

Offshore Wind Ports: Cumulative Impacts Study



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Offshore Wind Ports: Cumulative Impacts Study

Final Report

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Abstract

New York State's 2019 Climate Leadership and Community Protection Act (Climate Act) sets aggressive clean energy and climate targets for New York State (State), which includes the installation of at least 9,000 megawatts (MW) of offshore wind (OSW) energy by 2035. The New York State Energy Research and Development Authority (NYSERDA) seeks to advance the cost-effective and responsible development of OSW to meet the Climate Act's 2035 OSW energy target.

Currently, five New York State ports have been identified to support the five awarded New York State OSW farm projects. The five currently awarded New York State OSW farm projects would produce approximately 4,300 MW, which will require additional OSW farm solicitations and additional port facilities to meet the State's 2035 OSW 9,000 MW energy target. According to the *NYSERDA 9 GW Port Uses and Navigational Assessment Report (2022)*, the collective OSW infrastructure output of 12 ports would be an optimal scenario to achieve the State's 9,000 MW OSW energy target by 2035. Based on this result, this study developed three alternatives within New York State: Planned Alternative (comprised of five ports that were awarded OSW farms), Partial-Build Alternative (assuming eight ports) and Full-Build Alternative (assuming 12 ports).

Using desktop and published data, the purpose of this study is to: (1) identify project-related and cumulative environmental, socioeconomic, and navigational effects of the study alternatives; (2) compare the potential benefits and adverse effects of the study alternatives; and (3) assist with planning for the current and upcoming OSW energy projects. The intent is to facilitate a common understanding of the potential impacts of the industry as a whole within the State and the types of regulatory compliance requirements associated with individual site development to streamline and accelerate the applicable environmental review and permitting processes for future development.

This study concluded that the Full-Build Alternative would not only meet or potentially exceed the 2035 OSW energy target, but the cumulative environmental, socioeconomic and navigation impacts would be minimized and mitigated to acceptable levels through responsible port development and well-coordinated State and federal environmental review and permitting processes. The socioeconomic benefits would be maximized, such as improved public health, air quality, jobs, and reducing greenhouse gas (GHG) emissions affecting climate change. By undertaking proper environmental review and permitting processes at proposed OSW ports, the potential adverse cumulative environmental impacts would be addressed in a responsible manner and ensure that viable OSW ports would be used to fully support and implement the State's OSW program on schedule.

Keywords

Planned Alternative, Partial-Build Alternative, Full-Build Alternative, offshore wind ports, offshore wind farms, sturgeon species, submerged aquatic vegetation, greenhouse gas, Climate Act, crew transfer vessels, service operations vessel

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Acronyms and Abbreviations

AC	Alternating current
AIS	Automated identification systems
BACT	Best Available Control Technology
BMPs	Best Management Practices
BOEM	Bureau of Ocean Energy Management
BPMs	Best Practice Measures
BUD	Beneficial Use Determinations
CEHA	Coastal Erosion Hazard Areas
CERP	Community and Environmental Response Plan
CH ₄	Methane
Climate Act	Climate Leadership and Community Protection Act
CO	Carbon monoxide
CO ₂	Carbon dioxide
CRIS	Cultural Resource Information System
CRRA	Climate Risk and Resiliency Act
CTV	Crew transfer vessels
cy	Cubic yards
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	United States Environmental Protection Agency
ESAs	Environmental Site Assessments
ESA	Endangered Species Act
FDNY	New York City Fire Department
FEMA	Federal Emergency Management Agency
GBF	Gravity-based foundation
GBS	Gravity-based structure
GHG	Greenhouse Gas
HRSNOC	Hudson River Safety, Navigation, and Operations Committee
HVAC	High-voltage alternating-current
HVDC	High-voltage direct-current
IPaC	Information for Planning and Conservation
LAER	Lowest Achievable Emission Rate
LIRR	Long Island Rail Road
LiMWA	Limit of Moderate Wave Action
LNM	Local Notices to Mariners
MLLW	Mean Lower Low Water

MTA	Metropolitan Transit Authority
MW	Megawatts
N ₂ O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHP	Natural Heritage Program
NMFS	National Marine Fisheries Service
NO ₂	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NO _x	Nitrogen Oxides
NRHP	National Register of Historic Places
NYC	New York City
NYCEDC	New York City of Economic Development Corporation
NYCWRP	New York City Waterfront Revitalization Program
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
NYSERDA	New York State Energy Research and Development Authority
NYSHPO	New York State Historic Preservation Office
NYSOPRHP	New York State's Office of Parks, Recreation and Historic Preservation
O&M	Operations and Maintenance
OSS	Offshore Substation
OSW	Offshore wind
PAH	Polycyclic aromatic hydrocarbons
PAMT	Port Authority Marine Terminal
PANYNJ	Port Authority of New York and New Jersey
PAWSA	Ports and Waterways Safety Assessment
PCB	Polychlorinated biphenyls
PM _{2.5}	Particulate matter with a diameter of 2.5 microns or less
RAMP	Remedial Action Monitoring Plan
RAWP	Remedial Action Work Plan
POWI	Port of Coeymans Offshore Wind Infrastructure
REC	Recognized Ecological Complexes
RIR	Remedial Investigation Report
RISE	Resilience Implementation and Strategic Enhancements
RIWP	Remedial Investigation Work Plan
SASS	Scenic Areas of Statewide Significance
SAV	Submerged aquatic vegetation
SBMT	South Brooklyn Marine Terminal

SCFWH	Significant Coastal Fish and Wildlife Habitat
SEQRA	State Environmental Quality Act
SF	Square foot
SFRMG	State Flood Risk Management Guidance
SIP	State Implementations Plans
SMP	Site Management Plan
SNWA	Special Natural Waterfront Area
SO ₂	Sulfur Dioxide
SO	Sulfur Oxides
SOV	Service operations vessel
SPCC	Spill Prevention, Control, and Countermeasures
SPDES	State Pollutant Discharge Elimination System
SPMT	Self-propelled modular transporters
SRHP	State Register of Historic Places
SWPPP	Stormwater Pollution Prevention Plan
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VHF	Very high frequency
VTS	New York Vessel Traffic Service
WTG	Wind Turbine Generator

Summary

New York State's 2019 Climate Leadership and Community Protection Act (Climate Act) sets aggressive clean energy and other climate directives for the State, which includes the installation of at least 9,000 megawatts (MW) of offshore wind (OSW) energy by 2035. As the State authority charged with implementing the State's OSW energy target by 2035, the New York State Energy Research and Development Authority (NYSERDA) seeks to advance the cost-effective and responsible development of OSW energy to serve New Yorkers in a way that fosters the long-term sustainability of the industry, facilitates regional collaboration, and spurs innovation and economic opportunities.

Currently, there are five New York State ports that are assumed to support the awarded New York State OSW farm projects: Port of Albany, Port of Coeymans, South Brooklyn Marine Terminal (SBMT), Port Jefferson and Port of Montauk. The five currently awarded New York State OSW farm projects would produce approximately 4,300 MW, which will require additional OSW farm solicitations to meet the State's 2035 OSW 9,000 MW energy target. The five awarded OSW farm projects are in different stages of project development and environmental review at the time of this publication. Published environmental impact statements (EISs) and permitting information of the awarded farm projects and ports, and other desktop sources have been used to support the study.

The Offshore Wind Ports Cumulative Impacts Study evaluates the socioeconomic, navigational, and environmental effects of three alternatives for the port development that would be required to support New York State's OSW farms:

- Planned Alternative, which comprises the ports that are part of the State's five awarded OSW farms (i.e., the No Action Alternative).
- Partial-Build Alternative, which assumes an additional three ports would be constructed in New York State for a total of eight ports.
- Full-Build Alternative, which assumes the same sites as the Partial-Build Alternative with an additional four ports for a total of 12 ports¹ built in the State.

The purpose of the study is to (1) identify project-related and cumulative environmental, socioeconomic, and navigational effects of the study alternatives; (2) compare the potential benefits and adverse effects of the study alternatives; and (3) assist with planning for the current and upcoming OSW energy projects.

The intent is to facilitate a common understanding of the potential impacts of the industry as a whole within the State and the types of regulatory compliance requirements associated with individual site development to streamline and accelerate the applicable environmental review and permitting processes for future development. The following sections:

- Describe the potential adverse effects of development for each of the 12 port sites that comprise the study alternatives (since the planned and Partial-Build Alternatives are subsets of the Full-Build Alternative) and project commitments and mitigation measures that reduce or avoid adverse effects.
- Describe the potential adverse cumulative effects of developing all port sites simultaneously (as a worst-case scenario of the Full-Build Alternative).
- Provides a comparison of the benefits and adverse effects of the study alternatives.

S.1 Potential Adverse Effects of Port Development

A desktop environmental screening of the 12 individual port sites that comprise the study alternatives was completed. Development of these ports have the potential for adverse effects on natural resources and other resource areas that primarily would be adequately minimized or mitigated through the use of standard Best Management Practices (BMPs) and strict adherence to regulatory permit conditions. Potential environmental effects of site development at the 12 sites are summarized below.

S.1.1 Land Use Compatibility

Strategic waterfront locations have been selected to develop the port facilities, and only three of the sites would involve the creation of a new port facility using vacant or undeveloped property. Port operations would be compatible with existing nearby land use and in compliance with zoning at all 12 sites. Each development site would require site plan and local town permitting approvals as well as federal coastal consistency concurrences from New York State Department of State (NYSDOS), potentially by incorporating design and operational specifications, if required.

S.1.2 Transportation Access and Mobility

Each port site would have efficient upland transportation access from regional highways with only minor site access improvements at a few sites. One site would include a short rail spur, a rail bridge and road bridge to the site. Traffic Management Plans would be prepared in coordination with the local municipalities and the Department of Transportation (DOT) to direct truck routes and address potential traffic congestion both during construction and operation.

S.1.3 Navigational Assessment

Each port site has efficient vessel access, adequate channel depths and viable navigation routes to OSW farms, assuming adequate dredging is performed and permitted. Significant dredging would be required at new port locations. Vessel traffic would be coordinated with and managed by United States Coast Guard's Vessel Traffic Service (VTS) and active communication with the maritime community, including the Maritime Association of the Port of New York and New Jersey Harbor Safety, Navigation, and Operations Committee.

S.1.4 Environmental Justice

Three quarters of the port sites have environmental justice (EJ) communities present in the vicinity of the ports. These EJ communities may experience traffic, air quality, and noise impacts particularly along truck routes, similar to non-EJ communities in the vicinity. Each port site would be required to analyze potential impacts to EJ communities and disadvantaged communities in accordance with State (New York State Department of Environmental Conservation, Commissioner Policy 29 and Section 7(3) of the Climate Act) and/or federal (Executive Order [EO] 12898) criteria to identify any disproportionately high and adverse effects on EJ populations, conduct public outreach and incorporate measures to avoid, minimize, and mitigate impacts. For example, at the Port of Albany, the town is requiring truck routes that avoid EJ neighborhoods to eliminate the potential for air quality, traffic, and noise impacts.

S.1.5 Terrestrial Biological Resources

Potential protected species and habitat, ranging from bats, shorebirds, amphibians, insects and/or plants may be present at a number of sites. United States Army Corps of Engineers (USACE) Section 10/404 Permits and New York State Department of Environmental Conservation (NYSDEC) Tidal or Freshwater Wetlands, and/or Protection of Waters Permits would be required at each site, at a minimum, and potentially NYSDEC Incidental Take Permits, which would address impacts to protected species. In particular, permits may require seasonal work restrictions, such as avoiding the shorebird nesting and fledging seasons, turtle nesting season, and clearing trees during the bat hibernation season; and/or requirements for mitigating impacts to protected species habitat through Net Conservation Benefit Projects.

S.1.6 Aquatic Biological Resources

S.1.6.1 *Wetlands/Open Waters*

It is estimated that the Full-Build Alternative may result in impacts totaling an estimated 80 acres of dredging to benthic habitat, approximately 40 acres of fill to tidal wetlands, and approximately five acres of freshwater wetland. Impacts to at least two mapped submerged aquatic vegetation (SAV) complexes, one freshwater mussel bed, two Significant Coastal Fish and Wildlife Habitat (SCFWH) tidal creek complexes and two Recognized Ecological Complexes (RECs) within the aggregated study area are anticipated. Temporary wetland and water quality impacts can be minimized through the implementation of permit-required containment measures, such as silt curtains, sheeting, cofferdams, floating containment booms, soil erosion and stormwater runoff controls. Depending on the level of sediment contamination, dredged sediments could be drained and reused on site or other locations with approved Beneficial Use Determinations (BUDs) from NYSDEC.

As part of the applicable USACE Section 10/404 Permits, NYSDEC Tidal Wetlands/Freshwater Wetlands/Protection of Waters Permit processes, the regulatory agencies would require tailored benthic and wetland mitigation to compensate for impacts per wetland type. The loss of benthic habitat, freshwater wetlands, and tidal wetlands from the ports would require a demonstration of wetland impact avoidance and minimization, prior to any agency review and concurrence with mitigation packages. Dredged sediment is anticipated to be permanently removed from the site. Benthic habitat impacts are anticipated to be temporary, as the benthic communities are expected to recolonize the area over time without a significant change in post-dredge depth. Mitigation measures required by the USACE and NYSDEC permits may include wetland restoration, wetland creation, wetland enhancement, wetland bank credit purchases and acceptable in-lieu fee programs (if available). Within the Hudson Valley Region and coastal New York State, only one wetland mitigation bank is currently authorized to issue mitigation credits to projects in the New York City area. Individual mitigation plans would need to account for losses of specific wetland types and meet USACE and NYSDEC requirements.

S.1.6.2 *Species and Habitat*

Impacts to at least two mapped SAV complexes and one freshwater mussel bed are anticipated. Prior to dredging, the SAV would be transplanted to neighboring SAV beds to avoid impacts and a freshwater mussel bed would be relocated offsite. Two ports just south of Albany would have impacts to Significant

Coastal Fish and Wildlife Habitat (SCFWH) tidal creek complexes and two ports on western Staten Island would have impacts to Recognized Ecological Complexes (RECs)—these unique wetland complexes provide important habitat for waterfowl, amphibians, fish, and migratory birds. Proposed in-water construction, including dredging, pile installation, shoreline stabilization would require USACE Section 10/404 Permits, NYSDEC Tidal Wetlands/Freshwater Wetlands/Protection of Waters Permits, and National Marine Fisheries Service (NMFS) approvals, which would address impacts to sensitive aquatic species, particularly to sturgeon and Essential Fish Habitat (EFH) species. In addition, NYSDEC Incidental Take Permits may be necessary for impacts to threatened or endangered species, such as Atlantic and Shortnose Sturgeon.

Construction activities would cause potential disruptions of fisheries during all life cycles, including during migration, foraging (feeding) and/or spawning seasons. The federal and State permits would require dredging to occur within a seasonal work window to avoid sensitive migration, foraging and/or spawning seasons, and include sediment containment measures (silt curtains, closed clamshell, etc.) to reduce EFH and sturgeon species impacts. To minimize pile driving underwater noise impacts, the federal and State permits may require underwater noise control measures such as drilled shaft pile installation, vibratory pile installation, and/or soft-start procedures.

Assuming an increase of vessel traffic at each port, there would be an increased risk of vessel strikes of sturgeon species, depending on vessel drafts, propeller depths, vessel speeds, width of river, and temporal and spatial exposure to sturgeon species. Deeper drafts of loaded work barges and higher speeds of crew transfer vessels (CTV) present higher risks for vessel strikes; however, based on similar projects and studies, cumulative adverse effects to sturgeon species populations are not anticipated, but would be monitored by NYSDEC Part 182 Incidental Take Permits. Implementing slow speeds for project vessels within the port vicinity would be an important mitigation measure to reduce the risk of sturgeon strike. Implementing fisheries seasonal work window restrictions, proper construction BMP techniques and other vessel mitigation (operating at slower speeds outside the navigation channel) impacts to the sturgeon species can be minimized. Responsible port construction and operations should follow strict adherence to federal and State permit conditions that address the avoidance, minimization, and mitigation of potential impacts to sturgeon and EFH species.

S.1.7 Cultural Resources

Most of the port sites are located within mapped archaeologically sensitive areas, which is typical of shoreline areas. Upland ground disturbances and dredging may disturb potential archaeological resources, and the New York State Historic Preservation Office (NYSHPO) may require further investigations to determine whether significant resources are present. At least three sites are located within the vicinity of a known historic site of Native American significance, requiring further consultation with Native American tribes/nations and other consulting parties to determine if adverse effects would occur from the project(s). Specifically, on the Hudson River, while final approvals have not been issued, it appears there may be unavoidable and unmitigable direct impacts to Papscanee Island (significant Native American site) from the NYS Wind Port and unavoidable and unmitigable visual impacts (views) from Papscanee Island and Schodack Island (both significant Native American sites). These would occur during fabrication of large OSW components at the Port of Coeymans and Port of Albany. NYSHPO consultation would be required at all sites to address direct and indirect effects. Memoranda of Agreements (MOA) or Letters of Resolution (LOR) may also be necessary to document mitigation commitments. Measures adopted by OSW ports have included: avoidance of archaeological resources by siting project components in existing right-of-way (ROW) and previously disturbed areas; committing to having an archaeologist on site to monitor during ground disturbance if required by NYSHPO; and the development and implementation of an Unanticipated Discoveries Plan, which outlines the procedures to follow if archaeological materials or human remains are discovered.

S.1.8 Community Character

The development of the port sites is not anticipated to adversely impact the broad elements of community character, including land use or development patterns, population growth and density, regional socioeconomics. New ports sites assumed in this study are largely compatible with existing waterfront land use and zoning. Temporary traffic, noise, air quality and visual effects would occur, particularly during port construction and manufacturing and staging OSW components. Local, State, or federal entities may require mitigation measures to be implemented as part of the approval process that would require mitigation measures to be implemented during construction. As a key community benefit, significant job opportunities would be created, and the local economy would be stimulated at each port site.

S.1.9 Hazardous Materials

Development of the port sites would disturb contaminated fill and sediments from former port operations and/or other past use and in-water contamination. Dredging and in-water construction in the Hudson River would likely disturb known polychlorinated biphenyls (PCB) contaminated sediments. Half of the sites may demolish structures with potentially hazardous building materials (e.g., asbestos). As part of environmental review and permitting, NYSDEC and other regulatory authorities would require proper site investigations as well as management and disposal plans to mitigate potential effects to the environment and human health, during construction and operations at applicable port sites.

S.1.10 Floodplains and Resiliency

All of the port sites are within 100-year floodplains and adjacent to floodways. To address potential flooding, the site designs would be required to elevate certain facilities or equipment above design flood elevations and/or reinforce infrastructure to meet (1) Federal Emergency Management Agency (FEMA) and NYSDEC floodplain design guidelines (accounting for sea-level rise, wave action, and floodways), (2) Climate Change Adaptation Guidance on Waterfront Revitalization Program Policy for ports in New York City, and (3) other local town floodplain development permit requirements. The NYSDOS Resilience Implementation and Strategic Enhancements (RISE) Local Assessment Tool should be referenced to incorporate resilience principles and achieve co-benefits from waterfront development, as possible. NYSDOS Office of Planning, Development, and Community Infrastructure may also be consulted to support coastal flood resiliency planning.

S.1.11 Noise

Three quarters of the sites have a residential area in the vicinity that may experience noise, particularly truck-related noise during construction activities. Most OSW ports are sited on an active port in an industrial area with high-ambient noise levels. Noise impacts would be mitigated by noise controls and best practices in accordance with noise mitigation plans developed in accordance with NYSDEC Assessing and Mitigating Noise Impacts Program Policy, local noise ordinances, and contractual requirements. Construction noise also includes underwater acoustic impacts to marine species from impact devices, such as pile driving steel piles, etc. To minimize pile driving underwater noise impacts to marine species, the federal and State permits may require underwater noise control measures such as drilled shaft pile installation, vibratory pile installation, and/or soft-start procedures. Once the

operations and maintenance (O&M) phase of the port is underway, the noise levels would drop substantially, especially at OSW ports with service operations vessel (SOV) or smaller crew transfer vessel (CTV) support. However, OSW ports that would continually have manufacturing, staging, or other heavy OSW operations, significant noise impacts may continue, requiring ongoing noise controls and mitigation measures.

S.1.12 Air Quality and Greenhouse Gases

Temporary exhaust emissions from marine vessels, on-vessel equipment, onshore, road and non-road vehicles, and equipment powered by stationary engines (e.g., generators) would occur during construction at the OSW port sites. Airborne particulates would increase as dust is raised by construction vehicles. Once the O&M phase of the port is underway, the exhaust emissions would drop substantially at OSW ports with SOV or CTV support. However, OSW ports that would continually have manufacturing, staging, or other heavy OSW operations, air pollution would continue, requiring ongoing air quality controls and mitigation measures. Air pollution and greenhouse gas (GHG) emissions would be controlled by use of low-sulfur fuels, limiting engine idling, use of electric tools, use of vessels that meet Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER) requirements. For certain stationary air emission sources (concrete batch plants, spray paint booths, other manufacturing) NYSDEC Air Permitting would be required to control emissions as well. As an example, the construction activities in one of the New York City ports has been assessed and would not have the potential to exceed the General Conformity thresholds for National Ambient Air Quality Standards (NAAQS) nonattainment or maintenance areas.² Operational impacts from port development would not be expected to result from program implementation.

S.2 Potential Adverse Cumulative Effects of the Full-Build Alternative

Cumulative impacts can occur when multiple actions affect the same environmental resource simultaneously or sequentially. Based on OSW ports supply demand modeling effort,³ it was confirmed that 12 port sites in New York State would be a robust and optimal scenario to produce the necessary OSW port output to fully achieve and potentially exceed the State's 2035 OSW energy target, when compared to the Planned Alternative and the Partial-Build Alternative. As a result, this study qualitatively evaluated the concurrent development of a Full-Build Alternative with 12 port sites, as a worst-case scenario, to determine the potential for significant cumulative effects. The port sites are geographically distributed across three New York State regions (see Figure 2), the Capital Region

(Upper Hudson River), the NY Harbor and Long Island with sufficient distance in between so that most localized effects at any one site would not overlap with the localized effects of another site or accumulate over time. As a result, there is no potential for cumulative adverse impacts to land-use compatibility, Environmental Justice (EJ) communities, vehicular traffic, community character, hazardous materials, localized air quality, or noise either during operations or construction of the port sites. Other resource areas with potential cumulative adverse impacts are described below.

Potential cumulative impacts include:

- **Land-Use Patterns and Socioeconomic Conditions:** Three ports would be new developments within vacant land; however, the sites are zoned for industrial/manufacturing uses and are located away from sensitive land uses (residences, schools, etc.). Nine of the port sites would be redeveloped with existing ports with compatible land use and zoning. Collectively, the OSW ports would not be expected to adversely impact the broad elements of community character, population growth, or density in New York State regions. The program would not alter or accelerate development patterns, and real estate market conditions would be expected to remain similar to today. As a result, adverse cumulative impacts on land-use patterns and socioeconomic conditions are not expected result from program implementation.
- **Vessel Navigation:** Collectively, the Full-Build Alternative is estimated to result in a cumulative increase of 4% in vessel traffic at the southern outlet of NY Harbor (Ambrose Channel),⁴ assuming all of the projected vessels from the OSW ports operating concurrently. Given the large volume of traffic and the wide variability of traffic in any given day, the increase in traffic associated with the OSW ports is small. For example, two of larger manufacturing OSW ports (Port of Coeymans and Port of Albany) on the Hudson River would both add approximately two to four round barge trips per week and one vessel per month for the delivery of inbound materials, which would not represent a significant increase in vessel traffic when compared to the annual commercial traffic of 3,000 barges and vessels, exclusive of recreational boating traffic,⁵ that is currently occurring on the Hudson River. Overall, the quantity of OSW vessel traffic would not pose additional risk to vessel safety to existing waterways in New York State. The use of barges and vessels for the delivery and shipping of materials/products would reduce the need for trucks, further minimizing the impact on the surrounding roadway network. Overall, the quantity of OSW vessel traffic would not pose additional risk to vessel safety in existing waterways in the State.⁶

- **Environmental Justice:** Three quarters of the port sites have EJ communities present in the vicinity which may experience traffic, air quality, and noise impacts adjacent to the port sites and also along truck routes, similar to non-EJ communities in the vicinity. Each port site would be required to analyze potential impacts to EJ communities and disadvantaged communities in accordance with NYSDEC Commissioner Policy 29 and Section 7(3) of the Climate Act and/or federal EO 12898 criteria to identify any disproportionately high and adverse effects on EJ populations. The port sites would also be required to conduct public outreach and incorporate measures to avoid, minimize, and mitigate impacts. These port-related impacts are not anticipated to create cumulative adverse impacts to EJ communities, and the regulatory processes requiring mitigation measures would be implemented to protect the quality of living in the neighborhood. For example, at the Port of Albany, the town is requiring truck routes that avoid EJ neighborhoods to eliminate the potential for air quality, traffic, and noise impacts.

To actively support EJ communities and provide cumulative economic benefits at the program level, the State has number of programs and tools in place. NYSERDA's procurement of Offshore Wind Renewable Energy Credits (ORECs) will assign 20% of the score of each project proposal to economic benefits, including benefits to disadvantaged communities, creation of workforce training opportunities, and job creation. The Climate Justice Working Group established by the Climate Act to identify disadvantaged communities and to help ensure that the benefits of climate change responses accrue to these disadvantaged communities. The State is also committed to requiring developers to pay workers a prevailing wage and to utilize project labor agreements. New York State has invested \$20 million to establish the Offshore Wind Training Institute in partnership with NYSERDA, State University of New York, Stony Brook, and Farmingdale to train a new workforce for the OSW industry at the affordable SUNY institutions.

In addition, the New York/New Jersey Bight Regional Working Group on Supply Chain Development will be continually coordinating to meet mutual regional OSW energy targets related to enhancing the domestic supply chain and deliver benefits and economic opportunities to underserved, disadvantaged, and overburdened communities. In New York City, the Offshore Wind NYC program would: (1) direct 40% of job and investment benefits to women, minorities, and EJ communities; (2) bring local jobs and environmental benefits to historically disadvantaged communities along the waterfront; (3) provide investments in professional training programs to create pipelines to OSW jobs. The OSW port projects would also be required to undertake EJ assessments and implement applicable avoidance, minimization, and mitigation measures to address potential impacts. Overall, thousands of construction and O&M jobs would be generated in close proximity to EJ communities along the State's waterfront, and the resulting regional benefits of job creation and sustainable employment would help offset the effects of port construction and operations, and avoid potential cumulative impacts to EJ communities.

- **Terrestrial Biological Resources:** Impacts to potential habitat for protected bats, shorebirds, amphibians, insects and/or plant habitats would occur. Impacts to terrestrial wildlife would be partially mitigated by repurposing existing waterfront facilities or using previously disturbed sites to the extent possible. Impacts to wildlife may consist of temporary displacement, habitat loss, and direct mortality. Direct mortality is most likely with less mobile species such as reptiles and amphibians and nesting birds. Habitat loss can cause more mobile species, such as birds and mammals, to seek suitable habitat adjacent to the port facility. Some species may be temporarily displaced during the construction phase but return to the site as noise levels decrease during the operational phases of less disruptive port facilities (CTVs, SOVs, etc.).

Cumulative impacts may be synergistic—where the combined effect of multiple impacts at other ports may be greater than the sum of individual impacts alone. However, the port sites would undertake environmental review and USACE and NYSDEC permitting processes to identify (1) avoidance, (2) minimization and mitigation measures to reduce terrestrial species and habitat impacts to the best extent practicable. In accordance with the required permits, effective mitigation measures would be implemented, including clearing trees during the bat hibernation season; avoiding construction during bird nesting/fledging seasons; installing anti-perching devices to discourage migratory bird landings; and/or mitigating impacts to protected species habitat through Net Conservation Benefit Projects to help enhance species recovery or overall population. In cases where potential construction-related impacts to a specific species cannot be fully mitigated, NYSDEC and federal agencies may require (1) incidental take permits and (2) the monitoring and reporting of species takes or injuries to ensure the regional stability of populations. Overall, the collective impacts (vegetation clearing) of the Full-Build Alternative would not be expected to be of a scale to cause broad cumulative impacts that would imperil or critically impact terrestrial species in the State's coastal environment, especially with the successful implementation of permit requirements, including seasonal work windows, monitoring of incidental take, and the implementation of habitat mitigation, such as Net Conservation Benefit mitigation.

- **Aquatic Biological Resources:**

- *Wetlands/Open Waters*

The Full-Build Alternative may result in an estimated cumulative loss of 80 acres of dredging impacts to benthic habitat, approximately 40 acres of fill impacts to tidal and tidally influenced wetlands/open waters, and approximately five acres of emergent freshwater wetland impacts. Impacts to at least two mapped SAV complexes, two SCFWH tidal creek complexes, one freshwater mussel bed and two RECs with emergent, scrub-shrub and forested estuarine and marine wetlands within the aggregated study area are anticipated. Important functions of these tidal and tidally influenced wetlands would be lost in the Capital Region, NY Harbor and Long Island coastal areas, including tidal surge buffers; protection from shoreline erosion; retention of excess nutrients; vital forage habitat for clams, crabs, and juvenile fish; and providing shelter and nesting sites for migratory

waterfowl. Similarly, the permanent loss of four acres freshwater wetlands would lose freshwater wetland functional values, such as fluvial floodwater retention, water quality filtration, and fish and wildlife habitat. Dredged sediment impacts would be a significant marine species habitat impact; however, these impacts are anticipated to be temporary, as benthic communities have been shown to recolonize the area over time when the dredging depths are not a substantial change. The cumulative wetland impacts from OSW ports would represent significant a loss.

However, mitigation measures would be required by the USACE and NYSDEC permits, including wetland restoration, wetland creation, wetland enhancement, wetland bank credit purchases and acceptable in-lieu fee programs (where appropriate). Any SAV or shellfish beds would be required to be relocated prior to dredging. To address wetlands loss, the wetland mitigation plans would need to account for losses of specific wetland types and functions, but those lost wetland types and functions would be relocated away from the port site (e.g., flood attenuation and habitat). Climate change and resultant (and modeled) sea-level rise should be factored into mitigation site planning (grading, planting lists, community types) to ensure that proposed wetland communities would persist over time. Responsible mitigation plans coordinated with federal and State regulatory agencies, such as Net Conservation Benefit projects, would be the goal of replacing wetland functions and values in the vicinity, especially for threatened and endangered species.

- *Habitat and Species*

Wetland losses affecting aquatic biological resources from dredging and fill activities of the Full-Build Alternative would likely have a cumulative impact on protected fisheries, shellfish, wildlife, and aquatic plant species. Cumulative losses of spawning, foraging, overwintering and juvenile habitat for sturgeon and other Essential Fish Habitat (EFH) species would occur, particularly in the Hudson River. Benthic communities that are impacted by dredging would likely recolonize following disturbance. Benthic habitat use, such as foraging and spawning, may be impacted if the depth is changed significantly.

Proposed in-water construction, including dredging, pile installation, and shoreline stabilization likely requires USACE Section 10/404 Permits, NYSDEC Tidal and/or Freshwater Wetlands/Protection of Waters Permits, Part 182 and National Marine Fisheries Service (NMFS) approvals to address impacts to wetlands and other waters of the United States (U.S.) as well as sensitive aquatic species and habitat, particularly to sturgeon and EFH-managed species. Permit requirements would be designed to avoid and minimize impacts to aquatic biological resources and may require mitigation (e.g., restoration or creation of habitat). Some port sites would require additional mitigation measures to account for site-specific resources present prior to dredging or installing new infrastructure, such as removing and transplanting the SAV beds or freshwater mussel bed(s) to approved locations offsite.

Cumulative impacts of construction activities would also cause potential disruptions of fisheries during all life cycles, including during migration, foraging (feeding) and/or spawning seasons. The federal and State permits would require dredging to occur within a seasonal work window typically to avoid sensitive migration, foraging and/or spawning seasons, and include sediment containment measures (silt curtains, closed clamshell, etc.) to reduce EFH and sturgeon species impacts. To minimize pile driving-related underwater noise impacts to sturgeon, the federal and State permits may require underwater noise control measures such as drilled shaft pile installation, vibratory pile installation, and/or soft-start procedures. Displaced habitat impacts is an important factor, as sturgeon species are known to return to the same locations for spawning, overwintering, and foraging. Responsible mitigation plans would mitigate habitat loss impacts to protected species through Net Conservation Benefit projects coordinated with the regulatory agencies, which would have the goal of enhancing affected species recovery and overall population growth. USACE and NYSDEC wetland permits would require mitigation plans that would potentially create or restore the wetland habitats; however, the wetland would be displaced and relocated away from the source, most likely.

The cumulative increase in vessel traffic associated with the Full-Build Alternative would also increase the risk of sturgeon mortality, particularly in areas of the Hudson River that overlap with sturgeon spawning areas and vessel traffic. Overall, the Full-Build Alternative is estimated to result in a 4% increase in vessel traffic at the confluence of the Ambrose Channel south of the NY Harbor (gateway to the OSW farms), assuming all of the projected vessels from the OSW ports are operating concurrently. Given the volume of traffic on the Hudson River and NY Harbor, and the wide variability of traffic in any given day, the increase in traffic associated with the OSW ports is relatively low. For example, two of the larger manufacturing OSW ports (Port of Coeymans and Port of Albany) would both add approximately two to four round barge trips per week and one vessel per month for the delivery of inbound materials, which would not represent a significant increase in vessel traffic when compared to the overall commercial traffic of 3,000 barges and vessels annually, exclusive of recreational boating traffic, that is currently occurring on the Hudson River.⁷

It is assumed that increased risk of vessel strikes of sturgeon species would be commensurate with the cumulative 4% increase of vessel traffic from OSW ports at the Ambrose Channel south of NY Harbor. Additional factors increasing the risk of sturgeon strikes are deep vessel drafts from loaded barges, propeller depths of barges, faster speeds of smaller vessels like crew transfer vessels (CTVs), narrow reaches of the Arthur Kill and Hudson River, and additional temporal and spatial exposure to sturgeon species attributed to OSW ports. However, each of the port sites would undertake Section 7 Endangered Species Act (ESA) consultation processes, and USACE and NYSDEC permitting processes to identify avoidance, minimization, and mitigation measures to reduce sturgeon strikes to the best extent practicable. In accordance with the required permits, effective avoidance, and minimization measures would include requiring slow speeds for project vessels in sensitive

sturgeon habitat areas, avoiding sensitive seasonal windows, and other measures such as telemetry monitoring and/or visual monitoring of sturgeon during potentially harmful activities. Ultimately, depending on the anticipated impacts to sturgeon, NYSDEC and federal agencies may require incidental take permits and monitoring and reporting of species takes or injuries to ensure the regional stability of populations. As part of these incidental take permits, mitigation projects may be required to address the direct take of individual sturgeon or the adverse modification or take of habitat that supports essential behaviors of sturgeon. This mitigation may involve the creation or enhancement of benthic habitat for sturgeon away from the port facilities. Overall, the collective potential for sturgeon strikes related to the Full-Build Alternative would not be expected to be of a scale to cause broad cumulative impacts that would imperil or critically impact the species within the State's coastal environment. However, it will be critically important to reduce cumulative adverse impacts to sturgeon and other EFH species by implementing the effective avoidance, minimization, and mitigation measures collectively at each port, including slow vessel speeds, following seasonal work windows, monitoring of incidental take and the implementation of acceptable mitigation plans, including Net Conservation Benefit projects.

- **Cultural Resources:** In the event that adverse effects to archaeological resources would result from port development, cumulative impacts could accrue resulting in the loss of historical resources. Aside from three sites that would affect areas of Native American significance, there is low risk for unmitigable adverse effects. NYSHPO consultation would be required at all sites. Depending on the resources affected, NYSHPO consultations may require engagement with Native American tribes/nations and other consulting parties to review the design and mitigation measures. If adverse effects are identified, the project design would be required to either avoid, minimize and/or mitigate these adverse effects to acceptable terms by NYSHPO and the consulting parties. Cultural resource impacts would be mitigated through commitments, such as monitoring during construction, that would be agreed to in the MOAs with NYSHPO and consulting parties.
- **Hazardous Materials:** The Full-Build Alternative sites would disturb contaminated fill soils and dredging and in-water construction in the upper Hudson River would likely disturb PCB-contaminated sediments. However, as part of environmental review and permitting requirements, the NYSDEC and other regulatory authorities would require additional investigations as well as management and disposal plans. As a result, with the responsible application of regulatory management and disposal mitigation measures, no cumulative effects to the environment and human health during construction and operations are anticipated from the Full-Build Alternative. The clean-up and restoration of brownfield sites to active use would be a regional benefit by reducing the potential for existing contamination to migrate offsite.

- **Floodplains and Resiliency:** Full-Build Alternative sites are within 100-year floodplains and adjacent to floodways. Developments would be designed to meet FEMA, NYSDEC and local floodplain design guidelines to withstand forces from flood waters and function after major flooding events. Port improvements would be required to be designed appropriately to meet federal, State and local design criteria to avoid cumulative flooding impacts locally or on a regional scale.
- **Noise:** Three quarters of the sites have a residential area in the vicinity that may experience port site and truck-related noise during construction activities. During the operational phase, the noise levels would drop substantially in OSW ports limited to SOV and CTV operations. Many OSW ports are sited on an active port in an industrial area with high-ambient noise levels. Noise impacts are a localized effect. These localized noise impacts would be mitigated by noise controls and best practices in accordance with noise mitigation plans developed in accordance with NYSDEC Assessing and Mitigating Noise Impacts Program Policy, local noise ordinances, and contractual requirements. Further, pile-driving and in-water construction would also be subject to USACE and NYSDEC permitting, which would require mitigation methods to reduce the risk of aboveground and underwater noise impacts. Due to the geographic dispersion of OSW port sites, cumulative noise impacts would not occur, even if the port sites are developed concurrently. Noise mitigation plans would be put in place to address noise impacts at the ports.
- **Air Quality and GHG:** Exhaust emissions from marine vessels, trucks, and construction equipment would be mitigated through NYSDEC Permitting and BMPs to reduce emissions. Analyses of one of the ports (South Brooklyn Marine Terminal) in a densely developed area of New York City has confirmed that the port would not exceed the General Conformity thresholds for NAAQS nonattainment or maintenance areas. Further, the short-term emissions of the OSW ports that would occur regionally during construction would be greatly offset by the regional net air pollution reduction (CO₂, methane, PM_{2.5} and other GHG) that would occur once the 9,000 megawatts (MW) of the OSW farms are operational.

S.3 Comparison of the Alternatives

According to the COWI's Regional Ports Supply Demand Model⁸ and related OSW planning research by the State, the collective OSW infrastructure output of 12 ports of the Full-Build Alternative would be the best option to achieve and position New York State to potentially exceed the 9,000 MW OSW energy target by 2035. By comparison, the Planned Alternative and Partial-Build Alternative would still be viable to potentially meet the 9,000 MW OSW target by 2035 and would result in similar, but proportionally less potential environmental and navigation related impacts than the Full-Build Alternative. The Full-Build Alternative would provide the maximum socioeconomic benefits to the State and its residents, including:

- **Public Health Benefits:** The Full-Build Alternative would maximize the reduction in coal and gas-fired power generation pollution emissions by installing 9,000 MW of OSW by 2035 and achieve far greater public health-related socioeconomic benefits. With the Planned Alternative alone, New York State would avoid more than 8.7 million tons of GHG emissions, 1,800 tons of NO_x, 780 tons of SO₂, and 180 tons of PM_{2.5} compared to a business-as-usual scenario without OSW energy. These emissions reductions would nearly double under the Full-Build Alternative. New Yorkers would also save approximately \$4 billion in health costs (respiratory disease, cardiovascular disease, cancer, neurological problems) and, more importantly, avoid hundreds fewer premature deaths under the Build Alternative (in proportion to the Planned Alternative).⁹ The Full-Build Alternative would not only maximize the regional improvement to air quality and reduce harmful public health-related effects, it would also reduce the harmful effects of acid rain.¹⁰
- **Economic Benefits:** The Full-Build Alternative is estimated to support approximately 34,288 job-years during construction followed by 1,309 jobs each year to operate and maintain the OSW energy projects for a total of 32,403 job-years. The OSW projects would also create high-tech, high-quality, long-term job opportunities and up to \$30 billion in economic development. Additional economic benefits would include increased property values and tax revenues, as well as demand for housing. Social and community investment expenditures are expected to support another 1,080 job-years over the life of the projects. By comparison, the Planned Alternative is estimated to support approximately 13,510 job-years during ports renovations and 545 jobs during O&M. Five ports in the State, estimated to generate \$12.1 billion in economic development (Appendix G: Economic Impacts Study).
- **Electricity Rate Benefits:** The Full-Build Alternative provides more affordable energy than fossil fuel-based power generation and maximizes cost-effectiveness of OSW for New York State ratepayers.¹¹
- **Reduced Climate Change Effects:** The Full-Build Alternative would provide a maximum State-wide OSW contribution to reducing greenhouse gas (GHG) emissions that affect the rate of climate change. By operating 9,000 MW of OSW by 2035 and eliminating the equivalent fossil fuel energy GHG emissions contributing to climate change, the reduced emissions would support slowing the rate of climate change. Climate change projections indicate potential sea-level rise of up to 6 feet and increased temperatures between 4° Fahrenheit (F) and 10°F by the year 2100 for the northeastern United States. Constructing the Full-Build Alternative would maximize the State-wide OSW contribution to reducing harmful effects of climate change, including flooding and coastal erosion from sea-level rise and storm surge, as well as extreme heat events and summer droughts.¹²

The Full-Build Alternative would result in greater levels of environmental impacts, but similar to those expected from the Partial-Build Alternative and Planned Alternative, as identified in this Study. The types and degree of impacts identified in the published environmental review documentation for the Planned

Alternative ports would be comparable to the Full-Build Alternative, particularly in relation to issues of concern: wetlands, threatened and endangered species habitat, EFH species, vessel strikes of sturgeon species, cultural resources, traffic, air quality and noise. Measures to mitigate those effects is also expected to be similar, as identified in the Study.

The cumulative impacts of the Study alternatives would be localized or regionally specific, but the overall cumulative impact for port development would be minimal for most resource areas, with the exception of key sensitive resources, including tidal wetlands, sturgeon species and habitat, EFH species and habitat, and cultural resources. Recognizing the potential for cumulative and unmitigable impacts to these important biological resources and cultural resources (Native American sites), it will be imperative for proposed port developments to undertake more focused planning and design efforts coordinated with regulatory agencies to avoid, minimize, and mitigate impacts during the environmental review and regulatory permitting processes.

To proactively anticipate and address cumulative impacts of proposed OSW ports, this Study has identified BMPs and mitigation measures for developers to consider. Environmental review and regulatory permitting would be conducted for port development at the time they are proposed, which would assess, at the site-specific level, all relevant potential environmental impacts. Pre-application meetings and coordination with federal and State regulatory agencies will be very important to identify the potential adverse impacts early in the design process and receive guidance on the best avoidance minimization (BMPs) and mitigation measures. As an additional safeguard to mitigation measures, regulatory agencies may require incidental take limits on protected species and monitoring (noise levels, sturgeon movements, water quality, etc.) of impacts to ensure proper protection of sensitive resources. The federal and State permitting regulatory processes have mechanisms to deal with localized impacts, but cumulative impacts often go beyond those review processes. This situation underscores the importance in developing future BMPs in a more environmentally responsible manner during construction, and operations should be implemented to further reduce any potential for cumulative impacts to occur.

The Full-Build Alternative represents an optimal scenario to not only meet or potentially exceed the 2035 OSW energy target, but as identified in this Study, it will be important for all port developments to proactively address potential adverse impacts early in the environmental review and permitting

processes to minimize the potential for unmitigable and cumulative impacts. Overall, the successful implementation of the Full-Build Alternative would maximize the socioeconomic benefits of the OSW program for New York State residents, such as improved public health, air quality, jobs, and reducing GHG emissions affecting climate change.

By undertaking proper environmental review and permitting processes the potentially adverse environmental impacts would be addressed in a responsible manner and ensure that viable OSW ports would be used to fully support and implement the State's OSW program on schedule. As ports continue to be identified for development to meet or exceed the State's 9GW goal or if future State or regional goals change, this Study could be updated to more adequately reflect the associated cumulative impacts.

Please Note this Disclaimer: *This study's identification and discussion of the potential cumulative impacts are not a substitute for future site-specific analyses of potential environmental impacts for the sites evaluated herein. Environmental review and regulatory permitting would be conducted for future offshore wind energy development and/or transmission projects at the time they are proposed, which would assess, at a site-specific level, all relevant potential environmental impacts. This study's identification and discussion of the potential cumulative impacts of the proposed action do not substitute for future site-specific analyses of potential environmental impacts for particular projects but do provide supporting information.*

1 Introduction

1.1 Overview

New York State's 2019 Climate Leadership and Community Protection Act (Climate Act)¹³ sets aggressive clean energy and climate targets for the State, which includes the installation of 2,400 megawatts (MW) of offshore wind (OSW) by 2030, and at least 9,000 MW of OSW energy by 2035, to achieve zero-emission electricity by 2040. It is also the intent of the NYS Climate Act to manufacture, fabricate, stage, install, operate, and maintain OSW components in the State to maximize economic opportunity for New Yorkers. As the New York State authority charged with implementing the OSW energy target by 2035, the New York State Energy Research and Development Authority (NYSERDA) seeks to advance the cost-effective and responsible development of OSW energy to serve New Yorkers in a way that fosters the long-term sustainability of the industry, facilitates regional collaboration, and spurs innovation and economic opportunities. NYSERDA's core guiding principles are to:

- Maximize cost-effectiveness of OSW for New York State ratepayers.
- Minimize environmental impacts.
- Maintain economic vitality of all ocean users.
- Maximize economic opportunity in New York State.
- Cultivate an OSW innovation ecosystem.
- Create opportunities for transparent stakeholder engagement.
- Foster long-term sustainability of the industry.

NYSERDA is coordinating the environmentally responsible and cost-effective development of OSW energy in support of the NYS Climate Act and is applying a standardized approach to identify and assess project-related and cumulative environmental, socioeconomic, and navigational impacts and benefits at proposed ports to support the buildout of the 2035 OSW 9,000 MW clean energy target. This study analyzes and compares build alternatives of State ports to assess their ability to meet the 2035 OSW clean energy target and their potential environmental impacts. Potential cumulative effects are assessed for the Full-Build Alternative that would meet the 2035 OSW clean energy target. This study was coordinated with two parallel efforts to provide a comprehensive view of the interdependent areas of New York State port usage,¹⁴ including navigational movements resulting from such usage and undersea cable corridors/transmission design approaches associated with the concurrent use of the State's waterways for OSW energy generation.¹⁵

The purpose of this study is to: (1) identify project-related and cumulative environmental, socioeconomic, and navigational effects of the study alternatives; (2) compare the potential benefits and adverse effects of the study Alternatives; and (3) assist with planning for the current and upcoming OSW energy projects. The intent is to facilitate a common understanding of the potential impacts of the industry as a whole in New York State and the types of regulatory compliance requirements associated with individual site development to streamline and accelerate the environmental review processes for future development.

Currently, there are five ports that have been identified to support the awarded New York State OSW farm projects: Port of Albany, Port of Coeymans, South Brooklyn Marine Terminal (SBMT), Port Jefferson, and Port of Montauk. The five currently awarded OSW farm projects would produce approximately 4,300 MW, which will require additional OSW farm solicitations to meet the State's 2035 OSW 9,000 megawatts (MW) energy target. The five awarded OSW projects are in different stages of project development and environmental review. South Fork Wind Farm has completed an environmental review process in accordance with the National Environmental Policy Act (NEPA), the South Fork Wind Farm, and South Fork Export Cable Project (August 2021). On January 18, 2022, the Bureau of Ocean Energy Management (BOEM) approved the Construction and Operations Plan (COP) for the South Fork Wind Farm (SFWF) and South Fork Export Cable Project. And on February 11, 2022, the SFWF started construction. Three other OSW farm projects, Empire Wind (1 and 2) and Sunrise Wind are currently undergoing NEPA review, which combined, assume potential uses of SBMT, Port Jefferson, and Port Montauk. At least two supporting OSW port facilities, the Port of Albany Expansion Project, and Port of Coeymans Offshore Wind Infrastructure (POWI) project, are also undergoing both NEPA and New York State Environmental Quality Review Act (SEQRA) reviews at the time of this study.

The port infrastructure needed to support the production of OSW energy is described in section 2 along with the programmatic assumptions for construction and operation of OSW facilities. Section 3 provides a detailed description of the three alternatives qualitatively evaluated in the study via desk-top research:

- **Planned Alternative**, which includes the five ports currently involved in New York State's five awarded ocean wind farm projects. The Planned Alternative essentially serves as the No Action Alternative, as it includes the currently planned port facilities to serve NYS ocean wind farm projects.

- **Partial-Build Alternative**, which assumes the Planned Alternative ports and three additional ports (the Brooklyn Port Authority Marine Terminal (PAMT), Arthur Kill Terminal, and Homeport Pier) for eight port sites total. The Partial-Build Alternative is any number of ports between the five ports listed in the Planned Alternative and the 12 ports of the Full-Build Alternative. A representative number, eight, was selected based on what type and number of ports is realistic if the Full-Build Alternative is not achieved and also as an example to show the relative cumulative impacts for a partial-build scenario.
- **Full-Build Alternative**, which includes the Planned Alternative ports and seven additional ports, 12 port sites total,¹⁶ in New York State. This alternative would meet NYSERDA’s guiding principles of maximizing economic opportunities in the State and the cost-effectiveness of OSW for its ratepayers.¹⁷

Collectively, these are called the “study alternatives.”

Section 4 describes the environmental settings of the 12 OSW port sites. Section 5 presents the analysis of the potential site-specific adverse effects that are expected to occur at each of the 12 sites in relation to the development scenarios of the study alternative. For the purposes of this study, socioeconomic, navigational and environmental criteria were developed to evaluate the Alternatives in relation to: land-use compatibility, transportation access and mobility, economic impacts, environmental justice communities, community character, cultural resources, natural resources, hazardous materials, air quality and greenhouse gas (GHG) emissions, and noise and vibration. This section identifies the best practices measures (BPMs) and likely permitting requirements that would minimize or mitigate the potential for adverse impacts to occur from port development. Section 6 summarizes the results of the cumulative impacts assessment. The final section summarizes and compares the overall potential benefits and impacts of the study alternatives.

Disclaimer: *Individual project environmental review and regulatory permitting would be conducted for future offshore wind energy development and/or transmission projects at the time they are proposed, which would assess, at a site-specific level, all relevant potential environmental impacts. This study’s identification and discussion of the potential cumulative impacts of the study alternatives do not substitute for future site-specific analyses of potential environmental impacts for particular projects but do provide supporting information.*

2 Offshore Wind Port Facility Types and Programmatic Requirements

NYSERDA published the New York State Offshore Wind Master Plan (Master Plan)¹⁸ in 2017 that lays out a comprehensive roadmap for development of 2,400 MW of OSW energy generation by 2030. Based on the NYS Climate Act adopted in 2019, the State's current OSW goal was increased to achieve at least 9,000 MW of OSW energy by 2035. As part of the NYSERDA's OSW Master Plan, the Assessment of Ports and Infrastructure¹⁹ (2017) study was prepared, which identifies potentially viable ports to support the OSW program and the major OSW components and facility types in order to understand each future facility's service requirements. For the purposes of analyzing the study alternatives, the major OSW components and facility types in the Assessment of Ports and Infrastructure study have been assumed and used at the potential OSW ports, as described below.

2.1 Major Offshore Wind Components

2.1.1 Turbines

Three-bladed horizontal axis wind turbines are the prevailing wind turbine technology at the time of this writing. OSW turbines are typically larger and more powerful than onshore wind turbines, since size limitations are not as restrictive for sea vessels as truck transportation. While the specifications of future technologies are highly confidential, it is reasonable to assume that wind turbine capacity would increase with technological developments.

2.1.2 Foundations

Based on the Assessment of Ports and Infrastructure study, these OSW foundation types are likely to be used by OSW developers with projects in water depths suitable for fixed bottom technologies and not floating foundations. The following are a range of potential foundations that may be used to construct OSW farms:

- Bottom fixed-foundations for OSW farms can be broadly categorized into the following types: monopile, jacket, suction buckets, and gravity-based foundation (GBF) configurations:
 - **Monopile:** designed for water depths approaching 40 meters (130 feet). The monopile is driven into the seabed and a transition piece is grouted or bolted onto the monopole, which connects to the turbine tower. Specialized installation vessels are often used to install monopiles.

- **Jacket** typically selected when conditions are not favorable for installation of monopiles. The most popular concept is the four-legged jacket, which consists of a jacket frame and transition piece. Pin piles are used to anchor the foundation to the seabed.
- **Suction Buckets** primarily used as foundation for OSW jackets but can also be used as foundations for monopiles in shallow waters. The jacket structure transfers the loads from the turbine, wind, waves, and current into the buckets. During installation, the buckets penetrate the seabed by self-weight, and suction is thereafter applied for the hydrostatic pressure to drive the foundations to target depth.
- **GBFs** are not driven into the seabed, rather the size and mass of the structure supports the turbines. GBFs consist of large concrete elements, which are lowered onto prepared gravel mats and filled with ballast. GBFs were used in some of the first OSW projects, whereas monopiles have been favored in many subsequent projects due to the development of specialized installation methods from vessels, allowing for a more efficient monopile installation and reduced impacts to the marine environment.

Hybrid and variations of these configurations are also in various phases of development.

2.1.3 Cables

OSW farms require both inter-array cables, which connect turbines within the farm, and export cables, which connect the farm with the onshore grid. Dedicated cable-laying vessels are used to transport cables from the manufacturer fabrication site to the installation site. Manufacturers are currently assessing an increase in voltage for inter-array cables, which would allow for an increase in rated turbine capacity.

2.1.4 Offshore Electrical Service Platforms

High-voltage, alternating-current (HVAC) cables are used to transport power from OSW farms to electrical interconnections located typically more than 10 kilometers (km) or 6 miles (m) from shore. HVAC transformer platforms are used to increase voltage from the inter-array cables to the export cable. High-voltage, direct-current (HVDC) cables may be used for export cables for longer distances, such as longer than 70 km (45 m). Wind farms developed in New York State are currently anticipated to use offshore substations, offshore HVDC convertor stations, offshore transformer modules (OTMs) and potentially AC platforms. The AC platforms use small, decentralized modules placed in standard containers and eliminate the need for a dedicated platform.

2.2 Port Types

The Offshore Wind Assessment of Ports and Infrastructure (December 2017) identified key facility parameters associated with major OSW components and vessel operations, which were further broken down into the following facility types:

2.2.1 Manufacturing and Fabrication

Manufacturing and fabrication facilities serve to produce a significant quantity of the same product or component and a smaller quantity of similar but varying products. Due to the size and weight of most major OSW components, facilities are often located on waterfronts in order to have sufficient space for production and storing completed components. The requirements for major OSW component waterfront manufacturing facilities vary by component type.

2.2.2 Staging and Installation Facilities

Staging and installation facilities serve to assemble material and equipment from various locations in a central location prior to being loaded onto vessels for offshore installation. Staging facilities require sufficient space to stockpile components prior to being loaded onto installation vessels. Area is also needed for manipulating large components, such as assembling towers or rotors before loading, or other activities that reduce the amount of work offshore.

2.2.3 Operations and Maintenance Facilities

Operations and Maintenance (O&M) facilities serve as a base to service a wind farm. O&M activities include maintaining and repairing turbines, conducting routine maintenance, monitoring critical components, and completing condition evaluations. Stationing an O&M facility in close proximity to an OSW farm is desirable, to reduce transit costs and allow for service during clear weather windows.

2.3 Port Facility Parameters

Table 1 provides the typical parameters for the general OSW port facility types expected to be used for the construction of the 9,000 MW of OSW.

Table 1. Recommended Facility Characteristics

Source: NYSERDA Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017); COWI 9GW Port Uses and Navigation Assessment Report (2022).

Category	Port Use	Upland Staging Area (Acres)	Wharf Length (Feet)	Navigable Channel Depth (Feet at MLLW)
Manufacturing and Fabrication	Foundations, Blades, Nacelles, Cables	Minimum 30 Preferred 70	Minimum 300 Preferred 650	Minimum 30, Preferred 40
Staging	Wind Turbine Generator (WTG)	25	330 to 650	Minimum 13, Preferred 38
O&M	O&M	Minimum 8 Preferred 15	Minimum 250 Preferred 300	Minimum 8, Preferred 26

For a majority of the OSW port facility types assessed in this study, the above OSW port facility characteristics have been assumed. However, for the port facilities under active environmental review and/or permitting processes, the specific characteristics and dimensions identified in published documents have been used.

3 Alternatives

The build alternatives have been developed for the purposes of this study to identify the range of potential impacts, constraints, construction mitigation measures, and potential corrective actions to accommodate a successful New York State OSW program. The description of the alternatives relied on published information from the OSW port sites in the Planned Alternative whenever available. For other OSW port sites, locations were generally identified for the purpose of this study, but those locations are not predetermined as a result of the study. The potential OSW ports included in the study are to be used as a relative example of what might be reasonably expected as port development happens across the Hudson River, NY Harbor, and Long Island regions of the State. Descriptions of the ports were based on publicly available information known at the time of this study.

3.1 Planned Alternative

The Planned Alternative includes the five awarded wind farm projects shown in Figure 1, which are located in the three key regions of the State:

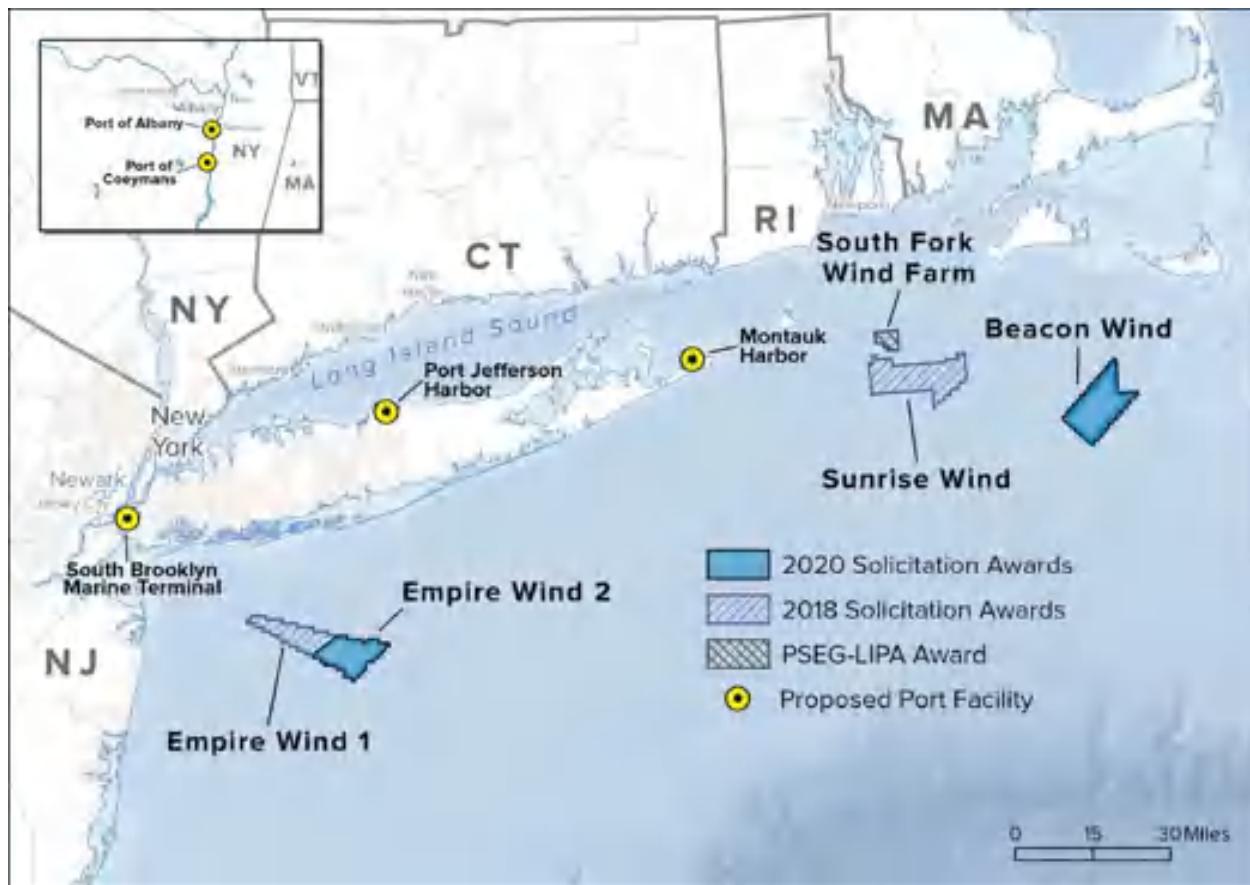
- Capital Region: Port of Albany, Port of Coeymans
- New York Harbor: SBMT
- Long Island: Port Jefferson Harbor and Port of Montauk

The assumed general facility envelopes of the awarded wind farm projects are illustrated in Appendix A, Port Location Maps, and their general characteristics are presented in Appendix B: Port Facility Characteristics.

Disclaimer: Environmental review and regulatory permitting would be conducted for future offshore wind energy development and/or transmission projects at the time they are proposed, which would assess, at a site-specific level, all relevant potential environmental impacts. This study's identification and discussion of the potential cumulative impacts of the Proposed Action do not substitute for future site-specific analyses of potential environmental impacts for particular projects but do provide supporting information.

Figure 1. Awarded Wind Farm Projects as of 2021

Source: NYSERDA



As described in chapter 1, the awarded wind farm projects are in different stages of project development and environmental review.

3.1.1 Port of Albany

The proposed OSW port facility site is located just south of the existing Port of Albany, located on the east side of River Road/Route 144 along the Hudson River in the Town of Bethlehem, Albany County, NY.. The 82-acre site is on Beacon Island, a previously disturbed, forested property bordered by the Normans Kill to the north and west. The site includes approximately 5 acres along the west side of South Port Road, a 77-acre parcel south of the Normans Kill, three small National Grid utility and access easements, and a 14.7-acre parcel owned by Albany Port Development Commission (APDC) previously used as a rail yard and metal recycling facility.

Ocean-bound vessels would be air-draft restricted by the Mid-Hudson Bridge (134 feet) and the Verrazano-Narrows Bridge, which has a clearance of 65.5 meters (215 feet) at center span. The water draft identified in the adjacent Federal Channel of the Hudson River has a depth of 9.8m (32 feet) mean lower low water (MLLW).

3.1.1.1 Foundation Component Fabrication and Staging

The proposed OSW port facility at this site could be used to support fabrication and assembly of OSW tower components including steel foundation structures (jackets) and secondary-steel foundation components, wind blades, and miscellaneous steel or concrete platforms, as well as staging and load-out operations.²⁰ The proposed designed is now approximately 589,000 +/- square foot of OSW tower manufacturing facility spread out over five separate buildings: (1) Building A Plate Preparation & Welding (289,931 SF), (2) Building B Welding Finishing (99,936 SF), (3) Building C Blast Metallization Plant (121,593 SF), (4) Building D Internal Assembly finishing (57,898 SF), (5) Building E Material receiving (19,600 SF). Tower production will occur within four buildings (Buildings A thru D) located on the Port Expansion property in the Town of Bethlehem. The fifth building (Building E) is located at 700 Smith Boulevard within the existing Port District in the City of Albany.²¹

Roadway and rail access to the site would require construction of new bridge(s) over the Normans Kill, connecting to Port Road South within a small area (less than an acre) to be acquired from National Grid. The proposed bridge over the Normans Kill would provide secure access for delivery vehicles to and from the main production facility, where Buildings A thru D are proposed, along with Building E (material receiving). Employee parking would be situated on the adjoining land owned by National Grid with access from existing River Road/Rt. 144. The main truck access route to I-787 and I-90 would go through the Port of Albany property. An additional roadway bridge for employees would be constructed from the south to River Road/Rt. 144.²²

A new freight rail spur would be realigned to service the west side of the building for delivery or off-loading of components. New roadway access would permit truck delivery of components, as well as staff access. The design features a large storage yard and laydown area for completed components to enable efficient loading onto ships.

To accommodate the manufacturing and staging area, the site would need to be cleared of vegetation and previous unusable infrastructure (old piles, etc.) and regraded with fill to establish level ground. Ground compaction, paving of surfaces, or other ground improvements would be needed to support the weight of the new facilities and OSW components staged on site.

3.1.1.2 Port Area

Once fabricated, the fabricated steel structures loadout and shipping would require a new wharf (dock) area with a new bulkhead area. Dredging would be required to create a proper docking area that connects to the navigation channel of the Hudson River. The proposed wharf and associated dredging within the Hudson River would be approximately 500 linear feet (LF), 4.4 acres and 105,000 cubic yards (CY). The proposed wharf consists of a deep foundation-supported, concrete-framed, open-type wharf structure, with a heavy stone slope revetment, high-modulus steel sheet pile cutoff wall, and drilled shaft-supported open wharf and relieving platform. The total area of the wharf is 45,500 square feet (SF).

3.1.2 Port of Coeymans

The proposed OSW port facility at the Port of Coeymans is located in the Town of Coeymans, Albany County, NY on the Hudson River approximately 10 miles south of Albany. The existing port, which is owned and operated by Carver Companies, provides approximately 3,500 feet of direct riverfront access, and offers the following services: stevedoring, tug and barge, break bulk, heavy lifts, warehousing, equipment rentals, staging, dredging, recycling, custom crushing, property leasing, indoor/outdoor storage, and riprap waterway repair.

A significant portion of the Port of Coeymans site is developed, consisting of multiple laydown areas, a berth and barge slip. The northeastern corner of the site on the waterfront area is largely undeveloped due to existing topography. The area of the site proposed for OSW use is a large parcel of land located adjacent to the waterfront. The proposed OSW port facility site is zoned for industrial use and lies within a primarily undeveloped area. The site is air draft restricted by the Mid-Hudson Bridge (134 feet) and the Verrazano-Narrows Bridge, which has a clearance of 65.5 meters (215 feet) at center span. The site is water draft restricted by the Hudson River Federal Channel, which has a depth of 9.8m (32 feet) MLLW.

3.1.2.1 Foundation Component Fabrication and Staging

The primary OSW facility purpose is to assemble secondary-steel foundation components, as well as staging and load-out operations. Fabrication of OSW tower components may include internal and external platforms, railings, steel ladders, cages, and other key parts that would attach to the monopile foundations, requiring assembly yards, docking platform(s) and dock transfer areas. Up to two concrete batch plants would be installed, using delivered concrete materials and water from the Town of RAVENNA. Batch plant cement materials would be acquired from a neighboring facility (Lafarge) and would avoid trucking through the town. Other materials, such as metal rebar, sand, and aggregate would be delivered by either truck or barge.²³

Sunrise Wind's joint development partners would construct advanced foundation components²⁴ for wind turbines at the Port of Coeymans. The construction and steel manufacturing work would create up to 230 jobs. Additionally, it is anticipated 115 local union workers would be based at the Port of Coeymans to construct the fundamental elements of the OSW turbine foundations. These components, ranging in size from 12 to 120 tons each and as tall as 40 feet, include the foundations' internal and external platforms, railings, steel ladders, cages, and other key parts that would attach to monopile foundations.²⁵

The fabrication area, laydown areas, and storage areas would be graded to be less than one% slope. The northern laydown site would be larger than the southern at approximately 15 acres, making it the major material laydown and storage area. These laydown areas would be used for temporary material storage. Such materials may include, but are not limited to steel sections, steel reinforcing, etc.²⁶

At the structure's fabrication and transport areas, ground compaction of soil/gravel materials, paving of surfaces, or other ground improvements would be needed to support the large amount of weight using the site.

3.1.2.2 Demolition

Demolition of six buildings (approximately 45,500 SF) would be required to create laydown and storage area for the foundation fabrication areas. The existing assembly sleds would also likely need to be removed to construct the new dock and minimize dredging requirements.²⁷

3.1.2.3 Port Area

Once fabricated, OSW tower components would be lifted onto self-propelled modular transporters (SPMT, likely Mammoet SPMT) potentially to be transported from fabrication to storage and/or shipping locations. OSW component loadout and shipping requires a high-level concrete dock supported by steel pilings to bedrock. A new, heavy duty 400-foot-long dock would be constructed along the existing timber bulkhead at the riverbank to service the transport barges or structure float out. Approximately 156,000 cubic yards (5.3 acres) of material would be required to be dredged, extending from the area of the dock to the navigation channel of the Hudson River. A large portion of this area is within a previously dredged area for the Tappan Zee Bridge Project. Bathometric surveys indicate the current draft depth of the proposed docking area is -12 feet MLLW, requiring dredging to approximately -32 feet MLLW to accommodate float out of the OSW components onto barges and safely maneuver.²⁸

A dock with steel reinforced concrete decking would be supported by steel pilings to bedrock. A steel sheeting bulkhead would be constructed along the face of the dock and extend well below the mudline. Double pile clusters of fendering dolphins would be installed on both the ends of the new dock to accommodate vessel docking and tie off. The required barges for this project may extend up to 400 feet long by 130 feet wide.²⁹

3.1.3 South Brooklyn Marine Terminal

The SBMT is located between 29th and 39th Streets in Brooklyn, Kings County, NY. The 88-acre site, located on the east bank of the New York Harbor Upper Bay, is currently an underutilized operational marine terminal. The site includes three piers (the 29th Street, 35th Street, and 39th Street Piers), associated upland storage areas, multiple parking lots, utility buildings, warehouses, and operational rail. The waterfront portion of the site consists of a steel sheet pile bulkhead and revetment.

The proposed OSW port facility site lies within a heavily developed urban area with neighboring industrial port areas to the north and south and residential and commercial areas to the east. The site is owned by the City of New York, under the jurisdiction of the New York City Department of Small Business and leased to the New York City Economic Development Corporation (NYCEDC). Historically, the site has been a developed multipurpose marine terminal, and since 2011 NYCEDC has made efforts to rehabilitate the terminal by investing in infrastructure improvements, site preparation, dredging, and freight rail infrastructure.³⁰

The site is air draft restricted by the Verrazano-Narrows Bridge, which has a clearance of 65.5 meters (215 feet) at center span. The site is water draft restricted by the Bay Ridge Channel, which has a depth of 12.2 meters (40 feet) MLLW.

3.1.3.1 Staging, Operations and Maintenance

The proposed port facility is intended for staging OSW components prior to delivery to OSW farm site. It is assumed that there is reasonable staging and storage area for staging components and finished products. Project components would be received, stored, assembled as necessary, and exported via marine vessels, onshore cranes, and other equipment. This facility would also serve 24-hour O&M support for the OSW farms once operational. It is assumed that there is reasonable staging and storage area for OSW components and staff operations.³¹

The main truck access route to I-278 would pass through the SBMT and the adjacent industrial areas along 2nd Avenue. Roadway access would permit truck delivery of components, as well as staff access. On-site rail access is available for delivery or offloading of components. The site would require a large storage yard and laydown area for completed components, to enable efficient loading onto ships.

To accommodate a fabrication and staging area, the site would be cleared of existing structures and regraded with fill to establish level ground. Ground compaction, paving of surfaces, or other ground improvements may be needed to support the weight of the new facilities and OSW components staged on site.

3.1.3.2 Port Area

Once fabricated, the fabricated steel structures loadout and shipping would require two heavy load wharves (one along the northwest end of the 39th Street Pier; the second along the southwest end of the 39th Street Pier) and a new bulkhead located immediately offshore of the existing steel sheet pile bulkhead. The existing stone revetment along the shoreline on the northeast and southwest sides of the 35th Street Pier would be rehabilitated to increase both the load capacity and available laydown area. Dredging would be required to create a proper docking area that connects to the Bay Ridge Federal Navigation Channel of the New York Harbor Upper Bay. Bathometric surveys indicate the existing minimum depth is -32 feet MLLW near the 39th Street Pier, requiring dredging to approximately -38 feet MLLW to accommodate float out of the components onto barges.³²

3.1.3.3 Operations and Maintenance Facility

The O&M base is assumed to occupy a portion of the port terminal. O&M activities at SBMT are assumed to include routine operational support performed by one service operations vessel (SOV) along with four smaller crew transfer vessels (CTV) (shared by both EW 1 and EW 2) transiting to and from the facility to service the wind turbines.³³ Maintenance activities are assumed to include a variety of survey and repair vessels that would operate on an infrequent, intermittent basis.

3.1.4 Port Jefferson

The proposed OSW port facility site is located adjacent to Beach Street in the Village of Port Jefferson, Town of Brookhaven, Suffolk County, NY along the north shore of Long Island. The approximately 25 acres of site under consideration consists of multiple, small, industrial waterfront facilities with varying existing uses and capacities. There are no air draft restrictions to this site.

The proposed OSW port facility site lies within a moderately developed area with light industry, including marine services, utilities, and waste handling and management facilities. Neighboring areas include commercial facilities, marinas, private residences, and natural areas. The site is bordered by the Port Jefferson Harbor to the east, commercial and preserved recreation, open space areas to the south, and residential areas to the north and west. Four waterfront properties within the site were identified for OSW activities: Port Jefferson Power Station, Northville Industries, Miller Marine Service, and the Tilcon Port Jefferson Terminal.

The site does not have any limiting air draft restrictions. The site is water draft restricted by the Port Jefferson Harbor Channel, which has a depth of 8m (26 feet) MLLW. The Bridgeport & Port Jefferson Ferry runs daily ferry service in the channel.

3.1.4.1 Operations and Maintenance Facility for Service Operation Vessels

The proposed OSW port facility would be a dedicated 24-hour O&M support for the OSW farms once operational. It is assumed that there would be reasonable staging and storage area for OSW components and staff operations. An operations building would be constructed to accommodate O&M and staging as needed.

Roadway access to the site would require construction of new driveway access. The main truck access route to I-495, approximately 9 miles away, would pass through several communities on the north shore of Long Island. The main truck access route to New York State Route 25A would travel through the proposed site along Beach Street on the west side of the Port Jefferson Inner Harbor. New roadway access would permit truck delivery of components, as well as staff access. Railway access, located approximately 1.3 miles away, would allow for delivery or offloading of components. The site would require a large storage yard and laydown area for completed components to enable efficient loading onto ships.

To accommodate the O&M uses, the site may need to be cleared of unusable infrastructure. Ground compaction, paving of surfaces, or other ground improvements may be needed to support the weight of the new facilities and OSW components staged on site.

3.1.4.2 Port Area

To accommodate the proposed O&M, it is assumed that the existing docks would be used for crew operations and the loading of replacement components on to vessels as necessary. Upgrades to the proposed Port Jefferson O&M harbor facility would be required. Orsted and Eversource are currently evaluating the Port Jefferson site to berth an SOV, which would service multiple OSW projects. Several scenarios are under evaluation, including using an existing pier at the Port Jefferson Power Station, as well as constructing a new pier adjacent to 146 Beach Street in Port Jefferson, NY.³⁴ Dredging would likely be required under either scenario to create a proper docking area that connects to the Port Jefferson Harbor Channel, which is maintained to a project depth of 26 feet MLLW. Bathymetric mapping indicates the current draft depth of the proposed docking area is approximately -2 feet to -20 feet MLLW, requiring dredging to approximately -26 feet MLLW to accommodate float-out of the components onto barges.

As the SOV would use the port infrequently, the facility would be able to be utilized by other users. No new upland structures are planned at the site. Only container storage may be established on an interim basis when the SOV comes to shore. Helicopters may be used for crew changes during installation of the wind turbine generators (WTGs).³⁵

3.1.5 Port of Montauk

The proposed OSW port facility site is located along East Lake Drive in the hamlet of Montauk, Town of East Hampton, Suffolk County, New York at the eastern extent of the South Fork of Long Island. The approximately 10-acre site is located on the eastern side of Montauk Harbor and the inlet to Block Island Sound. The site consists of an existing dock facility with a large parking lot and an adjacent available lot.

The proposed OSW port facility site lies within primarily commercial and vacant areas, with neighboring commercial, residential, vacant, and natural areas (e.g., beach, parklands) to the north, east, and southeast. The site is bordered by the Port Montauk Harbor, an existing commercial and recreational harbor, to the south and west, and East Lake Drive to the north and east. Further east of East Lake Drive, the area is undeveloped preserved recreation and open-space land of the Montauk County Park.

The site does not have any limiting air draft restrictions; however, Montauk Airport may affect air draft if tall OSW components are moved into the area. The site is water draft restricted by the Montauk Harbor Channel, which currently has a depth of 12 feet at MLLW; however, the United States Army Corps of Engineers (USACE), in the Lake Montauk Harbor Feasibility Study (2019), recommends deepening the navigation channel to -17 feet MLLW.³⁶

3.1.5.1 Operations and Maintenance Facility

The proposed OSW port facility would be dedicated 24-hour O&M support for the South Fork Wind OSW farm once operational. It is assumed that there would be a reasonable staging and storage area for OSW components and staff operations. South Fork Wind LLC (SFW) is proposing to build an O&M Facility including a 1,160 square feet office building; forklift garage; two storage containers; seven parking spaces; a berthing facility with a stationary crane; a dedicated small on-site package septic system; and mooring area for CTVs.³⁷

Roadway access to the site would require construction of new driveway access. The main truck access route to State Route 27 would travel along the eastern shore of Lake Montauk. New roadway access would permit truck delivery of components as well as staff access. The site would require a large storage yard and laydown area for completed components to enable efficient loading onto ships.

To accommodate the manufacturing and staging area, the site would need to be cleared of vegetation, previous unusable infrastructure, and regraded with fill to establish level ground. Ground compaction, paving of surfaces, or other ground improvements may be needed to support the weight of the new facilities and OSW components staged on site.

3.1.5.2 Port Area

To accommodate the proposed O&M, new docks would be installed for crew operations and the loading of replacement components onto vessels as necessary. Construction of a new O&M Facility would include: (1) removal of existing piles and docks and (2) dredging approximately 2,500 cubic yards in the existing marina to accommodate deeper draft CTVs. An approximately 0.41-acre area of Lake Montauk will be dredged to a depth of -12.4 feet mean low water with an additional one foot of allowed over dredge, (3) maintenance repairs to the existing bulkhead including new waler and tie rods, (4) construction of a new floating pontoon dock (100 feet long by 16 feet wide with 5 feet of freeboard), (5) installation of five 2-feet diameter steel pipe piles and one 2-foot diameter steel monopile to secure the pontoon dock and provide mooring for crew transfer vessels (CTV), (6) installation of an aluminum gangway (28 feet long by 4 feet wide), (7) annual maintenance dredging of up to 1,500 cubic yards per year, within the permit term.³⁸ It should be noted that the USACE has a navigation study of the Navigation Channel at Montauk Harbor that is recommending a deepening to 17 feet.³⁹

3.2 Full-Build Alternative

Based on COWI's Regional Ports Supply Demand Model,⁴⁰ it was identified that a collective OSW infrastructure output of 12 ports would be an optimal scenario to achieve and potentially exceed the State's 9,000 MW OSW energy target by 2035. As a result, the Full-Build Alternative is comprised of 12 port sites⁴¹ identified in the Regional Ports Supply Demand Model, selected from NYSERDA's pre-qualified OSW port list⁴² that would collectively meet the physical site parameters needed to provide the additional OSW port fabrication, manufacturing, staging, and O&M functions. The Full-Build Alternative includes the five port development sites of the Planned Alternative and seven additional sites. The intent of this alternative is to assume a reasonable worst-case scenario including a Full-Build-out of ports in New York State to capture the potential cumulative environmental impacts that may result. The seven additional ports contemplated with the Full-Build Alternative are, from east to west: Arthur Kill Terminal, Port Ivory, Homeport Pier, Brooklyn Navy Yard, Brooklyn Port Authority

Marine Terminal, NYS Wind Port, and Hempstead Public Works Area (see Figure 2 and Table 2). The assumed general port facility envelopes are illustrated in Appendix A: Port Location Maps, and general information is presented in Appendix B: Port Facility Characteristics. A description of the seven additional sites is provided below.

Figure 2. Port Locations Overview



Table 2. Full-Build Alternative Port Facilities

Full-Build Alternatives	Location	Assumed Port Use
Planned Alternative	Port of Albany	Fabrication (Towers/Foundations Components)
Planned Alternative	Port of Coeymans	Fabrication (Towers/Foundations Components)
Planned Alternative	SBMT	Staging (WTG and Foundation) and O&M
Planned Alternative	Port Jefferson	O&M (SOVs)
Planned Alternative	Port of Montauk	O&M (CTVs)
Additional Port	Arthur Kill Terminal	Staging (WTG)
Additional Port	Port Ivory	Fabrication (Offshore Substation components)
Additional Port	Homeport Pier	O&M
Additional Port	Brooklyn Navy Yard	O&M
Additional Port	PAMT	O&M
Additional Port	Hempstead Public Works	O&M
Additional Port	NYS Wind Port	Component Manufacturing

3.2.1 Arthur Kill Terminal

The conceptual OSW port facility site at Arthur Kill Terminal is an undeveloped approximately 32-acre parcel just south of the Outerbridge Crossing on the western shoreline of Staten Island, NY. The site consists of approximately 23 acres of upland area and nine acres of submerged land between the shoreline and bulkhead line. The lot is mostly vacant, wooded greenfield site with the exception of several unimproved access roads throughout the site and a natural shoreline. There are plans to develop a state-of-the-art port facility for offshore wind staging and assembly.⁴³ There are also currently no shoreline improvements at this location; therefore, extensive dredging, filling and improvements would be required.

The site is located between the neighborhoods of Charleston and Tottenville near the southwestern most area of Staten Island. It is located in an area zoned for industrial use and is surrounded by light industrial and commercial uses as well as transportation infrastructure.⁴⁴

Adjacent to the site is the Arthur Kill Federal Navigation Channel, which has a water draft depth of 35 MLLW. It does not have any air draft restrictions.

3.2.1.1 Staging (Wind Turbine Generators)

The conceptual OSW port facility at this site would be for staging of Wind Turbine Generators (WTGs). Atlantic Offshore Terminals plans to develop a quayside designed for simultaneous vessel berthing, unrestricted access for cargo and installation vessels, complete onshore assembly, a warehouse for equipment and spare part storage, tenant office space, a visitor center, parking areas, and on-site utilities.

The site would need to be cleared of vegetation and previous unusable infrastructure (old piles, etc.) and regraded with fill to establish level ground. A large portion of the site would require extensive fill of tidal wetlands and open waters (approximately 9 acres), converting the shoreline to upland to accommodate the conceptual port. Ground compaction, paving of surfaces, or other ground improvements would be needed to support the weight of the new facilities and OSW components staged on site.

Construction of a main entrance to the site near the intersection of Arthur Kill Road and South Bridge Street would be required. The main truck access routes to the site are from New York State Route 440 (approximately 0.25 miles) and the Garden State Parkway (approximately 4 miles). The site is located approximately 0.35 miles from the New York Metropolitan Transit Authority (MTA), Staten Island Railway Arthur Kill Station, located at Arthur Kill Road and Richmond Valley Road, which could provide public transportation for workers.

3.2.1.2 Port Area

Construction of wharf structures intended for the loading of components both on and off transport vessels would be required. An approximately 1,300-foot quayside would be created for vessel berthing. Dredging would be required to create a proper docking area that connects to the Arthur Kill Federal Navigation Channel. Bathometric surveys indicate the current draft depth of the conceptual docking area is approximately -20 feet to -2 feet mean lower low water (MLLW), requiring dredging to approximately -33 feet MLLW to accommodate float out of the WTGs onto barges.

3.2.2 Port Ivory

The conceptual OSW port facility at Port Ivory (former Ivory Soap factory site) is located on the northern shore of Staten Island, NY, along the Arthur Kill Federal Channel and northwest of the Goethals Bridge. The 64-acre site consists of Parcels B and C (owned by the Port Authority of New York and New Jersey), comprising 26-acres of developed (pavement and warehouses) acres inland and 38-acres of undeveloped

vegetated area along the waterfront, respectively (see Appendix A, Location Maps). Parcel B has been used as a construction staging area, whereas Parcel C is not currently in use and is returning to a natural state with trees and other vegetation. Parcel C of Port Ivory is the waterfront area envisioned for offshore wind.⁴⁵

The site is located in an area zoned for a combination of transportation, utility, industry, and manufacturing and is surrounded by industrial and commercial uses as well as transportation infrastructure. The Howland Hook Marine Terminal, west of the Port Ivory site, is currently owned by New York City, leased by the Port Authority of New York and New Jersey (PANYNJ), and leased to/operated by the Global Container Terminals. Howland Hook Marine Terminal and Express Rail, located west of the Port Ivory site, is an operational port that includes the New York Container Terminal freight rail line.⁴⁶

Eastbound vessels from Port Ivory would be air draft restricted by the Verrazano-Narrows Bridge and Bayonne Bridge, both of which have a clearance of 65.5 meters (215 feet) at the center span. Westbound vessels from Port Ivory would be air draft restricted at a vertical clearance of 135 feet by the Arthur Kill Vertical Lift Bridge, a freight rail bridge adjacent to Goethals Bridge. Port Ivory is water depth restricted by the Arthur Kill Federal Channel, which has a minimum authorized depth of approximately -16.15 meters (-53 feet) NAVD88, or -15.3 meters (-50 feet) MLLW, in the vicinity of Port Ivory. The air and water drafts may affect vessels accessing the facility and the ability to transport some components vertically. There is the potential need for some components to be transported horizontally due to the air draft restriction.

3.2.2.1 Fabrication (Offshore Substation [OSS] Components)

The conceptual use of the OSW port facility at this site would be for fabrication of Offshore Substation (OSS) components. It is assumed that there would be reasonable staging and storage area for manufacturing and staging components and finished product. Storage building(s) may be constructed to accommodate OSS manufacturing, including the assembly of electrical components, and finishing, such as spray on coatings, which must be stored in a protected environment.

Roadway access to Parcel C would require construction of new driveway access. The main truck access route to I-287 is adjacent to the site, and there is on-site rail access for delivery or offloading of components. New roadway access would permit truck delivery of components, as well as staff access. The site would require a large storage yard and laydown area for completed components, to enable efficient loading onto ships.

To accommodate the manufacturing and staging area, the site would need to be cleared of vegetation and previous unusable infrastructure (old piles, etc.), and then regraded with fill to establish level ground. A large portion of the site would require fill of tidal wetlands and open waters, converting the shoreline to an upland area to accommodate the conceptual port design. Ground compaction, paving of surfaces, or other ground improvements would be needed to support the weight of the new facilities and OSW components staged on site.

3.2.2.2 Port Area

Once fabricated, the fabricated steel structures loadout and shipping would require a new wharf (dock) area with a new bulkhead area. Dredging would be required to create a proper docking area that connects to the navigation channel of the Arthur Kill. Bathymetric mapping indicate the current draft depth of the conceptual docking area is -37 to -45 feet MLLW, requiring dredging to approximately -50 feet MLLW to accommodate float out of the components onto barges.

3.2.3 Homeport Pier

The conceptual OSW port facility is located at Homeport Pier; a 1,410 foot-pier and 35-acre former naval base located in Staten Island's Stapleton neighborhood (see appendix A). Ownership was transferred from the Navy to New York City in 1994. The pier is largely unused today; the Navy docks boats there for Fleet Week each year, Millers Launch and the New York City Fire Department (FDNY) keep a fireboat and barracks at the pier.⁶ This facility has been used to support marine responses during disaster events like Superstorm Sandy. The site is located in an area zoned for transportation and utility uses, and is surrounded by residential and commercial uses, as well as marinas.⁴⁷

Homeport Pier is air draft restricted by the Verrazano-Narrows Bridge, which has a clearance of 65.5 meters (215 feet) at center span. The site is water draft restricted by the Ambrose Channel in the Upper Bay, with a minimum water depth below the bridge ranging from approximately 22.9 meters (75 feet) at the west edge of the channel to 29 meters (95 feet) at the east edge of the channel, with a maximum depth of approximately 29.9 meters (98 feet) just east of the centerline.⁴⁸

3.2.3.1 Operation and Maintenance Facility

The conceptual OSW port development at this site would be a dedicated 24-hour O&M facility for the OSW farms once operational. It is assumed that there would be reasonable staging and storage area for OSW components and staff operations. An operations building would be constructed to accommodate O&M and staging as needed.

Roadway access to the site is established, and there is public transit service nearby, with the MTA Staten Island Railway Tompkinsville Station, located at the northern side of the site near Minthrone Street and Victory Boulevard, which would provide staff easy access to the site by public transportation. The main truck access route to I-287 is located approximately 2 miles from the site.

To accommodate the O&M area, the site may need to be cleared of any vegetation and previous unusable infrastructure (old piles, etc.). Ground compaction, paving of surfaces, or other ground improvements may be needed to support the weight of the new facilities and OSW components staged on site.

3.2.3.2 Port Area

The conceptual OSW port facility is assumed to be an O&M facility, with vessel operations using the existing pier on the south end of the site. Maintenance and improvements to the pier may be necessary to support a long-term O&M facility. Dredging may be required to create a proper docking area that connects to the Ambrose Channel of the NY Harbor. Bathymetric mapping indicates the current draft depth of the conceptual docking area is ranges from approximately -10 to -40 feet MLLW, which may require dredging to accommodate float out of the O&M-related replacement components onto barges, as necessary.

3.2.4 Brooklyn Navy Yard

The conceptual OSW port facility is located at Brooklyn Navy Yard, a manufacturing hub on the East River in Wallabout Bay, Brooklyn. The yard spans 300 acres, houses 500+ businesses and employs more than 11,000 people. The conceptual OSW port facility would be located within a 35-acre location within Brooklyn Navy Yard.⁴⁹

Brooklyn Navy Yard is zoned for industrial uses and is surrounded by commercial, industrial, residential, and open space/recreation uses. The site is water draft restricted by the East River, which has a navigable depth of 10.7 meters (35 feet) MLLW, and air draft restricted by the Brooklyn Bridge (entrance to Upper Bay—south end), which has a vertical clearance of 127 feet.⁵⁰

3.2.4.1 Operation and Maintenance Facility

The conceptual OSW port facility at this site would be a dedicated 24-hour O&M support for the OSW farms once operational. It is assumed that there would be reasonable staging and storage area for OSW components and staff operations. An operations building would be constructed to accommodate O&M and staging as needed.

The main truck access route to I-287 is adjacent to the site. Freight rail access is located at an adjacent facility. The MTA York Street Station (subway) is located at Jay Street and York Street, approximately one mile from the site.

To accommodate the O&M area, the site would need to be cleared of any vegetation and existing infrastructure. Ground compaction, paving of surfaces, or other ground improvements may be needed to support the weight of the new facilities and OSW components staged on site.

3.2.4.2 Port Area

This conceptual OSW port development would include an O&M facility and vessel operations using the existing pier on the south end of the site. Maintenance and improvements to the pier may be necessary to support a long-term O&M facility. Dredging may be required to create a proper docking area that connects to the East River. Bathymetric mapping indicates the current draft depth of the proposed docking area is approximately -24 to -40 feet MLLW, which may require dredging along pier and -50 feet MLLW on face of pier to accommodate float out of the O&M-related replacement components onto barges as necessary.

3.2.5 Brooklyn Port Authority Marine Terminal

The conceptual OSW port facility is located at the Brooklyn Port Authority Marine Terminal (PAMT), which includes Brooklyn Cruise Terminal and associated parking, warehouses, and marine terminals. The site is located along Buttermilk Channel in Brooklyn. Piers 6 through 9 and Pier 12 handle bulk and neo-bulk cargoes.⁵¹ The PAMT is zoned for industrial uses and is surrounded by industrial, commercial, residential, and open space/recreation land uses.

The site is water draft restricted by Buttermilk Channel, which has a navigable depth of approximately 10.7 meters—12.1 meters (35–40 feet) MLLW at mid-channel with lesser depths at the side of the channel, and air draft restricted by the Verrazano-Narrows Bridge, which has a clearance of 65.5 meters (215 feet) at center span.⁵²

3.2.5.1 Operation and Maintenance Facility

The conceptual OSW port development at this site would be a dedicated 24-hour O&M facility for the OSW farms once operational. An operations building would be constructed to accommodate O&M and staging as needed.

Roadway access to this site is established, and the main truck access route to I-287 is adjacent to the site. Rail access is not available in the vicinity of the site.

To accommodate the O&M area, the site may need to be cleared of unusable infrastructure and regraded with fill. Ground compaction, paving of surfaces, or other ground improvements may be needed to support the weight of the new facilities and OSW components staged on site.

3.2.5.2 Port Area

The conceptual OSW port development would be an O&M facility, with vessel operations using the existing pier on the south end of the site. Maintenance and improvements to the pier may be necessary to support a long-term O&M facility. Dredging may be required to create a proper docking area that connects to the Buttermilk Channel. Bathymetric mapping indicates the current draft depth of the conceptual docking area is approximately -20 to -40 feet MLLW, which may require dredging to accommodate float out of the O&M-related replacement components onto barges as necessary.

3.2.6 Hempstead Public Works Area

The conceptual OSW port facility is located at the Hempstead Public Works Area in Point Lookout, NY along the waterfront in East Bay. The existing public works facility occupies approximately three acres and is located adjacent to commercial and light industrial facilities with waterfront uses.⁵³

The site is water draft restricted by Reynold's Channel, which has a navigable depth of 4 meters–6.1 meters (13–20 feet) MLLW in the vicinity of the site. The site is air draft restricted by a fixed bridge connecting Long Beach Barrier Island to Alder Island, which has a horizontal clearance of 30 feet and a vertical clearance of 20 feet.⁵⁴

3.2.6.1 Operations & Maintenance Facility

The conceptual OSW port development at this site would be a dedicated 24-hour O&M facility for the OSW farms once operational. It is assumed that there would be reasonable area for staff and CTV operations and limited staging and storage area for OSW components. An operations building may be necessary to accommodate O&M and staging.

Roadway access is established, and the main truck access route to Meadowbrook State Parkway is located approximately 3 miles from the site. The site is located approximately 4 miles west of the Long Island Rail Road (LIRR), Long Beach Station located at West Park Avenue and Rev. JJ Evans Boulevard.

To accommodate the O&M area, the site would be cleared of vegetation and unusable infrastructure and regraded with fill. Ground compaction, paving of surfaces, or other ground improvements would be needed to support the weight of the new facilities and OSW components staged on site.

3.2.6.2 Port Area

The conceptual OSW port facility is assumed to be an O&M facility, with vessel operations using the existing pier on the south end of the site. Maintenance and improvements to the pier may be necessary to support a long-term O&M facility. Dredging may be required to create a proper docking area that connects to the Reynold's Channel of Jones Inlet. Bathymetric mapping indicates the current draft depth of the conceptual docking area is approximately one to six feet MLLW; dredging for CTVs and other O&M activities may be required.

3.2.7 New York State Wind Port

The conceptual OSW port facility is located at NYS Wind Port on the east side of the Hudson River, immediately south of Port of Albany and north of Port of Coeymans. The approximately 91-acre undeveloped site is part of a larger 112-acre facility in East Greenbush, NY.⁵⁵ NYS Wind Port is zoned for coastal industrial uses and is surrounded by undeveloped, industrial, coastal, and residential land uses.⁵⁶ There are currently no shoreline improvements at this location, therefore, extensive dredging, filling and improvements would be required.

The site is water draft restricted by the Hudson River, which has a minimum restricted depth of -32 feet MLLW in the vicinity of NYS Wind Port. The site is air draft restricted by the Verrazano-Narrows Bridge, which has a clearance of 65.5m (215 feet) at center span, and the Mid-Hudson Bridge with a clearance of 134 feet.⁵⁷

Roadway access is established, and the main truck access route to U.S. Route 20 is located approximately 2 miles from the site. From U.S. Route 20, the main truck access route to I-90 would go through the Town of East Greenbush. The site is located adjacent to the Amtrak Empire Service Train line and the Amtrak Albany-Rensselaer Train Station is located approximately 3 miles north of the site.⁵⁸

3.2.7.1 Component Manufacturing

The conceptual OSW port development at this site would be for light fabrication and staging for OSW components such as steel foundation structures (jackets), wind blades and miscellaneous steel or concrete platforms. It is assumed that there would be reasonable staging and storage area for both components and finished products. A storage building would be constructed to accommodate manufacturing and finishing such as spray on coatings, which must be stored in a protected environment.

To accommodate the manufacturing and staging area, the site would need to be cleared of vegetation and unusable infrastructure and regraded with fill to establish level ground. A large portion of the site would require fill of tidal wetlands and open waters, converting the shoreline to upland to accommodate the conceptual port. Ground compaction, paving of surfaces, or other ground improvements would be needed to support the weight of the new facilities and OSW components staged on site.

3.2.7.2 Port Area

Once manufactured, the components loadout and shipping would require a new wharf (dock) area with a new bulkhead area. Dredging would be required to create a proper docking area that connects to the Hudson River Federal Channel. National Oceanic and Atmospheric Administration (NOAA) Navigation Chart indicates the approximate depth of the conceptual docking area is very shallow and would require dredging to float out of the components onto barges. The dredging may impact submerged aquatic vegetation and sturgeon foraging habitat.

3.3 Partial-Build Alternative

A Partial-Build Alternative was developed assuming a scenario between the Planned Alternative and the Full-Build Alternative. The Partial-Build Alternative includes the currently programmed OSW ports of the Planned Alternative plus three additional ports facilities of the Full-Build Alternative, totaling eight port sites. The three additional port sites include: Arthur Kill Terminal, PAMT, and Homeport Pier site. Under the Partial-Build Alternative, current use of the four other conceptual sites identified for OSW port development in the Full-Build Alternative is assumed to continue in the future.

The Partial-Build Alternative represents a scenario of any number of ports between the five ports listed in the Planned Alternative and the 12 ports of the Full-Build Alternative. Eight ports were selected as a representative number based on what type and number of ports is realistically to occur if the Full-Build Alternative is not achieved and also as an example to show the relative cumulative impacts for a Partial-Build scenario.

4 Environmental Setting

This chapter describes the range existing conditions at the 12 OSW port locations identified for the Full-Build Alternative. Key environmental resources were identified for assessment based on environmental review and permitting requirements, as typically performed for the environmental screenings of proposed alternatives. The environmental resources considered include land use and zoning, terrestrial biological resources, aquatic biological resources, cultural resources, community character, hazardous materials, water resources, floodplains, air quality, noise, and Environmental Justice (EJ) communities. The environmental settings consider a quarter-mile study area around each OSW port site, potential truck routes and provide general baseline conditions to consider for assessing the potential impacts of each individual development, comparing the study alternatives, and assessing the cumulative effects of the program, as described in chapters 5 and 6. The following description of existing environmental resources is not intended to be comprehensive, but to provide a representative range of key environmental factors and resources to consider at the port locations of the Full-Build Alternative.

4.1 Land Use and Zoning

Existing site use of the OSW port sites vary broadly, ranging from active ports with industrial, manufacturing and commerce uses, vacant land in industrial areas, transportation, and electrical power (utility) generation uses, marinas and public fishing piers, and municipal public works facilities (see Land Use and Zoning Figures in appendix C). In the quarter-mile study area, land uses include industrial and manufacturing uses, marinas, vacant lands, transportation uses, residential, mixed residential/commercial, commercial and office buildings, open space and public facilities and institutions.

The three proposed OSW ports in the Albany Capital Region—the Port of Albany Expansion, Port of Coeymans, and NYS Wind Port—are located within vacant land zoned for coastal industrial uses and adjacent to the extensive Port of Albany–Rensselaer, and are comprised of private and public port facilities, and industrial, manufacturing and warehouse uses. The Port of Coeymans is an existing port zoned for coastal industrial uses in a rural setting.

In the New York Harbor, the three Brooklyn-based ports are within well-established ports (SBMT, PAMT, Brooklyn Navy Yard) with industrial, port-commerce and manufacturing uses surrounded by densely developed areas of New York City, including large manufacturing and industrial areas, port facilities, multistory commercial/office buildings and limited multistory residential buildings. The two ports on western Staten Island along the Arthur Kill, Port Ivory and Arthur Kill Terminal,

are sited within vacant, greenfield lands surrounded by less dense developments with large manufacturing and industrial areas. Port Ivory is adjacent to active port facilities with freight rail yards (PANYNJ NY Container Terminal) and Arthur Kill Terminal is predominantly a greenfield site that is adjacent to commercial developments and vacant land. On the eastside of Staten Island is Homeport Pier, which is an active shipping pier with industrial and warehouse uses; a high-rise apartment complex and community park borders it to the south and a variety of commercial, residential, transportation and public institutions are within quarter-mile radius. Homeport Pier is within the City's Special Stapleton Waterfront District, which allows port uses while maintaining physical and visual public access to maximize recreational opportunities as well as to conserve and enhance the value of land.

The three proposed OSW ports on Long Island are located within existing public dock/fishing areas and municipal public works facilities (Hempstead Public Works Area), a marina with commercial restaurant and parking properties (Port Montauk), and an active industrial and commercial waterfront with a power generating facility (Port Jefferson). The Port Jefferson site vicinity has medium-to-high density residential areas, marina and recreational uses, and a commercial district. The Port Montauk site vicinity includes a county park, marinas, residential areas, and vacant land. Hempstead Port is located within a Town of Hempstead public works facilities, with marinas, commercial areas, and public beaches in the quarter-mile vicinity.

4.2 Sensitive Terrestrial Biological Resources

Federal and State listed endangered or threatened species and associated habitat information for the terrestrial biological resources of the study alternatives was compiled from the online U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) Reports and NYSDEC Natural Heritage Program (NHP) correspondence (see Table 3 below for a summary and appendix D for the IPaC report and NHP response letters). Based on this desktop research, at least 24 federally and State listed species have the potential to occur in the vicinity of the study alternatives. Of these, the piping plover (*Charadrius melanotos*), Red Knot (*Calidris canutus rufa*), and Indiana Bat (*Myotis sodalis*) are species that have potential critical habitat within New York State. In addition, as part of the federal Migratory Bird Treaty Act and Bald Eagle and Golden Eagle Protection Act, at least 54 migratory birds have been identified in the vicinity of the 12 port sites (appendix D), which is typical of the coastline within the Atlantic Flyway. It should be noted that these are potential special status species and habitats present based on initial desktop reviews, and separate site-specific agency consultations would be required during environmental reviews to more accurately identify sensitive species that could be affected.

The affected terrestrial environment is assumed to include the shoreline and upland areas within quarter mile that have the potential to be directly affected by the construction or operations of the proposed OSW Port facilities.

In the Capital Region, the Port of Albany-Rensselaer, NYS Wind Port, and the Port of Coeymans are all ports sited within vacant land, vegetated with deciduous forest and herbaceous vegetation, including successional old field and northern hardwoods. Along the waterfront are freshwater emergent and scrub-shrub tidal marshes with drainages to the tidal Hudson River. The Port of Albany site borders the Port of Albany–Rensselaer and has early successional upland vegetation. NY Port Wind is also adjacent to developed port and industrial lands to the north and has agricultural lands on site and to the east and south. Port of Coeymans is sited within an existing port with limited grass and deciduous forest vegetation along the perimeter due to a primarily bulkheaded shoreline.

The three New York City Harbor ports in Brooklyn and Homeport Pier on the eastside of Staten Island are located in urbanized landscaped lands devoid of vegetation, consisting of ports with industrial, port-commerce and manufacturing uses surrounded by densely developed areas of New York City. The two ports on western Staten Island along the Arthur Kill–Port Ivory and Arthur Kill Terminal—are sited within vacant land vegetated with deciduous forest and herbaceous vegetation with herbaceous, scrub-shrub and forested estuarine and marine wetlands along the shoreline. Arthur Kill Terminal also has small area of potential freshwater forested/shrub wetlands on site. Bordering Arthur Kill Terminal to the south is similar vegetation on undeveloped land and more developed areas to the north and east (Outer Bridge Crossing and commercial developments). Port Ivory also has a large estuarine and marine wetland with habitat adjacent to the east and active port facilities with freight rail yards (PANYNJ NY Container Terminal) to the south and west and south.

The three proposed OSW ports on Long Island are located within developed waterfront areas, including an active port devoid of vegetation (Port Jefferson), a municipal public works facility with landscaped grass and deciduous trees with a bulkheaded waterfront (Hempstead Public Works), and a marina with paved parking lot and limited grass and tree plantings along the perimeter (Port Montauk). To the east of the Port Montauk site is a county park with herbaceous vegetation and sand beaches, and the Hempstead Public Works site also has sand beaches in the quarter-mile vicinity.

Table 3. Federal and State Identified Special Status Species

Category	Species	Federal Status	State Status
Birds	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	N/A	Threatened
Birds	Black Skimmer (<i>Rynchops niger</i>)	N/A	Special Concern
Birds	Common Tern (<i>Sterna hirundo</i>)	N/A	Threatened
Birds	Least Bittern (<i>Ixobrychus exilis</i>)	N/A	Threatened
Birds	Northern Harrier (<i>Circus hudsonius</i>)	N/A	Threatened
Birds	Peregrine Falcon (<i>Falco peregrinus</i>)	N/A	Endangered
Birds	Pied-billed Grebe (<i>Podilymbus Podiceps</i>)	N/A	Threatened
Birds	Piping Plover (<i>Charadrius melanotos</i>)	Threatened	Endangered
Birds	Red Knot (<i>Calidris canutus rufa</i>)	Threatened	Threatened
Birds	Roseate Tern (<i>Sterna dougallii dougallii</i>)	Endangered	Endangered
Birds	Least Tern (<i>Sternula antillarum</i>)	N/A	Threatened
Mammals	Indiana Bat (<i>Myotis sodalis</i>)	Endangered	N/A
Mammals	Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	Threatened	N/A
Amphibians	Atlantic Coast Leopard Frog (<i>Lithobates kauffeldi</i>)	N/A	Unlisted
Fish	Shortnose Sturgeon (<i>Acipenser brevirostrum</i>)	Endangered	Endangered
Fish	Atlantic Sturgeon (<i>Acipenser oxyrinchus</i>)	Endangered	N/A
Insects	Cobra Clubtail (<i>Gomphurus vastus</i>)	N/A	Unlisted
Insects	Monarch Butterfly (<i>Danaus plexippus</i>)	N/A	Candidate
Insects	Comet Darner (<i>Anax longipes</i>)	N/A	Unlisted
Insects	Russet-tipped Clubtail (<i>Stylurus plagiatus</i>)	N/A	Unlisted
Insects	Umber Shadowdragon (<i>Neurocordulia obsoleta</i>)	N/A	Unlisted
Plants	American Waterwort (<i>Elatine americana</i>)	N/A	Critically Imperiled
Plants	Estuary Beggar Ticks (<i>Bidens bidentoides</i>)	N/A	Rare
Plants	Persimmon (<i>Diospyros virginiana</i>)	N/A	Threatened
Plants	Sandplain Gerardia (<i>Agalinis acuta</i>)	N/A	Endangered
Plants	Seabeach Amaranth (<i>Amaranthus pumilus</i>)	N/A	Threatened
Plants	Square-Stemmed Spike Rush (<i>Eleocharis quadrangulata</i>)	N/A	Endangered
Plants	Tidewater Mucket (<i>Leptodea ochracea</i>)	N/A	Critically Imperiled
Plants	Torrey's Mountain Mint (<i>Pycnanthemum torreyi</i>)	N/A	Endangered
Plants	Seabeach Amaranth (<i>Amaranthus pumilus</i>)	Threatened	Threatened
Plants	Side Oats Grama (<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>)	N/A	Endangered
Plants	Violet Wood Sorrel (<i>Oxalis violacea</i>)	N/A	Threatened
Plants	Yellow Giant Hyssop (<i>Agastache nepetoides</i>)	N/A	Threatened
Shellfish	Alewife Floater (<i>Utterbackiana implicata</i> – freshwater mussel)	N/A	Unlisted
Shellfish	Fragile Papershell (<i>Leptodea fragilis</i> – freshwater mussel)	N/A	Unlisted

Table 3 continued

Category	Species	Federal Status	State Status
Ecological Communities	Floodplain Forest	N/A	Unlisted
Ecological Communities	High Salt Marsh	N/A	Unlisted
Ecological Communities	Low Salt Marsh	N/A	Unlisted
Ecological Communities	Salt Panne	N/A	Unlisted
Ecological Communities	Marine Back-barrier lagoon	N/A	Unlisted
Ecological Communities	Maritime Beach	N/A	Unlisted
Ecological Communities	Marine Intertidal Gravel/Sand Beach	N/A	Unlisted

Notes:

1. USFWS has established Critical Habitat for the Piping Plover, Red Knot, Least Tern and Indiana Bat, however site-specific formal consultation would be required to confirmed whether the port area is located within or may affect this Critical Habitat.
2. NOAA National Marine Fisheries Service has designated the Atlantic Sturgeon as an Endangered species.
3. NY NHP has identified the habitat presence for the Black Skimmer, Atlantic Coast Leopard Frog, Cobra Clubtail, Russet-tipped Clubtail, Comet Darner, Umber Shadowdragon, Alewife Floater, Fragile Papershell, Floodplain Forest, High Salt Marsh, Low Salt Marsh, Salt Panne, Marine Black-barrier Lagoon, Maritime Beach, Marine Intertidal /Sand Beach within the State as Critically Imperiled or Imperiled.
4. An additional 54 bird species of birds listed in appendix D, considered Migratory Birds, have been identified throughout the study alternatives. Please see appendix D for the listing.
5. USFWS is proposing to revise the Northern Long-eared Bat status to Endangered.

4.3 Sensitive Aquatic Resources

The affected aquatic environment is assumed to include the coastal open water and wetland areas within quarter-mile of the port facilities. Aquatic habitats within and in the vicinity of the active ports or urbanized landscapes in New York State Metropolitan Areas may be significantly altered by maintenance dredging and existing port operations. The proposed OSW Port facilities on undeveloped sites with natural shorelines may have higher densities of fish and wildlife species in the vicinity.

4.3.1 Wetland and Water Resources

Surface waters, wetlands, aquifers, and other water resources present at the proposed OSW port sites were identified using the USFWS National Wetland Inventory Mapper, the NYSDEC Environmental Resource Mapper and aerial mapping. The USACE and NYSDEC have jurisdictional authority over identified surface waters, wetlands and other regulated water resources and would require regulatory permit authorizations for the construction and operation of the proposed OSW ports. NYSDEC also regulates development within the wetland “adjacent area” or wetland buffer surrounding wetlands.

NYS DOS (and communities with approved Local Waterfront Revitalizations Plans) also regulates work along waterfronts, particularly within or adjacent to mapped Statewide Areas of Scenic Significance and Significant Coastal Habitats. All the proposed OSW ports have regulated open waters or wetlands along their shoreline.

In the Capital Region, the Port of Albany-Rensselaer, NYS Wind Port, and the Port of Coeymans all have freshwater emergent and scrub-shrub tidal marshes with drainages to the tidal Hudson River. NYSDEC-mapped submerged aquatic vegetation (SAV) is present along the NYS Wind Port and Port of Albany-Rensselaer shoreline. An NYS DOS Significant Coastal Fish and Wildlife Habitat (SCFWH), Normans Kill, a significant freshwater tributary of the Hudson River and spawning habitat for anadromous fish species borders the west side of Port of Albany Site and the SCFWH Papscane Marsh and Creek is a large tidal creek with emergent and forested marshes and spawning habitat for anadromous fish species that borders the southeast of NYS Wind Port. The Port of Coeymans is sited along primarily bulkheaded shoreline along the Hudson River, and in the half-mile vicinity has the SCFWH Coeymans and Hannacroix Creeks Complex, a sheltered tidal cove, containing mudflats, emergent marsh, SAV beds to the south and the SCFWH Schodack Island with floodplain forests, emergent wetlands, tidal creeks, and mudflats along the east shoreline of the Hudson River.

The three New York City Harbor ports in Brooklyn and Homeport Pier on the eastside of Staten Island are located along the estuarine and marine deep-water habitat of the NY/NJ Harbor. The two ports on western Staten Island along the Arthur Kill—Port Ivory and Arthur Kill Terminal—have emergent, scrub-shrub and forested estuarine and marine wetlands along the shoreline and estuarine and marine deep-water habitat of the Arthur Kill. Arthur Kill Terminal also has small area of potential freshwater forested/shrub wetlands on site. Bordering Arthur Kill Terminal to the south is similar estuarine wetlands along an undeveloped shoreline. Port Ivory also has a large estuarine and marine wetland with habitat adjacent to the east designated by the New York City Waterfront Revitalization Program (NYCWRP) as:

- Northwestern Staten Island Harbor Hens Area/Arlington Marsh SNWA
- Bridge Creek Recognized Ecological Complex (REC)

The three proposed OSW ports on Long Island are located within developed waterfront areas, including an active bulkheaded port (Port Jefferson), a municipal public works facility with a bulkheaded waterfront (Hempstead Public Works), and a marina with a gravelly/sandy filled shoreline (Port Montauk). The NY NHP has listed the following ecological communities in the adjacent aquatic habitat areas of the Long Island OSW ports:

- Hempstead Public Works Area: Within 500-feet is SCFWH Middle Hempstead Bay estuary, a very large salt marsh complex along Reynolds Channel, including high-salt marsh, low-salt marsh and salt panne.
- Port Jefferson Harbor: An SCFWH described as a Marine Back-barrier lagoon of moderately large size.
- Port Montauk: Approximately 0.1 mile north of the site is a Marine Intertidal Gravel/Sand Beach Large beach communities occur along shore of Montauk Peninsula, within a protected, approximately 3,000-acre natural area. A quarter-mile south of the port is an SCFWH-designated Lake Montauk, a former freshwater lake that converted to an estuary vegetated with eelgrass by a northern inlet to Block Island Sound.

Other sensitive aquatic biological resources exist within the shoreline and marine environment adjacent to the study alternatives as identified above in Table 1 and appendix D. Aquifers were not identified at any of the proposed OSW ports.

4.3.2 Listed Species and Habitat

Listed fish, amphibians, shellfish, and plant species are present within the shoreline and marine environment adjacent to the study alternatives as identified above in Table 1 and appendix D. In the Capital Region, most of the listed plant species in Table 1 are present along the shoreline of NYS Wind Port and Port of Albany and freshwater mussel beds (*Leptodea fragilis*) are present along the Port of Albany site. Port of Coeymans is sited along primarily bulkheaded shoreline along the Hudson River.

Of the fisheries species, shortnose sturgeon have known spawning grounds (spring season) in the vicinity of Port of Albany, NYS Wind Port, and Port of Coeymans, between the Troy Dam and Coxsackie, NY. Adult shortnose sturgeon may also concentrate in overwintering areas over 50 miles south of Port of Coeymans between Saugerties and Hyde Park and to areas just south of Kingston, NY, near Esopus Meadows. Atlantic sturgeon can be found throughout the Hudson River Estuary, as well as within the coastal waters of the Atlantic Ocean and Long Island Sound, where they spend most of their adult life. Spawning by Hudson River Atlantic sturgeon (a component of the NY Eight Distinct Population Segment) takes place during spring in the vicinity of Hyde Park. Juvenile Atlantic sturgeon remain in the estuary for two to six years before moving to the ocean to mature. Of the special status listed birds, the piping plover (*Charadrius melanotos*) and Red Knot (*Calidris canutus rufa*) are species that have designated critical habitat within aquatic environments of New York State. To further identify aquatic biological resources, the following were reviewed:

- Migratory bird listings, protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, have potential to occur in the vicinity of the alternatives (identified in appendix D) along with their associated conservation status. The USFWS and its partners manage migratory birds based largely on the Atlantic Flyway migratory corridor as they migrate between nesting and wintering areas.
- NYSDOS SCFWH and NYCWRP designations, including RECs and SNWAs.
- Fish with National Marine Fisheries Service (NMFS) designated Essential Fish Habitat (EFH) or “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” as dictated under the Magnuson-Stevens Fisheries Conservation and Management Act.

It should be noted that these are potential special status species and habitats present based on initial desktop reviews, and separate site-specific agency consultations would be required during environmental reviews to more accurately identify sensitive species that could be affected.

4.4 Cultural Resources

The New York State's Office of Parks, Recreation and Historic Preservation (NYSOPRHP) Cultural Resource Information System (CRIS) database was researched to identify known and potential historic resources, including listed and/or eligible for listing resources, in the New York State Register of Historic Places (SRHP) and the National Register of Historic Places (NRHP). Cultural resources located in the marine environment can generally be divided into three broad categories: submerged indigenous archaeological sites; shipwrecks or other sunken objects (aircraft); and submerged architectural or other built resources, such as piers, docks, weirs, pipelines, telecommunication cables, and artificial reefs. Cultural resources may also include terrestrial cultural resources such as buildings, structures, or other areas; cultural or historic landscapes or seascapes; traditional cultural properties; or Native American resources that are associated with indigenous nations with an interest in the marine environment. These various types of cultural resources are associated with the prehistory and history of the marine environment.

Ten of the sites are within CRIS-mapped archaeological sensitive areas, including Arthur Kill, Port Ivory, NYS Wind Port, Homeport Pier, Port Jefferson, SBMT, Brooklyn Navy Yard, PAMT, Hempstead Public Works Area, and Port of Montauk. Only three sites had historic architectural resources or historic districts in the vicinity, including PAMT, Brooklyn Navy Yard, and Port of Coeymans. The PAMT has the S/NHRP-listed Mary A. Whalen Tanker mooring directly off the terminal area.

Native American tribal resources are present on Papscanee Island Historic District, an SHRP-eligible site and visually unique landscape of the Stockbridge-Munsee Mohican Nation. Papscanee Island Historic District is located within the NYS Wind Port site and across the river from the Port of Albany site. Schodack Island State Park is located across the Hudson River, east of the Port of Coeymans. The island was inhabited by the Stockbridge-Munsee Tribe at the time of Dutch contact and was home of Chief Sachem Skiwias and served as the location of the Mohican Council Fire, the Tribe's seat of government. No submerged precontact sites were identified during the remote sensing survey at the Port of Coeymans site. To the south of Port of Coeymans is the Coeymans Landing Historic District, which was once the earliest Dutch settlement of the area.

4.5 Community Character

Community character considers several elements, including natural features, land uses, development patterns, population growth and density, and regional socioeconomics. Other less tangible characteristics of a community include the visual landscape, demographics, open space, air quality, noise, and traffic patterns. Coastal communities are shaped by open water dominating the landscape, and typically include natural beaches, bulkheads, docks, piers, boats, ports, and marinas. Primary industries in shoreline communities include port commerce and shipping, offshore energy and other infrastructure development, sand and gravel mining, commercial fishing, tourism and recreation, and real estate development.⁵⁹ These coastal communities may be seasonal uses due to the winter season in New York State.

When considering community character, sensitive land uses typically include residential areas, parks and recreational fields, hospitals, schools, churches, and major employers of the community. Of the alternatives, nine of the sites have residential communities within the vicinity. Homeport Pier has Staten Island Urby Apartment complex and Stapleton Waterfront Park bordering to the south. Port Montauk has Montauk County Park to the east and residential receptors south of the site along the local access road. However, the port location is an airport and busy marinas. Most of the ports are located within or adjacent to existing ports, and within compatible with land use and zoning.

The visual landscape and air quality are also important elements of a shoreline community's character. Aesthetic resources and scenic quality of visual landscape are sometimes identified by government agencies, while other resources are unofficially identified attractive visual resources or sensitive to visual change. The New York State Coastal Management Program identifies Scenic Areas of Statewide Significance (SASS) as part of the Coastal Resources to be protected. Of the study alternatives, the NYSDOS has identified sites within the Hudson River Valley and Port of Montauk vicinity:

- Montauk Point, Indian Fields SASS: This is the Montauk County Park east of the proposed OSW site, described as “one of the largest undeveloped oceanfront parks on Long Island” that is “rich in natural beauty.”
- Lake Montauk SASS: this is the waterbody of Lake Montauk along the proposed OSW site, described as an “unusual New York coastal landscape and scenic area and a tidal pond with a unique history as an early coastal resort.”
- Columbia-Greene North SASS⁶⁰ is located the south and east of Port of Coeymans, including Schodack Island. The SASS captures the historic Hudson Valley with alluvial plains, steep bluffs and varied shoreline with islands, coves, marshlands and forests, working farms and the historic development pattern of clustered settlements and the adjacent rolling open lands.

Local municipalities may also identify visual resources in local planning documents or waterfront development policies, such as New York City’s recently published Comprehensive Waterfront Plan, and include parks and recreation facilities, scenic overlooks/corridors, water bodies, and public gathering places. The NYC Comprehensive Waterfront Plan identifies the six areas of focus, including Climate Resiliency and Adaptation, Waterfront Public Access, Economic Opportunity, Water Quality and Natural Resources, Ferries and Governance. The Plan identifies Offshore Wind industry as an Economic Opportunity with a target to “Position NYC to become a regional hub for the manufacturing, assembly, installation and operation of offshore wind components by upgrading key waterfront facilities.”

Air quality also influences community character, including pollutants that may affect human health and the environment. Adverse air quality effects on human health and the environment can result in medical treatment, premature deaths, and lost workdays. Most of the largest individual emission sources continue to be electric generating plants. Many air quality control regions along the Atlantic coast are considered nonattainment or maintenance regions for one or more of the National Ambient Air Quality Standards (NAAQS) and are subject to State Implementations Plans (SIP) to control and reduce emission of pollutants. Greenhouse gas (GHG) emissions such as carbon dioxide contribute to climate change, including rising average global carbon dioxide concentrations and temperatures. Fossil fuel (coal, oil, and natural gas) combustion to generate energy is the greatest contributor to atmospheric carbon dioxide (CO₂) levels. Compared with other states in 2017, New York had the lowest carbon dioxide emissions per capita of any state in the nation.⁶¹ This is attributable to a smaller proportion of New York State’s electric energy needs being met by coal-fired power plants, and also to the widespread use of public transportation in its larger cities.⁶² For further information on Air Quality, see the Air Quality (Section 4.8 below).

4.6 Hazardous Materials

A wide range of contaminated and hazardous materials are present at the OSW port sites and vicinity. Contamination associated with current and previous uses at the site need to be accounted for. A majority of the proposed sites are located within current port facilities, working industrial waterfronts, recreational marina/docking areas, or areas with urban fill, contaminated by other past uses, such as ports, industrial and commercial operations at the site. Limited desktop research of publicly available documents (EISs, etc.), land use, and aerial mapping were performed to identify potential contamination at the proposed OSW port sites.

All the proposed OSW port sites have the potential to affect health and safety by disturbing contaminated soils, groundwater, sediments, and buildings and structures containing hazardous materials (asbestos, lead-based paint, heavy metals, etc.) from former port operations and/or other past uses.

Within the proposed berth and docking areas, all the proposed OSW port sites have the potential to temporarily disturb contaminated sediments during dredging and in-water construction of infrastructure. Approximately 200 miles of the Hudson River (the majority) from the Village of Hudson Falls to the Battery in New York City, has been designated as the Hudson River polychlorinated biphenyls (PCB) Sediments Superfund Site. The Hudson River PCB Sediments Site was established to dredge targeted areas to remediate PCB contamination from capacitor manufacturing operations by General Electric facilities in Fort Edward and Hudson Falls, NY. Contaminants such as heavy metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), and dioxins/furans are elevated in Upper New York Bay and the East River. In Gowanus Bay surface sediments would contain similar contamination, but also may contain PCBs from Gowanus Canal. Proposed OSW port sites with current port operations, including Brooklyn Navy Yard, SBMT, PAMT, Homeport Pier, Port of Coeymans and Port Jefferson, may demolish buildings/structures with potential hazardous building materials (e.g., asbestos). Specifically, at the proposed Port of Albany,⁶³ the site is characterized as containing former landfill soils of fly ash and bottom ash with high levels of metals and other contaminants. Each proposed OSW port site would be required to prepare Phase I Environmental Site Assessments (ESAs) and likely Phase II ESAs to characterize the on-site contamination as part of proper due diligence of properties and environmental review processes.

4.7 Floodplains

Federal Emergency Management Agency (FEMA) map data was reviewed to identify 100-year floodplains, floodways, wave action prone areas, and Coastal Erosion Hazard Areas (CEHAs). Port locations within a CEHA will require a NYSDEC Coastal Erosion Management Permit and/or potentially a local municipal approval. Special Flood Hazard Areas (SFHAs) are areas that would be inundated by the 100-year flood associated with the adjacent tidal waters. Other factors of concern within the SFHAs are wave run-up in addition to storm surge, high velocity wave action, and floodways. Floodways are channels of a river and adjacent land areas that are reserved to discharge the 100-year flood without causing a rise in flood elevations.

FEMA map data (see appendix C) indicates that all the proposed OSW port facilities are located within 100-yr floodplains, including eight sites with 50% or more of the site within a 100-year floodplain and four sites with less than 50% of the site within a 100-year floodplain. All sites are adjacent to floodways, as well. The Hempstead Public Works site is also within a FEMA-mapped moderate wave action zone along Reynolds Channel.

Placement of buildings or structures within SFHAs subjects them to potential damages or loss during flooding events. As a result of climate change, sea levels will rise over time making peak flood elevations higher than today. NYSDEC has issued 6 NYCRR Part 490, Projected Sea-level Rise, which provides sea-level rise projections to the year 2100 for tidal regions of New York State, including Mid-Hudson Region, New York City/Lower Hudson Region, and the Long Island Region as shown in Table 4 through Table 6. *Please note that the following sea-level projections of the three regions will be revised in 2022, please refer to 6 NYCRR Part 490 for the most up-to-date projections.*

Table 4. Mid-Hudson Region

Source: 6 NYCRR 490.4(a)

Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	1 inch	3 inches	5 inches	7 inches	9 inches
2050s	5 inches	9 inches	14 inches	19 inches	27 inches
2080s	10 inches	14 inches	25 inches	36 inches	54 inches
2100	11 inches	18 inches	32 inches	46 inches	71 inches

Table 5. New York City/Lower Hudson Region

Source: 6 NYCRR 490.4(a)

Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	2 inches	4 inches	6 inches	8 inches	10 inches
2050s	8 inches	11 inches	16 inches	21 inches	30 inches
2080s	13 inches	18 inches	29 inches	39 inches	58 inches
2100	15 inches	22 inches	36 inches	50 inches	75 inches

Table 6. Long Island Region

Source: 6 NYCRR 490.4(a)

Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	2 inches	4 inches	6 inches	8 inches	10 inches
2050s	8 inches	11 inches	16 inches	21 inches	30 inches
2080s	13 inches	18 inches	29 inches	39 inches	58 inches
2100	15 inches	21 inches	34 inches	47 inches	72 inches

Per the New York State Flood Risk Management Guidance for Implementation of the Community Risk and Resiliency Act (SFRMG, NYSDEC 2020): “Non-critical facilities and infrastructure should be sited out of tidal areas defined by the following guideline elevation. If siting out of these areas is not feasible, the structures should be elevated such that the lowest floor or other horizontal structural member is at or higher than the following guideline elevation, considering feasibility, project costs, risk tolerance, and environmental effects, or otherwise protected from flood damage to the applicable guideline elevation: The elevation and special flood-hazard area that result from adding the medium sea-level rise projection applicable for the full, expected service life of the facility, plus two feet of freeboard, to the base flood elevation and extending this level to its intersection with the ground.”

These flood guidelines should be applied to non-critical facilities within tidal areas, such as the proposed OSW port facilities.

The State Flood Risk Management Guidance (SFRMG) further recommends: “Projects involving new or replacement critical facilities and infrastructure (except transportation and water infrastructure) in tidal areas should be sited out of the areas defined by the following guideline elevation. If siting out of these areas is not feasible, the structures should be elevated such that the lowest floor or other horizontal structural member is at or higher than the following guideline elevation, considering feasibility, project

costs, risk tolerance, and environmental effects, or otherwise protected from flood damage to the guideline elevation: The vertical flood elevation and corresponding horizontal floodplain that result from adding the high sea-level rise projection applicable for the full, expected service life of the facility, plus three feet of freeboard, to the BFE and extending this level to its intersection with the ground.”

Construction in the VE Zone should be avoided. Buildings within the current or projected Limit of Moderate Wave Action (LiMWA) defined area should be built using VE Zone construction techniques, but a higher flood elevation, as defined above, should be incorporated into the design. Developments other than buildings, such as key transportation arteries, pipes, wastewater treatment plant settlement tanks, or other facilities, should be constructed to withstand the force of wave action during the projected base flood. Protection of buildings means elevation or flood proofing in accordance with building code and FEMA standards, or other applicable engineering guidance.

In some cases, it may be sufficient to elevate critical equipment, e.g., electronic controls to the recommended elevation, i.e., base flood elevation plus high projected sea-level rise, plus 3 feet of freeboard, within structures that themselves cannot be feasibly constructed to the recommended elevation.

In NYC, Climate Change Adaptation Guidance on Policy 6.2 of the New York City Waterfront Revitalization Program requires projects to (1) incorporate the consideration of climate change projections for coastal flooding and sea-level rise into the design and review of projects and (2) identify potential vulnerabilities to and consequences of sea-level rise and coastal flooding over their lifespan and to identify and incorporate design techniques to address these risks.

4.8 Air Quality and Greenhouse Gas Emissions

Air quality pollutants at the proposed OSW port sites may affect human health and the environment. Chronic and acute adverse air quality effects may result in medical treatment, premature deaths, and lost workdays. Most of the largest individual emission sources in the region continue to be fossil fuel (coal, oil, and natural gas) combustion electric generating plants and the greatest contributor to atmospheric carbon dioxide (CO₂) levels. Compared with other states in 2017, New York had the lowest carbon dioxide emissions per capita of any state in the nation.⁶ This is attributable to a smaller proportion of New York State’s electric energy requirement that is met by coal-fired power plants and to the widespread use of public transportation in the State’s larger cities.⁶⁴

Most urban areas along New York State's coastline are considered nonattainment or maintenance regions for one or more of the NAAQS and are subject to State Implementations Plans (SIP) to control and reduce emission of pollutants. NAAQS pollutants are carbon monoxide (CO), lead, ground-level ozone, nitrogen dioxide (NO_2), particulate matter, and sulfur dioxide (SO_2). GHG emissions such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and fluorinated gases (hydrofluorocarbons, etc.) deplete the ozone and contribute to climate change, including rising average global carbon dioxide concentrations and temperatures. Similarly, particulate matter is a mixture of solid particles and liquid droplets of varying size found in the atmosphere. United States Environmental Protection Agency (EPA) has established NAAQS for two different particles sizes—particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($\text{PM}_{2.5}$). While some particulate matter is emitted directly, $\text{PM}_{2.5}$ can form in the atmosphere by chemical reactions between SO_2 , nitrogen oxides (NO_x), volatile organic compounds (VOCs), and ammonia. As with ozone, $\text{PM}_{2.5}$ precursors are regulated by EPA to achieve ambient $\text{PM}_{2.5}$ reductions. According to NYSDEC's published 2021 Statewide GHG Emissions Report, the statewide gross emissions of CO_2 have dropped 6% between 1990 and 2019, based largely on large-scale and long-term trends in population, economic factors including changes in the types of industries that are active in the State, and land-cover changes including those that affect forests. One key trend has been a reduction in CO_2 emissions associated with the electricity system. There is a New York State-specific trend in the reduction of electricity emissions associated with various regulations, increased application of energy efficiency measures, and fuel switching. Between 2018 and 2019, the decrease in total GHG emissions was driven largely by a decrease in CO_2 emissions from fossil fuel combustion. The decrease in CO_2 emissions from fossil fuel combustion was a result of a 1% decrease in total energy use and reflects a continued shift from coal to less carbon intensive natural gas and renewables in the electric power sector.⁶⁵

In New York State, CO_2 remains the primary GHG emitted by human activity (or 58% of 2019 emissions) and fossil fuel combustion is the primary source of CO_2 . The land-use sector is an important CO_2 sink, removing roughly 8% of the State's total annual GHG emissions, primarily into forest biomass and soil organic carbon. The second most important GHG in the State, in terms of CO_2 equivalent emissions, is methane (35% of emissions) primarily from fossil fuel infrastructure, waste, and agriculture. Almost

all of the remaining statewide GHG emissions in 2019 were hydrofluorocarbons (HFCs) (6%).⁶⁶

All proposed OSW ports are located within Ozone (1-hour and/or 8-hour) and/or PM_{2.5} Nonattainment Areas.⁶⁷ Specifically, north the Port of Albany site, the Ezra Prentice neighborhood is part of the NYSDEC's Albany South End Community Air Quality Study with air monitoring programs and enforced truck restrictions.⁶⁸

4.9 Noise

Ambient or existing noise sources and noise levels in the vicinity of the proposed OSW port sites were considered. In the absence of actual noise monitoring data at the sites, a land use-based assessment is typically performed for screening level assessments. Sensitive receptors (sensitive land uses) were identified within quarter-mile of the sites and also along potential truck routes to the nearest highway (see appendix C for Land Use Maps).

The two main types of noise sources are mobile and stationary noise sources. Mobile noise sources are those that move in relation to a noise-sensitive receptor, such as trucks, work barges, and freight trains. Stationary noise sources are those that do not move in relation to a noise-sensitive receptor, such as construction equipment. Active port facilities and working waterfronts would have both mobile and stationary noise sources.

The three Brooklyn OSW port sites are well-established ports with higher ambient noise levels from industrial, shipping, and manufacturing uses surrounded by densely developed areas of New York City and limited sensitive receptors in the vicinity (multistory residential buildings). The two ports on western Staten Island along the Arthur Kill–Port Ivory and Arthur Kill Terminal—have residential areas within half mile. Homeport Pier is an active shipping pier with industrial and warehouse uses assumed to have high-ambient noise levels, however, a high-rise residential apartment complex and community park borders to the south.

The Port of Albany Expansion is sited within vacant land that does not border noise sensitive land uses. However, the northern truck route for the Port of Albany site would pass by the Ezra Prentice residential complex. NYS Wind Port is located within Papscanee Island of significance to the Stockbridge Munsee Native American Tribe, which would be considered sensitive to increased noise levels. The Port of Coeymans is within an active port facility with higher ambient noise levels. The closest sensitive receptor is a residence within half-mile of the port; however, the proposed truck routes would pass by residential areas.

The Port Jefferson site is an active port with assumed high ambient noise levels; however, a suburban residential area is present within the quarter-mile study area. Depending on the season, the Port Montauk site may have lower ambient noise levels; however, the site contains a large seafood restaurant, a commercial fishermen dock and recreational docking (marina) area that would have higher noise levels in the summer. The Montauk County Park borders to the east and a residential area is present along the shoreline to the south. Hempstead Port may have elevated noise levels from the Town of Hempstead public works operations and there are public beaches in the quarter-mile vicinity to the south.

4.10 Environmental Justice Communities

Nine potential environmental justice communities were identified in proximity to the proposed OSW sites. Environmental communities include qualifying minority and/or low-income populations according to State or federal criteria. Both NYSDEC Commissioner Policy 29, Environmental Justice and Permitting (CP-29), and Executive Order (EO) 12898 requires the identification of environmental justice populations within the study area, and an assessment of whether the proposed project would result in disproportionately high and adverse effects on environmental justice populations, taking into consideration minimization, mitigation, and enhancement measures, and project benefits, as appropriate. If environmental justice communities are present, public outreach efforts to involve minority and low-income populations are required.

Similarly, a NYS Climate Act Section 7(3) analysis would be required for each port site to determine whether any disproportionate impact to disadvantaged communities would occur in accordance with NYS Climate Act criteria. Port of Albany, SBMT, Brooklyn Navy Yard and Brooklyn PAMT, Homeport Pier, Hempstead Public Works Eight of the 12 sites have NYS Climate Act-mapped disadvantaged communities and EJ communities present in the quarter-mile vicinity: Port of Albany, SBMT, Brooklyn Navy Yard and Brooklyn PAMT, Homeport Pier, Hempstead Public Works Area. Port of Albany has the Ezra Prentice residential complex present to the north. NYSDEC monitors the air quality of Ezra Prentice neighborhood as part of the Albany South End Community Air Quality Study and enforces truck routes that avoid the environmental justice community.

Arthur Kill and Port Ivory have environmental justice communities within a half-mile, however the truck routes are expected to avoid these communities. Port of Coeymans, NYS Wind Port, Port Jefferson and Port Montauk have no identified environmental justice communities in the vicinity.

5 Alternatives Analysis

This chapter assesses the study alternatives based on the key socioeconomic, environmental, and navigational criteria developed to evaluate the alternatives for this study. Evaluation criteria were developed based on key NEPA and SEQRA resource categories to provide an understanding of the potential environmental and sociological implications of port upgrades and environmental assessment information that offers context and supports future planning, environmental reviews, and permitting for individual port upgrades. The criteria do not represent a comprehensive set of NEPA or SEQRA criteria, but a selection of informative socioeconomic, environmental and transportation factors to support the evaluation and highlight the differences between the study alternatives. The comparison of the study alternatives focuses on a screening level assessment of socioeconomic, environmental, and navigational effects in New York State for the Planned and Full-Build Alternatives and provides an understanding of the incremental impacts associated with development of the Partial-Build Alternative.

The Planned Alternative includes Port of Albany, Port of Coeymans, SBMT, Port Jefferson and Port of Montauk. The Full-Build Alternative includes the Planned Alternative plus seven additional ports: Arthur Kill Terminal, Port Ivory, Homeport Pier, Brooklyn Navy Yard, PAMT, NYS Wind Port, and Hempstead Public Works Area. The Partial-Build Alternative assumes eight port sites, including the five Planned Alternative ports plus three additional ports facilities (Arthur Kill Terminal, PAMT, and Homeport Pier) of the Full-Build Alternative, totaling. The Partial-Build Alternative impacts are not itemized and summarized in this section as the full range of potential impacts are provided with the Planned and Full-Build Alternatives, and the Partial-Build Alternative would simply result in incremental impacts between those two alternatives.

5.1 Evaluation Criteria

To evaluate the study alternatives, criteria related to socioeconomic, environmental, and navigational effects included consideration of:

- **Economic Impacts:** by considering economic opportunity within New York State, including job creation, social and community investments and economic development monetary value.
- **Land Use Compatibility:** by considering historic and existing site use, site availability and consistency with land use and zoning in the study area.
- **Transportation Access and Mobility:** by considering the adequacy of existing roadway and freight railroad access, and acceptable vessel navigation access, capacity, and routes.

- **Environmental Justice:** by identifying the presence of low-income and minority populations in the study area, considering the benefits of potential job creation, and temporary and permanent impacts related to construction and operation of the OSW facilities.
- **Biological and Water Resources:** by considering potential impacts to sensitive terrestrial and aquatic biological resources, wetlands/open waters, endangered and threatened species habitat, and wetlands.
- **Cultural Resources:** by considering potential impacts to mapped upland and marine archaeological resources, historic architectural resources, and historic districts.
- **Community Character:** by considering potential impacts to sensitive receptors and neighborhood character.
- **Hazardous Materials:** by identifying disturbances of contaminated and hazardous materials and considering human health and safety issues.
- **Floodplains and Resiliency:** by considering potential impacts within 100-year floodplains, wave action prone areas, CEHAs and considering resiliency issues.
- **Air Quality and GHG Emissions:** by considering the overall benefit to regional air quality that would result from clean energy generation during operations and the temporary impacts associated with construction of the OSW port facilities.
- **Noise:** by considering temporary and permanent noise effects in the study areas of the OSW port sites.

5.2 Summary of Results

Table 7 summarizes the results of the analysis of the study alternatives in relation to the evaluation criteria described above. Appendix E contains the supporting Alternatives Impact Summary Tables that identify the resource impacts at each potential port facility; one table of individual port facilities of the Planned Alternative and one of individual port facilities of the Full-Build Alternative.

Table 7. Alternative Impact Summary Table

Resource	Characteristic	Criteria	Planned Alternative	Full-Build Alternative
Economic Impacts	NY Economic Support	Maximize economic opportunity in NY State	Five ports in NY State, estimated to generate \$12.1 billion in economic development. Estimated to support approximately 13,510 job-years during ports renovations and 545 jobs during O&M. Social and community investment expenditures are expected to support another estimated 450 job-years.	Twelve ports in NY State, estimated to generate approximately \$30.7 billion in economic development. Estimated to support approximately 34,288 job-years during ports renovations. 1,309 jobs during O&M. Social and community investment expenditures are expected to support another 1,080 job-years.
Land Use	Land use, zoning conformance	Site port facility within compatible land use and zoning areas	Four of the five sites are compatible with existing industrial/manufacturing/ coastal industrial zoning and land use. two sites involve creation of new port, converting vacant land, or parking and marina uses. One site is within waterfront park and conservation zoning. Each site would be required to undergo town planning board review and approval.	Eleven of 12 sites are compatible with existing industrial/manufacturing/ coastal industrial zoning and land use. Five sites involve creation of new port by converting vacant land, or parking, marina, or agricultural uses (not designated farmland). Seven sites involve repurposing existing ports or docking areas to port facilities. One site is within waterfront park and conservation zoning. Each site to undergo town planning board review and approval.
Vessel Traffic	Navigation conflicts (hot spots), Density of commercial vessels, Ferry routes	Minimize and avoid navigational congestion and conflicts	Three ports have some vessel congestion or ferry route. All sites require precautions during recreational vessel season.	At least three ports have some vessel congestion or ferry route. All sites require precautions during recreational vessel season.

Resource	Characteristic	Criteria	Planned Alternative	Full-Build Alternative
Navigational Areas	Federally designated navigation channels Shallow/restricted drafts, Anchorage and mooring availability, Shipping lanes.	Close access to navigation channels, adequate drafts, and available anchorages. Minimize routes with constrained shipping lanes.	Adequate channel depths for proposed port uses. Two sites may restrict heavy loads during low tide. Two sites require medium access channel dredging. All sites have close access to federal channels. Three sites have winter ice concerns and have no suitable anchorage locations nearby. Two sites do not have turning basins or areas to turn for larger vessels. Two sites have vertical air draft bridge restrictions at 135 feet.	Adequate channel depths for proposed port uses. Two sites may restrict heavy loads during low tide. Two sites require medium access channel dredging. All sites have close access to federal channels. Four sites have winter ice concerns and have no suitable anchorage locations nearby. Three sites do not have turning basins or areas to turn for larger vessels. Four sites have vertical air draft bridge restrictions at 135 feet.
Vehicular Traffic Impacts and Accessibility	Highway access, Viable truck routes, Roadway improvements, Freight rail access, Rail improvements.	Easy, direct site access and highway access. Avoid and minimize road or traffic management improvements.	All the site sites have viable truck routes to highway. Two sites require minor road access improvements, and One site requires a new vehicular bridge and rail bridge over a stream.	All the site sites have viable truck routes to highway. Five sites require minor road access improvements, and one site requires a new vehicular bridge and rail bridge over a stream.
Environmental Justice	Potential for disproportionate effects on Environmental justice communities.	Avoid and minimize impacts to environmental justice communities in the quarter-mile vicinity.	Three sites have environmental justice communities present in the vicinity. Potential traffic, air quality and noise impacts along truck routes may occur to these communities.	Nine sites have environmental justice communities present in the vicinity. Potential traffic, air quality, and noise impacts along truck routes may occur to these communities.
Sensitive Terrestrial Biological Resources	Listed endangered or threatened species or habitat, Critical habitat.	Avoid and minimize impacts to sensitive terrestrial habitats and listed species	Three sites may have limited impacts to bat, shorebird, or other listed species habitat.	Seven sites may have impacts to bat, shorebird, insect, or other listed species habitat.
Sensitive Aquatic Biological Resources	<u>Wetlands</u> Federal and State regulated wetlands, and surface waters, Aquifers, Water quality.	Avoid and minimize impacts to federal or state regulated waters, wetlands, or aquifer impacts.	Three sites would have moderate level of wetlands/open water fill and dredging impacts. Two sites would have minor wetlands/open water impacts. One site may affect SAV adjacent At least three ports would increase impervious surfaces creating stormwater runoff. No ports have aquifers present.	Six sites would have moderate level of wetlands/open water fill and dredging impacts. At least two sites have SAV. Six sites would have minor wetlands/open water impacts. At least eight ports would increase impervious surfaces creating stormwater runoff. No ports have aquifers present.

Resource	Characteristic	Criteria	Planned Alternative	Full-Build Alternative
Sensitive Aquatic Biological Resources	<i>Habitat and Species</i> Listed endangered or threatened species or habitat, NYSDOS SCFWH, NYCWRP RECs, SNWAs.	Avoid and minimize impacts to sensitive aquatic habitats, listed species and NYSDOS or NYC designated special coastal zone habitats.	All sites may affect potential sturgeon and several EFH species present. One site may affect protected shorebirds present. Dredging at one site would impact SAV and freshwater mussels. One site may affect a SCFWH tidal creek complex.	All sites may affect potential sturgeon and several EFH species present. Two sites may affect protected shorebirds present. At least two sites may affect SAV. One site may impact freshwater mussels. One site may affect the Outer Bridge Shoreline REC. One site may affect the adjacent Northwestern Staten Island Harbor Hens Area/Arlington Marsh SNWA, and Bridge Creek REC. Two sites may affect SCFWH tidal creek complexes.
Cultural Resources	Historic architectural resources, Historic districts, Upland and marine archaeological resources (shipwrecks).	Avoid and minimize impacts to mapped cultural resources or historic districts within the vicinity.	All five sites may impact archaeological sensitive areas. Two ports may have unavoidable adverse visual impacts to Native American sites. One site with historic architectural resources within quarter mile. One site has a historic tanker moored nearby.	All sites may impact archaeological sensitive areas. Three ports may have unavoidable adverse impacts to archaeological sites. Three sites with historic architectural resources within quarter mile. One site has a historic tanker moored nearby.
Community Character	Sensitive receptors, (residences, parks, hospitals, schools, etc.) Neighborhoods.	Avoid and minimize impacts to sensitive receptors and community character identified in the vicinity.	Four sites have residential communities within ¼-mile. Potential traffic, air quality and noise impacts along truck routes may occur to these communities.	Nine sites have residential communities within quarter -mile. Potential traffic, air quality and noise impacts along truck routes may occur to these communities.
Hazardous Materials	Hazardous materials, Subsurface contamination, Health and safety issues.	Avoid and minimize disturbances of hazardous materials and protect human health and safety.	All five sites contain contaminated fill soils from former port operations and/or other past uses. Two sites likely require demolition of buildings with potential hazardous building materials. Temporarily disturbance of potentially contaminated sediments during dredging and in-water construction at five sites.	All 12 sites contain contaminated fill soils from former port operations and/or other past uses. Four sites likely require demolition of buildings with potential hazardous building materials. Temporary disturbance of potentially contaminated sediments during dredging and in-water construction at five sites.

Resource	Characteristic	Criteria	Planned Alternative	Full-Build Alternative
Floodplains and Resiliency	100-year floodplains, Wave action prone areas, Coastal Erosion Hazard Zones (CEHAs).	Avoid and minimize impacts to floodplains, floodways, wave action or CEHA areas.	All 5 sites have 100-yr floodplains present on-site and floodways adjacent. Three sites have at least 50% of site within floodplains. No wave action or CEHA areas present.	All 12 sites have 100-yr floodplains present on-site and floodways adjacent. Eight sites have at least 50% of site within floodplains. One site within wave action zone. No CEHA areas present.
Air Quality and GHG Emissions	USEPA National Ambient Air Quality Standards (NAAQS) Nonattainment areas, Sensitive receptors.	Avoid and minimize air quality impacts and sensitive receptors.	All five sites are located within Ozone and/or PM _{2.5} Nonattainment Areas. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels would occur.	All 12 sites are located within Ozone and/or PM _{2.5} Nonattainment Areas. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels would occur.
Noise	Sensitive receptors (within quarter mile), Local noise codes, Truck routes.	Avoid and minimize noise impacts and sensitive receptors.	Four sites have sensitive receptors in the quarter -mile study area that may experience truck traffic-related noise during construction. Most ports are sited on an active port and/or in industrial areas with high ambient noise levels. Minor noise levels are expected from O&M activities.	Nine sites have sensitive receptors in the quarter -mile study area that may experience truck traffic-related noise during construction. Most ports are sited on an active port and/or in industrial areas with high ambient noise levels. Minor noise levels are expected from O&M activities.

5.2.1 Economic Impacts

Implementing the Full-Build Alternative would maximize direct and indirect economic benefits, in the form of economic development, workforce employment, and increased property values and tax revenues. These economic benefits would occur at local, county, State, and regional levels. A broad desktop economic impact study of the Planned and Full-Build Alternatives was prepared assuming the State's OSW energy target of 9,000 MW capacity by 2035 (see Appendix G: Economic Impact study). The study focused on the economic impacts—measured in terms of jobs and income—related directly to the OSW energy program, which can be tracked and quantified through expenditures related to its implementation. The following groups of activities were assessed: renovations and upgrades of identified ports; offshore wind farm construction; O&M activities; and social and community investments for long-run business sustainability such as wildlife monitoring, or funding for community training and skills upgrades.

In terms of job impacts in New York State, the Full-Build Alternative is estimated to support a total of 34,288 job-years during construction followed by 1,309 jobs each year to operate and maintain the OSW energy projects for a total of 32,403 job-years (appendix G). One job-year means one job per year or the average jobs created per year over the total number of years. The OSW industry can be expected to not just create large numbers of construction labor jobs, but also create high quality long-term job opportunities, many of them related to technologically advanced products and processes. Social and community investment expenditures are expected to support another 1,080 job-years over the life of the projects. The New York State workforce living in coastal communities is well positioned to respond to the proposed OSW development (appendix G).

The primary difference between the Planned Alternative and the Full-Build Alternative stems from the inclusion of the additional seven OSW ports to support the NYSERDA program. The inclusion of additional ports increases the economic benefits related to both construction and O&M expenditures in New York State. It is important to note that if the Full-Build Alternative, is implemented, it would provide additional and upgraded port capacity. This would, in turn, make it more likely that the economic impacts of construction and O&M of the proposed OSW energy program could be realized in the State.

The following additional economic benefits would be maximized under the Full-Build Alternative:

- **Electricity Rate Benefits:** The Full-Build Alternative provides more affordable energy than fossil fuel-based power generation and maximizes cost-effectiveness of OSW for New York State ratepayers.
- **Workforce Employment Benefits:** The State's investments in professional training at the Global Wind Organization training centers (SUNY, local colleges, etc.) would facilitate a new generation of OSW professionals within New York State to capture the job opportunities of the emerging OSW industry.
- **OSW Supply Chain Benefits:** Growth in the supply chain of the offshore wind energy industry, including manufacturing facilities and the shipment of supplies would also benefit communities throughout New York State.
- **Property Value and Housing Benefits:** As a secondary regional benefit of the OSW energy production, with the decommissioning of fossil fuel-based power generators and improved health benefits, property values and tax revenues would increase, as well as demand for permanent and/or rental housing.

Further local and regional economic benefits to EJ and disadvantaged communities would be realized through multiple State programs (see chapter 6). Overall, implementing the OSW energy program may result in direct socioeconomic impacts in the form of economic development, workforce employment, and the avoidance of adverse health outcomes.

5.2.2 Land Use Compatibility

Both the Planned Alternative and Full-Build Alternative would use strategic waterfront locations to develop the port facilities. Overall, the Full-Build Alternative would maximize the use of available and practical existing port and waterfront facilities within the State, as nine of the 12 sites would be existing port or waterfront facilities. Three of the sites would involve the creation of a new port facility by converting vacant or undeveloped property; however, each of those sites are located near compatible land use and zoning areas, and two of the sites would essentially be contiguous extensions to existing port facilities. It is anticipated that all the sites would obtain site plan and local town permitting approval by the local municipality and would require federal coastal consistency concurrences from NYSDOS, potentially by incorporating design and operational specifications if required.

In addition to meeting the requisite NYSDOS and town plan and town permitting approvals, the following avoidance, minimization, and mitigation measures could be applied for a more responsible development of the proposed OSW ports of the study alternatives:

- Optimize use of and/or expand existing port facilities to the extent practicable.

- Maximize use of practical waterfront access locations with compatible land and zoning to the extent practicable.
- Incorporate stakeholder and community feedback into the project design, especially to address traffic, air quality, noise, visual and other community-specific impacts of concern.
- Continue coordination with applicable municipalities, officials, and stakeholders.

5.2.3 Transportation Access and Mobility

5.2.3.1 Vehicular Traffic Impacts and Accessibility

Both the Planned Alternative and Full-Build Alternative would use port sites with efficient, practical transportation access. Each of the OSW port sites are in close proximity to highways to facilitate efficient site access by large trucks and construction equipment. Five of the 12 sites would require minor road access improvements. One site would require major improvements including a new vehicular bridge and a rail bridge over a stream, and a short rail spur extension. During construction, congestion along truck routes may occur. As practical, some sites would be able to utilize available freight railroad access to reduce truck trips. Due to the vehicular and truck traffic generated by the construction and operations of the OSW ports, Traffic Management Plans would be required in coordination with the local municipalities and Department of Transportation (DOTs), which typically include:

- Truck routes avoiding sensitive receptors.
- Truck routes incorporating speed zone signage, new traffic signal(s), traffic signal timing adjustments, and widening turning lanes.
- Specific traffic control plans and truck routes for oversized load deliveries.
- Adding highly visible signage and lighting of construction sites and intersections leading to the site.
- Scheduling truck deliveries and construction traffic to avoid peak hours, as possible.
- Posting regular construction-related traffic updates to the local community through social media, public notices, and/or other appropriate communications tools.
- Maximizing use of freight rail and waterborne vessels to further reduce truck traffic.

5.2.3.2 Vessel Navigation Impacts and Accessibility

A ports and vessel navigation study was prepared by SUNY Maritime for the study alternative ports (see appendix F) and also referencing the 9GW Port Uses and Navigation Assessment prepared by COWI to assess the potential ports navigation and accessibility issues. With the necessary dredging, the Planned Alternative and Full-Build Alternative would have efficient vessel access and viable navigation routes to OSW Farms. Adequate channel depths are available adjacent to the Full-Build Alternative sites; however, two OSW port sites may have heavy load restrictions during low tide. Four ports have winter ice concerns and have no existing anchorage locations nearby, which would require direct “homeruns” routes to

the ports. Three sites do not have turning basins or areas to turn for larger vessels. Four OSW ports would have vertical air draft bridge restrictions at 135 feet. However, these issues could be addressed with proper planning and operations. Mitigation measures that are recommended that would enhance navigational access and efficiencies, include maintenance dredging, adding air-draft sensors at downstream bridges, and adding anchorage and turning areas at strategic locations as described below.

Three of the Full-Build Alternative ports may have potential vessel or ferry traffic congestion in the vicinity. However, it is assumed that vessel movements would be accommodated with speed restrictions, using available meeting/overtaking areas and effective VHF (two-way radio) communication. For example, at the Port of Coeymans, there are currently two to four tugboat round trips and one ship per week, and the O&M phase (manufacturing and staging) at new OSW port facility would add two to four round trips per week but will also include one to two larger (130 feet x 400 feet) barges to transport OSW components.⁶⁹ The new OSW operations at Port of Coeymans would not represent a significant increase in vessel traffic when compared to the overall commercial traffic of 3,000 barges and vessels on the Hudson River annually, exclusive of recreational boating traffic.⁷⁰ Similarly, the O&M phase (manufacturing and staging) at Port of Albany Expansion is estimated to generate approximately two to three barges per week for the transport of outbound products, and one vessel per month for the delivery of inbound materials, equating to roughly 21 vessels/barges per year from the Port of Albany.⁷¹ This increase in maritime traffic is not projected to have a significant impact on the existing Hudson River maritime commercial or recreational traffic, and the use of barges and vessels for the delivery and shipping of materials/products reduces the need for trucks, further minimizing the impact on the surrounding roadway network.

According to NYSERDA's *Navigational Safety Risk Assessment*⁷² of the Full-Build Alternative, it is conservatively assumed that a 4% vessel increase would occur at the confluence of the Ambrose Channel south of the NY Harbor (gateway to the OSW farms), assuming all of the projected vessels from the OSW ports operating concurrently. The New York Harbor would have the capacity to support this amount of additional OSW industry vessel traffic. Because of the new vessel traffic that would occur, study alternatives may result in a small but measurable amplification of risks already present in the New York State's navigable waters, to the extent OSW projects increase the existing vessel traffic. The Risk Assessment demonstrated that the OSW impacts are expected to be small (less than 4% increase in overall

traffic at all hotspots considered) and navigation and communication impacts are not expected to be more significant than those caused by the baseline vessel traffic. The results of the analysis of safe navigation indicate that the potential increase in vessel navigation safety is either negligible or otherwise clearly mitigatable. The quantity of OSW vessel traffic would not pose additional risk to vessel safety to existing waterways within New York State.

Best management practices and related measures necessary to manage new vessel traffic depends largely on the size, maneuverability, and density of traffic. To ensure a reliable and efficient marine transportation system within the Hudson River, it would be responsible for ports to coordinate with the Hudson River Safety, Navigation, and Operations Committee (HRSNOC). In the New York Harbor, vessel traffic is managed by U.S. Coast Guard's Vessel Traffic Service (VTS). Even conservatively assuming a 4% increase in vessels of the Full-Build Alternative operating concurrently, the New York Harbor would have the capacity to support the additional OSW industry vessel traffic. The United States Coast Guard (USCG) would require regular communication using the Local Notices to Mariners (LNM) to the local marine community, providing updates construction-related and O&M vessel traffic.

In addition, the following avoidance, minimization, and mitigation measures may be considered to facilitate and coordinate OSW vessel navigation.⁷³ ⁷⁴

- Maintenance dredging between the port and adjacent federal navigation channel.
- Adding air draft sensors on downstream bridges and fog sensors in chronically foggy areas.
- Adding more anchorage and turning areas, especially on the Hudson River north of Kingston.
- Maintaining continuous and effective VHF communication for meeting/overtaking vessels and monitoring vessel traffic.
- Performing a scan and survey to identify and mitigate impacts to subsea infrastructure (cables, pipelines, etc.).
- Continued consultation with maritime stakeholders, including USCG, VTS, PANYNJ, and USACE on best practices.
- Active communication with the Maritime Association of the Port of New York and New Jersey Harbor Safety, Navigation, and Operations Committee.
- Utilization of existing Traffic Separation Schemes (TSSs), maintained channels, and transit lanes by vessels associated with the port to comply with existing uses and management of the surrounding waterway, to the extent practicable.
- Requiring all construction vessels be equipped with working Automatic Identification System (AIS) transceivers at all times.
- Marine coordination for vessels associated with the port (i.e., a central coordination hub from which all Project vessel movements would be managed, and third-party traffic would be monitored).

- Monitor Tide Stations in the Capitol District for real time water level data to assist in Navigation in the Hudson River from NOAA, Hudson River National Estuarine Research Reserve (HRNERR) and other sources.

5.2.4 Environmental Justice

A majority of the OSW port sites in the Planned Alternative and three quarters in the Full-Build Alternative may have EJ and disadvantaged communities present within ¼-mile. These communities may experience temporary traffic, air quality and noise impacts and particularly along truck routes, similar to non-EJ communities in the vicinity. The sites with EJ communities and disadvantaged communities present would require an EJ analysis in accordance with State (NYSDEC CP-29), Section 7(3) of the NYS Climate Act and/or federal (Executive Order (EO) 12898) criteria, including an assessment of whether the proposed project would result in disproportionately high and adverse effects on EJ populations, taking into consideration minimization, mitigation, and enhancement measures and project benefits, as appropriate. If EJ or disadvantaged communities are present, public outreach efforts would be required to involve minority and low-income populations. As an example of effective mitigation, the Port of Albany has an EJ community nearby that the Town of Bethlehem would require all OSW-related truck routes to avoid, to eliminate the potential for air quality, traffic, and noise impacts.⁷⁵

To actively support EJ communities and provide cumulative economic benefits at the statewide program level, the State has number of programs and tools in place. NYSERDA's procurement of Offshore Wind Renewable Energy Credits (ORECs) will assign 20% of the score of each project proposal to economic benefits, including benefits to disadvantaged communities, creation of workforce training opportunities, and job creation. The Climate Justice Working Group, established by the NYS Climate Act, will identify disadvantaged communities, and help ensure that the benefits of climate change responses accrue to these disadvantaged communities. The State is also committed to requiring developers to pay workers a prevailing wage and to utilize project labor agreements. New York State has also invested \$20 million to establish the Offshore Wind Training Institute in partnership with NYSERDA and SUNY Stony Brook and Farmingdale to train a new workforce for the OSW industry at the affordable SUNY institutions.

In addition, the NY/NJ Bight Regional Working Group on Supply Chain Development would be continually coordinating to meet mutual regional OSW energy targets related to enhancing the domestic supply chain and deliver benefits and economic opportunities to underserved, disadvantaged, and overburdened communities. Thousands of construction and O&M jobs would be generated in close proximity to EJ communities and the resulting benefits of job creation could offset the temporary effects of construction.

Another regional program to support EJ communities is the NYCEDC's 15-year, \$191 million Offshore Wind (OSW) Vision NYC plan to make New York City a leading destination for the OSW industry. The plan also ensures the City meets nation-leading climate targets of 100-% clean electricity by 2040 and carbon neutrality by 2050. The \$191 million OSW investment would put New York City on path to create over 13,000 jobs and generate \$1.3 billion in average annual investment and reduce 34.5 million tons of CO₂—the equivalent of removing nearly 500,000 cars from roadways for 15 years. NYC's Offshore Wind NYC⁷⁶ would be providing equity to disadvantaged communities by:

- Ensuring 40% of job and investment benefits would be directed to women, minorities, and environmental justice communities.
- Transforming maritime properties to bring jobs and environmental benefits to historically disadvantaged communities.
- Enabling existing development and business support systems to prepare a diverse pool of talent and entrepreneurs to serve the industry.
- Attracting investment to grow the industry and create good-paying jobs for New Yorkers of all backgrounds.
- Making NYC the model for growing urban OSW clusters in the United States and ensure that the clean energy transition is equitable for all.

NYCEDC and its partners have collaborated to activate the SBMT as an OSW port and support the Empire Wind Project. As part of their operation at SBMT, the Empire Wind Project plans to establish a \$5M fund to ensure that low-income populations, people of color, and New Yorkers from EJ communities equitably share in the benefits of the industry. Nearly 5,000 New York City jobs could be created by 2035 through regional offshore wind deployment, and SUNY Maritime College has the capacity to provide training and certify hundreds of workers yearly. New York City would invest in education to create pipelines to these jobs, funding new wind energy programs at CTE high schools and CUNY campuses.

In addition to the federal, regional and State EJ policies, the following avoidance, minimization, and mitigation measures can be applied to mitigate EJ community impacts more responsibly:

- Optimize use of and/or expand existing port facilities to the extent practicable.
- As part of the Traffic Management Plan, in coordination with the affected local municipalities and DOTs, identify truck routes that avoid EJ communities.
- Incorporate local feedback from local EJ communities and incorporate applicable measures to avoid, environmental impacts on communities.
- Implement the BPMs and mitigation measures identified in traffic (Section 5.2.3), air quality (Section 5.2.11), and noise (Section 5.2.12).
- Coordinate with the NY/NJ Bight Regional Working Group on Supply Chain Development to deliver benefits and economic opportunities (jobs) to underserved disadvantaged, and overburdened communities.
- Continue to maintain, a strong community engagement policy throughout life of the Project, including pre-application meetings with local municipalities and stakeholders, open houses, and a Project website with updates to the local community.

5.2.5 Terrestrial Biological Resources

Impacts to potential habitat for protected bats, shorebirds, amphibians, insects and/or plant habitats would occur. Impacts to terrestrial wildlife would be partially mitigated by repurposing existing waterfront facilities or using previously disturbed sites to the extent possible. Impacts to wildlife may consist of temporary displacement, habitat loss, and direct mortality. Direct mortality is most likely with less mobile species such as reptiles and amphibians and nesting birds. Habitat loss can cause more mobile species such as birds and mammals to seek suitable habitat adjacent to the port facility. Some species may be temporarily displaced during the construction phase but return to the site as noise levels decrease during the operational phases of less disruptive OSW port facilities (CTVs, SOVs, etc.).

The Planned Alternative and Full-Build Alternative would result in very similar potential impacts to terrestrial biological resources, including shorelines. However, impacts to terrestrial resources would be higher at the new ports that would clear greenfield sites.

During construction and operations, the potential impacts to terrestrial biological resources may include:

- Clearing vegetation and potential terrestrial habitats for migrating, breeding, foraging or nesting.
- Potential soil erosion into adjacent vegetation and wildlife habitat.
- Potential accidental releases from construction vehicles or equipment affecting terrestrial habitats.
- Potential disruption of wildlife travel corridors for migration, feeding and/or breeding.

Seven of the Full Alternative and three of the Planned Alternative sites may involve disturbance/removal of potential protected species habitat (see appendix D for further details). Two other sites, Port Ivory and Arthur Kill Terminal, would affect the shorebird and waterfowl habitat within and adjacent to designated RECs, including the Northwestern Staten Island Harbor Hens Area/Arlington Marsh (Port Ivory). Of the special-status listed birds, the piping plover and Red Knot are species that have designated critical habitat within shoreline environments of New York State.

As the port sites are located within Atlantic Flyway migratory corridor, a number of birds may potentially be affected during migration season between nesting and wintering areas (see Migratory Bird Listing in appendix D). In addition, the Northern long-eared bat and Indiana bat summer roosting habitat would be affected by proposed tree clearing at the port sites.

The proposed construction activities within the terrestrial resources, including shoreline habitats with wetlands would require USACE Section 10/404 Permits and NYSDEC Tidal Wetlands/Protection of Waters/Part 182 Incidental Take Permits, which would address impacts to protected species. In particular, seasonal work restrictions would be required by the permits, including avoiding the shorebird nesting and fledging seasons and clearing trees during the bat hibernation season. The permits would also require minimizing the clearance and disturbance of protected species habitats as practicable. NYSDEC State Pollution Discharge Elimination System General Permit (SPDES GP) for Stormwater Discharges (e.g., Stormwater Pollution Prevention Plan [SWPPP]) would also be required to implement soil erosion and sediment control during construction. Further avoidance, minimization, and mitigation measures can be applied to mitigate potential terrestrial impacts more responsibly:⁷⁷

- Siting within previously disturbed and developed areas to the extent practicable.
- Implementation of lighting reduction measures such as downward projecting lights, lights triggered by motion sensors, and limiting artificial light to the extent practicable, where safe and practicable to reduce attraction of avian species.
- Installation of anti-perching devices to discourage migratory bird landings, where appropriate.
- Management of accidental spills or releases of oils or other hazardous wastes through a SPCC Plan, as applicable.
- Implementation of “green stormwater infrastructure” such as vegetated swales and stormwater basins, etc. to address the increased stormwater runoff and water quality degradation.
- Consideration of staggering silt fencing or other erosion control devices in sensitive areas to facilitate the passage of biota, if deemed effective.
- Mitigating impacts to protected species habitat through “Net Conservation Benefit” Projects. A net conservation benefit is achieved when the adverse impacts of a proposed activity on a protected species or its habitat will be outweighed by the mitigation measures.

5.2.6 Sensitive Aquatic Resources

5.2.6.1 Wetland and Water Resources

The Planned Alternative and Full-Build Alternative would result in very similar potential impacts to sensitive aquatic resources, including wetlands and protected fisheries habitat due to their waterfront locations. For the Planned Alternative, the SBMT would have approximately five-acres of tidal open water impacts from new infrastructure and four-acres/120,000 CY of dredging;⁷⁸ Port of Coeymans would result in 5.3-acres/156,000 CY of dredging,⁷⁹ and the Port of Albany would impact approximately three-acres/105,000 CY dredging, and fill up to two acres⁸⁰ of tidally influenced freshwater wetlands; Port Jefferson would likely require about two acres of dredging; and Port of Montauk would have minimal dredging (0.41 acre/2,500 CY).⁸¹ Based on the estimated impacts, the Planned Alternative may dredge approximately 15 acres of benthic habitat (sediments), fill five acres of tidal wetlands from new infrastructure impacts, and fill two acres of freshwater wetland impacts. Three of the Full-Build Alternative sites are new port sites that would require substantial dredging to benthic habitats to create new berths and substantial tidal wetland fill impacts involving regrading to create a level and elevated shoreline. Arthur Kill Terminal is approximately nine plus acres of tidal wetlands fill, three plus acres of freshwater wetlands from regrading site and new infrastructure, more than 25 acres of dredging. Port Ivory and NYS Port Wind would each require approximately 10 plus acres of tidal wetlands fill and 15 plus acres of dredging. The other eight ports are estimated to have relatively limited dredging (one acre each) and acreage of tidal wetland fill impacts (0.5 acre each). Assuming this estimation, the Full-Build Alternative may result in an estimated 80 acres of dredging impacts to benthic habitat and 40 acres of fill impacts to tidal wetlands, and five acres of freshwater wetland impacts.

Specifically, within the Full-Build Alternative, the NYS Wind Port and Port of Albany would impact NYSDEC-mapped SAV, and intertidal mix wetlands of the SCFWH Papscane Marsh and Creek and the Normans Kill tidal creeks, respectively. Two ports on western Staten Island—Port Ivory and Arthur Kill Terminal—would potentially impact RECs with emergent, scrub-shrub and forested estuarine and marine wetlands along the shoreline. The regulatory agencies would require tailored wetland mitigation to compensate for impacts to these unique wetland habitats.

All port site in-water improvements, including dredging and in-water fills for infrastructure (riprap, bulkheads, trestles, etc.), would require securing the applicable USACE Section 10/404, NYSDEC Tidal and/or Freshwater Wetlands/Protection of Waters/Water Quality Certificate permits, at a minimum. NYSDEC also regulates development within the wetland “adjacent area” or wetland buffer surrounding

wetlands. Based on the estimated benthic and wetland impacts at the sites, compensatory mitigation would be required at a majority of the port sites. As part of the regulatory process, it is important to acknowledge that avoidance and minimization measures must be undertaken first during planning and design of the project to demonstrate to the USACE and NYSDEC, that the wetland impacts have been minimized to the extent practicable. NYSDOS encourages developers to consider on-site dredged material management, as sediment characterization results are appropriate, and the management plan meets NYSDEC permitting requirements. Once these measures have been applied to the design, then justification can be given for the proposed wetland impacts.

Individual mitigation plans would need to account for losses of specific wetland types and meet USACE and NYSDEC requirements. In particular, “Net Conservation Benefit” mitigation are agency-preferred mitigation plans, whereby the proposed habitat creation or restoration benefits of the mitigation would outweigh the adverse impacts of a proposed activity on a protected species or its occupied habitat. Some port sites would require additional mitigation measures to account for site-specific resources present prior to dredging or installing new infrastructure, such as removing and transplanting the SAV beds or freshwater mussel bed(s) to approved locations offsite. The following regulatory mitigation options could be considered at the port sites to provide cost-effective and environmentally responsible wetland mitigation:

- Wetland Restoration: Reclaiming an on-site or off-site degraded wetlands to bring back one or more functions that have been partially or completely lost by such actions as filling or draining. It is a preferred form of mitigation because it typically has the greatest chance of successfully establishing natural wetland functions. Wetland studies, such as the Hudson River Comprehensive Restoration Plan or USACE Hudson Raritan Estuary (HRE) Study, could be considered for potential restoration sites.
- Wetland Creation: Making a new wetland, usually by flooding or excavating lands that were not previously occupied by a wetland. It offers the benefit of maintaining no-net-loss of wetland acreage. Careful design, monitoring, and long-term maintenance are critical for wetland creation sites. Creation is especially successful when it is done by enlarging an existing wetland or waterbody.
- Wetland Enhancement: Involves altering an existing functional wetland to increase selected functions and benefits to a degree that offsets losses of these functions or benefits in another wetland or parts of the same wetland.
- Wetland Bank Credits: In the New York City area, the Saw Mill Creek Wetland Mitigation Bank may be available to purchase mitigation credits. However, there are limited mitigation credits available, and the credits would only be available to projects within NYSDEC Region 2 (New York City). Other wetland mitigation options would need to be explored for port sites outside New York City.

- Other potential in-lieu fee programs that may be discussed with the USACE and NYSDEC as potential mitigation options:
 - New York In-Lieu Fee Program (ducks.org): Middle-Hudson Watershed (proposed)
 - The Wetland Trust

Wetland and water quality impacts are minimized through the implementation of typical USACE Section 10/404 Permit and NYSDEC Tidal and/or Freshwater Wetland Permit conditions, such as the use of environmental bucket/closed clamshell for dredging, silt curtains, sheeting, cofferdams, floating containment booms, soil erosion and stormwater runoff controls. Depending on the level of sediment contamination, dredged sediments could be drained and reused on site or other locations with approved Beneficial Use Determinations (BUDs) from NYSDEC. Port of Coeymans is planning on reuse of sediments via a BUD and has been successful doing so in the past. Further mitigation measures would be implemented through the implementation of NYSDEC SPDES GP/SWP/PP to control soil erosion and stormwater runoff and SPCC plan to manage petroleum storage and accidental spills or releases of oils or other hazardous wastes.

Responsible measures to reduce disturbances to open waters, wetlands, and wetland buffer (adjacent) areas may include:

- Optimize use of and/or expand existing port facilities, to the extent practicable.
- Minimize new shoreline hardening or waterward expansions of existing hardened shorelines.
- Identify beneficial reuse options for dredged material during construction and maintenance dredging.
- Design in-water port infrastructure and berth area design to minimize impacts within regulated wetlands and wetland buffer (adjacent) areas.
- Designate vessel routes to avoid known areas of SAV.
- Avoid construction access through regulated wetlands and waterbodies.

5.2.6.2 Species and Habitat

All the proposed port sites may have shortnose sturgeon, Atlantic sturgeon, and several EFH species present at least during migration seasons (see appendix D for species listings). Shortnose sturgeon live throughout the Hudson River and have known spawning grounds (spring season) in the vicinity of Port of Albany, NYS Wind Port and Port of Coeymans, between the Troy Dam and Coxsackie, NY. Atlantic sturgeon can be found throughout the Hudson River Estuary, as well as within the coastal waters of the Atlantic Ocean and Long Island Sound, where they spend most of their adult life. Spawning by Hudson River Atlantic sturgeon (a component of the NY Eight Distinct Population Segment) takes place during spring in the vicinity of Hyde Park. Juvenile Atlantic sturgeon remain in the estuary for two to six years

before moving to the ocean to mature. It is also known that adult shortnose sturgeon also concentrate in overwintering areas over 50 miles south of the proposed project area from Saugerties to Hyde Park and to areas just south of Kingston, NY, near Esopus Meadows. Sturgeon are a demersal species and are typically found on the river bottom. According to recent telemetry monitoring conducted over four years in the vicinity of the Port of Coeymans,⁸² the vast majority of sturgeon positions detected were in the channel of the Hudson River, where depths are 35 feet and greater. However, the majority of these tag detections represented mature fish; earlier life stages (larvae, post-larvae, juveniles) would potentially occupy a greater range of depth strata habitats and could potentially be subject to impacts occurring outside of the river channel.

Proposed in-water construction activities at the port sites, including dredging, pile installation, shoreline stabilization and other infrastructure improvements would be subject to USACE Section 10/404 Permits and NYSDEC Tidal Wetlands/Protection of Waters Part 182 Permits, which would address impacts to sensitive aquatic species such as sturgeon species. These construction activities would cause potential disruptions of fisheries during all life cycles, including to aquatic corridors during migration, foraging (feeding) and/or spawning seasons. The USACE federal permitting process would require Section 7 Endangered Species Act (ESA) consultations with the NMFS and USFWS, Section 106 consultations with New York State Historic Preservation Office (NYSHPO) and NEPA documentation would be required. Similarly, NYSDEC permitting process would require consultations with NYSDEC NHP and Section 14.09 consultations with NYSHPO and SEQRA documentation. Proper environmental review and permitting process scheduling should be accounted for each proposed port project, as applicable.

Dredging at the port sites would result in a permanent and temporary loss of sturgeon and other EFH species foraging habitat and benthic prey resources; however, the proposed dredging areas represents a small portion of habitat affected compared to the surrounding available foraging habitat at each port site (New York Harbor, Hudson River, Long Island Sound, etc.). Dredged sediment is anticipated to be permanently removed from the site. Benthic habitat impacts are anticipated to be temporary, as the benthic community is likely to recolonize the area over time following disturbance. More importantly, all proposed dredging would be subject to USACE Section 10/404 Permits and NYSDEC Tidal Wetlands/Protection of Waters Permits and NMFS review/approvals, which would require dredging to occur within a seasonal work window to avoid EFH and sturgeon species impacts. Within the Hudson

River, seasonal work windows for sturgeon would also be beneficial to the American shad, banded killifish, spottail shiner and alewife, which are other species known to have a spawning season similar to the sturgeon. However, depending on species present, additional seasonal work windows may be required. Further permit condition requirements typically require dredging within turbidity curtains and use of closed clamshells, depending on the sediment contamination.

In-water pile driving can produce lethal and sublethal underwater noise impacts to sturgeon that extend into the navigational channel.⁸³ Pile driving and in-water construction would also be subject to USACE Section 10/404 Permits and NYSDEC Tidal Wetlands/Protection of Waters/Part 182 Permits and NMFS review/approvals, which would require mitigation methods to reduce the risk of underwater noise impacts. To minimize pile driving underwater noise impacts, the federal and State permits may require underwater noise control measures such as drilled shaft pile installation, vibratory pile installation, and/or soft-start procedures to protect EFH or endangered fish species.

Sturgeon mortalities may occur from vessel strikes and a cumulative increase in vessel traffic associated with the Full-Build Alternative (discussed in greater detail in chapter 6) would likely result in increased risk of sturgeon mortality.⁸⁴ It should be noted that strikes to slower moving marine mammals and sea turtles may occur but would be rarer in comparison to potential for sturgeon strikes. Factors that potentially increase risk of vessel strike mortality are draft of vessel, speed of operation, width of river, and amount of temporal and spatial exposure. Deeper draft vessels occupy a greater portion of the water column and place the propellers closer to the river bottom where sturgeon are believed to spend the majority of their time. Increased risks of vessel strikes occur with vessels operating at greater speeds and within narrow areas of the river, which reduce the ability of sturgeon to avoid oncoming vessels. If vessel traffic is occurring over an area of sturgeon congregation or long-term residency it would increase the risk of vessel strikes.

Work barges (no propeller) and tugboats (propeller) used to support construction of the ports, construction of the OSW farms and major repairs during O&M would travel at slow speeds at the ports, usually under 3 knots.⁸⁵ Periods of active barge movements at a given port may involve one to two barge trips per day. Typical tugboat drafts are less than six feet, which leaves a large portion of the water column as clearance between the propeller and the depths sturgeon most commonly occupy. For these reasons, work barge activities may represent lower risk of vessel strikes. However fully loaded ocean-bound barges to support the construction of OSW farms may extend to 35 feet drafts, which causes regulatory agency concern for potential vessel strike impacts to sturgeon. For example, at the Port of

Albany, where existing barges typically have a 12 feet draft, the fully OSW-related barges would have a draft up to 35 feet draft within a narrow reach of the Hudson River. During O&M, crew vessel boats may have a draft of four to six feet; however, the boats would travel at higher speeds of 25–35 knots (28.8– 40.2 mph). Although these crew boats typically do have relatively shallow drafts, the higher speeds of the crew vessels present a higher risk of sturgeon strikes by vessel, depending on the presence and concentration of sturgeon at a given port site.

Further assessments of the cumulative potential increase in vessel strike impacts to sturgeon associated with the Full-Build Alternative are discussed in greater detail in chapter 6. Mitigation measures (such as reducing vessel speeds) would be identified during the ESA Section 7 consultation and USACE and NYSDEC permitting processes. Ultimately, federal and State (Part 182 Permits) Incidental Take Permits may be applied to a given port site to monitor and restrict the number of protected species incidentally injured or taken as a result of a project. Measures to address potential sturgeon and EFH impacts more responsibly include:

- Conducting Section 7 ESA consultation (with NMFS, NYSDEC, USFWS) meetings early in the permitting process and holding pre-application meetings with regulatory agencies as early possible to identify the best means to avoid and minimize impacts to sturgeon, EFH and other T&E species and inform the design early in the process.
- Development of mitigation plans that incorporate benthic habitat restoration to create/restore foraging and spawning habitat for sturgeon and EFH species.
- Implement slow speeds for project vessels within the port vicinity to reduce risk of sturgeon strikes.
- Development of wetland mitigation plans that incorporate Net Conservation Benefits.
- For ports on the Hudson River, development of wetland mitigation plans that incorporate elements the Hudson River Comprehensive Restoration Plan.
- As applicable and required, perform telemetry monitoring and/or visual monitoring of sturgeon and other protected species during potentially harmful activities.
- Proper planning and design of in-water port infrastructure and mooring areas to minimize impacts within marine habitats of sturgeon, EFH species and other sensitive aquatic resources.
- Use of weighted turbidity curtains surrounding pile installation and dredging areas to prevent fish species from entering the work area and to limit the potential suspended sediments to escape the work area.
- Adherence to in-water seasonal restrictions during sensitive times of year (e.g., migration, spawning, breeding, nesting seasons) to protect species, as required by regulatory agencies.
- Apply construction best management practices (BMPs) to minimize turbidity and water quality impacts, including floating containment booms, sheeting containment or cofferdams, closed clamshell dredge equipment, as applicable.

- Plan for underwater noise and vibration mitigation methods to reduce impacts to protected fisheries, including drilled piles, vibratory hammers, soft start-ups to and wooden block buffers during pile driving, and deployment of vibration containment (“bubble curtains”), as applicable.
- Apply exclusion zones and real-time monitoring systems as appropriate, to perform underwater noise assessments relative to impact thresholds, overseen by a qualified fisheries biologist based on consultation with the regulatory authorities, as applicable.
- Management of accidental spills or releases of oils or other hazardous wastes SPCC Plans in accordance with NYSDEC and USCG requirements, as applicable.
- Implementation of NYSDEC-approved SPDES General Permit for Stormwater Discharges, including “green stormwater infrastructure” practices.
- Implementation of lighting reduction measures such as downward projecting lights, lights triggered by motion sensors, and limiting artificial light to the extent practicable—where safe and practicable.

5.2.7 Cultural Resources

Ten of the Full-Build Alternative sites are within CRIS-mapped archaeological sensitive areas, typical for shoreline areas, including Arthur Kill, Port Ivory, NYS Wind Port, Homeport Pier, Port Jefferson, SBMT, Brooklyn Navy Yard, PAMT, Hempstead Public Works Area, and Port of Montauk. Historic shorelines are commonly identified as archaeological sensitive areas. Only three sites had historic architectural resources or historic districts in the vicinity, including PAMT, Brooklyn Navy Yard and Port of Coeymans. At least three sites (NYS Port Wind, Port of Albany, Port of Coeymans) are located within the vicinity of known historic site of Native American significance requiring further consultation with Native American tribes/nations and other consulting parties to determine if adverse effects would occur from the project(s). Specifically, on the Hudson River, while final approvals have not been issued, it appears there may be unavoidable and unmitigable direct impacts to Papscanee Island (significant Native American site) and unavoidable and unmitigable visual impacts (views) from Papscanee Island and Schodack Island (both significant Native American sites) would occur during fabrication of large OSW components. The NYS Wind Port site is located within the Papscanee Island Historic District of significance to the Stockbridge-Munsee Mohican Nation, which would likely unmitigable direct impacts to these historic resources.

NYSHPO consultation would be required at all sites, including a Section 14.09 process for State reviews and a Section 106 process for federal review processes (required for USACE and other federal permits). Direct and indirect effects would need to be assessed, including potential visual and/or contextual impacts to historic resources within viewsheds of port sites (e.g., Port of Albany and Port of Coeymans are within the viewshed of Native American tribal lands of significance). Upland ground disturbances and dredging may disturb potential archaeological resources, and NYSHPO may require further investigations prior to

construction, and/or monitoring during excavations or dredging. If impacts to historic resources are identified, Memoranda of Agreements (MOAs) or Letter of Resolutions (LORs) may be necessary to document mitigation commitments. Depending on the location, NYSHPO consultations may also require engagement with Native American tribes/nations and other consulting parties to review the design and mitigation measures. Measures that may be adopted by OSW ports include, avoidance of archaeological resources by siting projects within previously disturbed areas; committing to an archaeologist on site to monitor during ground disturbances if required by NYSHPO; and the development and implementation of an Unanticipated Discoveries Plan, which outlines the procedures to follow if archaeological materials or human remains are discovered.

5.2.8 Community Character

The Planned Alternative and Full-Build Alternative are not anticipated to adversely impact the broad elements of community character, land use, development patterns, population growth and density, and localized socioeconomic conditions. Four of the Planned Alternative sites and nine of the Full-Build Alternative sites have residential communities in the vicinity. However, most of the port sites would be located within or adjacent to existing ports and working waterfront areas, and consistent with the local community character. Within the neighboring residential communities of the port sites, temporary traffic, noise, visual and/or air quality effects may occur adjacent to the port sites and along the truck routes. Temporary visual impacts would occur during manufacturing and staging large OSW components. However, for pre-existing ports, over the long term, those ports would retain an appearance that is aesthetically similar to the existing industrial port uses.

It is anticipated that all the sites would apply for local municipality approvals and incorporate specific mitigation measures stipulated in the town/city approvals. In addition, each site would obtain federal coastal consistency concurrences from NYSDOS and incorporate related design and operational specifications requested.

To more responsibly address potential community character related impacts, mitigation measures identified in the land use (Section 5.2.2), traffic (Section 5.2.3), air quality (Section 5.2.11), noise (Section 5.2.12) could be incorporated. Local stakeholder and public feedback should also be incorporated into the site design and mitigation measures to minimize impacts on communities.

As a benefit to local communities, the construction and operations of the proposed OSW ports would create local job opportunities and stimulate the local economy, with added local business activity (restaurants, hotels, etc.). Over the long-term, the proposed OSW port improvements would represent major investments and stability for the local port, a potential employer for the community.

5.2.9 Hazardous Materials

The Planned Alternative and Full-Build Alternative sites would disturb contaminated fill and sediments from former port operations and/or other past uses. For example, the Port of Albany site contains former landfill soils of fly ash and bottom ash with metals and other contaminants.⁸⁶

Dredging and in-water construction at the Port of Albany and NYS Wind Port along the Hudson River would likely disturb known pesticide and PCB-contaminated sediments. Sediment testing at Port of Coeymans indicated that the proposed dredged material primarily met Class A concentrations and Class B sediment contamination concentrations. Dredging at the ports within the NY Harbor would likely disturb contaminated sediments such as heavy metals, pesticides, PAHs, and dioxins/furans and potentially PCBs.

Two of the Planned Alternative and six of the Full-Build Alternative sites, all sited within existing ports, may demolish structures with potential hazardous building materials (e.g., asbestos). In addition, upland soil excavations at all sites may disturb contaminated soils from previous port, industrial and other past uses.

As part of environmental review and permitting requirements, the following plans and engineering controls would be developed in coordination with the NYSDEC to mitigate potential effects to the environment and human health during construction and operations. Responsible measures to address potential impacts include:

- Perform Phase I and Phase II Environmental Site Assessments (ESAs) to identify the locations and quantities of contaminated and hazardous materials that may be disturbed.
- Prepare a Soil Management Plan to identify proper guidance and management for the handling, reuse, transport and/or disposal of contaminated soils in accordance with NYSDEC and EPA standards and regulations. Dust control measures should also be employed.
- A dewatering and discharge plan should be prepared to guide proper management and treatment of groundwater encountered during excavation according to NYSDEC and EPA standards and regulations.

- A Health and Safety Plan (HASP) should be established for the purpose of reducing the risk of contaminant exposure to workers and the public.
- Restrict access to both onshore and offshore work sites to authorized and qualified personnel.
- A Hazardous Materials Management Plan should be developed for testing, handling, transporting, and disposing of hazardous materials encountered during the proposed excavations, consistent with applicable regulations.
- As applicable, perform investigations and develop engineering and institutional controls for remediation plans as required by the NYSDEC, including but not limited to: Remedial Investigation Work Plan (RIWP), Remedial Investigation Report (RIR), Remedial Action Work Plan (RAWP), Site Management Plan (SMP), Remedial Action Monitoring Plan (RAMP), Community Air Monitoring Plan (CAMP), and/or Community and Environmental Response Plan (CERP).
- Prepare and implement a State Pollutant Discharge Elimination System (SPDES) General Permit for Construction Activities/Stormwater Pollution Prevention Plan (SWPPP) to control soil erosion and stormwater runoff.
- Prepare and implement a Spill Prevention, Control, and Countermeasures (SPCC) plan to manage accidental spills or releases of oils or other hazardous wastes.

5.2.10 Flooding

Potential for tidal flooding from waters affected by sea-level rise exists at all of the Planned Alternative and Full-Build Alternative sites, as 100-year floodplains are present on site, and floodways are adjacent. At three of the Planned Alternative and eight of the Full-Build Alternative sites, a mapped 100-year floodplain covers at least half the site. One site is located within a moderate wave action zone. However, this a common setting for coastal port locations.

To address potential flooding, the site plans would elevate the facilities above the floodplain and/or reinforce infrastructure to meet (1) FEMA and floodplain design guidelines accounting for sea-level rise, wave action and floodways, (2) NYSDEC SFRMG floodplain design guidelines per 6 NYCRR 490, (3) Climate Change Adaptation Guidance on WRP Policy for ports in New York City and (4) other local town floodplain development permit requirements and building codes. Specifically, the SFRMG further recommends that the high sea-level rise projection be applied for critical facilities and equipment, and the medium projection be applied to non-critical facilities and equipment. Two feet of freeboard is required for enclosed structures; three feet is recommended for critical structures and equipment. In some cases, it may be sufficient to elevate critical equipment, e.g., electronic controls to the recommended elevation within structures that themselves cannot be feasibly constructed to the recommended elevation. NYSDOS Resilience Implementation and Strategic Enhancements (RISE) Local Assessment Tool should be referenced to also incorporate resilience principles and achieve

as many co-benefits from waterfront development, as possible. NYSDOS Office of Planning, Development and Community Infrastructure also provides support for coastal flood resiliency planning online⁸⁷, with key resilience principles to help understand their vulnerabilities, advance resilience measures that reduce risk, including through the use of natural infrastructure and natural processes, and avoid investments that are not highly adapted to a changing climate. See Section 4.8: Floodplains for additional discussion regarding flood-risk reduction.

To further address potential flood impacts, port facilities should avoid and minimize placement of structures within SFHAs, as practicable. Structures should be founded on concrete foundations to resist any flooding impacts and allow for positive drainage and surface flow to the proposed stormwater conveyance and treatment systems. In-water infrastructure should be sufficiently reinforced with pile foundations to resist buoyancy and other forces from flood waters and, where necessary, wave action. To plan for flood emergency events, coastal evacuation plans should be prepared to transport mobile assets (materials, trucks, cars, fuels, etc.) from the flood prone areas.

5.2.11 Air Quality

Localized air quality impacts are not expected at the sites either during construction or operation since using effective BMPs would be employed, such as using ultra-low-sulfur diesel fuel and diesel particulate filters, limiting idling on site, operating away from fresh air intakes, using engines with manufacturer emissions controls. As an example, the SBMT construction activities have been assessed and would not have the potential to exceed the General Conformity thresholds for NAAQS nonattainment or maintenance areas.⁸⁸ Truck routes would avoid residential neighborhoods to further reduce potential impacts to the extent practicable. Specifically, north of the Port of Albany site, truck routes would be required to avoid the Ezra Prentice neighborhood as part of the NYSDEC's Albany South End Community Air Quality Study with air monitoring programs and enforced truck restrictions. Once the ports begin an O&M phase, site emissions would drop significantly.

Dust would be generated from site excavation and grading to establish pad areas and haul roads, demolition and construction activities, use of haul roads, material stockpiles, wharf construction activities, and loading / unloading activities. BMPs to control dust typically include using water trucks to spray all site roadways and stockpiles, utilizing atomizers, employing road sweepers as needed to clean haul roads, and enforcing a maximum speed limit of 15 miles per hour to limit the minimization, pulverization, and abrasion of dust particles.

GHG emissions assessments per Section 7(2) of the Climate Protection Act relative to the statewide GHG limits of 6 NYCRR Part 496 would be required for each port site. GHG assessments of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride would be required per the Climate Protection Act. GHG emissions assessments would also need to adhere to NYSDEC's draft guidance CP-49 and DAR-21 that are currently being finalized.

NYSDEC Air Permitting (Air Facility Registrations, Title V Air Permit, etc.) and/or other applicable provisions under 6 NYCRR Chapter III may be required for operations of petroleum-fired boilers, painting shops, welding and plasmas cutting, concrete facilities and other stationary facilities (welding, metalworking and assembly manufacturing/pre-fabrication) with exhaust emissions.

Air quality impacts at the port sites are not expected through the implementation NYSDEC Air Permitting requirements and effective BMPs at each of the sites. Further, the short-term emissions during construction activities would be greatly offset by the net air quality benefits of the OSW project operations by providing a long-term clean air, renewable energy source that would help eliminate the CO₂, methane and other GHG emissions from the existing fossil fuel energy generation in New York State. During environmental review, port sites would be expected to meet the General Conformity Requirements. Further cumulative air quality related benefits of the implementation of the Full-Build Alternative are discussed in chapter 6.

5.2.12 Noise

A majority of the Planned Alternative and Full-Build Alternative sites have a residential area in the vicinity that may experience noise during construction, including truck-related noise on the roadways. Most OSW ports are sited on an active port in an industrial area with high-ambient noise levels. During construction at the port sites, temporary elevated noise from trucks, marine vessels, cranes, excavators, pile drivers, and other construction equipment.

Construction noise impacts would be mitigated by implementing noise reduction measures according to a noise mitigation plan that complies with the NYSDEC Assessing and Mitigating Noise Impacts Program Policy and local noise ordinances. Responsible noise mitigation plans typically specify noise thresholds per equipment type, noise exceedance correction process, installation of noise barriers, mufflers, engine enclosures, noise insulating fabric, intake silencers, restrict the use of compression braking, use electric tools, minimize idling, regular equipment maintenance and backup alarms. Impact devices such as jackhammers, pavement breakers, and pneumatic tools should not be used during nighttime or weekends.

Pile driving and in-water construction would also be subject to USACE Section 10/404 Permits and NYSDEC Tidal Wetlands/Protection of Waters Permits and NMFS review/approvals, which would require mitigation methods to reduce the risk of aboveground and underwater noise impacts. NYSDEC permitting may also require 6 NYCRR Part 182 related threatened and endangered species noise controls. To meet the regulatory permit conditions, further noise reduction measures should be employed, such as drilled shaft installation of piles, vibration installation of piles initially, initial pile tapping method prior to impact pile driving, “bubble curtains,” and/or other methods to minimize noise associated with pile driving to the lowest practicable level possible.

All port sites would need to comply with the adopted noise mitigation plan governing the site during construction and operations. Once the O&M phase of the port is underway, the noise levels would drop substantially especially at OSW ports with SOV or smaller CTV support. However, OSW ports that would continually have manufacturing, staging, or other heavy OSW operations, significant noise impacts may continue, requiring ongoing noise controls and mitigation measures.

6 Cumulative Impact Assessment Summary

Cumulative impacts can occur when multiple actions affect the same environmental resource simultaneously or sequentially. It is the combination of these effects, and any resulting socioeconomic, environmental, or navigational degradation, that is the focus of cumulative impact analysis. The concept of cumulative impacts considers all disturbances since cumulative impacts result in the compounding of the effects of all actions over time. Thus, the cumulative impacts of an action can be viewed as the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource no matter what entity (federal, non-federal, or private) takes the action(s).

To assume an optimal scenario of ports within New York State, it was determined that 12 port sites would be the best alternative to produce the necessary OSW port output to fully achieve and potentially exceed the State's 2035 OSW energy target, based on COWI's ports supply demand modeling effort.⁸⁹ The Planned Alternative and Partial-Build Alternative would be viable alternatives, but the Full-Build Alternative would represent the best option to meet or exceed the 2035 OSW energy target. As a result, the cumulative impacts assessment qualitatively evaluated the concurrent development of all 12 port sites, comprising the Full-Build Alternative, as a worst-case scenario to determine the potential for significant cumulative effects. The potential for beneficial and adverse cumulative effects of the Full-Build Alternative are summarized below.

Please Note: Port developers will likely need to provide additional cumulative impact analyses in accordance with federal and State environmental review requirements, beyond what's provided in the report. For example, non-Port related projects should be evaluated in a cumulative impacts analysis. This would likely include evaluating other large-scale development projects occurring within the study area and during the same timeframe for context.

6.1 Beneficial Cumulative Effects

Overall, implementing the Full-Build Alternative would maximize positive socioeconomic impacts in the form of economic development, workforce employment, increased property values and tax revenues, and the avoidance of adverse health outcomes. Reducing pollution by even modest amounts in highly populated areas regions of New York, resulting in significant public health-related socioeconomic benefits. These socioeconomic benefits would occur at local, county, state, and/or regional levels.⁹⁰ Specifically, benefits of the Full-Build Alternative meeting and/or exceeding the 2035 OSW energy target would include:

- **Public Health Benefits:** The Full-Build Alternative would maximize the reduction in coal and gas-fired power generation pollution emissions, thereby maximizing the health benefits of avoided emissions of GHGs and criteria air pollutants. Air pollution from coal-fired power plants⁹¹ – including CO₂, NO_x, SO_x and air-borne inorganic particles such as fly ash, carbonaceous material (soot), suspended particulate matter (SPM) – is linked with respiratory disease, cardiovascular disease, cancer, neurological problems, acid rain, global warming, and other environmental and public health impacts. With the Planned Alternative alone, New York would avoid more than 8.7 million tons of GHG emissions, 1,800 tons of NO_x, 780 tons of SO₂, and 180 tons of PM_{2.5} compared to a business-as-usual scenario without OSW energy. These emissions reductions would nearly double under the Full-Build Alternative. As increased use of offshore wind power would lead to improved air quality, society benefits from reduced negative health impacts and increased employee productivity. As an example, State health care expenditures for treatment of asthma, acute bronchitis, and respiratory conditions would be reduced.⁹² Improved health benefits would be realized, including fewer adverse health outcomes or premature deaths annually with the air quality improvements of OSW power generation. New Yorkers would also save approximately \$4 billion in health costs (respiratory disease, cardiovascular disease, cancer, neurological problems) and, more importantly, avoid 100s fewer premature deaths under the Build Alternative, in proportion to the Planned Alternative. The Full-Build Alternative would also reduce the harmful health-related effects of acid rain, including improvements to water quality, less corrosion to drinking water pipes, and a reduction in respiratory problems caused by acid rain.
- **Economic Benefits:** In terms of job creation in New York State, the Full-Build Alternative is estimated to support a total of 34,288 job-years (jobs each year) during construction followed by 1,309 job-years to operate and maintain the OSW energy projects for a total of 32,403 job-years. This represents over a 60% increase in jobs compared to the Planned Alternative (*A job-year means one job per year or the average jobs created per year over the total number of years*). The OSW industry can be expected to not just create large numbers of construction labor jobs, but also create high quality long-term job opportunities, many of them related to technologically advanced products and processes. Social and community investment expenditures are expected to support another 1,080 job-years over the life of the projects.
- **Environmental Justice:** To actively support EJ and disadvantaged communities at the Program level, the NY/NJ Bight Regional Working Group on Supply Chain Development would be continually coordinating the enhancement of the domestic supply chain to deliver benefits and economic opportunities to underserved, disadvantaged, and overburdened communities. NYCEDC's *OSW NYC Vision Plan* would include a \$191 million OSW investment within New York City that would create over 13,000 jobs and generate \$1.3 billion in average annual investment and reduce 34.5 million tons of CO₂ – the equivalent of removing nearly 500,000 cars from roadways for 15 years. NYCEDC and its partners have collaborated to activate the SBMT as an OSW port and support the Empire Wind Project. As part of their operation at SBMT, the Empire Wind Project plans to establish a \$5M fund to ensure that low-income populations, people of color, and New Yorkers from EJ communities equitably share in the benefits of the industry. The Offshore Wind NYC program would: (1) direct

40% of job and investment benefits to women, minorities, and EJ communities; (2) bring local jobs and environmental benefits to historically disadvantaged communities along the waterfront; (3) provide investments in professional training programs at the Global Wind Organization training centers (SUNY, local colleges, etc.) to create pipelines to OSW jobs. Overall, thousands of construction and O&M jobs would be generated in close proximity to EJ communities along New York State’s waterfront, resulting in sustainable employment opportunities.

- **Electricity Rate Benefits:** The Full-Build Alternative provides more affordable energy than fossil fuel-based power generation and maximizes cost-effectiveness of OSW for New York State ratepayers.⁹³
- **Workforce Employment Benefits:** The State’s investments in professional training at the Global Wind Organization training centers (SUNY, local colleges, etc.) would facilitate a new generation of OSW professionals within New York State to capture the job opportunities of the emerging OSW industry.
- **Property Value and Housing Benefits:** As a secondary regional benefit of the OSW energy production, with the decommissioning of fossil fuel-based power generators and improved health benefits, property values and tax revenues would increase, as well as demand for permanent and/or rental housing.⁹⁴
- **Reduced Climate Change Effects:** The Full-Build Alternative would provide a maximum State-wide OSW contribution to reducing the rate of climate change. By operating 9,000 MW of OSW by 2035 and eliminating the equivalent fossil fuel energy GHG emissions contributing to climate change, the reduced emissions would support slowing the rate of climate change. Climate change projections indicate potential sea-level rise of up to 6 feet and increased temperatures between 4° Fahrenheit (F) and 10° F by the year 2100 for the northeastern United States. Constructing the Full-Build Alternative would maximize the State-wide OSW contribution to reduce the harmful effects of climate change, including flooding and coastal erosion from sea-level rise and storm surge, and extreme heat events and summer droughts.⁹⁵
- **Ecosystem benefits** of reduced impacts on water uses since wind turbines require nearly no water to operate and “would not strain water supply by competing with agriculture, drinking water systems, or other important water needs.” The OSW Program would reduce New York’s reliance on electricity generated by fossil fuels and, as a result, reduce pollution discharges into water bodies.⁹⁶
- **Fuel diversity benefits** as the addition of new renewable electricity supplies also would reduce the State’s reliance on natural gas and other fossil fuels.⁹⁷
- **Economic development benefits.** The development of offshore wind energy is expected to net billions of dollars of State and regional economic benefits, including economic development, tens of thousands of jobs, increased property values and tax revenues and opportunities for the underserved, disadvantaged, and overburdened communities. To facilitate this, the NY/NJ Bight Regional Working Group on Supply Chain Development would be actively coordinating to meet mutual regional OSW energy targets related to enhancing the domestic supply chain.⁹⁸

6.2 Potential for Adverse Cumulative Effects

The port sites are geographically distributed across three New York State regions with sufficient distance in between so that most localized effects at any one site would not overlap with the localized effects of another site or accumulate over time. As a result, there is no potential for cumulative adverse impacts to land use compatibility, EJ communities, vehicular traffic, community character, hazardous materials, localized air quality, or noise either during operations or construction of the port sites.

Land Use Patterns and Socioeconomic Conditions—The Full-Build Alternative has no potential to change land use patterns in the regions and would not result in substantial conversion of environmentally sensitive areas to industrial use. Three ports would be new developments within vacant land; however, the sites are zoned for industrial/manufacturing uses and are located away from sensitive land uses (residences, schools, etc.). The other nine ports sites would be redeveloped existing ports with compatible land use and zoning. Collectively, the OSW ports would not be expected to adversely impact the broad elements of community character, or population growth or density in the New York State regions. The program would not alter or accelerate development patterns, and real estate market conditions adjacent to the port sites would not be expected to change as a result of the port development (although the OSW program as a whole may increase property values and taxes in the State). Since most of the identified development sites are historic or existing industrial waterfront sites and their incremental effects would be compatible with existing land use and zoning, there would be no potential for adverse cumulative effects to result from development of the 12 OSW port sites. As a result, adverse cumulative impacts on land use patterns and socioeconomic conditions would not result from program implementation.

Vessel Navigation—The Full-Build Alternative is estimated to result in a 4% increase in vessel traffic would occur at the confluence of the Ambrose Channel south of the NY Harbor (gateway to the OSW farms), assuming all of the projected vessels from the OSW ports operating concurrently.⁹⁹ Given the large volume of traffic on the river and the wide variability of traffic in any given day, the increase in traffic associated with the OSW ports is small. For example, two of larger manufacturing OSW ports (Port of Coeymans and Port of Albany) would both add approximately two to four round barge trips per week and one vessel per month for the delivery of inbound materials, which would not represent a significant increase in vessel traffic when compared to the overall commercial traffic of 3,000 barges

and vessels, exclusive of recreational boating traffic, that is currently occurring on the Hudson River.¹⁰⁰ Overall, the quantity of OSW vessel traffic would not pose additional risk to vessel safety to existing waterways within New York State.¹⁰¹ The use of barges and vessels for the delivery and shipping of materials/products reduces the need for trucks, further minimizing the impact on the surrounding roadway network.

BMPs and related measures necessary to manage new vessel traffic depends largely on the size, maneuverability, and density of traffic. To ensure a reliable and efficient marine transportation system within the Hudson River, it would be responsible for ports to coordinate with the HRSNOC. In the New York Harbor vessel traffic would be managed by U.S. Coast Guard's Vessel Traffic Service (VTS). Even conservatively assuming a 4% increase in vessels of the Full-Build Alternative operating concurrently, the New York Harbor would have the capacity to support the additional OSW industry vessel traffic. The USCG would require regular communication using the LNM to the local marine community, providing updates construction-related and O&M vessel traffic.¹⁰²

Environmental Justice—Three quarters of the port sites have EJ communities present in the vicinity which may experience traffic, air quality, and noise impacts and along truck routes, similar to non-EJ communities in the vicinity. Each port site would be required to analyze potential impacts to EJ communities and disadvantaged communities in accordance with NYSDEC Commissioner Policy 29 and Section 7(3) of the Climate Act and/or federal EO 12898 criteria to identify any disproportionately high and adverse effects on EJ populations, conduct public outreach and incorporate measures to avoid, minimize and mitigate impacts. These port-related impacts are not anticipated to create cumulative adverse impacts to EJ communities, and the regulatory process required mitigation measures would be implemented to protect the quality of living in the neighborhood. For example, at the Port of Albany, the town is requiring truck routes that avoid EJ neighborhoods to eliminate the potential for air quality, traffic and noise impacts.

To actively support EJ communities and provide cumulative economic benefits at the Program level, the State has number of programs and tools in place. NYSERDA's procurement of ORECs will assign 20% of the score of each project proposal to economic benefits, including benefits to disadvantaged communities, creation of workforce training opportunities, and job creation. The Climate Justice Working Group established by the NYS Climate Act will identify disadvantaged communities and

help ensure that the benefits of climate change responses accrue to these disadvantaged communities. The State is also committed to requiring developers to pay workers a prevailing wage and to utilize project labor agreements. New York has invested \$20 million to establish the Offshore Wind Training Institute in partnership with NYSERDA and SUNY Stony Brook and Farmingdale to train a new workforce for the OSW industry at the affordable SUNY institutions.

In addition, to actively support EJ communities at the Program level, the NY/NJ Bight Regional Working Group on Supply Chain Development will be continually coordinating to meet mutual regional OSW energy targets related to enhancing the domestic supply chain and deliver benefits and economic opportunities to underserved, disadvantaged, and overburdened communities. The *Offshore Wind NYC* program would: (1) direct 40% of job and investment benefits to women, minorities, and EJ communities; (2) bring local jobs and environmental benefits to historically disadvantaged communities along the waterfront; (3) provide investments in professional training programs to create pipelines to OSW jobs. The OSW port projects would also be required to undertake EJ assessments and implement applicable avoidance, minimization, and mitigation measures to address potential impacts. Overall, thousands of construction and O&M jobs would be generated in close proximity to EJ communities along New York State's waterfront and the resulting regional benefits of job creation and sustainable employment would offset temporary effects of construction of the port sites and avoid cumulative impacts to EJ communities.

Terrestrial Biological Resources – Impacts to potential habitat for protected bats, shorebirds, amphibians, insects and/or plant habitats would occur. However, the collective impacts (vegetation clearing) would be localized across the State and would not be expected to be of a scale to cause broad cumulative impacts that would imperil or critically impact terrestrial species within the State's coastal environment. Impacts to terrestrial wildlife will be partially mitigated by repurposing existing waterfront facilities or using previously disturbed sites to the extent possible. Each of the proposed sites would undertake environmental review and consultation with USFWS, and USACE and NYSDEC permitting processes to minimize and mitigate impacts, such as clearing trees during the bat hibernation season, avoiding construction during the bird nesting and fledging seasons, and installing anti-perching devices to discourage migratory bird landings.

Impacts to wildlife can consist of temporary displacement, habitat loss, and direct mortality. Direct mortality is most likely to affect fewer mobile species such as reptiles and amphibians and nestling birds. Habitat loss can cause more mobile species such as birds and mammals to seek suitable habitat adjacent to the port facility. Some species may be temporarily displaced during the construction phase but return

to the site as noise levels decrease during the operational phases of less disruptive port facilities (CTVs, SOVs, etc.). Adherence to federally stipulated work windows (primarily to avoid the nesting season) would reduce the potential for impact to protected birds.

Cumulative impacts may be synergistic – where the combined effect of multiple impacts may be greater than the sum of individual impacts alone. However, the port sites would undertake environmental review, and USACE and NYSDEC permitting processes to identify avoidance, minimization and mitigation measures reduce terrestrial species and habitat impacts to the best extent practicable. In accordance with the required permits, effective mitigation measures would be implemented, including: clearing trees during the bat hibernation season; avoiding construction during protected bird nesting/fledging seasons, and installing anti-perching devices to discourage migratory bird landings; and/or mitigating impacts to protected species habitat through “Net Conservation Benefit” Projects. A net conservation benefit mitigation project is intended enhance of the species' overall population or contribution to the recovery of the species in New York. In cases where potential construction-related impacts to a specific species cannot be fully mitigated, NYSDEC and federal agencies may require incidental take permits and monitoring and reporting of species takes or injuries to ensure the regional stability of populations. Overall, the collective impacts (vegetation clearing) of the Full-Build Alternative would be localized across the State and would not be expected to be of a scale to cause broad cumulative impacts that would imperil or critically impact terrestrial species within the State’s coastal environment, especially with the successful implementation of permit requirements, including seasonal work windows, monitoring of incidental take and the implementation of acceptable habitat mitigation plans, including Net Conservation Benefit Projects.

6.2.1 Aquatic Biological Resources

6.2.1.1 Wetlands/Open Waters

The Full-Build Alternative may result in an estimated cumulative loss of 80 acres of dredging impacts to benthic habitat, approximately 40 acres of fill impacts to tidal and tidally influenced wetlands/open waters, and approximately five acres of emergent freshwater wetland impacts. Impacts to at least two mapped SAV complexes, one freshwater mussel bed, two SCFWH tidal creek complexes and two RECs with emergent, scrub-shrub and forested estuarine and marine wetlands within the aggregated study area are anticipated. Important functions of these tidal and tidally influenced wetlands would be lost in the Capital Region, NY Harbor and Long Island coastal areas, including tidal surge buffers; protection from shoreline erosion; retention of excess nutrients; vital forage habitat for clams, crabs, and juvenile

fish; and providing shelter and nesting sites for migratory waterfowl. Similarly, the permanent loss of four acres freshwater wetlands would lose freshwater wetland functional values, such as fluvial floodwater retention, water quality filtration, and fish and wildlife habitat. Dredged sediment impacts would be a significant marine species habitat impact, however these impacts are anticipated to be temporary, as benthic communities have been shown to recolonize the area over time when the dredging depths are not a substantial change. The cumulative wetland impacts from OSW ports would represent significant a loss.

However, compensatory mitigation measures would be required by the USACE and NYSDEC permits, including wetland restoration, wetland creation, wetland enhancement, wetland bank credit purchases and acceptable in-lieu fee programs (where appropriate). Wetland mitigation plans would require increased ratios for wetlands created, restored or enhanced off-site and would need to account for losses of specific wetland types and functions in port impact areas. Off-site tidal wetland mitigation would also relocate lost wetland function. The wetland mitigation site would benefit the new location, but the port location would permanently lose the flood attenuation and habitat functions. Wetland mitigation goals would also be required to compensate for habitat loss for wetland-dependent wildlife species, where specific restoration measures would not only provide wetland acreage but compensate for lost habitat and provide a net conservation benefit specific to each mitigation site. Climate change and resultant (and modeled) sea-level rise would be factored into mitigation site planning (grading, planting lists, community types) to ensure that proposed wetland communities would persist over time. Responsible mitigation plans coordinated with federal and State regulatory agencies, such “Net Conservation Benefit” Projects would the goal of replacing wetland functions and values in the vicinity.

6.2.1.2 Habitat and Species

Wetland losses affecting aquatic biological resources from dredging and fill activities of the Full-Build Alternative would likely have a cumulative impact on protected fisheries, shellfish, wildlife, and aquatic plant species. Two ports would affect SCFWH tidal creek complexes, and two ports would have impacts to RECs – these unique wetland complexes provide important habitat for waterfowl, amphibians, fish, and migratory birds. Cumulative losses of spawning, foraging, overwintering and juvenile habitat for sturgeon and other EFH species would occur, particularly in the Hudson River. Dredged sediment impacts would be a significant marine species foraging and spawning habitat impact, however these impacts are anticipated to be temporary, as benthic communities have been shown to recolonize the area over time when the dredging depths are not a substantial change.

Proposed in-water construction, including dredging, pile installation, and shoreline stabilization likely requires USACE Section 10/404 Permits, NYSDEC Tidal and/or Freshwater Wetlands/Protection of Waters Permits, Part 182 and NMFS approvals to address impacts to wetlands and other, waters of the U.S., and sensitive aquatic species and habitat, particularly to sturgeon and EFH-managed species. Permit requirements would be designed to avoid and minimize impacts to aquatic biological resources and may require mitigation (e.g. restoration or creation of habitat). Some port sites would require additional mitigation measures to account for site-specific resources present prior to dredging or installing new infrastructure, such as removing and transplanting the SAV beds or freshwater mussel bed(s) to approved locations offsite.

Cumulative impacts of construction activities would also cause potential disruptions of fisheries during all life cycles, including during migration, foraging (feeding) and/or spawning seasons. The federal and State permits would require dredging to occur within a seasonal work window typically to avoid sensitive migration, foraging and/or spawning seasons, and include sediment containment measures (silt curtains, closed clamshell, etc.) to reduce EFH and sturgeon species impacts. To minimize pile driving-related underwater noise impacts to sturgeon, the federal and State permits may require underwater noise control measures such as drilled shaft pile installation, vibratory pile installation, and/or soft-start procedures. Displaced habitat impacts is an important factor, as sturgeon species are known to return to the same locations for spawning, overwintering and foraging. Responsible mitigation plans would mitigate habitat loss impacts to protected species through “Net Conservation Benefit” Projects coordinated with the regulatory agencies would have the goal of enhancing affected species recovery and overall population growth. USACE and NYSDEC wetland permits would require mitigation plans that would potentially create or restore the wetland habitats, however, the wetland would be displaced and relocated away from the source, most likely.

The cumulative increase in vessel traffic associated with the Full-Build Alternative would also increase the risk of sturgeon mortality, particularly in areas of the Hudson River that overlap with sturgeon spawning areas and vessel traffic. Overall, the Full-Build Alternative is estimated to result in a 4% increase in vessel traffic at the confluence of the Ambrose Channel south of the NY Harbor (gateway to the OSW farms), assuming all of the projected vessels from the OSW ports operating concurrently. Given the volume of traffic on the Hudson River and NY Harbor, and the wide variability of traffic in any given day, the increase in traffic associated with the OSW ports is relatively low.

For example, two of the larger manufacturing OSW ports (Port of Coeymans and Port of Albany) would both add approximately two to four round barge trips per week and one vessel per month for the delivery of inbound materials, which would not represent a significant increase in vessel traffic when compared to the overall commercial traffic of 3,000 barges and vessels annually, exclusive of recreational boating traffic, that is currently occurring on the Hudson River.

It is assumed that increased risk of vessel strikes of sturgeon species would be commensurate with the cumulative 4% increase of vessel traffic from OSW ports at the Ambrose Channel south of NY Harbor. Additional factors increasing the risk of sturgeon strikes are deep vessel drafts from loaded barges, propeller depths of barges, faster speeds of smaller vessels like CTVs, narrow reaches of the Arthur Kill and Hudson River, and additional temporal and spatial exposure to sturgeon species attributed to OSW ports. However, each of the port sites would undertake Section 7 ESA Consultation processes, and USACE and NYSDEC permitting processes to identify avoidance, minimization, and mitigation measures to reduce sturgeon strikes to the best extent practicable. In accordance with the required permits, effective avoidance and minimization measures would include requiring slow speeds for project vessels in sensitive sturgeon habitat areas, avoiding sensitive seasonal windows, and other measures such as telemetry monitoring and/or visual monitoring of sturgeon during potentially harmful activities. Ultimately, depending on the anticipated impacts to sturgeon, NYSDEC and federal agencies may require incidental take permits and monitoring and reporting of species takes or injuries to ensure the regional stability of populations. As part of these incidental take permits, mitigation projects may be required, to address the direct take of individual sturgeon or the adverse modification or take of habitat that supports essential behaviors of sturgeon. This mitigation may involve the creation or enhancement of benthic habitat for sturgeon away from the port facilities. Overall, the collective potential for sturgeon strikes related to the Full-Build Alternative would not be expected to be of a scale to cause broad cumulative impacts that would imperil or critically impact the species within the State's coastal environment. However, it will be critically important to reduce cumulative adverse impacts to sturgeon and other EFH species by implementing the effective avoidance, minimization, and mitigation measures collectively at each port, including slow vessel speeds, following seasonal work windows, monitoring of incidental take and the implementation of acceptable mitigation plans, including "Net Conservation Benefit" Projects.

Cultural Resources—In the event that adverse effects to archaeological resources would result from port development, cumulative impacts could accrue resulting in the loss of historical resources. Aside from three sites that would affect areas of Native American significance, there is low risk for unmitigable adverse effects. NYSHPO consultation would be required at all sites. Depending on the resources affected, NYSHPO consultations may require engagement with Native American tribes/nations and other consulting parties to review the design and mitigation measures. If adverse effects are identified, the project design would be required to either avoid, minimize and/or mitigate these adverse effects to acceptable terms by NYSHPO and the consulting parties. Cultural resource impacts would be mitigated through commitments, such as monitoring during construction, that would be agreed to in the MOAs with NYSHPO and consulting parties.

Hazardous Materials—The Full-Build Alternative sites would disturb contaminated fill soils and dredging and in-water construction in the upper Hudson River would likely disturb PCB-contaminated sediments. However, as part of environmental review and permitting requirements, the NYSDEC and other regulatory authorities would require additional investigations, and management and disposal plans to mitigate potential local and cumulative effects to the environment and human health during construction and operations. The clean-up and restoration of brownfield sites to active use would be a regional benefit by reducing the potential for existing contamination to migrate offsite.

Floodplains and Resiliency—Full-Build Alternative sites are within 100-year floodplains and adjacent to floodways. Developments would be designed to meet FEMA, NYSDEC and local floodplain design guidelines to withstand forces from flood waters and function after major flooding events. Since the port developments would be within tidal floodplains connected with the vast Atlantic Ocean, the collective fills and improvements would not necessarily cause increased flood elevations along the coastal waterfront, as compared to developments in fluvial floodplains. Port improvements would be required to be designed appropriately to meet federal, State and local design criteria to avoid cumulative flooding impacts locally or on a regional scale.

Noise—Three quarters of the sites have a residential area in the vicinity that may experience port site and truck-related noise during construction activities. During the operational phase, the noise levels would drop substantially in areas of SOV and CTV operations. Many OSW ports are sited on an active port in an industrial area with high ambient noise levels. Noise impacts are a localized effect. These localized noise impacts would be mitigated by noise controls and best practices in accordance with noise mitigation plans developed in accordance with NYSDEC Assessing and Mitigating Noise Impacts Program Policy,

local noise ordinances and contractual requirements. Further, pile driving and in-water construction would also be subject to USACE and NYSDEC permitting, which would require mitigation methods to reduce the risk of aboveground and underwater noise impacts. Due to the geographic dispersion of OSW port sites, cumulative noise impacts would not occur, even if the port sites are developed concurrently.

Air Quality and GHG—Short-term exhaust emissions from marine vessels, trucks and construction equipment would be mitigated through NYSDEC Permitting and BMPs, including use of low-sulfur fuels, restricting engine idling time, use of electric tools, use of vessels that meet BACT and LAER requirements to reduce emissions. Analyses of one of the ports in a densely developed area of New York City has confirmed that the port would not exceed the General Conformity thresholds for NAAQS nonattainment or maintenance areas. Further, the short-term emissions of the OSW ports that would occur regionally during construction would be greatly offset by the regional net air pollution reduction (CO₂, methane, PM_{2.5} and other GHG) that would occur once the 9,000 MW of the OSW farms are operational. Overall, an extensive cumulative benefit of improved air quality and reduced levels of GHG pollutants to the region afforded by the full buildout of 9,000 MW of OSW energy.

7 Conclusion

According to the COWI's Regional Ports Supply Demand Model¹⁰³ and related OSW planning research by the State, the collective OSW infrastructure output of the Full-Build Alternative would be an optimal scenario to achieve and potentially exceed the 9,000 MW OSW energy target by 2035. By comparison, the Planned Alternative and Partial-Build Alternative would still be viable to potentially meet the 9,000 MW OSW target by 2035 and would result in similar, but proportionally less potential environmental and navigation related impacts than the Full-Build Alternative. The Full-Build Alternative would provide the maximum socioeconomic benefits to New York State and its residents, particularly through job creation, affordable clean power, and long-term public health benefits (air quality improvements, GHG reduction, etc.).

The Full-Build Alternative would result in greater levels of environmental impacts, but similar to those expected from the Partial-Build Alternative and Planned Alternative, as identified in this study. The types and degree of impacts identified in the published environmental review documentation for the Planned Alternative ports would be comparable to the Full-Build Alternative, particularly in relation to issues of concern: wetlands, threatened and endangered species habitat, EFH species, vessel strikes of sturgeon species, cultural resources, traffic, air quality and noise. Measures to mitigate those effects is also expected to be similar, as identified in this study.

The cumulative impacts of the study alternatives would be localized or regionally specific, but the overall cumulative impact for port development would be minimal for most resource areas, with the exception of key sensitive resources, including tidal wetlands, sturgeon species and habitat, EFH species and habitat, and cultural resources. Recognizing the potential for cumulative and unmitigable impacts to these important biological resources and cultural resources (Native American sites), it will be imperative for proposed port developments to undertake more focused planning and design efforts coordinated with regulatory agencies to avoid, minimize, and mitigate impacts during the environmental review and regulatory permitting processes.

To proactively anticipate and address cumulative impacts of proposed OSW ports, this study has identified BMPs and mitigation measures for developers to consider. Environmental review and regulatory permitting would be conducted for port development at the time they are proposed, which would assess, at the site-specific level, all relevant potential environmental impacts. Pre-application meetings and coordination with federal and State regulatory agencies will be

very important to identify the potential adverse impacts early in the design process and receive guidance on the best avoidance, minimization (BMPs) and mitigation measures. As an additional safeguard to mitigation measures, regulatory agencies may require incidental take limits on protected species and monitoring (noise levels, sturgeon movements, water quality, etc.) of impacts to ensure proper protection of sensitive resources. The federal and State permitting regulatory processes have mechanisms to deal with localized impacts, but cumulative impacts often go beyond those review processes, which underscores the importance of further use of BMPs developed in a more environmentally responsible manner during construction and operations should be implemented to further reduce any potential for cumulative impacts to occur.

The Full-Build Alternative represents an optimal scenario to not only meet or potentially exceed the 2035 OSW energy target, but as identified in this study, it will be important for all port developments to proactively address potential adverse impacts early in the environmental review and permitting processes to minimize the potential for unmitigable and cumulative impacts. Overall, the successful implementation of the Full-Build Alternative would maximize the socioeconomic benefits of the OSW program for New York State residents, such as improved public health, air quality, jobs, and reducing GHG emissions affecting climate change.

By undertaking proper environmental review and permitting processes the potential adverse environmental impacts would be addressed in a responsible manner and ensure that viable OSW ports would be used to fully support and implement the State's OSW program on schedule. As ports continue to be identified for development to meet or exceed the State's 9GW goal or if future state or regional goals change, this study could be updated more adequately reflect the associated cumulative impacts.

Please Note this Disclaimer: *This study's identification and discussion of the potential impacts do not substitute for future site-specific analyses of potential environmental impacts for the sites evaluated herein. Environmental review and regulatory permitting would be conducted for future offshore wind energy development and/or transmission projects at the time they are proposed, which would assess, at a site-specific level, all relevant potential environmental impacts. This study's identification and discussion of the potential impacts of the Proposed Action do not substitute for future site-specific analyses of potential environmental impacts for particular projects but does provide supporting information.*

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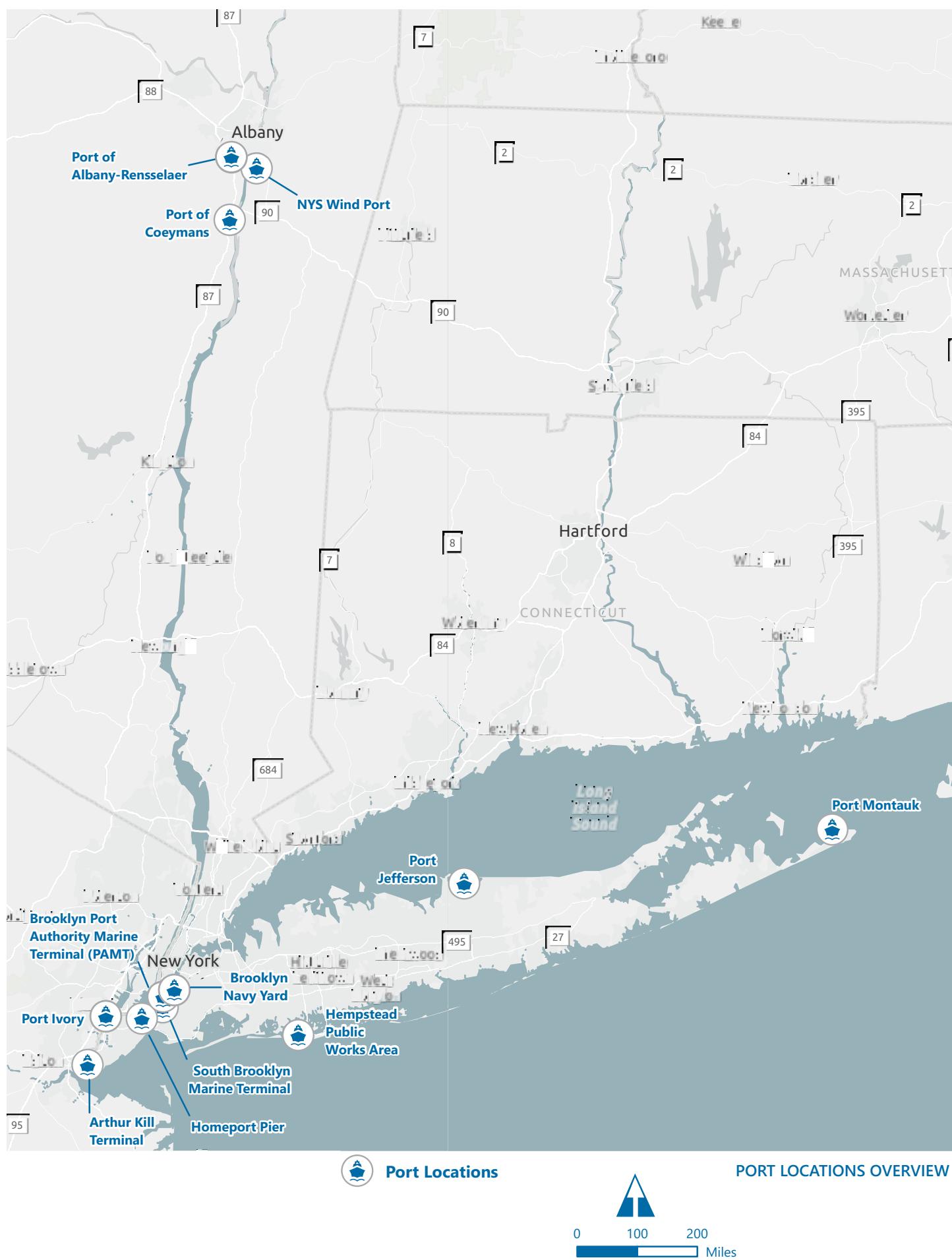
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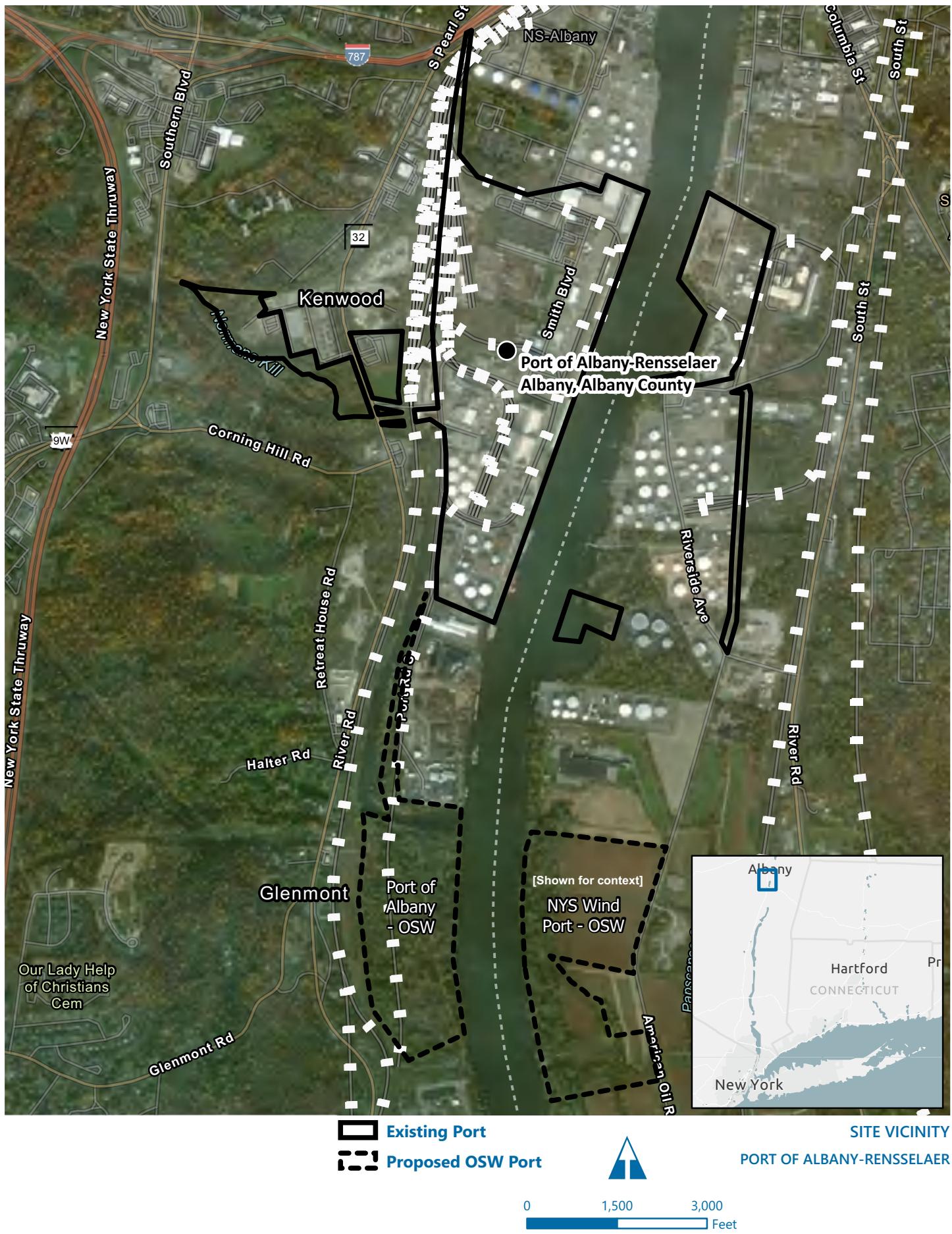
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Appendix A. Port Location Maps

Port Locations Overview Map



Port of Albany-Rensselaer Location Map



Port of Coeymans Location Map



South Brooklyn Marine Terminal Location Map



Existing Port

Note: Proposed OSW Port
sited within Existing Port
boundary.

0 500 1,000
Feet



SITE VICINITY

SOUTH BROOKLYN MARINE
TERMINAL

Port Jefferson Location Map



Port Montauk Location Map



Proposed OSW Port



0

140

280

Feet

SITE VICINITY
PORT MONTAUK

Arthur Kill Terminal Location Map



OSW



0

205

410

SITE VICINITY

ARTHUR KILL TERMINAL



Port Ivory Location Map



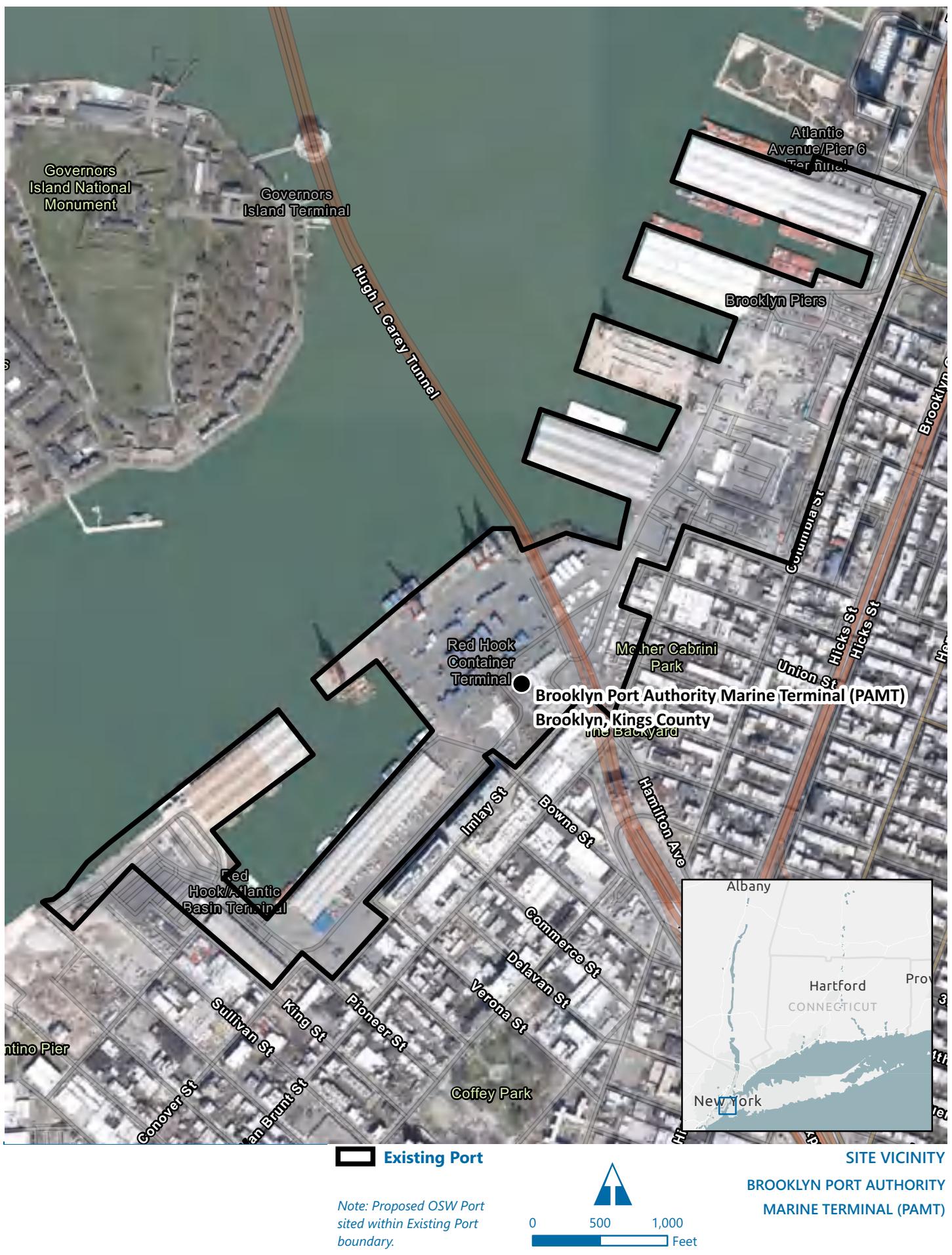
Homeport Pier Location Map



Brooklyn Navy Yard Location Map



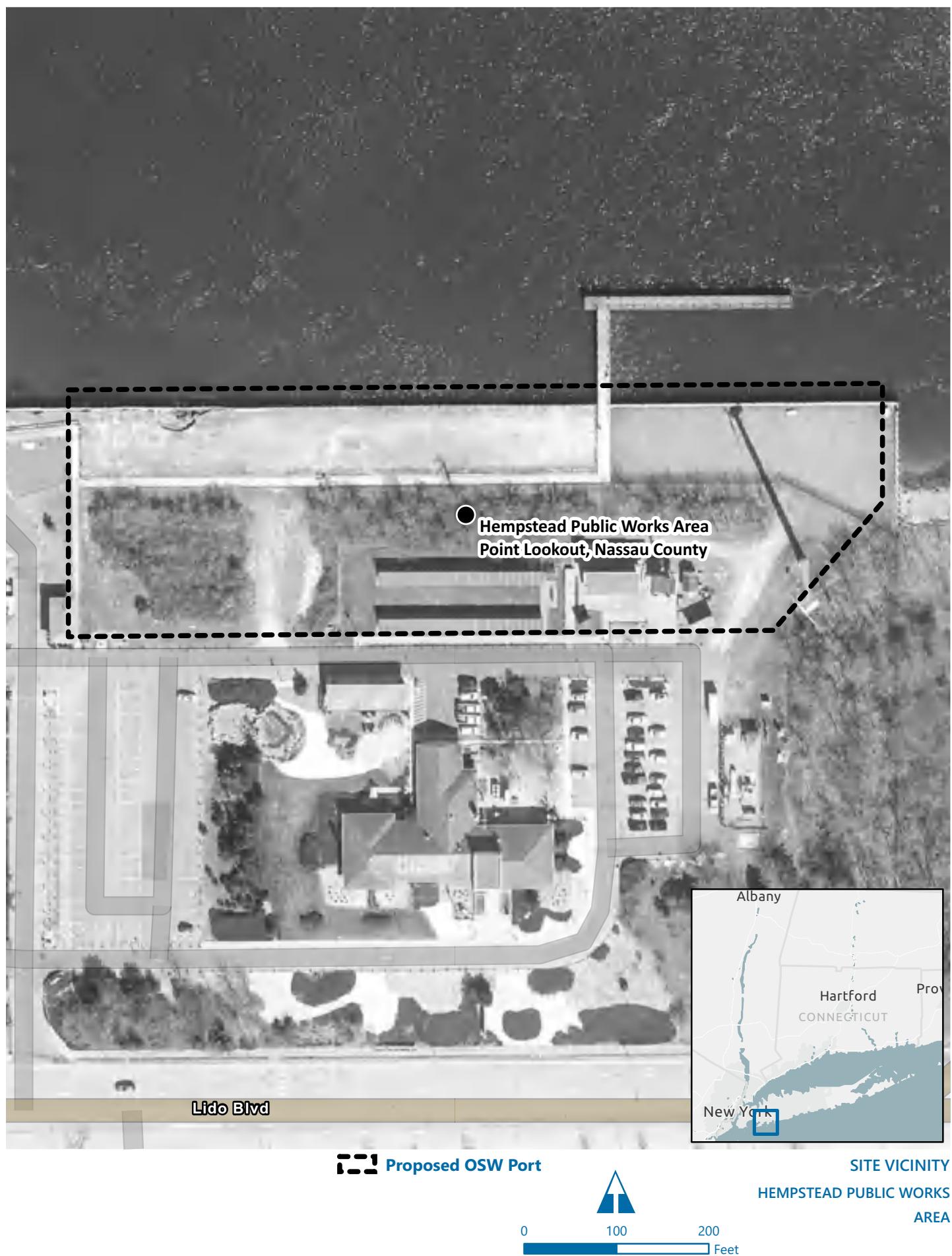
Brooklyn Port Authority Marine Terminal Location Map



NYS Wind Port Location Map



Hempstead Public Works Location Map



Appendix B. Port Characterization Tables

B.1 Port Facility Characteristics

Table B-1. Site Characteristics: Port of Albany-Rensselaer

Sources: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017); APDC Port of Albany Expansion Project SFEIS (2022)

Characteristic	Description
Location	Address: East of River Road (NYS Rt. 144) south of Normans Kill and north of PSEG property Town of Bethlehem, Albany County, NY. Primary parcel located on Beacon Island. Latitude: 42°37'26" N Longitude: 73°45'25" W
Proposed OSW Usage	Manufacturing steel towers, blades and other components; staging.
Investment / Upgrade Required	Moderate: Clear site of vegetation and previous unusable infrastructure (old piles, etc.), fill and grade site, install access road(s) to River Road, install new bulkhead/wharf, and dredge berth area. Roadway and rail access from the north would require a bridges over the Normans Kill. Construct tower manufacturing facility with five buildings (four on-site, one at existing Port of Albany with addition of rail spur for deliveries. Small area (under one acre) may be acquired from National Grid for proper site access.
Owner	Albany Port District Commission: http://www.portofalbany.us (operates adjacent, 400-acre facility 24-hours/day)
Significant Tenants	Federal Marine Terminal: http://www.fmtcargo.com/locations/albany/index.html Ben Weitsman Ardent Mills Westway Terminal Co
Distance to Wind Energy Areas (WEAs)	NY WEA: 314.1 km (195.2 miles)
Area	Total Proposed OSW Expansion Area acres: 82 acres consisting of a 4.8 acre parcel along the west side of South Port Road and a 76.8 acre parcel south of Normans Kill; includes area below MHHW
Wharf Area	45,500 square feet (SF), approximately 27,500 SF over water
Wharf Length(s)	500 linear feet (LF)
Navigable Depth	Berth: 25 ft. – 30 ft. MLLW (with dredging) Channel: 32 ft. MLLW federally authorized channel
Limiting Air Draft Restrictions (facility to unrestricted offshore area)	Mid-Hudson Bridge: 134 ft. Verrazano-Narrows Bridge: 198 ft. for the center 2,000 ft. 215 ft. maximum at the centerline
Intermodal Connections	2.2 miles to Interstate I-787 and I-90, adjacent freight railway connection planned
Surrounding Land Use	Undeveloped (west), industrial (north & south), and rural/suburban (west)
Notes	Expansion of existing Port of Albany, which is an existing 24-hour facility that spans over 400 acres on the Albany and Rensselaer sides of the Hudson River and has short- and long-term leases available within port property.

Table B-2. Site Characteristics: Port of Coeymans

Sources: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017); Port of Coeymans Offshore Wind Infrastructure (POWI) DEIS (2021); Sunrise Wind COP (2021)

Characteristic	Description
Location	Address: 2170 River Road, RAVENA, 12143. Expansion area proposed to the eastside of Route 144, and west side of Interstate 87/NYS Thruway. Latitude: 42°29'03" N Longitude: 73°48'05" W
Proposed OSW Usage	Fabrication of steel foundation components, and other OSW components.
Investment / Upgrade Required	Moderate: Demolition of six (6) buildings [displace the existing C&D Processing Facility, which will be relocated to the adjacent Coeymans Industrial Park property], located toward the center of the POC site will total approximately 45,500 SF. Construction of steel tower fabrication and storage areas, associated buildings, new wharf installation for heavy components load out, breasting/mooring dolphins, pile supported catwalk, concrete batch plants to manufacture concrete, limited site grading, material storage, upgraded roads, and dredging.
Owner	P&M Brick, LLC of Carver Companies
Significant Tenants	Same as the owner
Distance to Wind Energy Areas (WEAs)	NY WEA: 298.5 km (185.5 miles)
Area	Proposed OSW Expansion Area acres: ~122 acres of upland area.
Water Frontage	993.6 m (3,260 ft.)
Wharf Length(s)	Approximately 122 m (400 ft.) long; can accommodate vessels up to 228 m (750 ft.)
Navigable Depth	Berth: 9.1 m (30 ft.) MLLW (with dredging from 3.7 m (12 ft.)) Channel: 9.8 m (32 ft.) MLLW federally authorized channel
Limiting Air Draft Restrictions	Mid-Hudson Bridge: 40.8 m (134 ft.); Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline
Intermodal Connections	Adjacent to Interstate I-87, on-site rail access to the freight rail network
Surrounding Land Use	Port industrial and undeveloped, rural setting
Notes	Existing waterfront terminal used for large-scale construction projects.

Table B-3. Site Characteristics: South Brooklyn Marine Terminal

Sources: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017); South Brooklyn Marine Terminal Pre-FEED Report (2018); Empire Wind COP (2021)

Characteristic	Description
Location	Address: 31 st to 39 th Streets in Brooklyn, NY 11232 Latitude: 40°39'34" N Longitude: 74°00'39" W
Proposed OSW Usage	Potential fabrication of steel towers, blades and other components; staging
Investment / Upgrade Required	Moderate: Demolish existing buildings and the rail spur on the 39th Street Pier to increase available laydown area and facilitate ground bearing capacity improvements. Install two 30 MT/m ² (6,000 PSF) heavy load quays, including: 213 m (700 ft.) long along the northwest end of the 39th Street Pier; and 200 m (660 ft.) long along the southwest end of the 39th Street Pier. Stabilize the 35th Street Pier Revetment to increase the load capacity. Limited site grading and dredging.
Owner	The City of New York (owner), Department of Small Business Services https://www1.nyc.gov/site/sbs/index.page New York City Economic Development Corporation https://www.nycedc.com
Significant Tenants	Red Hook Container Terminals: http://redhookterminals.com/ Sims Municipal Recycling: https://www.simsmunicipal.com/contact/
Distance to Wind Energy Areas (WEAs)	Equinor Empire Wind Offshore Wind Farm: 81 km (51 mi) Hudson South Area: 127 km (79 mi) Hudson North Area: 132 km (82 mi) Fairway North Area: 189 km (118 mi) Fairway South Area: 145 km (90 mi) Deepwater Wind South Fork Windfarm: 274 km (170 mi)
Area	Total South Brooklyn Marine Terminal Facility acres: 35.6 hectares (88 acres); Total Proposed OSW Facility Area acres: approximately 25.8 hectares (64 acres) of upland area (above MHHW) and 4.0 hectares (10 acres) of area below MHHW
Water Frontage	1,950 m (6,400 ft.) available to offshore wind
Wharf Length(s)	Southwest face of the 39th St Pier - 710 ft. Northwest face of the 39th St Pier - 650 ft. 35th St Pier - 280 ft. *Due to the relieving platform construction method selected along the 39th Street Pier and the offshore face of the 35th Street Pier, other areas may be used as secondary berths.
Navigable Depth	Berth: 10.7 m (35 ft.) MLLW Channel: 12.2 m (40 ft.) MLLW federally authorized for Bay Ridge Channel
Limiting Air Draft Restrictions (from facility to unrestricted offshore area)	Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline
Intermodal Connections	Adjacent to Interstate I-278, on-site rail access
Surrounding Land Use	Industrial, residential, commercial
Notes	Site has additional availability. Air draft challenges if used as a staging port.

Table B-4. Site Characteristics: Port Jefferson

Source: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017)

Characteristic	Description
Location	Address: Beach Street, Port Jefferson, NY 11777 Latitude: 40°57'00" N Longitude: 73°04'20" W
Proposed OSW Usage	O&M for Service Operations Vessels (SOCs)
Investment / Upgrade Required	Minimal-Moderate: Possible limited demolition, site grading, wharf modifications and limited dredging
Owner(s)	Port Jefferson Power Station: http://www.lipower.org/ Northville Industries: https://www.northville.com/Locations.aspx Miller Marine Services: http://www.millermarineservices.com/ Tilcon Port Jefferson Terminal: http://www.tilconny.com/location.htm?Stone-Quarry-Port-Jefferson-New-YorkSuffolk-County-NY-
Significant Tenants	Unknown
Distance to Wind Energy Areas (WEAs)	NY WEA: 271.2 km (168.5 miles) South Fork Project (BOEM commercial lease OCS-A 0486): 162.1 km (100.7 miles)
Area	Potential OSW Facility acres: ~25 acres; includes area below MHHW
Water Frontage	Approximately 805 m (2,640 ft.)
Wharf Length(s)	Maximum tenable vessel length is approximately 88 m (289 ft.)
Navigable Depth	Berth: <i>Unknown</i> Channel: 8 m (26 ft.) MLLW (Port Jefferson Harbor Channel)
Limiting Air Draft Restrictions	None
Intermodal Connections	Approximately 14.5 km (9 miles) to I-495; 2 km (1.3 miles) to existing railway
Surrounding Land Use	Industrial, commercial, residential, park
Notes	Port Jefferson Inner Harbor is located at the southern extent of Port Jefferson Harbor. Repurposing existing ports, the degree of modification is unknown.

Table B-5. Site Characteristics: Port of Montauk

Sources: NYSERDA 2018 Ports Assessment: Offshore Wind Operations and Maintenance Port Facilities (2018); NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017); Sunrise Wind COP (2021); NYSDEC Permit Application Information (2022)

Characteristic	Description
Location	Address: 541 East Lake Drive, Montauk, NY 11954 Latitude: 41°04'32" N Longitude: 71°56'04" W
Proposed OSW Usage	O&M for Crew Transfer Vessels (CTVs)
Investment / Upgrade Required	Minimal: limited demolition, site grading, wharf modifications and dredging. O&M facility would include a stationary crane for equipment transfer and up to three vessel berths for CTVs. Modifications may include reinforcement and/or rehabilitation of quayside(s). Construction of a new O&M Facility would include: (1) Removal of existing piles and docks. (2) Dredging approximately 2,500 cubic yards in the existing marina to accommodate deeper draft CTVs. An approximately 0.41-acre area of Lake Montauk will be dredged to a depth of -12.4 feet mean low water with an additional one foot of allowed overdredge. (3) Maintenance repairs to the existing bulkhead including new waler and tie rods. (4) Construction of a new floating pontoon dock (100 feet long by 16 feet wide with 5 feet of freeboard). (5) Installation of five 2-feet diameter steel pipe piles and one 2-feet diameter steel monopile to secure the pontoon dock and provide mooring for Crew Transfer Vessels. (6) Installation of an aluminum gangway (28 feet long by 4 feet wide
Owner	Inlet Seafood Property, LLC, C & W Land Co, LLC, Town of East Hampton
Significant Tenants	Inlet Seafood http://inletseafood.com/ 9 Acre Compound
Distance to Wind Energy Areas (WEAs)	NY WEA: 170.6 km (106 miles) South Fork Project (BOEM commercial lease OCS-A 0486): 61.1 km (38 miles)
Area	Total Proposed OSW Facility acres: ~10 acres; includes area below MHHW
Water Frontage	2,398.8 m (7,870 ft.)
Wharf Length(s)	Floating aluminum pontoon – 31m (100 ft.) Along bulkhead – 43m (140 ft.)
Navigable Depth	Berth: <i>Unknown</i> Channel: Reach A (east): 3.7 m (12 ft.) MLLW; Reach B (west, boat basin): 3 m (10 ft.) MLLW (Montauk Harbor Channel)
Limiting Air Draft Restrictions	No published air draft restrictions based on NOAA navigation chart; however, Montauk Airport may affect air draft if tall components are moved into the area.
Intermodal Connections	4 km (2.5 miles) to State Route 27
Surrounding Land Use	Residential, commercial, marinas
Notes	Existing dock facility with large parking lot and adjacent 3.6 hectare (9 acre) lot.

B.2 Full Build Alternative (additional 7 ports)

Table B-6. Site Characteristics: Arthur Kill Terminal

Sources: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017); NYSERDA OREC RFP Arthur Kill Terminal (2020)

Characteristic	Description
Location	Address: 4849 Arthur Kill Road, Staten Island, NY 10309; along the Arthur Kill, just south of the Outerbridge Crossing, west of Arthur Kill Road, and north of Mill Creek outlet Latitude: 40°31'23" N Longitude: 74°14'31" W
Proposed OSW Usage	Staging (Wind Turbine Generator (WTG))
Investment / Upgrade Required	Significant site modifications: Dredging, quay and upland grading, filling and paving work, site establishment activities, including site preparing and clearing of vegetation, installation of gates and fencing, preparation of laydown areas for material storage and contractor parking, set-up of construction offices, temporary facilities, and utilities, installation of lighting, site demolition and removal activities, construction of a wharf, and civil works associated with construction of the warehouse, office, and paving.
Owner	Melohn Capital LLC
Significant Tenants	One single family residence abutting Arthur Kill Road
Distance to Wind Energy Areas (WEAs)	Equinor Empire Wind Offshore Wind Farm 1: 76 km (47 mi)
Area	Total Proposed OSW Facility acres: 13 hectares (32 acres) consisting of approximately 9.4 hectare (23 acres) of upland area (above MHHW) and 3.7 hectare (9 acres) of submerged land (area below MHHW) between the shoreline and bulkhead line
Water Frontage	457 m (1,500 ft.) on the Arthur Kill and 152 m (500 ft.) on Mill Creek
Wharf Length(s)	400 m (1,300 ft.) quayside
Navigable Depth	Berth: 10.1 m (33 ft.) MLLW (with dredging) Channel: 10.7 m (35 ft.) MLLW federally authorized Arthur Kill Channel
Limiting Air Draft Restrictions	None
Intermodal Connections	.4 km (.25 miles) to New York State Route 440, 6.4 km (4 miles) to the Garden State Parkway, .8 km (5 miles) to existing railway
Surrounding Land Use	Residential, commercial, industrial, manufacturing
Notes	Vacant, greenfield site with the exception of several unimproved access roads throughout the site and a natural shoreline.

Table B-7. Site Characteristics: Port Ivory

Source: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017)

Characteristic	Description
Location	Address: 300 Western Ave, Staten Island, NY 10303 Latitude: 40°38'25" N Longitude: 74°11'23" W
Proposed OSW Usage	Fabrication (Offshore Substation (OSS) components)
Investment / Upgrade Required	Moderate: Vegetation clearing, grade and fill site to increase load bearing capacity, site demolition (i.e. pavement and pier), dredging, and construction of pile-supported wharf
Owner	Port Authority of NY & NJ http://www.panynj.gov
Significant Tenants	Global Container Terminal: http://www.globalterminalsnewyork.com
Distance to Wind Energy Areas (WEAs)	NY WEA: 90.4 km (56.2 miles)
Area	Total Proposed OSW Expansion Area acres: ~64 acres located north of existing container terminal; including Parcels B and C.
Water Frontage	972m (3,189 ft.)
Wharf Length(s)	Minimum of 765.7m (2,512 ft.)
Navigable Depth	Berth: TBD Channel: 15 m (50 ft.) MLLW (Arthur Kill, Elizabeth-port Reach)
Limiting Air Draft Restrictions	Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline
Intermodal Connections	Adjacent to I-278; on-site rail access
Surrounding Land Use	Industrial, commercial
Notes	Busy container terminal. Storage area to the north of the terminal owned by the Port Authority and used by GCT.

Table B-8. Site Characteristics: Homeport Pier

Source: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017)

Characteristic	Description
Location	Address: 305 Front Street, Staten Island, NY 10304 Latitude: 40°37'57" N Longitude: 74°04'26" W
Proposed OSW Usage	O&M
Investment / Upgrade Required	Minimal-Moderate: Possible limited demolition and vegetation clearing, site grading, wharf modifications, and dredging
Owner	NYC Parks
Significant Tenants	Same as owner
Distance to Wind Energy Areas (WEAs)	Equinor Empire Wind Offshore Wind Farm 1: 39 km (24 mi)
Area	Total Homeport Pier Facility acres: ~11.3 hectare (28 acres); includes area below MHHW
Water Frontage	623 m (2,044 ft.)
Wharf Length(s)	429.8 m (1,410 ft.)
Navigable Depth	Berth: 11.3 m – 13.7 m (37 ft. – 45 ft.) MLLW Channel: West edge: 22.9 m (75 ft.) MLLW; East edge: 29 m (95 ft.) MLLW; 29.9 m (98 ft.) maximum depth MLLW (Ambrose Channel)
Limiting Air Draft Restrictions	Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline
Intermodal Connections	Maritime and rail access, 3.2 km (2 miles) access to I-278
Surrounding Land Use	Residential, commercial, marinas
Notes	Underutilized waterfront site with additional availability

Table B-9. Site Characteristics: Brooklyn Navy Yard

Source: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017)

Characteristic	Description
Location	Address: Kay Ave, Brooklyn, NY 11249 Latitude: 40°42'24" N Longitude: 73°58'11" W
Proposed OSW Usage	O&M
Investment / Upgrade Required	Minimal-Moderate: Repurposing exiting port with possible limited demolition, site grading, wharf modifications and dredging.
Owner	Brooklyn Navy Yard: http://brooklynnavyyard.org
Significant Tenants	Same as owner
Distance to Wind Energy Areas (WEAs)	NY WEA: 89 km (55.3 miles)
Area	Potential Brooklyn Navy Yard Facility available: ~ 11.1 hectares (27.5 acres) of underutilized existing port facility at northern extent of Navy Yard.
Water Frontage	1,706 m (5,597 ft.)
Wharf Length(s)	Approximate lengths: Face: 150 ft.; South Side: 500 ft.+350 ft.; North Side: 800 ft.
Navigable Depth	Berth: 7.62m (25 ft.) MLLW; 15.2m (50 ft.) MLLW on face of pier Channel: 10.67m (35 ft.) MLLW → East River
Limiting Air Draft Restrictions	Brooklyn Bridge - 39m (127 ft.)
Intermodal Connections	0.7 km (0.4 miles) miles to Interstate I-278 Industrial rail at adjacent facility
Surrounding Land Use	Brooklyn Navy Yard, Steiner Studios, NYC Auto Auction
Notes	Underused section on the northern extent of the Brooklyn Navy Yard. NYC Energy LLC/SEF Industries wants to build a floating power generator along Pier K. Upland residential developments proposed. Upland area estimated on Google Earth. The Brooklyn Navy Yard website states the area of the entire asset as 121.4 hectares (300 acres).

Table B-10. Site Characteristics: Brooklyn Port Authority Marine Terminal

Source: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017)

Characteristic	Description
Location	Address: 70 Hamilton Ave, Brooklyn, NY 11231 Latitude: 40°41'07" N Longitude: 74°00'34" W
Proposed OSW Usage	O&M
Investment / Upgrade Required	Minimal-Moderate: Repurposing existing port; Possible limited demolition, site grading, wharf modifications and dredging
Owner	Port Authority of NY & NJ http://www.panynj.gov
Significant Tenants	Red Hook Terminals: www.redhookterminal.com
Distance to Wind Energy Areas (WEAs)	NY WEA: 89.8 km (55.8 miles)
Area	Total Brooklyn Port Authority Marine Terminal Facility acres; ~49.4 hectares (122 acres); includes area below MHHW
Water Frontage	4,876.8m (16,000 ft.)
Wharf Length(s)	Pier 12 North: 97.5m (320 ft.); Pier 12 West: 277.4m (910 ft.); Pier 12 East: 213.4m (700 ft.); Pier 11 Face: (1,400 ft.); Berths 1 & 2 Face: 411.5m (1,350 ft.); Berths 1 & 2 Rear of Face: 106.7+198.1m (350+650 ft.); Pier 9B Face: 97.5m (320 ft.); Pier 9B South: 198.1m (650 ft.); Pier 9B North: 213.4m (700 ft.); Pier 9A Face: 97.5m (320 ft.); Pier 9A South: 192m (630 ft.); Pier 9A North: 228.6m (750 ft.); Pier 8 Face: 97.5m (320 ft.); Pier 8 South: 207.3m (680 ft.); Pier 8 North: 304.8m (1,000 ft.)
Navigable Depth	Berth: 12.8 m (42 ft.) MLLW Channel: 10.7 m – 12.1 m (38 ft. - 42 ft.) MLLW at midchannel with lesser depths at the side of the channel (Buttermilk Channel)
Limiting Air Draft Restrictions	Verrazano-Narrows Bridge: 60m (198 ft.) for the center 610m (2,000 ft.) 65.5m (215 ft.) maximum at the centerline
Intermodal Connections	Adjacent to Interstate I-278; rail access not available
Surrounding Land Use	Industrial and commercial
Notes	Existing, underutilized waterfront terminal. South end is shared with cruise terminal. Site included in Vision 2020 NYC Comprehensive Waterfront Plan, complimentary goals with OSW. Site has additional availability.

Table B-11. Site Characteristics: NYS Wind Port

Source: NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017)

Characteristic	Description
Location	Address: American Oil Road, East Greenbush, NY 12144 Latitude: 42°36'17" N Longitude: 73°45'24" W
Proposed OSW Usage	Component Manufacturing
Investment / Upgrade Required	Clear site of vegetation, fill and grade site and wetlands, install/improve access road(s), to American Oil Road, install new bulkhead/wharf, and dredge berth area.
Owner	NYS Offshore Wind Port
Significant Tenants	<i>Unknown</i>
Distance to Wind Energy Areas (WEAs)	NY WEA: 314 km (195 miles)
Area	Total Proposed OSW Facility acres; ~36.8 hectare (91 acres); includes area below MHHW
Water Frontage	3,700+ Ft.
Wharf Length(s)	<i>Unknown</i>
Navigable Depth	Berth: unknown Channel: 9.8 m (32 ft.) MLLW federally authorized channel
Limiting Air Draft Restrictions	Mid-Hudson Bridge: 40.8 m (134 ft.) Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline
Intermodal Connections	Maritime access, vehicle, and rail access
Surrounding Land Use	Undeveloped, industrial, coastal industrial, residential, and parks
Notes	New port, allows for growth and expansion of waterfront industrial users

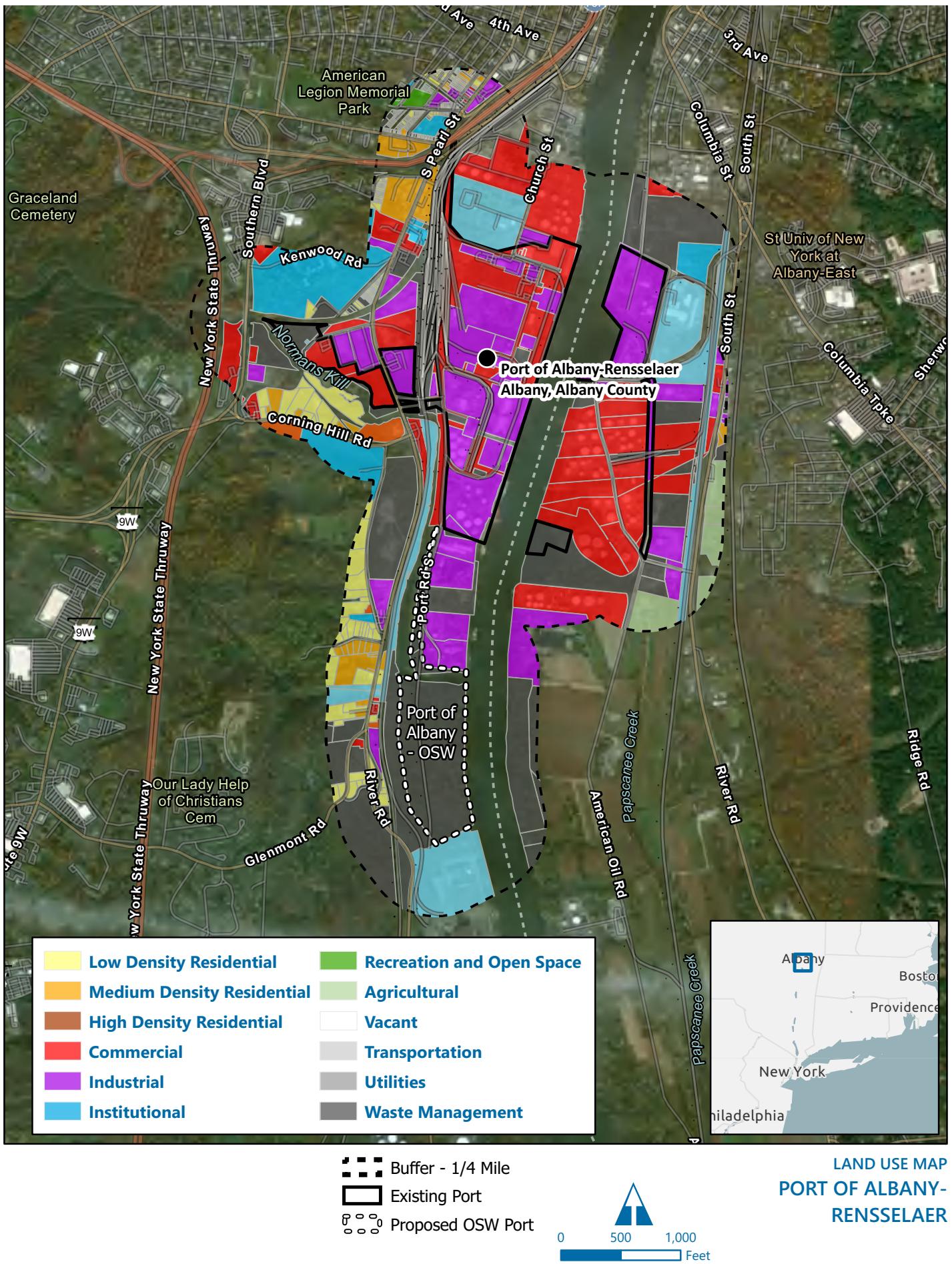
Table B-12. Site Characteristics: Hempstead Public Works Area

Sources: NYSERDA 2018 Ports Assessment: Offshore Wind Operations and Maintenance Port Facilities (2018); NYSERDA New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017)

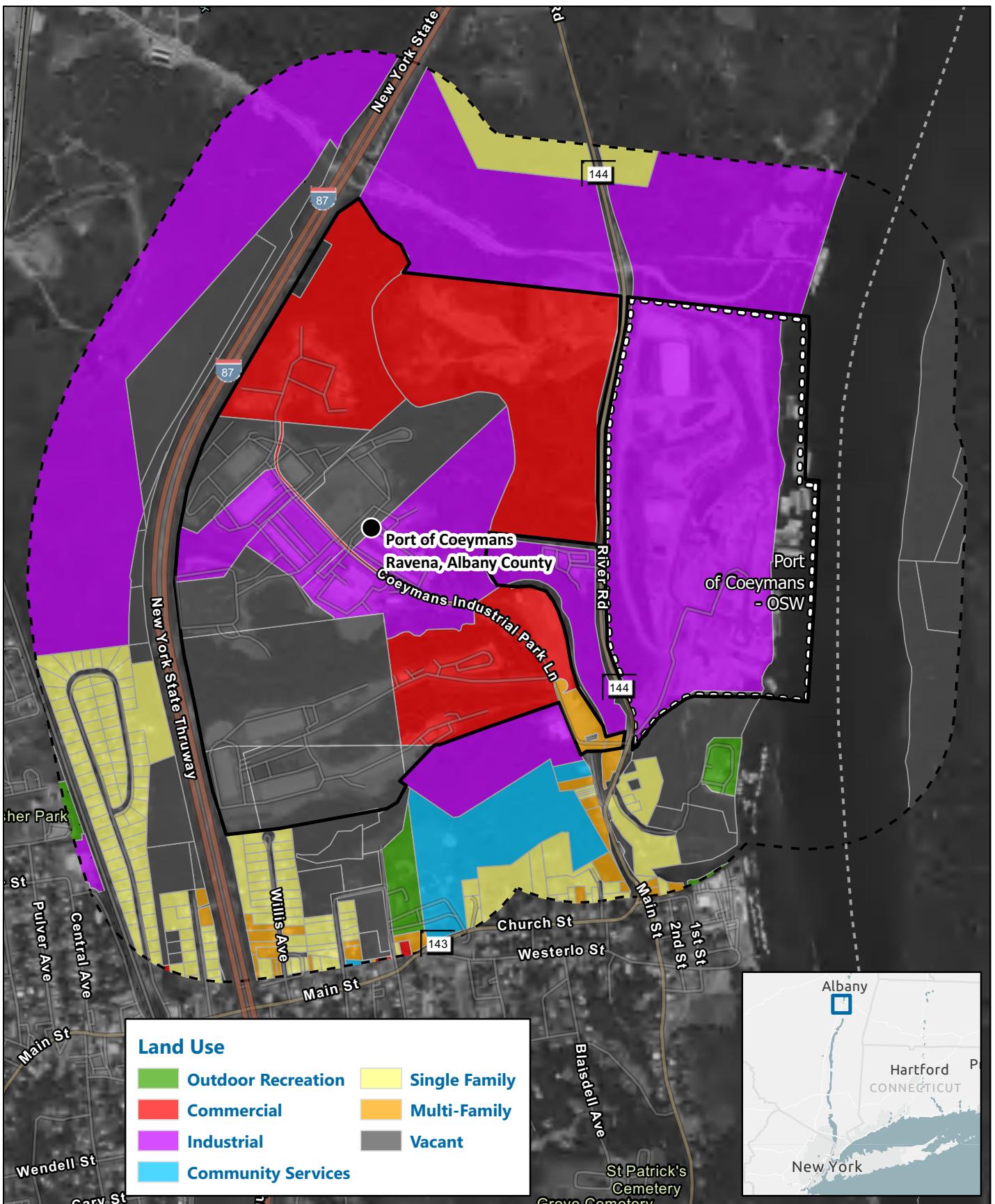
Characteristic	Description
Location	Address: 1401 Lido Boulevard, Point Lookout, NY 11569 Latitude: 40°35'36" N Longitude: 73°35'21" W
Proposed OSW Usage	O&M
Investment / Upgrade Required	Possible limited demolition, site grading, wharf modifications and dredging
Owner	Town of Hempstead, Long Island Department of Conservation and Waterways
Significant Tenants	Same as owner
Distance to Wind Energy Areas (WEAs)	NY WEA: 39.3 km (24.4 mi) Equinor Empire Wind Offshore Wind Farm 1: 27 km (17 mi) South Fork Project (BOEM commercial lease OCS-A 0486): 206.5 km (128.3 miles)
Area	Total Hempstead Public Works Area Facility acres; ~1.2 hectares (3 acres); includes area below MHHW
Water Frontage	240 m (780 ft.)
Wharf Length(s)	Unknown
Navigable Depth	Site: 0-2 m (0-6 ft.) MLLW, dredging may be needed Channel (in vicinity of site): 4-6 m (13-20 ft.) MLLW (Reynold's Channel)
Limiting Air Draft Restrictions	Fixed Bridge: Horizontal Clearance 9 m (30 ft.) Vertical clearance of 6 m (20 ft.)
Intermodal Connections	4.8 km (3 miles) to Meadowbrook State Parkway, 6.4 km (4 miles) to rail access at the LIRR Long Beach Station
Surrounding Land Use	Commercial and industrial
Notes	Existing public works facility adjacent to commercial and light industrial facilities with waterfront uses.

Appendix C. Environmental Figures

Port of Albany-Rensselaer Land Use Map



Port of Coeymans Land Use Map



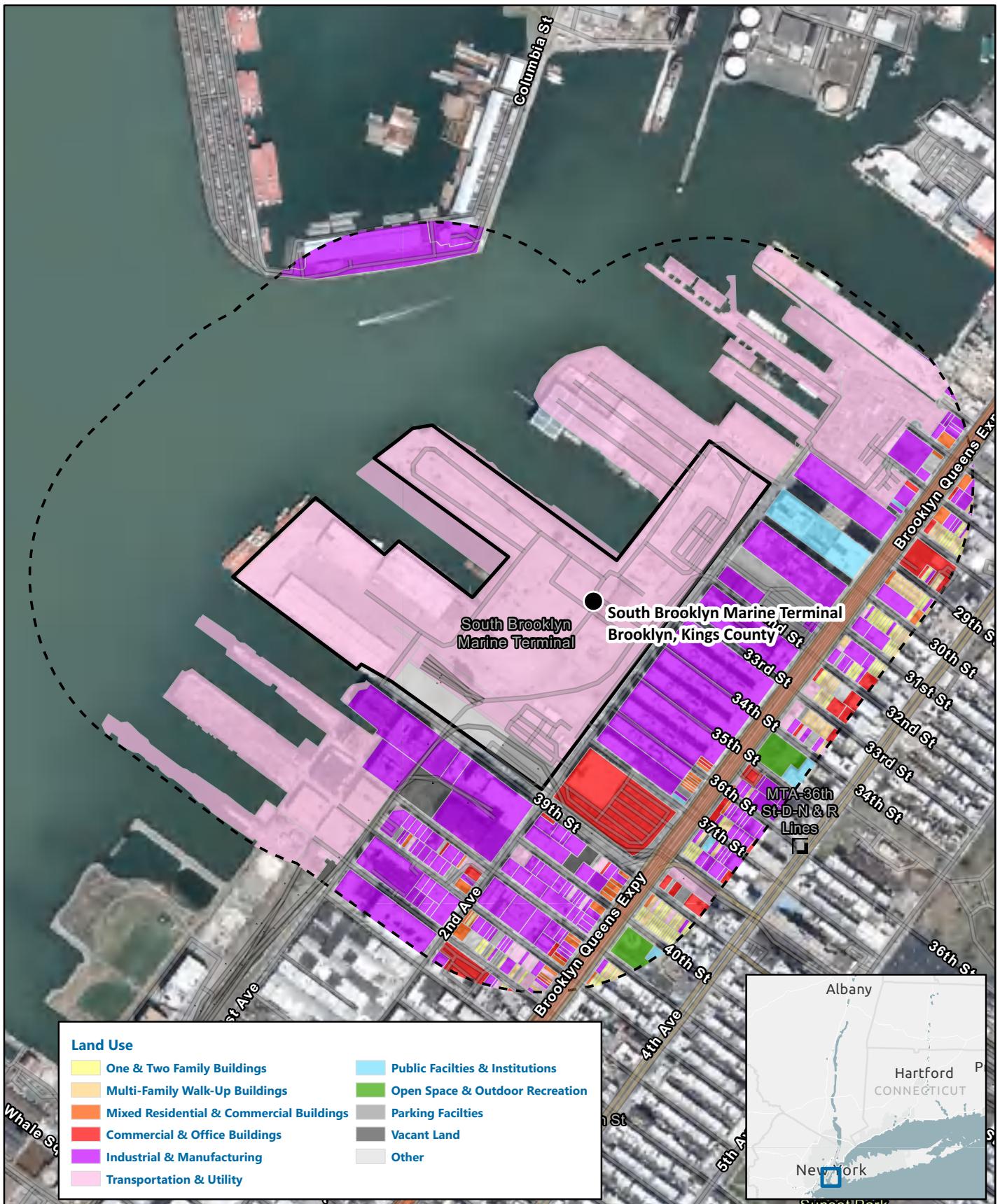
LAND USE MAP
PORT OF COEYMAN

Existing Port
Proposed OSW Port
Buffer - 1/4 Mile



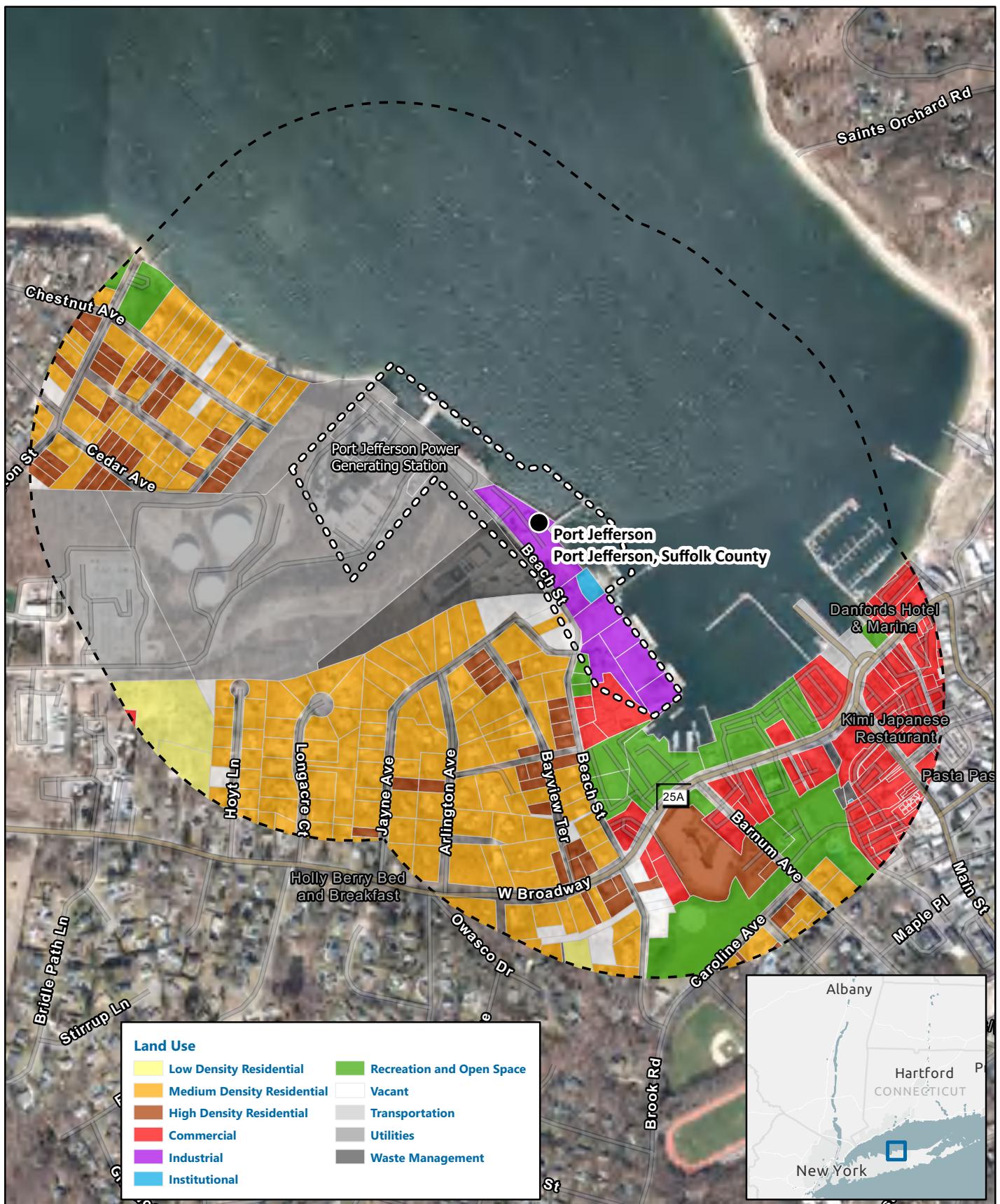
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South Brooklyn Marine Terminal Land Use Map



LAND USE MAP
SOUTH BROOKLYN MARINE
TERMINAL

Port Jefferson Land Use Map



0 500 1,000 Feet

0 500 1,000 Feet



LAND USE MAP
PORT JEFFERSON

Port Montauk Land Use Map



Land Use

Low Density Residential	Institutional
Medium Density Residential	Recreation and Open Space
High Density Residential	Vacant
Commercial	Transportation

Proposed OSW Port

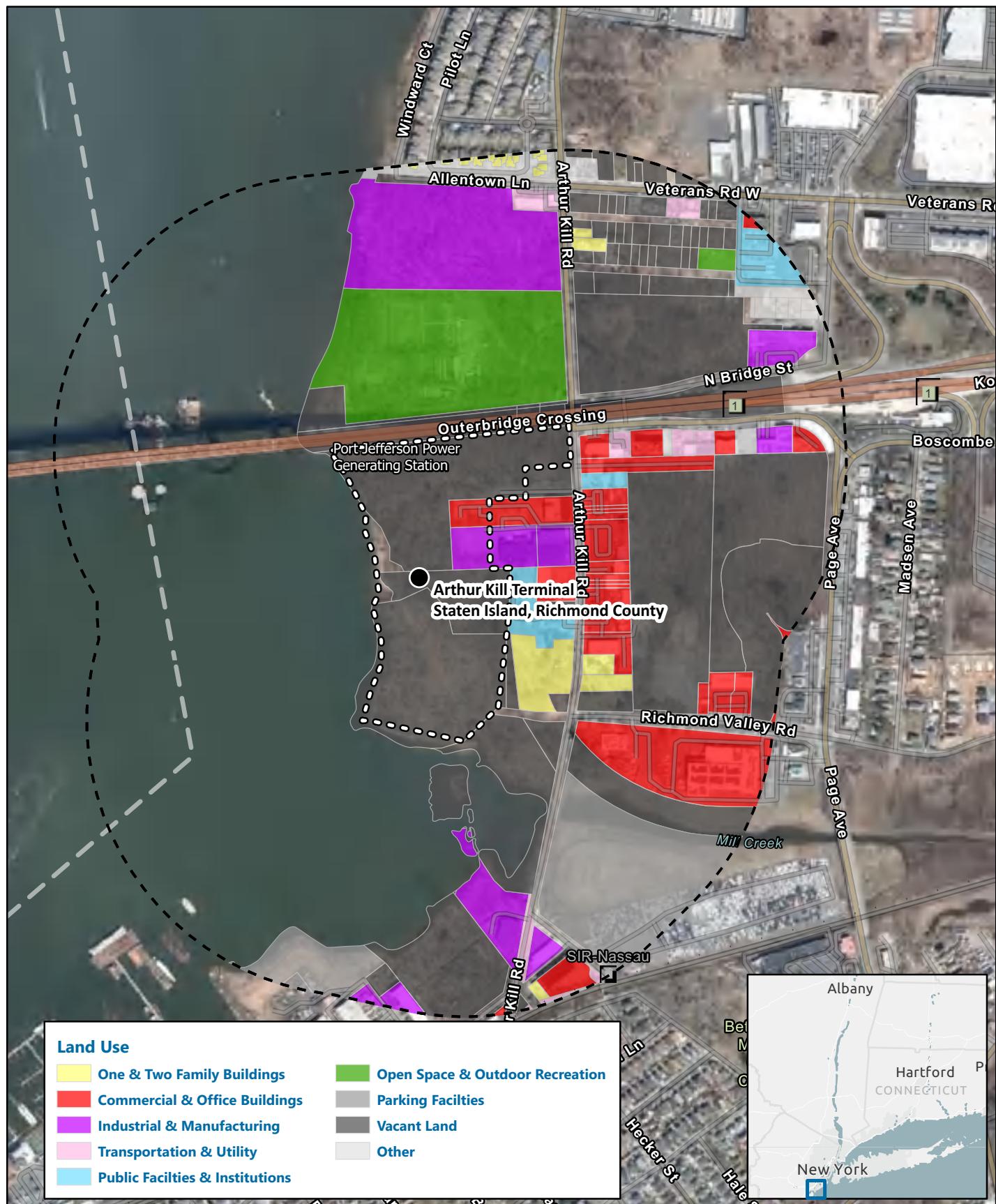
Buffer - 1/4 Mile



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Feet

LAND USE MAP
PORT MONTAUK

Arthur Kill Terminal Land Use Map



0 500 1,000 Feet

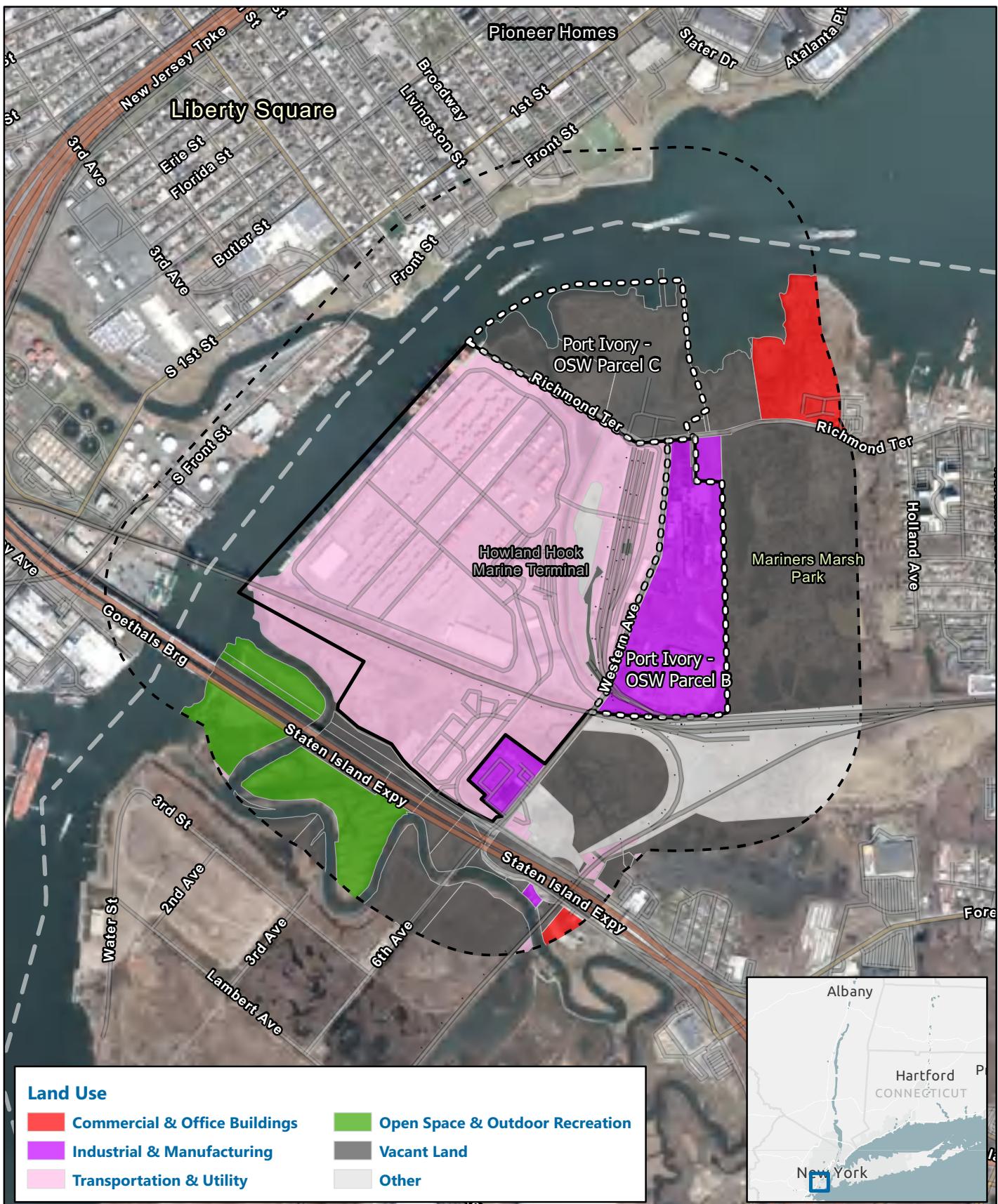
Proposed OSW Port

Buffer - 1/4 Mile

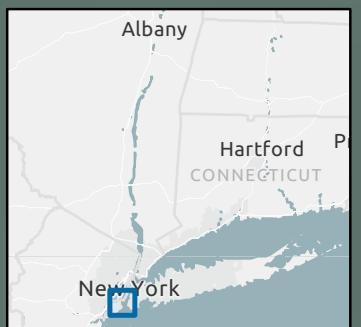
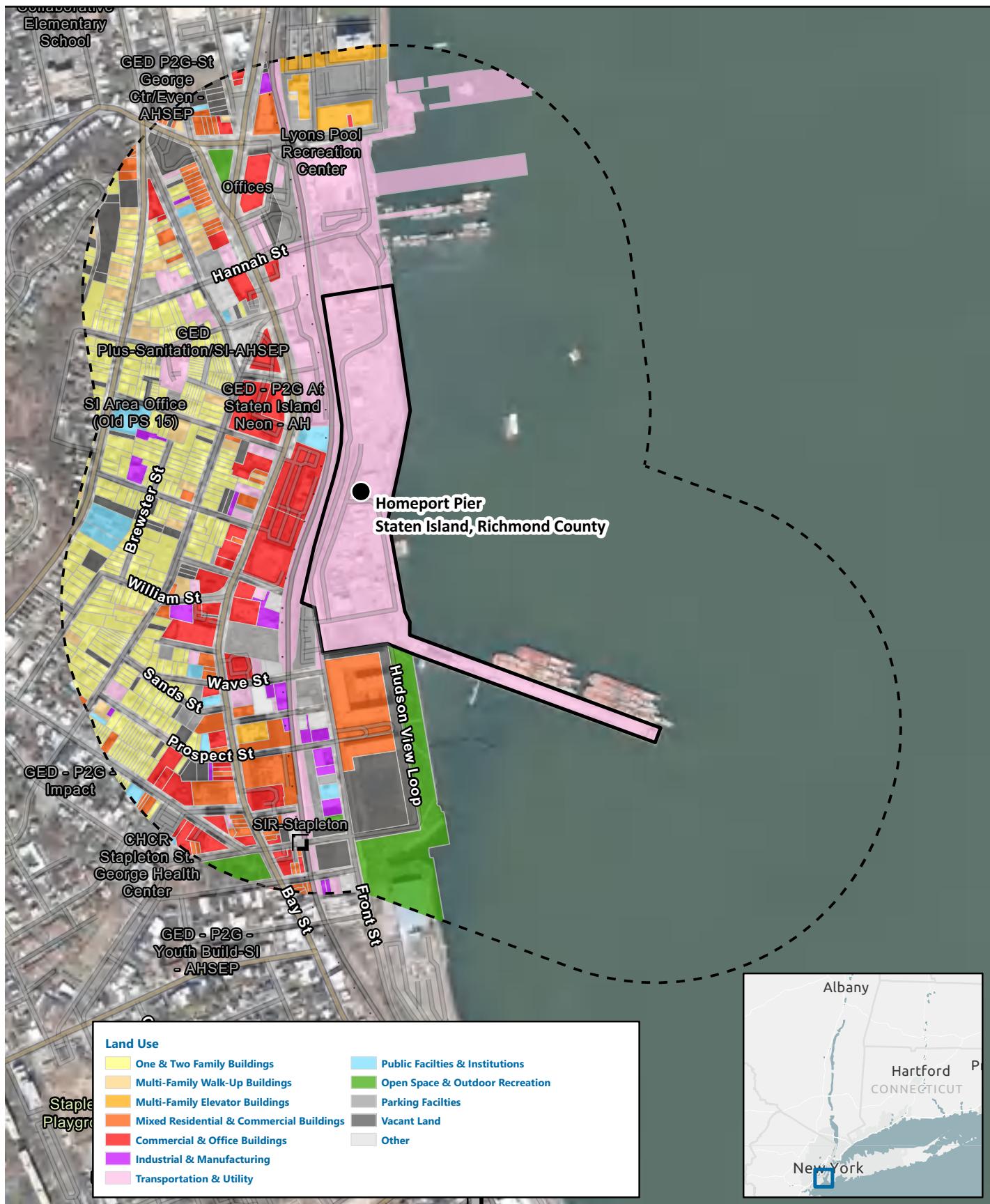


LAND USE MAP
ARTHUR KILL TERMINAL

Port Ivory Land Use Map



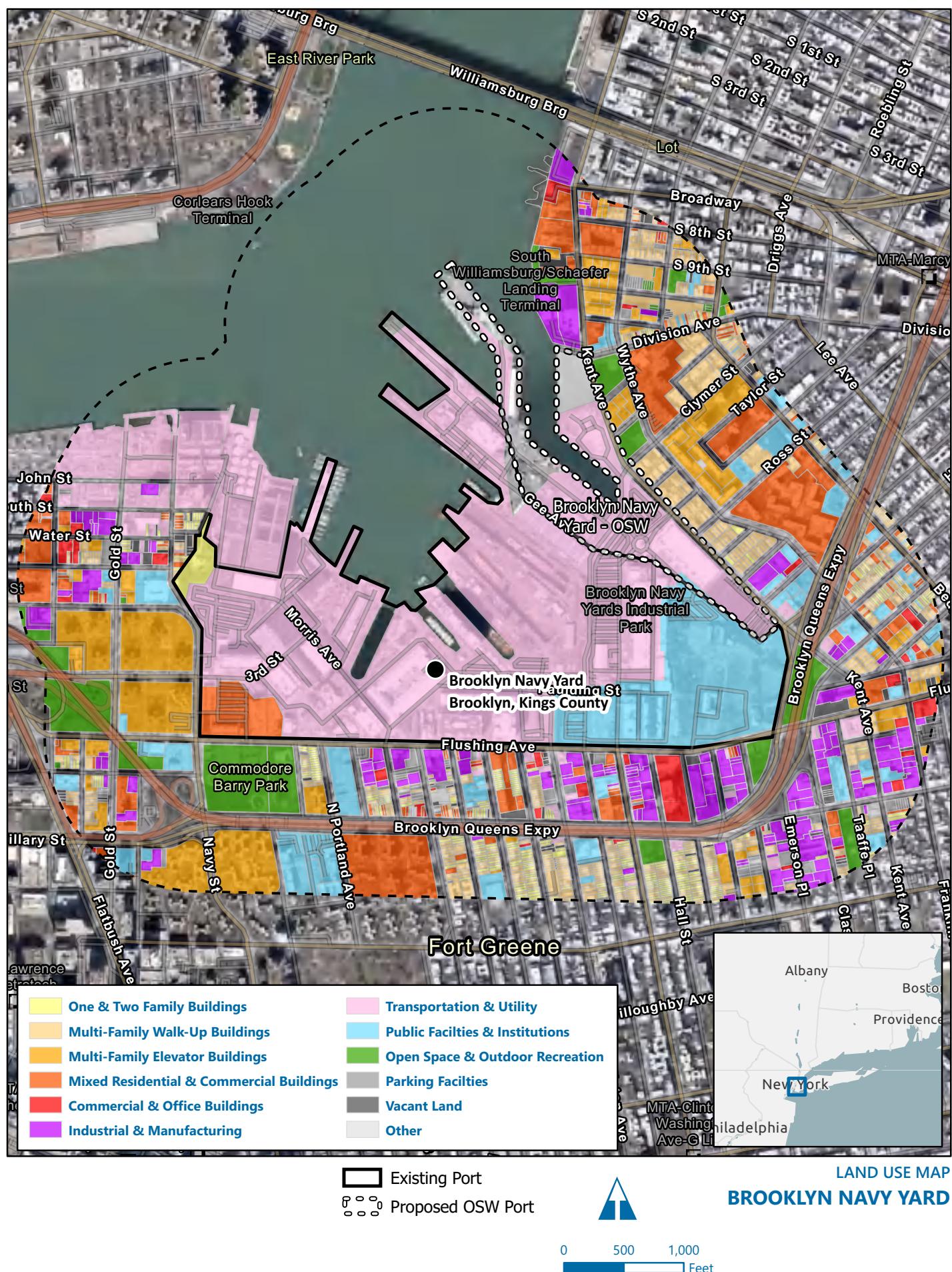
Homeport Pier Land Use Map



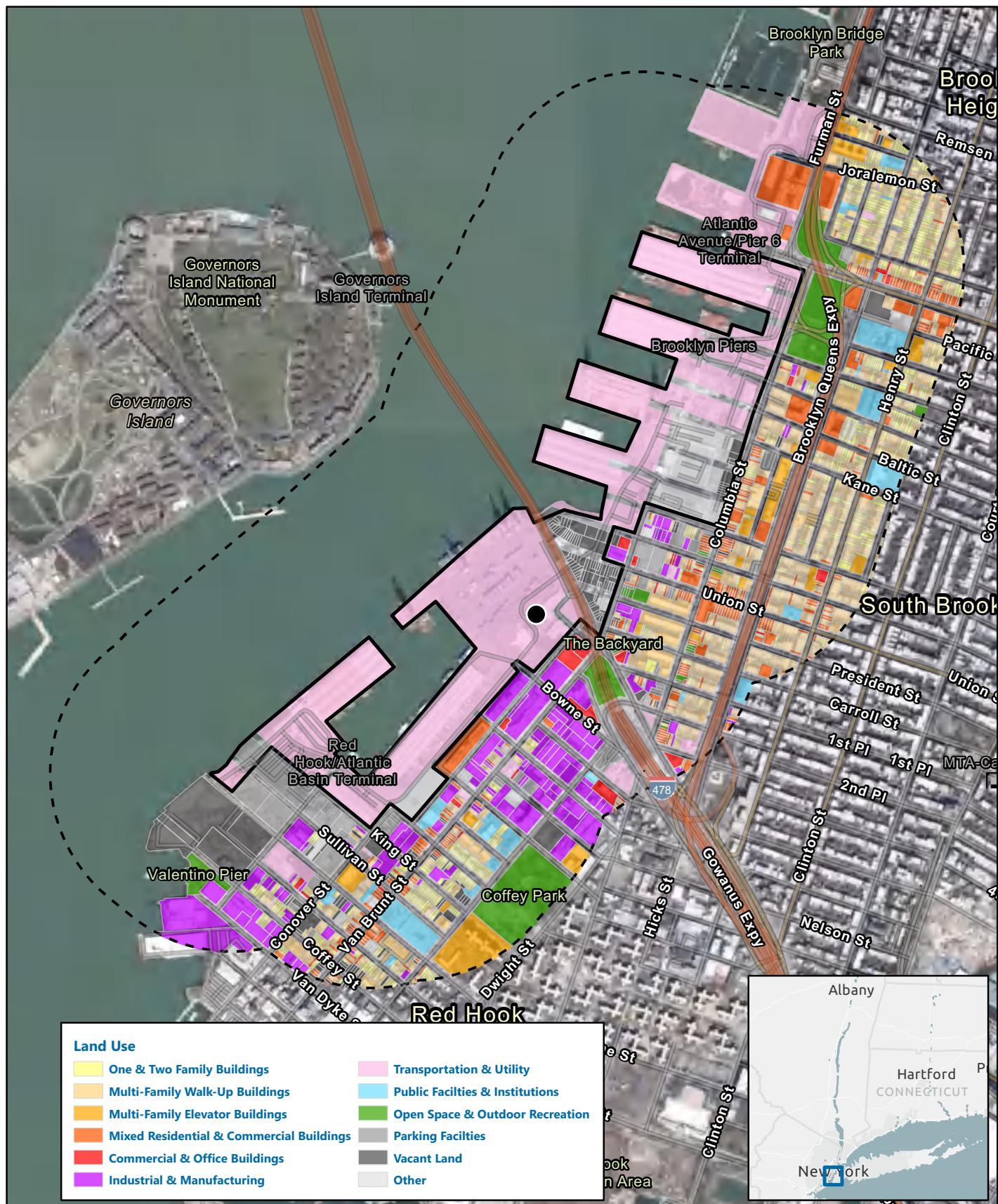
**LAND USE MAP
HOMEPORT PIER**

0 500 1,000 Feet

Brooklyn Navy Yard Land Use Map



Brooklyn Port Authority Marine Terminal Land Use Map



Land Use

One & Two Family Buildings	Pink	Transportation & Utility
Multi-Family Walk-Up Buildings	Light Orange	Public Facilities & Institutions
Multi-Family Elevator Buildings	Orange	Open Space & Outdoor Recreation
Mixed Residential & Commercial Buildings	Red	Parking Facilities
Commercial & Office Buildings	Yellow	Vacant Land
Industrial & Manufacturing	Purple	Other

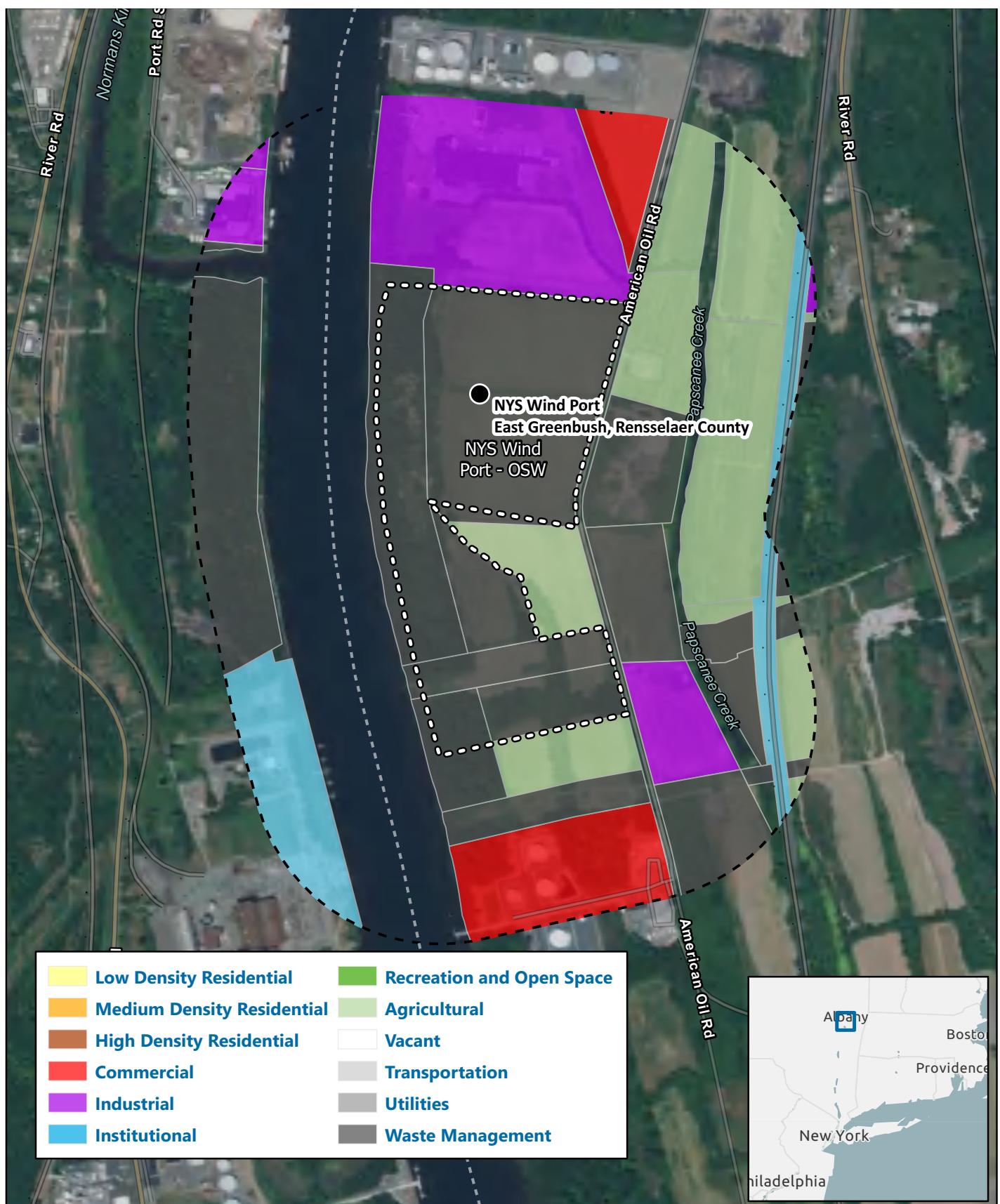
Existing Port
Buffer - 1/4 Mile



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LAND USE MAP
BROOKLYN PORT AUTHORITY
MARINE TERMINAL (PAMT)

NYS Wind Port Land Use Map



Proposed OSW Port

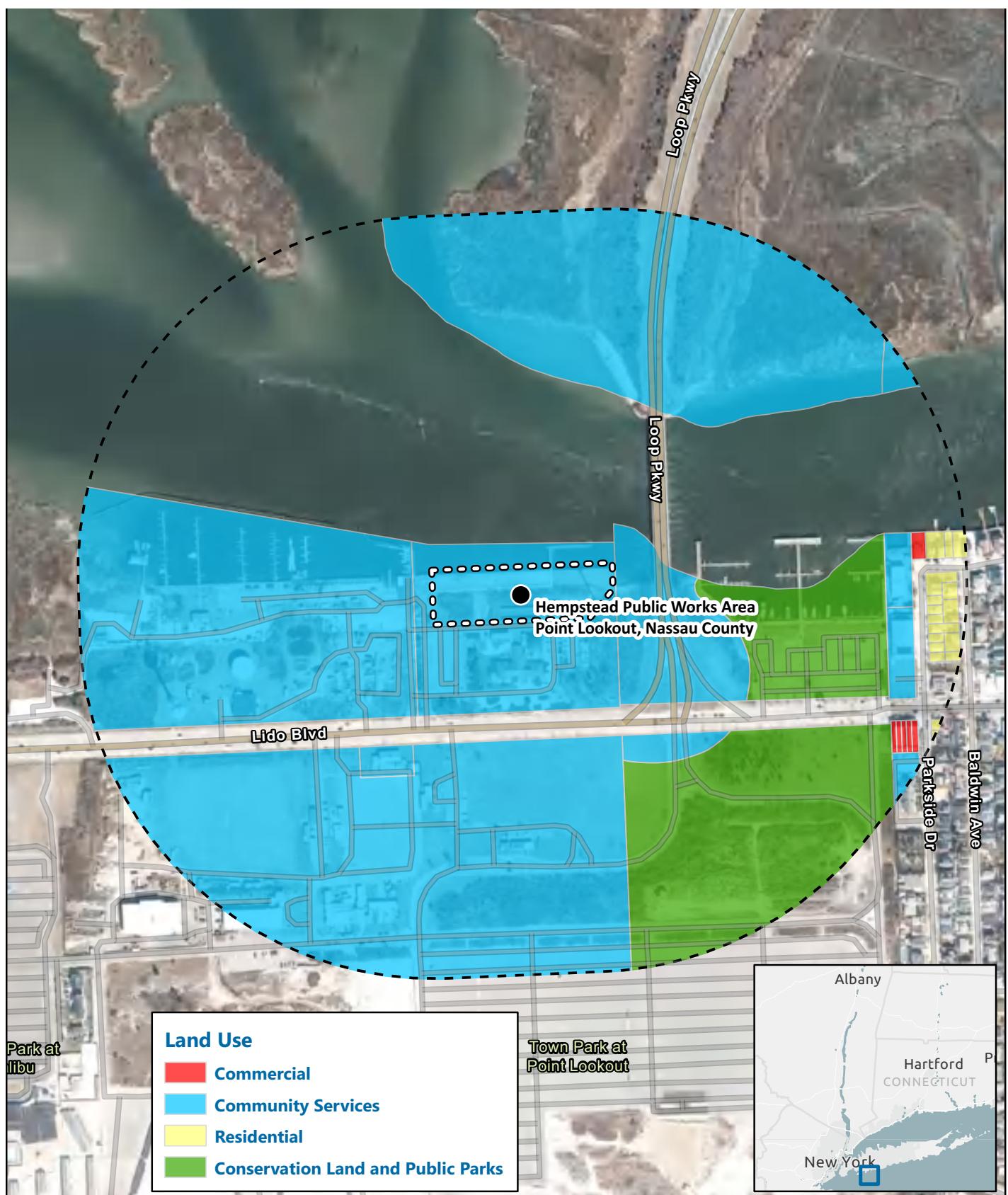
Buffer - 1/4 Mile



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Feet

LAND USE MAP
NYS WIND PORT

Hempstead Public Works Land Use Map



Land Use

- Commercial
- Community Services
- Residential
- Conservation Land and Public Parks

Town Park at
Point Lookout

Albany

Hartford
CONNECTICUT

New York

Proposed OSW Port

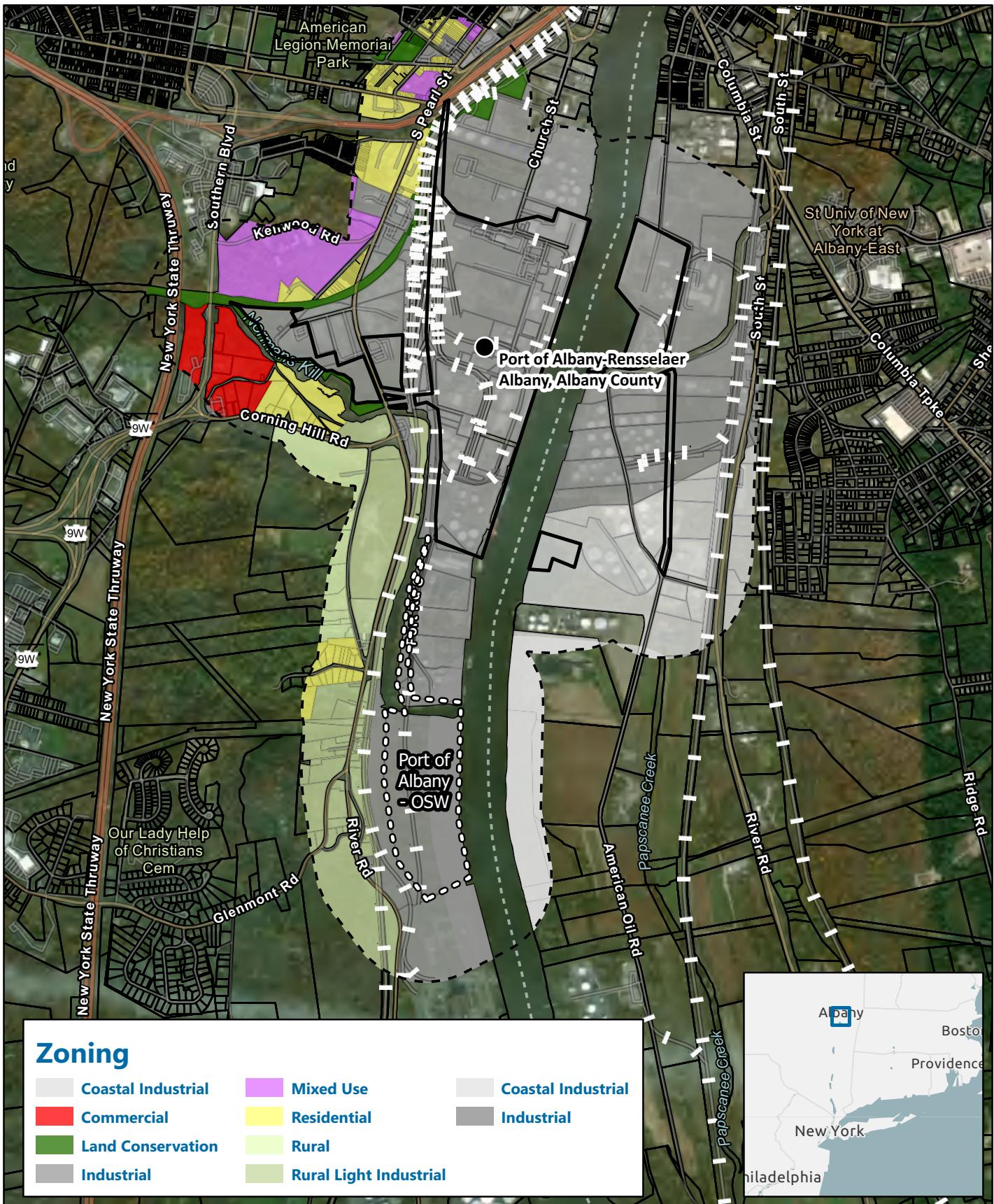
Buffer - 1/4 Mile



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LAND USE MAP
HEMPSTEAD PUBLIC WORKS
AREA

Port of Albany-Rensselaer Zoning Map



Zoning

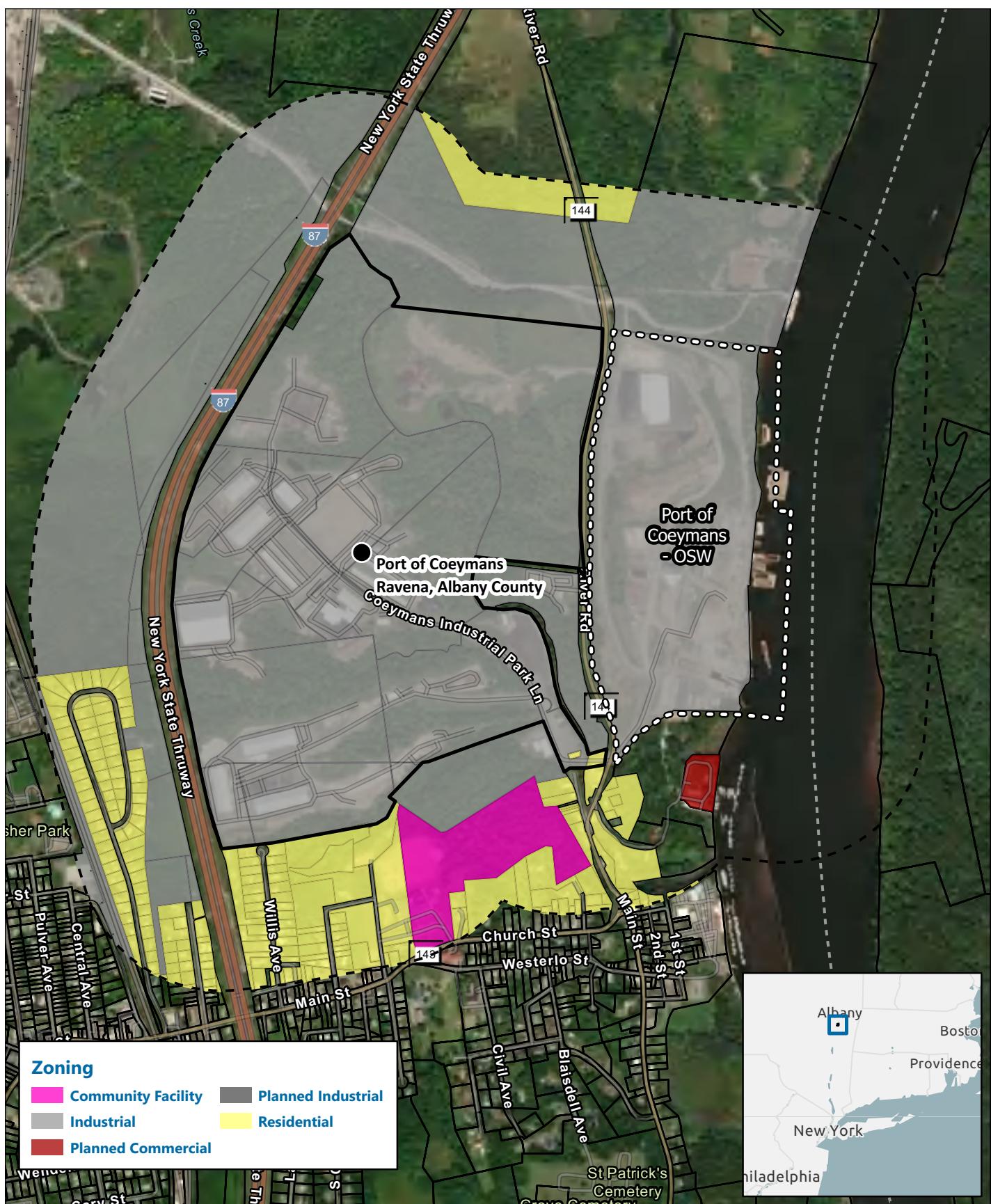
Coastal Industrial	Mixed Use
Commercial	Residential
Land Conservation	Rural
Industrial	Rural Light Industrial

Existing Port
Proposed OSW Port
Buffer - 1/4 Mile

0 500 1,000 Feet

ZONING MAP
PORT OF ALBANY-
RENSSELAER

Port of Coeymans Zoning Map



- Existing Port
- Proposed OSW Port
- Buffer - 1/4 Mile

0 500 1,000 Feet

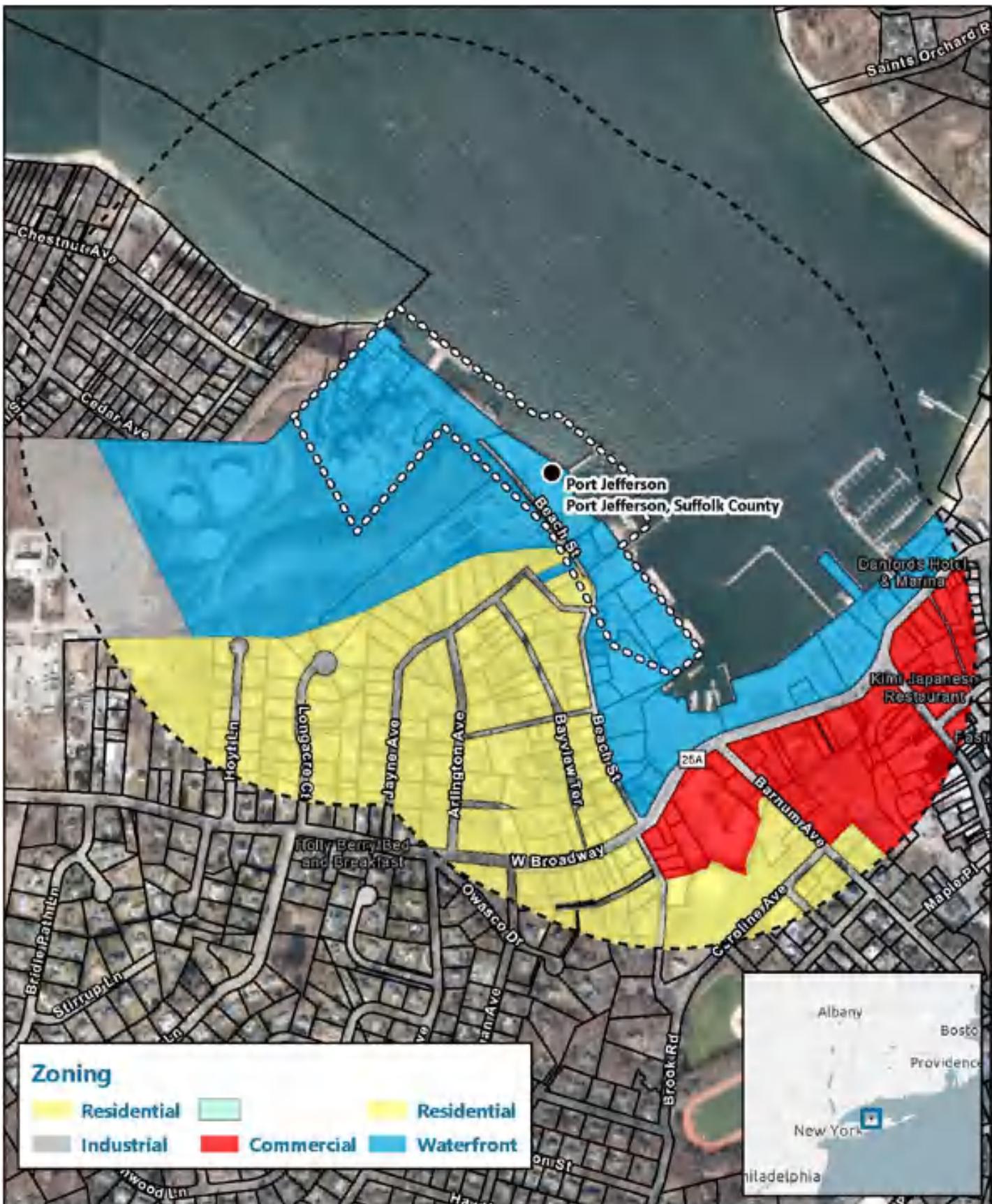
**ZONING MAP
PORT OF COEYMANS**

South Brooklyn Marine Terminal Zoning Map



ZONING MAP
SOUTH BROOKLYN MARINE TERMINAL

Port Jefferson Zoning Map



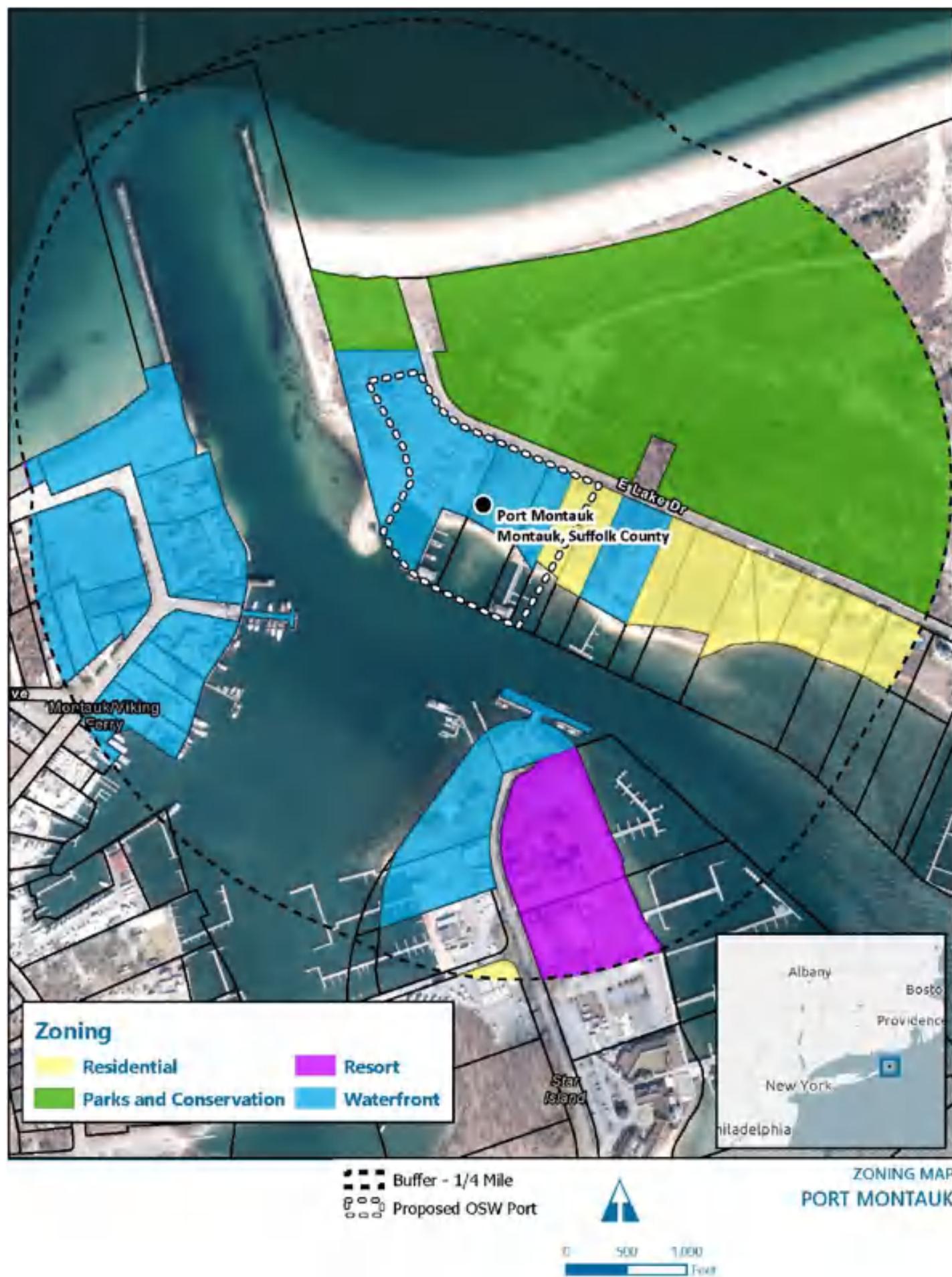
Buffer - 1/4 Mile
Proposed OSW Port



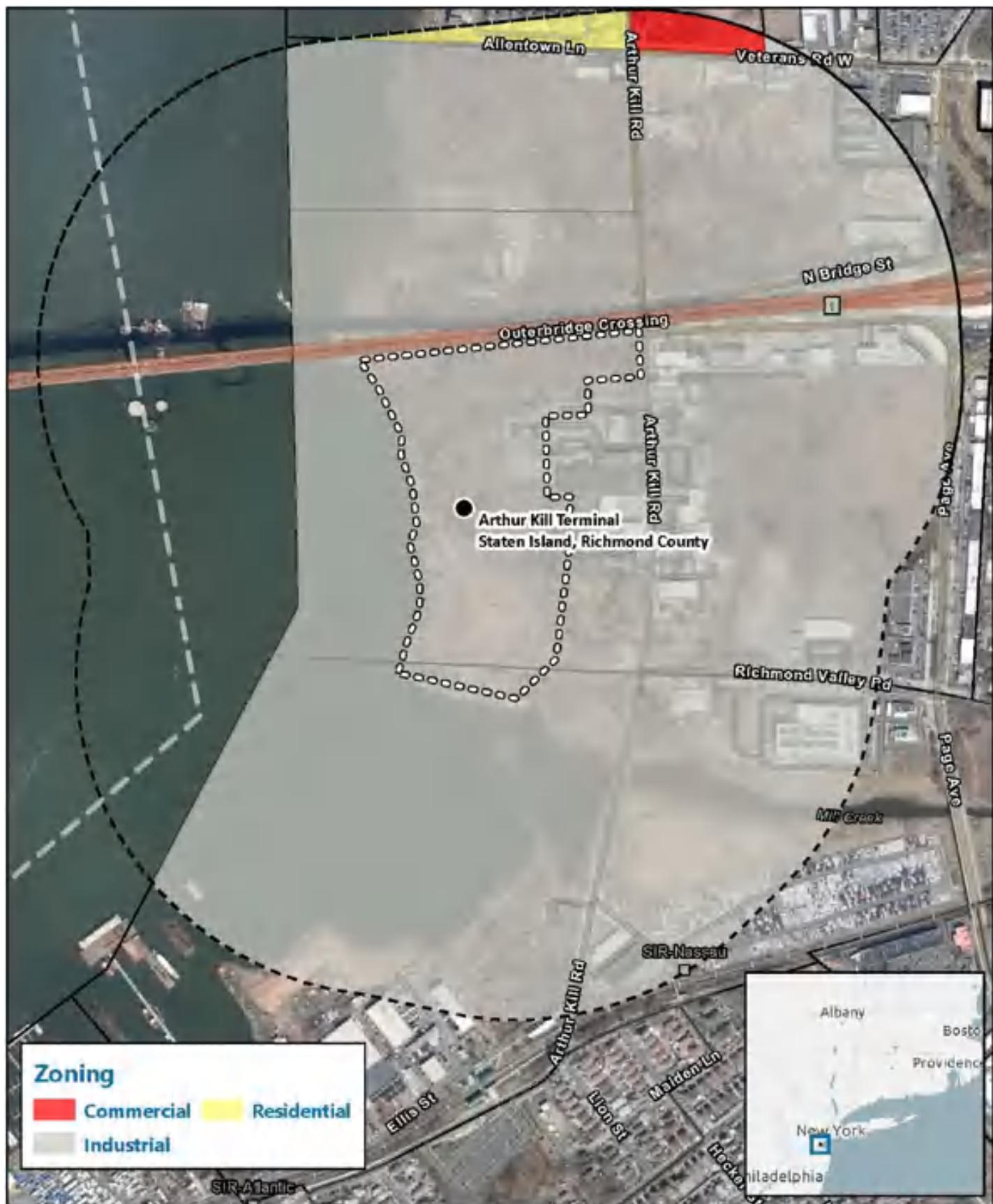
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ZONING MAP
PORT JEFFERSON

Port Montauk Zoning Map



Arthur Kill Terminal Zoning Map



Zoning

- Commercial
- Residential
- Industrial

□ Proposed OSW Port

■ Buffer - 1/4 Mile



ZONING MAP
ARTHUR KILL TERMINAL

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Feet

Port Ivory Zoning Map



Zoning

Industrial

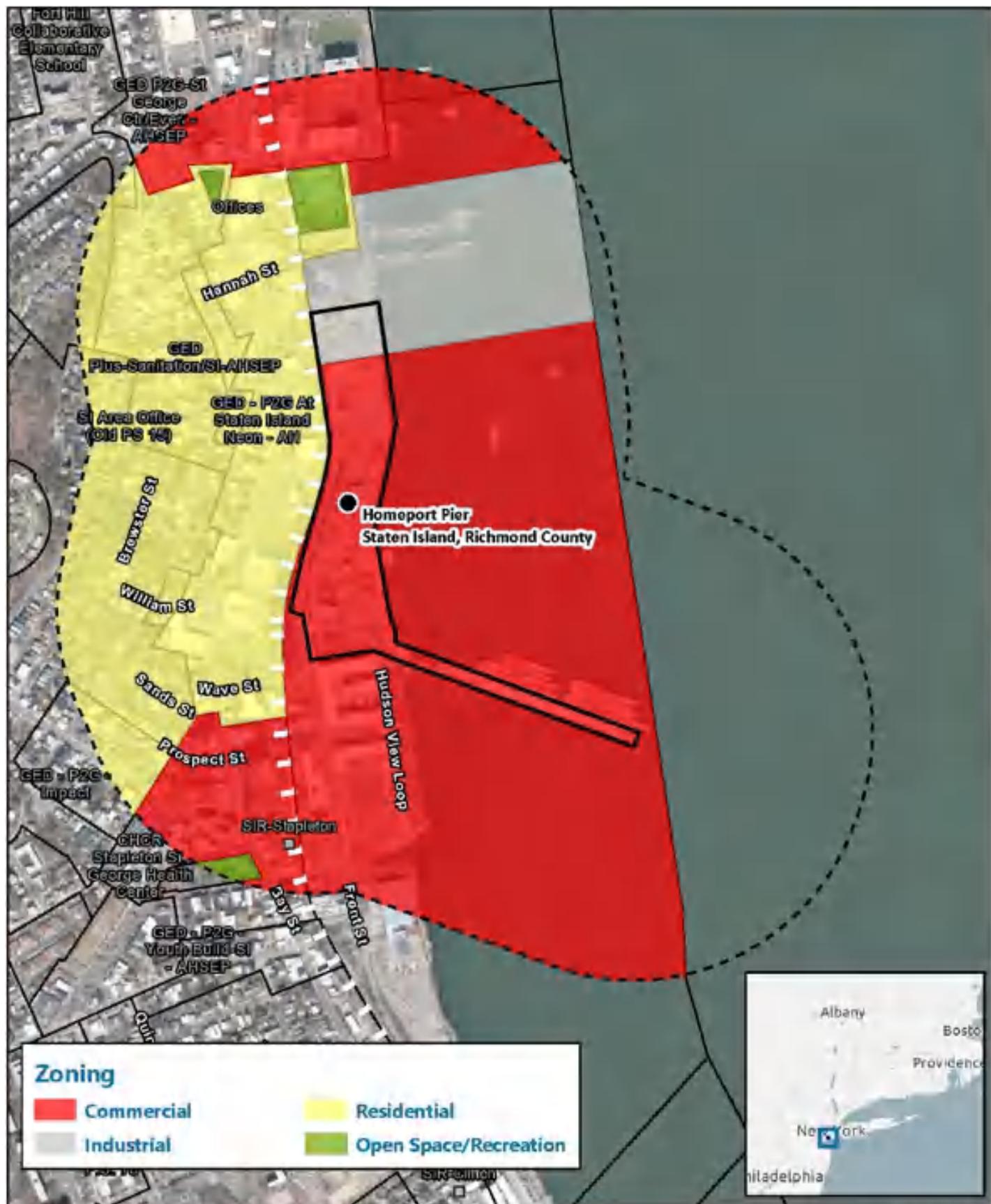
Open Space/Recreation

- Buffer - 1/4 Mile
- Existing Port
- Proposed OSW Port

0 500 1,000 Feet

ZONING MAP
PORT IVORY

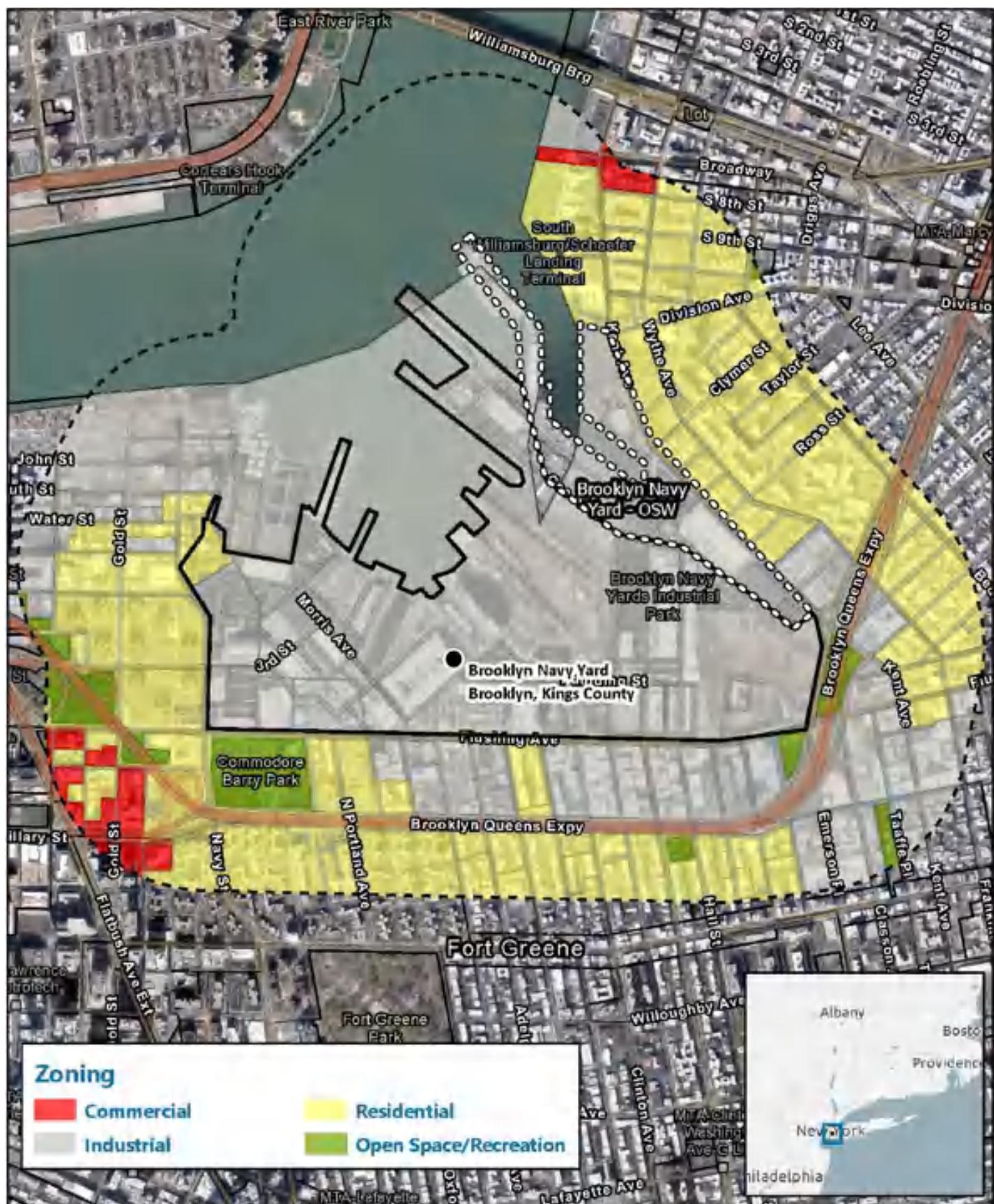
Homeport Pier Zoning Map



ZONING MAP
HOMEPORT PIER

0 500 1,000
Feet

Brooklyn Navy Yard Zoning Map



Zoning

Commercial
Industrial

Residential
Open Space/Recreation

- Existing Port
- Proposed OSW Port
- Buffer - 1/4 Mile

0 500 1,000 Feet

ZONING MAP
BROOKLYN NAVY YARD

Brooklyn Port Authority Marine Terminal Zoning Map



Zoning

Industrial
Residential

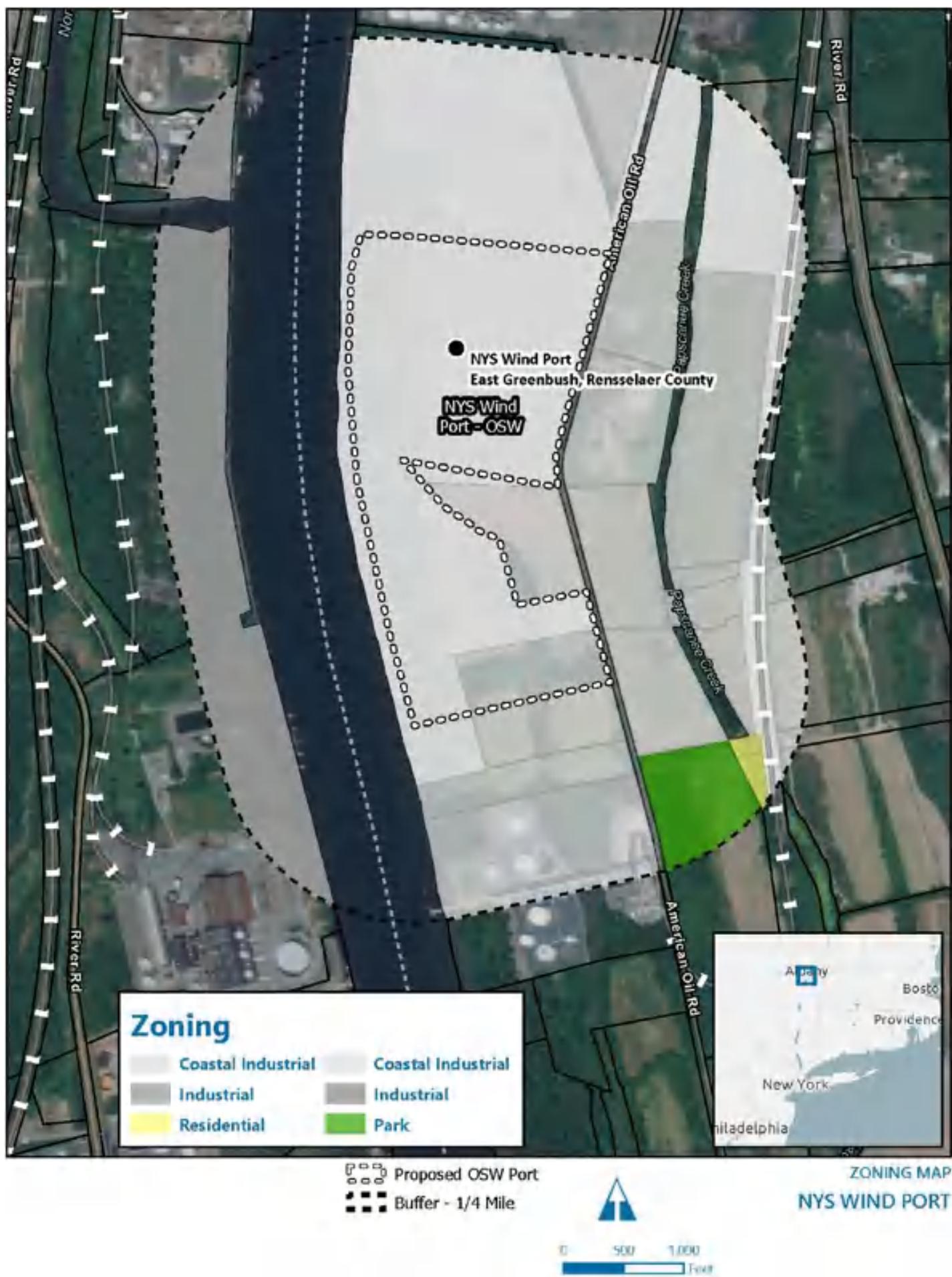
Open Space/Recreation

Buffer - 1/4 Mile
Existing Port

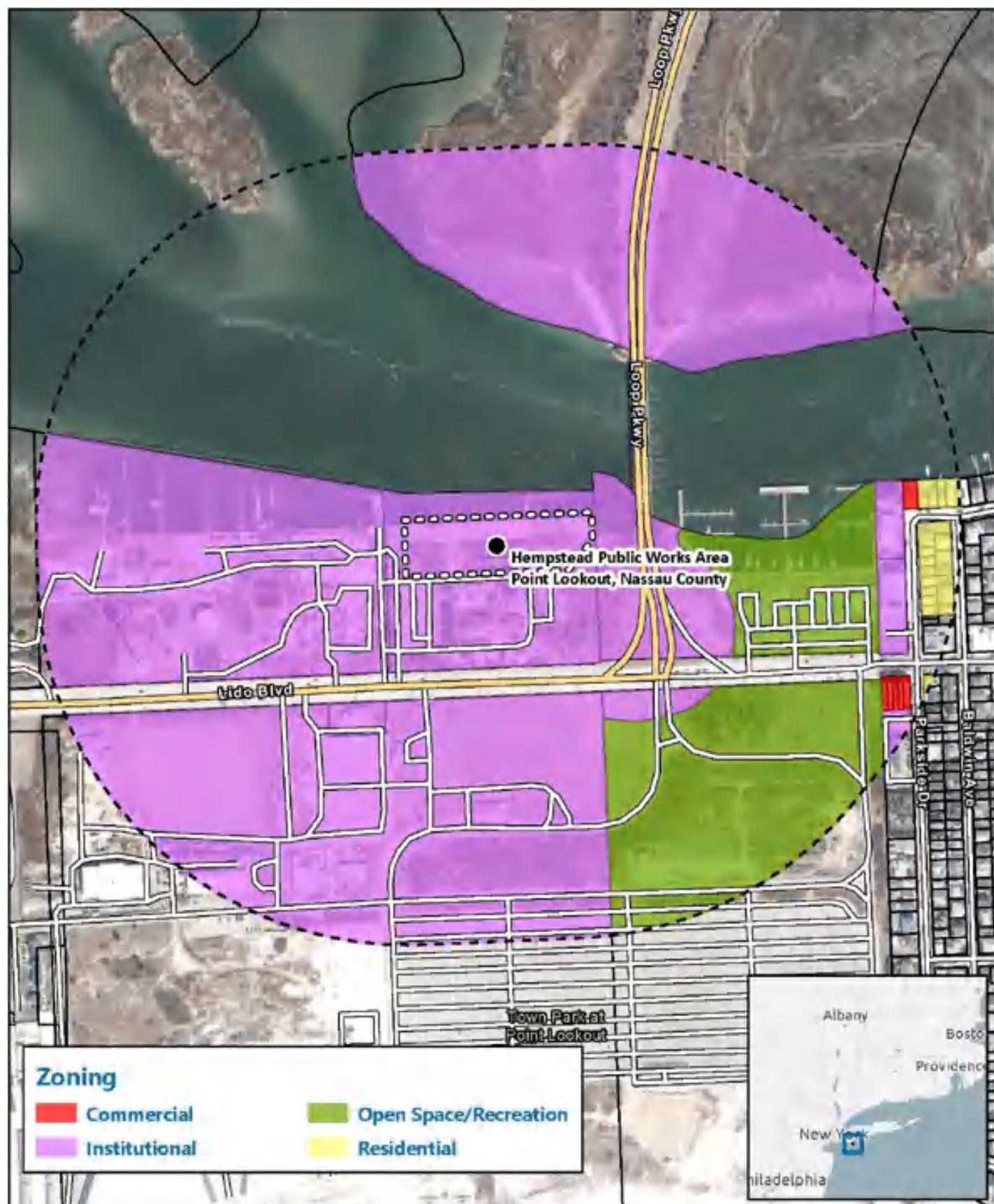
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Feet

ZONING MAP
BROOKLYN PORT AUTHORITY
MARINE TERMINAL (PAMT)

NYS Wind Port Zoning Map



Hempstead Public Works Zoning Map



Zoning

- Commercial
- Institutional

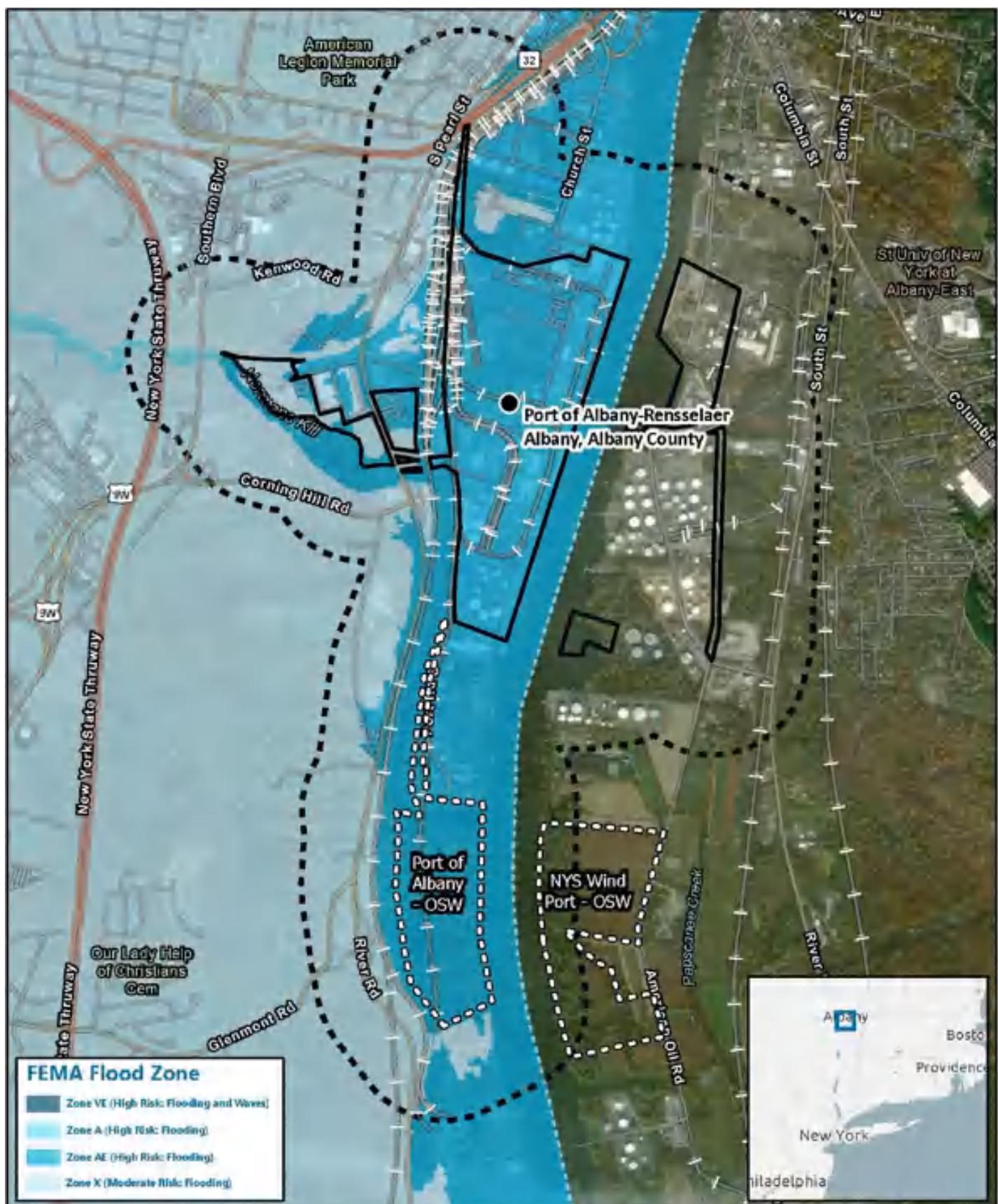
- Open Space/Recreation
- Residential

Buffer - 1/4 Mile
Proposed OSW Port

0 500 1,000
Feet

ZONING MAP
HEMPSTEAD PUBLIC WORKS
AREA

Port of Albany-Rensselaer Floodplain Map



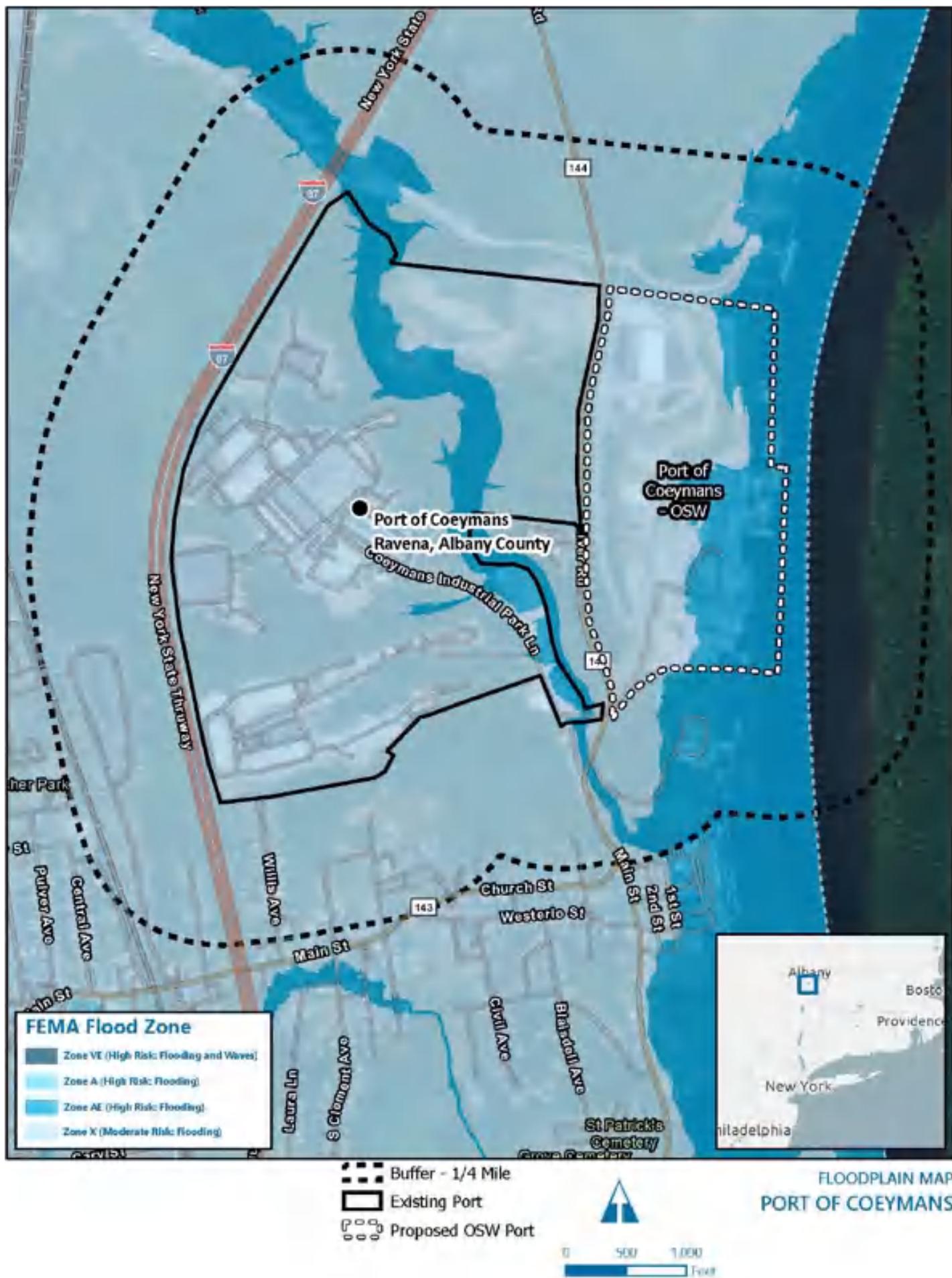
■ Buffer - 1/4 Mile
□ Existing Port
○ Proposed OSW Port

0 500 1,000 Feet

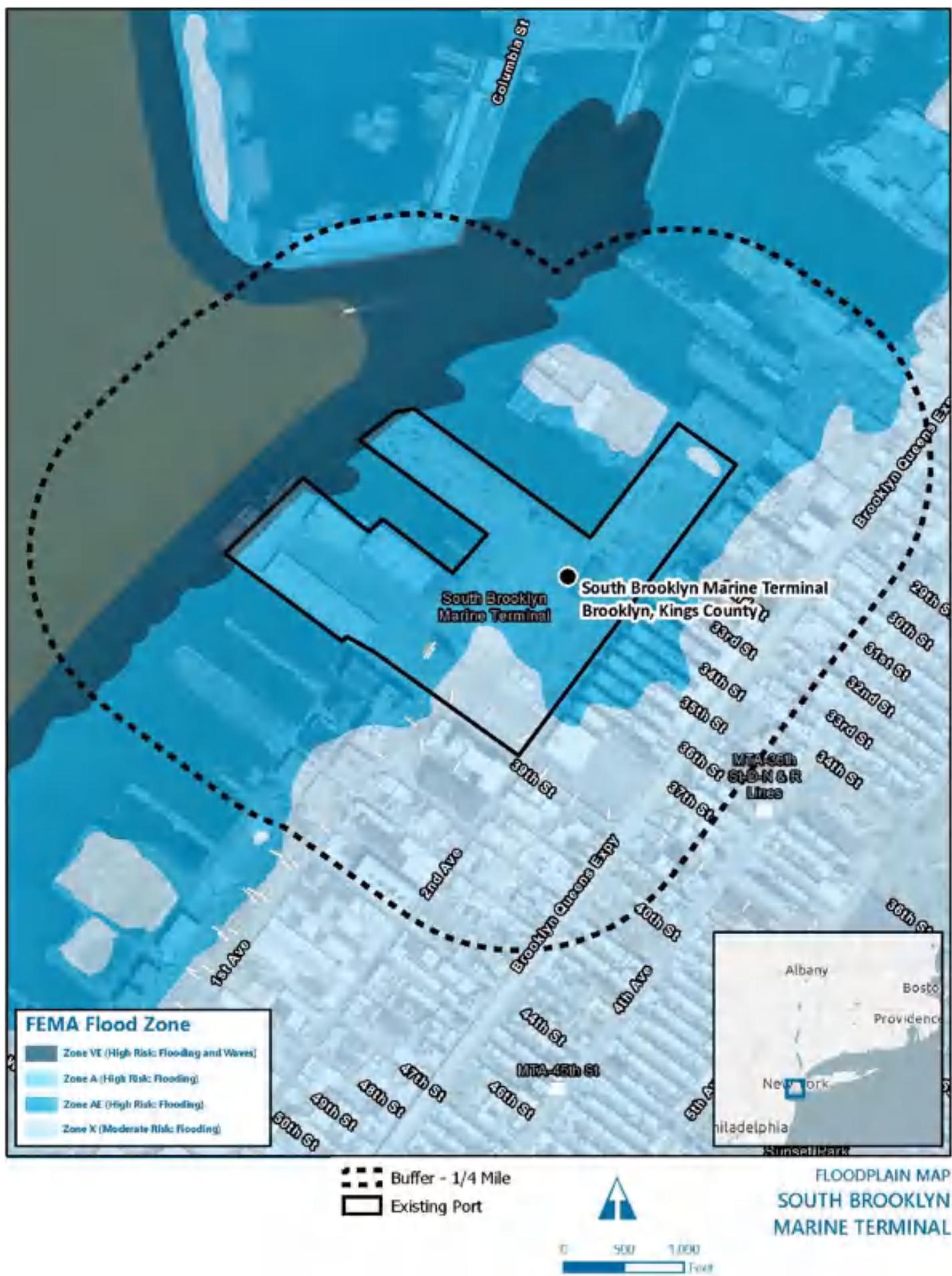
FLOODPLAIN MAP
PORT OF ALBANY-
RENSSELAER



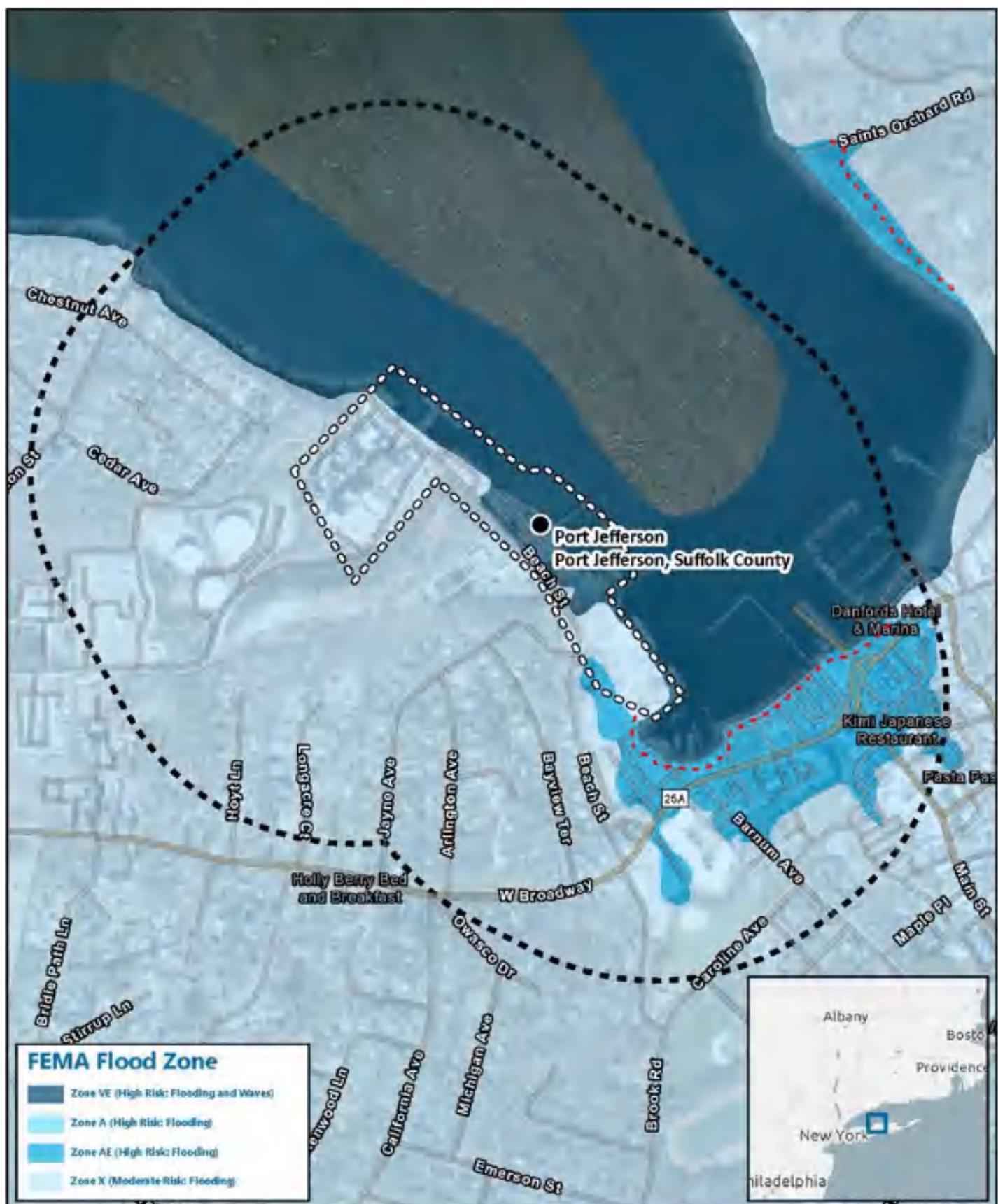
Port of Coeymans Floodplain Map



South Brooklyn Marine Terminal Floodplain Map



Port Jefferson Floodplain Map



FEMA Flood Zone

- Zone VE (High Risk: Flooding and Waves)
- Zone A (High Risk: Flooding)
- Zone AE (High Risk: Flooding)
- Zone X (Moderate Risk: Flooding)

Buffer - 1/4 Mile
Proposed OSW Port



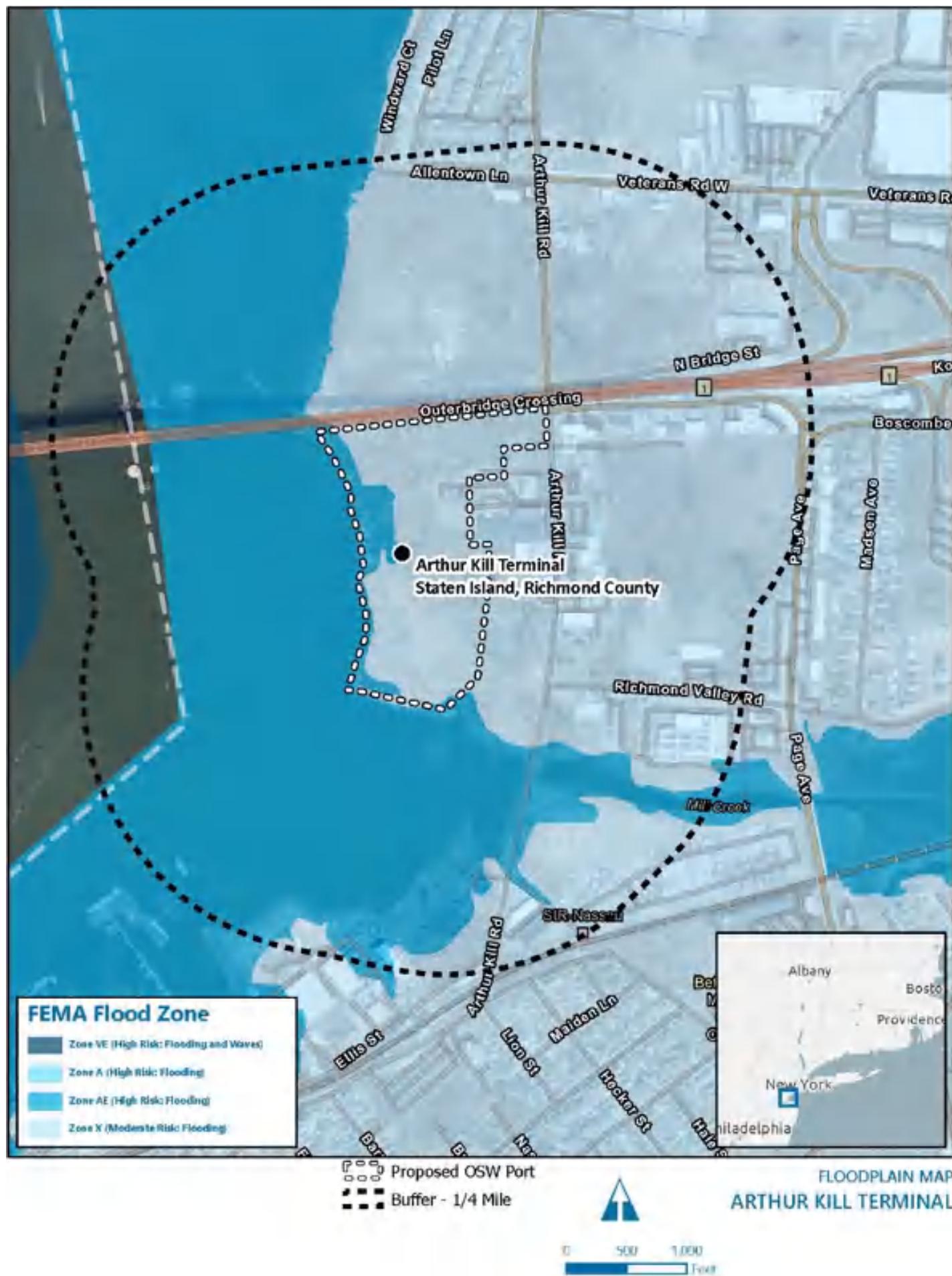
0 500 1,000 Feet

FLOODPLAIN MAP
PORT JEFFERSON

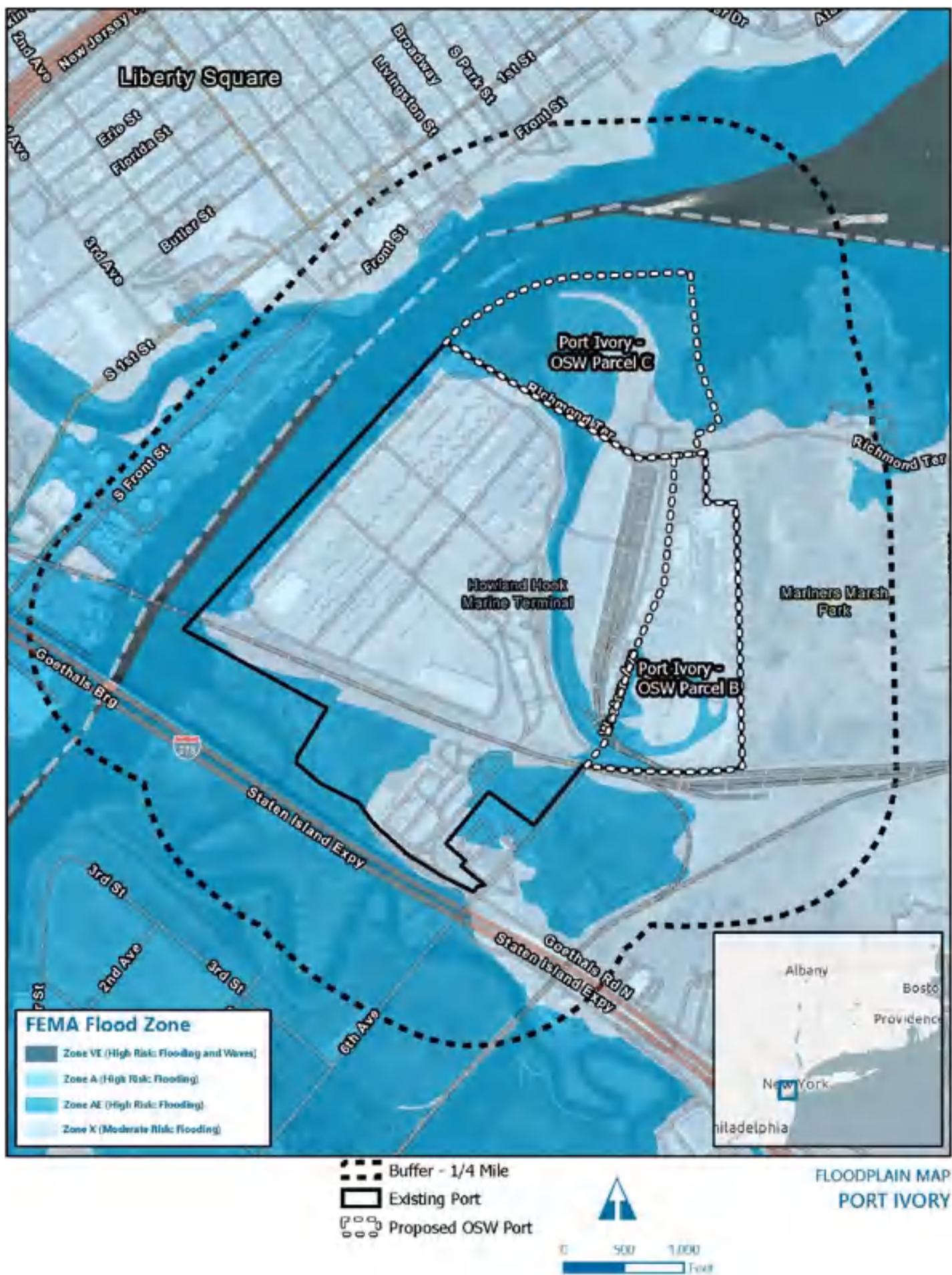
Port Montauk Floodplain Map



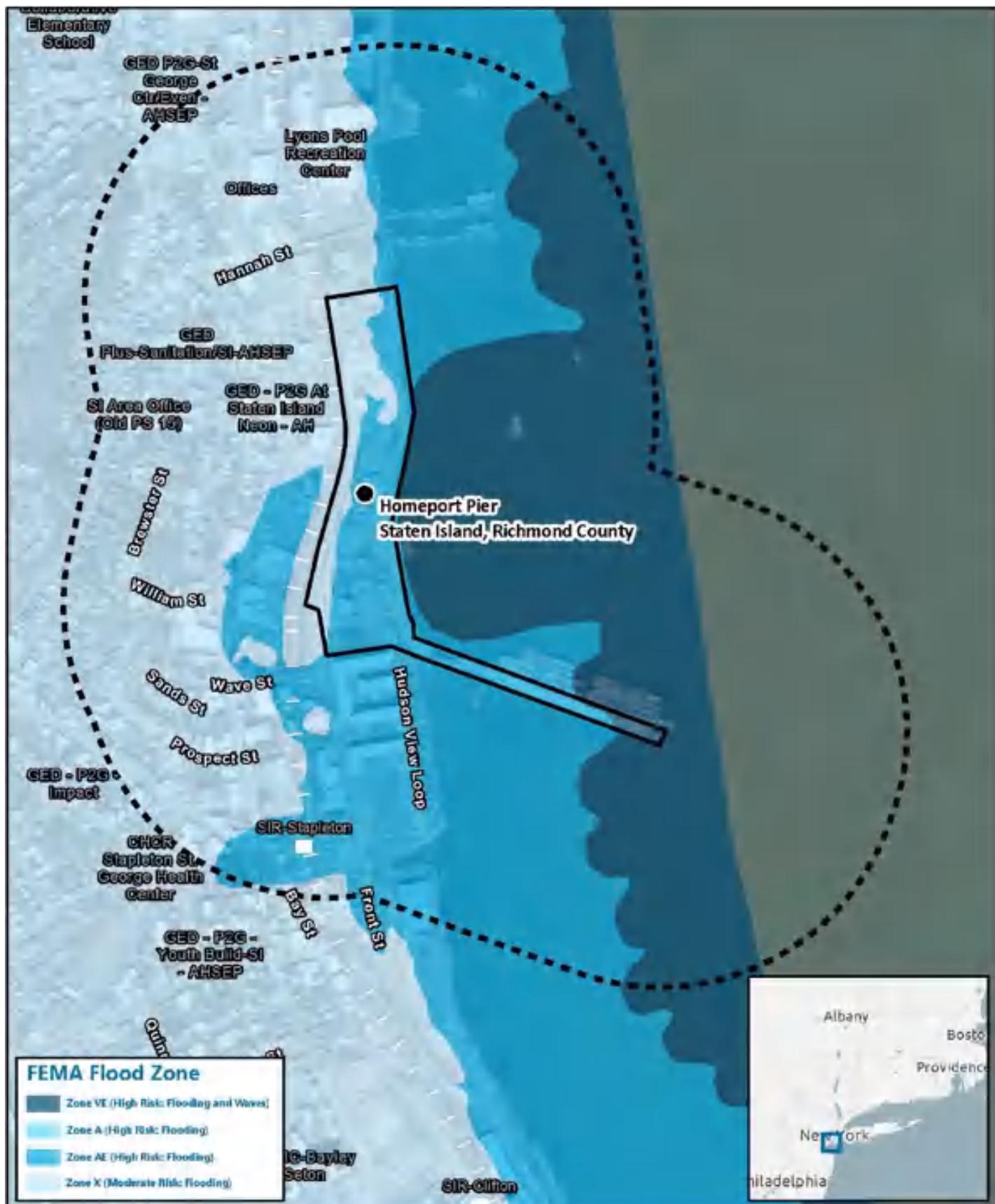
Arthur Kill Terminal Floodplain Map



Port Ivory Floodplain Map



Homeport Pier Floodplain Map

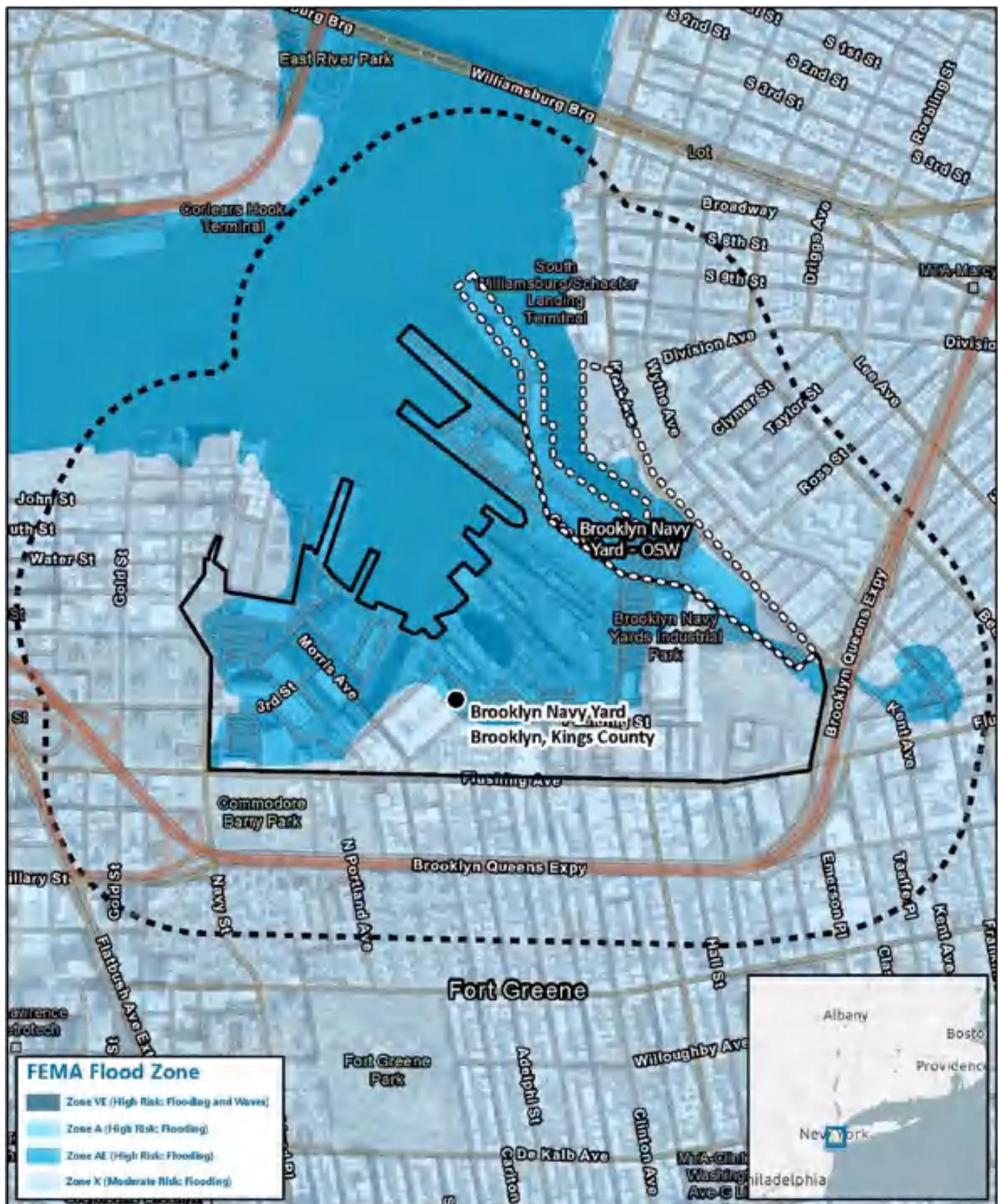


Buffer - 1/4 Mile
Existing Port

0 500 1,000 Feet

FLOODPLAIN MAP
HOMEPORT PIER

Brooklyn Navy Yard Floodplain Map



Buffer - 1/4 Mile
Existing Port
Proposed OSW Port

0 500 1,000 Feet

FLOODPLAIN MAP
BROOKLYN NAVY YARD

Brooklyn Port Authority Marine Terminal Floodplain Map



Buffer - 1/4 Mile

Existing Port

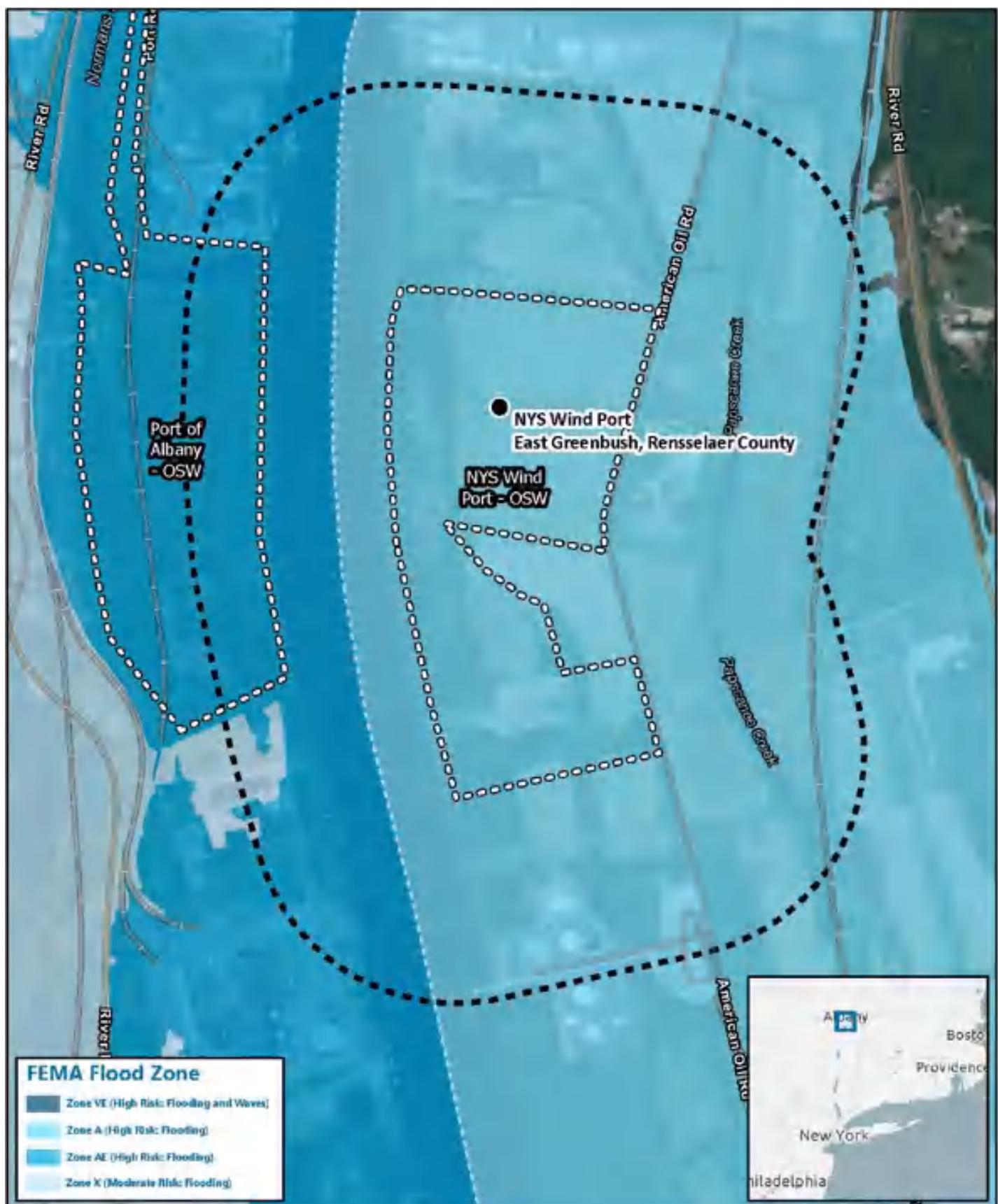


FLOODPLAIN MAP

BROOKLYN PORT AUTHORITY
MARINE TERMINAL (PAMT)

0 500 1,000
Feet

NYS Wind Port Floodplain Map



■ Buffer - 1/4 Mile
□ Proposed OSW Port

NYS WIND PORT FLOOD ZONE
BASED ON EAST GREENBUSH, NY
FIRM EFFECTIVE MARCH 18, 1980
361733 0006 A

0 500 1,000
Feet

FLOODPLAIN MAP
NYS WIND PORT

Hempstead Public Works Floodplain Map



Buffer - 1/4 Mile
Proposed OSW Port

0 500 1,000
Feet

FLOODPLAIN MAP
HEMPSTEAD PUBLIC WORKS
AREA



Appendix D. Threatened and Endangered Species Information (NYDEC, NHP, USFWA IPaC, and EFH)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12239-4057
P: (518) 402-8896 F: (518) 402-8826
www.dec.ny.gov

December 13, 2021

Christopher Coccato
HDR
2711 Westchester Avenue
White Plains, NY 10604-3504

Re: NYSERDA Ports Cumulative Impact Assessment and Alternatives Analysis Study

Dear Christopher Coccato:

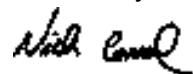
In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur at the proposed project sites or in their vicinities.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law, please consult with the NYSDEC Division of Environmental Permits.

Sincerely,



Nicholas Conrad
Information Resources Coordinator
New York Natural Heritage Program



The following rare plants, rare animals, and significant natural communities have been documented in the Natural Heritage database in or near the project sites for the

Ports Cumulative Impact Assessment and Alternatives Analysis Study

December 2021

This report includes animal species listed by NYS as Endangered or Threatened; these are highlighted in the report. For information regarding any permit considerations for listed animal species, contact the NYSDEC.

Other animal species in this report, while not listed by NYS as Endangered or Threatened, are rare in New York and of conservation concern.

Plant species in this report are listed by NYS as Endangered, Threatened, or Rare, and are of conservation concern.

Natural communities in this report are considered state-significant by the NY Natural Heritage Program. Each community is an example of a community type that is rare or uncommon in the state, and/or is a high-quality example of its type. NY Natural Heritage considers these community occurrences to have high ecological and conservation value.

	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*
Arthur Kill Landfill				
Birds	Peregrine Falcon	<i>Falco peregrinus</i>	Endangered	S3B
Outer Bridge Crossing, nesting on pier in Arthur Kill near bridge, within .15 mile of project site.				
Dragonflies/ Damselflies	Comet Darner	<i>Anax longipes</i>	Unlisted	S2S3
Comet Pond and surrounding wetlands and fields, .4 mile northeast of project site.				
Plants	Torrey's Mountain Mint	<i>Pycnanthemum torreyi</i>	Endangered	S1
Vegetated roadside along Veterans Road West, .5 mile northeast of project site.				

Brooklyn Navy Yard

Birds	Peregrine Falcon	<i>Falco peregrinus</i>	Endangered	S3B
Williamsburg Bridge, nesting on bridge.				

Brooklyn Port Authority Marine Terminal

Birds	Common Tern	<i>Sterna hirundo</i>	Threatened	S3B
Governors Island, nesting on piers and breakwaters.				

	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*
Hempstead Public Works Area				
Birds	Piping Plover	<i>Charadrius melanotos</i>	Endangered and federally Threatened	S3B
	Common Tern	<i>Sterna hirundo</i>	Threatened	S3B
	Least Tern	<i>Sternula antillarum</i>	Threatened	S3B
	Black Skimmer	<i>Rynchops niger</i>	Special Concern	S2
Plants	Seabeach Amaranth	<i>Amaranthus pumilus</i>	Threatened and federally Threatened	S2
Nassau and Lido Beaches, within .5 mile of project site (birds are nesting).				
Communities	High Salt Marsh			S1S2
	Low Salt Marsh			S1S2
	Salt Panne			S1S2
Very large salt marsh complex, with patches along Reynolds Channel within .25 mile of project site.				

Homeport Pier – no records of concern

Port Ivory

Birds	Peregrine Falcon	<i>Falco peregrinus</i>	Endangered	S3B
Nesting on Goethals Bridge, about 250 yards from project site.				
	Least Bittern	<i>Ixobrychus exilis</i>	Threatened	S3B
	Pied-billed Grebe	<i>Podilymbus podiceps</i>	Threatened	S3B
Nesting in tidal marshes along Pralls Creek and extending to within 1/3 mile of project site.				
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	S2S3B,S2N
Nesting on Shooters Island, within 1 mile of project site.				
Amphibians	Atlantic Coast Leopard Frog	<i>Lithobates kauffeldi</i>	Unlisted	S1S2
Wetlands, ponds, and ditches south of Old Place Creek.				
Plants	Square-Stemmed Spike Rush	<i>Eleocharis quadrangulata</i>	Endangered	S1
Pond about ¼ mile east of project site.				
	Persimmon	<i>Diospyros virginiana</i>	Threatened	S2
North shore of Old Place Creek, down slope from I-278 ramp and Gulf Avenue, about 1/3 mile southeast of project site.				

	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*
Port Jefferson				
Communities	Marine Back-barrier lagoon			S2
	Port Jefferson Harbor: a moderately large marine lagoon that is in mostly good ecological condition.			
Port Montauk				
Birds	Piping Plover	Charadrius melanotos	Endangered and federally Threatened	S3B
	Common Tern	Sterna hirundo	Threatened	
	Least Tern	Sternula antillarum	Threatened	S3B
	Nesting on beach about .2 mile northeast of project site.			
	Northern Harrier	Circus hudsonius	Threatened	S3B,S3N
	Nesting in fields in Montauk County Park, which is adjacent to project site.			
Communities	Maritime Beach			S2
	Marine Intertidal Gravel/Sand Beach			S2S3
	Large beach communities along shore of Montauk Peninsula, including within .1 mile of project site. Communities are in good condition, within a protected, approximately 3000-acre natural area.			
South Brooklyn Marine Terminal	– no records of concern			
Port of Coeymans				
Birds	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	S2S3B,S2N
	Nesting within .5 mile of project site, in Schodack Island State Park.			
Fish	Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	Endangered and federally Endangered	S1
	Hudson River.			
Plants	Estuary Beggar Ticks	<i>Bidens bidentoides</i>	Rare	S3
	Shore of Hudson River in Schodack Island State Park, directly opposite project site			
Plants	Yellow Giant Hyssop	<i>Agastache nepetoides</i>	Threatened	S2S3
Communities	Floodplain Forest			S2S3
	Schodack Island State Park.			
Dragonflies\\ Damselflies	Russet-tipped Clubtail	<i>Stylurus plagiatus</i>	Unlisted	S1
	Shore of Hudson River at mouth of Coeymans Creek, about .2 mile south of project site.			
Notes:				
	The Hudson River along Schodack Island State Park and north and south of the mouth of Coeymans Creek, and the lower Coeymans Creek, has been designated a significant anadromous fish concentration area . Schodack Island State Park also is the location of a significant nesting colony of Great Blue Heron (<i>Ardea herodias</i>).			

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*
NYS Wind Port and Port of Albany-Rensselaer			
Birds Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	S2S3B,S2N
Nesting within .15 mile of NYS Wind Port project site. Formerly nested within southern portion of Port of Albany-Rensselaer project site.			
Fish Shortnose Sturgeon Hudson River.	<i>Acipenser brevirostrum</i>	Endangered and federally Endangered	S1
Freshwater Mussels Alewife Floater Hudson River.	<i>Utterbackiana implicata</i>	Unlisted	S1
Dragonflies/ Damselflies Cobra Clubtail Umber Shadowdragon	<i>Gomphurus vastus</i> <i>Neurocordulia obsoleta</i>	Unlisted Unlisted	S1 S1
Normans Kill at Island Creek Park, adjacent to Port of Albany-Rensselaer project site.			
Plants Violet Wood Sorrel	<i>Oxalis violacea</i>	Threatened	S2S3
Woods near where railroad crosses under NYS Route 144, within 100 yards southwest of Port of Albany-Rensselaer project site.			
Plants Side Oats Grama	<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>	Endangered	S2
Rocky woods about 1/3 mile southwest of Port of Albany-Rensselaer project site.			

* Conservation status in NYS as ranked by NY Natural Heritage Program on a 1 to 5 scale:

S1 = Critically imperiled

S2 = Imperiled

S3 = Rare or uncommon

S4 = Abundant and apparently secure

S5 = Demonstrably abundant and secure

SNA = Status not assessed or assigned.

B after a rank indicates the status for breeding populations of that species.

N after a rank indicates the status for wintering (nonbreeding) populations of that species.

Information about many of the rare animals, rare plants, and natural communities in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org.

This report only includes records from the NY Natural Heritage databases. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. This information should not be substituted for on-site surveys.

New York Natural Heritage Program

SUNY College of Environmental Science and Forestry

In partnership with NYS Department of Environmental Conservation

625 Broadway, Albany, NY 12233-4757, (518) 402-8935, NaturalHeritage@dec.ny.gov



IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

New York



Local offices

Long Island Ecological Services Field Office

📞 (631) 286-0485
📠 (631) 286-4003

340 Smith Road
Shirley, NY 11967-2258

New York Ecological Services Field Office

 (607) 753-9334 (607) 753-9699

3817 Luker Road
Cortland, NY 13045-9385

<http://www.fws.gov/northeast/nyfo/es/section7.htm>

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Indiana Bat <i>Myotis sodalis</i>	Wherever found	Endangered
There is final critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/5949		

Northern Long-eared Bat <i>Myotis septentrionalis</i>	Wherever found	Threatened
No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045		

Birds

NAME	STATUS
Piping Plover <i>Charadrius melanotos</i>	Threatened
There is final critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6039	
Red Knot <i>Calidris canutus rufa</i>	Threatened
Wherever found	
There is proposed critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/1864	
Roseate Tern <i>Sterna dougallii dougallii</i>	Endangered
No critical habitat has been designated for this species.	
https://ecos.fws.gov/ecp/species/2083	

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i>	Candidate
Wherever found	
No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	

Flowering Plants

NAME	STATUS

Sandplain Gerardia *Agalinis acuta*

Wherever found

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/8128>

Endangered

Seabeach Amaranth *Amaranthus pumilus*

Wherever found

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/8549>

Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date

range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

American Golden-plover *Pluvialis dominica*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

American Oystercatcher *Haematopus palliatus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/8935>

Breeds Apr 15 to Aug 31

Bald Eagle *Haliaeetus leucocephalus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1626>

Breeds Sep 1 to Aug 31

Black Guillemot *Cephus grylle*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds May 15 to Sep 10

Black Scoter *Melanitta nigra*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Black Skimmer *Rynchops niger*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/5234>

Breeds May 20 to Sep 15

Black-billed Cuckoo *Coccyzus erythrophthalmus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9399>

Breeds May 15 to Oct 10

Black-legged Kittiwake *Rissa tridactyla*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Blue-winged Warbler *Vermivora pinus*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Breeds May 1 to Jun 30

Bobolink *Dolichonyx oryzivorus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 20 to Jul 31

Brown Pelican *Pelecanus occidentalis*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds Jan 15 to Sep 30

Canada Warbler *Cardellina canadensis*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 20 to Aug 10

Cerulean Warbler *Dendroica cerulea*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/2974>

Breeds Apr 20 to Jul 20

Common Eider *Somateria mollissima*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds Jun 1 to Sep 30

Common Loon *Gavia immer*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/4464>

Breeds Apr 15 to Oct 31

Common Murre *Uria aalge*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds Apr 15 to Aug 15

Cory's Shearwater *Calonectris diomedea*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

Double-crested Cormorant *phalacrocorax auritus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/3478>

Breeds Apr 20 to Aug 31

Dovekie *Alle alle*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/6041>

Breeds elsewhere

Eastern Whip-poor-will *Antrostomus vociferus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 1 to Aug 20

Evening Grosbeak *Coccothraustes vespertinus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 15 to Aug 10

Golden Eagle *Aquila chrysaetos*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1680>

Breeds Jan 1 to Aug 31

Golden-winged Warbler *Vermivora chrysoptera*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/8745>

Breeds May 1 to Jul 20

Great Shearwater *Puffinus gravis*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Gull-billed Tern *Lethocelidon nilotica*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9501>

Breeds May 1 to Jul 31

Hudsonian Godwit *Limosa haemastica*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

Kentucky Warbler *Oporornis formosus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Apr 20 to Aug 20

King Rail *Rallus elegans*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 1 to Sep 5

Lesser Yellowlegs *Tringa flavipes*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/8936>

Breeds elsewhere

Long-eared Owl *asio otus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/3631>

Breeds Mar 1 to Jul 15

Long-tailed Duck *Clangula hyemalis*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/7238>

Breeds elsewhere

Manx Shearwater *Puffinus puffinus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Apr 15 to Oct 31

Pomarine Jaeger *Stercorarius pomarinus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Prairie Warbler *Dendroica discolor*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 1 to Jul 31

Prothonotary Warbler *Protonotaria citrea*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Apr 1 to Jul 31

Purple Sandpiper *Calidris maritima*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

Razorbill *Alca torda*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds Jun 15 to Sep 10

Red-breasted Merganser *Mergus serrator*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Red-headed Woodpecker *Melanerpes erythrocephalus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 10 to Sep 10

Red-necked Phalarope *Phalaropus lobatus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Red-throated Loon *Gavia stellata*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Ring-billed Gull *Larus delawarensis*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Roseate Tern *Sterna dougallii*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds May 10 to Aug 31

Royal Tern *Thalasseus maximus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds Apr 15 to Aug 31

Ruddy Turnstone *Arenaria interpres morinella*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Breeds elsewhere

Rusty Blackbird *Euphagus carolinus*

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Breeds elsewhere

Short-billed Dowitcher *Limnodromus griseus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
<https://ecos.fws.gov/ecp/species/9480>

Breeds elsewhere

Sooty Tern *Onychoprion fuscatus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds Mar 10 to Jul 31

Surf Scoter *Melanitta perspicillata*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Thick-billed Murre *Uria lomvia*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds Apr 15 to Aug 15

White-winged Scoter *Melanitta fusca*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Willet *Tringa semipalmata*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds Apr 20 to Aug 5

Wilson's Storm-petrel *Oceanites oceanicus*

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Breeds elsewhere

Wood Thrush *Hylorchila mustelina*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (●)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the

- probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
 3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

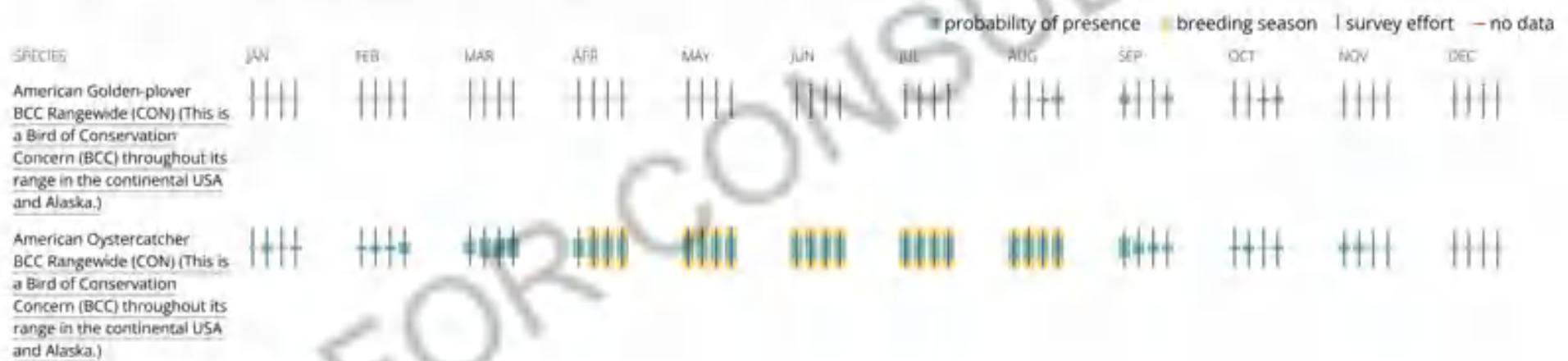
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

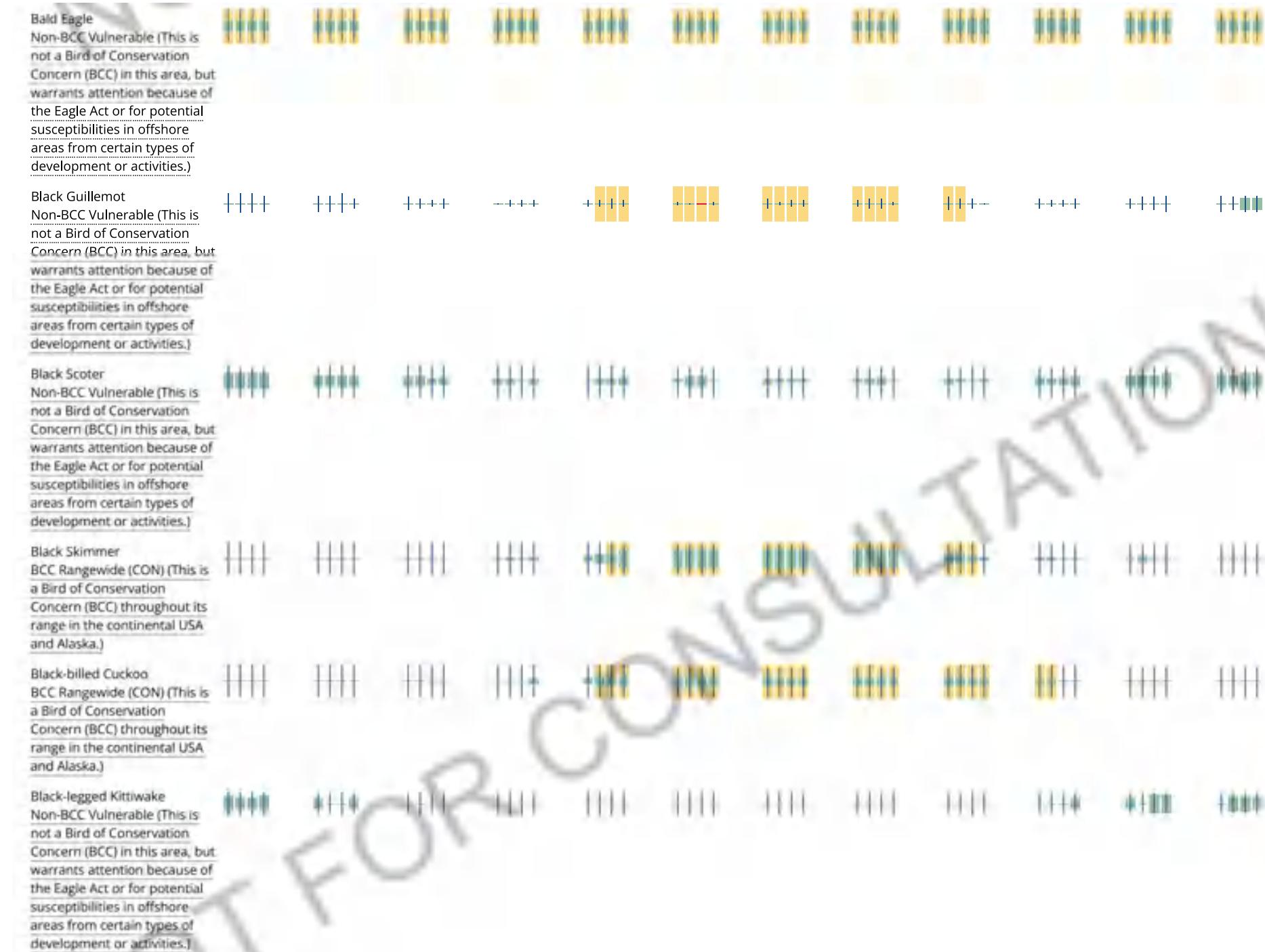
No Data (-)

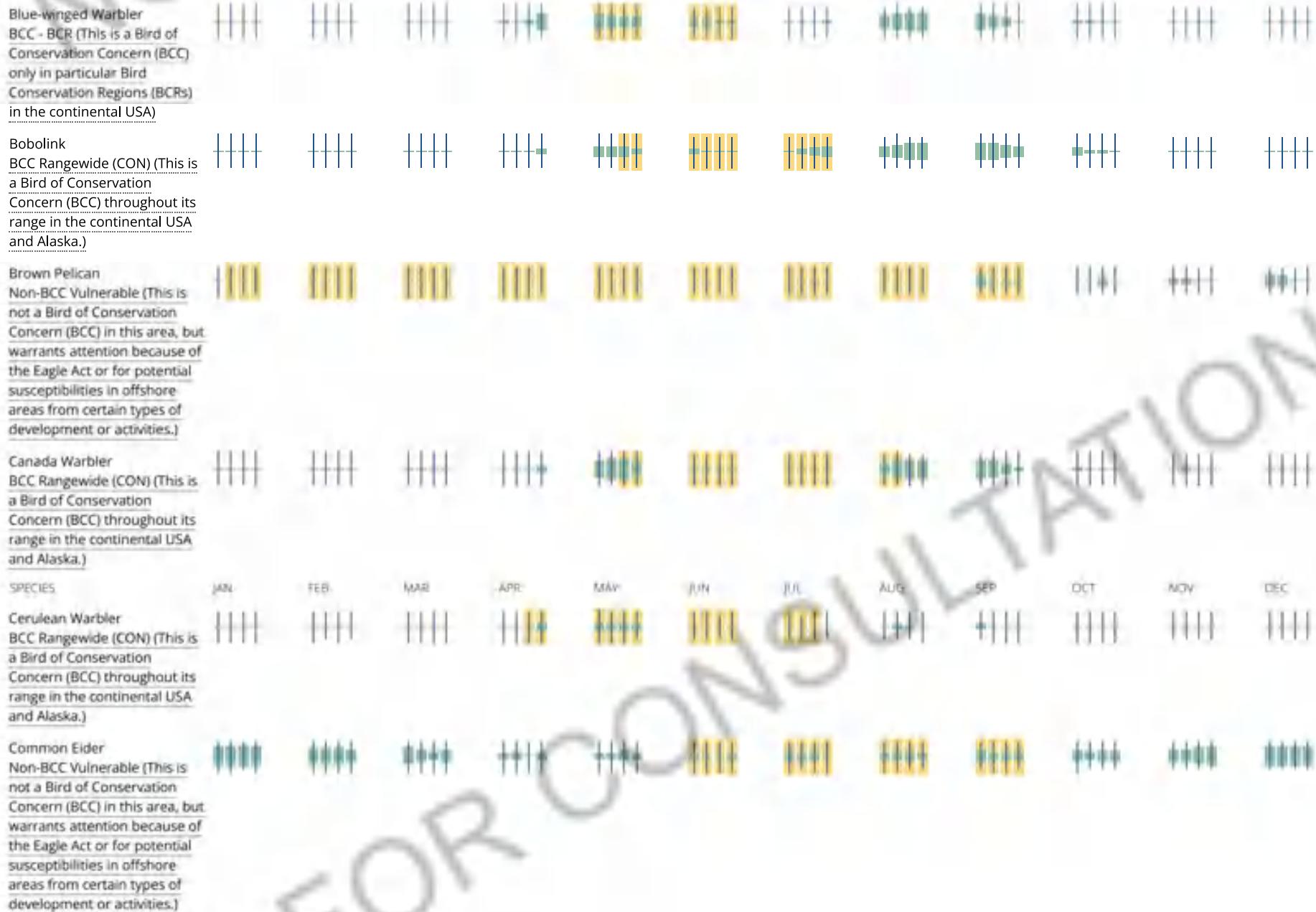
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

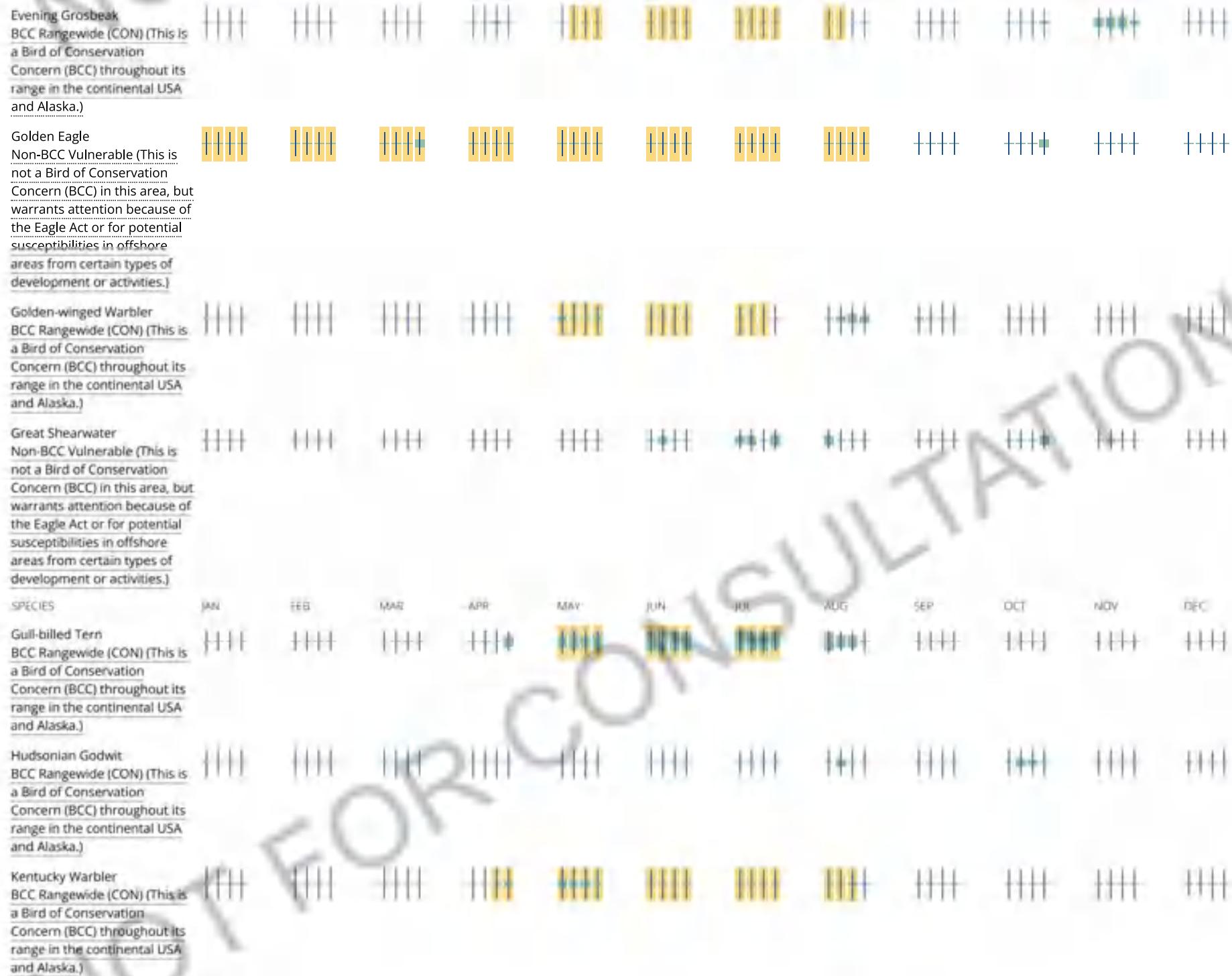
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

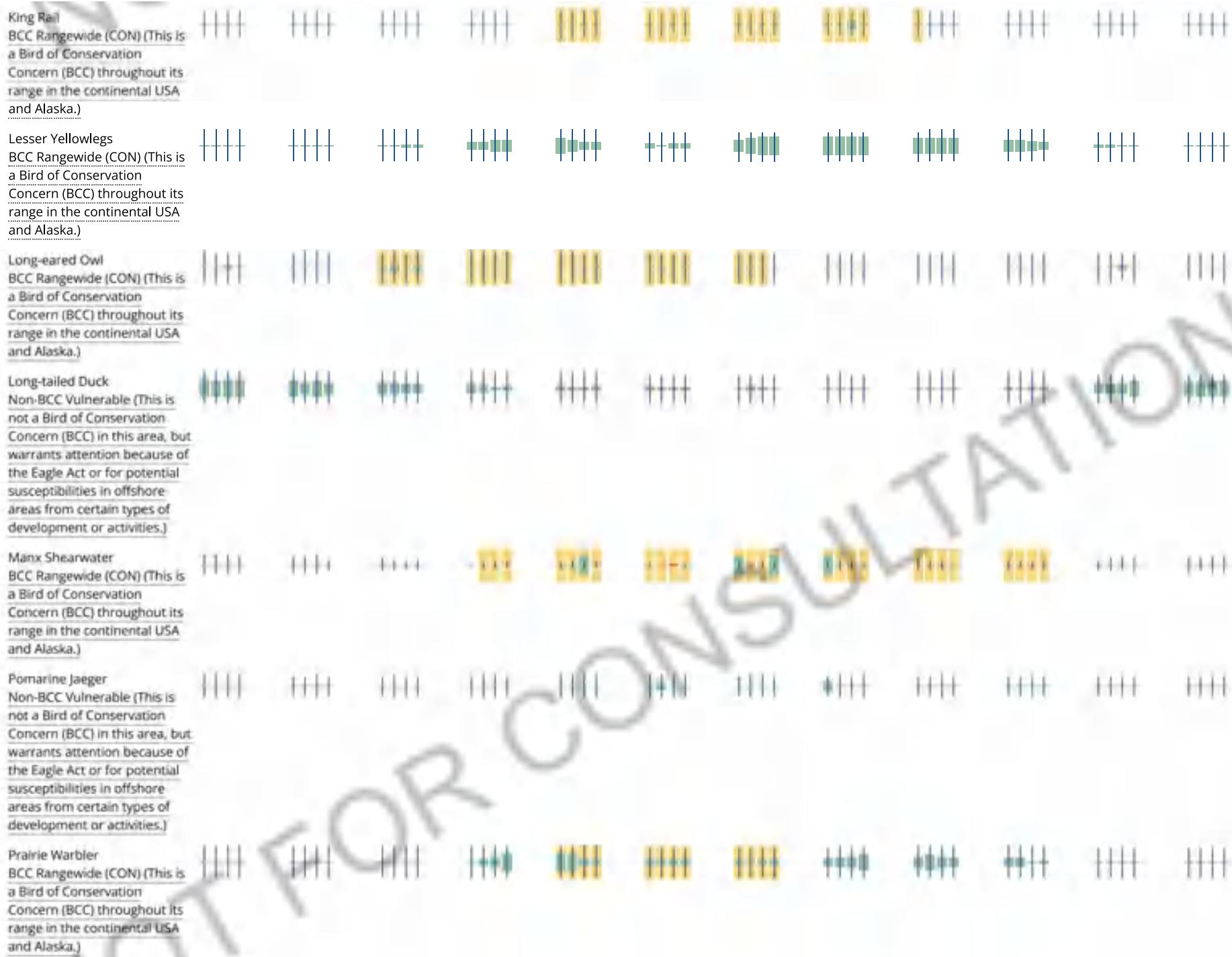


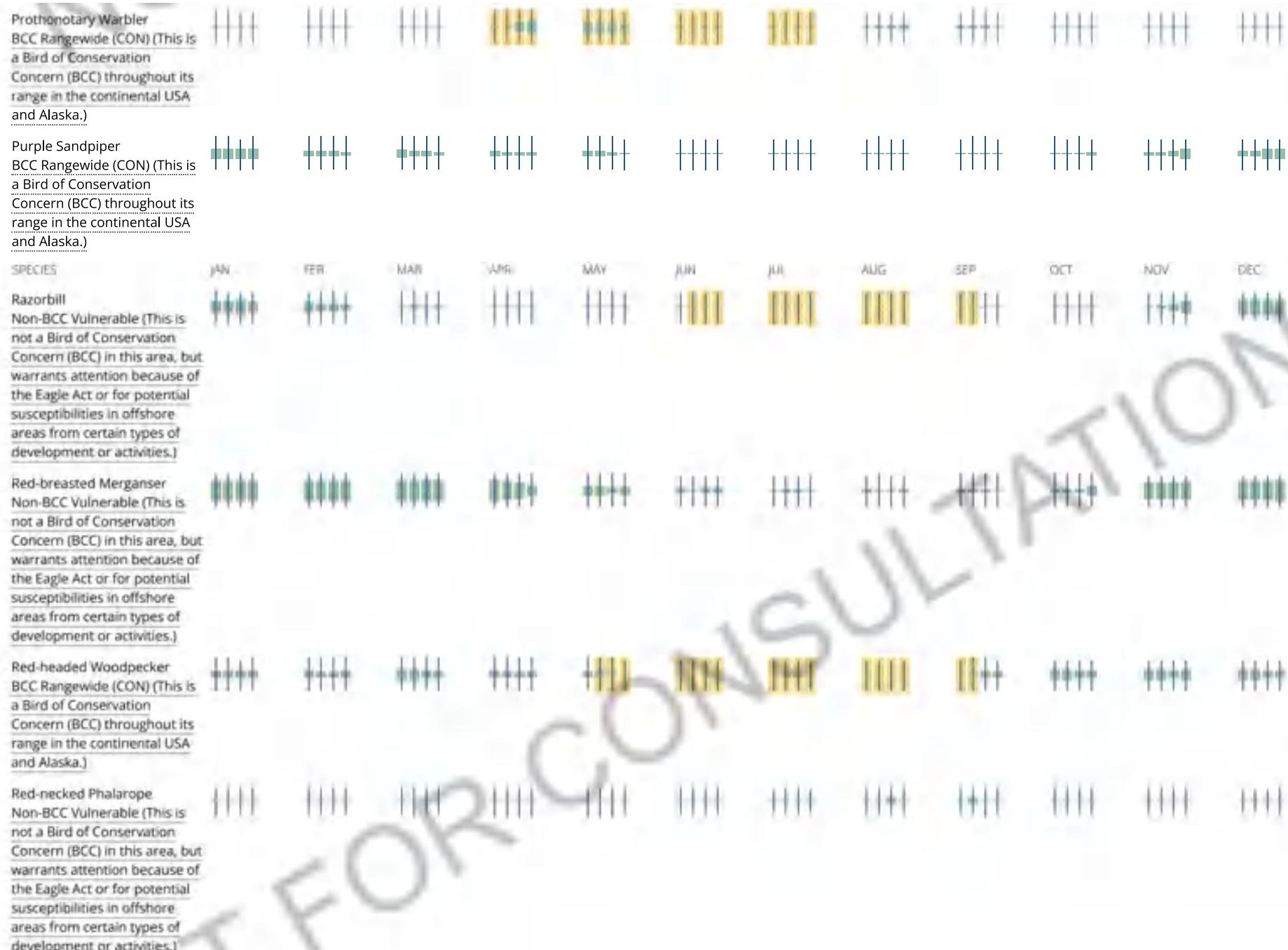


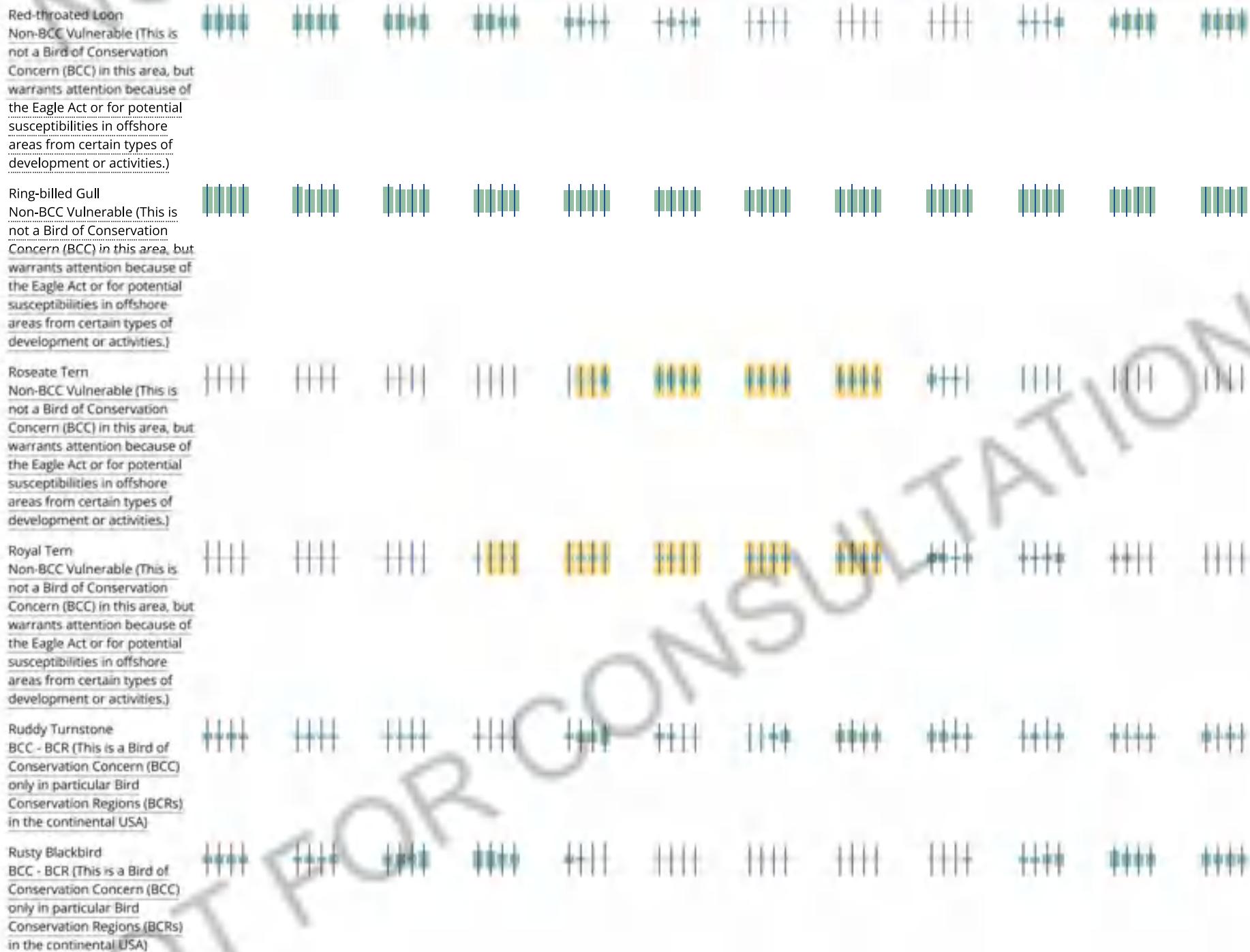














Wilson's Storm-petrel
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures or permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey](#), [banding](#), and [citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey](#), [banding](#), and [citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubeworm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

EFH Mapper Report. Block Island Sound

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

[Greater Atlantic Regional Office](#)

[Atlantic Highly Migratory Species Management Division](#)

Query Results

Degrees, Minutes, Seconds: Latitude = 41° 7' 55" N, Longitude = 72° 3' 14" W

Decimal Degrees: Latitude = 41.132, Longitude = -71.946

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** WARNING ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Winter Flounder	Eggs Juvenile Larvae/Adult	New England	Amendment 14 to the Northeast Multispecies FMP

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Little Skate	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
		Atlantic Herring	Juvenile Adult	New England	Amendment 3 to the Atlantic Herring FMP
		Atlantic Cod	Adult	New England	Amendment 14 to the Northeast Multispecies FMP
		Red Hake	Adult	New England	Amendment 14 to the Northeast Multispecies FMP
		Yellowtail Flounder	Adult	New England	Amendment 14 to the Northeast Multispecies FMP
		Windowpane Flounder	Adult Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Winter Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Albacore Tuna	Juvenile	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
		Skipjack Tuna	Adult	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
		Smoothhound Shark Complex (Atlantic Stock)	ALL	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
		Sand Tiger Shark	Neonate/Juvenile	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
		Longfin Inshore Squid	Juvenile Eggs	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Bluefish	Adult Juvenile	Mid-Atlantic	Bluefish
		Atlantic Butterfish	Juvenile	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Spiny Dogfish	Sub-Adult Female Adult Male	Mid-Atlantic	Amendment 3 to the Spiny Dogfish FMP

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Scup	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Summer Flounder	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Black Sea Bass	Juvenile	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

**For links to all EFH text descriptions see the complete data inventory: [open data inventory -->](#)

All spatial data is currently available for the Mid-Atlantic and New England councils,

Secretarial EFH,

Bigeye Sand Tiger Shark,

Bigeye Sixgill Shark,

Caribbean Sharpnose Shark,

Galapagos Shark,

Narrowtooth Shark,

Sevengill Shark,

Sixgill Shark,

Smooth Hammerhead Shark,

Smalltail Shark

EFH Mapper Report. Long Island Sound

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

[Greater Atlantic Regional Office](#)

[Atlantic Highly Migratory Species Management Division](#)

Query Results

Degrees, Minutes, Seconds: Latitude = 41° 3' 0" N, Longitude = 74° 56' 6" W

Decimal Degrees: Latitude = 41.050, Longitude = -73.065

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** WARNING ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Winter Flounder	Eggs Juvenile Larvae/Adult	New England	Amendment 14 to the Northeast Multispecies FMP

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Little Skate	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
		Atlantic Herring	Juvenile Adult	New England	Amendment 3 to the Atlantic Herring FMP
		Pollock	Adult Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Red Hake	Adult Eggs/Larvae/Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Silver Hake	Eggs/Larvae Adult	New England	Amendment 14 to the Northeast Multispecies FMP
		Monkfish	Juvenile	New England	Amendment 4 to the Monkfish FMP
		Windowpane Flounder	Adult Larvae Eggs Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Winter Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Smoothhound Shark Complex (Atlantic Stock)	ALL	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
		Sand Tiger Shark	Neonate/Juvenile	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
		Scup	Larvae Eggs Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Longfin Inshore Squid	Juvenile Adult Eggs	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Atlantic Mackerel	Eggs Larvae Juvenile Adult	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Bluefish	Adult Juvenile	Mid-Atlantic	Bluefish
		Atlantic Butterfish	Eggs Larvae Adult Juvenile	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Summer Flounder	Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Black Sea Bass	Juvenile	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

HAPCs

Link	Data Caveats	HAPC Name	Management Council
		Summer Flounder	Mid-Atlantic

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

**For links to all EFH text descriptions see the complete data inventory: [open data inventory -->](#)

All spatial data is currently available for the Mid-Atlantic and New England councils,

Secretarial EFH,

Bigeye Sand Tiger Shark,

Bigeye Sixgill Shark,

Caribbean Sharpnose Shark,

Galapagos Shark,

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

**For links to all EFH text descriptions see the complete data inventory: [open data inventory -->](#)

Narrowtooth Shark,
Sevengill Shark,
Sixgill Shark,
Smooth Hammerhead Shark,
Smalltail Shark

EFH Mapper Report. New York Harbor

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

[Greater Atlantic Regional Office](#)

[Atlantic Highly Migratory Species Management Division](#)

Query Results

Degrees, Minutes, Seconds: Latitude = 40° 33' 54" N, Longitude = 75° 57' 26" W

Decimal Degrees: Latitude = 40.565, Longitude = -74.043

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** WARNING ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Winter Flounder	Eggs Juvenile Larvae/Adult	New England	Amendment 14 to the Northeast Multispecies FMP

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Little Skate	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
		Atlantic Herring	Juvenile Adult Larvae	New England	Amendment 3 to the Atlantic Herring FMP
		Red Hake	Adult Eggs/Larvae/Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Silver Hake	Eggs/Larvae	New England	Amendment 14 to the Northeast Multispecies FMP
		Yellowtail Flounder	Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Windowpane Flounder	Adult Larvae Eggs Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Winter Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Clearnose Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Smoothhound Shark Complex (Atlantic Stock)	ALL	Secretarial	Amendment 10 to the 2006 Consolidated HMS FMP: EFH
		Scup	Larvae Eggs Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass
		Longfin Inshore Squid	Eggs	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Atlantic Mackerel	Juvenile Adult	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Bluefish	Adult Juvenile	Mid-Atlantic	Bluefish

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Atlantic Butterfish	Larvae	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Summer Flounder	Larvae Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

HAPCs

Link	Data Caveats	HAPC Name	Management Council
		Summer Flounder	Mid-Atlantic

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

****For links to all EFH text descriptions see the complete data inventory: [open data inventory -->](#)**

All spatial data is currently available for the Mid-Atlantic and New England councils,
 Secretarial EFH,
 Bigeye Sand Tiger Shark,
 Bigeye Sixgill Shark,
 Caribbean Sharpnose Shark,
 Galapagos Shark,
 Narrowtooth Shark,
 Sevengill Shark,
 Sixgill Shark,
 Smooth Hammerhead Shark,
 Smalltail Shark

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

[Greater Atlantic Regional Office](#)

[Atlantic Highly Migratory Species Management Division](#)

Query Results

Degrees, Minutes, Seconds: Latitude = 40° 43' 19" N, Longitude = 75° 58' 35" W

Decimal Degrees: Latitude = 40.722, Longitude = -74.024

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** WARNING ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Winter Flounder	Eggs Juvenile Larvae/Adult	New England	Amendment 14 to the Northeast Multispecies FMP

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Little Skate	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
		Atlantic Herring	Juvenile Adult Larvae	New England	Amendment 3 to the Atlantic Herring FMP
		Red Hake	Adult Eggs/Larvae/Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Windowpane Flounder	Adult Larvae Eggs Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Winter Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Clearnose Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Longfin Inshore Squid	Eggs	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Bluefish	Adult Juvenile	Mid-Atlantic	Bluefish
		Atlantic Butterfish	Larvae	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Summer Flounder	Larvae Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

HAPCs

Link	Data Caveats	HAPC Name	Management Council
		Summer Flounder	Mid-Atlantic

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

****For links to all EFH text descriptions see the complete data inventory: [open data inventory -->](#)**

**All spatial data is currently available for the Mid-Atlantic and New England councils,
Secretarial EFH,**

Bigeye Sand Tiger Shark,
Bigeye Sixgill Shark,
Caribbean Sharpnose Shark,
Galapagos Shark,
Narrowtooth Shark,
Sevengill Shark,
Sixgill Shark,
Smooth Hammerhead Shark,
Smalltail Shark

EFH Mapper Report. Upper Hudson River

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

[Greater Atlantic Regional Office](#)

[Atlantic Highly Migratory Species Management Division](#)

Query Results

Degrees, Minutes, Seconds: Latitude = 42° 39' 6" N, Longitude = 74° 15' 20" W

Decimal Degrees: Latitude = 42.652, Longitude = -73.745

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** WARNING ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Winter Flounder	Eggs Juvenile Larvae/Adult	New England	Amendment 14 to the Northeast Multispecies FMP

Link	Data Caveats	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Little Skate	Juvenile Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
		Atlantic Herring	Juvenile Adult Larvae	New England	Amendment 3 to the Atlantic Herring FMP
		Red Hake	Adult Eggs/Larvae/Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Windowpane Flounder	Adult Larvae Eggs Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
		Winter Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Clearnose Skate	Adult Juvenile	New England	Amendment 2 to the Northeast Skate Complex FMP
		Longfin Inshore Squid	Eggs	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Bluefish	Adult Juvenile	Mid-Atlantic	Bluefish
		Atlantic Butterfish	Larvae	Mid-Atlantic	Atlantic Mackerel, Squid,& Butterfish Amendment 11
		Summer Flounder	Larvae Juvenile Adult	Mid-Atlantic	Summer Flounder, Scup, Black Sea Bass

Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

HAPCs

Link	Data Caveats	HAPC Name	Management Council
		Summer Flounder	Mid-Atlantic

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

****For links to all EFH text descriptions see the complete data inventory: [open data inventory -->](#)**

**All spatial data is currently available for the Mid-Atlantic and New England councils,
Secretarial EFH,**

Bigeye Sand Tiger Shark,
Bigeye Sixgill Shark,
Caribbean Sharpnose Shark,
Galapagos Shark,
Narrowtooth Shark,
Sevengill Shark,
Sixgill Shark,
Smooth Hammerhead Shark,
Smalltail Shark

Appendix E. Alternatives Impact Summary Tables

Preliminary Draft Screening Matrix – Full Build Alternative

February 2022

Category	Resource	Criteria Characteristics	Planned Alternative	Arthur Kill Terminal (WTG, staging)	Port Ivory (fabrication OSS)	Homeport Pier (O&M)	Brooklyn Navy Yard (O&M)	Brooklyn PA Marine Terminal (O&M)	NYS Wind Port (manufacturing blades)	Hempstead Public Works Area (O&M)	Full Build Alternative (Planned Alternative + 7 Ports Summary)
Land Use Compatibility	Land Use	State or municipal-owned/managed lands, Land use/zoning conformance	Two sites involve creation of new port, converting vacant land or parking and marina uses to a port facility. Three sites involve repurposing existing ports or docking areas to port facilities. Majority of sites are compatible with existing industrial/manufacturing/commercial/waterfront zoning and land use. One site is within waterfront park and conservation zoning. Each site would be required to undergo Town planning board review and approval.	Creation of new port with major conversion from vacant land to port operations. Use may be allowed under existing industrial/manufacturing zoning and compatible with adjacent commercial/ industrial area.	Creation of new port with major conversion from vacant land to port operations. Use may be allowed under existing industrial/manufacturing zoning and compatible with adjacent working waterfront areas. Waterfront is part of the Kill Van Kull Significant Maritime & Industrial Area (SMIA) and a Priority Maritime Area Zone (PMAZ) designated by NYCDCP.	Repurposing an existing port with new infrastructure. Use is allowed under the existing Special Stapleton Waterfront District zoning and compatible with adjacent PANYNJ ports. Waterfront is part of the Kill Van Kull Significant Maritime & Industrial Area (SMIA) and a Priority Maritime Area Zone (PMAZ).	Repurposing an existing port with new infrastructure. Use is allowed under the existing industrial/manufacturing zoning and compatible with adjacent ports. Waterfront is part of the Brooklyn Navy Yard SMIA and a PMAZ.	Repurposing an existing port with new infrastructure. Use is allowed under the existing industrial/manufacturing zoning and compatible with adjacent PANYNJ ports. Waterfront is part of the Red Hook SMIA and a PMAZ.	Creation of new port with conversion from agricultural uses (not designated farmland) and vacant land to port operations. Use may be allowed under existing coastal industrial zoning and compatible with port/industrial uses in vicinity.	Repurposing of Town Public Works facility with existing bulkhead/docking area with new port infrastructure. Use may require a waiver/special approval from existing public/institutional zoning (no manufacturing). O&M use appears to be compatible with adjacent active waterfront areas (marinas).	11 of 12 sites are compatible with existing industrial/manufacturing/coastal industrial zoning and land use. 5 sites involve creation of new port by converting vacant land, or parking, marina or agricultural uses (not designated farmland). 7 sites involve repurposing existing ports or docking areas to port facilities. 1 site is within waterfront park and conservation zoning. Each site to undergo Town planning board review and approval.
Transportation Access and Mobility	Vessel Traffic	Navigation conflicts (hot spots), Density of commercial vessels (as measured by automated identification systems [AIS]), Ferry routes, recreational vessels	Three sites have vessel congestion or ferry routes. All sites require precautions during recreational vessel season.	Monitor vessel traffic; precautions needed during recreational vessel season.	Same as Arthur Kill Terminal.	Same as Arthur Kill Terminal.	Monitor Navy Yard vessel traffic; precautions needed during recreational vessel season.	Monitor BPAMT vessel traffic; precautions needed during recreational vessel season.	Low frequency of vessels. Precautions needed during busy recreational vessel season.	Precautions needed during busy recreational vessel season. Proposed O&M crew boat compatible with waterway.	Three sites have vessel congestion or ferry routes. All sites require precautions during recreational vessel season.

Category	Resource	Criteria Characteristics	Planned Alternative	Arthur Kill Terminal (WTG, staging)	Port Ivory (fabrication OSS)	Homeport Pier (O&M)	Brooklyn Navy Yard (O&M)	Brooklyn PA Marine Terminal (O&M)	NYS Wind Port (manufacturing blades)	Hempstead Public Works Area (O&M)	Full Build Alternative (Planned Alternative + 7 Ports Summary)
Transportation Access and Mobility	Navigational Areas	Federally designated navigation channels, Shallow/restricted drafts, Anchorage and mooring availability, Shipping lanes	Two sites may restrict heavy loads during low tide. Two sites require medium access channel dredging. All sites have close access to federal channels. 3 sites have winter ice concerns and have no suitable anchorage locations nearby. Two sites do not have turning basins or areas to turn for larger vessels. Two sites have vertical air draft bridge restrictions at 135'.	Adequate channel depths to 35'. Moderate dredging of access channel needed. Anchorage locations and turning basins available. Speed restrictions to minimize wake effects. Underwater cables must be assessed before anchoring. No vertical air draft bridge restrictions.	Adequate channel depths to 35'+. Moderate dredging of access channel needed. Anchorage locations and turning basins available. Speed restrictions to minimize wake effects. Underwater cables must be assessed before anchoring. Vertical air draft restriction is 135' at Goethals Bridge.	Adequate channel depths to 35'+ at Pier. Maintenance dredging of access channel. Anchorage locations and turning basins available. Speed restrictions to minimize wake effects. Underwater cables must be assessed before anchoring. Vertical air draft restriction is 228' at Goethals Bridge.	Same as Homeport Pier.	Same as Homeport Pier.	Adequate channel depths to 30' during high tide, however low tide may restrict to a 27' draft. Moderate dredging of access channel needed. Channel narrows to 400' wide. In winter, vessels may have to convoy from Kingston north to navigate ice. No Federal or suitable anchorage location exist for safety purposes. No turning basins or areas to turn for larger vessels exist until reaching the Port of Albany. Speed restrictions to minimize wake effects. Underwater cables must be assessed before anchoring. Vertical air draft bridge restrictions at 135'.	Proposed O&M crew vessels has adequate channel depths to 22'. No anchorage location nearby. Speed restrictions to minimize wake effects. Underwater cables must be assessed before anchoring. 30' vertical air draft restriction at bridge.	Adequate channel depths for proposed port uses. Two sites may restrict heavy loads during low tide. Three sites require medium access channel dredging. All sites have close access to federal channels. Four sites have winter ice concerns and have no suitable anchorage locations nearby. Three sites do not have turning basins or areas to turn for larger vessels. Four sites have vertical air draft bridge restrictions at 135'.
Transportation Access and Mobility	Vehicular Traffic Impacts & Accessibility	Highway access, Viable truck routes, Roadway improvements, Freight rail access, Rail improvements	All sites have viable truck routes. Two sites would require minor road access improvements and one site requires major road access improvements including a new vehicular bridge over a stream and a rail bridge and rail extension. Temporary congestion along truck routes may occur.	Minor roadway access improvements necessary. Existing truck route to Route 440 is short (1/2-mile) will limit potential traffic impacts during construction and peak operations.	Minor roadway access improvements necessary. Existing truck route to I-87 is short (1-mile) and will limit potential traffic impacts during construction and peak operations. Freight rail access available to reduce truck traffic.	No anticipated roadway improvements. Existing route to I-287 via local is a circuitous, potentially congested route. Temporary traffic impacts construction may occur during construction, but not anticipated given the lighter frequency of O&M operations.	No roadway improvements necessary. Existing truck route to I-278 is short (1/2-mile) and will limit potential traffic impacts during construction and peak operations.	No roadway improvements necessary. Existing truck route to I-278 is short (1/2-mile) and will limit potential traffic impacts during construction and peak operations.	Limited roadway access improvements. Existing 3.5-mile route to I-87 via local roads is a circuitous, potentially congested route during construction and peak operations.	No anticipated roadway improvements. Existing 9.5-mile vehicular route to Nassau Expressway via local roads is a circuitous, potentially congested route. Temporary traffic impacts construction may occur during construction, but not anticipated given the lighter frequency of O&M operations.	All sites have viable truck routes. Only five sites would require minor road access improvements. One site requires major improvements including a new vehicular bridge and a rail bridge. Temporary congestion along truck routes may occur.

Category	Resource	Criteria Characteristics	Planned Alternative	Arthur Kill Terminal (WTG, staging)	Port Ivory (fabrication OSS)	Homeport Pier (O&M)	Brooklyn Navy Yard (O&M)	Brooklyn PA Marine Terminal (O&M)	NYS Wind Port (manufacturing blades)	Hempstead Public Works Area (O&M)	Full Build Alternative (Planned Alternative + 7 Ports Summary)
Socioeconomic Impacts	Environmental Justice	EJ Communities Potential for disproportionate effects on EJ communities	Three sites have EJ communities present in the vicinity. Potential traffic, air quality and noise impacts along truck routes may occur to these communities.	EJ community present north of Route 440, however truck traffic will largely avoid impacts by using direct route (Arthur Kill Road) to Route 440.	EJ community nearby to the southeast, however truck traffic will avoid impacts using direct route (Western Avenue) to I-278.	EJ community present in vicinity. Temporary construction impacts may occur, however, sporadic O&M operations will result in less traffic, noise, air quality or visual effects to community.	EJ community present in vicinity. Limited potential impacts during construction and peak operations from short truck route to I-278.	EJ community present to the south, however truck traffic would avoid the area.	No EJ community present.	EJ community present in vicinity. Temporary construction impacts may occur, however, sporadic O&M operations will result in less traffic, noise, air quality or visual effects to community.	Nine sites have EJ communities present in the vicinity. Potential traffic, air quality and noise impacts along truck routes may occur to these communities.
Environmental Impacts	Sensitive Terrestrial Biological Resources	Federal or state listed endangered or threatened species or associated habitat, designated critical habitat, Important Bird Areas, Natural Heritage Communities, Conservation and mitigation sites	Three sites would involve limited habitat impacts, including removal of protected potential bat habitat, shorebird or other listed species habitat. Two sites have no listed terrestrial species present.	Clearing over 40+ acres of old field succession/ hardwoods potentially containing protected NLEB and Indiana bat habitat and dragonflies/damselflies. Converting 20+ acres to developed impervious surfaces.	Clearing 20+ acres of herbaceous vegetation with protected shorebird (least bittern, pied billed grebe) and amphibian (Atlantic Coast frog) habitat. Converting 10+ acres to developed impervious surfaces.	Developed site; no sensitive terrestrial biological resources present.	Developed site; no sensitive terrestrial biological resources present.	Developed site; no sensitive terrestrial biological resources present.	Clearing 40+ acres of farmland and hardwoods potentially containing NLEB and Indiana bat habitat and protected dragonflies/damselflies habitat and Violet Wood Sorrel plant. Converting 20+ acres to developed impervious surfaces. Minor impacts to Papscane Creek, a SCFWH tidal creek complex.	Developed site; may disturb protected shorebirds (piping plover, common tern, least tern, black skimmer) habitat.	Seven sites involve removal of potential protected species habitat, including bats, shorebirds or other listed species habitat. Two sites may affect SCFWH tidal creek complexes.

Category	Resource	Criteria Characteristics	Planned Alternative	Arthur Kill Terminal (WTG, staging)	Port Ivory (fabrication OSS)	Homeport Pier (O&M)	Brooklyn Navy Yard (O&M)	Brooklyn PA Marine Terminal (O&M)	NYS Wind Port (manufacturing blades)	Hempstead Public Works Area (O&M)	Full Build Alternative (Planned Alternative + 7 Ports Summary)
Environmental Impacts	Sensitive Aquatic Biological Resources	Species and Habitat Federal or state listed endangered or threatened species or associated habitat, designated critical habitat, Important Bird Areas, Natural Heritage Communities, Conservation and mitigation sites, Natural Heritage Communities, Conservation and mitigation sites, NYSDOS Significant Coastal Fish and Wildlife Habitat (SCFWH), NYCWRP designations Recognized Ecological Complexes (RECs), Special Natural Waterfront Areas (SNWAs)	All sites have Shortnose and Atlantic Sturgeon (E), Alewife Floater (C) and several EFH species present, and one site has protected shorebirds present. One site would require substantial dredging; the other four sites require limited dredging and acreage of wetland impacts.	Contains Shortnose and Atlantic Sturgeon (E), and several EFH species. Waterfront is part of the Outer Bridge Shoreline REC identified by NYCWRP. Approximately 9+ acres of tidal wetlands impacts, 3+ acres of freshwater wetlands impacts (inland), 25+ acres of heavy dredging (very shallow).	Contains Shortnose and Atlantic Sturgeon (E), and several EFH species. Site borders the Northwestern Staten Island Harbor Hens Area/Arlington Marsh SNWA , and Bridge Creek REC identified by NYCWRP. Approximately 10+ acres of tidal wetlands impacts, 15+ acres of dredging. Creating 10+acres of impervious surfaces with runoff.	Contains Shortnose and Atlantic Sturgeon (E), protected turtle species and several EFH species. Limited dredging and open water impacts.	Contains Shortnose and Atlantic Sturgeon (E), protected turtle species and several EFH species. Limited dredging and open water impacts.	Contains Shortnose and Atlantic Sturgeon (E) and Alewife Floater (C). SAV and vegetated tidal wetlands mapped along the shoreline. Approximately 10+ acres of tidal wetlands impacts, 15+ acres of dredging. Creating 20+acres of impervious surfaces with runoff. Minor impacts to a SCFWH Papscane tidal creek and marsh complex.	Contains Shortnose and Atlantic Sturgeon (E) and Alewife Floater (C). SAV and vegetated tidal wetlands mapped along the shoreline. Approximately 10+ acres of tidal wetlands impacts, 15+ acres of dredging. Creating 20+acres of impervious surfaces with runoff. Minor impacts to a SCFWH Papscane tidal creek and marsh complex.	Contains Shortnose and Atlantic Sturgeon (E), protected turtle species, shorebirds (piping plover, common tern, least tern, black skimmer), and several EFH species. Bulkheaded, docking area on site with limited habitat. Limited dredging and open water impacts.	All sites have Shortnose and Atlantic Sturgeon (E), Alewife Floater (C) and EFH species present, and two sites have protected shorebirds present. SAV is mapped at one site. One site is part of the Outer Bridge Shoreline REC. One site borders the Northwestern Staten Island Harbor Hens Area/Arlington Marsh SNWA, and Bridge Creek REC. Five sites would require substantial dredging; the other seven sites will require limited dredging and acreage of wetland impacts.
Environmental Impacts	Sensitive Aquatic Biological Resources	Wetland/Water Resources Federal and State regulated wetlands, and surface waters, Aquifers, Water quality	Three sites would have moderate level of wetlands/open water fill and dredging impacts. Two sites would have minor wetlands/open water impacts. At least three ports would increase impervious surfaces creating stormwater runoff. No ports have aquifers present.	Approximately 9+ acres of tidal wetlands fill, 3+ acres of freshwater wetlands from reggrading site and new infrastructure, 25+ acres of heavy dredging (very shallow), and creating 20+ acres of impervious surfaces with runoff.	Approximately 10+ acres of tidal wetlands impacts, 15+ acres of dredging. Creating 10+ acres of impervious surfaces with runoff.	Minimal dredging with adequate depths close to the navigation channel. Minimal wetland impacts and increase to impervious surfaces.	Minimal dredging with adequate depths close to the navigation channel. Minimal wetland impacts and increase to impervious surfaces.	Minimal dredging and open water impacts from new infrastructure. No increase to impervious surfaces.	SAV and vegetated tidal wetlands mapped along the shoreline. Approximately 10+ acres of tidal wetlands impacts, 15+ acres of dredging. Creating 10+acres of impervious surfaces with runoff. Creating 20+acres of impervious surfaces with runoff.	Minimal dredging and open water impacts from new infrastructure. Minor increase to impervious surfaces.	Six sites would have moderate level of wetlands/open water fill and dredging impacts. Two sites have SAV. Six sites would have minor wetlands/open water impacts. At least eight ports would increase impervious surfaces creating stormwater runoff. No ports have aquifers present.

Category	Resource	Criteria Characteristics	Planned Alternative	Arthur Kill Terminal (WTG, staging)	Port Ivory (fabrication OSS)	Homeport Pier (O&M)	Brooklyn Navy Yard (O&M)	Brooklyn PA Marine Terminal (O&M)	NYS Wind Port (manufacturing blades)	Hempstead Public Works Area (O&M)	Full Build Alternative (Planned Alternative + 7 Ports Summary)
Environmental Impacts	Cultural Resources	Historic architectural resources, Historic districts, Upland and marine archaeological resources (shipwrecks)	All five sites may impact archaeological sensitive areas. Two ports may have unavoidable adverse visual impacts to Native American sites. One site with historic architectural resources or historic districts in the vicinity.	Archaeological sensitive area. No mapped historic architectural resources or historic districts within the vicinity.	Archaeological sensitive area. No mapped historic architectural resources or historic districts within the vicinity.	Archaeological sensitive area. No mapped historic architectural resources or historic districts within the vicinity.	Listed Buildings and historic district in vicinity. Site is within an Archeologically Sensitive Area. However, work would not demolish historic building(s).	Listed Buildings and historic district in vicinity. Mary A. Whalen Tanker Listed directly off pier. Site is within an Archeologically Sensitive Area. However, work would not demolish historic building(s).	Site located within a significant Native American site. Potential unavoidable adverse impacts to the site.	Archaeological sensitive area. No mapped historic architectural resources or historic districts within the vicinity.	All sites may impact archaeological sensitive areas. Three ports may have unavoidable adverse impacts to archaeological sites. Three sites with historic architectural resources or historic districts in the vicinity.
Environmental Impacts	Community Character	Sensitive receptors (residences, parks, hospitals, schools, etc.) Neighborhoods	Four sites have residential sensitive receptor adjacent to the site. Sited within industrial and commercial area. Direct highway access to Outer Bridge Crossing/Route 440 within ¼ mile; minimal traffic, noise or air quality effects to community expected.	One residential sensitive receptor adjacent to the site. Sited within active port and industrial area. Direct highway access to Goethals Bridge Crossing/I-278 within ½ mile; minimal traffic, noise or air quality effects to community expected.	No sensitive receptors adjacent to the site. Sited within active port and industrial area. Direct highway access to I-278 corridor within ¼ mile will limit potential traffic, noise or air quality effects to community.	Staten Island Urby Apartment complex and Stapleton Waterfront Park bordering southside of the site may experience traffic, visual and noise effects. Well-sited within active port and industrial area. Temporary construction impacts may occur, however, sporadic O&M operations will result in less traffic, noise, air quality or visual effects to community.	Limited residences in the vicinity the site. Sited on an active port and a commercial/industrial area. Direct highway access to I-278 corridor within ¼ mile will limit potential traffic, noise or air quality effects to community during construction and peak operations.	Limited residences in the vicinity the site. Sited on an active port and a commercial/industrial area. Direct highway access to I-278 corridor within ¼ mile will limit potential traffic, noise or air quality effects to community during construction and peak operations.	Lack of sensitive receptors in vicinity. Sited within an industrial waterfront zoning and near active industries and Port of Albany. Potential truck traffic congestion may occur during construction and peak operations.	Limited sensitive receptors in vicinity, however local fishing area and marina will be displaced. Well-sited within municipal public works facility and near busy marinas. Temporary traffic impacts construction may occur during construction, but not anticipated during O&M operations given the lighter frequency of trips.	Nine sites have residential communities nearby. However, most sites are within or adjacent to existing ports and within compatible land use and zoning. Traffic, noise, visual and/or air quality effects may occur within the community.
Environmental Impacts	Hazardous Materials	Hazardous materials Subsurface contamination Health and safety issues	All sites will disturb contaminated fill soils from former port operations and/or other past uses. Two sites will likely demolish buildings with potential hazardous building materials (e.g. asbestos). All sites will temporarily disturb contaminated sediments during dredging and in-water construction.	Upland site developments will disturb contaminated fill soils from former site uses. Dredging and in-water construction may disturb contaminated sediments.	Upland site developments may disturb contaminated fill soils from former industrial and port operations. Dredging and in-water construction may disturb contaminated sediments.	Upland site developments may disturb contaminated fill soils. Dredging and in-water construction may disturb contaminated sediments.	Upland site developments may demolish buildings with hazardous materials and disturb contaminated fill soils from former industrial and port operations. Dredging and in-water construction may disturb contaminated sediments.	Upland site developments may demolish buildings with hazardous materials and disturb contaminated fill soils from port operations. Dredging and in-water construction may disturb contaminated sediments.	Upland site developments may disturb contaminated fill soils from port operations. Dredging and in-water construction may disturb contaminated sediments.	Upland site developments may demolish buildings with potential hazardous building materials (e.g. asbestos). All sites will temporarily disturb contaminated sediments during dredging and in-water construction.	All sites will disturb contaminated fill soils from former port operations and/or other past uses. Four sites may demolish buildings with potential hazardous building materials (e.g. asbestos). All sites will temporarily disturb contaminated sediments during dredging and in-water construction.

Category	Resource	Criteria Characteristics	Planned Alternative	Arthur Kill Terminal (WTG, staging)	Port Ivory (fabrication OSS)	Homeport Pier (O&M)	Brooklyn Navy Yard (O&M)	Brooklyn PA Marine Terminal (O&M)	NYS Wind Port (manufacturing blades)	Hempstead Public Works Area (O&M)	Full Build Alternative (Planned Alternative + 7 Ports Summary)
Environmental Impacts	Floodplains & Resiliency	100-year floodplains, Floodways, Wave action prone areas, Coastal Erosion Hazard Zone (CEHZ) Drainage Patterns	All 5 sites have 100-yr floodplains present on-site and floodways adjacent. 3 sites have at least 50% of site within floodplains. No wave action or CEHZ areas present.	Potential for flooding impacts; about 30% of site within 100-yr floodplain, along Arthur Kill floodway. Improvements will raise the site to address flooding and drainage.	Potential for flooding impacts; about 30% of site within 100-yr floodplain, along Arthur Kill floodway. Improvements will raise the site to address flooding and drainage.	Potential for flooding impacts; 50% of site within 100-yr floodplain, along NY Harbor floodway. Improvements will raise the site to address flooding and drainage.	Potential for flooding impacts; 75% of site within 100-yr floodplain, along NY Harbor floodway. Improvements will raise the site to address flooding and drainage.	High potential for flooding impacts; 90% of site within 100-yr floodplain along NY Harbor floodway. Improvements will raise the site to address flooding and drainage.	High potential for flooding impacts; 100% of site within 100-yr floodplain, along Hudson River floodway. Improvements will raise the site to address flooding and drainage.	High potential for flooding impacts; 85% of site within 100-yr floodplain, along floodway. Waterfront has potential for wave action impacts. Improvements will raise the site to address flooding, drainage and wave impacts.	All 12 sites have 100-yr floodplains present on-site and floodways adjacent. Eight sites have at least 50% of site within floodplains. One site within wave action zone. No CEHZ areas present. One site has potential for wave action impacts.
Environmental Impacts	Air Quality & Greenhouse Gases	USEPA National Ambient Air Quality Standards (NAAQS) Nonattainment area Sensitive receptors Truck routes	All sites are located within Ozone and/or PM _{2.5} Nonattainment Areas. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur. However, air quality impacts are not expected at the sites by using effective BMPs.	Air quality impacts are not expected with effective BMPs. 8-Hour Moderate Ozone Nonattainment Area and PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur. However with BMP mitigation measures, air quality impacts are not expected.	Air quality impacts are not expected with effective BMPs. 8-Hour Moderate Ozone Nonattainment Area and PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	Air quality impacts are not expected with effective BMPs. 8-Hour Moderate Ozone Nonattainment Area and PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur. However with BMP mitigation measures, air quality impacts are not expected.	Air quality impacts are not expected with effective BMPs. 8-Hour Moderate Ozone Nonattainment Area and PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	Air quality impacts are not expected with effective BMPs. 8-Hour Moderate Ozone Nonattainment Area and PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	Air quality impacts are not expected with effective BMPs. 8-Hour Moderate Ozone Nonattainment Area and PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	Air quality impacts are not expected with effective BMPs. 8-Hour Moderate Ozone Nonattainment Area and PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	All sites are located within Ozone and/or PM _{2.5} Nonattainment Areas. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur. However, air quality impacts are not expected at the sites by using effective BMPs.
Environmental Impacts	Noise	Sensitive receptors within 1/4 mile, Local noise codes, Truck routes	Four sites have sensitive receptors in the vicinity that may experience truck traffic-related noise during construction. Most ports are sited on an active port and industrial area with higher ambient noise levels. Minor noise levels are expected from O&M activities.	One adjacent residential receptor. Truck route should avoid residential area.	No adjacent sensitive receptors and sited within active port and industrial area. Truck route avoids residential area.	Potential noise impacts to Staten Island Urby Apartment complex and Stapleton Waterfront Park (southern site border) during construction and/or peak O&M operations. Sited within active port and industrial area.	Limited residences in the vicinity may experience some truck traffic-related noise. Sited on an active port and a commercial/industrial area with high ambient noise levels.	Limited residences in the vicinity may experience some truck traffic-related noise. Sited on an active port and a commercial/industrial area with high ambient noise levels.	Lack of sensitive receptors in vicinity and truck routes should avoid residential areas.	Limited sensitive receptors in vicinity, however local fishing and truck routes should avoid residential areas.	Nine sites have a residential area in the 1/4-mile study area that may experience truck traffic-related noise during construction. Most ports are sited on an active port and/or in industrial areas with high ambient noise levels. Minor noise levels are expected from O&M activities.

Note: Socioeconomic Impacts are Construction Jobs, O&M Jobs and Economic Development Impacts/Benefits are only summarized at the Alternative-level, not per port location.

Preliminary Draft Screening Matrix – Planned Alternative

February 2022

Category	Resource	Criteria Characteristics	Port of Albany-Rensselaer (manufacturing)	Port of Coeymans (fabrication)	South Brooklyn Marine Terminal (staging and O&M)	Port Jefferson (O&M)	Port of Montauk (O&M)	Planned Alternative (Summary)
Land Use Compatibility	Land Use	State or municipal-owned/managed lands, Land use/zoning conformance	Creation of new port, a major conversion from vacant land to port operations. Use is allowed under existing industrial/manufacturing zoning and compatible with adjacent commercial/industrial area.	Repurposing an existing port with new infrastructure. Use is allowed under the existing industrial/manufacturing zoning and compatible with area.	Repurposing an existing port with new infrastructure. Use is allowed under the existing Marina-Waterfront District zoning, a Priority Marine Activity Zone (PMAZ) and compatible with area.	Repurposing an existing port with new infrastructure. Use is allowed under the existing Marina-Waterfront District zoning and compatible with area.	Creation of new port, a conversion from parking and marina uses to port operations with new infrastructure. Proposed use will have compatibility concerns under existing commercial/residential zoning and being adjacent to Montauk County Park. Site within Lake Montauk Scenic Areas of Statewide Significance (SASS) scenic landscape designated by NYSDOS.	Four of the five sites are compatible with existing industrial/manufacturing/ coastal industrial zoning and land use. Two sites involve creation of new port, converting vacant land, or parking and marina uses. One site is within waterfront park and conservation zoning. Each site would be required to undergo Town planning board review and approval.
Transportation Access and Mobility	Vessel Traffic	Navigation conflicts (hot spots), Density of commercial vessels (as measured by automated identification systems [AIS]), Ferry routes, recreational vessels	Low frequency of vessels. Project would add approximately 21 ships/barges per year. Precautions needed during recreational vessel season.	42 ships per year (0.8 per week) and 122 barges per year (2.3 per week). Low navigational risk during operations (2-4 vessel round trips per week, include 1-2 larger (130' x 400') barges associated with heavy wind component transport from POC. Existing POC operations is 1 ± ship and 2-4 barges per week.	Moderate vessel congestion at Gowanus Bay. Precautions needed during recreational vessel season.	Precautions related to dedicated ferry route and during recreational vessel season required.	Precautions needed during busy recreational vessel season.	Three sites have potential vessel congestion or ferry routes. All sites require precautions during recreational vessel season.
Transportation Access and Mobility	Navigational Areas	Federally designated navigation channels Shallow/restricted drafts, Anchorage and mooring availability, Shipping lanes/fairways, Navigation safety and security zones; danger areas	Adequate channel depths to 30' during high tide, however low tide may restrict to a 27' draft. Moderate dredging of access channel needed. Channel narrows to 400' wide. In winter, vessels may have to convoy from Kingston north to navigate ice. No Federal or suitable anchorage location exist nearby. No turning basins or areas to turn for larger vessels exist until reaching the Port of Albany. Speed restrictions to minimize wake effects. Underwater cables must be assessed before anchoring. Vertical air draft bridge restrictions at 135'.	Similar conditions to Port of Albany.	Good channel depths up to 40'. Maintenance dredging of access channel needed. Speed restrictions to minimize wake effects. Underwater cables must be assessed before anchoring. Vertical air draft allowance at Verrazano bridge up to 217'.	Adequate channel depths to 27' at low tide. Channel narrows to 300' wide. Shoaling area to east. Maintenance dredging of access channel needed. Shoaling area to east. Available anchorage location exists. Speed restrictions to minimize wake effects. No vertical air draft restrictions.	Minimal channel depths to 12' and narrow channel width. Shoaling area to east. Maintenance dredging of access channel needed. Ice in winter months. No anchorage location exists. Speed restrictions to minimize wake effects. No vertical air draft restrictions.	Adequate channel depths for proposed port uses, however two sites may restrict heavy loads during low tide. Two sites require moderate access channel dredging. Three sites have winter ice concerns and have no suitable anchorage locations nearby. Two sites do not have turning basins or areas to turn for larger vessels. Underwater cables must be assessed before anchoring. Two sites have vertical air draft bridge restrictions at 135'.

Category	Resource	Criteria Characteristics	Port of Albany-Rensselaer (manufacturing)	Port of Coeymans (fabrication)	South Brooklyn Marine Terminal (staging and O&M)	Port Jefferson (O&M)	Port of Montauk (O&M)	Planned Alternative (Summary)
Transportation Access and Mobility	Vehicular Traffic Impacts & Accessibility	Highway access, Viable truck routes, Roadway improvements, Freight rail access, Rail improvements	Road access improvements include a new vehicular bridge over Kill and associated access roads. A rail bridge with rail extension will also be built to serve the operations. The 3-mile truck route to I-87 will have no unmitigable impacts occur during construction and peak operations.	No roadway improvements necessary. Truck route to I-87 through rural area is not expected to cause traffic impacts during construction and peak operations. Direct Lafarge haul road may be used, avoiding public roads. Much of the material Deliveries will be via barge on the Hudson River which minimizes the number of heavy vehicles.	No roadway improvements necessary. Existing truck route to I-287 is short (1/2-mile) will limit potential traffic impacts during construction and peak operations. Freight rail access is available to reduce truck trips.	Minor roadway access improvements may be necessary. Existing route to I-495 is a circuitous 10 to 12-mile route primarily on State routes. Temporary traffic impacts construction may occur during construction, but not anticipated given the lighter frequency of O&M operations.	Minor roadway access improvements may be necessary. Existing route to I-495 via Route 30 and Route 27 is a circuitous, congested route. Temporary traffic impacts construction may occur during construction, but not anticipated given the lighter frequency of O&M operations.	All sites have viable truck routes. Two sites would require minor road access improvements and one site requires major road access improvements including a new vehicular bridge over a stream and a rail bridge and rail extension.
Socioeconomic Impacts	Environmental Justice	EJ Communities Potential for disproportionate effects on EJ communities	EJ community, Ezra Prentice, present to the north. Potential truck traffic impacts on route to I-87/I-90. Well-sited as an expansion of an existing port. The 3-mile truck route to I-87 will address potential impacts during construction and peak operations with mitigation measures.	No EJ community present.	EJ community present. Well-sited within an existing port. Direct highway access to I-287 would have minimal traffic, noise or air quality effects to community during construction and peak operations with mitigation measures.	No EJ community present.	EJ community present, west of the port site. Community across the inlet from the port site meets the interim criteria identified for a disadvantaged community. Direct access to Route 27 would have minimal to no traffic, noise, or air quality effects to the community during construction and peak operations with mitigation measures in place.	Three sites have EJ communities present in the vicinity. Potential traffic, air quality and noise impacts along truck routes may occur to these communities.
Environmental Impacts	Sensitive Terrestrial Biological Resources	Federal or state listed endangered or threatened species or associated habitat, designated critical habitat, Important Bird Areas, Natural Heritage Communities, Conservation and mitigation sites	Clearing over 50+ acres of old field succession/ hardwoods potentially containing NLEB and Indiana bat habitat and protected dragonflies/ damselflies habitat and Violet Wood Sorrel plant. Converting 20+ acres to developed impervious surfaces.	Clearing small acreage of old field succession/ hardwoods containing NLEB and Indiana bat habitat and protected dragonflies/ damselflies habitat. Converting 10+ acres to developed impervious surfaces.	Developed site; no sensitive terrestrial biological resources present.	Developed site; no sensitive terrestrial biological resources present.	Developed site; however site disturbances may affect protected shorebirds and raptor (piping plover, common tern, least tern, and northern harrier) nesting habitats in the vicinity (beaches, County park).	Three sites would involve limited habitat impacts, including removal of protected potential bat habitat, shorebird or other listed species habitat. Two sites have no listed terrestrial species present.

Category	Resource	Criteria Characteristics	Port of Albany-Rensselaer (manufacturing)	Port of Coeymans (fabrication)	South Brooklyn Marine Terminal (staging and O&M)	Port Jefferson (O&M)	Port of Montauk (O&M)	Planned Alternative (Summary)
Environmental Impacts	Sensitive Aquatic Biological Resources	Species and Habitat Federal or state listed endangered or threatened species or associated habitat, designated critical habitat, Important Bird Areas, Natural Heritage Communities, Conservation and mitigation sites, NYSDOS Significant Coastal Fish and Wildlife Habitat (SCFWH), NYCWRP designations Recognized Ecological Complexes (RECs), Special Natural Waterfront Areas (SNWAs)	Contains SCFWH with Shortnose and Atlantic Sturgeon (E), Alewife Floater (C) and several EFH species. Up to one acre of tidal wetlands/open water impacts from new infrastructure, one acre of freshwater wetland impacts from bridges/roads/ other fills, 3 acres/105,000 CY of dredging/infrastructure impacts, and converting up to 15 acres of impervious surfaces creating stormwater runoff. Dredging could result in direct impacts to submerged aquatic vegetation (SAV) and freshwater mussel (<i>Leptodea fragilis</i>), requiring relocation of both SAV and freshwater mussels. Minor impacts to Normans Kill, a SCFWH tidal creek complex.	Contains SCFWH with Shortnose and Atlantic Sturgeon (E), Alewife Floater (C) and several EFH species. Waterfront is part of a PMAZ. Limited dredging (5.2 acres/156,000 CY) impacts.	Contains Shortnose and Atlantic Sturgeon (E), protected turtle species and several EFH species. Approximately 5-acres of tidal open water impacts from new infrastructure and 4-acres/120,000 CY of dredging impacts.	Contains Shortnose and Atlantic Sturgeon (E), protected turtle species and several EFH species. On shoreline, piping plover (E), Common Tern (T) Least Tern (T) and Northern Harrier (T) nesting habitats in the vicinity (beaches, County park). Limited dredging (0.41 acre/2,500 CY) impacts.	Contains Shortnose and Atlantic Sturgeon (E), Alewife Floater (C) and several EFH species present, and one site has protected shorebirds present. One site would require dredging in new area; the other four sites require limited dredging and acreage of wetland impacts in existing ports/docking areas. Planned Alternative may dredge approximately 15 acres of benthic habitat (sediments), fill six acres of tidal wetlands from new infrastructure impacts, and fill one acre of emergent freshwater wetlands for a new bridge/roadway. Minor impacts to Normans Kill, a SCFWH tidal creek complex.	
Environmental Impacts	-	Wetland/Water Resources Federal and State regulated wetlands, and surface waters, Aquifers, Water quality	Up to one acre of tidal wetlands/open water impacts from new infrastructure, one acre of freshwater wetland impacts from bridges/roads/ other fills, 3 acres/105,000 CY of dredging/infrastructure impacts, and converting up to 20 acres of impervious surfaces creating stormwater runoff.	Small acreage of wetlands/ open water impacts (5.2 acres/156,000 CY) from dredging. Minor increase to impervious surfaces.	Approximately 5-acres of tidal open water impacts from new infrastructure and 4 acres/120,000 CY of dredging impacts. Dredged material may be reused under an NYSDEC Beneficial Use Determination (BUD) at offsite locations. No increase to impervious surfaces.	Limited maintenance dredging (two acres) and open water impacts due to adequate depths close to the navigation channel, minor wetland impacts from new infrastructure. Minor increase to impervious surfaces.	Minimal dredging (0.41 acre/2,500 CY) with adequate depths close to the navigation channel, some wetland/ open water impacts from new dock infrastructure. Increases to impervious surfaces.	3 sites would have moderate level of wetlands/open water fill and dredging impacts. 2 sites would have minor wetlands/open water impacts. At least 3 ports would increase impervious surfaces creating stormwater runoff. No ports have aquifers present.

Category	Resource	Criteria Characteristics	Port of Albany-Rensselaer (manufacturing)	Port of Coeymans (fabrication)	South Brooklyn Marine Terminal (staging and O&M)	Port Jefferson (O&M)	Port of Montauk (O&M)	Planned Alternative (Summary)
Environmental Impacts	Cultural Resources	Historic architectural resources, Historic districts, Upland and marine archaeological resources (shipwrecks)	No mapped cultural resources or historic districts on site. However, unavoidable adverse visual impacts would occur to a site of Native American significance across the Hudson River.	Listed properties in the vicinity of the site. Coeymans Landing Historic District and Schodack Island State Park inhabited by the Stockbridge-Munsee Tribe location of the Mohican Council Fire, the Tribe's seat. No submerged precontact sites were identified during the remote sensing survey. Unavoidable adverse visual impacts may occur to the Native American site (Schodack Island) across the Hudson River.	May impact archaeological sensitive area. No mapped historic architectural resources or historic districts within the vicinity.	May impact archaeological sensitive area. No mapped historic architectural resources or historic districts within the vicinity.	May impact archaeological sensitive area. No mapped historic architectural resources or historic districts within the vicinity.	All five sites may impact archaeological sensitive areas. Two ports may have unavoidable adverse visual impacts to Native American sites. One site with historic architectural resources or historic districts in the vicinity.
Environmental Impacts	Community Character	Sensitive receptors (residences, parks, hospitals, schools, etc.) Neighborhoods	Ezra Prentice and other residential communities are north of the site. Well-sited as an expansion of an existing port. The 3-mile truck route to I-87 has potential impacts during construction and peak operations.	No sensitive receptors adjacent to the site. Well-sited within an existing port. Direct ½-mile highway access to I-87 would have minimal traffic, noise or air quality effects to community.	Limited residences in the vicinity. Well-sited within an existing port. Direct highway access to I-287 would have minimal traffic, noise or air quality effects to community.	Residential neighborhood receptors west and south of the site, along local access road. Sited on an existing port. Temporary construction impacts may occur, however, sporadic O&M operations will result in less traffic, noise, air quality or visual effects to community.	Site adjacent to Montauk County Park and residential receptors south of the site along local access road. However, cited near an airport and busy marinas. Temporary construction impacts may occur, however, sporadic O&M operations will result in less traffic, noise, air quality or visual effects to community.	Four sites have residential communities nearby. However, most sites are within or adjacent to existing ports and within compatible land use and zoning.
Environmental Impacts	Hazardous Materials	Hazardous materials, Subsurface contamination, Health and safety issues	Upland site developments will disturb former landfill soils of fly ash and bottom ash with high levels of metals and other contaminants. Dredging and in-water construction may disturb pesticide and PCB-contaminated sediments.	Upland site developments will likely demolish buildings with hazardous materials and disturb contaminated fill soils from port operations. Dredging and in-water construction would disturb non-hazardous (Class A and Class B) contaminated sediments.	Upland site developments may demolish buildings with hazardous materials and disturb contaminated fill soils from port operations. Dredging and in-water construction may disturb contaminated sediments.	Upland site developments may disturb contaminated fill soils from port operations. Dredging and in-water construction may disturb contaminated sediments.	Upland site developments may disturb contaminated fill soils. Dredging and in-water construction may disturb contaminated sediments.	All sites will disturb contaminated fill soils from former port operations and/or other past uses. Two sites will likely demolish buildings with potential hazardous building materials (e.g. asbestos). All sites will temporarily disturb contaminated sediments during dredging and in-water construction.
Environmental Impacts	Floodplains & Resiliency	100-year floodplains Wave action prone areas Floodways, Coastal Erosion Hazard Zone (CEHZ) Drainage Patterns	High potential for flooding impacts; 98% of site within 100-yr floodplain and floodway on west and north borders. Improvements will raise the site, affecting potential flooding and natural drainage.	10% of site within 100-yr floodplain and bordering floodway of Hudson River. Improvements will raise the site, affecting potential flooding and drainage.	High potential for flooding impacts; 90% of site within 100-yr floodplain and along NY Harbor floodway. Improvements will raise the site, affecting potential flooding and drainage.	High potential for flooding impacts; 70% of site within 100-yr floodplain. Improvements will raise the site, affecting potential flooding and drainage.	Potential for flooding impacts; 45% of site within 100-yr floodplain. Improvements will raise the site, affecting potential flooding and drainage.	High potential for tidal flooding impacts from waters affected by sea level rise at most sites, as the 100-yr floodplains are present on-site and floodways are adjacent. Three sites have 50% located within 100-yr floodplains. Improvements will raise the site, affecting potential flooding and natural drainage.

Category	Resource	Criteria Characteristics	Port of Albany-Rensselaer (manufacturing)	Port of Coeymans (fabrication)	South Brooklyn Marine Terminal (staging and O&M)	Port Jefferson (O&M)	Port of Montauk (O&M)	Planned Alternative (Summary)
Environmental Impacts	Air Quality & Greenhouse Gases	USEPA National Ambient Air Quality Standards (NAAQS) Nonattainment area Sensitive receptors	Air quality impacts are not expected with effective BMPs. 1-Hour and 8-Hour Ozone Marginal Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur. Air quality of Ezra Prentice neighborhood to the north is part of the NYSDEC's <i>Albany South End Community Air Quality Study</i> with air monitoring programs and enforced truck restrictions.	Air quality impacts are not expected with effective BMPs. 1-Hour and 8-Hour Ozone Marginal Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	Air quality impacts are not expected with effective BMPs. 8-Hour Ozone Moderate Nonattainment Area, PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	Air quality impacts are not expected with effective BMPs. 8-Hour Ozone Moderate Nonattainment Area, PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	Air quality impacts are not expected with effective BMPs. 8-Hour Ozone Moderate Nonattainment Area, PM _{2.5} Nonattainment Area. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur.	All sites are located within Ozone and/or PM _{2.5} Nonattainment Areas. During construction and operations, elevated diesel exhaust emissions from trucks, equipment and marine vessels will occur. However, air quality impacts are not expected at the sites by using effective BMPs.
Environmental Impacts	Noise	Sensitive receptors within 1/4 mile, Local noise codes, Truck routes	No adjacent sensitive receptors and sited within industrial and commercial area. Truck route will avoid residential areas.	Impacts are not anticipated at the nearest sensitive residential or Schodack Island State Park noise receptors. adjacent sensitive receptors and sited within industrial and commercial area. Rural truck route passes through residential areas, which may have short-term noise impacts during construction or peak operations.	Limited residences in the vicinity of truck route may experience some truck traffic-related noise. Sited on an active port and commercial/industrial area with high ambient noise levels.	Limited residences in the vicinity may experience truck traffic-related noise during construction. Minor noise levels expected from O&M activities. Sited on an active port and industrial area.	Limited residences and park users in the vicinity may experience some port-related and truck traffic-related noise. Minor noise levels expected from O&M activities.	Four sites have sensitive receptors in the vicinity that may experience truck traffic-related noise during construction. Most are sited on an active port and industrial area with higher ambient noise levels. Minor noise levels are expected from O&M activities.

Note: Socioeconomic Impacts are Construction Jobs, O&M Jobs and Economic Development Impacts/Benefits are only summarized at the Alternative-level, not per port location.

Appendix F. Navigation Impact Study (SUNY Report)

NYSERDA Task Work Order (TWO) No. 2 Support for Offshore Wind Ports Cumulative Impacts Study

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1. Introduction

This report was prepared by The State University of New York, Maritime College (SUNY Maritime) while performing work subcontracted work for HDR and sponsored by the New York State Energy Research and Development Authority (NYSERDA), the Sponsors.¹

Scope of Work: Support for Offshore Wind Ports Cumulative Impacts Study

In support of New York's Climate Leadership and Community Protection Act, NYSERDA is coordinating the cost-effective development of at least 9,000 megawatts (MW) or 9 gigawatts (GW) of offshore wind (OSW) energy by 2035. To date, the Long Island Power Authority has competitively selected the South Fork Wind Farm and NYSERDA has issued two solicitations for offshore wind energy projects and has competitively selected four offshore wind projects Sunrise Wind, Empire Wind 1 & 2, and Beacon Wind. Combined, these projects bring New York's active offshore wind portfolio to over 4,300 MW. As these and additional offshore wind energy projects develop to achieve the State's goals, an assessment of project-related navigational impacts, including those associated with port infrastructure are necessary to gain an understanding of the cumulative impacts associated with meeting the 2035 goal.

NYSERDA has identified five ports of the current "Planned Alternative" to support the OSW infrastructure staging, manufacturing, assemblage and delivery to the off-shore wind farm sites and support the operations and maintenance (O&M) of the off-shore wind farms. The five ports of the current "Planned Alternative" have been strategically laid out to assume port facilities across the Key Regions of the State, including:

- North (Hudson) River Valley Region
 - Port of Albany (manufacturing)
 - Port of Coeymans (fabrication)
- New York Harbor Region
 - South Brooklyn Marine Terminal (staging and O&M)
- Long Island Region
 - Port Jefferson (O&M)
 - Port Montauk (O&M)

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Preliminary studies indicate that the capacity and timing of the Planned Alternative ports would not be sufficient to achieve the State's 9 GW OSW goal by 2035. Hence, to assume a reasonable scenario to fully achieve or perhaps even exceed the State's 9 GW OSW goal by 2035, a "Full Build Alternative" has been developed that comprises of the five ports of the Planned Alternative in addition to the "Potential Alternative" port locations. The Full Build Alternative has been strategically laid out to assume additional Potential Alternative port facilities across the Key Regions of the State, including:

- **North (Hudson) River Valley Region:** New York State Wind Port (manufacturing)
- **New York Harbor Region:** Arthur Kill Terminal (staging and O&M), Port Ivory (fabrication), Homeport Pier (O&M), Brooklyn Navy Yard (O&M), Brooklyn Port Authority Marine Terminal (O&M)
- **Long Island Region:** Hempstead Public Works Area (O&M)

The goal of the navigational impact study is to explore port facility characteristics, navigational constraints and vessel routes and density associated with the Planned Alternative and Full Build Alternative including No Action Alternatives. This study will discuss and describe cumulative effects of offshore energy maritime support vessels and waterborne transportation as part of the offshore energy offshore distribution system in New York waterways under the assumed port facilities of the Full Build Alternative.

1.1 Study Objectives

The purpose of this study is to *investigate and identify* the impacts of the support of offshore energy in New York Waterways from the following objectives:

- **Identify and assess port facility characteristics** of the Planned Alternative and *Full Build* Alternative
- **Identify and assess navigational constraints with the** Planned Alternative and *Full Build* Alternative
- **Identify and assess vessel routes and density associated with the** Planned Alternative and *Full Build* Alternative

References include:

- Government Documents
- Industry Documents
- NYSERDA Task Work Order (TWO) No. 6 - 9 GW Port Uses and Navigational Assessment
- Interviews

1.2 Background

The transportation delivery system is complex relying on multimodal transportation services. A key player in the transportation delivery system is the marine transportation system. The maritime transportation system of NYC and NY State relies on large, medium and small terminals, plethora of cargo and support vessels, and a robust maritime support services that collectively form an efficient system. The health of the maritime transportation system and the benefits to the community is largely dependent on government support and sound port practices access to facilitate the delivery of vital goods and services. The maritime benefit to our communities is paramount for a green New York State and supports good paying blue-collar jobs in NY for

both mariners and terminal operators. The purpose of this study is to investigate and identify demand of port uses and navigation waterborne services in New York State and potential impacts by offshore energy.

Port Authority of New York & New Jersey reports that its terminals support 152,000 jobs in the state and directly contribute \$32 billion to the state's economy. The Port of Albany reports that its terminals support for approximately 1,400 local jobs and 4,500 jobs throughout New York State. Private ports and terminals employment and economic data is not available.

Offshore Wind Support Vessels includes but not limited to as follows:

- Service Offshore Vessels - Subject to Jones Act (Subchapter L). When a SOV intends to tow it must hold a dual Certificate of Inspection as Subchapter L **and** when engaged in towing either Subchapter M (< 300 GRT) or (I \geq 300 GRT). During Towing operations the vessel must be fully compliant with the applicable Certificate of Inspection.
- Wind Turbine Installation Vessel (WTIV) - Not subject to Jones Act unless transporting cargo
- Crew Transfer Vessels - Subject to Jones Act (Subchapter T for vessels < 100 GRT carrying more than 6 offshore workers or passengers.
- Tug/Tow - Subject to Jones Act. Tug Certificate of Inspection under Subchapter M (< 300 GRT) or (I \geq 300 GRT). During Towing operation vessels must fully comply with the applicable Certificate of Inspection.
- Cargo Carrying Vessels (CCV) - Subject to Jones Act only if engaged in carriage of goods between domestic ports or from domestic ports to offshore wind installation sites.

1.2.1 Review Process

- Review Full Build Alternative proposals.
- Review finding of NYSERDA Task Work Order (TWO) No. 6 - 9 GW Port Uses and Navigational Assessment
- Interviews with Subject Matter Experts

Alternatives	Location	Assumed Port Use
Full Build Alternative	1. Port of Albany-Rensselaer	Manufacturing (Towers)
	2. Port of Coeymans	Fabrication (Substructures)
	3. South Brooklyn Marine Terminal	Staging (WTG and Substructures) and O&M
	4. Port Jefferson	O&M (Service Operations Vessels (SOCs))
	5. Port of Montauk	O&M (Crew Transfer Vessels (CTVs))
	6. Arthur Kill Terminal	Staging (WTG)
	7. Port Ivory	Fabrication (Offshore Substation components)
	8. Homeport Pier	O&M
	9. Brooklyn Navy Yard	O&M
	10. Brooklyn Port Authority Marine Terminal	O&M
	11. Hempstead Public Works	O&M
	12. NYS Wind Port	Component Manufacturing

Source: HDR

2. Planned Alternative Ports and Terminals

The New York State waterfront is vast and powerful economic engine providing safe, green friendly transportation, reducing road construction, and enhancing quality of life. Ports and Terminals play an important role in ability to create and sustain a diverse mix of jobs, move goods projects move forward in a timely manner while promoting the health of the city's ecosystems in the State of New York

New York Harbor is the third largest port in the United States (Port Authority Trade Statistics, 2019). It is also a major through port for oil in the United States providing the vast majority of home heating oil shipments to the New England region with over eighty percent via Tug/Tow.² The Economic impact of the Port Authority of New York and New Jersey alone is valued at \$99.5 billion in business activity, \$36.1 billion in personnel income and close to \$12 billion in federal, state, and local tax revenues.³

An economic impact study of the Port of Albany measured the Port's overall economic impact on New York State at more than \$813 million. The measure of the Port's significance to the regional economy in terms of Output was more than \$428 million. Tenants of the Port of Albany paid over \$80 million in wages and benefits.⁴

An economic impact study of privately owned ports and terminals in the State of New York is not available.

For the purposes of this paper the region is divided as follows:

- North (Hudson) River Region - North of the Holland Tunnel Ventilator
- New York Harbor Region - Areas currently within the USCG Vessel Traffic System.
- Long Island Region - Nassau and Suffolk Counties

2.1 North (Hudson) River Region

The North (Hudson) River extends from the Battery (Lower Manhattan) to the Port of Albany. Deep draft and shallow draft ports and terminals are located on the North (Hudson) River from New York City to the Port of Albany.

The North (Hudson) River is navigable by ships and deep draft tug/tows to the Port of Albany and shallow-draft tug/tow north up and including the vast cargo canal system connecting the Port of Albany to both Lake Champlain and Lake Erie. The canal system in New York contains numerous ports and Lake Erie provides access to all the Great Lakes and its ports and harbors.

The project provided for a channel 600 feet wide, New York City to Kingston, thence 400 feet wide to 2,200 feet wide south of the Mall (Dunn) Bridge at Albany with turning basin at Albany and anchorages near Hudson and Stuyvesant, all with depths of 32 feet in soft material and 34 feet in rock; thence 27 feet deep and 400 feet wide, 900 feet south of the Mall (Dunn) Bridge; thence 14 feet deep and generally 400 feet wide to the Federal Lock at Troy; and thence 14 feet deep, 200 feet wide, to the southern limit of the State Barge Canal at Waterford; with widening at bends and widening in front of the cities of Troy and Albany to form harbors 12 feet deep. Length – (NYC to Waterford) about 155 miles. The project included removal of

² AWO Fact Sheet June 2011

³ The 2020 Report on the Economic Value of the New York-New Jersey Port Industry, pg. I, New York Shipping Association,

⁴ <https://www.portofalbany.us/our-impact/economic/>

the State Dam at Troy and construction of a new lock and dam at Troy about 2.5 miles below Waterford. The project construction is complete. Existing environmental restrictions for dredging require all in-water work to be completed between September 1st and December 31st⁵.

During extremely severe winters navigation is interfered with ice. The USCG monitors, reports, performs ice breaking services and commercial mariners collaborate in ice conditions to keep commerce flowing.

NYSERDA Task Work Order (TWO) No. 6 - 9 GW Port Uses, and Navigational Assessment, identified Items for consideration for Navigation to improve waterborne commerce in the State of New York by enhancing navigation safety, supply chains, resiliency, and economic growth. This report identifies items for consideration for all vessels (offshore wind related and non-offshore wind project related) navigating on the subject New York waterways:⁶

- Holland Tunnel - Albany: Extend VTS to Port of Albany
- George Washington Bridge-Tappan Zee Bridge: Air Draft Sensor on the Tappan Zee Bridge. Unobstructed waters for anchoring as identified in report.
- Tappan Zee Bridge - Kingston: Maintain Federal Authorized Channel 600-feet wide by 32-feet deep. Unobstructed waters for anchoring as identified in report.
- Hudson Highlands: Fog Sensors
- Lange Rack: Air Draft Sensor Mid-Hudson Bridge. Unobstructed waters for anchoring as identified in report
- Kingston: Unobstructed waters for anchoring as identified in report
- Kingston - Albany: Air Draft Sensor Castleton Highway Bridge. Current/Tide Sensor Port of Albany and Port of Coeymans. Multiple Fog Sensors. Maintain Federal Authorized Channel 400-feet wide by 32-feet deep. Turning Basin at Port of Coeymans.

2.1.1 Port of Albany

The Albany Port District Commissioners (APDC) leads and manages the publicly-owned maritime Port of Albany-Rensselaer. The APDC consist of five members, four appointed by the Governor upon nomination by the Mayor of Albany, and one appointed by the Governor upon nomination of the Mayor of Rensselaer.

The Port of Albany has over 200 acres of land and deep water facilities in two locations as follows: Albany (4,200 Feet dock) and Rensselaer (1,200 Feet dock) and proposing 80 additional acres with 500 feet of dockage in Bethlehem, just south of Albany. The Port of Albany, Bethlehem proposal is currently undeveloped and under permitting process. Pending bridge reconstruction, the proposed Bethlehem terminal will be accessible by road. Completion timeframe and facility specifics are not identified at this time. is in the permitting process to build more dockage in Bethlehem (500 Feet of Dock).

Intermodal Connections at the Port of Albany include - Rail, Barge Ro-Ro ramp, heavy-lift, and major highways. Port of Albany spent nearly \$18 million “Tiger Grant” on the development of heavy-lift.

The Port of Albany will be connected by road to Bethlehem pending bridge reconstruction. Both the Port of Albany (west side of the river) and Rensselaer (east side of the river) have rail access.

⁵ <https://www.nan.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/487349/fact-sheet-hudson-river-nyc-to-waterford-ny-maintenance-dredging/>

⁶ NYSERDA Task Work Order (TWO) No.6, 9 GW Port Uses and Navigational Assessment, 6.2, pg. 98

Air Draft Limitations - Mid-Hudson Bridge: 40.8 m 134 ft.

Site	Type of port	Distance to Sea buoy (Nautical Miles)	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
Port of Albany	Public	143	4,200	202	Barge Rail Highways	Heavy Lift	
Port of Albany at Bethlehem	Public	142	500	80 (proposed)	In permitting		\$350 million (plus)
Port of Albany at Rensselaer	Public	143	1,200	34	Barge Rail Highways		

2.1.2 Port of Coeymans Marine Terminal

The Port of Coeymans Marine Terminal (PCMT) is *privately* owned and operated facility that is a prime location for all shipping, processing, warehousing, and transportation needs that is equipped to handle break-bulk (modularization of power plants and bridges), bulk (aggregates) manufacturing, marine construction, and heavy lifts.

Located on the West Bank of the North (Hudson River) south of the Port of Albany this modern terminal boasts 450 acres of land, deep water facilities, and an 820 Metric Ton Marine Travel lift for repairs and special projects. The deep water port includes a ship dock for vessels up to 750-feet, two barge finger docks, and multipurpose inlet to accommodate vessels up to 60*280 feet for general and specialized cargo support.

The PCMT is owned/operated by Carver Industries, privately developed, with maritime facilities in Supporting facilities to include: Brayton Point - Patriot Stevedoring, Carver Maritime Charleston, Carver Maritime Manatee, Carver Stevedoring, Coeymans Industrial Park, and Coeymans Marine Towing. Coeymans Marine Towing consist of 9 tugboats and over 40 barges.

Intermodal Connections at the Port of Coeymans Marine Terminal include - Rail, traditional and specialized barge loading facility, heavy lift, and major highways.

The Port of Coeymans Marine Terminal upland support is continuous extending from the river up to and across the NYS Thruway and includes onsite rail.

Mooring Buoys are located near the terminal for lay-berthing barges and other floating equipment.

Air Draft Limitations - Mid-Hudson Bridge: 40.8 m 134 ft.

Site	Type of port	Distance to Sea buoy (Nautical Miles)	Dockage space (Max Vessel)	Upland Support space (acres)	Intermodal facilities	Other services
PCMT Ship dock	Private	133	750-foot	450	Barge Rail Highways	Heavy lift, Travel Lift, Tug Fleet, Barge Fleet
PCMT barge dock	Private	133	3 Barge Berths 80ft x 280ft			
PCMT Specialized Cargo Dock	Private	133	Accommodation Barge size of 60ft x 280ft			

2.2 New York Harbor Region

Navigation of the channels in the Port of New York and New Jersey is not restricted by ice. The main channels do not freeze over, and any ice in the smaller waterways is well broken up by tugs and general traffic. Freshwater ice is brought down the Hudson River in large floes during periods of thaws or winter freshets. The items for navigation consideration are subdivided into six categories as follows:⁷

- **Atlantic Approach:** Federally designate Deep-water Anchorage off Long Beach New York
- **Ambrose Channel:** Deepen Gravesend Anchorage to accommodate Neo Panamax Vessels
- **Sandy Hook Channel:** Widen Channel to mitigate shoaling
- **Upper Bay:** Scan and survey bay to identify and mitigate subsea infrastructure
- **KVK:** Widen Bends for Neo Panamax Vessels. Update current models at Bergen Point.
- **AK:** Air Draft Sensors on the Goethals Bridge and Outerbridge Crossing. Periodic maintenance dredging

2.2.1 South Brooklyn Marine Terminal, Brooklyn

The South Brooklyn Marine Terminal is an intermodal shipping, warehousing, and manufacturing complex in the Port of New York and New Jersey. It is located along the Upper New York Bay, between 29th and 39th Streets in the Sunset Park and Greenwood Heights neighborhoods of Brooklyn, New York City.

The proposed facility improvements will provide marine vessel access and allow the storage, staging, pre-assembly and transfer of materials utilized in construction, installation, and operation and maintenance of OSW projects. Project elements include bulkhead improvements to the 39th Street (St) “Pier”, 35th St “Pier” and the bulkhead that extends between 32nd and 33rd St, new pile supported and floating platforms, new fenders for vessel mooring, upgrades to “pier” infrastructure, construction of administration facilities and an operations-and-maintenance base, demolition of existing buildings, and improvements to site utilities

The Project includes infrastructure improvements to provide the necessary structural capacity, berthing facilities and sufficient water depth to allow the SBMT to operate as an OSW hub for construction and operation. A major component of the future use of SBMT is marine vessel activity, which will include berthing and transfer of cargo and crew to cargo carrying vessels (CCV), barges, service operations vessels (SOV), and crew transfer vessels (CTV).

Pursuant to analyses of infrastructure and site conditions, vessels would berth in the following arrangement:

- CCVs would berth along the west (offshore) and south faces of the 39th St “Pier” (39W, 39S)
- Barges would berth along the north and west face of the 39th St “Pier” (39N, 39W)
- Barges would berth along the west face of 35th St “Pier” (35W)
- SOVs would berth along a proposed wharf off of the northeastern edge of the 35th Street “Pier” (35N)
- CTVs would berth along a proposed floating wharf platform extending from the existing bulkhead located between 32nd and 33rd St (32-33).

The Project includes the construction of an approximately 57,000 square feet (sq-ft) operations and maintenance (O&M) base containing approximately 22,000 (sq-ft) of office and support space, and approximately 35,000 (sq-ft) of warehouse facilities and associated utility space with a maximum height of

⁷ NYSERDA Task Work Order (TWO) No.6, 9 GW Port Uses and Navigational Assessment, 6.1, pg. 98

32.8 ft from grade. The deepening of navigation channels, rehabilitation and strengthening of bulkheads, and installation of wharves will allow both navigational access and berthing for all vessel types (CCVs, barges, SOVs, and CTVs) required to support OSW projects.

Air Draft Limitation: Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline.

Site	Type of port	Distance to Sea buoy (Nautical Miles)	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
SBMT Barge	Public NYCEDC	17.4	400	66.1	Barge Rail Highways	Heavy Lift, SOV Berths, CTV Berths, CCV Berth	TBD
SBMT Ship	Public NYCEDC		508				
SBMT SOV	Public NYCEDC		240				
SBMT CTV	Public NYCEDC		90				

2.3 Long Island Region

Long Island's North Shore commercial ports include Port Jefferson, Oyster Bay, Hempstead Harbor, and Port Shoreham developed for heavy lift cargo to support the failed Shoreham Nuclear Power Facility project. Two offshore terminals are located on the North Shore of Long Island in Northport and Riverhead.

Commercial ports on Long Island provide liquid, dry and limited break bulk cargoes providing resiliency and relieving truck congestion. The North Shore is home to two major commercial ferry operators out of Port Jefferson and Orient Point to the mainland Connecticut.

Long Island's South Shore commercial ports include Jamaica Bay, located at the western end and Montauk Harbor and North Fork Greenport Harbor at the eastern end of Long Island. Along the south shore between are several inlets for shallow draft commercial and recreational fishing vessels.

The number of terminals has decreased over the years on Long Island for various reasons including high real estate cost and lack of government support.

Items for consideration for Navigation:⁸

- **Hell Gate:** Current Sensor
- **Throggs Neck:** Tide Sensor
- Federally designated anchorage grounds between Execution Rocks and Throggs Neck to support Ships and Tug/Tows units.
- Maintain Port Jefferson Harbor Channel. Shoaling has been reported inside the harbor east of the channel
- Maintain Port of Montauk Harbor Channel. Shoaling has been reported East side of the channel at the breakwater.
- Consider a Federal Designated Anchorage for Port of Montauk

⁸ NYSERDA Task Work Order (TWO) No.6, 9 GW Port Uses and Navigational Assessment, 6.3 and 6.4, pg. 98

2.3.1 Port Jefferson

Port Jefferson Harbor, on the north shore of Long Island is entered through a dredged channel that leads between two jetties that are in ruins to a docking area near the southwestern end of the harbor; the jetties are each marked by a light. Commercial terminals include liquid and dry bulk, launch and supply services are sited along the west shore in close proximity at the southern end of the harbor.

Port Jefferson has channel and connector depth capacity to accommodate both CCV's and SOV's at either the private Power Plant (Marketspan Generation LLC) or Liquid Bulk (Consolidated Petroleum) facilities pursuant to private facility agreement. Additionally, channel and connector depths to accommodate CTV's at the Private Commercial Service Operation (Consolidated Petroleum), Marina (Sound Express), or Aggregate (Tilcon) facilities pursuant to private facility agreement.

Site	Type of port	Distance to Sea buoy (Nautical Miles)	Dockage space (Max Vessel)	Upland Support space (acres)	Intermodal facilities	Other services
Marketspan Generation LLC	Private Power Plant	57.2	738 Feet ⁹	65.16 ¹⁰	Road BPPJ Ferry	None
Consolidated Petroleum	Private Liquid Bulk		600 Feet	3.9		
Consolidated Petroleum	Private Commercial Service Operation		Finger Pier	0.4 (approximate)		
Sound Express	Private Marina		Finger Pier	1.15		
Tilcon	Private Aggregate		480 Fleet	2.74		

2.3.3 Port Montauk

Montauk Harbor, in the northern part of Lake Montauk, is entered through a dredged channel on the northern shore about 3 miles west of Montauk Point; a federal project provides for a depth of 12 feet in the channel and 10 feet in the boat basin northwestward of Star Island. Limited channel depths and close proximity to the ocean dictates that Port Montauk it is best suited for Crew Transfer Vessels (CTV) pursuant to private facility agreement or purchase.

⁹ Ship dock has not been utilized for cargo delivery to the generating facility for several years leaving the possibility of usage when not needed for cargo by SOV's

¹⁰ Available upland acres are not known.

Site	Type of port	Distance to Sea buoy (Nautical Miles)	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
ELD LLC ¹¹	Private	0.75	Finger Dock	6.15	Road	None	TBD
Inlet Seafood LLC	Private	0.75	Finger Dock	6.73	Road	None	TBD

Table 1 provides a summary of planned alternatives collected from the above tables.

¹¹ 527 ELD, LLC was established on Dec 13, 2019, as a foreign limited liability company type registered at 1 Engle Street, Suite 201 Englewood, 527 ELD, LLC has been operating for 2 years 0 months, and 22 days since it established.

Table 1: Summary of planned alternatives

Site	Type of port	Distance to Sea buoy (NM)	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost				
Port of Albany											
Port of Albany	Public	143	4,200	202	Barge, rail, highway	Heavy Lift					
Port of Albany at Bethlehem		142	500 (proposed)	80 (proposed)	In permitting		\$350 million (plus)				
Port of Albany at Rensselaer		143	1,200	34	Barge, rail, highway						
Port of Coeymans Marine Terminal											
Ship dock	Private	133	750-foot	450	Barge rail highway	Heavy lift, Travel Lift, Tug Fleet, Barge Fleet	NA				
barge dock			3 Barge Berths 80ft x 280ft								
Specialized Cargo Dock			Accommodation Barge size of 60ft x 280ft								
South Brooklyn Marine Terminal											
Barge	Public, NYCEDC	17.4	400	66.1	Barge rail highway	Heavy Lift, SOV Berths, CTV Berths, CCV Berth	TBD				
Ship			508								
SOV			240								
CTV			90								
Port Jefferson											
Marketspan Generation LLC	Private Power Plant	57.2	738 Feet[1]	65.16[2]	Road BPPJ Ferry	None	NA				
Consolidated Petroleum	Private Liquid Bulk		600 Feet	3.9							
Consolidated Petroleum	Private Commercial Service Operation		Finger Pier	0.4 (approx.)							
Sound Express	Private Marina		Finger Pier	1.15							
Tilcon	Private Aggregate		480 Fleet	2.74							
<small>[1] Ship dock has not been utilized for cargo delivery to the generating facility for several years leaving the possibility of usage when not needed for cargo by SOV's</small>											
<small>[2] Total acres. Available upland acres are not known.</small>											
Port Montauk											
ELD LLC[1]	Private	0.75	Finger Dock	6.15	Road	None	TBD				
Inlet Seafood LLC	Private	0.75	Finger Dock	6.73	Road	None	TBD				
<small>[1] 527 ELD, LLC was established on Dec 13, 2019, as a foreign limited liability company type registered at 1 Engle Street, Suite 201 Englewood, 527 Eld, Llc has been operating for 2 years 0 months, and 22 days since it established.</small>											

3. Proposed NYS Offshore Energy Full Build Alternate Ports and Terminals

3.1 North (Hudson) River Region

The North (Hudson) River Region is replete with additional existing and choice port development locations. This report will explore one area selected by HDR.

New York State Wind Port - Undeveloped parcel of river front on the east bank of the Hudson River with ample upland potential.

3.1.2 New York State Wind Port

The proposed New York State Wind Port is sited on the East bank of the North River opposite of the proposed Port of Albany Bethlehem site. Pursuant to site development vessels berthing could accommodate CCVs, Barges, SOVs, and Cable laying vessel.

Air Draft Limitations: Mid-Hudson Bridge: 40.8 m 134 ft MHW

Site	Type of port	Distance to Sea buoy (Nautical Miles)	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
East Greenbush	Not Known	142	Not Known	91	Road Rail Access	None	Not Known

3.2 New York Harbor Region

The New York Harbor Region has 5 possible sites in various stages of port development. This report will explore five areas selected by HDR.

Arthur Kill - Port potential requiring wide-ranging development including dockage, wharfage, landfill, heavy lift, etc. Site features open access to the ocean without air-draft restrictions. Navigation Channel draft restrictions are 35-feet. Connector water depths and dockage depths are unknown.

Port Ivory - Port potential requiring wide-ranging development including dockage, wharfage, landfill, heavy lift, etc. Site features open access to the ocean with air-draft restrictions of 215-feet via the KVK and 135-feet via AK. Navigation Channel draft restrictions are 50-feet via KVK and 35-feet via AK. Connector water and availability (dock to federal channel) and dockage depths are unknown.

Homeport - Port potential includes solid pier with limited upland support or heavy lift, etc. Site features open access to the ocean with air-draft restrictions of 215-feet (Verrazano Bridge) and maximum for Navigation Channel drafts for Port of New York easily accessible to sea. Inside the federal designated anchorage to the shoreline is available for staging moorings.

Brooklyn Navy Pier - Port potential includes existing piers, upland support, and on-site ship repair facility GMD Shipyard. Site limitation include air-draft restrictions of 127-feet (Brooklyn Bridge) and strong currents in the East River.

Port Authority Marine Terminal - Port potential includes substantial pier lengths with upland support and container terminal. Site features open access to the ocean with air-draft restrictions of 215-feet (Verrazano Bridge) and good Navigation Channel drafts for Port of New York easily accessible to sea.

3.2.1 Arthur Kill

The proposed Arthur Kill Port is sited on the bank of the Arthur Kill and consist of 23.2 acres of land along with 9.2 acres of submerged land. AK has navigable depth of 35 feet and no air draft restrictions via Sandy Hook Channel. Pursuant to site development vessels berthing could accommodate CCVs, Barges, SOVs, and Cable laying vessel.

Air Draft Limitation via AK: None

Site	Type of port	Distance to Sea buoy (Nautical Miles)	Dockage space (Waterfront)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
Arthur Kill Terminal	Private	25	1,500 feet	23.2	Road	None	TBD

3.2.2 Port Ivory

The Port Ivory site is adjacent to the Global Container Terminal (GCT) on Staten Island New York. Units can navigate to the site via KVK or AK. KVK Channel has navigable depth of 50 feet and 215-feet of Air Draft. AK has navigable depth of 35 feet and air draft of 135-feet. Pursuant to site development vessels berthing could accommodate CCVs, Barges, SOVs, and Cable laying vessel.

Air Draft Limitation via KVK: Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline

Air Draft Limitation via AK: Arthur Kills Railroad Bridge 135-feet.

Site	Type of port	Distance to Sea buoy (NM)	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
Port Ivory	PANYNJ	KVK 18.8 AK 23.7	2,512 GCT	187 ¹²	I-278 On-Site Rail	Container Terminal	TBD

¹² Proposed Port Ivory Site is undeveloped and adjacent to Global Container Site.

3.2.3 Homeport

The Homeport pier, originally built for the US Navy is used for layberthing. The property has several tenants include FDNY and Millers Launch. Pursuant to site development vessels berthing could accommodate CCVs, Barges, SOVs, CTV's and Cable laying vessel.

Air Draft Limitation: Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline

Site	Type of port	Distance to Sea buoy (NM)	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
Homeport	NYCEDC	16	1,410 Pier 2,820 feet ¹³	28	Road Rail Access	None	TBD
FDNY							
Millers							

3.2.4 Brooklyn Navy Yard

The Brooklyn Navy Yard (BNY) originally built ship building has three active graving docks operated by GMD Ship Repair as well as several marine and non-maritime tenants. Pursuant to site development vessels berthing could accommodate CCVs, Barges, SOVs, CTV's and Cable laying vessel.

Air Draft Limitation: Brooklyn Bridge: 127 ft. maximum at the centerline

Site	Type of port	Distance to Sea buoy	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
BNY	Public	21.4	1,800	27.5	Industrial Rail I-278	Ship Repair	TBD

3.2.5 Brooklyn Port Authority Marine Terminal

The Brooklyn Port Authority Marine Terminal site includes Red Hook Container Terminal (RHCT) and Brooklyn Cruise Terminal (BCT). Navigable depth of 35 feet and 215-feet of Air Draft. Pursuant to site development vessels berthing could accommodate CCVs, Barges, SOVs, CTV's and Cable laying vessel.

Air Draft Limitation: Verrazano-Narrows Bridge: 60 m (198 ft.) for the center 610 m (2,000 ft.) 65.5 m (215 ft.) maximum at the centerline

¹³ Less FDNY Facility

Site	Type of port	Distance to Sea buoy	Dockage space (feet)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
BPAMT	PANYNJ	20	9,670	80	I-278	Container Services	TBD
RHCT							
BCT							

3.3 Long Island

Hempstead Public works - Port potential is limited to shallow draft CTV's.

3.3.1 Hempstead Public Works

Site	Type of port	Distance to Sea buoy	Dockage space (Waterfront)	Upland Support space (acres)	Intermodal facilities	Other services	Development Cost
Public Works	Public	1.25	787 Feet	3	None	None	TBD

Table 2 is a summary of data reported in section 3.2.

Table 2: Summary of Full Build Alternative

Site	Type of port	Distance to Sea buoy (NM)	Dockage space (feet)	Upland Support Space (Acres)	Intermodal facilities	Other services	Development Cost
East Greenbush	Not Known	142	Not Known	91	Road, Rail Access	None	Not Known
Arthur Kill Terminal	Private	25	1,500	23.2	Road	None	TBD
Port Ivory	PANYNJ	KVK 18.8	2,512	187[1]	I-278 on-site rail	Container Terminal	TBD
Port Ivory	PANYNJ	AK 23.7	GCT				
1[1] Proposed Port Ivory Site is undeveloped and adjacent to Global Container Site.							
Homeport	NYCEDC	16	1,410 Pier, 2,820 feet[1]	28	Road, rail access	None	TBD
Homeport (FDNY)							
Homeport (Millers)							
1[1] Less FDNY Facility							
BNY	Public	21.4	1,800	27.5	Industrial Rail, I-278	Ship Repair	TBD
Brooklyn Port Authority Marine Terminal (BPAMT)	PANYNJ	20	9,670	80	I-278	Container Services	TBD
BPAMT (RHCT)							
BPAMT (BCT)							
Hempstead Public Works	Public	1.25	787	3	None	None	TBD

4. Operational Phase Assessment

The key characteristics of the 12 “full build alternatives,” of which five are “planned alternatives” were described in the previous sections. As indicated above, “The purpose of this study is to investigate and identify demand of port uses and navigation waterborne services in New York State and potential impacts by offshore energy.” Thus, the operation details follow these objectives, and the discussion is divided accordingly.

The 12 “full build alternatives” highlight critically important operational and construction data. The data (Tables 1 and 2) starts with identifying the *site type* as public or private (some agencies are also identified). This type of distinction is critical for jurisdiction and legal responsibilities. Next the operational data identifies the *distance* of the port from a sea buoy in Nautical Miles (NM). The sea buoy is a standard recognized marker that identifies the location where a vessel moves into ocean waters. It does not provide any data of the distance between a site and an installation site. This distinction is important because for an offshore wind (OSW) installation, maintenance and/or operation, there is a need to travel further to the OSW site as well. *Docking space* (in feet) indicates the docking space available and in some instances the accommodation. Thus, depending on the OSW component in the staging port/site, docking space is different. Some docking spaces must be very large, such as for turbines; others might be small, such as for crew changes. The *upland support space* (acres) indicates the space that a site must have to work with and the space it can accommodate for delivery and maneuverability. Some OSW components are very large and require a large amount of space. Furthermore, there is also a need for surface transportation and/or waterfront accessibility of handling large components. *Intermodal facilities* and *other services* further clarify the type of vessels that can be accommodated in the site. Finally, *development cost* indicates the site commitment and plans for development.

4.1 Planned Alternative

Phase one of the OSW assessment identifies sites that positioned themselves already to provide services to the OSW including installation, operation, and maintenance. These sites include:

The Port of Coeymans. The Port of Coeymans is privately owned terminal and a prime port site. The analysis of the Planned Alternative to support Fabrication, Manufacturing and Staging indicates that the Port of Coeymans is fully operational.

The South Brooklyn Marine Terminal (SBMT). The South Brooklyn Marine Terminal (SBMT) plan to upgrade the existing facility is well underway and a contract with an offshore wind developer is in progress. Furthermore, SBMT is a key port site for location, air draft and access to sea. SBMT is located near the Brooklyn Port Authority Marine Terminal, which can provide additional support.

The Port of Albany-Rensselaer. The Port of Albany-Rensselaer has made significant improvements to its existing facilities, but it will need significant funding to expand south to potentially develop its Bethlehem site.

The Planned Alternative for O&M ports (Port Jefferson and Montauk) are well-sited and will require private agreements to repurpose existing uses.

4.2 Full Build Alternative

The analysis of the Full Build Alternative to support Offshore Wind is a work in progress. The analysis above demonstrated that Homeport Pier, Brooklyn Navy Yard, and Brooklyn Port Authority Marine Terminals are existing terminals requiring upgrades while NYS Wind Port, Port Ivory and Arthur Kill Terminals require full development that will depend on environmental, zoning, and public considerations.

The Hempstead Public Works facility is restricted to shallow draft vessels and can only be considered for CTVs.

Tompkins Cove and Electric City (Lock 8 on the Erie Canal) provides a means of transportation for heavy equipment with low investments and therefore high returns. These prime facilities (discussed in Section 6) should be taken into consideration and made available.

5. Navigational Constraints of Planned Alternative and Full Build Alternative¹⁴

5.1 Navigation Factors

In this section navigation areas of consideration include as follows ([Table 3](#)):

- Infrastructure
 - Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Seasonal private docks adjacent to the channel increase navigational risk
 - Bridges
- Anchorage Availability
- Project channel dimensions
- Shoaling
- Harbor Assist/Escort Vessel availability
- Bridge Air Draft
- Tide constraints
- Current constraints
- Ice Conditions
- Navigation Speed
- Turning Basin availability

Table 3 Navigation Factors

	Column A	Column B	Column C	Column D
	Maneuvering	Special Restrictions	Seasonal Occurrences	Daily Occurrences
1	Meeting Areas	Speed	Fog	Currents
2	Overtaking Areas	Air Draft	Ice	Wind
3	Junctions	Channel Depths	Northeasters	Tides
4	Turning Basins	Infrastructure	Freshets	Traffic Density
5		Shoaling	Tropical Systems	
6		Under Keel Clearance	Hurricanes	
7		Safety Zone	Traffic Mix	
8		Security Zone	Marine Events	
9			Seasonal Management Areas	

The navigation management tools required and regulated, beside the private sector are also by USCG, NOAA and USACE. The tools are outlined in [Table 4](#):

¹⁴ [NYSERDA Task Work Order \(TWO\) No. 6 9 GW Port Uses and Navigational Assessment](#), Johansson, E, Quinn T., Spear J. 2022 pg 38-99

Table 4 Navigation Management Tools

	Column A	Column B	Column C	Column D
	Private	USCG	NOAA	USACE
1	Harbor Assist	Aids to Navigation	US Coast Pilot	Channel Maintenance
2	Escort Tugs	Vessel Traffic Service	Navigation Charts	Channel Deepening
3	Navigation Modeling	Homeport Portal	Tide Predictions	Standard Operation Procedures
4	Navigation Risk Assessments	Port and Waterway Safety Assessments	Current Predictions	Anchorage Grounds
5		Ice Breakers	PORTS*	
6		Harbor Operations Safety and Navigation Guidelines	Recommended Vessel Routes	
7		Harbor Operation Safety Committees		
8		Regulation Navigation Area		

Physical Oceanographic Real-Time System (PORTS) - a. Current Meters, b. Tide Meters, c. Air Draft, d. Fog Sensors, e. Wave Sensors, and f. Weather Forecast

5.2 Atlantic Approach

Foreign vessels and U.S. vessels under register entering or departing from the Port of New York and New Jersey must employ a pilot licensed by the State of New York or New Jersey. Enrolled vessels must have on board or employ a pilot licensed by the federal government.

All traffic passes through a precautionary area transiting to the pilot station. Most vessels choose to approach the pilot station directly since Ambrose Light was disestablished. ([Figure 2](#)). Traffic within the precautionary area may consist of vessels making the transition between operating in Ambrose or Sandy Hook Channel and one of the traffic lanes. Mariners are advised to exercise extreme care in navigating within this area. Vessels are generally boarded in the charted, designated pilot boarding area, located southeast of the Ambrose Channel Lighted Whistle Buoy A at 40°26'47"N., 73°48'27"W. Arrangements for pilot services are made in advance

The preferred approach of vessels to the pilot boarding area is determined by sea conditions ([Table 5](#)) and navigation management tools ([Table 6](#)). Vessels approach the pilot boarding area one at a time and generally approach from the East providing a lee for pilot boarding of the embarked vessel. The Pilot will then direct the ship to either Sandy Hook or Ambrose Channel.

Enrolled United States Flag Vessels and the majority of Tug/Tow on domestic voyages are not required to embark a Pilot when the Officer in Charge of the vessels meets requisite requirements.

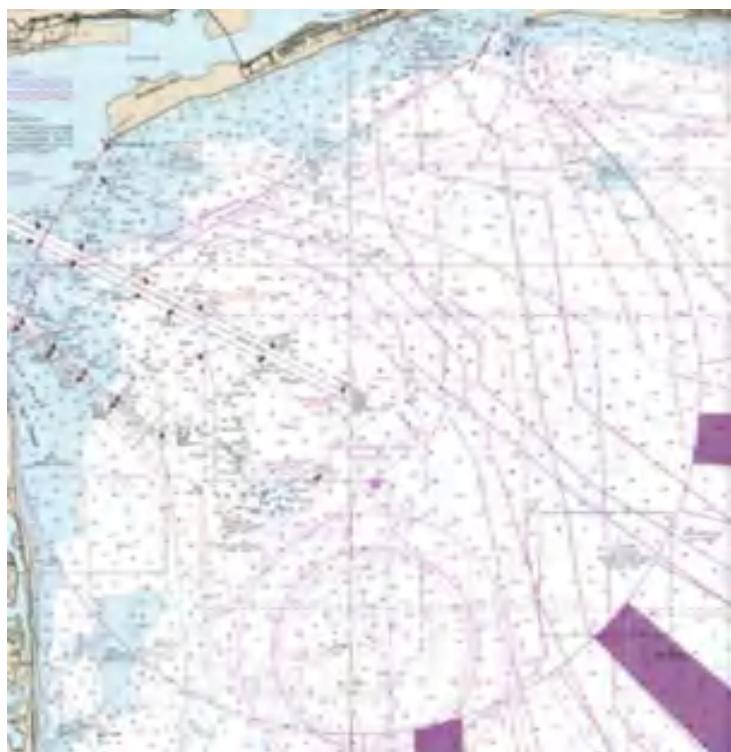


Figure 2 Pilot Boarding Area

Table 5 Atlantic Approach Navigation Factors

	Column A	Column B	Column C	Column D
	Maneuvering	Special Restrictions	Seasonal Occurrences	Daily Occurrences
1	Meeting Areas	Speed	X Fog	X Currents
2	Overtaking Areas	Air Draft	Ice	X Wind X
3	Junctions	X Channel Depths	Northeasters	X Tides
4	Turning Basins	Infrastructure	Freshets	X Traffic Density X
5	Anchorages	X Shoaling	Tropical Systems	X
6		Under Keel Clearance	Hurricanes	X
7		Safety Zone	Traffic Mix	X
8		Security Zone	Marine Events	
9			Seasonal Management Areas	X

Table 6 Atlantic Approach Navigation Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist		Aids to Navigation		US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs		Vessel Traffic Service		Navigation Charts	X	Channel Deepening	
3	Navigation Modeling	X	Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments	X	Port and Waterway Safety Assessments		Current Predictions	X	Anchorage Grounds	*
5			Ice Breakers		PORTS*	e.f.		
6			Harbor Operations Safety&Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

Physical Oceanographic Real-Time System (PORTS) - a. Current Meters, b. Tide Meters, c. Air Draft, d. Fog Sensors, e. Wave Sensors, and f. Weather Forecast

- **Maneuvering**
 - Multiple traffic lanes converging at Pilot Boarding Area requires vessels to navigate cautiously according to International Rules of the Road.
 - Custom and Practice Long Beach Long Island Anchorage is vital supporting port operations and supply chain needs¹⁵
 - Maneuvering during reduced speed
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
- **Restrictions**
 - Speed restrictions
 - Pilot boarding (vessel maneuvering at a safe speed of not more than 10 knots)
 - Seasonal Management Area (November 1 - April 30)

Seasonal Management Areas

Endangered North Atlantic right whales may occur within 30 miles of the New York and New Jersey coasts in the approaches to New York Harbor (peak season: November through April) ([Figure 3](#)). All vessels 65 feet (19.8 meters) or longer must travel at **10 knots or less** in certain locations (called Seasonal Management Areas or SMAs) along the U.S. east coast from November 1 through April 30th to reduce the threat of vessel collisions with endangered North Atlantic right whales.

¹⁵ Custom and Practice Long Beach Long Island Anchorage is currently in rule-making as a Federally Designated Anchorage Ground



Figure 3 Seasonal Management Areas

5.2.1 Ambrose Channel

Ambrose Channel, the principal entrance, extends from the sea to deep water in Lower Bay (Figure 4). Thence, Anchorage Channel, an extension of Ambrose Channel, leads through Upper Bay to The Battery. Ambrose Channel is wide and well defined with floating and fixed aids to navigation. (Tables 7 and 8)



Figure 4 Ambrose Channel Bend

Table 7 Ambrose Channel Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths		Northeasters	X	Tides	X
4	Turning Basins		Infrastructure		Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling		Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events			
9					Seasonal Management Areas			

Table 8 Ambrose Channel Navigation Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist		Aids to Navigation		X	US Coast Pilot	X	Channel Maintenance
2	Escort Tugs	X	Vessel Traffic Service		X	Navigation Charts	X	Channel Deepening
3	Navigation Modeling	X	Homeport Portal		X	Tide Predictions	X	Standard Operation Procedures
4	Navigation Risk Assessments	X	Port and Waterway Safety Assessments		X	Current Predictions	X	Anchorage Grounds
5			Ice Breakers			PORTS*	a.c.	
6			Harbor Operations Safety & Navigation Guidelines		X	Recommended Vessel Routes		
7			Harbor Operation Safety Committees		X			
8			Regulation Navigation Area					

Physical Oceanographic Real-Time System (PORTS) - a. Current Meters, b. Tide Meters, c. Air Draft, d. Fog Sensors, e. Wave Sensors, and f. Weather Forecast

- **Maneuvering**

- Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
- Meeting for Neo Panamax Vessels is not preferable in the bend from Ambrose 10-14
- Overtaking for Neo Panamax Vessels is not preferable in Ambrose Channel

- **Restrictions**

- Air Draft Verrazano Bridge - Neo Panamax and Passenger Vessels
- Neo Panamax Vessels do not have adequate anchorage¹⁶
- Deep-Draft vessels must maintain 3 feet UKC
- Towing Vessels shall maintain the shortest length of hawser as reasonably possible.

5.2.2 Sandy Hook Channel

Sandy Hook Channel, project depth 35 feet, provides a secondary route from the sea to deep water in Lower Bay; it connects with Raritan Bay Channel to the westward, Chapel Hill Channel to the north and Terminal Channel to the south (Figure 5) and its navigation factors and management tools (Tables 9 and 10).



Figure 5 Sandy Hook

Table 9 Sandy Hook Channel Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths		Northeasters	X	Tides	X
4	Turning Basins	X	Infrastructure		Freshets	X	Traffic Density	
5	Anchorages		Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone	X	Marine Events	X		
9					Seasonal Management Areas			

¹⁶ Neo Panama Vessel anchorage is currently planned to be developed in the Federally Designated Anchorage Grounds at Gravesend and will be available pursuant to Dredging.

Table 10 Sandy Hook Channel Navigation Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	X
2	Escort Tugs		Vessel Traffic Service	X	Navigation Charts	X	Channel Deepening	X
3	Navigation Modeling	X	Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments		Current Predictions	X	Anchorage Grounds	X
5			Ice Breakers		PORTS*	b.f.		
6			Harbor Operations Safety&Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

Physical Oceanographic Real-Time System (PORTS) - a. Current Meters, b. Tide Meters, c. Air Draft, d. Fog Sensors, e. Wave Sensors, and f. Weather Forecast

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Meeting or overtaking not advised as follows:
 - Sandy Hook Point,
 - Junctions (Terminal and Chapel Hill Channel)
 - End of Raritan Bay Reach
 - Ward Point Bend
- **Restrictions**
 - Speed restrictions
 - Pilot boarding (vessel maneuvering at a safe speed of not more than 10 knots)
 - Seasonal Management Area (November 1 - April 30)
 - Shoaling conditions at Sandy Hook Point.
 - Deep-Draft vessels must maintain 2 foot UKC
 - Security Zone restrictions enforced at Naval Weapons Station Earle N.J.

5.3 New York Harbor

Upper Bay is that portion of New York Harbor between The Narrows and The Battery. Anchorage Channel, marked by lighted buoys, is the main passage through the middle of the bay. Bay Ridge Flats is a shoal area with depths of 8 to 20 feet east of Anchorage Channel. Gowanus Flats is at the north end of Bay Ridge Flats. Jersey Flats, the area on the New Jersey side west of Anchorage Channel, is much shallower with a

least depth of 5 feet. Channels have been dredged through these shoal areas to provide access to the piers on both sides of the bay

The Port of New York and New Jersey has over 1,100 waterfront facilities. Most of these facilities are privately owned and operated, and the rest are owned or operated by either the railroads serving the port, the Port Authority of New York and New Jersey, the City of New York, the States of New York and New Jersey, the federal government or other municipalities.

The Narrows, connecting Lower Bay and Upper Bay of New York Harbor, has a clear width of over 0.6 mile at its narrowest point between Fort Wadsworth and Fort Hamilton. The Verrazano Narrows Bridge, a fixed suspension span, crosses The Narrows at these two points linking Staten Island with Brooklyn. The bridge has a vertical clearance of 215 feet for a midchannel width of 2,000 feet.

5.3.1 Upper Bay East

Upper Bay East - Bay Ridge Channel, Red Hook Channel and Buttermilk Channel follow the Brooklyn piers from The Narrows to East River. Midchannel depths in these channels are generally 25 to 40 feet with lesser depths on the sides; the area is subject to shoaling

Bay Ridge Anchorage located on the East side of Anchorage Channel plays a critical role in supply chain operations as cargo staging areas utilizing mooring buoys for shallow water vessels and as a deep draft anchorage ([Figure 6](#)).

The Brooklyn Shore from Owls Head north and into Gowanus Bay is prime deep water commercial waterfront that has been woefully neglected and in dire need of support. Recently South Brooklyn



Figure 6 Upper Bay East

Marine Terminal has been selected by the NYCEDC for restoration to support offshore wind energy. It is not known if any action will be taken to restore other valuable deep-water facilities along the Brooklyn Shore.

Erie Basin is the largest barge port on the East Coast and includes a vessel repair facility featuring two floating dry docks. The navigation factors and management tools are described in ([Tables 11 and 12](#)).

Table 11 Upper Bay East Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft		Ice	X	Wind	X
3	Junctions	X	Channel Depths		Northeasters	X	Tides	X
4	Turning Basins	X	Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone	X	Traffic Mix	X		
8			Security Zone	X	Marine Events	X		
9					Seasonal Management Areas			

Table 12 Upper Bay East Navigation Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation		X	US Coast Pilot	X	Channel Maintenance
2	Escort Tugs	X	Vessel Traffic Service		X	Navigation Charts	X	Channel Deepening
3	Navigation Modeling	X	Homeport Portal		X	Tide Predictions	X	Standard Operation Procedures
4	Navigation Risk Assessments	X	Port and Waterway Safety Assessments		X	Current Predictions	X	Anchorage Grounds
5			Ice Breakers			PORTS*	a.b.f.	
6			Harbor Operations Safety and Navigation Guidelines		X	Recommended Vessel Routes		
7			Harbor Operation Safety Committees		X			
8			Regulation Navigation Area		X			

Physical Oceanographic Real-Time System (PORTS) - a. Current Meters, b. Tide Meters, c. Air Draft, d. Fog Sensors, e. Wave Sensors, and f. Weather Forecast

- **Maneuvering**

- Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
- Junction - Buttermilk Channel
- Traffic congestion in Gowanus Bay

○ **Restrictions**

- Speed Restrictions are enforced in anchorage areas
- Navigation speed is restricted to minimize wake and/or surge effects on moored vessels
- Cable, pipeline and other subsea utilities impact anchoring areas and decisions during emergency anchoring.
- Under Keel Clearance Bay Ridge Channel, Red Hook Channel and Buttermilk Channel follow the Brooklyn piers from The Narrows to East River. Midchannel depths in these channels are generally 25 to 40 feet with lesser depths on the sides; the area is subject to shoaling
- Anchorage as per VTS user Guideline

5.3.2 Upper Bay West

Upper Bay West - Port Jersey Channel, Pierhead Channel, Greenville Channel, Claremont Terminal Channels and follow the New Jersey Shore from Constable Hook to just south of Liberty Island ([Figure 7](#)). Midchannel depths in these channels are generally 11 to 50 feet with lesser depths in Greenville Channel and deeper depths in Port Jersey Channel.

Anchorage Grounds include Stapleton Anchorage for deep draft vessels and the Jersey Flats for shallow draft vessels. The Jersey Flats are the area on the New Jersey side west of Anchorage Channel plays a critical role in supply chain operations utilizing mooring buoys as cargo staging areas.

Pierhead Channel - leads from the main channel about 0.7 mile southward of Liberty Island, thence along the New Jersey pierhead line to Kill Van Kull. The channel connects several channels that lead to various facilities along the New Jersey waterfront, including the Army Corps of Engineers Caven Point Terminal, New York Waterway Ferry Landing, Claremont.



Figure 7 Upper Bay West

Terminal, New York Cross Island Railroad Terminal, and Port Jersey Channel has federal project provides for a depth of 50 feet in the channel and is transited by Auto Carriers, Containers Ships, and Passenger Ships. The navigation factors and management tools are described in ([Tables 13 and 14](#)).

Table 13 Upper Bay West Navigation Factors

	Column A	Column B	Column C	Column D
	Maneuvering	Special Restrictions	Seasonal Occurrences	Daily Occurrences
1	Meeting Areas	X Speed	X Fog	X Currents X
2	Overtaking Areas	X Air Draft	X Ice	X Wind X
3	Junctions	X Channel Depths	X Northeasters	X Tides X
4	Turning Basins	X Infrastructure	X Freshets	X Traffic Density X
5	Anchorages	X Shoaling	X Tropical Systems	X
6		X Under Keel Clearance	X Hurricanes	X
7		Safety Zone	X Traffic Mix	X
8		Security Zone	X Marine Events	X
9			Seasonal Management Areas	

Table 14 Upper Bay West Navigation Management Tools

	Column A	Column B	Column C	Column D
	Private	USCG	NOAA	USACE
1	Harbor Assist	X Aids to Navigation	X US Coast Pilot	X Channel Maintenance X
2	Escort Tugs	X Vessel Traffic Service	X Navigation Charts	X Channel Deepening X
3	Navigation Modeling	X Homeport Portal	X Tide Predictions	X Standard Operation Procedures
4	Navigation Risk Assessments	X Port and Waterway Safety Assessments	X Current Predictions	X Anchorage Grounds X
5		Ice Breakers	PORTS*	a.b.f.
6		Harbor Operations Safety and Navigation Guidelines	X Recommended Vessel Routes	
7		Harbor Operation Safety Committees	X	
8		Regulation Navigation Area	X	

Physical Oceanographic Real-Time System (PORTS) - a. Current Meters, b. Tide Meters, c. Air Draft, d. Fog Sensors, e. Wave Sensors, and f. Weather Forecast

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Junctions
 - Constable Hook

- Port Jersey Channel
- Large vessels including Neo Panamax vessels employ Harbor tug assist and/or Escort Tugs for navigation and/or for turning when required during special circumstances.
- Meeting/overtaking/crossing maneuvers
 - The Upper Bay has heavy traffic combined with multiple junctions and anchorages requiring accepted standards of care
- **Restrictions**
 - Speed Restrictions are enforced in anchorage areas.
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels
 - Air Drafts for vessels entering the Constable Hook Range
 - Bayonne Bridge 215-feet MHW
 - Authorize Channel Depths differ throughout the various channels
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Deep-Draft vessels must maintain 2 foot UKC

5.3.3 Kill Van Kull

Kill Van Kull - separates the southern shore of the city of Bayonne from New Brighton, Port Richmond, and Mariners Harbor Staten Island and connects the Upper Bay of New York Harbor with Newark Bay and Arthur Kill. Kill Van Kull is a major channel for liquid and dry bulk cargo on the NJ side and ship repair facilities, tug/barge yards, Dry Bulk and Tank Cleaning Facilities on the New York Side are on its shores in New York Harbor, and has extensive through traffic to the Arthur Kills and Newark Bay. The KVK is deep and lined with terminals bank to bank.

The primary entrance to the Kill Van Kull is from the Upper Bay via The Constable Hook Range. The secondary entrance is from the Arthur Kills. The KVK and AK meet at Bergen Point ([Figure 8](#)) where vessels conduct critical maneuvers when rounding Bergen Point when entering/departing Newark Bay to the KVK. The navigation factors and management tools are described in ([Tables 15 and 16](#)).

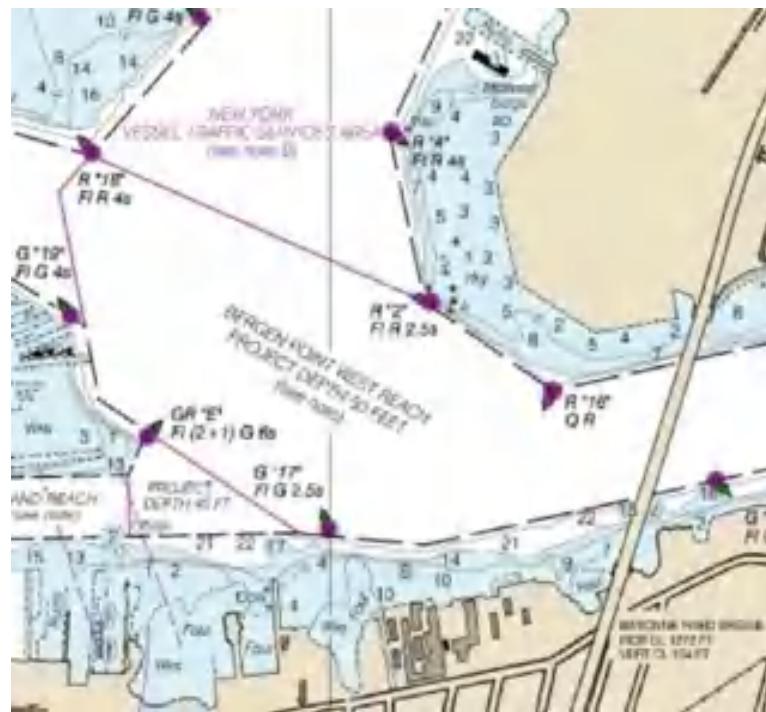


Figure 8 Bergen Point Turn

Table 15 Kill Van Kull Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins	X	Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling		Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone	X	Traffic Mix	X		
8			Security Zone	X	Marine Events			
9					Seasonal Management Areas			

Table 16 Kill Van Kull Navigation Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	X
2	Escort Tugs	X	Vessel Traffic Service	X	Navigation Charts	X	Channel Deepening	X
3	Navigation Modeling	X	Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments	X	Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	
5			Ice Breakers		PORTS*	a.b. c.f.		
6			Harbor Operations Safety and Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

Physical Oceanographic Real-Time System (PORTS) - a. Current Meters, b. Tide Meters, c. Air Draft, d. Fog Sensors, e. Wave Sensors, and f. Weather Forecast

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Meeting/overtaking
 - Kill Van Kull (KVK) is a major navigation channel replete with terminals and shipyards.
 - Pilots aboard Neo-Panamax vessel arrange for passage through the KV to not meet with Neo-Panamax vessel and similar size vessels within the KV
 - Neo-Panamax vessel will not overtake another Neo-Panamax vessel in the KV.
 - Speed
 - Vessel speed is restricted to minimize wake and/or surge effects on moored vessels along the KV
- **Restrictions**
 - Neo-Panamax vessels Bergen Point transit windows limits are within 1 hour either side of High or Low Water at the Battery.
 - Neo-Panamax vessel Bergen Point transit windows are not permitted when Neo-Panamax Wind exceed 20 knots sustained or gust of 25.
 - Other large vessels transit Bergen Point windows are not permitted when Winds exceed 30 knots sustained or 34 Gust.
 - Deep-Draft vessels must maintain 2 foot UKC
 - Visibility

- Neo-Panamax 1.5 Nautical Mile visibility requirement
- Deep Draft 1 Nautical Mile visibility requirement
- All Vessels greater than 300 GT .5 visibility requirement

5.3.4 Arthur Kills

Arthur Kills is the narrow body of water separating Staten Island from New Jersey. The cities of Perth Amboy, Tottenville and Elizabeth and many large factories, oil refineries and storage facilities are on its shores. Northern Arthur Kill and Kill Van Kull are the major channels for bulk, containerize, and petroleum cargo in New York Harbor ([Figures 9 and 10](#)). The navigation factors and management tools are described in ([Tables 17 and 18](#)).



Figure 9 Arthur Kill North



Figure 10 Arthur Kill South

Table 17 Arthur Kill Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions		Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins	X	Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone	X	Traffic Mix	X		
8			Security Zone	X	Marine Events	X		
9					Seasonal Management Areas			

Table 18 Arthur Kill Navigation Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	X
2	Escort Tugs	X	Vessel Traffic Service	X	Navigation Charts	X	Channel Deepening	X
3	Navigation Modeling	X	Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments	X	Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	X
5			Ice Breakers		PORTS			
6			Harbor Operations Safety and Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Meeting/overtaking
 - Arthur Kills (AK) is a major navigation channel and replete with cargo terminals navigated and serviced primarily by Tankers and Tug/Tows
 - Large Tankers enter from the KVK and depart south via the AK.
 - Meeting/Overtaking areas for large vessels are avoided as follows:
 - Shooters Island Buoy 18
 - AK Railroad Bridge
 - Tremely Point
 - Smoking Point
 - Outerbridge Crossing
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels along the AK
- **Restrictions**
 - Channel depths in the AK are 50-feet from Shooters Island to AK Railroad Bridge. 40-feet from the AK Railroad Bridge to the Bayway Refinery and thereafter to 35-feet from Bayway to the Sandy Hook Channel entrance buoy.
 - Deep-Draft Tankers arriving at the Bayway Refinery are restricted to Bayway transit to HW or no later than 1 hour after HW Battery
 - Air-draft restrictions
 - 135-feet extend from the AK Railroad Bridge at MHW
 - 143 feet Outerbridge Crossing at MHW
 - Deep-Draft vessels must maintain 2-foot UKC

5.4 North (Hudson) River

Hudson River, also called the North River in New York City, has its source in the Adirondack Mountains, about 275 miles along its course from a junction with East River at The Battery, NY, and flows in a general southerly direction into New York Upper Bay. Troy Lock and Dam, 134 miles above The Battery, permits vessels to pass from tidewater to the upper river and the New York State Canal System. The river water is usually fresh as far south as Poughkeepsie, halfway from Troy Lock and Dam to The Battery

The lower Hudson River has depths of 43 feet or more in midchannel from deep water in Upper New York Bay off Ellis Island to the upper limit of New York City's major wharves at 59th Street, about 5.3 miles above the entrance. Above this point, the federal project depth is 32 feet to Albany.

North of Kingston the federal project depth is 32 feet to Albany, however, due to shoaling, drafts are restricted to 30 feet fresh water. Drafts in excess of 27-feet must be scheduled to coincide with the rising tide to facilitate safe transit due to channels depths not meeting federal project depths.

During the winter months ice buoys are deployed and ice reports are posted via the USCG Homeport Website. During ice season, vessels less than 3,000 horsepower while engaged in towing operations are

not authorized to transit that portion of the Hudson River south of the Troy Locks when ice thickness on average is eight inches or greater.

The tides in the river are affected by freshets, winds and droughts. Because of these variables the predictions given for points above George Washington Bridge are based upon averages for the 6-month period, May to October, when the freshwater discharge is at a minimum

5.4.1 Holland Tunnel - George Washington Bridge

This stretch of the river includes the deep water channel and supportive Anchor Grounds 16, 19 East, and 19 West, and special anchorage areas for vessels primarily for use by yachts and other recreational craft less than 65-feet ([Figure 11](#)). The navigation factors and management tools are described in ([Tables 19 and 20](#)).



Figure 11 South of Geo Washington Bridge

Table 19 Holland Tunnel - Geo Washington Bridge Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas		Speed	X	Fog	X	Currents	X
2	Overtaking Areas		Air Draft		Ice	X	Wind	X
3	Junctions		Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling		Tropical Systems	X		
6			Under Keel Clearance		Hurricanes	X		
7			Safety Zone	X	Traffic Mix	X		
8			Security Zone	X	Marine Events	X		
9					Seasonal Management Areas			

Table 20 Holland Tunnel - Geo Washington Bridge Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation		X	US Coast Pilot	X	Channel Maintenance
2	Escort Tugs		Vessel Traffic Service			Navigation Charts	X	Channel Deepening
3	Navigation Modeling		Homeport Portal		X	Tide Predictions	X	Standard Operation Procedures
4	Navigation Risk Assessments		Port and Waterway Safety Assessments		X	Current Predictions	X	Anchorage Grounds
5			Ice Breakers			PORTS		
6			Harbor Operations Safety and Navigation Guidelines		X	Recommended Vessel Routes		
7			Harbor Operation Safety Committees		X			
8			Regulation Navigation Area		X			

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Commuter Ferries cross the river at multiple locations
 - Anchorage Grounds
 - Anchor Grounds 16, 19 East, and 19 West.

- Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
- Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels along the river
- **Restrictions**
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Channel depths are maintained to 45-feet up to the Manhattan Cruise Terminal by the USACE, and thereafter to 32-feet to GWB
 - Deep-Draft vessels are limited in draft due to channel depths, shoaling, tide, and prevailing weather conditions

5.4.2 George Washington Bridge - Tappan Zee Bridge

This stretch of the river includes the deep water channel and supportive Deep water Anchor Grounds 17, 18, 18A. When the use of Anchorage No. 17 and 18-A is required by naval vessels the vessels anchored therein shall move when the Captain of the Port directs them. Anchorage ground 18 is reserved for use by ships only. Special anchorage areas exist primarily for use by yachts and other recreational craft less than 65-feet ([Figure 12](#)). The navigation factors and management tools are described in ([Tables 21 and 23](#)).



[Figure 12 Yonkers Anchorage Grounds](#)

Table 21 Geo Washington - Tappan Zee Bridge Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions		Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling		Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 22 Geo Washington - Tappan Zee Bridge Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist		Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs		Vessel Traffic Service		Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments		Current Predictions	X	Anchorage Grounds	X
5			Ice Breakers		PORTS*			
6			Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area	X				

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Hudson River Pilots Association maintains a Pilots Station in Yonkers
 - Meeting/overtaking
 - Meeting/overtaking arrangements factor vessel at anchor for safety reasons
 - Anchorage Grounds
 - Anchor Grounds 17, 18 and 18A
 - Due air draft limitations vessels may be required to anchor north of the Tappan Zee Bridge to await low water or south in Anchor Grounds 17, 18, and 18A
 - Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels along the river
- **Restrictions**
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Air Draft
 - Air Draft Tappan Zee Bridge 139-Feet MHW
 - No Air Draft Sensor on the Tappan Zee Bridge
 - Staging Area
 - Units Anchor north and south of the Tappan Zee Bridge for safety reasons as follows:
 - Favorable Tide
 - Ice conditions
 - Poor visibility
 - No Harbor Assist or Escort Vessels are homeported in this region
 - Channel depths are maintained by the USACE. to 32-feet
 - Deep-Draft vessels are limited in draft due to channel depths, shoaling, tide, and prevailing weather conditions
 - Anchoring
 - During episodic event for safety of crew and cargo commercial vessels anchor north of Anchorage 17 up to Dobbs Ferry.

5.4.3 Haverstraw Bay

Haverstraw Bay is the wide stretch of Hudson River between Croton Point and Stony Point, 5 miles to the northward; the greatest width is about 2.5 miles. The extensive flats in the eastern half of the bay have depths of 5 to 9 feet. The dredged channel through Haverstraw Bay is marked by seasonal lighted buoys and two lighted ranges. Deep draft vessels must navigate within Haverstraw Channel which runs across the bay and narrows to 300-feet wide ([Figure 13](#)). The navigation factors and management tools are described in ([Tables 23 and 24](#)).

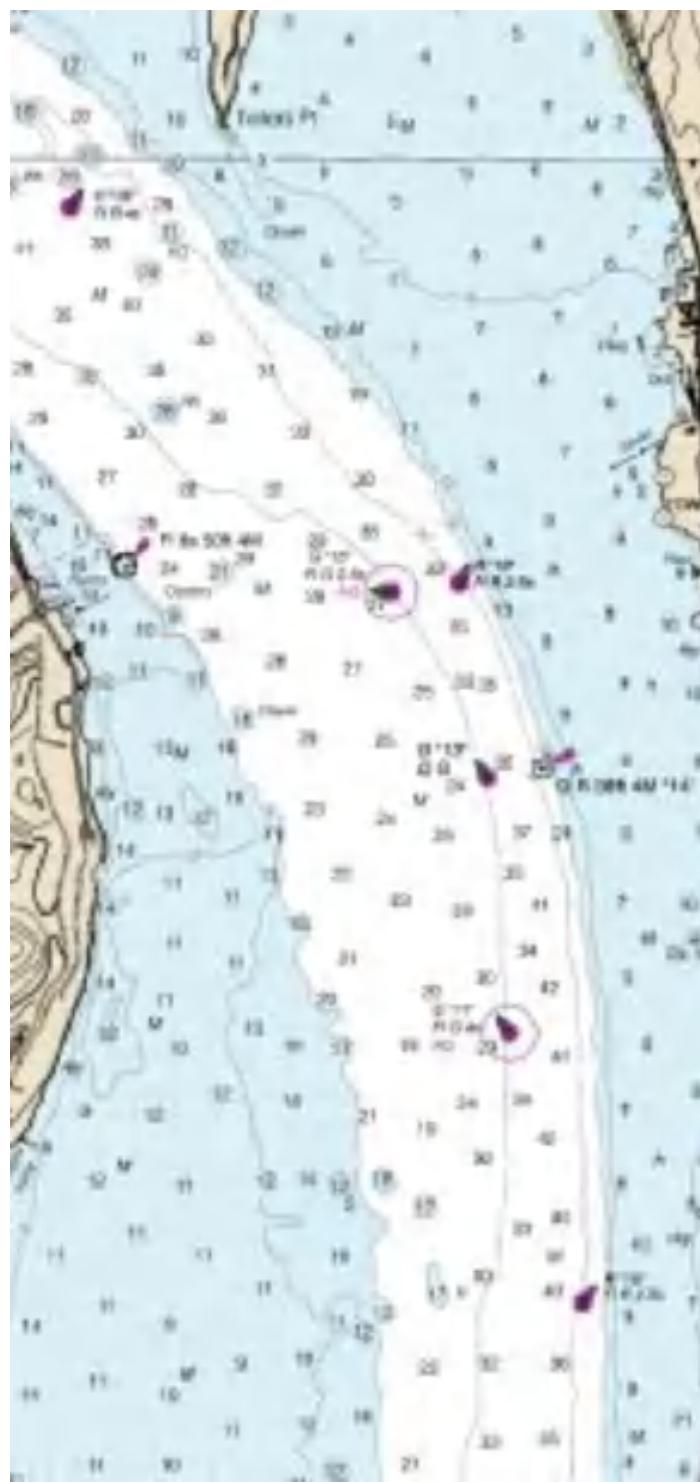


Figure 13 Haverstraw Bay

Table 23 Haverstraw Bay Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft		Ice	X	Wind	X
3	Junctions		Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone	X	Traffic Mix	X		
8			Security Zone	X	Marine Events	X		
9					Seasonal Management Areas			

Table 24 Haverstraw Bay Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist		Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	X
2	Escort Tugs		Vessel Traffic Service		Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	
5			Ice Breakers		PORTS			
6			Harbor Operations Safety and Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area	X				

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Meeting/overtaking
 - Meeting/Overtaking areas for large vessels are avoided as follows:
 - Tappan Zee Bridge

- Scarborough Light
 - Haverstraw Channel buoys 22-26
- Anchorage Grounds
 - No Federal Anchorage Grounds exist in this area
 - During episodic event or during reduced visibility for safety of crew and cargo commercial vessels anchor outside of the Federal Channel as follows:
 - Montrose Point
 - Tompkins Cove
 - Rockland Flats
 - Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
- Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels.
- **Restrictions**
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Channel depths are maintained by the USACE to 32-feet.
 - Shoaling
 - Due to shoaling deep draft vessels must navigate the center of the Federally Maintained Navigation Channel.
 - Significant Shoaling as follows:
 - Scarborough Light
 - Haverstraw Channel
 - Safety and Security Zone at Indian Point Nuclear Power Plant
 - No vessels are permitted within a 300-yard radius of the power plant
 - Deep-Draft vessels are limited in draft due to channel depths, shoaling, tide, and prevailing weather conditions
 - Anchoring
 - No Federal Anchorages exist in this area

5.4.4 Hudson Highlands

The Hudson Highlands run from Jones Point to Storm King. the river becomes much narrower at Jones Point and has an average width of 0.3 mile for the next 8 miles between the bases of the highlands on both sides. When approaching the sharp turns in this reach, caution should be exercised.

Con Hook a small island at Mile 43W, is marked on its channel side by a light. A rock, with a depth of 7 feet over it and marked by a lighted buoy, is about 0.3 mile southward of Con Hook. When descending the river, particularly with a fair current, there is a tendency to set toward the rock; caution is advised. The area 800 yards north of Con Hook and along the western shoreline is extremely shallow and dangerous and should be avoided due to a large shoal. When southbound on the Hudson River approaching Con Hook, mariners must take care not to confuse the lights on navigation aids with the lights from the railroad track on the west bank, the lights from bridge in the distance, and other background lighting in general to avoid vessel grounding.

Worlds End a sharp bend in the Hudson River at Mile 46, has depths of more than 100 feet. Extreme caution should be exercised when passing through Worlds End; the view is obstructed and vessels should reduce speed. The navigation factors and management tools are described in ([Tables 25 and 26](#)).

Table 25 Hudson Highlands Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft		Ice	X	Wind	X
3	Junctions		Channel Depths		Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling		Tropical Systems	X		
6			Under Keel Clearance		Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 26 Hudson Highlands Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist		Aids to Navigation		X	US Coast Pilot	X	Channel Maintenance
2	Escort Tugs		Vessel Traffic Service			Navigation Charts	X	Channel Deepening
3	Navigation Modeling		Homeport Portal		X	Tide Predictions	X	Standard Operation Procedures
4	Navigation Risk Assessments		Port and Waterway Safety Assessments		X	Current Predictions	X	Anchorage Grounds
5			Ice Breakers		X	PORTS		
6			Harbor Operations Safety and Navigation Guidelines			Recommended Vessel Routes		
7			Harbor Operation Safety Committees		X			
8			Regulation Navigation Area		X			

- **Maneuvering**
 - Traffic mix

- Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Meeting/overtaking
 - Meeting/Overtaking areas for large vessels are avoided as follows:
 - Bear Mountain Bridge
 - Con Hook
 - Worlds End (Garrison to Cold Spring)
 - Anchorage Grounds
 - No Federal Anchorage Grounds exist in this area
 - Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels.
- o **Restrictions**
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Ice Conditions
 - Ice Jams at Worlds End north to Storm King
 - Staging Area
 - Units Anchor north and south of the Hudson Highlands for safety reasons as follows:
 - Ice conditions
 - Poor visibility
 - Anchoring
 - No Federal Designated Anchorages exist
 - Deep-Draft vessels are limited in draft due to channel depths, shoaling, tide, and prevailing weather conditions

5.4.5 Diamond Reef

Diamond Reef with a depth of 5 feet over it and marked by a seasonal lighted buoy, lies in about the middle of Hudson River 0.2 mile above the entrance to Wappinger Creek. Between Diamond Reef and Poughkeepsie, the west side of the river should be favored to avoid two 18-foot spots that are buoyed. ([Figure 14](#)). The navigation factors and management tools are described in ([Tables 27 and 28](#)).

**Figure 14 Diamond Reef****Table 27 Diamond Reef Navigation Factors**

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft		Ice	X	Wind	X
3	Junctions		Channel Depths		Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling		Tropical Systems	X		
6			Under Keel Clearance		Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 28 Diamond Reef Management Tools

	Column A	Column B	Column C	Column D
	Private	USCG	NOAA	USACE
1	Harbor Assist	Aids to Navigation	X	US Coast Pilot
2	Escort Tugs	Vessel Traffic Service		Navigation Charts
3	Navigation Modeling	Homeport Portal	X	Tide Predictions
4	Navigation Risk Assessments	Port and Waterway Safety Assessments	X	Current Predictions
5		Ice Breakers	X	PORTS
6		Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes
7		Harbor Operation Safety Committees	X	
8		Regulation Navigation Area	X	

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Meeting/overtaking
 - Meeting/Overtaking areas for large vessels are avoided between Danskammer point and Marlboro
 - Anchorage Grounds
 - No Federal Anchorage Grounds exist in this area
 - During episodic event or during reduced visibility for safety of crew and cargo commercial vessels anchor outside of the Federal Channel as follows:
 - Newburgh Bay
 - Marlboro
 - Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels.
- **Restrictions**
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Anchoring
 - No federal anchorage grounds exist
 - Deep-Draft vessels are limited in draft due to channel depths, shoaling, tide, and prevailing weather conditions

5.4.6 Lange Rack

From Marlboro to Hyde Park the river is fairly open with the exception of the Mid-Hudson Bridge (U.S. 44) with a vertical clearance of 134 feet and the railroad bridge in close proximity with a horizontal clearance of 490-feet and vertical clearance of 167-feet (Figure 44). The navigation factors and management tools are described in (Tables 29 and 30).

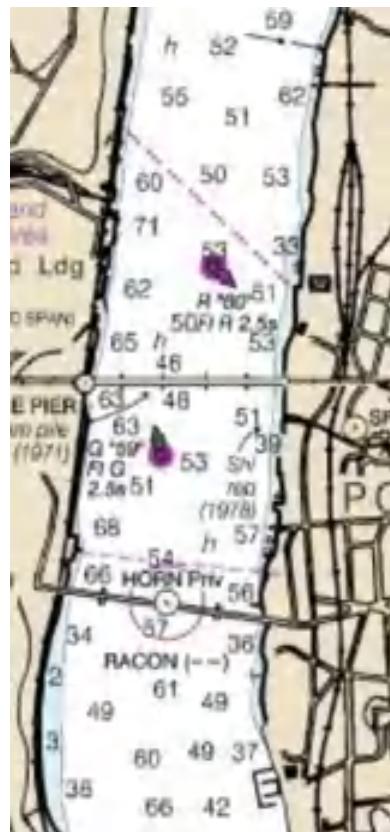


Figure 15 Poughkeepsie

Table 29 Lange Rack Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions		Channel Depths		Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling		Tropical Systems	X		
6			Under Keel Clearance		Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 30 Lange Rack Management Tools

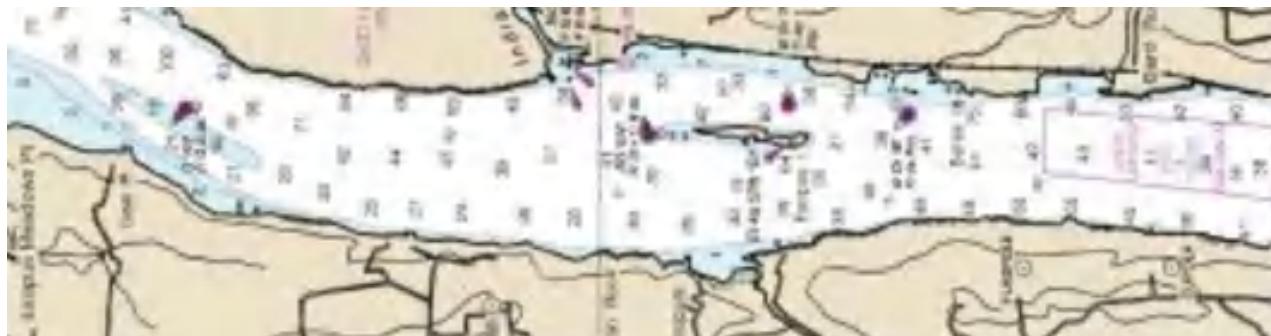
	Column A	Column B	Column C	Column D
	Private	USCG	NOAA	USACE
1	Harbor Assist	Aids to Navigation	X	US Coast Pilot
2	Escort Tugs	Vessel Traffic Service		Navigation Charts
3	Navigation Modeling	Homeport Portal	X	Tide Predictions
4	Navigation Risk Assessments	Port and Waterway Safety Assessments	X	Current Predictions
5		Ice Breakers	X	PORTS
6		Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes
7		Harbor Operation Safety Committees	X	
8		Regulation Navigation Area	X	

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Meeting/overtaking
 - Meeting/Overtaking areas for large vessels are avoided in the area of the abandoned railroad bridge (Walkway Bridge)
 - Anchorage Grounds
 - No Federal Anchorage Grounds exist in this area
 - During episodic event or during reduced visibility for safety of crew and cargo commercial vessels anchor outside of the Federal Channel as follows:
 - Milton
 - Poughkeepsie
 - Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
 - Due air draft limitations vessels may be required to anchor either north or south of the Mid-Hudson Bridge to await low water
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels.
- **Restrictions**
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Ice Conditions
 - Ice Jams at Crum Elbow

- Harbor Assist/Escort Vessels
 - No Harbor Assist/Escort Vessels are homeported
- Air Draft
 - Air Draft Mid-Hudson Bridge 134-Feet MHW
 - No Air Draft Sensor on the Mid-Hudson Bridge
- Staging Area
 - Units Anchor in Lange Rack for safety reasons as follows:
 - Favorable Tide
 - Daylight transit
 - Ice conditions
 - Poor visibility
- Deep-Draft vessels are limited in draft due to channel depths, shoaling, tide, and prevailing weather conditions

5.4.7 Kingston

The North (Hudson) River can technically be broken into two sections. Battery to Kingston and Kingston to Albany. Most northbound deep draft units anchor south of Kingston to wait for daylight transits. During Ice conditions units muster south of Kingston and convoy through the ice north. Once a unit commits navigating north of Kingston, navigation management tools are limited. Harbor Assist Vessels, Escort Vessels, suitable turning basins or anchorages for larger vessels do not exist until reaching the Port of Albany. Emergency anchoring is limited within the Federal Channel. Effective and timely communications with other vessels is essential ([Figure 16](#)). The navigation factors and management tools are described in ([Tables 31 and 32](#)).



[Figure 16 Kingston/Hyde Park Anchorages](#)

Table 31 Kingston/Hyde Park Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas		Speed	X	Fog	X	Currents	X
2	Overtaking Areas		Air Draft		Ice	X	Wind	X
3	Junctions		Channel Depths		Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling		Tropical Systems	X		
6			Under Keel Clearance		Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 32 Kingston/Hyde Park Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist		Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs		Vessel Traffic Service		Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	X
5			Ice Breakers	X	PORTS			
6			Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area	X				

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Hudson River Pilots Association maintains a Pilots Station in Hyde Park
 - Staging Area

- Units Anchor south of Kingston for safety reasons as follows:
 - Favorable Tide
 - Daylight transit
 - Ice conditions
 - Poor visibility
 - Pilot Boarding
- Anchorage Grounds
 - Federal Designated Anchor Ground 19
 - Custom and Practice Anchorages at Port Ewen and Big Rock
 - Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
- Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels.
- **Restrictions**
 - Tide constraints
 - Ice Conditions
 - In heavy Ice vessels will assemble with the assistance of the Coast Guard to convoy north up the river
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Harbor Assist/Escort Vessels
 - No Harbor Assist/Escort Vessels are homeported in the region
 - Anchoring
 - Anchorage 19 is restricted to 3 vessels or less
 - Deep-Draft vessels are limited in draft due to channel depths, shoaling, tide, and prevailing weather conditions

5.4.8 Kingston Point to Albany

In the North (Hudson) River above Kingston many shoals extend from the shore on either side. The bottom is rocky and the channel is reduced to 400 feet. Most of the channels through the critical areas are marked with lights and buoys however, local knowledge is critical, especially in ice conditions and mariner without experience and/or requisite recency requirements are advised to take a pilot. During winter months units muster south of Kingston to convoy through the ice. No turning basins or areas to turn for larger vessels exist until reaching the Port of Albany. The navigation factors and management tools are described in ([Tables 33 and 34](#)).

Table 33 Kingston to Albany Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions		Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins	X	Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 34 Kingston to Albany Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X ¹⁷	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	X
2	Escort Tugs		Vessel Traffic Service		Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	
5			Ice Breakers	X	PORTS			
6			Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area	X				

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season

¹⁷ Port of Albany

- Anchorage Grounds
 - Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
- Meeting/overtaking
 - Meeting/Overtaking areas for large vessels are avoided as follows:

<ul style="list-style-type: none">▪ Kingston Point Reach▪ Silver Point▪ Roeliff Jansen Kill▪ Catskill Creek▪ Hudson Light	<ul style="list-style-type: none">▪ Hudson Middle Ground Flats▪ Rattlesnake Island▪ Coeymans▪ Castleton Bridges▪ Statts Point to Van Wies
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
- Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels.
- o **Restrictions**
 - Infrastructure Cable, pipeline and other subsea utilities must be considered in anchoring and during emergency anchoring.
 - Project dimensions from Kingston to Albany is 400 feet wide by 32 feet deep
 - USACE maintenance is limited based on New York State Seasonal dredging restrictions and limited dredge spoil pump out location (Houghtaling Island)
 - Shoaling
 - Drafts are restricted to 30 feet fresh water, Kingston to Albany, due to shoaling not meeting federal project depths. Drafts in excess of 27-feet must be scheduled to coincide with the rising tide to facilitate safe transit due to channels depths and shoaling within the federal navigation maintained channel.
 - Harbor Assist/Escort Vessels
 - Harbor Assist are homeported in the Port of Albany
 - No Escort Vessels are homeported in the Port of Albany
 - Air Draft
 - Castleton Bridge Vertical 135-feet at MHW
 - No Air-draft sensor at the Castleton Bridge
 - Passage under Castleton Bridge is planned during high water for loaded Vessels
 - Tide constraints
 - Ice Conditions
 - In heavy Ice vessels can only meet at prearranged locations.
 - Vessels stuck in Ice can block marine traffic in both directions for undetermined times.
 - Vessels with the assistance of the Coast Guard maintain convoy formation
 - Transit times are unpredictable during ice conditions
 - Ice Buoys installed are sometimes stuck beneath or dragged off station by ice
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels.
 - Seasonal private docks adjacent to the channel increase navigational risk during recreational boating season
 - Turning Basins
 - The Port of Albany is the single turning basin in this region for commercial vessels from Coeymans to Albany.
 - Anchoring
 - No Federal or suitable anchorage location exist for safety purposes.
 - Deep-Draft vessels are limited in draft due to channel depths, shoaling, tide, and prevailing weather conditions

5.5 East River

East River is a 14-mile-long tidal strait that connects Long Island Sound with New York Upper Bay and separates the western end of Long Island from the New York mainland. The Sound entrance is between Throggs Neck and Willets Point; the Upper Bay entrance is between The Battery and Governors Island. Hell Gate, about halfway between Throggs Neck and The Battery, is noted for its strong tidal currents. Harlem River extends northward from Hell Gate to the Hudson River. Both sides of the East River, from The Battery to Port Morris, a distance of 9 miles, present an almost continuous line of wharves except where shoals or currents prevent access.

In the East River between the Brooklyn Bridge and Poorhouse Flats Range, shallow-draft vessels customarily keep to the west (Manhattan) side of the channel whether northbound or southbound, thereby reserving the east (Brooklyn) side of the channel for deep-draft vessels. Vessels transiting East River should be aware of this practice and anticipate northbound shallow-draft vessels crossing from east to west in the vicinity of Corlears Hook, and from west to east in the vicinity of Newtown Creek ([Figure 17](#)).

In East River the flood current sets eastward and the ebb sets westward. Note: this is the direct opposite of conditions in Long Island Sound where the flood is generally westward and the ebb eastward. The velocity of current is 0.7 knot at Throggs Neck, 1.6 knots at Port Morris, 4 knots in Hell Gate, 3 knots at Brooklyn Bridge, and 1.5 knots north of Governors Island. In Hell Gate (off Mill Rock) the velocity is 3.4 knots for the eastward current and 4.6 knots for the westward current. The direction and velocity of the currents are affected by strong winds that may increase or diminish the periods of flood or ebb. The currents generally set with the channel, but heavy swirls are found in Hell Gate.

5.5.1 Battery - Colears Hook



Figure 17 Battery - Corlears Hook

The navigation factors and management tools are described in ([Tables 35 and 36](#)).

Table 35 Battery - Colears Hook Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone	X	Traffic Mix	X		
8			Security Zone	X	Marine Events	X		
9					Seasonal Management Areas			

Table 36 Battery - Corlears Hook Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs	X	Vessel Traffic Service	X	Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	
5			Ice Breakers		PORTS			
6			Harbor Operations Safety and Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Commercial and Recreational vessels must be aware of wakes and take extra precaution to its impacts on tug/tow gear.
 - Meeting/overtaking
 - The channel between The Battery and Governors Island is very congested and subject to strong currents. Caution should be exercised while navigating in the area. Deep draft Tug/Tow's transiting the East River Deepwater Range (Battery) heading east must maintain steerage to remain clear of the shallow water.
 - Meeting/Overtaking areas are primarily outside of bends in the river.
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels along the shore.
- **Restrictions**
 - Air Draft - Brooklyn Bridge 127-Feet at MHW at center
 - Current
 - Commercial units with fair current tend to navigate in the center of the waterway while units navigating against the currents stay close to the shoreline. Shallow draft commercial units navigating against the current will often shift from one shore to the other to minimize current effects often referred to as “running the points”.
 - Deep-Drafts often plan passage to arrive at Hell Gate one-hour either side of slack water
 - Infrastructure Cable, pipeline and other subsea utilities must be considered during emergency anchoring.
 - Anchoring
 - No Federal Designated Anchorages exist
 - Deep-Draft vessels must maintain 2-foot UKC

5.5.2 Poor House Flats

The Poor House Flats extends from Colears Hook to Roosevelt Island. Within this region is the entrance to Newtown Creek and secondary East Channel of the East River ([Figure 18](#)).

The East Channel is primarily utilized by commuter ferries, recreational vessels, along with limited commercial uses. The primary channel for commercial vessels is the West Channel of the East River.

Deep-Draft units navigate along the Brooklyn Shore from the Williamsburg Bridge to approximately Bushwick Inlet where they cross the East River sideways to the current to the West on the Poorhouse Flats Range. Projected Depth is 35-feet. Deep draft units navigating the Poorhouse Flats must maintain steerage to account for set and drift of prevailing currents.

Shallow-Draft units tend to navigate outside of the 35-foot channel in the Poor House Flats (projected depth 25-feet) to provide deep-draft units additional maneuvering room.

Vessels operating in this area must pay special attention to deep-drafts navigating the Poorhouse Flats Range, commercial vessels exiting Newtown Creek, and recreational vessels. The navigation factors and management tools are described in ([Tables 37 and 38](#)).



Figure 18 Poor House Flats

Table 37 Poor House Flats Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling		Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone	X	Traffic Mix	X		
8			Security Zone	X	Marine Events	X		
9					Seasonal Management Areas			

Table 38 Poor House Flats Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs	X	Vessel Traffic Service	X	Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	
5			Ice Breakers		PORTS			
6			Harbor Operations Safety and Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Commercial and Recreational vessels must be aware of wakes and take extra precaution to its impacts on tug/tow gear.
 - Meeting/overtaking
 - Maneuvers are planned in advance to reduce risk.
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels along the shore.
- **Restrictions**
 - West Channel of the East River off Roosevelt Island. East Channel off Roosevelt is shallower and requires bridge lifts.
 - Air Draft - Queensboro Bridge 131-Feet at MHW at center
 - Current
 - Deep-Draft units navigate within the 35-foot deep channel from the Williamsburg Bridge to approximately Bushwick Inlet along the Brooklyn Shore and then cross the East River west on the Poorhouse Flats Range. Deep drafts units navigating the Poorhouse Flats range must maintain steerage to account for set and drift of prevailing currents.
 - Deep-Drafts often plan passage to arrive at Hell Gate one-hour either side of slack water
 - Infrastructure Cable, pipeline and other subsea utilities must be considered during emergency anchoring.
 - Anchoring
 - No Federal Designated Anchorages Exist
 - Deep-Draft vessels must maintain 2-foot UKC

5.5.2.1 Newtown Creek

Newtown Creek is entered on the eastern side of East River 3.6 miles from The Battery. The creek extends 3.3 miles eastward and southward and has several short tributaries or basins. Traffic is fairly heavy and consists chiefly of petroleum products, sand, gravel and crushed rock; drafts of vessels navigating the creek seldom exceed 15 feet. Tributary basins are Dutch Kills, on the north side of Newtown Creek 0.8 mile from East River; Whale Creek, on the south side opposite Dutch Kills; Maspeth Creek, on the east side 2.2 miles from East River; East Branch, on the east side 2.5 miles from the river; and English Kills, which extends westward and southward from the East Branch entrance and forms the last 0.8 mile of Newtown Creek ([Figure 19](#)). The navigation factors and management tools are described in ([Tables 39 and 40](#)).

**Figure 19 Newtown Creek****Table 39 Newtown Creek Navigation Factors**

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins	X	Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance		Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 40 Newtown Creek Management Tools

	Column A		Column B		Column C		Column D	
	Private	USCG		NOAA		USACE		
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs		Vessel Traffic Service	X	Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	
5			Ice Breakers		PORTS			
6			Harbor Operations Safety and Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Commercial and Recreational vessels must be aware of wakes and take extra precaution to its impacts on tug/tow gear.
 - Numerous terminals with a wide array of uses are sited within Newtown Creek and its many branches
 - Meeting/overtaking
 - Maneuvers are planned in advance for meeting while overtaking maneuvers occur rarely only during special circumstances.
 - Speed
 - Navigation speed is restricted to minimize wake and/or surge effects on moored vessels along the shore.
- **Restrictions**
 - Air Draft - 90 Feet at MHW at the Kosciusko Memorial Bridge
 - Channel depths
 - A federal project provides for a 23-foot channel in Newtown Creek from the East River to and in a turning basin about 240 yards above the Kosciusko Memorial Bridge, thence 20 feet in East Branch and in English Kills to the Metropolitan Avenue bridge, and thence 12 feet in English Kills to the head of the project at Montrose Avenue. Dutch Kills is unnavigable for commercial vessels due to shoaling.

- Tide
 - Height of Tide is a factor for deeper draft vessels. High water operations for deeper draft vessels restricts operation windows.
- Current
 - Current in the East River is factored during the approach into Newtown Creek. Current in Newtown Creek is minimal.
- Infrastructure
 - Bridge openings are critical when maneuvering within a narrow creek. Bridge delays on commercial units lead to excessive maneuvering, diminished tidal windows, excessive undo navigational pressure and/or possible marine incident.
 - Squatter vessels place excessive undo navigational pressure and/or possible marine incident
 - Cable, pipeline and other subsea utilities must be considered during emergency anchoring.
- Anchoring
 - No Federal Designated Anchorages exist in Newtown Creek.

5.5.3 Approaches to Hell Gate

Hell Gate is the part of East River between Wards Island and Roosevelt Island, 0.7 mile to the southwest. The crooked channel, the strong tidal currents, and the heavy traffic in Hell Gate require extra caution on the part of the navigator to avoid accident or collision ([Figure 20](#)). The navigation factors and management tools are described in ([Tables 41 and 42](#)).



Figure 20 Approaches to Hell Gate

Table 41 Approaches to Hell Gate Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 42 Approaches to Hell Gate Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation		X	US Coast Pilot	X	Channel Maintenance
2	Escort Tugs	X	Vessel Traffic Service		X	Navigation Charts	X	Channel Deepening
3	Navigation Modeling		Homeport Portal		X	Tide Predictions	X	Standard Operation Procedures
4	Navigation Risk Assessments		Port and Waterway Safety Assessments		X	Current Predictions	X	Anchorage Grounds
5			Ice Breakers			PORTS		
6			Harbor Operations Safety and Navigation Guidelines		X	Recommended Vessel Routes		
7			Harbor Operation Safety Committees		X			
8			Regulation Navigation Area		X			

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Commercial and Recreational vessels must be aware of wakes and take extra precaution to its impacts on tug/tow gear.
 - Commercial Vessels have vessel specific navigation windows at Hell Gate. Deep-draft tend to transit Hell Gate 1 hour either side of slack water, many prefer to transit 15 minutes either side of slack water. Shallow draft vessels tend to transit Hell Gate at any stage of the current while some prefer to transit with the current.
 - Meeting/overtaking
 - Meeting and overtaking maneuvers rarely occur in Hell Gate but do happen during special circumstances. Meeting and overtaking maneuvers primarily occur either south of Hell Gate in the straight channel between the Queensboro Bridge and the northern tip of Roosevelt Island or North of Hell Gate in the straight channel between North Brothers Island and Wards Island. Mariners broadcast timely security calls on Channel 13 VHF and maintain constant contact with VTS.
 - Junctions
 - Commercial and recreational vessels navigate the Harlem River and East Channel of the East River
 - Speed
 - Safe speed is maintained throughout the approaches and in Hell Gate for steerage and navigation safety.
- **Restrictions**
 - Vessel specific current restrictions
 - VHF radio communications may be problematic between vessels due to high rise buildings sometimes requiring VTS to serve as relay between such vessels.
 - Air Draft - Queensboro Bridge 131-Feet at MHW at center
 - Current
 - In Hell Gate (off Mill Rock) the velocity is 3.4 knots for the eastward current and 4.6 knots for the westward current. The direction and velocity of the currents are affected by strong winds that may increase or diminish the periods of flood or ebb. The currents generally set with the channel, but heavy swirls are found in Hell Gate. The currents play a major factor in the timing of passage for Deep Draft units navigating Hell Gate.
 - Infrastructure
 - Cable, pipeline and other subsea utilities must be considered during emergency anchoring.
 - Anchoring
 - No Federal Designated Anchorages suitable for commercial vessels
 - Deep-Draft vessels must maintain 2-foot UKC

5.5.4 Brothers Islands

At approximately 90 degrees, the bend around North Brothers Island is sharp with oil and dry bulk terminals along the Bronx shoreline. Shallow draft units may transit between the Brother Islands during certain current or tide stages and/or to mitigate meeting or overtaking maneuvers with a deep draft unit navigating

in the primary channel (Figure 21). The navigation factors and management tools are described in (Tables 43 and 44).



Figure 21 Brothers Island

Table 43 Brothers Island Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft		Ice	X	Wind	X
3	Junctions	X	Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages		Shoaling		Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 44 Brothers Island Management Tools

	Column A		Column B		Column C		Column D	
	Private	USCG		NOAA		USACE		
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs		Vessel Traffic Service	X	Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	
5			Ice Breakers		PORTS			
6			Harbor Operations Safety and Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Commercial and Recreational vessels must be aware of wakes and take extra precaution to its impacts on tug/tow gear.
 - Meeting/overtaking
 - Meeting and overtaking maneuvers rarely occur north of Brothers Island but do happen during special circumstances. Meeting and overtaking maneuvers primarily occur before or after North Brothers Island. Mariners broadcast timely security calls on Channel 13 VHF and maintain contact with VTS.
 - Junctions
 - Shallow draft commercial and recreational vessels sometimes navigate between the Brothers Islands.
 - South Brothers Island Channel is a deep draft channel connecting the East River with Astoria Terminals
 - Speed
 - Safe speed is maintained for steerage and navigation safety.
- **Restrictions**
 - Vessel specific current restrictions
 - Infrastructure
 - Cable, pipeline and other subsea utilities must be considered during emergency anchoring.
 - Anchoring
 - No Federal Designated Anchorages exist
 - Deep-Draft vessels must maintain 2-foot UKC

5.5.5 Brothers Islands to Throggs Neck

The Navigation Channel from North Brothers Island to Throggs Neck is well defined, without severe turns, and diminishing current strengths. Located within this region is the Bronx River, Westchester Creek, and Flushing Bay/Creek. The navigation factors and management tools are described in ([Tables 45 and 46](#)).

Table 45 Brothers Islands - Throggs Neck Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone	X	Traffic Mix	X		
8			Security Zone	X	Marine Events	X		
9					Seasonal Management Areas			

Table 46 Brothers Islands - Throggs Neck Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	X
2	Escort Tugs		Vessel Traffic Service	X	Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal	X	Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments	X	Current Predictions	X	Anchorage Grounds	X
5			Ice Breakers		PORTS*			
6			Harbor Operations Safety and Navigation Guidelines	X	Recommended Vessel Routes			
7			Harbor Operation Safety Committees	X				
8			Regulation Navigation Area					

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Commercial and Recreational vessels must be aware of wakes and take extra precaution to its impacts on tug/tow gear.
 - Meeting/overtaking
 - Meeting and overtaking maneuvers are conducted with timely and effective VHF Communication
 - Anchoring
 - Anchorage Grounds are located on both sides of the federal channel for both anchoring and mooring buoys. Mooring buoys are critical logistic tools for supply chains up the various creeks and rivers in the region.
 - Special anchorage areas exist for vessels primarily for use by yachts and other recreational craft less than 65-feet.
 - Junctions
 - Commercial and recreational vessels navigate Bronx River, Westchester Creek, and Flushing Bay/Creek
 - Speed
 - Safe speed is maintained for steerage and navigation safety.
- **Restrictions**
 - Vessel specific current restrictions
 - Infrastructure
 - Cable, pipeline and other subsea utilities must be considered during emergency anchoring.
 - Shoaling
 - USACE periodically dredges the Bronx River, Westchester creeks and Flushing Bay/Creek. Flushing Bay/Creek is scheduled to be dredged in the near future
 - Deep-Draft vessels must maintain 2-foot UKC

5.6 Long Island Sound

Long Island Sound is a wide body of water replete with harbors on both the Connecticut shore and North Shore of Long Island. Commercial users include Tug/Tow, Bulk Ships, small passenger ships, recreational vessels, fishing vessels, and two large ferry operations (Bridgeport-Port Jefferson and Orient - New London).

On the New York side of the Sound are two offshore terminals (Northport and Riverhead) and deep-water Port Jefferson. Additional ports have been gentrified reducing cargo deliveries completely or to a fraction of previous volumes to include: Hempstead Harbor, Port Washington, Oyster Bay, Huntington, and Northport. A once prosperous lobster industry has virtually disappeared.

5.6.1 Throggs Neck - Matinecock Point

Long Island Sound begins at Throggs Neck and extends over 100 nautical miles to Orient Point. Throggs Neck to Matinecock Point is a busy section of the Sound for both commercial and recreational users. Commercial users must navigate in deeper water while contending with weather impacts and recreational users during summer months. Proposed Recommended Vessel Route under review can be seen in ([Figure 22](#)). The navigation factors and management tools are described in ([Tables 47](#) and [48](#)).

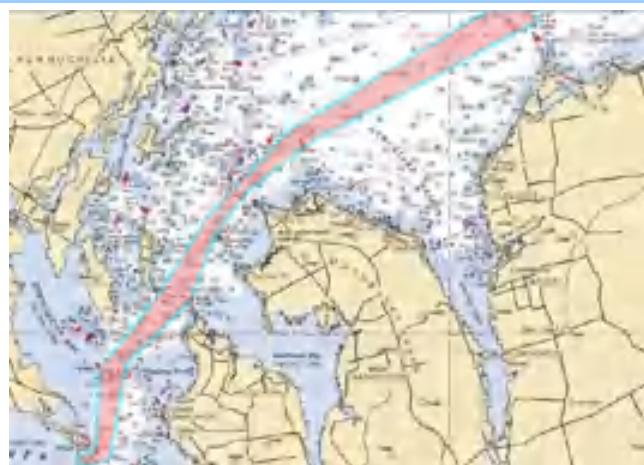


Figure 22 Throggs Neck - Matinecock

Table 47 Throggs Neck - Matinecock Point Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft	X	Ice	X	Wind	X
3	Junctions	X	Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling		Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 48 Throggs Neck - Matinecock Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist	X	Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs		Vessel Traffic Service		Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal		Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments		Current Predictions	X	Anchorage Grounds	X
5			Ice Breakers		PORTS			
6			Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes	X ¹⁸		
7			Harbor Operation Safety Committees					
8			Regulation Navigation Area	X				

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Commercial and Recreational vessels must be aware of wakes and take extra precaution to it impacts on tug/tow gear.
 - This area is used widely for sailing instruction and is a popular fishing ground.
 - Meeting/overtaking
 - Meeting and overtaking maneuvers are conducted with timely and effective VHF Communication
 - Junctions
 - Commercial and recreational vessels navigate Eastchester Creek
 - Speed
 - Safe speed is maintained for steerage and navigation safety.
- **Restrictions**
 - Vessel specific current restrictions
 - Infrastructure
 - Cable, pipeline and other subsea utilities must be considered during emergency anchoring.
 - Anchoring
 - Anchorage Ground 1 is insufficient for deep anchoring.
 - Deep draft Ships custom and practice anchor East of Hart Island

¹⁸ Recommended Vessel Route from Throggs Neck to Matinecock Point is currently under consideration

- Tug/tow units custom and practice anchor off United States Merchant Marine Academy up to the federal channel approximately on a line drawn from Willets Point to Stepping Stones
- Deep-Draft vessels must maintain 2-foot UKC

5.6.2 Port Jefferson

Port Jefferson Harbor, on the north shore of Long Island is entered through a dredged channel that leads between two jetties that are in ruins to a docking area near the southwestern end of the harbor; the jetties are each marked by a light. The approach is marked by a lighted whistle buoy, about 1.1 miles northwest of the entrance. Three stacks on the west side near the head of the harbor are conspicuous landmarks. A 12 mph speed limit is enforced in the main entrance channel, and a 5 mph speed limit is enforced at the head of the harbor in the vicinity of the mooring areas and wharves. Commercial terminals include liquid and dry bulk, launch and supply services, as well as the Bridgeport Port Jefferson Ferry ([Figure 23](#)). The navigation factors and management tools are described in ([Tables 49 and 50](#)).



Figure 23 Port Jefferson Harbor

Table 49 Port Jefferson Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft		Ice	X	Wind	X
3	Junctions		Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance	X	Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 50 Port Jefferson Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist		Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs		Vessel Traffic Service		Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal		Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments		Current Predictions	X	Anchorage Grounds	X
5			Ice Breakers		PORTS			
6			Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes			
7			Harbor Operation Safety Committees					
8			Regulation Navigation Area	X				

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Bridgeport/Port Jefferson Ferry conducts daily service from 6am-midnight
 - Commercial and Recreational vessels must be aware of wakes and take extra precaution to it impacts on tug/tow gear.

- Meeting/overtaking
 - Meeting and overtaking maneuvers is avoided at the Jetty and conducted with timely and effective VHF Communication
 - A deep water range is present entering the harbor
- Speed
 - Safe speed is maintained for steerage and navigation safety.
- o **Restrictions**
 - Shoaling
 - Inside the harbor east of the channel
 - Deep-Draft vessels must maintain 2-foot UKC
 - 26.8 feet at High Water Transits
 - Anchoring
 - A mooring buoy is located east of the channel in the harbor for aggregate scows.
 - Tug/tow and deep draft ships units custom and practice anchor off Port Jefferson to await berthing and/or tide.

5.6.3 Long Island Sound

Long Island Sound is a deep navigable waterway lying between the shores of Connecticut and New York and the northern coast of Long Island.

Currents run in an east-west direction and when conflicting with strong east-west winds develop waves that often subsides with the change in current. Commercial vessels often plan voyages to favor natural lees of either Long Island or Connecticut depending on wind direction. On the north coast of Long Island bluffs rise to a height of 200 feet.

Execution Rocks, is the main entrance to Long Island Sound from westward and the Race, the main entrance to Long Island Sound from eastward, extends between Fishers Island and Little Gull Island, between which is a width of about 3.5 miles.

Two offshore production facilities, Riverhead Production Platform and Northport Platform are sited in the New York waters of Long Island Sound.

The navigation factors and management tools are described in ([Tables 51 and 52](#)).

Table 51 Long Island Sound Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft		Ice	X	Wind	X
3	Junctions		Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure	X	Freshets	X	Traffic Density	X
5	Anchorages	X	Shoaling		Tropical Systems	X		
6			Under Keel Clearance		Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 52 Long Island Sound Management Tools

	Column A		Column B		Column C		Column D	
	Private		USCG		NOAA		USACE	
1	Harbor Assist		Aids to Navigation	X	US Coast Pilot	X	Channel Maintenance	
2	Escort Tugs		Vessel Traffic Service		Navigation Charts	X	Channel Deepening	
3	Navigation Modeling		Homeport Portal		Tide Predictions	X	Standard Operation Procedures	
4	Navigation Risk Assessments		Port and Waterway Safety Assessments		Current Predictions	X	Anchorage Grounds	X
5			Ice Breakers		PORTS*			
6			Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes	X		
7			Harbor Operation Safety Committees					
8			Regulation Navigation Area	X				

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Bridgeport/Port Jefferson Ferry conducts daily service from 6am-midnight
 - Orient Point Ferry conducts daily service from 6am-midnight

- Meeting/overtaking
 - Meeting and overtaking maneuvers is conducted with timely and effective VHF Communication
 - Navigation Recommendation Route at the Race
- Speed
 - Safe speed is maintained for steerage and navigation safety.
- o **Restrictions**
 - Two offshore platforms are located in LIS
 - Northport
 - Riverhead
 - Anchoring
 - Designated anchorages Riverhead, Port Jefferson, Northport

5.7 South Shore of Long Island

The South Shore of Long Island has along its shoreline various inlets for shallow draft vessels. The State boundary on the south shore of Long Island extends 3 miles into the Atlantic from the shoreline.

South of these, extending well into the island's midsection, run several chains of hills. The south shore is a barrier beach from about 30 miles west of the eastern extremity to the western end.

5.7.1 Montauk Harbor

Montauk Harbor, in the northern part of Lake Montauk, is entered through a dredged channel on the northern shore about 3 miles west of Montauk Point; a federal project provides for a depth of 12 feet in the channel and 10 feet in the boat basin northwestward of Star Island. The entrance is protected by jetties, each of which is marked by a light. A lighted bell buoy, about 0.3 mile north of the entrance, marks the approach to the harbor. The navigation factors and management tools are described in ([Tables 53 and 54](#)).

Table 53 Montauk Navigation Factors

	Column A		Column B		Column C		Column D	
	Maneuvering		Special Restrictions		Seasonal Occurrences		Daily Occurrences	
1	Meeting Areas	X	Speed	X	Fog	X	Currents	X
2	Overtaking Areas	X	Air Draft		Ice	X	Wind	X
3	Junctions		Channel Depths	X	Northeasters	X	Tides	X
4	Turning Basins		Infrastructure		Freshets	X	Traffic Density	
5	Anchorages		Shoaling	X	Tropical Systems	X		
6			Under Keel Clearance		Hurricanes	X		
7			Safety Zone		Traffic Mix	X		
8			Security Zone		Marine Events	X		
9					Seasonal Management Areas			

Table 54 Montauk Management Tools

	Column A	Column B	Column C	Column D
	Private	USCG	NOAA	USACE
1	Harbor Assist	Aids to Navigation	X	US Coast Pilot
2	Escort Tugs	Vessel Traffic Service		Navigation Charts
3	Navigation Modeling	Homeport Portal		Tide Predictions
4	Navigation Risk Assessments	Port and Waterway Safety Assessments		Current Predictions
5		Ice Breakers		PORTS
6		Harbor Operations Safety and Navigation Guidelines		Recommended Vessel Routes
7		Harbor Operation Safety Committees		
8		Regulation Navigation Area		

- **Maneuvering**
 - Traffic mix
 - Commercial vessels must be aware of traffic mix and take extra precaution during recreational season
 - Meeting/overtaking
 - Very busy in the summer with small boats and now yachts Meeting and overtaking maneuvers is conducted with timely and effective VHF Communication
 - Weather
 - Easterly swell makes breakwater approach tough in the winter. Same with NW winds
 - Speed
 - Safe speed is maintained for steerage and navigation safety.
- **Restrictions**
 - Channel depths dredged to 12'
 - East side of the channel at the breakwater is reported as shoaling
 - Ice in winter months
 - Anchoring
 - No Federally Designated Anchorages

6. Items for Consideration for Navigation

The New York Maritime Transportation System is vital to the State of New York to support critical cargo movements and as an economic engine. The system is managed primarily by Federal along with State and Local Agencies. Projects managed by the Army Corps of Engineers (Channel deepening/maintenance etc.) and NOAA (PORTs) Systems managed by NOAA depends on local partnership and/or funding. Projects managed by the Army Corps of Engineers (Channel deepening/maintenance etc.) and observing systems managed by NOAA depend on local partnership and/or funding. The Port of New York is well managed by VTS and existing navigation safety tools and has the capacity for additional traffic to support the wind industry. The mitigation required to handle new/additional traffic depends largely on the size, maneuverability and density of traffic.

6.1 Port of New York

- Atlantic Approach: Federally designate Deep-water Anchorage off Long Beach New York
- Ambrose Channel: Deepen Gravesend Anchorage to accommodate Neo Panamax Vessels
- Sandy Hook Channel: Widen Channel to mitigate shoaling
- Upper Bay: Scan and survey bay to identify and mitigate subsea infrastructure
- KVK: Widen Bends for Neo Panamax Vessels. Update current models at Bergen Point.
- AK: Air Draft Sensors on the Goethals Bridge and Outerbridge Crossing. Periodic maintenance dredging

6.2 North (Hudson) River

- Holland Tunnel - Albany: Extend VTS to Port of Albany
- George Washington Bridge-Tappan Zee Bridge: Air Draft Sensor on the Tappan Zee Bridge. Unobstructed waters for anchoring as identified in report.
- Tappan Zee Bridge - Kingston: Maintain Federal Authorized Channel 600-feet wide by 32-feet deep. Unobstructed waters for anchoring as identified in report.
- Hudson Highlands: Fog Sensors
- Lange Rack: Air Draft Sensor Mid-Hudson Bridge. Unobstructed waters for anchoring as identified in report
- Kingston: Unobstructed waters for anchoring as identified in report
- Kingston - Albany: Air Draft Sensor Castleton Highway Bridge. Current/Tide Sensor Port of Albany and Port of Coeymans. Multiple Fog Sensors. Maintain Federal Authorized Channel 400-feet wide by 32-feet deep. Turning Basin at Port of Coeymans.

6.3 East River

- Hell Gate: Current Sensor
- Throggs Neck: Tide Sensor

6.4 Long Island Sound

- Federally designated anchorage grounds between Execution Rocks and Throggs Neck to support Ships and Tug/Tows units.
- Maintain Port Jefferson Harbor Channel. Shoaling has been reported inside the harbor east of the channel
- Maintain Port of Montauk Harbor Channel. Shoaling has been reported East side of the channel at the breakwater.
- Consider a Federal Designated Anchorage for Port of Montauk

7. Port Facility Characteristics

Appendix A identifies 245 port sites by various characteristics. The complete list of all the port facilities and their characteristics is in Table 7.4. A quick analysis of the sites indicates the following:

- [Table 7.1](#), indicates that there are 243 sites of which 184 (75.7%) are in New York. The table also shows that 69% of the facilities are privately owned.

Table 7.1: Facilities distribution by operation

	NJ	NY	Grand Total	% of Total	% of NY
APDC		2	2	0.8%	1.1%
Gov.	1	2	3	1.2%	1.1%
NYCDEP		29	29	11.9%	15.8%
NYCDOS		4	4	1.6%	2.2%
NYCDOT		4	4	1.6%	2.2%
NYCEDC		6	6	2.5%	3.3%
PANYNJ	9	4	13	5.3%	2.2%
Private	45	127	172	70.8%	69.0%
Public	4	6	10	4.1%	3.3%
Grand Total	59	184	243	100.0%	100.0%
Distribution	24.3%	75.7%	100.0%		

- [Table 7.2](#), shows the facilities location distribution by waterway which is dominated by the North and East Rivers.

Table 7.2: Facilities by waterway

Row Labels	NJ	NY	Grand Total	% of Total	% of NY
AK	14	4	18	7.4%	2.2%
Bronx River		3	3	1.2%	1.6%
East River		40	40	16.5%	21.7%
East Chester Creek		4	4	1.6%	2.2%
Flushing Bay/Creek		6	6	2.5%	3.3%
Gowanus		6	6	2.5%	3.3%
Jamacia Bay		3	3	1.2%	1.6%
Jamaica Bay		3	3	1.2%	1.6%
KVK	8	7	15	6.2%	3.8%
LI Sound		1	1	0.4%	0.5%
Lower Bay	3	3	6	2.5%	1.6%
Mariners Harbor		8	8	3.3%	4.3%
Mariners Harbor		1	1	0.4%	0.5%
Newark Bay	10	1	11	4.5%	0.5%
Newtown Creek		9	9	3.7%	4.9%
North River	10	68	78	32.1%	37.0%
Passaic River	2		2	0.8%	0.0%
Raritan River	2		2	0.8%	0.0%
Upper Bay	10	17	27	11.1%	9.2%
Grand Total	59	184	243	100.0%	100.0%
Distribution	24.3%	75.7%			

- [Table 7.3](#), illustrates the site distribution by facility type which is dominated by liquid bulk passengers and dry bulk.

Table 7.3: Site distribution by facility type

Row Labels	NJ	NY	Grand Total	% of Total	% of NY
Break Bulk	1	1	2	0.8%	0.5%
Car Carriers	1		1	0.4%	0.0%
Container	5	6	11	4.5%	3.3%
Cruise Port	1	2	3	1.2%	1.1%
Dry Bulk		22	22	9.1%	12.0%
Dry Bulk	6	15	21	8.6%	8.2%
Dry Bulk - Food Product		1	1	0.4%	0.5%
Dry/break bulk		4	4	1.6%	2.2%
Energy Generation		10	10	4.1%	5.4%
Environmental	1	1	2	0.8%	0.5%
Gov.	3		3	1.2%	0.0%
Intermodal Rail	1	1	2	0.8%	0.5%
Liquid Bulk	23	48	71	29.2%	26.1%
Liquid Bulk - Food Product		1	1	0.4%	0.5%
Marina		4	4	1.6%	2.2%
Marina/Boat Ramp	2	1	3	1.2%	0.5%
Maritime Support Services	1	14	15	6.2%	7.6%
Maritime Training		1	1	0.4%	0.5%
Military	1		1	0.4%	0.0%
Passenger	11	39	50	20.6%	21.2%
Ship Repair and Maintenance	1	8	9	3.7%	4.3%
Small Passenger		1	1	0.4%	0.5%
Support Services	1		1	0.4%	0.0%
Tug Yard		2	2	0.8%	1.1%
Undeveloped		1	1	0.4%	0.5%
(blank)		1	1	0.4%	0.5%
Grand Total	59	184	243	100.0%	100.0%
Distribution	24.3%	75.7%			

[Table 7.4](#)., lists all the port terminals.

Table 7.4: Port terminal list

State	Waterway	Location	Name	Operatio n	Facility Type
NJ	AK	Carteret	KMI	Private	Liquid Bulk
NJ	Upper Bay	Ellis Island	National Park Service Ellis Island	Public	Gov.
NJ	Lower Bay	Atlantic Highlands	SeaStreak Connors Ferry Ter.	Private	Passenger
NJ	KVK	Bayonne	Buckeye Bayonne	Private	Liquid Bulk
NJ	KVK	Bayonne	Duraport Marine and Rail	Private	Dry Bulk
NJ	KVK	Bayonne	Gordon Terminal Service, Inc.	Private	Liquid Bulk
NJ	KVK	Bayonne	IMTT 5B	Private	Liquid Bulk
NJ	KVK	Bayonne	IMTT Bayonne	Private	Liquid Bulk
NJ	KVK	Bayonne	IMTT Con Hook	Private	Liquid Bulk
NJ	KVK	Bayonne	Ken Port	Private	Support Services
NJ	KVK	Bayonne	Lafarge Cement	Private	Dry Bulk
NJ	Upper Bay	Bayonne	Bayonne Dry Dock and Repair	Private	Ship Repair and Maintenance
NJ	Upper Bay	Bayonne	Cape Liberty Cruise Port	PANYNJ	Cruise Port
NJ	Upper Bay	Bayonne	Northeast Auto	PANYNJ	Car Carriers
NJ	Lower Bay	Belford	NY Waterways Belford Terminal	Private	Passenger
NJ	AK	Carteret	Carteret Veteran's Pier	Public	Marina/Boat Ramp
NJ	Upper Bay	Claremont	Sims Metal Management	Private	Dry Bulk
NJ	Upper Bay	Claremont	US Army Corp of Engineers	Public	Gov.
NJ	Lower Bay	Earle	Earle Navy Pier	Gov.	Military
NJ	AK	Elizabeth	Construction and Marine Equipment Co	Private	Break Bulk
NJ	AK	Elizabeth	Federal Petroleum LLC.	Private	Liquid Bulk
NJ	AK	Elizabeth	Plaza Fuel	Private	Liquid Bulk
NJ	North River	Glenmont	Clean Harbors Environmental	Private	Environmental
NJ	Upper Bay	Greenville	New York New Jersey Rail, LLC Greenville Yards	PANYNJ	Intermodal Rail
NJ	Upper Bay	Greenville	Weeks	Private	Maritime Support Services
NJ	North River	Hoboken	Cornucopia Hoboken	Private	Passenger
NJ	North River	Hoboken	NY Waterways Lackawanna	Private	Passenger
NJ	North River	Hoboken	NY Waterways North Hoboken / 14th St	Private	Passenger
NJ	North River	Jersey City	NY Waterways Harborside	Private	Passenger
NJ	North River	Jersey City	NY Waterways Liberty Harbor/Marin Blvd.	Private	Passenger
NJ	North River	Jersey City	NY Waterways Terminal – Paulus Hook	Private	Passenger
NJ	Upper Bay	Jersey City	Global Container Bayonne	PANYNJ	Container
NJ	Upper Bay	Liberty Island	National Park Service Liberty Island	Public	Gov.
NJ	AK	Linden	Citgo Petroleum Corp. Linden	Private	Liquid Bulk
NJ	AK	Linden	NuStar ST Linden Terminal, LLC	Private	Liquid Bulk
NJ	AK	Linden	Phillips 66 Tremley Point Terminal	Private	Liquid Bulk
NJ	Newark Bay	Newark	Center Point Terminal Company Newark	Private	Liquid Bulk
NJ	Newark Bay	Newark	Darling Ingredients Inc.	Private	Liquid Bulk
NJ	Newark Bay	Newark	Eastern Metal Recycling	Private	Dry Bulk
NJ	Newark Bay	Newark	Shell Newark	Private	Liquid Bulk
NJ	Newark Bay	Newark	Sims Metal Management - Newark	Private	Dry Bulk
NJ	Passaic River	Newark	PVSC	Private	Liquid Bulk
NJ	AK	Perth Amboy	Buckeye Perth Amboy Terminal	Private	Liquid Bulk
NJ	AK	Perth Amboy	Chevron	Private	Liquid Bulk
NJ	AK	Perth Amboy	KMI	Private	Liquid Bulk
NJ	AK	Perth Amboy	Weeks	Private	Dry Bulk
NJ	Raritan River	Perth Amboy	Buckeye Raritan Bay	Private	Liquid Bulk
NJ	Raritan River	Perth Amboy	Cornucopia Perth Amboy	Private	Passenger
NJ	Newark Bay	Port Elizabeth	APM TERMINALS	PANYNJ	Container
NJ	Newark Bay	Port Elizabeth	Maher Terminals, Inc.	PANYNJ	Container
NJ	Newark Bay	Port Newark	Hudson Tank Terminals Corp.	PANYNJ	Liquid Bulk
NJ	Newark Bay	Port Newark	Port Newark Container Terminal	PANYNJ	Container
NJ	Newark Bay	Port Newark	Red Hook Barge Terminal Newark	PANYNJ	Container
NJ	AK	Port Reading	Buckeye Port Reading	Private	Liquid Bulk
NJ	AK	Sewaren	Shell Sewaren	Private	Liquid Bulk
NJ	Passaic River	South Kearny	Kuehne Chemical Company, Inc.	Private	Liquid Bulk

NJ	AK	Staten Island	KMI	Private	Liquid Bulk
NJ	North River	Weehawken	Lincoln Harbor Yacht Club	Private	Marina/Boat Ramp
NJ	North River	Weehawken	NY Waterways Lincoln Harbor	Private	Passenger
NJ	North River	Weehawken	NY Waterways Port Imperial	Private	Passenger
NY	North River	Albany	Citgo Glenmont Albany	Private	Liquid Bulk
NY	North River	Albany	Global Albany	Private	Liquid Bulk
NY	North River	Albany	Port Albany Ventures, LLC	Private	Dry Bulk
NY	North River	Albany	Port of Albany- Albany	APDC	Dry/break bulk
NY	North River	Albany	Scarano Ship Yard	Private	Ship Repair and Maintenance
NY	North River	Albany	Westway Feed Products	Private	Liquid Bulk - Food Product
NY	North River	Albany	Buckeye Albany Terminal, LLC.	Private	Liquid Bulk
NY	North River	Albany	Callanan	Private	Dry Bulk
NY	North River	Albany	City of Albany Snow Dock	Public	Passenger
NY	East River	Astoria	Astoria Energy LLC	Private	Energy Generation
NY	East River	Astoria	Con-ED East River Generating Station	Private	Energy Generation
NY	North River	Athens	Peckham Materials Corporation	Private	Liquid Bulk
NY	North River	Beacon	NY Waterways Beacon	Private	Passenger
NY	North River	Bear Mountain	Bear Mountain Dock	Public	Passenger
NY	North River	Bowline	GenOn Bowline Generating	Private	Energy Generation
NY	EastChester Creek	Bronx	RCA	Private	Dry Bulk
NY	EastChester Creek	Bronx	Pascap	Private	Dry Bulk
NY	EastChester Creek	Bronx	Peckham	Private	Dry Bulk
NY	EastChester Creek	Bronx	US Concrete	Private	Dry Bulk
NY	Bronx River	Bronx	Sims Metal	Private	Dry Bulk
NY	Bronx River	Bronx	Weeks	Private	Dry Bulk
NY	Bronx River	Bronx	Casa	Private	Dry Bulk
NY	East River	Bronx	Buckeye Bronx	Private	Liquid Bulk
NY	East River	Bronx	Maritime College	Gov.	Maritime Training
NY	East River	Bronx	McInnis Cement	Private	Dry Bulk
NY	East River	Bronx	NYCDEP Wards Island	NYCDEP	Liquid Bulk
NY	East River	Bronx	NYCDEP Hunts Point	NYCDEP	Liquid Bulk
NY	East River	Bronx	NYCEDC Soundview Ferry Landing	NYCDEP	Passenger
NY	East River	Bronx	Sprague Oil	Private	Liquid Bulk
NY	East River	Brooklyn	Brooklyn Cruise Terminal Pier 12	PANYNJ	Cruise Port
NY	East River	Brooklyn	Brooklyn Navy Yard	Private	Ship Repair and Maintenance
NY	East River	Brooklyn	Brooklyn Navy Yard Cogeneration Plan	Private	Energy Generation
NY	East River	Brooklyn	Brooklyn Navy Yard Ferry Landing	Private	Small Passenger
NY	East River	Brooklyn	New York Sand & Stone (Navy yard)	Private	Dry Bulk
NY	East River	Brooklyn	NY Waterways India St / Greenpoint	Private	Passenger
NY	East River	Brooklyn	NYCDEP Red Hook	NYCDEP	Liquid Bulk
NY	East River	Brooklyn	NYCEDC Brooklyn Bridge Park Pier 6 Ferry Landing	NYCDEP	Passenger
NY	East River	Brooklyn	NYCEDC Brooklyn Bridge Pier 1	NYCDEP	Passenger
NY	East River	Brooklyn	NYCEDC N.6th St./N. Williamsburg Landing	NYCDEP	Passenger
NY	East River	Brooklyn	NYCEDC Red Hook Landing	NYCDEP	Passenger
NY	East River	Brooklyn	NYCEDC South Williamsburg	NYCEDC	Passenger
NY	East River	Brooklyn	NYCEDC Stuyvesant Cove Ferry Landing	NYCDEP	Passenger
NY	East River	Brooklyn	Red Hook Container Terminal	PANYNJ	Container
NY	Gowanus	Brooklyn	Astoria Generating Company	Private	Energy Generation
NY	Gowanus	Brooklyn	Bayside Fuel Oil - Smith Street	Private	Liquid Bulk
NY	Gowanus	Brooklyn	LaFarge Cement Brooklyn	Private	Dry Bulk
NY	Gowanus	Brooklyn	New York Sand & Stone (25th st)	Private	Dry Bulk
NY	Gowanus	Brooklyn	NYCDOS Sanitation Transfer Station	NYCDOS	Container
NY	Gowanus	Brooklyn	Vane Brothers	Private	Maritime Support Services
NY	Jamaica Bay	Brooklyn	NYCDEP 26 Ward	NYCDEP	Liquid Bulk
NY	Jamaica Bay	Brooklyn	NYCDEP Coney Island	NYCDEP	Liquid Bulk
NY	Lower Bay	Brooklyn	Astoria Generating Company	Private	Energy Generation
NY	Lower Bay	Brooklyn	Bayside Fuel Oil Shore Parkway	Private	Liquid Bulk
NY	Lower Bay	Brooklyn	NYCDOS Sanitation Transfer Station	NYCDOS	Container

NY	Newtown Creek	Brooklyn	Allococo Steel	Private	Dry Bulk
NY	Newtown Creek	Brooklyn	Bayside Fuel Oil - Grand Street	Private	Liquid Bulk
NY	Newtown Creek	Brooklyn	Kinder Morgan Brooklyn	Private	Liquid Bulk
NY	Newtown Creek	Brooklyn	NYCDEP Newtown Creek	NYCDEP	Liquid Bulk
NY	Newtown Creek	Brooklyn	TNT Metal	Private	Dry Bulk
NY	Newtown Creek	Brooklyn	United Metro Energy Corporation	Private	Liquid Bulk
NY	Upper Bay	Brooklyn	Brooklyn Army Terminal Pier 4	Public	
NY	Upper Bay	Brooklyn	Hughes Brothers	Private	Maritime Support Services
NY	Upper Bay	Brooklyn	New York New Jersey Rail, LLC 65th ST Railyard	PANYNJ	Intermodal Rail
NY	Upper Bay	Brooklyn	NY Waterways IKEA Dock	Private	Passenger
NY	Upper Bay	Brooklyn	NYCDEP Owls Head	NYCDEP	Liquid Bulk
NY	Upper Bay	Brooklyn	NYCEDC Bay Ridge Landing	NYCDEP	Passenger
NY	Upper Bay	Brooklyn	NYCEDC Brooklyn Army Terminal Pier 4 Ferry Landing	NYCDEP	Passenger
NY	Upper Bay	Brooklyn	Reinauer Barge Port	Private	Maritime Support Services
NY	North River	Buchanan	CertainTeed Gypsum	Private	Dry Bulk
NY	North River	Catskill	Dutchmans Landing	Public	Passenger
NY	North River	Catskill	Lehigh Cement Alsen Dock	Private	Dry Bulk
NY	North River	Catskill	Lehigh Cement Company	Private	Dry Bulk
NY	North River	Catskill	Peckham	Private	Dry Bulk
NY	North River	Coeymans	P&M Brick, LLC	Private	Dry/break bulk
NY	Flushing Bay/Creek	College Point	Skaggs-Walsh Inc	Private	Liquid Bulk
NY	North River	Glenmont	Innovative Municipal Products U.S., Inc	Private	Liquid Bulk
NY	North River	Glenmont	North Albany Terminal Company – Glen	Private	Liquid Bulk
NY	LI Sound	Glenwood Landing	Global Glenwood	Private	Liquid Bulk
NY	East River	Governors Island	Governors Island Ferry Terminals Governors Island	Gov.	Passenger
NY	North River	Grassy Point	US Gypson	Private	Dry Bulk
NY	North River	Haverstraw	NY Waterways Haverstraw	Private	Passenger
NY	North River	Haverstraw	Tilcon	Private	Dry Bulk
NY	North River	Hudson	Colarusso and Son	Private	Dry Bulk
NY	Jamacia Bay	Inwood	Global Inwood	Private	Liquid Bulk
NY	North River	Kingston	Feeney Ship Yard	Private	Ship Repair and Maintenance
NY	North River	Kingston	Hudson River Cruises	Private	Passenger
NY	North River	Kingston	Hudson River Maritime Museum	Private	Passenger
NY	North River	Kingston	Kingston Point Terminal, Inc	Private	Liquid Bulk
NY	Jamacia Bay	Lawrence	Shell Long Island	Private	Liquid Bulk
NY	East River	Long Island City	Ravenswood Generating Station	Private	Energy Generation
NY	East River	Manhattan	NY Waterways Battery Park City Terminal	Private	Passenger
NY	East River	Manhattan	NYC-DOT Priv Ferry (East 34th St)	NYCDOT	Passenger
NY	East River	Manhattan	NYC-DOT Private Ferries, Pier 11	NYCDOT	Passenger
NY	East River	Manhattan	NYCDEP Wards Island	NYCDEP	Liquid Bulk
NY	East River	Manhattan	NYCDOS Sanitation Transfer Station	NYCDOS	Container
NY	East River	Manhattan	NYCEDC Corlears Hook Ferry Landing	NYCDEP	Passenger
NY	East River	Manhattan	NYCEDC East 90th Street Ferry Landing	NYCDEP	Passenger
NY	East River	Manhattan	NYCEDC/Trust for Governors Island Battery Marine Building	NYCEDC	Passenger
NY	East River	Manhattan	Skyport Marina	NYCEDC	Marina/Boat Ramp
NY	North River	Manhattan	Chelsea Piers	Private	Marina
NY	North River	Manhattan	Circle Line - Pier 83	Private	Passenger
NY	North River	Manhattan	Circle Line - World Yacht Pier	Private	Passenger
NY	North River	Manhattan	Con-ED 59th Street Station	Private	Energy Generation
NY	North River	Manhattan	Manhattan Cruise Terminal	NYCEDC	Cruise Port
NY	North River	Manhattan	NY Waterways Pier 79 W. 39th St/Midtown	Private	Passenger
NY	North River	Manhattan	NYCDEP North River	NYCDEP	Liquid Bulk
NY	North River	Manhattan	Pier 15	Private	Marina

NY	North River	Manhattan	Pier 36	Private	Marina
NY	North River	Manhattan	Pier 40 North Side	Private	Marina
NY	Upper Bay	Manhattan	NYC-DOT Battery Marine Building	NYCDOT	Passenger
NY	North River	New Hamburg	New Hamburg Terminal Corp.	Private	Liquid Bulk
NY	North River	New Windsor	Global Newburgh	Private	Undeveloped
NY	Newark Bay	Newark	Buckeye Newark	Private	Liquid Bulk
NY	North River	Newburgh	Global Cargo Newburgh Terminal	Private	Liquid Bulk
NY	North River	Newburgh	Global Cargo Newburgh Terminal	Private	Liquid Bulk
NY	North River	Newburgh	Global North Newburgh Terminal	Private	Liquid Bulk
NY	North River	Newburgh	Global South Newburgh Terminals	Private	Liquid Bulk
NY	North River	Newburgh	NY Waterways Newburgh	Private	Passenger
NY	North River	Newburgh	Roseton Generating LLC	Private	Energy Generation
NY	North River	Newburgh	Steelways	Private	Ship Repair and Maintenance
NY	North River	Nyack	North River Shipyard	Private	Ship Repair and Maintenance
NY	North River	Ossining	NY Waterways Ossining	Private	Passenger
NY	North River	Ossining	Paradise Heating Oil Inc.	Private	Liquid Bulk
NY	North River	Peekskill	Meenan Oil Company (Peekskill)	Private	Liquid Bulk
NY	North River	Poughkeepsie	Petro Poughkeepsie	Private	Liquid Bulk
NY	East River	Queens	NYCDEP Bowery Bay	NYCDEP	Liquid Bulk
NY	East River	Queens	NYCDEP Tallman Island	NYCDEP	Liquid Bulk
NY	East River	Queens	NYCEDC Astoria Ferry Landing	NYCDEP	Passenger
NY	East River	Queens	NYCEDC Hunters Point	NYCDEP	Passenger
NY	East River	Queens	NYCEDC Long Island City	NYCDEP	Passenger
NY	East River	Queens	NYCEDC Roosevelt Island Ferry Landing	NYCDEP	Passenger
NY	Flushing Bay/Creek	Queens	Lafarge Cement	Private	Dry Bulk
NY	Flushing Bay/Creek	Queens	NYCDOS Sanitation Transfer Station	NYCDOS	Container
NY	Flushing Bay/Creek	Queens	Tilcon	Private	Dry Bulk
NY	Flushing Bay/Creek	Queens	Tully Aggregate	Private	Dry Bulk
NY	Flushing Bay/Creek	Queens	US Sand and Stone	Private	Dry Bulk
NY	Jamaica Bay	Queens	NYCEDC Rockaway Ferry Landing	NYCDEP	Passenger
NY	Jamaica Bay	Queens	NYCDEP Rockaway	NYCDEP	Liquid Bulk
NY	Newtown Creek	Queens	Empire Metal	Private	Dry Bulk
NY	Newtown Creek	Queens	Green Asphalt	Private	Dry Bulk
NY	Newtown Creek	Queens	Sims Metal	Private	Dry Bulk
NY	North River	Ravena	LaFarge Cement	Private	Liquid Bulk
NY	North River	Rensselaer	Buckeye Rensselaer	Private	Liquid Bulk
NY	North River	Rensselaer	Cenex Rensselaer Petroleum Fuel & Terminal Company	Private	Liquid Bulk
NY	North River	Rensselaer	Gorman Terminals	Private	Liquid Bulk
NY	North River	Rensselaer	National Gypsum	Private	Dry Bulk
NY	North River	Rensselaer	Port of Albany- Rensselaer	APDC	Dry/break bulk
NY	North River	Rensselaer	Sprague Energy Rensselaer Term	Private	Liquid Bulk
NY	North River	Rensselaer	Sunoco Hudson Terminal	Private	Liquid Bulk
NY	North River	Roseton	Buckeye Roseton	Private	Liquid Bulk
NY	North River	Roseton	Danskammer Power Plant	Private	Energy Generation
NY	AK	Staten Island	GARPO	Private	Ship Repair and Maintenance
NY	AK	Staten Island	Global Container New York	PANYNJ	Container
NY	AK	Staten Island	Visy Paper	Private	Dry Bulk
NY	AK	Staten Island	Wittes Yard	Private	Dry Bulk
NY	KVK	Staten Island	Atlantic Salt Company, Inc	Private	Dry Bulk
NY	KVK	Staten Island	Cable Queen	Private	Maritime Support Services
NY	KVK	Staten Island	Caddell Dry Dock and Repair	Private	Ship Repair and Maintenance
NY	KVK	Staten Island	Flag Recycling	Private	Dry Bulk
NY	KVK	Staten Island	Moran Yard	Private	Tug Yard
NY	KVK	Staten Island	NYCDEP Port Richmond	NYCDEP	Liquid Bulk
NY	KVK	Staten Island	Reinauer Yard	Private	Tug Yard
NY	Mariners Harbor	Staten Island	Clean Water of N.Y. Inc. Fixed	Private	Maritime Support Services

NY	Mariners Harbor	Staten Island	Great Lakes Dredge and Drydock	Private	Maritime Support Services
NY	Mariners Harbor	Staten Island	Kirby	Private	Maritime Support Services
NY	Mariners Harbor	Staten Island	Mays Shipyard	Private	Ship Repair and Maintenance
NY	Mariners Harbor	Staten Island	McAllister	Private	Maritime Support Services
NY	Mariners Harbor	Staten Island	New York Sand & Stone	Private	Dry Bulk
NY	Mariners Harbor	Staten Island	Simpson and Brown	Private	Maritime Support Services
NY	Mariners Harbor	Staten Island	Sterling	Private	Maritime Support Services
NY	Mariners Haror	Staten Island	New York Terminals LLC	Private	Liquid Bulk
NY	Upper Bay	Staten Island	Homeport	NYCEDC	Maritime Support Services
NY	Upper Bay	Staten Island	Miller Environmental Recovery	Private	Environmental
NY	Upper Bay	Staten Island	Millers Tug/Barge Launch Services	Private	Maritime Support Services
NY	Upper Bay	Staten Island	NYC-DOT St. George	NYCDOT	Passenger
NY	Upper Bay	Staten Island	NYCEDC ST George Landing	NYCDEP	Passenger
NY	Upper Bay	Staten Island	Reynolds	Private	Maritime Support Services
NY	Upper Bay	Staten Island	United Sandy Hook Pilots	Private	Maritime Support Services
NY	North River	Troy	Callanan	Private	Dry Bulk
NY	North River	Wappingers Falls	Tilcon	Private	Dry Bulk
NY	North River	Yonkers	American Sugar Refining	Private	Dry Bulk - Food Product
NY	North River	Yonkers	Yonkerrs City Pier	Public	Passenger
NY	Upper Bay	Brooklyn	South Brooklyn Marine Terminal	NYCEDC	Break Bulk
NY	North River	Tompkins Cove	Tompkins CAMF LLC	Public	Dry/break bulk

8. Vessel Routes and Density of Planned Alternative and Full Build Alternative ²⁰

Vessel Routing and Density are built using several factors. Consumer density is a main factor for Port Selection and primary reason the Port of New York is the first stop and largest Port on the East Coast. From the Port of New York cargo is distributed via road, rail, and marine transportation modes. The primary intrastate and interstate marine transportation mode is tug/barge delivery transporting liquid, dry, break-bulk, specialized, and containers.

8.1 Port of New York

The United States Coast Guard, after careful review and consideration, will institute a Vessel Management Reporting System (VMRS) in US Ports as a tool to enhance navigation and vessel safety, and to protect the marine environment. Vessel Movement Reporting System (VMRS) means a mandatory reporting system used to monitor and track vessel movements. As the largest port on the East Coast the Vessel Management Reporting System utilized by the United Coast Guard in the Port of New York is the Vessel Traffic System (VTS) ([Figure 8.1](#)).

New York Harbor VTS Area of Operation includes as follows: The navigable waters²¹ of the Lower New York Bay west of a line drawn from Norton Point to Breezy Point; and north of a line connecting the entrance buoys of Ambrose Channel, Swash Channel, and Sandy Hook Channel, to Sandy Hook Point; on the southeast including the waters of the Sandy Hook Bay south to a line drawn at latitude 40°25.00' N.; then west into the waters of Raritan Bay East Reach to a line drawn from Great Kills Light south through Raritan Bay East Reach LGB #14 to Comfort Point, New Jersey; then north including the waters of the Upper New York Bay south of 40°42.40' N. (Brooklyn Bridge) and 40°43.70' N. (Holland Tunnel Ventilator Shaft); west through the KVK into the Arthur Kill north of 40°38.25' N. (Arthur Kill Railroad Bridge); then north into the waters of the Newark Bay, south of 40°41.95' N. (Lehigh Valley Draw Bridge).

The navigable waters of the Raritan Bay south to a line drawn at latitude 40°26.00' N.; then west of a line drawn from Great Kills Light south through the Raritan Bay East Reach LGB #14 to Point Comfort, New Jersey; then west to the Raritan River Railroad Bridge; and north including the waters of the Arthur Kill to 40°28.25' N. (Arthur Kill Railroad Bridge); including the waters of the East River north of 40°42.40' N. (Brooklyn Bridge) to the Throggs Neck Bridge, excluding the Harlem River.

²⁰ NYSERDA Task Work Order (TWO) No. 6 9 GW Port Uses and Navigational Assessment, Johansson, E, Quinn T., Spear J. 2022 pg.18-37

²¹ Navigable waters mean all navigable waters of the United States including the territorial sea of the United States, extending to 12 nautical miles from United States baselines, as described in Presidential Proclamation No. 5928 of December 27, 1988.



Figure 8.1. VTS Area of Operation

VTS employs the following Very High Frequencies Channels 11, 12, and 14. Channel 11 is universally used throughout the system to check in and out. As the area of operation (Fig. 8.1) is large two VHF channels, 12 and 14, are used as highlighted (Fig. 8.1)

Channel 11 Sailing plan throughout VTS New York Area.

Channel 12 -Arthur Kill, East River, Raritan Bay and Anchorage Administration.

Channel 14 - Lower Bay, Upper Bay, Kill Van Kull, Newark Bay, Sandy Hook Channel and Raritan Bay.

VTS Sector New York collects data of all vessel movements within the VRMS System except vessels not required (a) Every power-driven vessel of 40 meters (approximately 131 feet) or more in length, while navigating; (b) Every towing vessel of 8 meters (approximately 26 feet) or more in length, while navigating; or (c) Every vessel certificated to carry 50 or more passengers for hire, when engaged in trade or exempted as follows:

- Ferries on a scheduled route: VTS calculates annual commuter ferry transits in 2017 at 590,000 trip movements and in 2020 at 820,000 trip movements.
- Harbor Assist/Escort Vessels: VTS treats the assist/escorted vessel as the VMRS user. Ships employ from 1-4 assist/escort tugs when entering the KVK, AK, and East River. Large Articulated Tug Barges employ 1-2 assist tugs during docking and undocking maneuvers. The VTS data for 2019 indicates 14,628 moves for Passenger, Freighter, Military/Other, and Tankers therefore theoretically factoring an average of 2 per vessel would represent a minimum of 29,256 annual harbor assist/escort tug movements.

In addition to managing vessel movements while underway, VTS also monitors and administers Federal Anchorage Grounds within the VRMS area of operation. Vessels must notify VTS when anchoring, monitor the appropriate working VHF channels, and be ready to move within 30 minute notification, and receive permission for any lightering operations. Vessels at anchor that determine that their proximity to other anchor vessels is too close must notify VTS and take appropriate action.

VTS keeps an accurate account of vessel movements within the VTS Area of Operation and logs them in five categories as follows: Passenger, Freighter, Military/Other, Tanker, and Tug/Tow.

- **PAX.** Passenger includes Ocean going Cruise Ships and Coastal Cruise Ships not normally operating exclusively within the Port of New York.
- **Freighter.** Freighter Category are vessels carrying non liquid cargo and include but not limited to Container Ships, Auto Carriers, Dry Bulk, Break Bulk.
- **Mil/Other.** Military/Other Category are Military and Other vessels that do not fall under any specific category such as research and training vessels.
- **Tanker.** Tanker includes self-propelled liquid bulk ships. Liquid Bulk Ship carry a wide array of products including petroleum, chemical, and even food products such as Orange Juice.
- **Tug/Tow.** Tug/Tow includes vessel movements of non-self-propelled vessels under tow. Tug/Tow movements represent the largest segment of cargo movements in the harbor and second only to commuter ferries in vessel movements. Harbor Assist/Escort Tugs are not included nor is recreational vessel Assistance Towing (Sea Tow, Boat US, etc.).

8.1.1 New York Harbor Routes and Density

The pre pandemic vessel traffic movement in the Port of New York is depicted in [Table 8.1](#) and [Figure 8.2](#). The data indicate that August had the largest cumulative vessel traffic movements in the Port of New York. Passenger vessel movements has pick up in May and in September/October, and wane in November. The 2019 annual average was 5,345 vessels with a standard deviation of 242.5 vessels or 4.5%. Freighters transits range from 478 to 543 per month with October as the busiest month (month average of 514). Military/Other transits range from a low of 16 and increase from May to October with a peak of 124 (month average of 76). Tanker transits remain rather steady during the year ranging from 484 to 630 (month average 545). Tug/Tow transits represent the overwhelming majority of cargo movements in the Port approximately 4 times as much as all other vessel movements recorded by VTS with an average of 4,126.

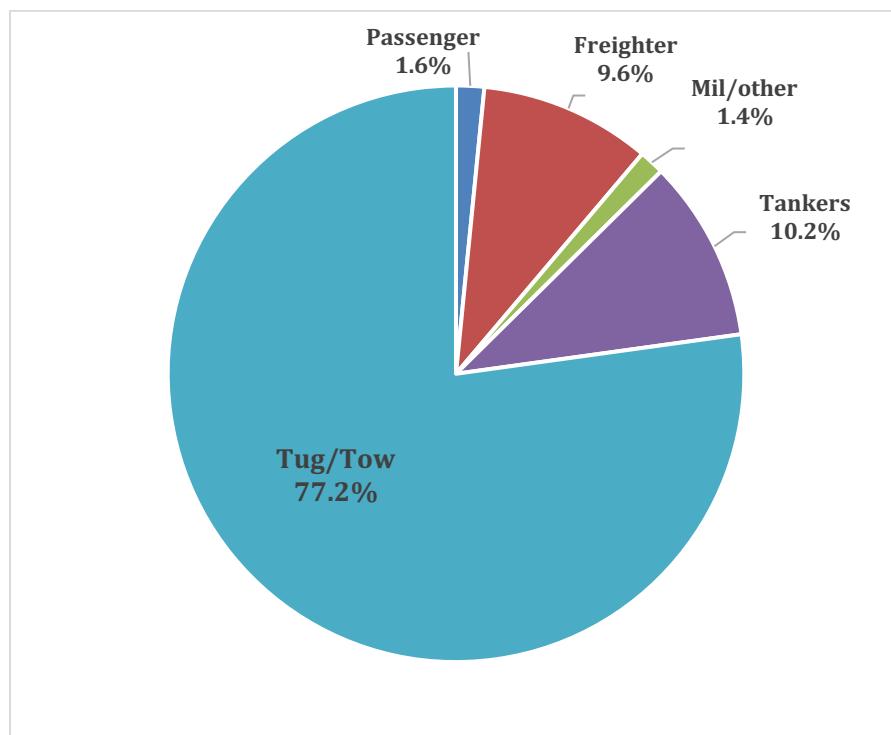
Primary routes for Tankers and Freighters as categorized by VTS are highlighted in [Figure 8.2](#). The primary destinations of Tankers are terminals located on the KVK and AK. Tankers transit to other sites to include Newark Bay, North River (Hudson River), and occasionally the East River.

Primary routes for Passenger Ships as categorized by VTS is the Manhattan Cruise Terminal on the North River, Bayonne Cruise Terminal at Port Jersey, and occasionally the Brooklyn Cruise Terminal on the Buttermilk Channel.

Primary routes for Military Vessels are the Upper Bay and North River mostly in the summer months

Table 8.1. 2019 VTS New York Harbor Vessel Traffic Data

2019	Net	Pax (Passenger)	Freighter	Military other	Tanker	Tugs Tow
January	5138	30	500	16	528	4064
February	4970	33	530	36	485	3886
March	4896	43	488	34	484	3847
April	5282	53	526	36	543	4124
May	5310	100	531	84	565	4030
June	5243	114	534	100	520	3975
July	5528	120	528	119	568	4193
August	5701	117	501	126	620	4337
September	5599	143	478	124	613	4241
October	5594	134	543	116	574	4227
November	5420	74	482	64	544	4256
December	5458	50	522	54	501	4331
2019 Total	64139	1011	6163	909	6545	49511
Distribution		1.6%	9.6%	1.4%	10.2%	77.2%

**Figure 8.2. New York Harbor distribution of vessel movements for 2019**

Tug/Barge units represent the majority of transits in the Port move cargo units perform several vital tasks. Tug/Barge units carry products into the VRMS system from Sea, North River, and East River from both domestic and foreign ports. Tug/Barge units also perform vital task within the port moving containers, dry bulk, break bulk, and liquid bulk as described in Section 2.5 of this report. Most liquid bulk units originate from Staten Island Sound (AK and KVK) destined for delivery at one of the many small and medium terminals located in the Port, to the North River extending to the Port of Albany, to the East River for Long Island, New England, and Foreign Ports, or to Sea for Ports South and North of New York.

From [Table 8.1](#) we note that the net activity in 2019 is increasing primarily in the tug and tow sector ([Figure 8.3](#)). A high of 4337 tows was noted in August. Typically, August is a busy month for the tug and tow sector as marine construction demand (aggregates, asphalt, break-bulk, etc.) stocks up for winter, summer gasoline stock needs replenishment, and terminals begin to stock up with home heating oil. This trend is especially important when additional activity in the harbor is expected. For example, this trend indicates that the tug/tow is growing at an average rate of over 37 tows per month (coefficient of determination of 65.5%).

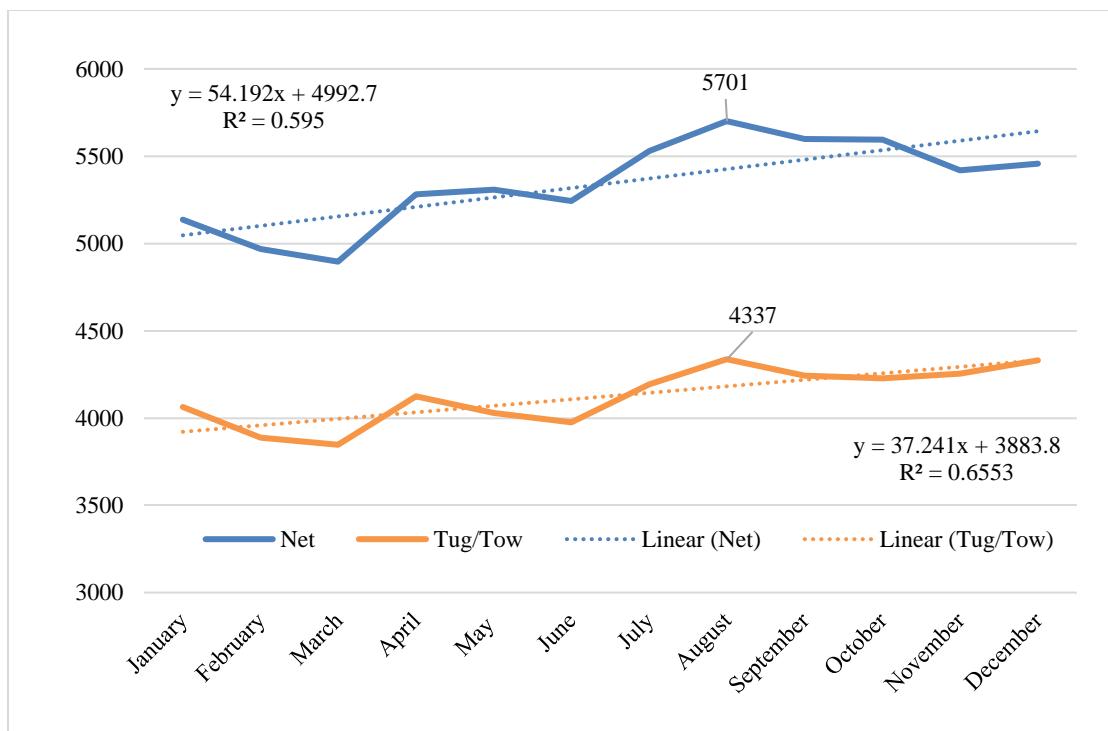


Figure 8.3. Waterborne activity in the New York Harbor (2019)

The vessel operations by vessel type and ownership are highlighted in [Figure 8.4](#) and [Table 8.2](#). [Table 8.2](#) identifies the primary operators in the port and the agency that is responsible for them. The vessel's routs ([Figure 8.4](#)) visualize the location of each facility and its container share in the total. [Table 8.2](#) also identifies the ship repair locations on the East River, Upper Bay KVK and AK.

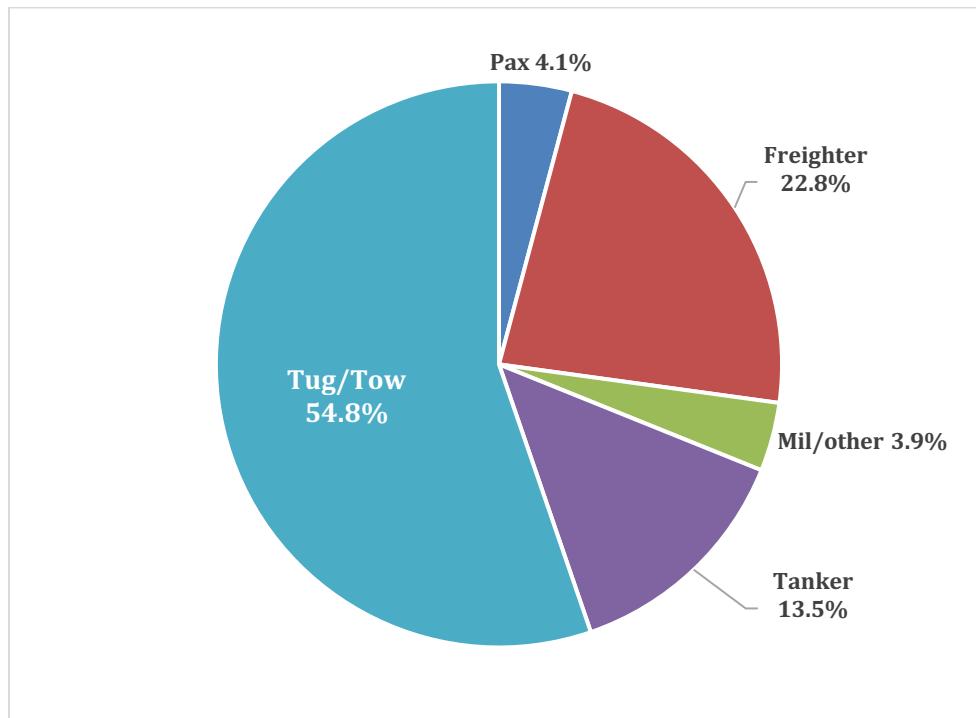
**Figure 8.4. Port Authority Container Vessel Routes****Table 8.2. Terminal Operators**

	Cruise Ships	Container	Ro-Ro	Break Bulk	Dry Bulk	Liquid Bulk	Recycling	Ship Repair
Port Authority	1. Brooklyn Cruise Terminal 2. Bayonne Cruise Terminal	1. Port Newark 2. Port Elizabeth 3. GCT Bayonne 4. GCT SI NY 5. Red Hook	Port Newark	Port Newark	Port Newark	Port Newark	Port Newark	
NYCEDC	Manhattan Cruise Terminal			SBMT				
Private				Over 65 private ship and/or barge cargo terminals operate throughout the Port of New York located in both primary and secondary waterways			East River-1 Upper Bay-2 KVK - 1 AK - 2	

The vessels operating along the Atlantic Ocean, North River and the East River account for 24,453 (Table 8.3) transits or 38.1% of the total traffic data (Table 8.1). The distribution between the three sites is illustrated in Figure 8.5 which is dominated by the tug and tow industry followed by freighters and tankers.

Table 8.3. 2019 VTS New York Harbor Vessel Traffic Data for Atlantic Ocean, North and East Rivers

2019 In/Out	Net	Pax	Freighter	Mil/other	Tanker	Tug/Tow
January	1933	25	462	28	282	1135
Feb	1875	35	488	39	253	1056
March	1851	42	458	33	231	1085
April	2085	64	496	40	277	1205
May	2081	79	504	89	284	1125
June	2063	99	508	107	253	1097
July	2124	104	507	125	293	1095
August	2272	100	468	122	331	1251
September	2139	160	445	124	315	1103
October	2106	158	520	110	280	1027
November	1955	97	456	72	275	1066
December	1969	42	268	62	230	1144
2019 Total	24453	1005	5580	951	3304	13389
Distribution		4.1%	22.8%	3.9%	13.5%	54.8%

**Figure 8.5. In-and-out via Atlantic Ocean, North and East Rivers (2019)**

The waterborne activity along the Atlantic Ocean, North and East Rivers in 2019 exhibits a positive slope picking up in August with a total of 2272 transits (Figure 8.6).

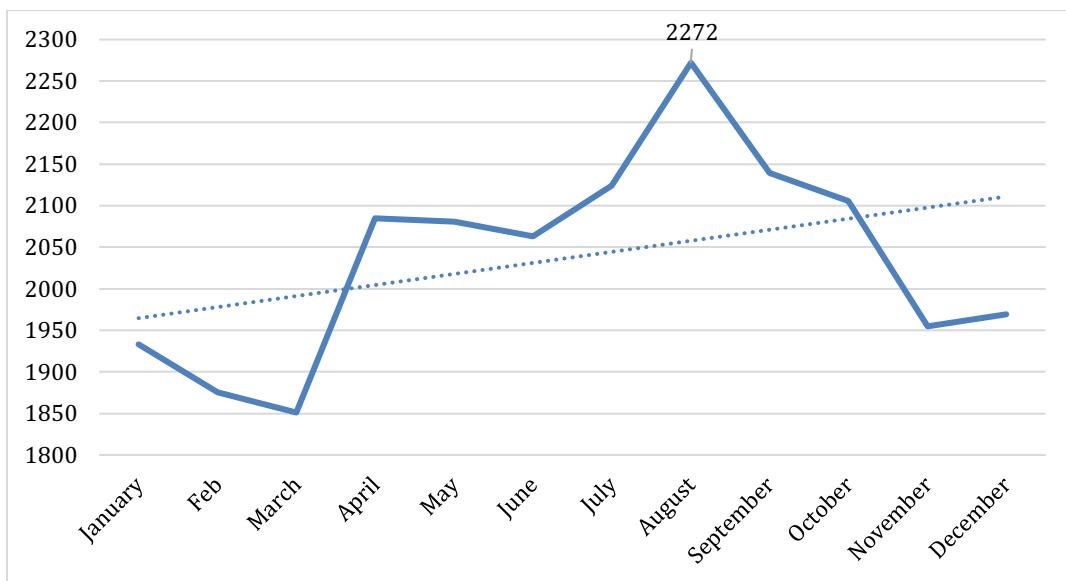


Figure 8.6. Monthly waterborne activity in the Atlantic Ocean, North and East Rivers (2019)

8.2 Atlantic Ocean

The three Traffic Separation Schemes are as follows Nantucket TSS running along the south shore of Long Island New York, Hudson TSS running straight out and the Barnegat TSS running along the New Jersey Shore (Figure 8.7).



Figure 8.7. TSS Approaches to the Port of New York

Sandy Hook Channel is primarily utilized by inbound loaded liquid bulkers (Ships and Tug/Barges) heading

to terminals along Staten Island Sound and outbound lightered deep-draft liquid bulkers too deep to enter Sandy Hook when loaded.

The two coastal routes run inshore the Nantucket and Barnegat TSS and is primarily utilized by Coastal cargo vessels. The Coastal cargo trade also operates a route from Atlantic City to Montauk.

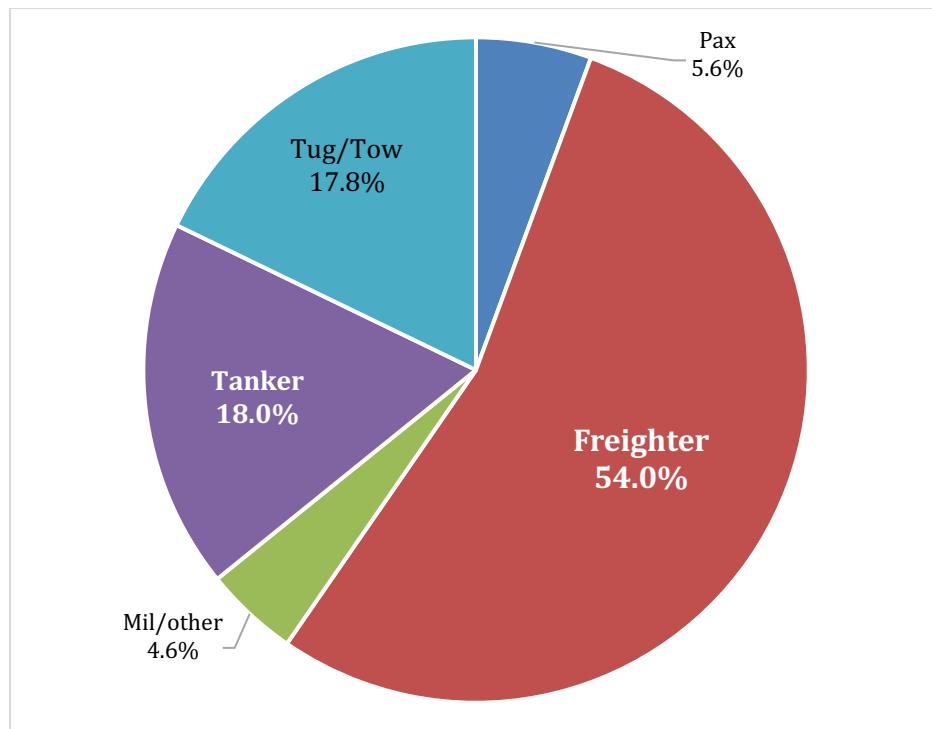
The large volume of vessel traffic in the Port of New York seen a development of increase in ships anchoring off Long Beach Long Island developing.

8.2.1 Ambrose Channel and Sandy Hook Routes and Density

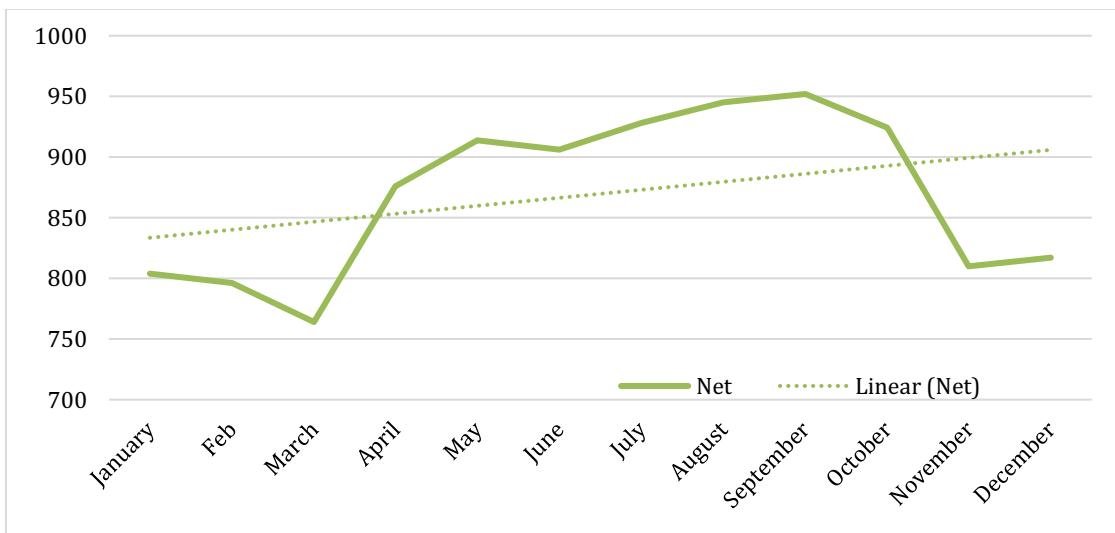
The primary Channel is **Ambrose** and secondary Sandy Hook entering New York Harbor from the three Traffic Separation Schemes (TSS) ([Figure 8.8](#)) and southern and northern coastal tug and barge routes; New Jersey Coastal and Long Island Coastal Fairways. Chapel Hill Channel connects Sandy Hook and Sandy Hook Channels.

Table 8.4. 2019 Ambrose Channel VTS Vessel traffic data

2019 In/Out Ambrose	Net	Passenger (Pax)	Freighter	Mil/other	Tanker	Tug/Tow
January	804	16	450	19	169	149
Feb	796	20	469	19	152	133
March	764	25	446	13	126	153
April	876	41	483	25	166	161
May	914	49	487	51	166	161
June	906	55	491	55	142	163
July	928	58	481	45	168	176
August	945	59	465	54	183	184
September	952	92	435	56	190	189
October	924	90	507	53	137	126
November	810	56	444	45	154	122
December	817	25	254	41	123	152
Year Total	10436	586	5412	476	1876	1869
Distribution		5.6%	54.0%	4.6%	18.0%	17.8%

**Figure 8.8. In-and-out via Ambrose (2019)**

VTS data reflects that the Freighters are the primary user of Ambrose Channels representing 54 percent of transits and Tankers and Tug/Tow (conventional and articulated tug/tow) closely tied as a distant second with approximately 18 percent transits each. Passenger ships represent approximately 5.6 percent of vessel transits and Mil/Other at 4.6 percent of vessel transits (Table 8.4 and Figure 8.8). Figure 8.9 illustrate (from Table 8.4) the 2019 monthly activities via Ambrose with 870 average monthly movements and a positive trend.

**Figure 8.9. In-and-out via Ambrose monthly activity (2019)**

VTS data reflects **Sandy Hook** transits are relatively small, the tankers are the primary user of Sandy Hook Channels representing 61.3 percent of transits. Tug and Barges are a distant second with approximately 30 percent. The other 9 percent account for passenger, freighters and Mil/Other vessel transits ([Table 8.5](#) and [Figure 8.10](#)). [Figure 8.11](#) illustrate (from [Table 8.5](#)) the 2019 monthly activities via Sandy Hook with 82 average monthly movements and a positive trend.

Table 8.5. 2019 Sandy Hook Channel VTS Vessel traffic data

2019 In/Out Sandy	Net	Pax	Freighter	Mil/other	Tanker	Tug/Tow
January	67			2	42	23
Feb	76		1	7	55	13
March	84			8	52	24
April	73			2	48	23
May	98		2	6	60	31
June	84	1	2	11	46	24
July	85		1	5	54	25
August	105			3	65	37
September	82			3	53	25
October	87		1	11	54	21
November	68			9	39	20
December	76		1	13	36	26
Year Total	985	1	8	80	604	292
Distribution		0.1%	0.8%	8.1%	61.3%	29.6%

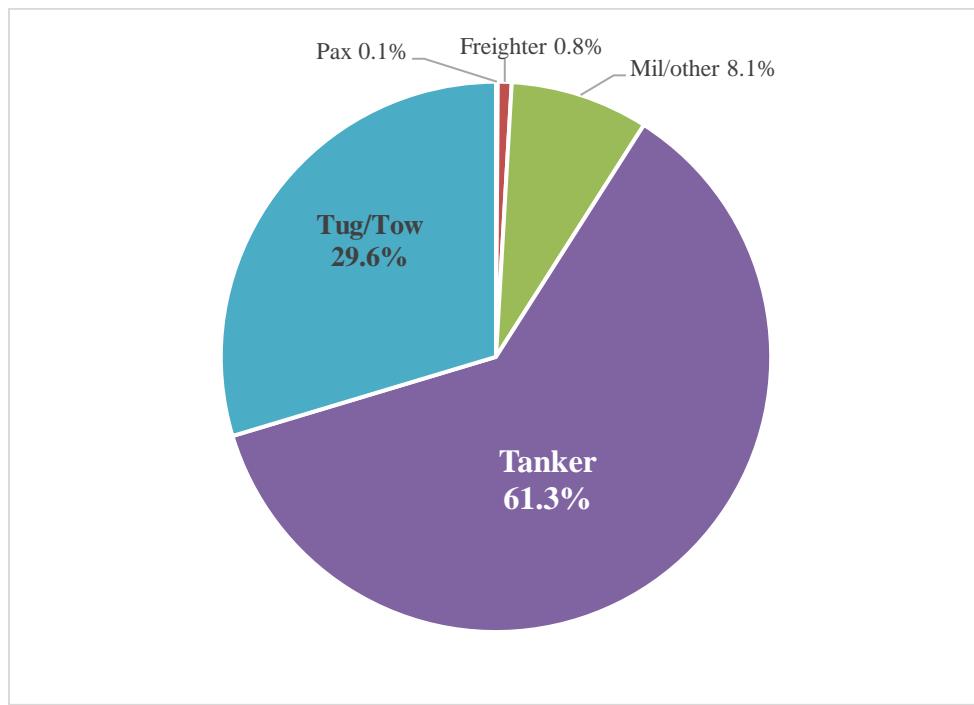


Figure 8.10. In-and-out via Sandy Hook (2019)

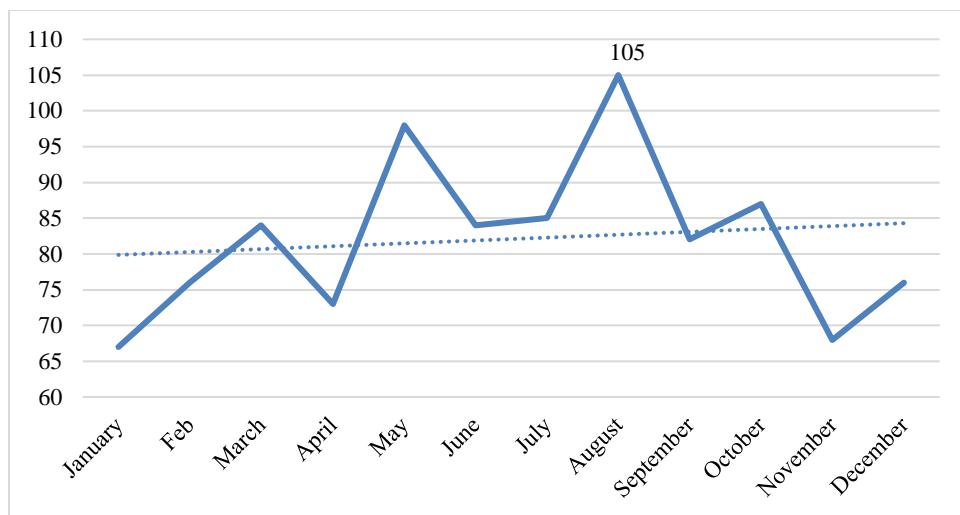


Figure 8.11. In-and-out monthly activity via Sandy Hook (2019)

8.3 North (Hudson) River

The North (Hudson) River begins at the lower tip of Manhattan at the Battery extending north to the Port of Albany and continues through the New York State Canals to Lake Champlain and Great Lakes through Lake Erie. The North River along the Manhattan shoreline was once replete with cruise ship and cargo piers and is now reduced to the Manhattan Cruise Terminal along with several dinner boat and commuter ferry terminal. Vessels navigating up the North River are required to check out of the New York Harbor VTS at the Holland Tunnel Ventilator. Vessels that operate north of the Holland Tunnel to Albany and further into the Canals to the Lakes including the Great Lakes are not reflected in VTS data.

Terminals are primarily sited on the main river except those in Rondout Creek and Athens NY. Primary liquid bulk products included home heating oil, gasoline, and asphalt are transported north to several terminals along the River and the Port of Albany where it is either trucked within New York State or loaded on rail cars to be transported to New England. Primary dry and liquid bulk units originate from Staten Island Sound (AK and KVK) destined for delivery at one of the many small and medium terminals located in the Port, to the North River.

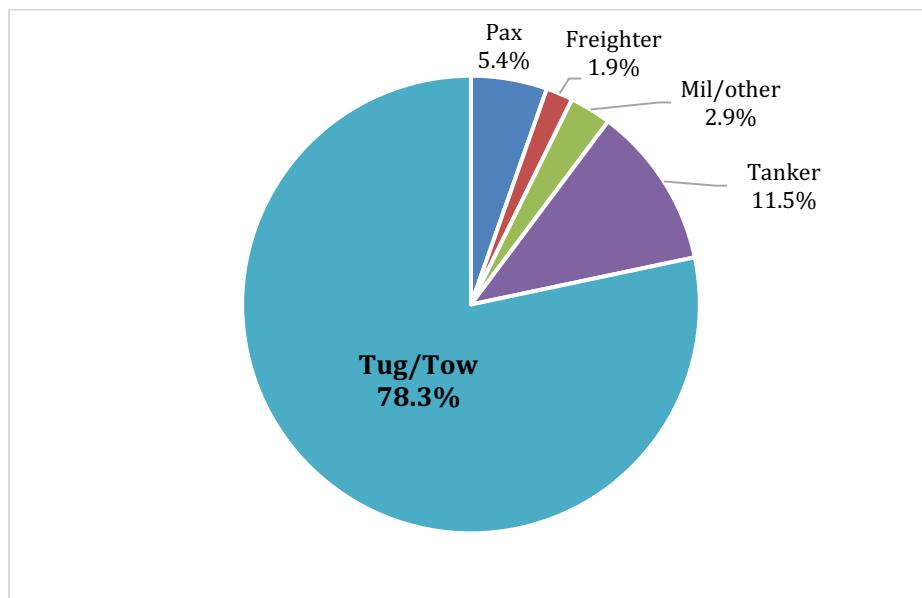
8.3.1 North (Hudson) River Route and Density

VTS Holland Tunnel Ventilator VTS Checkout data reflects a robust marine highway system that primarily is utilized by the Tug/Barge segment. Both ships and tug/barge units navigate in the federal channel utilizing wider segments of the river for overtaking and meeting other vessels. Custom and practice anchorages off Kingston and Federal Designated Anchorage off Hyde Park are utilized by ships and tug/barges during restricted visibility prior to continuing the last stretch of the river to the Port of Albany. Other custom and practice anchorages are utilized during restricted visibility and for waiting for bridge air draft windows or berthing.

VTS data reflects that the Tug/Tow is the primary user of the North River gateway to Albany and Erie Canal with an overwhelming 78.3 percent of vessel transiting cargo. Tankers represent 11.5 percent, Passenger vessels at 5.4 percent, Military/Other at 3 percent and Freighters at 2 percent ([Table 8.6](#) and [Figure 8.12](#)).

Table 8.6. Holland Tunnel Ventilator VTS Checkout data

2019 In/Out Holland	Net	Pax	Freighter	Mil/other	Tanker	Tug/Tow
January	484	8	8	6	71	391
Feb	508	14	17	12	45	419
March	451	16	9	8	48	369
April	616	21	11	8	63	514
May	559	26	15	20	57	440
June	584	37	14	19	64	451
July	613	34	21	29	70	459
August	727	38	2	28	79	580
September	643	61	7	28	72	474
October	658	65	9	27	85	472
November	582	39	10	15	80	438
December	568	17	10	6	67	467
Year Total	6993	376	133	206	801	5474
Distribution		5.4%	1.9%	2.9%	11.5%	78.3%

**Figure 8.12. In-and-out via Holland (2019)**

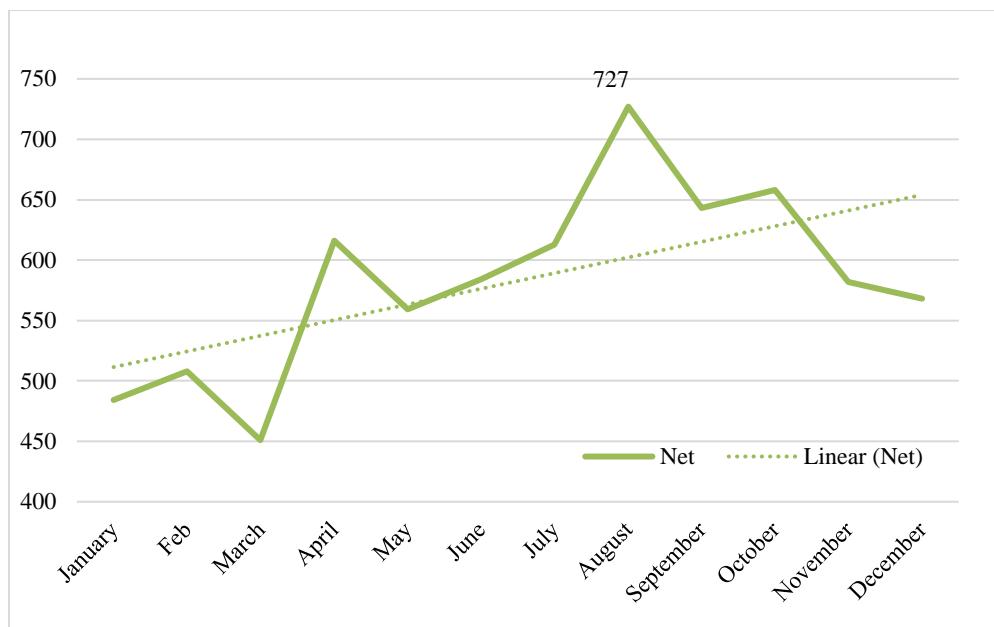


Figure 8.13. In-and-out via Holland monthly activity (2019)

Figure 8.13 indicates the monthly activities in Holland in 2019 showing a positive trend with a maximum of 727 activities and a monthly average of 583 (standard deviation of 74 or 12.7%).

8.4 East River

Long Island Sound provides access to Long Island/Connecticut Ports and sheltered navigation routes to Block Island Sound where vessel can navigate to points east or to sea.

Vessels navigating up the East River are required to check out of the New York Harbor VTS at Throgs Neck. Vessels that operate within the Throgs Neck are not reflected in VTS Throgs Neck data and include significant liquid and dry bulk terminals on the East River as well as secondary channels in Newtown Creek, Flushing Creek, Bronx River, and Westchester Creek.

8.4.1 East River Route and Density

The East River has significant currents that effect vessel routing factoring variables such as current speed, tidal stage, vessels draft, vessels tonnage, vessels horsepower and method of tow. Deep-draft units plan to arrive at Hell Gate approximately 1-hour either side of slack water and transit in the deep water. Shallow draft units navigate outside the main channel when able to avoid deep drafts vessels and to mitigate currents. Vessels navigating against strong currents tend to navigate from point to point to reduce current impacts while vessels navigating with currents stay in the center of the channel.

When past Hell Gate vessels continue to terminals within the harbor or continue to Long Island Sound.

When entering Long Island Sound at Execution Rocks vessel routing is determined by Port Location, Under Keel Clearance requirements, or weather events. During strong northerly winds units tend to navigate in the lee of Connecticut and southerly winds in the lee of Long Island. Vessels departing or entering the Race factor strong currents when selecting routes with deep draft vessels taking extra precautions.

Primary dry and liquid bulk units originate from Staten Island Sound (AK and KVK) destined for delivery at one of the many small and medium terminals located in East River connecting waterways or points east of the Throggs Neck Bridge for Long Island, New England, and Foreign Ports.

VTS data reflects that the Tug/Tow is the primary user of the East River gateway to Long Island Sound as recorded at the Throggs Neck Bridge station with an overwhelming 95.3 percent of vessel transiting cargo with passenger, freighter, military/other and tanker making up the remaining 4.7 percent ([Table 8.7](#) and [Figure 8.14](#)).

Table 8.7. Throggs Neck VTS Checkout data

2019 In/Out Throggs	Net	Pax	Freighter	Mil/other	Tanker	Tug/Tow
January	578	1	4	1	0	572
Feb	495	1	1	1	1	491
March	552	1	3	4	5	539
April	520	2	2	5	0	507
May	510	4	0	12	1	493
June	489	6	1	22	1	459
July	498	12	4	46	1	435
August	495	3	1	37	4	450
September	462	7	3	37	0	415
October	437	3	3	19	4	408
November	495	2	2	3	2	486
December	508	0	3	2	4	499
Year Total	6039	42	27	189	23	5754
Distribution		0.7%	0.4%	3.1%	0.4%	95.3%

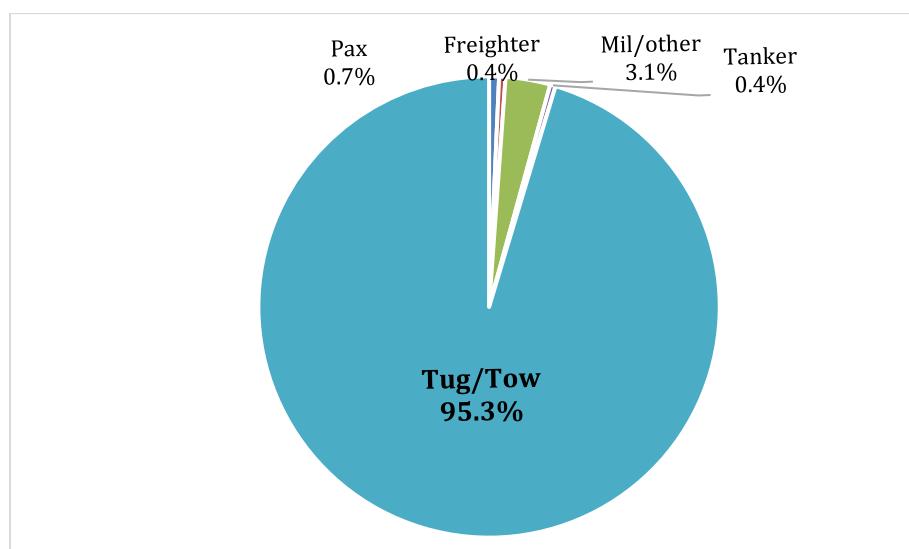
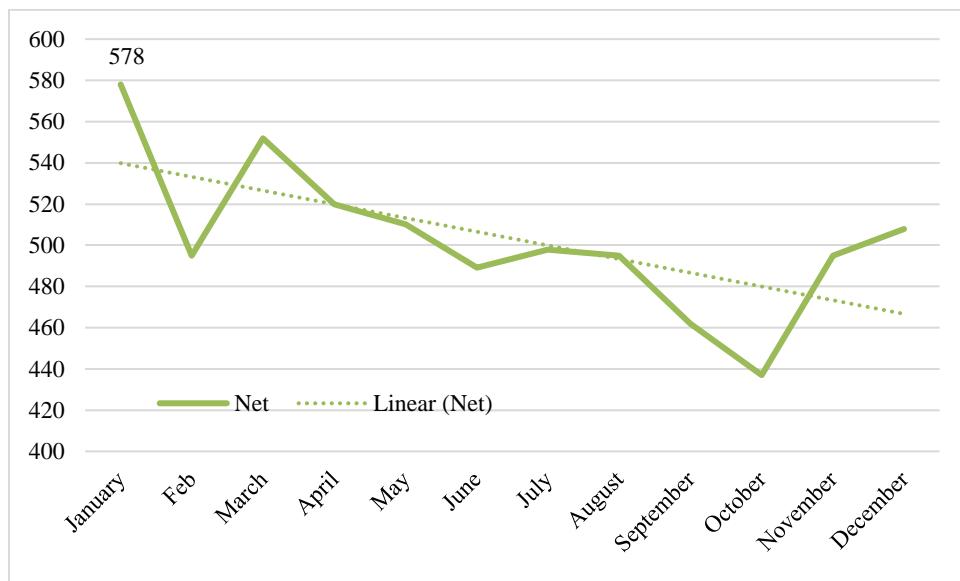


Figure 8.14. In-and-out via Throggs Neck (2019)

[Figure 8.15](#) indicates the monthly activities in Throggs Neck in 2019 showing a negative trend with a maximum of 578 activities and a monthly average of 503 (standard deviation of 35 or 7%).



[Figure 8.15. In-and-out via Throggs Neck monthly activity \(2019\)](#)

8.5 Trend Analysis

A trend analysis was conducted on the VTS data. The data used is monthly from the years 2017 to 2021. However, the trend analysis for projecting into the future is based on 2017 to 2019. This is the pre-pandemic period. [Figure 8.16](#) illustrates the VTS in-and-out activity for the last five years. The data illustrates that the 2017 to 2019 regional annual figures were very similar with a high of 66,194 activities in 2018. The figures declined due to the pandemic in 2020 and 2021.

A monthly detailed analysis for the same period illustrates seasonal activities ([Table 8.8](#) and [Figure 8.17](#)). The analysis distinguishes between activities before and after the pandemic. For the years before the pandemic the figures illustrate an annual positive trend. The analysis indicates that in all the three years, the number of activities as calculated by the intercepts were 4,964.9 for 2017, 5,224.2 for 2018 and 4,992.7 for the year 2019. The intercept average for the same three years was 5060.6, with a slope of 48.783 with a low coefficient of determination (R^2). The year 2020 was erratic except for the first two months. Likewise, 2021 was erratic as well. We also note that the end-year trend amount was not the beginning of the next year intercept amount. Thus, the project per year starts with the year's intercept and builds on it. Therefore, the projected figures use the average of 2017 to 2019 for projection. A different approach is a monthly analysis.

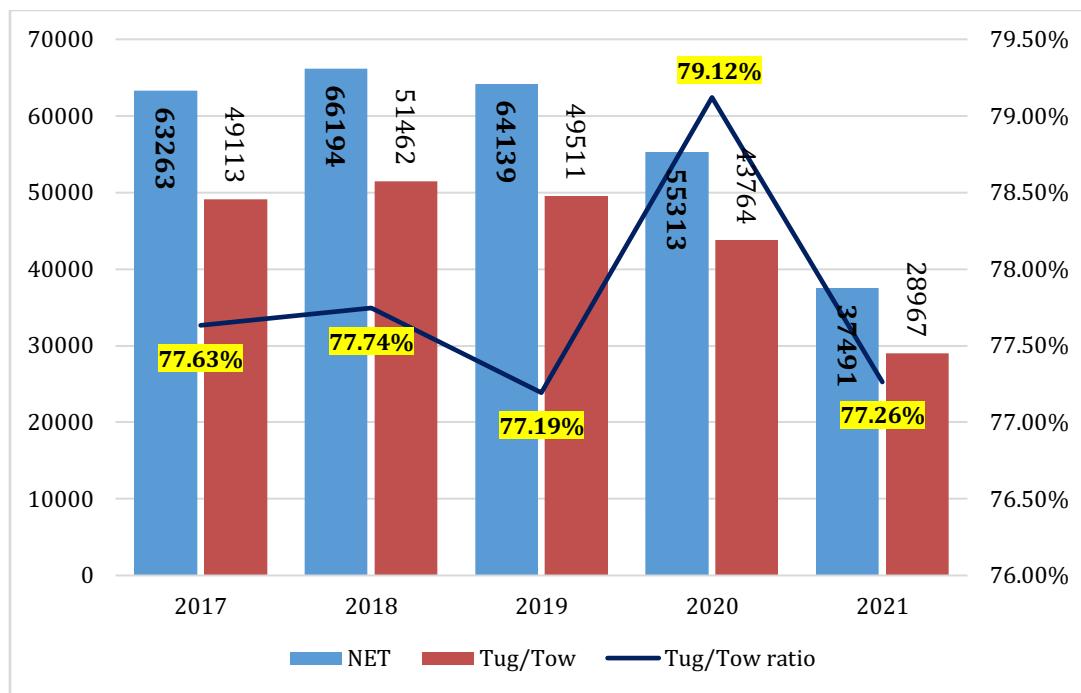


Figure 8.16. VTS in-and-out New York region

Table 8.8. Monthly VTS net activity

	2017	2018	2019	2020	2021	Avg. (2017 to 2019)
January	5218	5533	5138	5166	4488	5,296
February	4775	5249	4970	4762	3802	4,998
March	5011	4945	4896	4975	5030	4,951
April	5215	5210	5282	3857	4620	5,236
May	5306	5642	5310	4088	4720	5,419
June	5218	5311	5243	4401	4619	5,257
July	5314	5617	5528	4508	4830	5,486
August	5338	5911	5701	4902	5382	5,650
September	5374	5824	5599	4465		5,599
October	5464	6085	5594	4874		5,714
November	5803	5374	5420	4596		5,532
December	5227	5493	5458	4719		5,393
Avg.	5,271.9	5,516.2	5,344.9	4,609.4	4,686	5,377.7
STDV	235	310	243	359	426	231
STDV/Avg.	4.5%	5.6%	4.5%	7.8%	9.1%	4.3%
% Change		4.6%	-3.1%			0.80%

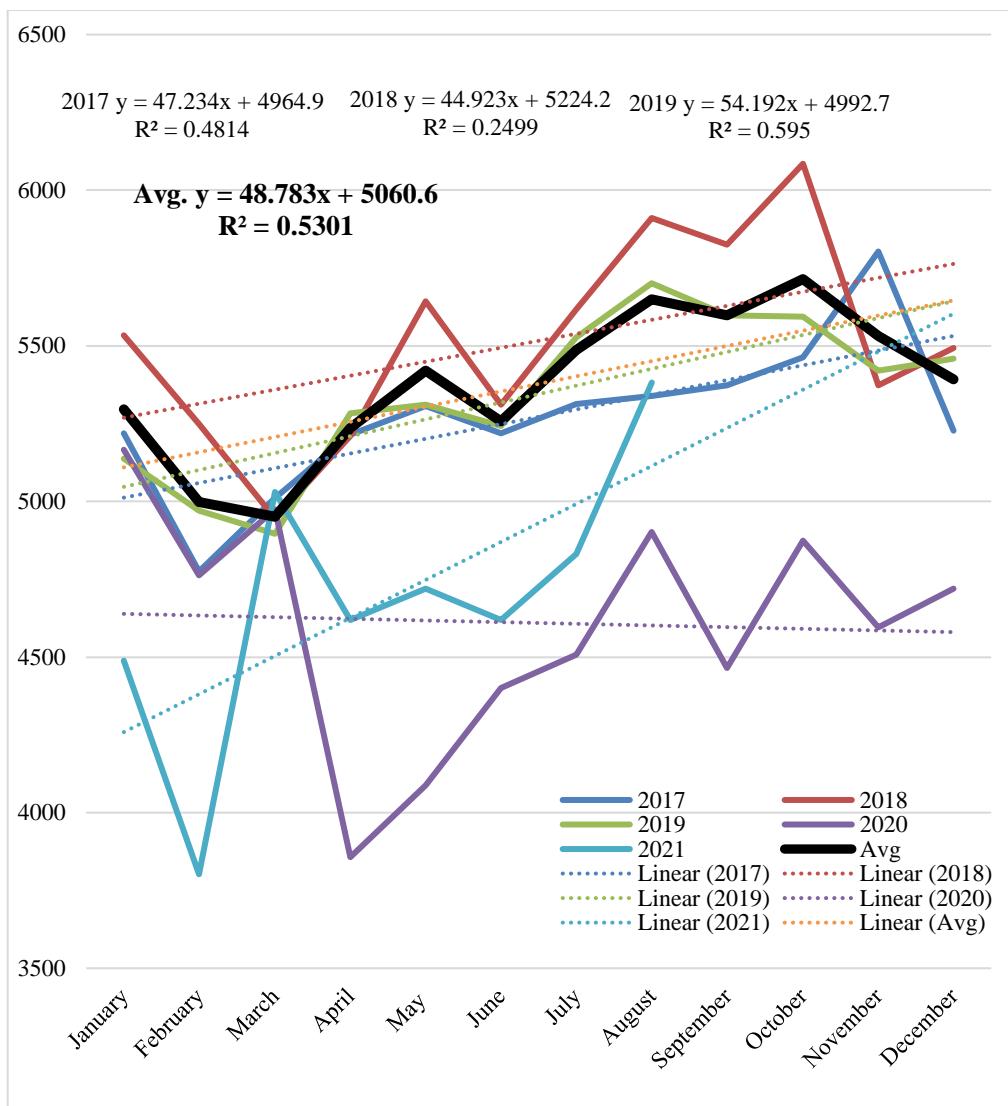


Figure 8.17. Monthly analysis of VTS in-and-out New York region

Projection determination is challenging, especially due to the pandemic, which has been ravaging economic activities, nationally and regionally, since February 2020. The future economic impact is still not clear because the pandemic's impact is still not settled; it might take some time before it is. The pandemic has been causing irregularities in the activities of the Port of New York, as recorded by VTS, illustrated in [Figure 8.17](#) and noted in the national supply chain. The disruptions spilled over to other jurisdictions nationwide, with a potential extended impact of changing the entire operating model of the past. Therefore, the projections provided below are limited.

The projections are based strictly and only on the past three years (2017 to 2019), ignoring any other factors, including socioeconomic and demographic. Furthermore, the projections are based on annual data for the next five years.

Table 8.9 summarizes data that is used for the projections in [Figure 8.18](#).

There was no attempt for month-to-month with respect to 2020 or beyond. The monthly information is available in [Table 8.8](#) and [Figure 8.15](#). The only two months that follow the prior three years pattern are January and February of 2020. These two months of 2020 and 2017 are practically the same (see [Figure 8.15](#)).

Table 8.9. Summary of VTS net average monthly activities for the years 2017 to 2019

	2017	2018	2019	Averages
1. Intercept (from regression estimates)	4,964.9	5,224.2	4,992.7	5,060.6
2. Annual monthly average (from data)	5,271.9	5,516.2	4,609.4	5,377.7**
3. Average monthly percentage changes from (2)		4.6%	-3.1%	0.8%*
4. Standard deviation (from annual data)	235	310	243	231**

*The average of 2018 and 2019 is an of the average monthly percentage change.

** The average across the row.

The average monthly VTS activities with an average growth rate of 0.8% ([Table 8.9](#)) are used to obtain the projections illustrated in [Figure 8.18](#). The projections start from the base average annual monthly figures of 5,378 ([Table 8.9](#)). This projection indicates that the VTS should record an estimated 5,596 activities in the year 2024 and 5,732 activities in the year 2027. Since the standard deviation (SD) was ± 231 activities ([Table 8](#)), applying this SD to the trend indicates that in 2027 the VTS estimated activities should be 5,978 for the upper figure and 5,485 for the lower.

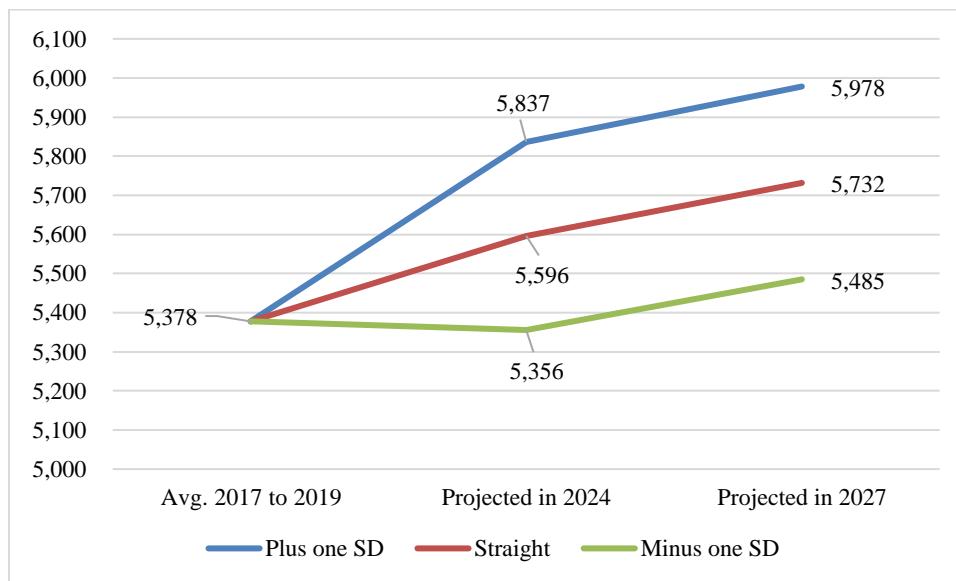


Figure 8.18. Projection of VTS average monthly activities for 2024 and 2027

The overall activities in the Port of New York could be further analyzed for the relative shares of each category. For example, the tug/tow sector averaged 77.5% of the total number of activities in the years 2017 to 2019. Applying the same percent in the year 2027, the estimate is an average of 4,442 activities, with a SD upper figure of 6,633 and a lower figure of 4,251. Similarly, other estimates can be determined.

In conclusion of this work order, we note that the New York Harbor is busy. Vessel operations are recorded 24/7 all year round. However, the VTS records omit activities of ferry traffic and other unreported tugs and recreational boats in the port. The records omitted are for tug assists, other local activities that need tugs and recreational activities. The data provided by VTS does not include vessel size. In summary, the VTS records underestimate the port activities.

More activities in the Port lead to more competition in operating space and greater risks for accidents, delays, increase in costs, etc. These results are worse when considering current, tides, air draft, and wind factors as a part of the activities that narrow operations windows.

In light of the above, especially when attempting to take advantage of the current schedule, trends and density of operations are required to develop an assessment of operating protocol for providing safe harbor operations. The additional activities from staging ports (sites) along the waterways of oversized equipment and non-standardized sizes need special attention.

It should be noted that three months of three consecutive years are not sufficient data to determine trends and an analysis of the rate of growth by vessel type and by location is therefore beyond the scope of work.

Appendix A: Acronyms and Abbreviations

Acronyms and Abbreviations

APDC	Albany Port District Commissioners
BFE	Base Flood Elevation (FEMA)
BU	Board of Public Utilities
CAM	Coastal Area Management
CCTV	Closed-Circuit Television
CES	Clean Energy Standard (New York State)
COD	Commercial Operation Date
COWI	COWI North America, Inc.
CTV	Crew Transfer Vessel
CZMA	Coastal Zone Management Act
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
ft	feet
GBF	Gravity Based Foundation
GE	General Electric
HAWT	Horizontal Axis Wind Turbine
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
LIMWA	Limit of Moderate Wave Action (FEMA)
MARSEC	Maritime Security (U.S. Coast Guard)
MHW	Mean High Water
MLW	Mean Low Water
MLLW	Mean Lower Low Water
MP	Monopile (foundation type)
MW	Megawatt
NM	Nautical Mile
NAVD88	North American Vertical Datum of 1988
NGVD29	National Geodetic Vertical Datum of 1929
NOAA	National Oceanic and Atmospheric Administration
NREL	National Renewable Energy Lab
NWP	Nationwide Permit (USACE)
NYC DEC	New York City Department of Environmental Conservation
NYC DEP	New York City Department of Environmental Protection
NYCEDC	New York City Economic Development Corporation
NYS	New York State
NYSERDA	New York State Energy Research and Development Authority
OCS	Outer Continental Shelf
OEM	Original Equipment Manager
OESP	Offshore Electrical Service Platform
O&M	Operations and Maintenance
OPC	Opinion of Probable Cost
OSW	Offshore Wind
OSS	Offshore Substation
OTM	Offshore Transformer Module
OWF	Offshore Wind Farm
PANYNJ	Port Authority of New York and New Jersey
PDE	Project Design Envelope
SOV	Service Offshore Vessel
SPMT	Self-Propelled Modular Trailer
SSP	Steel Sheet Pile
SM	Status Mile
SWATH	Small Waterplane Area Twin Hull (vessel)
TP	Transition Piece (upper component of MP foundation type)
USACE	United States Army Corps of Engineers
WEA	Wind Energy Area
WTG	Wind Turbine Generator
WTIV	Wind Turbine Installation Vessel

Appendix G. Economic Impact Study of Offshore Wind Program in New York State

Economic Impact Study of Offshore Wind Program in New York State

Prepared for:

New York State Energy Research and Development Authority

Albany, NY

Prepared by:

HDR Inc.

New York, New York

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Acronyms and Abbreviations

CLCPA	Climate Leadership and Community Protection Act
ESD	Empire State Development
MW	megawatts
NYSERDA	New York State Energy Research and Development Authority (NYSERDA)
O&M	Operations and maintenance
OPC	Opinions of probable costs
OSW	Offshore wind
WTG	Wind Turbine Generator

Executive Summary

New York's Climate Leadership and Community Protection Act (CLCPA) sets aggressive clean energy and climate targets for New York State (State) with the goal of at least 9,000 MW of offshore wind (OSW) generation capacity by 2035. The New York State Energy Research and Development Authority (NYSERDA) is coordinating the cost-effective development of OSW energy projects and has retained HDR to develop a Ports Cumulative Impact Assessment and Alternatives Analysis Study in support of the State's current and future OSW project portfolio.

As OSW energy projects are developed to achieve the State's goals, there is a growing need and interest in identifying and assessing the environmental and socioeconomic benefits and impacts of these projects. The economic impacts of OSW energy projects would be generated by their construction, subsequent operations and maintenance of these projects, and other related program expenditures. The impacts would extend to onshore facilities and infrastructure in ports along the State coast that would support the construction of the target generation capacity and then operations and maintenance activities.

The purpose of this study is to outline the economic impacts of the NYSERDA OSW energy program of at least 9,000 megawatt (MW) capacity by 2035, provide their quantification, and highlight the differences in impacts between the OSW support ports alternatives referred to as the Planned Alternative and the Full Build Alternative. The following describes these alternatives:

- Planned Alternative: This alternative includes five ports initially assumed for the State OSW energy program. It is noted that existing modeling suggests that this may be insufficient to fully support the State OSW energy goal.
- Full Build Alternative: This alternative is the Planned Alternative and seven additional ports to support the OSW energy program.

ES.1 Study Scope and Methodology

This study focused on the economic impacts—measured in terms of jobs and income—related directly to the OSW energy program, which can be tracked and quantified through expenditures related to its implementation. The impacts were assessed under the following four groups of activities and processes:

1. Offshore wind farm construction;
2. Operations and maintenance (O&M) of offshore wind farms;
3. Renovations and upgrades of ports along State coastline needed as a base for both construction and O&M activities; and
4. Social and community investments for long-run business sustainability, such as wildlife monitoring, or funding for community training and skills upgrades.

The study relied on publicly available data and information from published reports and a range of news releases from government agencies and project developers, applied input-output modeling techniques to available data, and extrapolated partial results to the entire OSW energy goal of at least 9,000 MW and the Full Build Alternative of OSW support ports.

ES.2 Results

In terms of job impacts in the State, the analysis shows that the entire OSW energy program of at least 9,000 MW of installed capacity is expected to support a total of 34,288 job-years during construction and then 1,309 jobs each year to operate and maintain the OSW energy projects. The Planned Alternative of OSW ports is expected to support a total of 13,510 job-years during ports renovations while the Full Build Alternative is expected to support 32,403 job-years. Once upgrades are completed, ports would be used for various activities related to project construction and then operations. These activities can be expected to create high-quality job opportunities, many of them related to technologically advanced products and processes. Social and community investment expenditures are expected to support another 1,080 job-years over the life of the projects.

It is important to note that if the Full Build Alternative, as defined previously, is implemented, it would provide additional and upgraded port capacity. This would, in turn, make it more likely that the economic impacts of construction and O&M of the entire OSW energy program could actually be realized in the State. Under the Planned Alternative, many of these jobs may not actually be realized due to onshore capacity constraints, either during construction of various OSW energy projects, or at their operational stage. While there may be options to deal with the constraints, some activities and processes may have to be outsourced to out-of-state providers causing “leakages” of potential economic impacts in the State.

1 Introduction

New York's Climate Leadership and Community Protection Act (CLCPA) sets aggressive clean energy and climate targets for New York State (State) of at least 9,000 MW by 2035. The New York State Energy Research and Development Authority (NYSERDA) is coordinating the cost-effective development of OSW energy projects and has retained HDR to develop a Ports Cumulative Impact Assessment and Alternatives Analysis Study in support of the State's current and future OSW project portfolio.

As OSW energy projects are developed to achieve the State's goals, there is a growing need and interest to identify and assess the environmental and socioeconomic benefits and impacts of these projects. The economic impacts of OSW energy projects would be generated by their construction, subsequent operations and maintenance (O&M) of these projects, and other related program expenditures. The impacts would extend to onshore facilities and infrastructure in ports along the State coast that would support the construction of the target generation capacity and then O&M activities.

It is noted that initially an assumed collective of five ports, called the “Planned Alternative” were identified as OSW port facilities to support the State’s goal of at least 9,000 MW of OSW by 2035. However, based on COWI’s Regional Ports Supply Demand Model, the Planned Alternative may be insufficient to fully support this goal. As a result, an additional seven ports were added to the Planned Alternative and collectively named the Full Build Alternative. Table 1 provides the list of the ports included in the Planned Alternative and the Full Build Alternative.

Table 1. Planned Alternative and Full Build Alternative Port Facilities

Full Build Alternatives	Location	Assumed Port Use
Planned Alternative	Port of Albany	Fabrication (Towers/Foundations Components)
Planned Alternative	Port of Coeymans	Fabrication (Towers/Foundations Components)
Planned Alternative	SBMT	Staging (WTG and Foundation) and O&M
Planned Alternative	Port Jefferson	O&M (SOVs)
Planned Alternative	Port of Montauk	O&M (CTVs)
Additional Port	Arthur Kill Terminal	Staging (WTG)
Additional Port	Port Ivory	Fabrication (Offshore Substation components)
Additional Port	Homeport Pier	O&M
Additional Port	Brooklyn Navy Yard	O&M
Additional Port	PAMT	O&M
Additional Port	Hempstead Public Works	O&M
Additional Port	NYS Wind Port	Component Manufacturing

The purpose of this study is to outline the economic impacts of the NYSERDA OSW energy program of 9,000 MW capacity by 2035, provide quantification of these impacts, and highlight the differences in impacts between the Planned Alternative and the Full Build Alternative.

The remainder of this report is organized as follows. Section 2 presents the methodology of this study, the key data, and assumptions used in the analysis. Section 3 presents the results.

2 Key Concepts and Study Approach

This section provides an overview of key concepts in economic impact analysis, defines the metrics of impacts that would be used in this study, and outlines the methodology with key input assumptions used to estimate the impacts of NYSERDA’s OSW energy program in the State.

2.1 Key Concepts in Economic Impact Analysis

Economic impact analysis is a type of conceptual analysis that identifies and quantifies the economic activity that is generated or can be attributed and linked to the investment project, government policies, events, etc. being evaluated. These projects, policies, or events have some underlying change in the stream of expenditures in an economy and lead to a change in the demand for goods and services. This has implications on the number of jobs and other measures of economic activity in the local, regional, and national economy.

Traditionally, economic impact analysis involves the estimation of three distinct types of economic activity, commonly referred to as “direct effects,” “indirect effects,” and “induced effects” that are attributable to an initial stream of incremental capital and operating expenditures. These are defined as follows:

- Direct effects refer to the initial economic effects occurring as the result of capital or operating expenditures directly related to the evaluated project. Direct spending results in the production of goods or services in the local economy where the project is located, employment of workers, and business output and sales.
- Indirect effects refer to the “spin-off” economic activities that result from purchases of production inputs, goods and services, by businesses that are impacted by the initial expenditures. The spending by the supplier firms on their labor, production inputs, goods and services that they require creates outputs of other firms further down the production chain, bringing about additional business output, employment, and earnings. The sum of these effects across the supply chain is the indirect impact.
- Induced effects represent the increase in business output, employment, and earnings over and above the direct and indirect impacts, generated by re-spending of employment income derived from direct and indirect employment. Induced impacts are thus changes in economic activity that are the result of personal (household) spending for goods and services by employees comprising the direct and indirect impacts.
- Total economic impact is the sum of the direct, indirect, and induced effects for the project being evaluated.

Indirect and induced impacts are often referred to as “multiplier effects,” since they increase the overall economic impacts of the original expenditure that initiated the rounds of spending and effects.

Each of the direct, indirect, and induced effects defined is estimated in terms of various measures of economic activity that include the following:

- Output, the total gross value of all business revenue. Output represents the total sum of all economic activity that has taken place in connection with the project. This is the broadest measure of economic activity.
- Value Added, or Gross Domestic Product, the “value added” to the economy, or value of output minus value of purchased goods and services used in the production process. Value added represents the unduplicated measure of the total value of economic activity.
- Employment, the number of incremental jobs created as a result of the capital expenditures and operations of the project.²
- Salaries and Wages, the additional salaries and wages that would result from capital expenditures on the project and its future operations.

In addition, an investment project, event, or government policies may result in various other broader socioeconomic impacts affecting broader local and regional economies. These may include additional enabled economic activity, improvements in productivity and competitiveness, improved quality of life, improved socioeconomic profile of the region, and other effects.

For example, the OSW energy projects may have an impact on electricity pricing and reliability in the State and improve the competitiveness of some rate payers. Waters in proximity to wind towers may be suitable for aquaculture. The experience gained through OSW energy projects (e.g., manufacturing of parts and components) may be used in projects in other states, international projects, or leveraged in other related engineering and manufacturing pursuits. By increasing the overall level of economic activity, the

² In economic impact analysis, employment impacts are typically estimated in terms of job-years which expresses the number of jobs created times the length of time in years that they would last for. For example, 1 job-year is 1 job created for 1 year. For simplicity, these impacts are often referred to as “jobs” or employment impacts. Impacts of construction activities are typically assessed as impacts of total project expenditures and thus represent cumulative impacts over project construction years. Impacts of project operations are typically assessed as impacts of annual project operations and maintenance and thus represent average annual impacts expected during project operational phase.

OSW projects may attract other businesses who find it advantageous to cluster around centers of related activities. The projects may also have a range of social impacts in local communities stemming from interactions with those communities, impacts on community resources and assets, community structure and other issues.

Many of these impacts may also be measured in terms of jobs and income; others may be better suited for qualitative metrics and descriptive evaluations.

2.2 Study Scope

This study focused on the economic impacts related more directly to the OSW energy program, which can be tracked and quantified through expenditures related to its implementation. These impacts were classified under the following four groups of activities and processes:

1. Offshore wind farm construction, including:
 - a. Manufacturing and fabrication of parts, components, and foundations
 - b. Assembly and fabrication of blades, nacelles, and other major components and equipment
 - c. Erection of towers, connections to grid, and construction of onshore facilities
2. O&M of offshore wind farms, including:
 - a. Remote monitoring
 - b. Dispatch of crews to wind energy areas
 - c. Inspections, maintenance, and repairs on-site (i.e., at wind energy areas)
3. Renovations and upgrades of ports along State coastline needed as a base for both construction and O&M activities, including:
 - a. Fabrication and assembly of components, construction staging
 - b. Service operations base, crew and equipment staging and dispatch, berthing of O&M vessels
4. Social and community investments for long-run business sustainability, including:
 - a. Marine wildlife monitoring
 - b. Community workforce training programs

Broader socioeconomic impacts are more difficult to forecast and quantify as they may depend on the specific site location and existing local socioeconomic and environmental conditions. These are left as a topic for further studies.

2.3 Overview of Approach

The direct, indirect, and induced impacts discussed above are typically estimated based on project financial and engineering information, its capital and operating expenditures using input-output modeling approaches.

An input-output model captures and quantifies the flows of goods and services between various industries in an economy. The indirect multipliers from such models provide an aggregate measure of the effect that each \$1 (one dollar) of revenue of an industry has on all other industries in the economy that arise through supply-purchase relationships, or input demand of this industry to produce its own outputs. Indirect multipliers can be expressed in terms of employment (indirect jobs per \$1 of incremental direct revenue in an industry), indirect output (indirect output per \$1 of incremental direct industry revenue), indirect employment income (indirect wages and salaries per \$1 of incremental direct industry revenues), and Gross Domestic Product (indirect value added per \$1 of incremental direct industry revenue). Direct multipliers provide measures of average employment requirements, employment income, and value added in an industry for each dollar of its own revenues. Similarly, induced multipliers provide measures of induced employment, employment income, value added, and output in an economy for each dollar of revenue in the directly affected industry.

Input-output models and multipliers from such models can thus be used to forecast the economic impacts of investment projects or policy initiatives with defined scope and cost of implementation. This is frequently done using commercial modeling platforms such as IMPLAN.

IMPLAN is an economic impact modeling tool used for forecasting the effect of investment projects, programs, or policies on the local, regional, and national economy. The impacts stem from new expenditures such as expenditures on construction, purchase of equipment and materials, or project operations. The model is based on classic input-output modeling approaches combined with social accounting matrices and multipliers. It consists of a software package with data sets at various levels of geography (all of US/ national average, state, county, zip code) which are loaded into the software depending on the specific project and desired geographic area of impact assessment.¹

The methodology of the estimation of economic impacts with IMPLAN requires identification of the streams of expenditures directly resulting from the proposed project-related activities (or the number of jobs that would be involved in various activities) which are then classified into industrial sectors.

¹ IMPLAN was originally developed in the 1970s for the United States Forest Service for economic impact projections of alternative uses of United States public forest resources. In later years, IMPLAN was improved and updated to make it more functional and relevant for a wider range of projects and users. IMPLAN is now widely used and recognized by government organizations, academia, advisory services, and business organizations. Currently, IMPLAN is operated by the Minnesota IMPLAN Group (MIG). More information about the company, software, help, and support can be found at <https://implan.com/>.

Because the full cost of the OSW energy program's construction and operations are not known at this time, or not released to the general public, we were unable to conduct a customized IMPLAN analysis for the entire scope of economic impacts listed in Section 2.2. Instead, this study relied on published reports and information which was compiled, analyzed and processed to produce a range of partial results (some of them based on analysis with IMPLAN) and extrapolated to the entire NYSERDA OSW energy goal of at least 9,000 MW. This was accomplished as described below.

- ICF recently completed an economic impact study of Empire Wind 1 and Empire Wind 2 projects (ICF Study) and provided economic impact estimates of construction and operations of these facilities.² The ICF Study adopted an input-output methodology similar to that outlined above with the use of IMPLAN, and provided estimates of jobs, income and value added impacts from project construction and operations. Assuming that other OSW projects would have similar costs and operating parameters, the results from the ICF Study were extrapolated to the construction and operational impacts for the entire portfolio of 9,000 MW of capacity. The planned capacity of Empire Wind 1 is 816 MW and the planned capacity of Empire Wind 2 is 1,260 MW. Therefore, the extrapolation entailed multiplying the results for Empire Wind 1 and 2 by a factor of 4.3.³ This resulted in estimates of the impacts of OSW program construction and operations.
- NYSERDA completed a number of ports assessment studies, pre-front engineering (pre-FEED) design reports, which provided opinions of probable costs (OPC) to renovate, reconstruct, or upgrade each port so as they would be able to serve their intended use in the State OSW program (such as an O&M base, construction staging area, or hub for fabrication and manufacturing of components). Four published studies were reviewed to source the OPC estimates: Port of Albany, Port of Coeymans, Port of Ivory, and South Brooklyn Marine Terminal. Based on those studies, the costs of upgrades range from \$149 million for the Port of Coeymans to \$340 million for the Port of Ivory, for a total cost of about \$1.1 billion (in 2018 dollars). The OPC estimates were classified as construction expenditures and used with IMPLAN 2019 multipliers for the State following the methodology outlined in the previous subsection to estimate their economic impacts in the State.⁴ Assuming that other OSW ports from the Planned Alternative and the Full Build Alternative would require similar extent and type of upgrades (on average), the impacts were extrapolated to the entire Planned Alternative and the entire Full Build Alternative. This resulted in estimates of port upgrades for the Planned Alternative and Full Build Alternative of OSW ports. impacts.

² ICF Resources, “Economic Impacts of the Empire Wind Project 9EW 1 and EW 2”, March 5, 2021, Appendix O Economic Impacts of the Empire Wind Project (EW 1 and EW 2) (boem.gov) (accessed December 2021).

³ The extrapolation factor was calculated based on the ratio of MW of installed capacity of the entire OSW energy program and Empire 1 and 2 projects as: $9,000 \text{ MW} / (816 \text{ MW} + 1,260 \text{ MW}) = 4.3$.

⁴ In the impact simulations, IMPLAN industry 56, construction of other new non-residential structures was used. All cost estimates were inflated to 2020 dollars using Gross Domestic Product deflators from the White House Office of Management and Budget.

- A range of news releases from regulatory agencies, state government, and developers provided information on additional expenditures made by OSW project proponents; for example, expenditures on wildlife monitoring and community development and workforce training programs. For example, developers of Empire Wind 1 and 2, Sunrise Wind, and Beacon Hill committed about \$25 million for wildlife and fisheries monitoring and a total of about \$67 million for community skills upgrade and training programs.⁵ These expenditures can be expected to generate further economic impacts in the local communities. They were classified as expenditures on scientific research and development services and on colleges and professional schools. These estimates were combined with IMPLAN 2019 multipliers for the State following the methodology outlined in the previous subsection, to estimate their economic impacts in the State. This resulted in economic impact estimates related to social and community investments. In addition, the various news releases were reviewed and compiled for each port, to provide a qualitative description of the type of impacts or economic opportunities that local port communities may expect from the OSW energy program.

All economic impacts were estimated at the state level (i.e., impacts materializing in the State), as cumulative impacts over the OSW life cycle, and as average annual impacts over project duration where possible.

⁵ Based on a range of news releases, e.g., see New York's Offshore Wind Projects - NYSERDA and sunrisewindfactsheet.ashx (azureedge.net),(accessed December 2021).

3 Results of the Analysis

This section presents the results of the analysis. The section concludes with a commentary on the differences in impacts between the Planned Alternative and the Full Build Alternative.

3.1 Offshore Wind Farms Construction

Tables 2, 3, and 4 present the impact estimates for construction of OSW projects. Based on the ICF Study, construction of Empire Wind 1 and 2 is expected to generate 7,909 job-years (One job for one year is one job-year, i.e. 100 jobs for 10 years equals 1000 job-years) in the State (including 3,762 direct job-years, 1,935 indirect job-years, and 2,212 induced job-years), \$665.9 million of employment income, and over \$1 billion of value added. This is equivalent to an average annual estimate of 1,048 jobs (including 497 direct jobs, 258 indirect jobs and 293 induced jobs), \$88.3 million of income, and \$134.3 million value added.

Table 4 also shows that extrapolating these results to the total OSW energy goal of at least 9,000 MW, we can expect a total of 34,288 job-years, nearly \$2.9 billion in employment income, and \$4.4 billion of value added from construction of OSW projects.

Table 2. Economic Impacts of OSW Energy Project Construction in New York State, Empire Wind 1 & 2 – Cumulative

Source: Results for Empire Wind 1 and 2 were compiled from ICF Study.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)
Direct	3,762	\$341.2	\$501.1
Indirect	1,935	\$178.3	\$254.6
Induced	2,212	\$146.4	\$257.3
Total	7,909	\$665.9	\$1,013.0

Table 3: Economic Impacts of OSW Energy Project Construction in New York State, Empire Wind 1 & 2 – Average Annual (During Construction)

Source: Results for Empire Wind 1 and 2 were compiled from ICF Study.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)
Direct	497	\$45.1	\$66.2
Indirect	258	\$23.8	\$34.0
Induced	293	\$19.4	\$34.1
Total	1,048	\$88.3	\$134.3

Table 4: Economic Impacts of OSW Energy Project Construction in New York State, Total 9,000 MW Portfolio – Cumulative (Extrapolated)

Source: Results for Total Portfolio were estimated (by extrapolation) by HDR.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)
Direct	16,309	\$1,479.2	\$2,172.4
Indirect	8,389	\$773.0	\$1,103.8
Induced	9,590	\$634.7	\$1,115.5
Total	34,288	\$2,886.8	\$4,391.6

3.2 Offshore Wind Farms Operations and Maintenance

Tables 5 and 6 present the impact estimates for operations of OSW projects. Based on the ICF Study, O&M of Empire Wind 1 and 2 is expected to generate about 302 jobs annually, including 133 direct jobs, 93 indirect jobs and 76 induced jobs. These jobs are estimated to have a total income of \$23 million, including \$10.3 million of direct income. Total value added generated by the two projects is estimated at \$36.7 million annually.

Table 6 also shows that by extrapolating these results to the total OSW portfolio of at least 9,000 MW, we can expect a total of 1,309 jobs each year in the State related to the operations of OSW energy projects. This includes 577 direct jobs, 403 indirect, and 329 induced jobs. Total value added generated by the entire portfolio is estimated at \$159.2 million annually.

Table 5: Economic Impacts of OSW Operations and Maintenance in New York State, Empire Wind 1 & 2 – Combined

Source: Results for Empire Wind 1 and 2 were compiled from ICF Study.

Type of Impact	Employment (Jobs)	Employment Income (\$M)	Value Added (\$M)
Direct	133	\$10.3	\$16.1
Indirect	93	\$7.6	\$11.7
Induced	76	\$5.1	\$8.9
Total	302	\$23.0	\$36.7

Table 6: Economic Impacts of OSW Operations and Maintenance in New York State, Total 9,000 MW Portfolio (Extrapolated)

Source: Results for Total Portfolio were estimated (by extrapolation) by HDR.

Type of Impact	Employment (Jobs)	Employment Income (\$M)	Value Added (\$M)
Direct	577	\$44.7	\$69.9
Indirect	403	\$33.1	\$50.7
Induced	329	\$21.9	\$38.5
Total	1,309	\$99.7	\$159.2

3.3 OSW Port Facilities Upgrades

Tables 7, 8, 9, and 10 present the impact of OSW ports upgrades. For the four ports for which OPC estimates were available, total impacts were estimated at a total of 10,801 job-years (including 6,456 direct job-years, 1,673 indirect job-years, and 2,672 induced job-years), \$828.9 million of employment income, \$1.1 billion value added, and \$2 billion in business output.

The average per-port impact amounts to a total of 2,700 job-years (including 1,614 direct job-years, 418 indirect job-years, and 668 induced job-years), \$207.2 million of employment income, \$286.5 million value added, and \$504.7 million in business output.

The Planned Alternative of OSW Ports amounts to a multiple of five of the per-port impact, while the Full Build Alternative to a multiple of 12. In terms of jobs, the impact is equivalent to a total of 13,501 job-years for the Planned Alternative and 32,403 job-years for the Full Build Alternative.

Table 7: Economic Impacts of OSW Port Upgrades in New York State, Four Port Facilities with OPC Estimates

Source: Estimated by HDR.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)	Output (\$M)
Direct	6,456	\$506.1	\$588.9	\$1,136.8
Indirect	1,673	\$142.7	\$234.8	\$391.5
Induced	2,672	\$180.1	\$322.4	\$490.4
Total	10,801	\$828.9	\$1,146.1	\$2,018.7

Table 8: Economic Impacts of OSW Port Upgrades in New York State, Average Impacts per Port

Source: Estimated by HDR.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)	Output (\$M)
Direct	1,614	\$126.5	\$147.2	\$284.2
Indirect	418	\$35.7	\$58.7	\$97.9
Induced	668	\$45.0	\$80.6	\$122.6
Total	2,700	\$207.2	\$286.5	\$504.7

Table 9: Economic Impacts of OSW Port Upgrades in New York State, Planned Alternative Total (Five Ports, Extrapolated)

Source: Estimated by HDR.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)	Output (\$M)
Direct	8,070	\$632.6	\$736.1	\$1,421.1
Indirect	2,091	\$178.4	\$293.5	\$489.4
Induced	3,340	\$225.1	\$403.0	\$613.0
Total	13,501	\$1,036.1	\$1,432.6	\$2,523.4

Table 10: Economic Impacts of OSW Port Upgrades in New York State, Full Build Alternative with Additional Ports (12 Ports, Extrapolated)

Source: Estimated by HDR.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)	Output (\$M)
Direct	19,368	\$1,518.2	\$1,766.8	\$3,410.5
Indirect	5,019	\$428.1	\$704.3	\$1,174.4
Induced	8,017	\$540.3	\$967.1	\$1,471.2
Total	32,403	\$2,486.6	\$3,438.2	\$6,056.2

3.4 Social and Community Investments Expenditures

Tables 11 and 12 show the impact of the additional expenditures on community skills workforce and wildlife monitoring programs committed by OSW project developers. The table shows that over the life of the projects, these expenditures are estimated to support a total of 1,080 job-years (including 709 direct job-years, 127 indirect job-years, and 244 induced job-years). Assuming project life of about 30 years, this implies an additional 36 jobs every year (including 24 direct jobs, 4 indirect, and 8 induced).

Table 11: Economic Impacts of Additional OSW Related Expenditures in New York State, Cumulative Over OSW Project Life

Source: Estimated by HDR.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)	Output (\$M)
Direct	709	\$50.2	\$68.3	\$92.0
Indirect	127	\$9.9	\$16.7	\$28.7
Induced	244	\$16.4	\$29.3	\$44.6
Total	1,080	\$76.5	\$114.3	\$165.3

Table 12: Economic Impacts of Additional OSW Related Expenditures in New York State, Average Annual (Over 30 Years)

Source: Estimated by HDR.

Type of Impact	Employment (Job-Years)	Employment Income (\$M)	Value Added (\$M)	Output (\$M)
Direct	24	\$1.7	\$2.3	\$3.1
Indirect	4	\$0.3	\$0.6	\$1.0
Induced	8	\$0.5	\$1.0	\$1.5
Total	36	\$2.5	\$3.8	\$5.5

3.5 Port-Level Economic Benefits

Most economic impacts considered in this study could not be estimated by port as the information on costs and resources needed for the entire OSW energy program is not publicly available at this time.

Individual ports may require many upgrades and renewal of their existing infrastructure. Table 8 shows that this work can be expected to support, on average, a total of 2,700 job-years (direct, indirect, and induced) stemming from construction.

Once upgrades are completed, ports would be used for various activities listed in Table 1 that entail a range of opportunities for local economies. The list below provides a compilation of recent news releases from government agencies and project proponents that illustrate specific plans and economic opportunities that various ports are likely to experience. They demonstrate creation of high-quality job opportunities, many of them related to technologically advanced products and processes.

3.5.1 Port-Level Economic Benefits from OSW Energy Program

3.5.1.1 Port of Albany

- Empire Wind 2 and Beacon Wind OSW projects would invest approximately \$730 million in combined private and public funds in long-term port facilities and cutting-edge technologies, including the nation's first offshore wind tower manufacturing plant⁶.

3.5.1.2 Port of Coeymans

- Empire Wind 1 and Beacon Wind OSW projects envision Port of Coeymans as a base to support the fabrication of offshore wind⁷ components.
- Sunrise Wind's development partners signed a \$86 million supply chain contract with Riggs Distler & Company, Inc. to construct advanced foundation components for wind turbines at the Port of Coeymans, bringing about 230 construction and steel manufacturing jobs to the Capital Region and Western New York⁸.

3.5.1.3 South Brooklyn Marine Terminal

- Empire Wind 2 and Beacon Wind OSW projects would establish a cutting-edge staging facility and operations and maintenance hub at the South Brooklyn Marine Terminal⁹.

3.5.1.4 Port Jefferson

- Sunrise Wind project would establish a new Operations & Maintenance Hub in Port Jefferson creating about 100 new permanent jobs¹⁰.

⁶ NYSERDA Offshore Wind Projects (<https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/NY-Offshore-Wind-Projects>).

⁷ Empire Wind COP (2021) (<https://www.boem.gov/renewable-energy/state-activities/empire-wind>).

⁸ Governor Hochul Announces Largest Single New York State Offshore Wind Supply Chain Award of \$86 Million to Support Sunrise Wind Project (10.08.2021) <https://sunrisewindny.com/news/2021/10/governor-hochul-announces-largest-single-new-york-state-offshore-wind-supply-chain-award>.

⁹ NYSERDA Offshore Wind Projects (<https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/NY-Offshore-Wind-Projects>).

¹⁰ Fact Sheet: Sunrise Wind (<https://orstedcdn.azureedge.net>).

3.5.1.5 Arthur Kill Terminal

- Empire State Development (ESD) and Arthur Kill Terminal, LLC signed an agreement to develop Arthur Kill terminal as a staging and assembly port with potential service area covering locations off New York State and other East Coast states¹¹.

3.6 Planned Alternative versus Full Build Alternative

The difference between the Planned Alternative and the Full Build Alternative stems from the inclusion of additional seven ports to the portfolio of OSW ports facilities to support the OSW energy program, and greater certainty that the economic impacts of construction and O&M of the OSW energy projects could actually be realized in the State.

The inclusion of additional ports increases the economic impacts related to construction expenditures needed to upgrade port infrastructure. As reported in Table 9, the Planned Alternative is expected to support a total of 13,501 job-years in the State while the Full Build Alternative, shown in Table 10, is expected to support 32,403 job-years during the port renovations phase.

Table 4 shows that OSW energy program construction is expected to generate a total of 34,288 job-years during construction and then 1,309 jobs each year to operate and maintain the OSW energy projects.

Under the Planned Alternative, many of these jobs may not actually be realized due to onshore capacity constraints, either during construction of various OSW energy projects, or at the operational stage. While there may be options to deal with the constraints, some activities and processes may have to be outsourced to out-of-state providers causing “leakages” of potential economic impacts in the State reported in this section.

¹¹ ESDC Proposal for OSW Staging and Assembly Port At Arthur Kill Terminal To USDOT (<https://esd.ny.gov/esd-media-center/press-releases/esd-submits-proposal-offshore-wind-staging-assembly-port-arthur-kill-terminal-us-dept-transportation>).

Endnotes

- ¹ Please note that the *9GW Port Uses and Navigation Assessment* study by COWI referenced by this Study conservatively assumes 13 ports within New York State. This difference reflects a more conservative vessel assessment than would occur with the 12 ports assumed in this Study. The COWI 2022 Study also assumed the potential for New York State to capture additional port investment beyond what is needed to fulfill port development to meet the State's goal of 9,000 MW of OSW wind by 2035: the intended purpose of this Study.
- ² Empire Wind COP (2021).
- ³ 9GW Port Uses and Navigational Assessment COWI North America, Inc. (2022).
- ⁴ NYSERDA Navigational Safety Risk Assessment Technical Report (2022).
- ⁵ Hudson River Ports and Waterways Safety Assessment (2018).
- ⁶ NYSERDA Navigational Safety Risk Assessment Technical Report (2022).
- ⁷ NYSERDA Navigational Safety Risk Assessment Technical Report (2022)
- ⁸ COWI's 9GW Port Uses and Navigation Assessment Report (2021)
- ⁹ Governor Hochul Announces Largest, Single New York State Offshore Wind Supply Chain Award of \$86 Million to Support Sunrise Wind Project (2021)
- ¹⁰ NYPSC FGEIS for Procurement of Offshore Wind (2018)
- ¹¹ NYPSC Procurement of Offshore Wind FGEIS (2018)
- ¹² *Ibid*
- ¹³ CLCPA § 14; Chapter 735 of the Laws of 2019.
- ¹⁴ 9GW Port Uses and Navigational Assessment COWI North America, Inc. (2022).
- ¹⁵ *Offshore Wind Cable Corridor Constraints Assessment* WSP USA reports (*under development*).
- ¹⁶ Please note that the *9GW Port Uses and Navigation Assessment* study by COWI referenced by this Study conservatively assumes 13 ports within New York State. This difference reflects a more conservative vessel assessment than would occur with the 12 ports assumed in this Study. The COWI 2022 Study also assumed the potential for New York State to capture additional port investment beyond what is needed to fulfill port development to meet the State's goal of 9,000 MW of OSW wind by 2035: the intended purpose of this Study.
- ¹⁷ While New York State is making regional supply chain investments in coordination with neighboring states to encourage cost-effective OSW energy, the Full-Build Alternative demonstrates a scenario that the OSW clean energy target can be met by development entirely within New York State.
- ¹⁸ New York State Offshore Wind Master Plan (2017)
- ¹⁹ New York State Offshore Wind Master Plan: Assessment of Ports and Infrastructure (2017)
- ²⁰ Port of Albany Expansion Project SFEIS (2022)
- ²¹ *Ibid*
- ²² *Ibid*
- ²³ POWI DEIS (2021).
- ²⁴ Governor Hochul Announces Largest, Single New York State Offshore Wind Supply Chain Award of \$86 Million to Support Sunrise Wind Project (October 8, 2021) (<https://www.governor.ny.gov/news/governor-hochul-announces-largest-single-new-york-state-offshore-wind-supply-chain-award-86>).
- ²⁵ Sunrise Wind COP (2021).
- ²⁶ POWI DEIS (2021).
- ²⁷ *Ibid.*
- ²⁸ *Ibid.*
- ²⁹ *Ibid.*
- ³⁰ Empire Wind COP (2021).
- ³¹ *Ibid.*

- ³² Ibid.
- ³³ Ibid.
- ³⁴ Sunrise Wind Farm Project DEIS (2021).
- ³⁵ Ibid.
- ³⁶ USACE Lake Montauk Harbor Feasibility Study (<https://www.nan.usace.army.mil/Missions/Civil-Works/Projects-in-New-York/Lake-Montauk-Harbor/>).
- ³⁷ Montauk O&M Facility NYSDEC Permit (2021)
- ³⁸ Montauk O&M Facility NYSDEC Permit (2021)
- ³⁹ USACE Montauk Harbor Navigation Study (2017).
- ⁴⁰ COWI's 9GW Port Uses and Navigation Assessment Report (2022)
- ⁴¹ Please note that the *9GW Port Uses and Navigation Assessment* study by COWI referenced by this Study conservatively assumes 13 ports within New York State. This difference reflects a more conservative vessel assessment than would occur with the 12 ports assumed in this Study. The COWI 2022 Study also assumed the potential for New York State to capture additional port investment beyond what is needed to fulfill port development to meet the State's goal of 9,000 MW of OSW wind by 2035: the intended purpose of this Study.
- ⁴² NYSERDA Offshore Wind Port Infrastructure RFQ 425 (2019) (aka Pre-2020 Solicitation Ports Report)
- ⁴³ Arthur Kill Terminal (<https://www.atlanticterminals.com/arthur-kill-terminal.html>).
- ⁴⁴ Ibid.
- ⁴⁵ 2018 Ports Assessment: Port Ivory Pre-front End Engineering Design Report (2019).
- ⁴⁶ Ibid.
- ⁴⁷ New York State Offshore Wind Master Plan: Ports Assessment of Ports and Infrastructure (2017).
- ⁴⁸ Ibid.
- ⁴⁹ Ibid.
- ⁵⁰ Ibid.
- ⁵¹ Ibid.
- ⁵² Ibid.
- ⁵³ New York State Offshore Wind Master Plan: Ports Assessment of Ports and Infrastructure (2017).
- ⁵⁴ Ibid.
- ⁵⁵ Ibid.
- ⁵⁶ Ibid.
- ⁵⁷ Ibid.
- ⁵⁸ Ibid.
- ⁵⁹ Final Generic EIS for Procurement of Offshore Wind (2018).
- ⁶⁰ NYSDOS Hudson River Valley SASS (1993) (<https://dos.ny.gov/scenic-areas-statewide-significance-sass>).
- ⁶¹ New York State Offshore Wind Master Plan: Ports Assessment of Ports and Infrastructure (2017).
- ⁶² *Ibid.*
- ⁶³ Port of Albany Expansion SFEIS (2022).
- ⁶⁴ Final Generic EIS for Procurement of Offshore Wind (2018).
- ⁶⁵ NYSDEC Statewide GHG Emissions Report (2021)
- ⁶⁶ *Ibid*
- ⁶⁷ New York Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants (March 2022)
- ⁶⁸ Port of Albany Expansion SFEIS (2022)
- ⁶⁹ *POWI DEIS (2021)*
- ⁷⁰ *Hudson River Ports and Waterways Safety Assessment (PAWSA) (2018)*.

- ⁷¹ Port of Albany Expansion SFEIS (2022)
- ⁷² Please note that the *9GW Port Uses and Navigation Assessment* study by COWI referenced by this Study conservatively assumes 13 ports within New York State. This difference reflects a more conservative vessel assessment than would occur with the 12 ports assumed in this Study. The COWI 2022 Study also assumed the potential for New York State to capture additional port investment beyond what is needed to fulfill port development to meet the State's goal of 9,000 MW of OSW wind by 2035: the intended purpose of this Study.
- ⁷³ Empire Wind COP (2021).
- ⁷⁴ 9GW Port Uses and Navigational Assessment (2022).
- ⁷⁵ Port of Albany Expansion SFEIS (2022)
- ⁷⁶ Offshore Wind NYC (<https://edc.nyc/program/offshore-wind-nyc>).
- ⁷⁷ Empire Wind COP (2021).
- ⁷⁸ SBMT Pre-FEED Study (2018)
- ⁷⁹ POWI FEIS (2021)
- ⁸⁰ Port of Albany Expansion SFEIS (2022)
- ⁸¹ *Montauk O&M Facility NYSDEC Permit (2021)*
- ⁸² *Ibid.*
- ⁸³ *Underwater Noise Monitoring Report Tappan Zee Constructors, LLC*
- ⁸⁴ *HDR Impact Assessment for Making the Existing TZC Trestle Structures Permanent at the Port of Coeymans (2019).*
- ⁸⁵ *Ibid*
- ⁸⁶ Port of Albany Expansion SFEIS (2022).
- ⁸⁷ NYSDOS Office of Planning, Development and Community Infrastructure also provides support for coastal flood resiliency planning online (<https://dos.ny.gov/resilience-planning>)
- ⁸⁸ Empire Wind COP (2021)
- ⁸⁹ 9GW Port Uses and Navigational Assessment COWI North America, Inc. (2022).
- ⁹⁰ *Final Generic EIS for Procurement of Offshore Wind (2018).*
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- ⁹⁸ A Shared Vision on the Development of an Offshore Wind Supply Chain (January 12, 2021).
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