site impacts, nutrient cycles (nitrogen and phosphorus), migration and movement patterns, threatened and endangered species, groundwater resources, cultural resources, and human uses. The Clouter Island CDF site was favorably ranked for continued CDF use because it represents a relatively small threat to environmental resources, although Clouter Creek is a large tidal creek that is projected to be sensitive to construction and operation of dredged material disposal facilities (Holland et al., 1993).

As with the Proposed Project, the Clouter Island Alternative project will result in a number of potential changes to the natural environment. The project will require new dredging, placement of structures along the shoreline and impacts to habitats. Long-term impacts include an increase

in impervious surface area and thereby an increase in stormwater runoff, maintenance dredging of the new berth and access area, and increased ship traffic.

In general, the Clouter Island Alternative has many similarities with the Proposed Project and the Daniel Island Alternative; however the Clouter Island Alternative is approximately 3 miles upriver from the other two alternatives. Therefore, ships have to travel farther and freshwater/brackish species are more likely to occur, while oceanic species are less likely to occur.

As described in detail in the Water Resources section (Section 5.4.15), the Clouter Island Alternative will adversely affect both turbidity and dissolved oxygen concentrations in the Lower Cooper River. As for short-term impacts, some increase in turbidity will be associated with the dredging and pile driving, but it will be temporary and localized. A reduction in water column DO concentration is possible if anaerobic sediments are disturbed and a corresponding BOD is generated. In regard to long-term impacts, increased depth from the proposed berth and access area will cause small, localized reductions in bottom DO levels and localized increases in bottom salinity, and increased stormwater pollution will cause a small increase in pollution loads (i.e., heavy metals, oils and greases) to the estuary.

A water jet sedimentation control system is also part of the Clouter Island Alternative project that would potentially have long-term affects on the Cooper River. A water jet sedimentation control system would cause some fluctuations in suspended sediments in the water column (but no increase in average suspended sediment concentrations) and can potentially impact fish larvae and eggs.

The Clouter Island Alternative project will result in the modification of land cover at the project site and along the access roadway, as shown in Figure 5.4-7. The total footprint of the proposed buildings and new impervious surface area (i.e., container yard, wharf, support areas) will be approximately 268 acres. Impacts from the Clouter Island Alternative terminal project are shown in Table 5.4-5. Access road impacts are listed in Table 5.4-6.

The Clouter Island Alternative requires a berth and access area where dredging will affect 62.5 acres of open water. The project would require dredging approximately 5.1 million cubic yards of sediment. An additional 7.1 acres of open water would be partially filled during construction of the wharf and the container yard. The wharf structures will be constructed as a pile support deck with open water and fill beneath the deck (see wharf design permit drawings Appendix C). The conceptual access roadway corridor for this alternative will also shade approximately 7.4 acres of Clouter and Beresford Creeks.

Table 5.4-5. Clouter Island Alternative Land Cover Breakdown.

Land Cover	Acres	% of Total
Impervious	0.0	0.0%
Wooded	19.4	5.7%
Landscaped	0.0	0.0%
CDF	244.3	71.3%
Saltwater Marsh	9.4	2.8%
Freshwater Wetland	0.0	0.0%
Open Water	69.6	20.3%
Total	*342.7*	100%

Table 5.4-6. Clouter Island Alternative Access Road Affected Land Covers.

Land Cover	Acres
Impervious	0.7
Wooded	12.3
Landscaped	4.9
CDF	8.4
Saltwater Marsh	10.3
Freshwater Wetland	0.0
Open Water	2.9
Residential	0.0
Total	*39.5*

Specific habitat impacts from the terminal are:

- Dredging for berth and area: 62.5 acres of open water;
- Partial fill for wharf: 6.2 acres of open water, 4.2 acres of marsh and 1.8 acres of upland; and
- Fill for container yard and support area: 0.9 acres of open water, 5.3 acres of marsh, and 235.6 upland acres.
- Stormwater retention basin construction: 39.5 upland acres.

The dredging and filling of 7.1 acres of estuarine waters for the wharf and container yard includes 4.9 acres of shallow (less than 2 ft) water and 2.1 acres of mudflat. Considerably less open water is impacted for the Clouter Island Alternative than the Proposed Project because the existing navigation channel is closer to the shore.

5.4.17.1. Upland Communities

The following sections present a discussion of the biotic communities potentially affected by the Clouter Island Alternative. At the Clouter Island Alternative project site, 264 acres of upland will be impacted, including 244.3 acres of existing CDF and 19.4 acres of forested land.

Potential impacts within a 200-foot-wide corridor for the conceptual access road are discussed to provide an evaluation of impacts resulting from the limits of fill for the conceptual footprint of the proposed roads serving the Clouter Island Alternative terminal (the actual access road would be for 4 lanes, which would likely be less than 200 feet wide). Drainage structures are also considered. For the access road, 26.3 acres of upland are within the corridor; including 8.4 acres of existing CDF, 12.3 acres of forested land, 4.9 acres of landscaped land and 0.7 acres of impervious land (the existing Clements Ferry Road).

The Clouter Island Alternative terminal area consists largely of dredged material disposal areas. Little or no natural upland biotic communities remain in the area to be occupied by this

alternative; consequently, no impacts to natural upland plant communities are expected in the area of the terminal.

The conceptual access roadway serving the Clouter Island Alternative terminal would traverse approximately 17 acres of upland plant biotic communities (wooded and landscaped) within 100 feet each side of centerline. Table 5.4-6 lists the biotic communities and acreages covered by the 200-foot corridor. Twelve acres of mature forested vegetation will be impacted and the corridor will further isolate and fragment larger upland habitats.

Approximately 40 to 50 acres of upland CDF will be isolated to the south of the Clouter Island alternative. Such a small CDF will quickly reach capacity and could potentially grow into a valuable wooded area.

Although the Clouter Island Alternative facility would not affect any native/virgin upland biotic communities, various songbirds, raptors, small mammals (e.g., raccoons, rabbits, etc.), and white tail deer may be found throughout this portion of the island. The Clouter Island Alternative facility will displace most of these species. This displacement should not imperil any of these species as they are common throughout the southeastern United States. Similar impacts are expected for the road corridor.

Effects to upland animal communities along the access road corridor include:

- Taking of individuals during construction;
- Elimination of habitat; and
- Habitat fragmentation.

Cumulative effects include a general reduction in the local population size of some upland animal species due to the direct and indirect effects noted previously. The Clouter Island Alternative is not expected to reduce species diversity within the upland animal community. Although difficult to predict, some changes in species composition within the adjacent upland animal community would not be unexpected. Any animals located to the south of Clouter Island Alternative will be effectively isolated.

5.4.17.2. Freshwater Wetland Communities

No freshwater wetlands occur for the Clouter Island Alternative or its conceptual roadway corridors; therefore, no direct impacts are expected. Stormwater runoff may cause potential hydrologic changes to wetlands that are currently estuarine. If the stormwater detention ponds are discharged in only a few locations, receiving wetlands may begin to show more freshwater characteristics. Invasion of cattails (*Typha* spp.) and common reed (*Phragmites australis*) may degrade the wetland quality.

5.4.17.3. Tidal Wetland Communities

The Clouter Island Alternative will impact estuarine wetlands and open water areas within the terminal area and along the conceptual access roadway corridors. Some wetland dredge and fill due to berth, wharf, and container yard construction will occur along the shoreline and tidal marshes adjacent to the terminal facility. The access road serving the terminal will cross several acres of tidal marsh at Clouter and Beresford Creeks. Specific impacts to wetlands are discussed in the following paragraphs.

The Clouter Island Alternative terminal facility, including berths, wharves and container yards, would result in the direct loss of approximately 9.4 acres of estuarine wetlands (cordgrass/ needlerush marsh).

The corridor of the conceptual access roadway serving the terminal would cross approximately 10 acres of cordgrass/needlerush marsh. The access road would be elevated above Clouter and Beresford Creeks and the fringing marsh on pile-support structures, thus impacts would be limited to shading of the marsh beneath the elevated road.

With regard to wetlands located along the road corridor, impacts would include:

- Direct loss of wetlands within the footprint of the road;
- Potential alteration of wetland hydrology;
- Changes in species composition and diversity due to changed hydrology.

Clouter Creek represents the most sensitive and important wetland resources near the site.

Estuarine wetland animal communities will be lost by the dredging/filling construction activities at the Clouter Island Alternative site. The numerous small estuarine wetland animals include microorganisms (decomposers), sea worms (polychaetes), small crustaceans, snails and shellfish. Animal communities in wetlands adjacent to the project site should be largely unaffected by the project. Indirect impacts to upland and estuarine animals caused by wetland loss will be discussed in the following sections.

5.4.17.4. Open Water River and Creek Communities

The Clouter Island Alternative also has the potential to impact estuarine and ocean biotic communities. Specific impacts to each of these biotic communities are discussed in the following paragraphs.

Intertidal estuarine plant community impacts have previously been discussed in the wetlands section. Little submerged aquatic vegetation exists in the area except for a few species of bottom algae. Therefore, little to no impacts will occur from the Clouter Island Alternative project.

The most immediate effect of the Clouter Island Alternative to the estuarine animal community will be loss of habitat. Dredging and filling of the Cooper River and tidal mudflats will impact the shallow water benthic community near the Clouter Island Alternative terminal facility. Construction and maintenance dredging may also increase suspended solids, thereby reducing quality of the remaining habitat and potentially smothering sensitive species. The terminal facility will result in the direct loss of 9.4 acres of tidal marsh.

Direct effects of the terminal to the estuarine animal community will be loss of individuals during construction (excavating/filling) and permanent loss of habitat along the proposed berth and wharf structures. Other potential effects from the terminal facility include decreased water quality from stormwater runoff (although this is expected to be minimized as a result of stormwater BMPs) and high suspended solids from sediment disturbance during ship maneuvering. All of these effects could result in an overall decline in abundance and diversity of estuarine animals near the alternative terminal facility.

The 200-foot corridor for the conceptual access roadway would also impact estuarine animal species inhabiting Clouter and Beresford Creeks. A potential positive impact of the pile-supported wharf and bridge over Clouter and Beresford Creeks is that most non-schooling fish are attracted to structures for their cover/shelter, as well as a substrate from which to forage for invertebrates and algae.

Potential finfish impacts are similar to those of the Proposed Project (see Section 5.2.17.3), except the area of open water directly affected by the Clouter Island Alternative project is much less than that for the Proposed Project (i.e., 70 acres versus 156 acres).

Potential shrimp, squid, and blue crab impacts are similar to those of the Proposed Project (see Section 5.2.17.3), except the area of open water directly affected by the Clouter Island Alternative project is much less than that for the Proposed Project (i.e., 70 acres versus 156 acres).

Potential sea turtle and diamondback terrapin impacts are similar to those of the Proposed Project (see Section 5.2.17.3), except the area of open water directly affected by the Clouter Island Alternative project is much less than that for the Proposed Project (i.e., 70 acres versus 156 acres).

Potential benthic organism impacts are similar to those of the Proposed Project (see Section 5.2.17.3), except the area of open water directly affected by the Clouter Island Alternative project is much less than that for the Proposed Project (i.e., 70 acres versus 156 acres).

Clouter Creek and Beresford Creek are the two creeks affected by the Clouter Island Alternative, although only the proposed roadway will traverse them. Impacts include pile-driving and construction-related damage, while long-term impacts are primarily shading. Potential long-term benefits of the pilings include cover/shelter and foraging.

5.4.17.5. Essential Fish Habitat (EFH)

Several activities associated with construction and operation of the Clouter Island Alternative will impact or have the potential to impact designated EFH and EFH-managed species that use the Charleston Harbor estuary and near shore marine waters. These activities include:

- Dredging/filling of the Cooper River estuarine water column;
- Dredging/filling of salt marsh areas and intertidal flats that fringe the Clouter Island Alternative site;
- Disposal of dredged material at upland CDF on lower Clouter Island;
- Increased shipping traffic.

Potential effects expected within each EFH as a result of the Daniel Island Alternative project include habitat loss, modification and disturbance. Potential effects to EFH and dependent resources resulting from these impacts are discussed in the following section.

Construction of the Clouter Island Alternative project will result in the direct loss of approximately 10.4 acres of estuarine EFH. This loss will be associated with dredge and fill activities in salt marsh (5.3 acres), and estuarine water column (0.9 acres; the rest is only deepened). An additional 4.2 acres of marsh will be lost when converted to estuarine water

column under the wharf. Loss of these habitats can have an adverse effect on organisms within the following council-managed species groups: penaeid shrimp, especially the white shrimp; red drum; select species from the snapper grouper complex; and the coastal migratory pelagics (by affecting prey species). No SCDNR-classified oyster beds will be destroyed, although some oysters are found within the intertidal area.

Minimal salt marsh areas will be lost in the areas occupied by the concrete pilings for the elevated access road over Clouter and Beresford Creeks.

Construction of the Clouter Island Alternative project will result in modification (i.e., deepening) of approximately 72.8 acres of existing estuarine EFH. This modification includes the deepening of 62.5 estuarine water column acres for the berth and access area and the alteration of 6.2 acres of existing estuarine water column under the wharf, as well as 4.2 saltwater marsh acres that will be converted to estuarine water column under the wharf.

During terminal construction along the Cooper River, approximately 3.35 million cubic yards of sediment will be removed. Construction of the wharf associated with the Clouter Island Alternative project will result in partial fill of approximately 12 acres. In these areas, the existing substrate will be filled; however, the water column beneath the wharves will only be filled along a slope that extends from the bottom of the berth to the bottom of the deck structure over 150 feet. The result will be an open water zone of varying depth beneath the 150-foot-wide wharf structure (see wharf design permit drawings Appendix C). The increased depths in the berth and access area will result in localized increases bottom salinity and small localized decreases in DO in these areas.

Additionally, the 200-foot-wide access road corridor covers approximately 13 acres of estuarine water column (2.9 acres) and marsh (10.3 acres); although the approximate 86-foot-wide pile-supported access road will shade approximately 5 acres of salt marsh if pile-supported elevated roadways are used over all marsh areas.

Existing estuarine and marine EFH within the study area that is not directly lost or modified by the Clouter Island Alternative project could be subjected to varying levels of disturbance as a result of construction and operation. The predominant cause of this disturbance is expected to be the increased shipping traffic (up to 3 more ships per day compared to current levels) and will chiefly affect the estuarine and marine water column (open water) habitats. Major spills and other discharges of toxic or hazardous materials are uncommon, but are of constant concern since large and important areas of EFH exist in the area. These potential impacts will be reduced by the use of stormwater collection systems (for spills on land) and spill prevention and response plans for aquatic spills.

Vessel-induced disturbances (e.g., suspended sediments from propeller wash) also affect the EFH. Effects may include resuspension of sediments and contaminants that can affect EFH. In heavily trafficked areas, bottoms may become unstable and colonization by bottom dwelling organisms may not be possible.

The Clouter Island Alternative berth and access area will cause increased sedimentation in these areas. Therefore, some EFH will also be affected by an expanded maintenance dredging effort.

5.4.17.6. Invasive Species

The Clouter Island Alternative project would have similar impacts as the previously described alternatives. The Clouter Island Alternative is in slightly less saline water, however, not enough to allow freshwater exotics to establish themselves.

5.4.17.7. Summary of Natural Resources Impacts

In summary, the predicted impacts on natural resources from the Clouter Island Alternative are as follows:

- Habitat impacts from the terminal include 9.5 acres of tidal wetland, 19.4 acres of wooded upland, and 69.6 acres of open water. There would be no loss of freshwater wetland.

- Habitat impacts from the access roadway include 10.3 acres of tidal wetland, 12.3 acres of wooded upland, and 2.9 acres of open water. There would be no loss of freshwater wetland.

- The Clouter Island Alternative will cause small, localized decreases in DO near the project site, particularly at the river bottom. In general, crabs and shrimp (especially bottom-dwellers) are considered more vulnerable to low dissolved oxygen than are vertebrate fish.

- EFH impacts from loss of habitat include 19.8 acres of tidal marsh (9.5 acres from the proposed terminal and 10.3 acres from the proposed roadway), 4.9 acres of shallow, subtidal waters (less than 2 ft), 0 acres of deep water (greater than 2 ft), 3068 linear feet of shoreline, and 2.1 acres of mudflats. EFH impacts from modification of habitat include 62.6 acres of deep water.

- Crab and shrimp are the EFH species most likely to be impacted by the Proposed Project.

- The Proposed Project would increase future ship traffic, thereby increasing the chance for an accidental release of aquatic exotic species into the Charleston Harbor via ship ballast water and, to a lesser extent, within cargo or from exterior ship hulls.

5.4.18. Threatened and Endangered Species

The impacts for the Clouter Island Alternative are expected to be similar to that for the Proposed Project, for which a detailed list and assessment of impacts is presented in Section 5.2.18. Despite the similarities in impacts to the Proposed Project, there are some differences as described in the following paragraphs.

As previously mentioned, the Clouter Island Alternative is 3 miles farther upriver than the Proposed Project, which makes impacts to sea turtles, manatees and other oceanic species less likely. However, because the Clouter Island Alternative is farther upriver, the water is slightly less saline making the presence of shortnose sturgeon possible, but still unlikely. As mentioned in Section 4.18, on the Cooper River shortnose sturgeon are typically found furthest downstream in the winter in salinities of approximately 10.5 ppt (Palmer et al., 2001). Median salinities at Filbin Creek (just upstream from the Clouter Island Alternative) are approximately 15.4 ppt near the bottom and 13.8 ppt near the surface (Table 4.15-2).

Also, the Clouter Island Alternative is closer to known Federally listed red-cockaded woodpecker habitat and the Francis Marion National Forest than the Proposed Project. However; all red-cockaded woodpecker clusters found in the previous Daniel Island DEIS study were north of I-526 and over 4 miles away from the Clouter Island Alternative (USACE, 1999) and the Francis Marion National Forest is over 7 miles away. Therefore, no direct impacts to the red-cockaded woodpecker as a result of the Clouter Island Alternative are expected. Indirect impacts are also not likely because the alternative does not support red-cockaded woodpecker foraging habitat.

Similar to the Daniel Island Alternative, the Clouter Island Alternative is closer to the Francis Marion National Forest making it more likely that its endangered bird inhabitants could visit the area. Also, uplands within active dredged material disposal areas have been known to provide nesting habitat for terns, pelicans, skimmers, and plovers; although local predator populations make nesting in these areas difficult.

5.4.19. Shorelines

The Clouter Island Alternative would cause similar direct impacts to shorelines as the Proposed Project. The Clouter Island Alternative would alter shorelines by the infilling of the shoreline at the facility site, and replacing the existing unprotected shoreline with an armored shoreline (a rock dike with armor stone below the low water line and a sheet pile wall above the low water line). As with the Proposed Project, the number of container and tug vessels transiting the harbor would increase, but the resulting impacts to Charleston Harbor shorelines, including Fort Sumter and Sullivan's Island, are expected to be minimal. Likewise, impacts to shorelines associated with propwash from turning vessels prior to docking or departure are expected to be minimal.

5.4.20. Floodplains

The Clouter Island Alternative impacts to floodplains would be similar to that for the Proposed Project. As with the Proposed Project, the Clouter Island Alternative would directly affect flooding of the project site by raising existing ground elevations in flood zones. Most of the project would be constructed on compacted fill, graded and paved for container storage and handling. Specific changes to the flood zones are as follows.

Approximately 86 percent of the project site (mostly container areas) is currently located in flood zone AE with a Base Flood Elevation (BFE) from 12 ft to 13 ft, NGVD29. After fill has been added, the post-project ground elevations for the container yard and support facilities would range from 14 ft to 16 ft, NGVD29. Therefore, no flooding would occur in these areas during the 100-yr event.

Approximately 14 percent of the project site is currently in a VE zone with a BFE from 14 ft to 16 ft, NGVD29. This includes container areas, support facilities and the wharf. The wharf would be at an elevation of 16 ft NGVD29, and the grade would gently slope eastward to an elevation of 14 ft NGVD29. The wharf would not flood during the 100-yr event. Container yard and support facility areas in the VE zone may flood up to 2 ft during a 100-yr event. Storm preparedness plans should contain contingencies to secure any containers that are stored in VE zones.

As with the Proposed Project, since the site is located in FEMA flood zones, National Flood Insurance Program regulations (NFIP, 44 CFR 60.3) would apply to portions of the project site in flood zone areas. In addition, local flood ordinances of Berkeley County can require equal or stricter building and development requirements than the minimums specified by FEMA.

Similar to the Proposed Project, it is unlikely that the Clouter Island Alternative would cause any increase in the 100-yr flood elevation. Also similar to the Proposed Project, the Clouter Island Alternative would be constructed in accordance with appropriate regulations and it would not increase flooding at other properties.

In summary, the Clouter Island Alternative impacts to floodplains would be similar to those for the Proposed Project. The Clouter Island Alternative would change elevations within the floodplain. Some areas within the terminal and roadway boundaries would still flood during 100-year return period storm surge events. However, the Clouter Island Alternative would cause negligible adverse impacts to flooding in areas outside the project footprint.



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

- Clouter Island Alternative Access Roadway Corridor
- Interstate Hwy.

Clouter Island Alternative

- Turning Basin
- Container Yard
- Stormwater Management
- Support Area
- Wharf

Federal Navigation Channel

0 0.25 0.5 1

Miles

Map Scale: 1:30,000

N W E S



Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.4-1
Conceptual Schematic Layout of the Clouter Island Alternative Terminal & Access Roadway

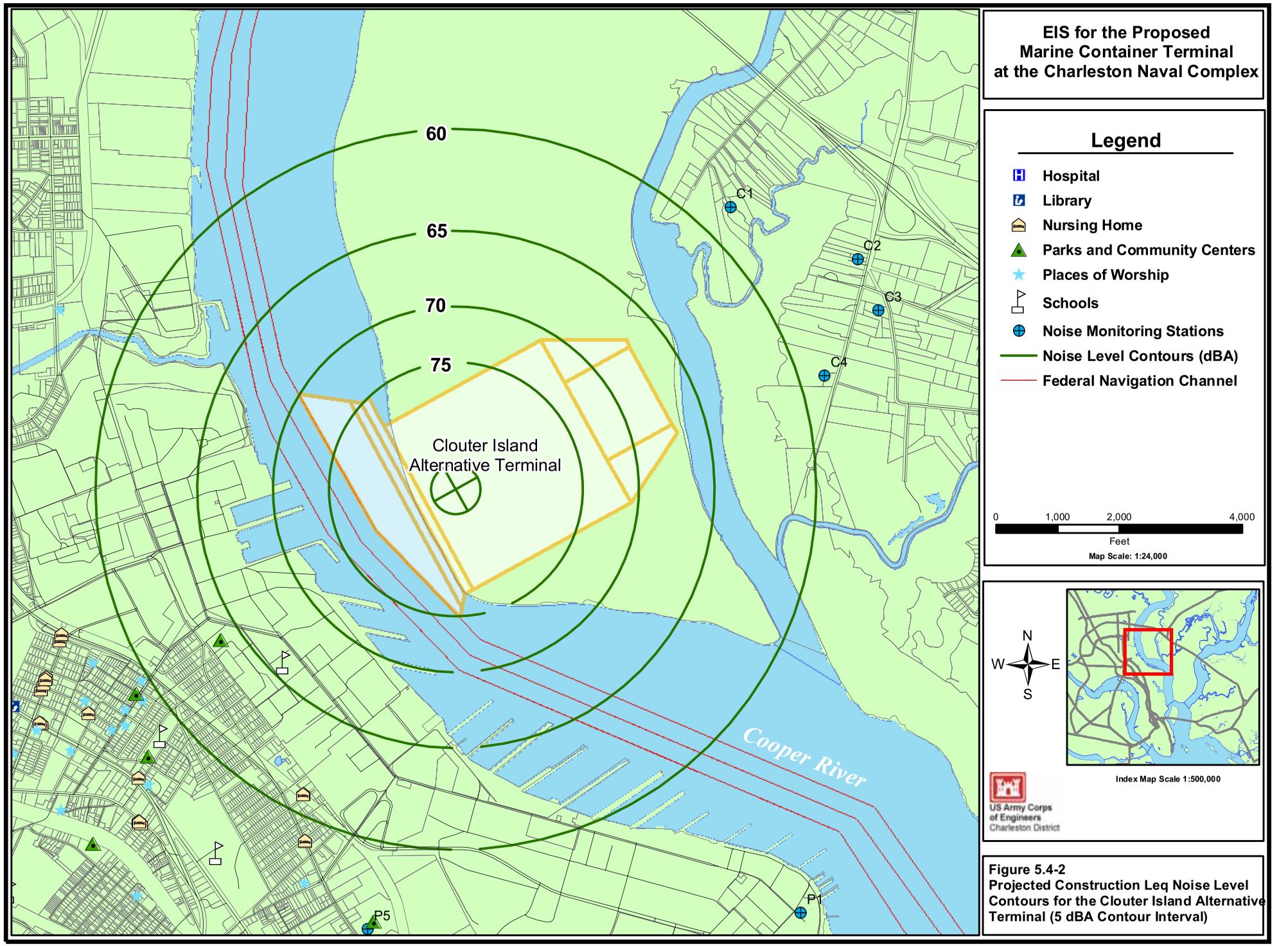


Figure 5.4-2
Projected Construction Leq Noise Level Contours for the Clouter Island Alternative Terminal (5 dBA Contour Interval)

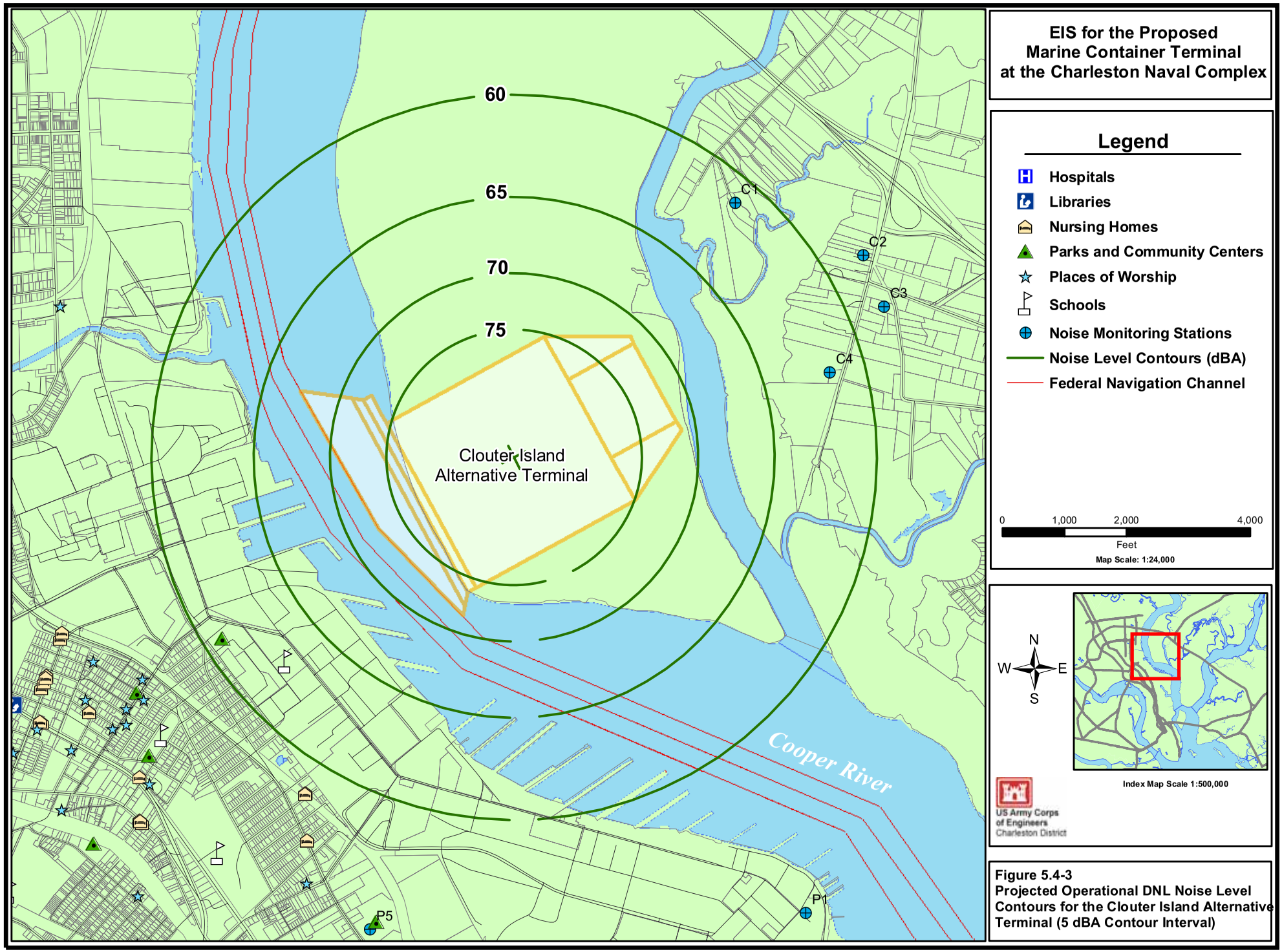


Figure 5.4-3
Projected Operational DNL Noise Level Contours for the Clouter Island Alternative Terminal (5 dBA Contour Interval)

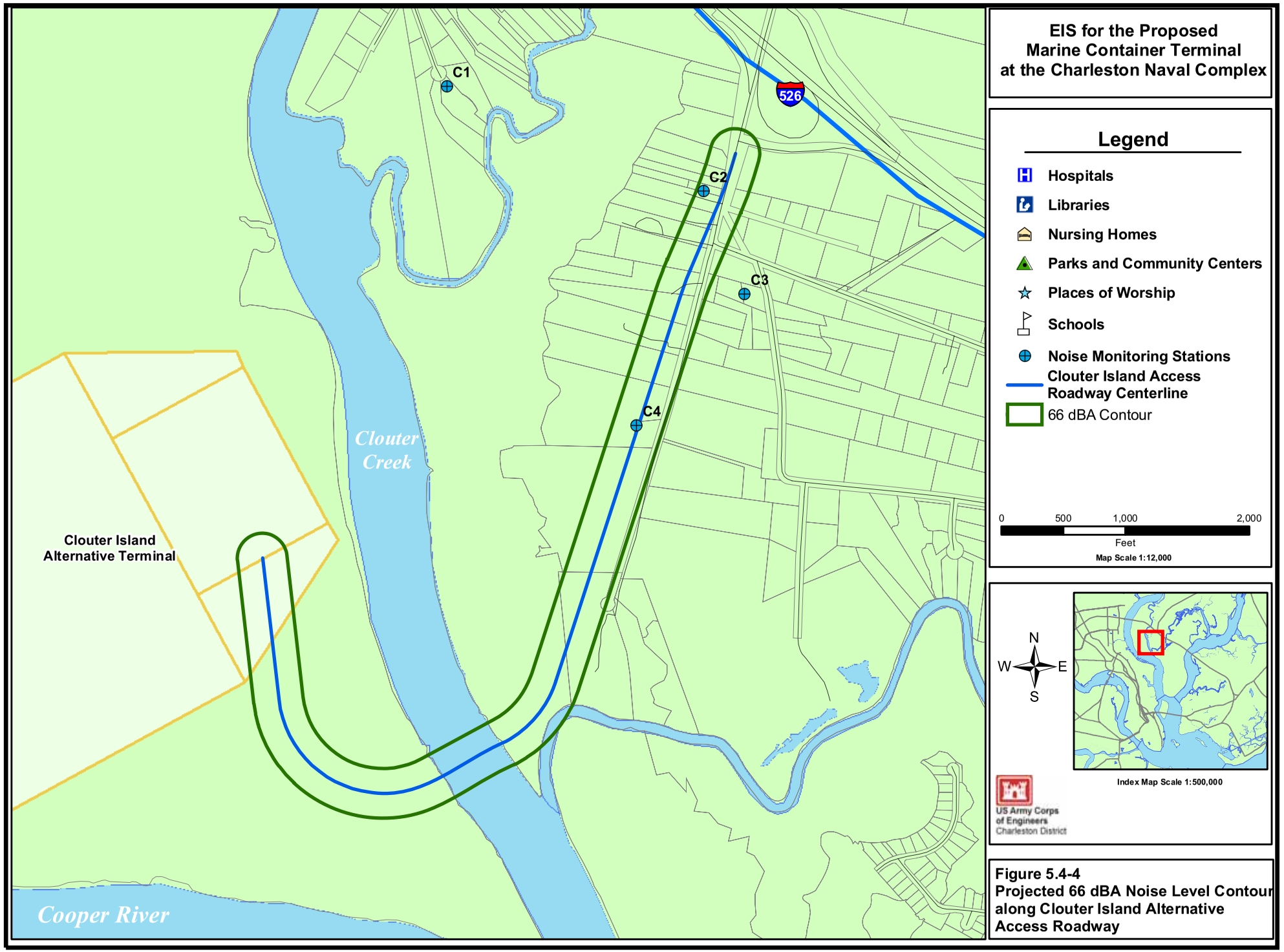


Figure 5.4-4
Projected 66 dBA Noise Level Contour along Clouter Island Alternative Access Roadway



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Light Level Contours

- 0.05 F.C.
- 0.1 F.C.
- 0.2 F.C.
- 0.3 F.C.

Clouter Island Alternative Terminal

0 500 1,000 2,000

Feet

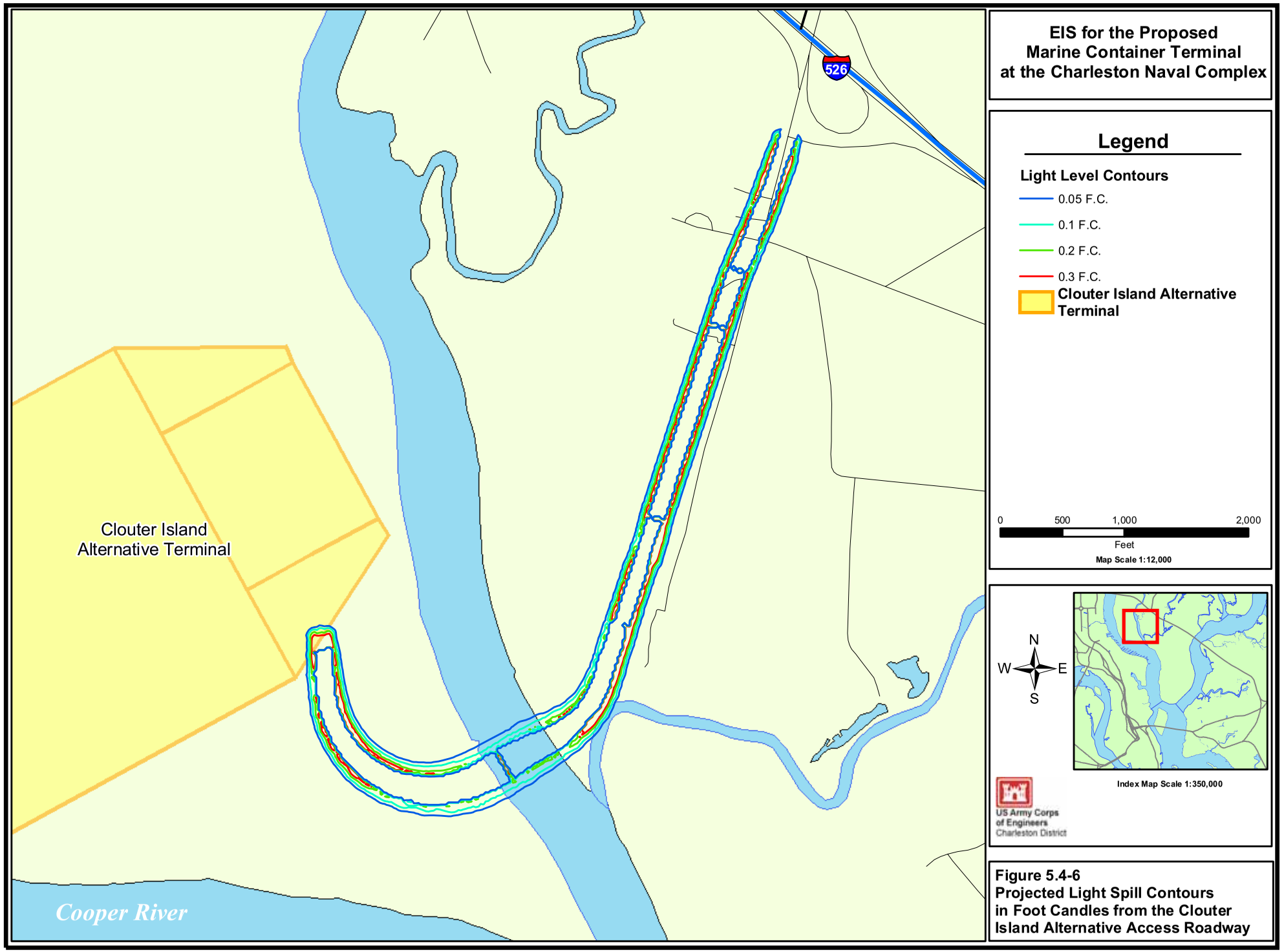
Map Scale 1:12,000

N W E S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.4-5
Projected Light Spill Contours in Foot Candles from the Clouter Island Alternative Terminal



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Light Level Contours

- 0.05 F.C.
- 0.1 F.C.
- 0.2 F.C.
- 0.3 F.C.

Clouter Island Alternative Terminal

0 500 1,000 2,000

Feet

Map Scale 1:12,000

N W E S

Index Map Scale 1:350,000

US Army Corps of Engineers
Charleston District

Figure 5.4-6
Projected Light Spill Contours in Foot Candles from the Clouter Island Alternative Access Roadway



EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex

Legend

Clouter Island Land Cover

- CDF
- Impervious
- Maintained Grass
- Tidal Wetlands
- Upland Forest/Scrub
- **Clouter Island Alternative Terminal**

0 500 1,000 2,000

Feet

Map Scale 1:12,000

N

W E

S

Index Map Scale 1:500,000

US Army Corps of Engineers
Charleston District

Figure 5.4-7
Existing Land Cover Impacted by the Clouter Island Alternative

5.5. UNAVOIDABLE ADVERSE IMPACTS OF THE PROPOSED PROJECT

This section provides a list of unavoidable adverse impacts of the Proposed Project, including both the proposed access roadway and the proposed terminal. For detailed explanations of the impacts, refer to Section 5 of the EIS.

- The Proposed Project would require public expenditures for public infrastructure investments, such as improved surface transportation facilities as well as for increased maintenance dredging.

- The highway and rail traffic generated by the Proposed Project would cause an unavoidable increase in highway and rail traffic, which would result in increased congestion and delays on area highways and interstates.

- It would result in an unavoidable increase in commercial vessel traffic, which would create the potential for increased conflicts between commercial vessels and recreational boats.

- The Proposed Project will result in an unavoidable increase in noise levels surrounding the proposed terminal and access roadways.

- The construction and operation of the Proposed Project would change the general visual character, viewsheds, and nightglow of the area. Changes to localized nighttime ambient light levels would be minimized through the incorporation of appropriate project design elements.

- There are unavoidable increases in air pollutants from mobile emissions sources, including nitrogen oxides (NO_x), volatile organic compounds (VOCs), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter (PM10 and PM2.5) that would be associated with construction and operation of the Proposed Project.

- The Proposed Project would result in unavoidable adverse impacts on hydrology and drainage. These impacts would include changes in land use and drainage patterns from mostly undeveloped to developed conditions in an area of about 184.4 upland acres and 16.8 wetland acres. The impacts would include about 56.6 acres of open water area filled for the terminal, about 11.6 acres of open water dredged and filled underneath the 3,510 foot wharf, and about 77.9 acres dredged for the berth and access area.

- Unavoidable adverse impacts to water quality for the Proposed Project would include alterations in the pattern and increase in the quantity of stormwater discharges. The stormwater runoff would be mostly from paved areas discharged through manmade outfalls. The stormwater entering surface water bodies may contain oil and grease, traces of petroleum products, and washings/runoff from vehicles and paved areas. However, the water quality of stormwater discharges would be regulated by SCDHEC permit requirements. There would be temporary increases in turbidity in the water bodies where dredging activities would be conducted and along the berth where the water jet sedimentation control system would be operated. Based on three-dimensional water quality modeling results, the project would cause minimal impacts to surface water dissolved oxygen and waste concentrations. The greatest dissolved oxygen impacts are limited to localized (i.e., within the turning basinberth and access area), short-term (i.e.,

maximum daily average impact) impacts, and the impacts are not expected to adversely affect aquatic species or existing and classified uses.

- Development of the Proposed Project would result in the permanent fill or excavation of 16.8 acres of wetlands, 14 of which are tidal and 2.8 of which are jurisdictional freshwater wetlands. The SCSPA's Mitigation Program, described in Appendix N, would offset the impacts of the Proposed Project to wetlands.

- In addition to the permanent loss of wetlands described above, development of the Proposed Project would result in the dredging of 146.1 acres of mostly shallow river bottom, the filling of 56.6 acres of intertidal flats and open water for the terminal and the filling of 11.6 acres underneath the wharf. The impacts to ecological resources of these actions would be offset by the Proposed Mitigation Plan.

5.6. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES FROM THE PROPOSED PROJECT

This section discusses natural, social and economic resources which would be permanently committed as a result of the Proposed Project. Because these resources would be expended in a way that could not be recovered once committed to the Proposed Project, their loss of availability for other uses would be irreversible.

- Conversion of the CNC location for the Proposed Project would, under Coastal Zone Management (CZM) guidelines, constitute a commitment of this coastal resource that would be difficult to reverse or retrieve. However, if a greater need arises for the location which would provide benefits and enable compensation for the lost opportunity and committed resources for the presently Proposed Project, the location should eventually be reclaimed.

- Construction of the Proposed Project (terminal and access roadway) would cost approximately $883 million, which would be an irreversible and irretrievable commitment of financial resources. There would be an additional commitment of public financial resources for improved surface transportation facilities.

- Development of the Proposed Project would result in the loss of about 56.6 acres of submerged lands to fill activity and the transformation of about 163.3 acres of relatively undeveloped land to terminal complexes (with associated changes in drainage patterns).

- Development of the Proposed Project would result in the permanent fill or shading of approximately 16.8 acres of tidal wetlands. Although these losses would be mitigated, these specific aquatic resources would be permanently committed to the Proposed Project.

- Development of the Proposed Project would result in the deepening of 77.9 acres of open water, the filling of 56.8 acres of intertidal flats and open water, and the modification (dredging and filling below mean high water) of 11.6 acres.

- An undetermined volume of fuel, as well as other types of energy resources, would be expended during the construction of the proposed facilities.

- Construction of the Proposed Project would result in the mining of up to 6.5 Mcy of suitable fill material, which will be used to provide a stable foundation for the dock, cranes, container storage and support buildings.

5.7. RELATIONSHIP OF SHORT-TERM USES OF MAN'S ENVIRONMENT AND LONG-TERM PRODUCTIVITY

This section discusses the short-term adverse impacts caused by terminal development at the CNC location relative to the long-term maintenance and enhancement of productivity. Short-term impacts are primarily those that occur during the period of construction. Long-term productivity relates to the continuous beneficial impacts of the Proposed Project, such as enhanced efficiency and increases in permanent employment opportunities.

In the short-term, the upland area of about 208 acres to be occupied by the terminal facility may remain relatively unused with minimal aesthetic value or contribution toward ecosystem balance. With the current rate of growth in the Charleston Harbor area, land will continue to be required to support urban, industrial, and infrastructure developments. As a result, the long-term productivity of this previously used area is for redevelopment to accommodate such developments. The long-term economic productivity derivable from these developments outweighs the short-term uses of this part of man's environment.

The hydrology, drainage, and flooding environment associated with the Proposed Project include land, runoff, and receiving waters. In the short-term, these water bodies are used for fishing, recreational navigation, and commercial navigation. The Proposed Project would enhance the long-term productivity of these water bodies for commercial navigation while still allowing fishing and recreational boating with relatively minor losses of available areas for each.

The environment associated with the Proposed Project includes the water quality of surface water bodies. The short-term uses of these water bodies include fishing, navigation, and assimilation of storm and sanitary wastewater discharges from adjoining areas. With the development of the Proposed Project, long-term economic productivity would be enhanced by increased navigational activities. Recreation and fishing maybe impacted, but these activities could be maintained. In addition, there would be some increased usage of the surface water bodies for dilution and assimilation of stormwater discharges.

The long-term water quality and ecological functions of existing wetlands would be replaced by economic benefits associated with the Proposed Project. Additionally, these functions would be reestablished through the proposed mitigation program (Appendix N).

Some of the long-term ecological functions of approximately 56.6 acres of existing estuarine bottom would be replaced by economic benefits with the Proposed Project. Similar ecological functions would become re-established through the proposed mitigation program (Appendix N).

5.8. CUMULATIVE IMPACTS

The Council on Environmental Quality's (CEQ) regulations for implementing the NEPA define cumulative impacts as:

> "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." (40 CFR part 1508.7)

Cumulative impacts can result from individually minor, but collectively substantial, actions taking place over a period of time. Impacts can include both direct effects, which are caused by an action and occur at the same time and place as the action, and indirect effects which are caused by an action and occur later in time and are farther removed in distance, but can still be considered to be reasonably foreseeable.

The scoping process conducted for this EIS (discussed in more detail in Section 7) included input from many agencies and a number of groups and concerned individuals. The concerns identified cover a range of resources and ecological components that could potentially be affected by the Applicant's Proposed Project discussed in Section 3. Cumulative impact issues raised during the scoping process and considered in this EIS include: surface transportation, air quality, navigation, water quality, site contamination, community resources, wetlands, and ecological resources in the Charleston Harbor area.

Concerns with regard to these resources and ecological components were raised during the scoping process in large part because:

- These components are especially vulnerable to potential incremental effects;
- The Applicant's Proposed Project is one of several similar actions occurring, or planned to occur, in the same geographic region;
- Other activities in the area have similar effects on the same resources;
- Cumulative effects from previous projects in the geographic area have been historically substantial for these same resources; and
- Other impact analyses in the geographic area have identified cumulative effects concerns with similar resources.

However, it is recognized that there may be additional resources and ecological components in addition to those identified above that may have cumulative impacts associated with the construction and operation of the Applicant's Proposed Project.

Where possible and/or practical, the impact analyses presented in Section 5.2 have used a quantitative analysis as a basis for determining cumulative impacts to the resources identified during scoping. Where this has not been possible, the cumulative impacts have been presented in qualitative terms. Cumulative effects have also been evaluated considering specific geographic boundaries and time frames, as well as considering magnitude and significance, as discussed below.

The resources identified during scoping encompass a range of geographic areas where potential cumulative impacts can occur. For the purposes of this EIS the "potential impact zones" for the resources identified above are:

- Roadway traffic – Tri-County region;
- Air quality – Tri-County region;
- Navigation – the Charleston Harbor Federal Navigation Channel;
- Water quality, wetlands, and ecological issues – the Cooper River area; and
- Site contamination and community resources – urban area within and surrounding the CNC.

The time frame for the cumulative effects assessment for this EIS is the 20-year period from 2005 to 2025, consistent with the time frame for the impact analysis presented in Section 5. This period extends beyond the practical limits of predictability for some topics, such as air quality and water quality issues, but has been included in light of the projected buildout period for the Proposed Project. The timeframe utilized for a historical examination of the cumulative impacts for the specific resources areas examined in the EIS varied depending upon availability and applicability of the information.

The magnitude and significance of potential cumulated effects have been based upon developing adequate baseline data for a specific resource of concern, upon which either adverse or beneficial changes from other past, present and reasonably future actions could cause the degradation or enhancement of the respective resource.

For the purposes of the cumulative impacts assessment, magnitude has been presented in terms of the relative size or amount of the impact, and significance is discussed in terms of its geographic extent (i.e., how widespread the impact might be), as well as in terms of duration and/or frequency (i.e., a one-time event, intermittent, or chronic).

The following is a brief description of past, present and future actions that have been identified which may have a potential cumulative impact when considered along with the Proposed Project being addressed in this EIS.

5.8.1. Maritime Projects

The USACE has completed the deepening of the channels serving Charleston Harbor to a depth of 45 feet, including the widening of some reaches. This project involved the dredging and disposal of approximately 33 million cubic yards of material to deepen existing channels, and realign several channel components. Dredged material from maintenance of the Federal Navigation Project was placed at both the Charleston ODMDS and upland disposal areas.

There are numerous additional projects proposed or underway around Charleston Harbor which will or would have impacts to wetlands and waters of the United States. These projects include, but are not limited to, the following:

- Maintenance dredging at all SCSPA berths;
- Maintenance dredging at CNC piers and other marine terminals and facilities;

- A marine terminal expansion project at the Kinder Morgan Shipyard River Terminal, including dredging, dock improvements, and additional vessel and rail traffic;
- CaroLinks is an inland port developer that announced plans to develop an 80-acre parcel of land on the Macalloy property on Shipyard Creek, but has not exercised an option to purchase the property and, subsequently, put their plans on hold for this site. The development is part of an overall plan to create a stand-alone integrated intermodal transportation and distribution network serving the Port of Charleston. CaroLinks is also evaluating options at other sites in South Carolina, including 800 acres in Orangeburg;
- Beach nourishment at Folly Beach;
- Erosion protection for the Morris Island lighthouse;
- Maybank Mid-Stream Transfer Facilities located on Town Creek and on the Cooper River north of the CNC;
- Security improvements at existing port terminals (compliant with the Maritime Transportation Security Act); and
- Demolition of the Grace and Pearman bridges, which cross the Cooper River.

5.8.2. CNC Regional Development Authority

The Charleston Naval Base was closed in 1996 and is being actively redeveloped. Since the closure of the Charleston Naval Base, now referred to as the Charleston Naval Complex (CNC), land is being transferred from the U.S. Navy to the Regional Development Authority (RDA) then to the City of North Charleston, Charleston County, federal agencies, state agencies and private companies for a variety of uses.

The northern portion of the CNC is a mixture of industrial, residential, commercial and recreational use. The Noisette Development Project is continuing redevelopment of a portion of the CNC for mixed uses. Industrial use includes ship repair facilities at the former U.S Navy facilities presently operated by Detyen's Shipyard. The southern portion of the CNC is a mixture of industrial, institutional and recreational uses. Commercial use includes office buildings occupied by state and local planning agencies including SCDHEC, RDA and BCDCOG. Industrial uses include the SCSPA Veteran's Terminal and other land owned by the SCSPA. Institutional use includes the Department of Homeland Security (DHS) Federal Law Enforcement Training Center (FLETC) facilities. Federal agencies presently located at the FLETC facility include USCG, National Oceanographic and Atmospheric Association (NOAA), U.S. Border Patrol, U.S. State Department and Department of Defense. The Clemson Restoration Institute campus will include 82 acres located around the Hunley lab to the north of the Federal Compound.

5.8.3. Transportation Projects

The SCDOT recently completed the construction of a new bridge to carry U.S 17 over the Cooper River and Town Creek. This bridge, named after Arthur Ravenel Jr. became operational in July, 2005. The Ravenel Bridge provides a vertical clearance of 186 feet over the Cooper River and 65 feet over Town Creek. The additional vertical clearance over the Cooper River and a wider navigation channel will support the largest class of post-Panamax vessels at the Proposed Project.

Other proposed or ongoing transportation projects which may result in direct and indirect impacts are those included in the Transportation Improvement Program, Charleston Regional Area Transportation Study (Fiscal Year 2003/ Fiscal Year 2004). This study is available from the BCDCOG.

5.8.4. Public Infrastructure Projects

The Charleston Water System (CWS), formerly the Charleston Commission of Public Works (CCPW), is currently replacing the deep sewer tunnel system in Peninsula Charleston and West Ashley. The original tunnel was built more than 30 years ago to carry untreated wastewater to the Plum Island Wastewater Treatment Plant. The new wastewater tunnel system was designed to serve the needs of Charleston for the next 100 years.

5.8.5. Land Development Projects

There is rapid, ongoing redevelopment occurring in the City of North Charleston and the City of Charleston. Two examples of this redevelopment effort are the Noisette and Magnolia Projects. The Noisette Project plan was released in December 2003 and describes the sustainable redevelopment of approximately 3,000 acres generally bounded by I-526 to the north, Meeting Street to the west, Cosgrove Avenue to the south, and the Cooper River to the east. Included in the master plan is approximately 350 acres of the northern portion of the former Charleston Naval Complex, which has been designated as “River Center at Noisette.”

The Magnolia Project plans to redevelop approximately 300 acres of land in the Charleston Neck area. The project is generally bounded by Speissegger Drive to the north (i.e., former site of Roper North Hospital), the Ashley River to the west, just east of I-26 to the east, and Ashepoo Street to the south. The new development would include high-density housing, business uses, and approximately 130 acres of open space. Ashley River Center have been developed which include a major mixed use development at the former Baker Hospital. In addition, the same development company is redeveloping the former Macalloy property, a Superfund cleanup site, into an industrial park bordering Shipyard Creek.

These redevelopment projects are projected to continue with or without the Proposed Project and are likely to result in independent impacts to community and natural resources as well as impacts to land use. However, it is recognized that the presence of the port terminal will likely accelerate some development activities directly related to the operations of the port.

Other land development projects which may result in direct and indirect impacts include, but are not necessarily limited to:

- The ongoing redevelopment of the Charleston Naval Complex properties (e.g., FLETC facilities)
- The construction of the Hunley Museum at Pier Alpha on the Charleston Naval Complex by the State Hunley Commission.
- The construction of an airplane manufacturing facility at a site near the Charleston International Airport.
- The reconstruction of a 43-acre property formerly known as the John C. Calhoun Homes into a mixed-use residential/commercial area by the I’On developers.
- The reconstruction project of a 55-acre property formerly known as Century Oaks community into a mix of townhouses and single-family houses.

- The development project of Horizon Village, which is the reconstruction of the former WW II-era North Park Village public housing complex located on the southern end of Rivers Ave.
- Major commercial development occurring near the North Charleston Coliseum and Performing Arts Center

5.8.6. Environmental Improvement Projects

The Charleston Harbor Project (CHP) is a resource planning initiative for the Charleston Harbor watershed which has been ongoing since 1991. In June 1999, the CHP released a draft Special Area Management Plan which recommends several regional initiatives. Among these proposed initiatives are the following:

- Develop a rice field succession plan for the Cooper River
- Develop molluscan shellfish management plans
- Stabilize Cooper River waterflows
- Establish Geographic Areas of Particular Concern (GAPC) designation for sensitive fish habitat
- Develop and promote measures to protect colonial waterbirds
- Protect hydrology for key plant habitats
- Reduce pulses of stormwater into tidal creeks
- Develop a regional water-related recreation plan
- Encourage utilization of identified dredge disposal sites
- Develop an area-wide runoff management strategy
- Limit impervious surfaces
- Establish vegetated buffers
- Encourage mass transit

6.0 MITIGATION

Mitigation is an important aspect of the review of every application for a Department of the Army permit to impact wetlands and other waters of the United States. Consideration of mitigation occurs throughout the permit evaluation and the NEPA process. This section describes the regulatory authority of the USACE to mitigate for unavoidable adverse impacts to wetlands and other waters of the United States and summarizes the proposed mitigation programs that have been submitted by the SCSPA and SCDOT for consideration along with the Proposed Project.

6.1. MITIGATION CATEGORIES

The General Policies for Evaluating Permit Applications (33 CFR 320.4(r)) identifies three general categories of mitigation:

- **Project modifications to minimize unavoidable adverse project impacts**: The SCSPA and SCDOT have developed a conceptual layout and general operational procedures for the Proposed Project. Minor project modifications such as reductions in scope and size, changes in construction methods, materials or timing, operation and maintenance practices or other similar modifications may be required to further minimize potential impacts to aquatic resources.

- **Mitigation measures to comply with 404(b)(1) Guidelines**: Mitigation for unavoidable impacts to wetlands and other waters of the United States is required to comply with the 404(b)(1) Guidelines.

- **Mitigation measures may be required as a result of the public interest review process**: Mitigation should be developed and incorporated within the public interest review process to the extent that the mitigation is found to be reasonable and justified by the District Engineer. Only those measures needed to ensure that the Proposed Project is not contrary to the public interest may be required.

6.1.1. 404(b)(1) Mitigation

The *Memorandum of Agreement Between the EPA and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines* is included as Appendix I. This MOA focuses on the Section 404 Regulatory Program and was developed to provide guidance on both the type and level of mitigation that is required to offset unavoidable impacts to existing waters of the United States.

The Council on Environmental Quality (CEQ), at 40 CFR 1508.20, states that mitigation includes the following components:

- Avoiding the impact altogether by not taking a certain action or parts of an action.

- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

- Compensating for the impact by replacing or providing substitute resources or environments.

The Army/EPA MOA combines these five components of mitigation into three specific steps: (1) avoidance, (2) minimization, and (3) compensation. The implementation of these steps is referred to as sequencing and occurs during the review of every permit application. Potential impacts to aquatic resources must be avoided to the maximum extent practicable, unavoidable impacts must be minimized, and compensatory mitigation is required to offset the loss of aquatic resource functions and values.

The mitigation sequence ensures that avoidance and minimization of potential impacts to aquatic resources is conducted before any compensatory mitigation is considered.

In some cases, the EPA and USACE may determine that certain impacts to aquatic resources are considered necessary to avoid further environmental harm. For instance, the Proposed Project includes the dredging and filling of waters of the United States to develop additional container storage yard and to provide necessary access to deep water. In this case, the placement of fill material will likely minimize the need for future dredging within the berthing area.

The objective of compensatory mitigation is to offset unavoidable losses of aquatic resources and to provide one-for-one functional replacement (i.e. no net loss of values) for wetlands. Although the USACE is responsible for evaluating the Proposed Project and determining the environmental consequences of developing a marine container terminal at the project site, the applicant is responsible for submitting an appropriate mitigation plan.

The determination of what is considered appropriate mitigation will be based solely on the functions and values of the aquatic resources that will be impacted and should include an adequate margin of safety to reflect the expected degree of success. The SCSPA has submitted a conceptual mitigation plan to offset potential impacts to aquatic resources (Appendix N).

6.1.2. Public Interest Review Mitigation

The construction and operation of the Proposed Project is expected to result in potential impacts to both the community and the natural environment, which includes aquatic resources. Many of these secondary and cumulative impacts are outside the regulatory authority of the USACE with regard to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. However, USACE Regulatory Policy requires that the review of any permit application must also consider potential impacts to Public Interest Factors.

Many of the topics that were evaluated in this EIS were taken directly from the list of Public Interest Factors that are included at 33 CFR 320.4. These factors include conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

The evaluation of the probable impact the proposed activity may have on the public interest requires a careful weighing of all those factors which become relevant in each particular case. The benefits which may reasonably be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. This balancing process determines whether to

authorize a proposal, and if so, the conditions under which it will be allowed to occur. A permit will be granted, subject to applicable guidelines and other criteria, unless the District Engineer determines that it would be contrary to the public interest.

6.2. PROPOSED PROJECT

6.2.1. Proposed Marine Container Terminal

As described in Section 1.0, the SCSPA has submitted a permit application to construct a marine container terminal at the Charleston Naval Complex on the Cooper River. The development of the proposed marine container terminal consists of the following activities that are regulated pursuant to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act:

- Placement of fill material in 9.6 acres of tidal marsh, 2.4 acres of freshwater wetland, and dredging and backfilling of 56.6 acres of navigable waters of the United States to construct 274.9 acres of container storage yard and support facilities;

- Construction of an approximately 3,510-foot long wharf structure in navigable waters of the United States that would be 120 feet wide (a total of 11.6 acres);

- Dredging and disposal of a total of 6.5 Mcy of aquatic sediment to construct three berths and an access area adjacent to the proposed wharf structure; and

- Installation of a water jet sediment suspension system on the proposed wharf structure to minimize maintenance dredging within the berthing area.

6.2.2. Proposed Access Roadway

The SCDOT has submitted a separate application for a Department of the Army permit to develop a four-lane limited access highway to begin at I-26 and end at the entrance to the proposed marine container terminal. The proposed access roadway is described as follows.

- The access roadway would be on new location for its entire length, have a design speed of 50 mph (posted speed of 45 mph), and would be classified as an urban arterial;

- The mainline of the road, measured from the I-26 interchange ramp junctures, would be approximately 0.85 miles in length, with approximately 0.71 miles on structure;

- Two low-level bridges over Shipyard Creek would need to be constructed;

- The existing Exit 218 (Spruill Avenue) would have to be removed to accommodate the new I-26 interchange. A new local access road connecting Spruill Avenue through to Meeting Street along Stromboli Avenue would be constructed to restore local access to I-26. The local access road would be approximately 1.03 acres in length; and

- The construction of the proposed access roadway would result in impacts to 4.2 acres of tidal marsh and 0.4 acres of freshwater wetland.

6.3. AVOIDANCE AND MINIMIZATION OF IMPACTS

Throughout the NEPA process, the Proposed Project is evaluated to see if and how the project could be modified to minimize potential adverse impacts to aquatic resources or the community.

The following discussion describes how the plans for the Proposed Project were designed and modified to avoid or minimize impacts.

6.3.1. Proposed Marine Container Terminal

From the beginning of the permitting process, the SCSPA has made efforts to design the terminal to the extent practicable to avoid and minimize impacts. As impacts were identified and evaluated, the SCSPA modified their design and operation plans to further avoid and reduce impacts. Specifics of avoidance and minimization can be found in the following.

Original Design Layout

- The location of the project is in a formerly used military base and industrial area that is currently vacant. By developing at this site, the SCSPA would avoid impacting undeveloped land.

- Efforts were made in the planning and design process of the proposed wharf structure to minimize long-term navigational safety concerns and maintenance dredging efforts.

Changes to the Design Layout

- The size of the berth and access area was reduced from 88.1 acres to 77.9 acres. This reduction in size avoids dredging efforts and impacts to Essential Fish Habitat (EFH) and minimizes impacts to water quality (i.e., dissolved oxygen levels).

- Changes to the dike located north of the proposed terminal were avoided, thereby minimizing impacts to the Federal Navigation Channel and long-term maintenance dredging efforts.

Construction and Operational Measures

- The SCSPA would use management, technology, and equipment advances to maximize the utilization of infrastructure, i.e., more cargo moving though a smaller terminal.

- Use of electric powered container cranes, potential use of electric powered rail mounted gantry cranes, and the construction of infrastructure to support future alternative marine power would help minimize future air emissions.

- Placement of fill by dredge rather than by truck to the extent practical would minimize the impacts of traffic, noise, and dust from trucks as they travel on local roads on and adjacent to the proposed terminal site.

- The use of a water jet sediment suspension system would minimize both the frequency of dredging and the quantity of dredged material to be placed in a confined disposal facility (CDF). Minimizing the quantity and frequency of maintenance dredging also lowers the potential for the discharge from the CDF to adversely affect water quality.

- Impacts to water quality would be minimized to the degree possible by using Best Management Practices (BMPs) and stormwater management measures and controls.

- The placement of noise barriers and light shields would minimize impacts to nearby receptors.

6.3.2. Proposed Access Roadway

A recommended access roadway alternative (Alternative 1C) was initially identified in the *Access Roadway Feasibility Study* (Appendix W) using the evaluation criteria established for the decision-making process, including the minimization of impacts to community resources. However, this roadway alternative met criticism after it was presented to the public in January 2006. Most of the criticism stemmed from the proposal to connect the local access roadway to the Spruill Avenue/Hackemann Avenue intersection. This connection would impact several existing residences and a church. After considering feedback from various government representatives and stakeholders, the SCDOT evaluated options that required additional modifications to Alternative 1C but would further avoid and minimize impacts. Modifications made to the proposed access roadway design (referred to as Alternative 1D) are as follows:

- Relocating the local access roadway connection from the Spruill Avenue/Hackemann Avenue intersection to the Stromboli Avenue/Spruill Avenue intersection. This modification avoided impacts to existing residential and church properties.

- Leaving the existing I-26 Exit 217 (Meeting Street) open for public access to the Interstate System.

- Establishing a local access connection between the mainline of the port access roadway and the SCSPA Veteran's Terminal and providing further improvements to local traffic by connecting the local access road to Spruill Avenue, Stromboli Avenue, and Meeting Street Road.

6.4. POTENTIAL ADVERSE IMPACTS OF PROPOSED PROJECT

This following list of potential adverse impacts is intended to assist in identifying specific issues to be addressed when considering the mitigation requirements of the Proposed Project (the proposed terminal and the proposed access roadway). These issues are discussed further in Section 5.2 of this EIS.

- The Proposed Project would require public expenditures for public infrastructure investments, such as improved surface transportation facilities as well as for increased maintenance dredging;

- The highway and rail traffic generated by the Proposed Project would cause an increase in highway and rail traffic, which would result in increased congestion and delays on area highways and interstates;

- The Proposed Project would result in an increase in commercial vessel traffic, which would create the potential for increased conflicts between commercial vessels and recreational boats;

- The Proposed Project would result in an increase in noise levels surrounding the proposed terminal, the proposed access roadway, and existing rail lines;

- Changes to localized nighttime ambient light levels are expected to be minimized through the incorporation of appropriate design elements. However, the construction and operation of the Proposed Project would change the general visual character and nightglow of the area;

- The construction and operation of the Proposed Project would result in an increase in mobile emissions of nitrogen oxides (NO_x), volatile organic compounds (VOCs), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter (PM10 and PM2.5), primarily associated with the combustion of gas and diesel fuels by marine vessels and other vehicles (trucks, cranes, automobiles, yard equipment).

- The Proposed Project would result in changes in land use and drainage patterns on the terminal site and along the access roadway. Subsurface drainage would also be affected by soil consolidation and paving to support yard equipment and stacked containers.

- Impacts to water quality for the Proposed Project would include alterations in the drainage pattern and an increase in the quantity of stormwater discharges. The stormwater runoff would mostly be from paved areas discharged through a detention basin with manmade outfalls. The stormwater entering surface water bodies may contain oil and grease, traces of petroleum products, and washings/runoff from vehicles and paved areas.

- Development of the berth and access area would result in the dredging of 77.9 acres of mostly shallow river bottom. There would be a localized increase in turbidity in water bodies where dredging activities would be conducted and where the water jet sediment suspension system is operated.

- Development of the Proposed Project would result in the loss of tidal marsh and freshwater wetlands. The proposed terminal would impact 9.6 acres of tidal marsh and 2.4 acres of freshwater marsh. Similarly, the proposed access roadway would impact 4.2 acres of tidal marsh and 0.4 acres of freshwater wetlands.

6.5. OVERVIEW OF PROPOSED MITIGATION PROGRAM

The SCSPA and SCDOT have submitted a Proposed Mitigation Program (the Program) to compensate for potential adverse impacts to the community and the natural environment associated with the Proposed Project. Since the publication of the draft EIS, the Program has been modified to address specific comments and concerns that were received during the public comment period. The Program is included as Appendix N.

Certain components of the Program will be required to comply with the 404(b)(1) Guidelines, whereas other components of this plan will be considered more generally during the public interest review of the Proposed Project. The following sections discuss the mitigation proposed to compensate for potentially adverse impacts associated with the Proposed Project.

6.5.1. Environmental Mitigation

6.5.1.1. Direct Impacts

The following components of the Program were proposed as potential mitigation for impacts to aquatic resources associated with dredging and filling waters of the United States. These activities are being conducted to comply with the 404(b)(1) Guidelines.

Tidal Marsh

Because there would be unavoidable impacts to waters of the United States, including tidal marsh, subtidal bottoms, and freshwater wetlands, much of the Program focuses on wetland restoration. To mitigate unavoidable impacts to 9.6 acres of tidal marsh from the development of the proposed terminal, the Program proposes to achieve a 2:1 restoration to impact ratio by restoring 22 acres of tidal marsh on Drum Island. Former intertidal and marine habitats in Charleston Harbor have been filled to accommodate dredged material disposal on Drum Island. The program would include removing 22 acres of fill from the southern tip of Drum Island, grading it to achieve tidal inundation, and revegetating the intertidal habitat with salt marsh plants including smooth cordgrass (*Spartina alterniflora)*.

To mitigate impacts resulting from roadway construction, suitable in-kind mitigation to offset impacts to wetlands is still being sought. If no estuarine mitigation opportunities are found to offset the 4.2 acres of tidal marsh lost as a result of the construction of the proposed access roadway, a debit from the Huspa Creek Mitigation Bank would be made.

Freshwater Wetlands

To address unavoidable impacts to 2.4 acres of freshwater wetlands from the construction of the proposed terminal, 33.1 credits would be purchased at a suitable mitigation bank. The appropriate number of credits to be purchased was calculated using the Charleston District Standard Operating Procedures (SOP) for calculating mitigation credits. The mitigation funds go towards restoration and preservation of freshwater wetlands at the approved mitigation bank.

Likewise, to mitigate for the 0.4 acres of freshwater wetlands impacted by the proposed access roadway, the Black River Mitigation bank would be debited at the prescribed ratio for freshwater wetland impacts.

Oyster Reef Restoration and Enhancement

To compensate for adverse impacts that may result from the filling or dredging of intertidal and subtidal habitats at the terminal site, the Program includes provisions to restore, enhance, and monitor approximately 5.28 miles (8 acres) of oyster reefs at suitable locations in and around Charleston Harbor. This restoration and monitoring work would be conducted by the South Carolina Department of Natural Resources (SCDNR).

6.5.1.2. Indirect Impacts

Impacts due to noise, light, air and water quality changes have broad effects on the environment and the public. One way to mitigate these effects is to reduce the total area of buildable land in the watershed by placing large areas in preservation to be used for recreation, wildlife habitat, and open space.

The following preservation activities are included in the Program to offset indirect impacts resulting from the Proposed Project.

Morris Island Preservation

Morris Island is a 126 acre uninhabited barrier island in Charleston Harbor that is accessible only by boat. This island has historic merit as a strategic location during the Civil War, and is one of the largest undeveloped estuaries on the East Coast providing critical habitat for numerous migratory birds and several endangered species.

The Trust for Public Land (TPL), a national non-profit private land conservation organization, is in an agreement to purchase Morris Island for preservation. The Mitigation Program proposes to provide funding to assist TPL in purchasing the island.

Cooper River Initiative

The Cooper River Initiative was formed in response to the concern regarding potential development within the East Branch area of the Cooper River. This broad-based consortium, led by SCDNR, is attempting to mitigate adverse impacts caused by development. To do this, the Cooper River Initiative has identified a focus area for protection measures, which would be vital to the overall quality and value of the Cooper River Watershed. The Mitigation Program proposes provisions to assist in the preservation of these target lands.

6.5.2. Mitigation Associated with Public Interest Factors

The Program proposes mitigation to offset certain secondary and cumulative impacts associated with the Proposed Project. As described previously, the District Engineer will require mitigation for adverse impacts associated with public interest factors to the extent that mitigation is determined to be reasonable and justified. The District Engineer will consider comments received from the public and agencies regarding the Proposed Project, including the Proposed Mitigation Program. The following components of the Program are intended to compensate for adverse impacts associated with public interest factors.

Community Resources

Leaders from several neighborhoods in the City of North Charleston (Union Heights, Accabee, 5 Mile, Liberty Hill, Windsor, and Howard Heights) established the Lowcountry Alliance for Model Communities (LAMC) to deal with the Proposed Project and other issues impacting their communities. LAMC participated in the permitting process for the Proposed Project and coordinated with the SCSPA and SCDOT in developing the Proposed Mitigation Program.

To offset impacts to the neighboring communities from the development of the Proposed Project, community programming initiatives were proposed. These programs are described in detail in Appendix N. In general, the community programs include:

- Establish a trust to create affordable housing,
- Monitor construction impacts such as vibration, noise and emissions,
- Assist with preschool to college-level education programs, including those in the field of transportation,
- Establish a Maritime Training Institute to help local residents develop port-related careers,
- Establish or support programs that assist local vendors in securing new business,
- Expand health care and fitness center facilities,
- Improve existing community centers, and
- Develop a master plan that would help realize the community visions for the area.

To further enhance educational opportunities in the area, the SCSPA proposes to donate a 3-acre parcel to Clemson University's Restoration Institute. The Institute focuses on creating and teaching new technologies for restoring historic, ecological, and urban infrastructure resources. The donated parcel has water access, which will be critical to the mission of the new Clemson campus. The parcel is adjacent to the Warren Lasch Conservation Laboratory, where the Restoration Institute has applied anti-corrosion technologies during the restoration of the H.L. Hunley submarine.

Other community mitigation efforts proposed in the Program include the full compensation and relocation assistance to those property owners that experience direct right of way impacts from the construction of the proposed access roadway. In addition, excess property resulting from the proposed removal of I-26 Exit 218 would be conveyed to the City of North Charleston. The City would likely use this property either in kind or proceeds from the sale for community mitigation and enhancement activities, such as green space or affordable housing.

Noise

Highway-type sound barriers, not to exceed 15 feet in height, would be constructed along terminal roads that are immediately adjacent to property lines that border residential uses. In addition, a noise wall would be constructed adjacent to the Rosemont neighborhood with a landscaped buffer established in the proximity of the noise wall near I-26.

7.0 PUBLIC INVOLVEMENT AND CONSULTATION

7.1. SCOPING MEETINGS

Public and agency scoping meetings were held on March 16, 2004 and March 22, 2004, respectively. The purpose of these scoping meetings was to solicit public and agency input on topics to be addressed in the EIS. Written and oral comments were received during the meetings. In the 30-day commenting period that followed each of the meetings, individuals and agencies were also able to submit comments via a hotline (843-971-7970) and a project website (www.PortEIS.com). Scoping comments were considered when developing the scope of the EIS. Copies of the public notices announcing these Scoping Meetings are included in Appendix H.

7.2. PUBLIC OUTREACH PROCESS

In support of receiving feedback from the public and providing information on the status of the EIS, the USACE held the following Neighborhood Outreach Meetings and Public Information Workshops:

7.2.1. Public Information Workshops

The Public Information Workshops are a means for the USACE to provide the public up-to-date information related to the development of the EIS. These workshops have been held at key times during the development of the EIS when advancements were made and information became available. The workshops that have been held thus far are listed below:

- Public Information Workshop, March 16, 2004; Sterett Hall, North Charleston, SC

This workshop was held simultaneously as the Public Scoping Meeting for the public to understand the process of developing an EIS, gather important facts about the Proposed Project, and ask questions about potential impacts from the Proposed Project.

Approximately 100 people attended this workshop, many of whom submitted scoping comments via court reporter, letters, and comment cards. This workshop also prompted quite a few comments via the website and hotline.

- Public Information Workshop, August 25, 2004; Citadel Alumni Center, Charleston, SC

This workshop was held to provide the public with an update on the scope of the draft EIS, the alternatives being considered, and the main issues identified during the scoping process. Information tables were arranged around the room and each were staffed with individuals that were experts in a major area of study that was identified in the scope of the draft EIS.

Approximately 50 people attended this workshop. The public was responsive with providing feedback to the USACE on relevant concerns regarding the scope and alternatives being considered in the draft EIS.

- Public Information Workshop, May 12, 2004; North Charleston Coliseum, North Charleston, SC

The goals of this workshop were to share with the public a revised list of project alternatives being evaluated in the draft EIS, identify potential access roadway alternatives for the Proposed

Project, discuss findings from the *Existing Roadway Traffic Study*, and provide information on the major areas of study in the draft EIS.

Approximately 50 people attended this workshop and several submitted feedback via feedback forms, the website, and the hotline.

- *Tour of the Draft EIS*, November 1, 2005; Sterett Hall, North Charleston, SC

Approximately two weeks after the publication of the draft EIS, the USACE hosted an informal meeting with the public to discuss the contents of the document. The purpose of this meeting was to "guide" the public through the draft EIS document and help the public understand its organization.

Approximately 30 people attended this workshop. Many attendees went home with CDs containing the draft EIS document and later provided comments on the document.

- Public Information Workshop, November 17, 2005; North Charleston Performing Arts Center, North Charleston, SC

This workshop was held concurrently with the public hearing as a means of providing the public with information on specific issues and concerns related to the Proposed Project and the draft EIS. Attendees were able to talk to representatives of the USACE and its consultant team before submitting comments.

Approximately 500 people attended this workshop during the public hearing, and a large number of comments were submitted via comment cards and court reporters. In the days immediately following the event, many more comments were received via the website and hotline, as well as letters sent directly to the USACE.

- Public Information Workshop, January 26, 2006, Gethsemani Community Center, North Charleston, SC

The purpose of this workshop was to provide information to the public – and receive comments back – related to the access roadway alternative recommended by the Transportation Agency Technical Working Group to provide direct travel between the proposed terminal and I-26.

This workshop was hosted at a community center within one of the affected neighborhoods to ensure that every interested resident had the opportunity to attend. Approximately 75 people attended.

- Public Information Workshop, March 30, 2006, Military Magnet Academy, North Charleston, SC

The SCDOT partnered with the USACE to host this information workshop. Following the last public information workshop (held on January 26, 2006), the SCDOT met with several stakeholders to get feedback on major concerns related to the access roadway alternatives. The purpose of this workshop was to present the revisions that were made to the recommended access roadway alternative based on the feedback received.

Approximately 100 people attended this information workshop. The majority of attendees were residents and business owners within the affected area.

7.2.2. Neighborhood Outreach Meetings

These neighborhood meetings were a means for the USACE to go to the communities that are within the study area of the EIS and provide information on the Proposed Project and the process of developing an EIS. These meetings were a valuable opportunity for community residents to meet with the USACE in a familiar setting, ask questions relevant to their needs, and submit scoping comments/feedback. The neighborhood meetings that the USACE attended are listed below:

- Liberty Hill Neighborhood Association, March 18, 2004; Felix Pinckney Community Center, North Charleston, SC

- Glenn Terrace/Oak Ridge Neighborhood Association, April 5, 2004; Collins Park Road Community Center, North Charleston, SC

- City of North Charleston Neighborhood Association Presidents, April 13, 2004; City of North Charleston City Hall, North Charleston, SC

- Chicora-Cherokee Neighborhood Association, April 14, 2004; Chicora Elementary School, North Charleston, SC

- Union Heights Neighborhood Association, April 16, 2004; Gethsemini Community Center, North Charleston, SC

- Olde North Charleston Neighborhood Council, May 11, 2004; Olde North Charleston Meeting Place, North Charleston, SC

7.2.3. Other Outreach Methods

In addition to hosting public outreach meetings, the USACE provided several alternate methods for the public to receive and submit information pertaining to the EIS, including:

- A public-access project website (www.PortEIS.com) maintained throughout the development of the EIS, providing readers with the latest news about the status of the EIS, supporting documents, and the ability to provide information via online feedback forms;

- A hotline (843-971-7970) providing brief announcements on the latest EIS developments and the ability for interested parties to leave a recorded message that is later transcribed and documented as public feedback;

- Email and U.S. Postal Service alerts sent out to members of the public that registered to receive updates on the EIS via either or both of these methods. People could request to be added to the mailing list(s) online via the project website, over the phone via the hotline, or in person at the public outreach meetings; and

- A series of newsletters, called PortEIS News, beginning in July, 2004 and distributed throughout the development of the EIS. Hardcopies and electronic copies of PortEIS News were sent to people on the U.S. Postal Service mailing list and email list, respectively. Electronic copies of PortEIS News issues were also available for downloading on the project website.

7.3. PUBLIC HEARING

A Public Hearing was held on November 17, 2005 at the North Charleston Performing Arts Center. The USACE conducted the Public Hearing as part of the NEPA process to receive oral and written comments from the public on the draft EIS and the Proposed Project. These comments were then incorporated and addressed in the final EIS. Representatives of the USACE and its consultant team were present to provide input on specific issues and concerns.

8.0 COMMENTS AND RESPONSES

8.1. RECEIVING AND REVIEWING COMMENTS

The process of developing an EIS requires that the lead Federal agency preparing the document review and respond to all timely comments received regarding the draft EIS. The USACE has received approximately 360 comment submittals in response to the draft EIS during the formal public comment period, which was October 17, 2005 through April 19, 2006. A copy of all comment submissions is provided at the end of Appendix EE.

Various interested parties provided comments, including federal and state agencies, local agencies and governments, elected officials, and the general public. Comment submissions were in the form of letters, faxes, emails via an online feedback form, court reporter transcripts of oral testimony, and transcripts of hotline recordings. A computerized comment database system was developed to compile, inventory, analyze, consolidate, and respond to the comments during the course of the EIS development.

Upon receipt, each comment submission was date-stamped by the USACE and provided to the USACE's contractor for processing. All comment submissions were processed in the same manner. Each comment was assigned and labeled with a unique, five-part identification number, including (1) a prefix denoting that the comment was received in response to the draft EIS, (2) the date the comment is received (day, month and year – 8 digits), (3) a letter identifying if the comment came from the general public (P) or an agency (A), (4) a letter that identifies the comment method and (5) a four-digit sequence number. The coding for the comment method was as follows:

Letter	Comment Method
C	Comment Card
L	Letter
W	Website
H	Hotline
R	Court Reporter

Along with its identification number, information concerning the author's name, contact information, and agency/organization was recorded in the comment database. All comments were maintained in three files: (1) the originals, (2) photocopies of the originals marked with comment category codes (discussed below), (3) scanned electronic copies (as ".pdf" files).

During the comment review process, key comment issues contained in each submission were identified, summarized, and consolidated into one or more of 26 specific comment categories contained in the database. A list of the comment categories and letter codes is provided below:

Letter Code	Comment Category / Description
A	Land Use
B	Physical Setting
C	Socioeconomic Environment
D	Social Characteristics and Environmental Justice
E	Community Infrastructure and Municipal Services

F	Transportation
G	Navigation and Terminal Facilities
H	Noise
I	Light
J	Aesthetics
K	Air Quality
L	Cultural Resources
M	Parks and Recreation
N	Hazardous Waste and Materials
O	Water Resources
P	Aquatic Sediments and Dredging
Q	Natural Resources
R	Threatened and Endangered Species
S	Shorelines
T	Floodplains
U	Cumulative Impacts
V	Progress of the EIS
W	Support for the SCSPA / Proposed Project
X	Project Alternatives / Alternatives Analysis
Y	Miscellaneous
Z	Mitigation Opportunities

Comment category codes were marked on each comment submittal as necessary and entered into the comment database alongside the appropriate comment submittal. This organization allowed the comment reviewer to filter the database for any given comment category and expedite the process of responding to comments.

8.2. RESPONDING TO COMMENTS

As previously mentioned, the USACE received approximately 350 comment submittals in response to the draft EIS. Key issues focused on potential impacts associated with transportation infrastructure, quality of life (i.e., noise, light, and air emissions), and environmental justice concerns. The comments regarding potential noise, light, air quality, and environmental justice impacts were often focused on impacts caused by traffic on the access roadway.

In most instances, each comment submittal had multiple comment issues. To ensure that all key comment issues were addressed, text excerpts from the comment submittals containing the issue were addressed individually. In this way, the response to each key issue can be viewed alongside the comment.

Agency and public comments are presented in separate sections for better organization of the comments. The agency comments have been presented in the order of Federal, State, County, and City. Comment authors can locate the response(s) to his/her comment(s) efficiently by referring to the table of contents.

Appendix EE contains the comment excerpts and the USACE's responses to the comments. The commit submittals in their entirety are provided at the end of this appendix in order of number sequence (the last four digits of the comment identification number).

9.0 REFERENCES, LIST OF ACRONYMS, AND DEFINITION OF TERMS

9.1. REFERENCES

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9.1. ACRONYMS

A

AADT	Annual Average Daily Traffic
AAQS	Ambient Air Quality Standards
AASHTO	American Association of State Highway and Transportation Officials
ACM	Asbestos-containing material
ADT	Annual Daily Traffic
AL	Aquatic Life
ANSI	American National Standards Institute
AOC	Areas of Concern
AST	Above-ground Storage Tank
ATM	Applied Technology and Management
ATV	All Terrain Vehicle

B

BEHP	bis-2-Ethylhexlphalate
BCDCOG	Berkeley-Charleston-Dorchester Council of Governments
BFEs	Base Flood Elevations
BLM	Bureau of Land Management
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene and xylene

C

CAA	Clean Air Act
CCPW	Charleston Commission of Public Works
CCSD	Charleston County School District
CCT	Clement, Crawford and Thornhill, Inc.
CDF	Confined Disposal Facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Chl *a*	Chlorophyll A
CHP	Charleston Harbor Project
CIA	Community Impact Assessment
CMS	Corrective Measures Study
CNEL	Community Noise Equivalent Level
CNC	Charleston Naval Complex
CO	Carbon Monoxide
COCs	Contaminants of Concern
CoPCs	Contaminants of Potential Concern
CSI	Confirmatory Sampling Investigation
CSXI	CSX Intermodal
CTC	Charleston Terminal Company
Cu	Copper
Cy	Cubic yards

D

dB	Decibel
dBA	A-Weighted Sound Level

DCE	Dichloroethene
DEIS	Draft Environmental Impact Statement
DHEC	Department of Health and Environmental Control
DNAPLs	Dense non-aqueous phase liquids
DNL	Day-Night Sound Level
DO	Dissolved Oxygen
DoD	Department of Defense

E

EA	Environmental Assessment
EAC	Early Action Compact
EAP	Early Action State Implementation Plan
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMC	Event Mean Concentration
EMS	Emergency Medical Services
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act

F

F	Fahrenheit
FAA	Federal Aviation Administration
FBM	Fleet Ballistic Missile
FC	Fecal Coliform
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highways Administration
FIRMs	Flood Insurance Rate Maps
FIS	Flood Insurance Study
FLETC	Federal Law Enforcement Training Center
FMPs	Fishery Management Plans
FOSL	Finding of Suitability for Lease
FOST	Finding of Suitability for Transfer

G

GIS	Geographic Information System
GPS	Global Positioning System
GPD	Gallons per day

H

HC	Hydrocarbons
HDDV	Heavy Duty Diesel Vehicles
Hg	Mercury
HSWA	Hazardous and Solid Waste Amendments
HUD	US Department of Housing and Urban Development
Hz	Hertz

I

ICWW	Intracoastal Water Way

IESNA	Illuminating Engineering Society of North America
IM	Interim Measures
IMO	International Maritime Organization
IRP	Installation Restoration Program
ISTEA	Intermodal Surface Transportation Efficiency Act
IWR	Institute for Water Resources

L

LDGV	Light Duty Gas Vehicles
Leq	Equivalent Sound Level
LNAPLs	Light non-aqueous phase liquids
LOS	Level of Service
LUC	Landuse Controls
LUST	Leaking Underground Storage Tank
LWCFA	Land and Water Conservation Fund Act of 1965

M

MCY	Million cubic yards
MGD	Million gallons per day
mg/L	Milligram/Liter
1.1.1 mlw	Mean Low Water
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MOU&A	Memorandum of Understanding and Agreement
MPC	Maximum Practical Capacity
mph	Miles Per Hour
MPWW	Mount Pleasant Waterworks
MSL	Mean Sea Level
MS4s	Municipal Separate Storm Sewer Systems
MTBE	methyl-tertiary-butyl-ether

N

NAAQS	National Ambient Air Quality Standard
NAC	Noise Abatement criteria
NMFS	National Marine Fisheries Service
NED	National Economic Development
NEPA	National Environmental Policy Act of 1969
NFA	No Further Action
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
nm	Nautical Miles
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOx	Nitrous Oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	Nonpoint Source
NPSLAM	Non-Point Source Loading Analysis Model
NRC	National Response Center
NRCS	Natural Resources Conservation Service
NS	Norfolk and Southern

NS&T	National Status & Trends
NTC	North Charleston Terminal
NWI	National Wetlands Inventory
NWS	Naval Weapons Station
NXS	Norfolk and Southern

O

O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards
OCRM	Office of Ocean and Coastal Resource Management
ODMDS	Ocean Dredged Material Disposal Site
OSHA	Occupational Safety and Health Administration
OPS	Optimum sustainable population

P

PAHs	polynuclear aromatic hydrocarbons
Pb	Lead
PB	Parson Brinckerhoff Quade & Douglas, Inc.
PCBs	Polychlorinated Biphenyls
PCE	Tetrachlorethene
PEL	Permissible Exposure Limits
Ph	Hydrogen Ion Concentration
PI	Pulse Induction
PIERS	Port Import Export Reporting Service
PL	Public Law
PM	Particulate Matter
PT	Physical Training
ppt	Parts per thousand
PUC	Public Utilities Commission
PUD	Planned Urban Development

R

RBC	Residential Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
Rec	Recreational Use
RDA	Redevelopment Authority
RFI	RCRA Facilities Investigation
ROD	Record of Decision
RO-RO	Roll-on-roll-off
RSZ	Reduced Speed Zone

S

SAA	Satellite Accumulation Area
SAFMC	South Atlantic Fishery Management Council
SAP	Sampling and Analysis Plan
SC	Sand-Clay
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCDOT	South Carolina Department of Transportation
SCECAP	South Carolina Estuarine and Coastal Assessment Program
SCE&G	South Carolina Electric & Gad

SCSPA	South Carolina Ports Authority
SECA	Sox Emission Control Areas
SEIS	Supplemental Environmental Impact Statement
SDDC	Surface Deployment and Distribution Command
SI	International Standard
SIP	State Implementation Plan
SM	Sand-Silt Mixture
SO_2	Sulfur Dioxide
SPCC	Spill Prevention, Control, and Countermeasures
SVOCs	Semi-volatile organic compounds
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan

T

TC	Transportation Command
TCE	Trichlorethene
TEFs	2,3,7,8- tetrachloridibenzodioxin Toxcitiy Equivalent Factors
TEU	Twenty-Foot Equivalent Unit
TEWG	Turtle Expert Working Group
TIP	Transportation Improvement Programs
TMDLs	Total Maximum Daily Loads
TNM	Traffic Noise Model
TPH	Total petroleum hydrocarbons
TSP	Total Suspended Particulate
TSS	Total Suspended Solids
TV1	Transformer Vault

U

UOD	Ultimate Oxygen Demand
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USCG	U.S. Coast Guard
UXO	Unexploded Ordnance

V

V/C	Volume-to-capacity
VOCs	Volatile Organic Compounds

W

WEFA	World Economic Forecasting Association
WLA	Wasteload Allocation

Z

Zn	Zinc

9.2. DEFINITION OF TERMS

A-Weighted Sound Level (dBA) - A measurement representing a sound generally as the human ear hears it by filtering out as much as 20 to 40 decibels of sound below 100 hertz (Hz).

Area of Potential Effect (APE) - A study area defined in conjunction with the State Historic Preservation Officer, which is usually smaller than the overall study area, and is specific to potential impacts to historic and archaeological resources.

Bioassays - Test used to evaluate the relative potency of a chemical by comparing its effect on living organisms with the effect of a standard preparation on the same type of organism. Bioassay and toxicity are not the same.

DNL - The 24-hour average noise level with a 10 dB penalty added between the hours of 10 p.m. and 7 a.m.

Equivalent Sound Level (L_{eq}) - The average sound level over a 24-hour period with noise events occurring between the hours of 2200 and 0700 subject to a penalty of 10 decibels.

Decibel (dB) - A unit of noise level representing a relative quantity. This reference value is a sound pressure of 20 micronewtons per square meter.

Entrainment - A process whereby particles and small organisms are pulled along by a current in water; often used in reference to small organisms being pulled into the intake structures of power plants and other water intakes.

Essential Fish Habitat - Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Level of Service - A measure of roadway congestion ranging from LOS A (least congested) to LOS F (most congested). LOS is one of the most common terms used to describe how "good" or how "bad" traffic is projected to be.

Mitigation Measures - Controls which are used to lessen the environmental impacts of a proposed development action.

Noise Contour - An outline graphically displayed on a plan or map identifying the limits of an area exposed to a specific sound level (example: 65 dBA noise contour).

Twenty-Foot Equivalent Unit (TEU) - A standardized measure of cargo volume based on the equivalent volume found in a 20-foot container.

Throughput - The amount of cargo that can be moved through a port facility in a specific amount of time using conventional equipment and best practical management practices.

USACE or “the Corps” - The United States Army Corps of Engineers, Charleston District.

Waters of the United States - This term means: (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (2) All interstate waters including

interstate wetlands; (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(iii) Which are used or could be used for industrial purposes by industries in interstate commerce.

(4) All impoundments of waters otherwise defined as waters of the United States under this definition; (5) Tributaries of waters identified in paragraphs (l)-(4) of this section; (6) The territorial sea; (7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s) (l)-(6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR § 423.11 (m) which also meet the criteria of this definition) are not waters of the United States. (t) The term "wetlands" means those areas that are inundated or saturated by surface or ground water 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. Wetlands generally include swamps, marshes, bogs and similar areas.

10.0 LIST OF PREPARERS

This section identifies individuals who participated in the preparation of this EIS for the Proposed Marine Container Terminal at the Charleston Naval Complex. The U.S. Army Corps of Engineers, Charleston District, and the Federal Highways Administration are the lead and cooperating agencies, respectively, for this project. The firm, Applied Technology & Management, Inc. and their sub-contractors, served as a consultant on this EIS.

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11.0 RECIPIENTS

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Advisory Council on Historic Preservation

Bureau of Land Management

Environmental Protection Agency, Region 4

Environmental Protection Agency, Office of Federal Activities, EIS Filing Section

Federal Emergency Management Administration (FEMA)

Federal Highway Administration (FHWA)

National Oceanic and Atmospheric Administration (NOAA)

National Marine Fisheries Service (NMFS)

National Parks Service-Regional (NPS)

National Parks Service-Fort Sumter (NPS)

South Atlantic Fishery Management Council

Surface Transportation Board (STB)

United States Army Corps of Engineers, Charleston District

United States Coast Guard, Group Charleston (USCG)

United States Department of Energy (DOE)

United States Department of Housing and Urban Development (HUD)

United States Department of Interior, Fish and Wildlife Service (FWS)

United States Department of Interior, Office of Environmental Policy and Compliance (OEPC)

STATE AGENCIES

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South Carolina Department of Health and Environmental Control, Tri-County EQC

South Carolina Department of Health and Environmental Control Office of Ocean and Coastal Resource Management

South Carolina Department of Natural Resources

South Carolina Department of Transportation

South Carolina Department of Achieves and History, State Historic Preservation Office

South Carolina State Clearinghouse

South Carolina State Ports Authority

LOCAL GOVERNMENTS

Berkeley County

Berkeley County, Department of Public Works

Berkeley-Dorchester-Dorchester Council of Governments

Charleston County

Charleston County, Planning Department

City of Charleston

City of Charleston, Planning Department

City of North Charleston

City of North Charleston, Planning Department

Dorchester County

Dorchester County, Planning Department

Town of Mount Pleasant

LIBRARIES

Charleston County Library, Main Branch

Charleston County Library, Cooper River Memorial (North Charleston, Rivers Avenue)

Charleston County Library, John L. Dart (Charleston, King Street)

Dorchester County Library, Summerville Branch

Mount Pleasant Regional Library

Otranto Road Regional Library (North Charleston, near Goose Creek)

COMMUNITY CENTERS / RESOURCE CENTERS

Sterett Hall, Charleston Naval Complex

Charleston City Fire Station 18, Daniel Island

Gethsemani Community Center

COMMUNITY ORGANIZATIONS

City of North Charleston, Citizens Advisory Council

South Carolina Coastal Conservation League

12.0 INDEX

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